MG3710A/MG3710E
Vector Signal Generator
MG3740A
Analog Signal Generator
Operation Manual

24th Edition

For safety and warning information, please read this manual before attempting to use the equipment.
Keep this manual with the equipment.

ANRITSU CORPORATION

Document No.: M-W3580AE-24.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, ANRITSU CORPORATION uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

⚠ DANGER — This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

⚠ WARNING — This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

⚠ CAUTION — This indicates a hazardous procedure or danger that could result in minor to moderate injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.



This indicates a note. The contents are described in the box.





These indicate that the marked part should be recycled.

MG3710A/MG3710E Vector Signal Generator
MG3740A Analog Signal Generator
Operation Manual

20 January 2012 (First Edition)
15 May 2026 (24th Edition)

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The operational instructions of this manual may be changed without prior notice.
Printed in Japan

For Safety

⚠ DANGER

Replacing Battery



- When replacing the battery, use the specified battery and insert it with the correct polarity. If the wrong battery is used, or if the battery is inserted with reversed polarity, there is a risk of explosion causing severe injury or death.

Battery Disposal

- DO NOT expose batteries to heat or fire. This is dangerous and can result in explosions or fire. Heating batteries may cause them to leak or explode.

⚠ WARNING



- ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the advice in the operation manual is not followed, there is a risk of personal injury or reduced equipment performance. The alert mark shown on the left may also be used with other marks and descriptions to indicate other dangers.

- Overvoltage Category
  This equipment complies with overvoltage category II defined in IEC 61010. DO NOT connect this equipment to the power supply of overvoltage category III or IV.

Electric Shock

- To ensure that the equipment is grounded, always use the supplied 3-pin power cord, and insert the plug into an outlet with a ground terminal. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock or causing damage to the internal components.

Repair



- Only qualified service personnel with a knowledge of electrical fire and shock hazards should service this equipment. This equipment cannot be repaired by the operator. DO NOT attempt to remove the equipment covers or unit covers or to disassemble internal components. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

For Safety

⚠ WARNING

Calibration



- The performance-guarantee seal verifies the integrity of the equipment. To ensure the continued integrity of the equipment, only Anritsu service personnel, or service personnel of an Anritsu sales representative, should break this seal to repair or calibrate the equipment. Be careful not to break the seal by opening the equipment or unit covers. If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed.

Falling Over

- This equipment should always be positioned in the correct manner. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.
  Always set up the equipment in a position where the power switch can be reached without difficulty.

Battery Fluid

- DO NOT short the battery terminals and never attempt to disassemble the battery or dispose of it in a fire. If the battery is damaged by any of these actions, the battery fluid may leak.
  This fluid is poisonous.
  DO NOT touch the battery fluid, ingest it, or get in your eyes. If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, rinse them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly with clean water.

LCD

- This equipment uses a Liquid Crystal Display (LCD). DO NOT subject the equipment to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may break and liquid may leak.
  This liquid is very caustic and poisonous.
  DO NOT touch it, ingest it, or get in your eyes. If it is ingested accidentally, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, rinse them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly with soap and water.

For Safety

⚠ CAUTION

Cleaning

- Always remove the main power cable from the power outlet before cleaning dust around the power supply and fan.
  - Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire.
  - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

Check Terminal



- Never input a signal of more than the indicated value between the measured terminal and ground. Input of an excessive signal may damage the equipment.

For Safety

⚠ CAUTION

Replacing Memory Back-up Battery

This equipment uses a Poly-carbon monofluoride lithium battery to backup the memory. This battery must be replaced by service personnel when it has reached the end of its useful life; contact the Anritsu sales section or your nearest representative.

Note: The battery used in this equipment has a maximum useful life of 7 years. It should be replaced before this period has elapsed.

The life of the battery will vary depending on the length of equipment usage and the operating environment.

The following conditions may be observed if the battery has expired.

- When power to the equipment is supplied, the time display may no longer match the actual time.
- Parameter and data settings may not be retained when the power to the equipment is cut.

External Storage Media

This equipment uses the USB flash drive as external storage media for storing data and programs.

If this media is mishandled or becomes faulty, important data may be lost. It is recommended to periodically back up all important data and programs to protect them from being lost accidentally.

Anritsu will not be held responsible for lost data.

Pay careful attention to the following points.

- Never remove the USB flash drive from the equipment while it is being accessed.
- The USB flash drive may be damaged by static electric charges.
- Anritsu has thoroughly tested all external storage media shipped with this equipment. Users should note that external storage media not shipped with this equipment may not have been tested by Anritsu, thus Anritsu cannot guarantee the performance or suitability of such media.

For Safety

⚠ CAUTION

Hard disk/SSD

The equipment is equipped with an internal hard disk/SSD from which, as with any hard disk/SSD, data may be lost under certain conditions. It is recommended to periodically back up all important data and programs to protect them from being lost accidentally.

Anritsu will not be held responsible for lost data.

To reduce the possibility of data loss, particular attention should be given to the following points.

- The equipment should only be used within the recommend temperature range, and should not be used in locations where the temperature may fluctuate suddenly.
- Always follow the guidelines to ensure that the equipment is set up in the specified manner.
- Always ensure that the fans at the rear and side of the equipment are not blocked or obstructed in any way.
- Exercise care not to bang or shake the equipment whilst the power is on.
- Never disconnect the mains power at the plug or cut the power at the breaker with the equipment turned on.

Notes on Handling (When Rubidium Reference Oscillator Option is Installed)

Please use the carrying case or the original packing materials when you transport it.

Because Rubidium Reference Oscillator frequency changes by the magnet, please do not set the one to have the magnetism (more than 0.5 Gauss) such as magnets near it.

Use in a Residential Environment

This equipment is designed for an industrial environment.

In a residential environment, this equipment may cause radio interference in which case the user may be required to take adequate measures.

Use in Corrosive Atmospheres

Exposure to corrosive gases such as hydrogen sulfide, sulfurous acid, and hydrogen chloride will cause faults and failures.
Note that some organic solvents release corrosive gases.

Equipment Certificate

ANRITSU CORPORATION certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories, including the National Institute of Advanced Industrial Science and Technology, and the National Institute of Information and Communications Technology, and was found to meet the published specifications.

Anritsu Warranty

ANRITSU CORPORATION will repair this equipment free-of-charge if a malfunction occurs within one year after shipment due to a manufacturing fault, and software bug fixes will be performed in accordance with the separate Software End-User License Agreement, provide, however, that ANRITSU CORPORATION will deem this warranty void when:

- The fault is outside the scope of the warranty conditions separately described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster, including fire, wind or flood, earthquake, lightning strike, or volcanic ash, etc.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war, etc.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant, etc.
- The fault is due to use of non-specified peripheral or applied equipment or parts, or consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.
- The fault is due to use in unusual environments(Note).
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

ANRITSU CORPORATION shall assume no liability for damage or financial loss of the customer due to the use of or a failure to use this equipment, unless the damage or loss is caused due to ANRITSU CORPORATION's intentional or gross negligence.

Note:
For the purpose of this Warranty, "unusual environments" means use:

- In places of direct sunlight
- In dusty places
- Outdoors
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present
- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes

ANRITSU CORPORATION Contact

In the event of this equipment malfunctions, please contact an Anritsu Service and Sales office. Contact information can be found on the Anritsu website.

Notes On Export Management

- We assume no responsibility if this product and the attached power cord are re-exported and used without our approval since they may not comply with the safety standards, etc., of specific countries.
- This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.
  Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.
  For more details, visit
  https://www.anritsu.com/support/export-procedures.
  When you dispose of the products or manuals subject to export control, they must be physically destroyed or shredded so as not to be unlawfully used for military purpose.

Trademark and Registered Trademark

IQproducer™ is a registered trademark of Anritsu Corporation.

Lifetime of Parts

The life span of certain parts used in this instrument is determined by the operating time or the power-on time. Due consideration should be given to the life spans of these parts when performing continuous operation over an extended period. These parts must be replaced at the customer's expense even if within the guaranteed period described in Warranty at the beginning of this manual. For details on life span, refer to the corresponding section in this manual.

LCD:	50 000 hours
Hard disk:	600 000 (Load/Unload)
Hard disk/SSD connector:	
	500 (Insertion/Removal)
Cooling fan:	40 000 hours
SSD:	3 000 000 hours

Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2012/19/EU (the “WEEE Directive”) in European Union.



For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

Software End-User License Agreement (EULA)

Please carefully read and accept this Software End-User License Agreement (hereafter this EULA) before using (includes executing, copying, installing, registering, etc.) this Software (includes programs, databases, scenarios, etc., used to operate, set, etc., Anritsu electronic equipment, etc.). By using this Software, you shall be deemed to have agreed to be bound by the terms of this EULA, and ANRITSU CORPORATION (hereafter Anritsu) hereby grants you the right to use this Software with the Anritsu specified equipment (hereafter Equipment) for the purposes set out in this EULA.

Article 1. Grant of License and Limitations

1. You may not sell, transfer, rent, lease, lend, disclose, sublicense, or otherwise distribute this Software to third parties, whether or not paid therefor.
2. You may make one copy of this Software for backup purposes only.
3. You are not permitted to reverse engineer, disassemble, decompile, modify or create derivative works of this Software.
4. This EULA allows you to install one copy of this Software on one piece of Equipment.

Article 2. Disclaimers

To the extent not prohibited by law, in no event shall Anritsu be liable for direct, or any incidental, special, indirect or consequential damages whatsoever, including, without limitation, damages for loss of profits, loss of data, business interruption or any other commercial damages or losses, and damages claimed by third parties, arising out of or related to your use or inability to use this Software, unless the damages are caused due to Anritsu's intentional or gross negligence.

Article 3. Limitation of Liability

1. If a fault (bug) is discovered in this Software, making this Software unable to operate as described in the operation manual or specifications even though you have used this Software as described in the manual, Anritsu shall at its own discretion, fix the bug, or replace the software, or suggest a workaround, free-of-charge, provided, however, that the faults caused by the following items and any of your lost or damaged data whatsoever shall be excluded from repair and the warranty.
   i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.
   ii) If this Software has been used in conjunction with other non-Anritsu-approved software.
   iii) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
   iv) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, or any devices other than this Equipment, etc.
2. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs or replacement by Anritsu engineers necessitated by the above faults shall be borne by you.
3. The warranty period for faults listed in Section 1 of this Article shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair or replacement, whichever is longer.

Article 4. Export Restrictions

You shall not use or otherwise export or re-export directly or indirectly this Software except as authorized by the laws and regulations of Japan and the United States, etc. In particular, this Software shall not be exported or re-exported (a) into any Japan or US embargoed countries or (b) to anyone restricted by the Japanese export control regulations, or the US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. In using this Software, you warrant that you are not located in any such embargoed countries or on any such lists. You also agree that you will not use or otherwise export or re-export this Software for any purposes prohibited by the Japanese and US laws and regulations, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction, and conventional weapons.

Article 5. Change of Terms

Anritsu may change without your approval the terms of this EULA if the changes are for the benefit of general customers, or are reasonable in light of the purpose of this EULA and circumstances of the changes. At the time of change, Anritsu will inform you of those changes and its effective date, as a general rule 45 days, in advance on its website, or in writing or by e-mail.

Article 6. Termination

1. Anritsu may terminate this EULA immediately if you violate any conditions described herein. This EULA shall also be terminated immediately by Anritsu if there is any good reason that it is deemed difficult to continue this EULA, such as your violation of Anritsu copyrights, patents, etc. or any laws and ordinances, or if it turns out that you belong to an antisocial organization or has a socially inappropriate relationship with members of such organization.
2. You and Anritsu may terminate this EULA by a written notice to the other party 30 days in advance.

Article 7. Damages

If Anritsu suffers any damages or loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

Article 8. Responsibility after Termination

Upon termination of this EULA in accordance with Article 6, you shall cease all uses of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

Article 9. Negotiation for Dispute Resolution

If matters of interpretational dispute or items not covered under this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

Article 10. Governing Law and Court of Jurisdiction

This EULA shall be governed by and interpreted in accordance with the laws of Japan without regard to the principles of the conflict of laws thereof, and any disputes arising from or in relation to this EULA that cannot be resolved by negotiation described in Article 9 shall be subject to and be settled by the exclusive agreed jurisdiction of the Tokyo District Court of Japan.

Revision History:

February 29th, 2020
December 17th, 2021
March 11th, 2024

Using VISA Driver for Remote Control of This Equipment

When controlling this measuring equipment remotely using the Ethernet port, a VISA*1 driver must be installed in the PC controller. We recommend using NI-VISA™*2 from National Instruments™ (NI hereafter) as the VISA driver.
Although a license is generally required to use NI-VISA™, the licensed NI-VISA™ driver is provided free-of-charge for use when performing remote control (Note) of this measuring equipment.

The NI-VISA™ driver can be downloaded from the NI website at:

https://www.ni.com

Be sure to comply with the NI license agreement for the usage and license scope.
Be sure to uninstall the NI-VISA™ driver when disposing of this measuring equipment or transferring it to a third party, etc., when ceasing to use NI-VISA™, or upon completion of the contract term when using this equipment on a rental contract.

(Notes)
Although the NI-VISA™ driver itself can be downloaded free-of-charge from the web, an implementation license is required for legal reasons when some requirements are not met. (Check the NI web page for the detailed requirements.)
If these requirements are not met, permission is not granted to use NI hardware and software and an NI implementation license must be purchased. However, since this measuring equipment incorporates NI hardware (GPIB ASIC), the NI-VISA™ driver can be downloaded and used free-of-charge.

Glossary of Terms:
*1: VISA: Virtual Instrument Software Architecture
I/O software specification for remote control of measuring instruments using interfaces such as GPIB, Ethernet, USB, etc.
*2: NI-VISA™
World de facto standard I/O software interface developed by NI and standardized by the VXI Plug&Play Alliance.

Trademarks:
- National Instruments™, NI™, NI-VISA™ and National Instruments Corporation are all trademarks of National Instruments Corporation.

Notice

The following actions are strictly prohibited for all of the software installed in this product or otherwise provided by Anritsu:

1. Copying, except for archival purposes.
2. Transferring to a third party separately from this product.
3. Analyzing the incorporated software including but not limited to modifying, decompiling, disassembling, and reverse engineering.

Cautions Against Computer Virus Infection

- Copying files and data
  Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
  All other required files should be transferred by means of USB flash drive or CompactFlash media after undergoing a thorough virus check.
- Adding software
  Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
  Ensure that the network has sufficient anti-virus security protection in place.
- Protection against malware (malicious software such as viruses).
  This equipment runs on Windows Operating System.
  To connect this equipment to network, the following is advised.
  - Activate Firewall.
  - Install important updates of Windows.
  - Use antivirus software.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following products in accordance with the Decision 768/2008/EC to indicate that they conform to the EMC, LVD, and RoHS directive of the European Union (EU).

CE marking



1. Product Model

Model: MG3710E Vector Signal Generator
MG3740A Analog Signal Generator

2. Applied Directive

EMC: Directive 2014/30/EU
LVD: Directive 2014/35/EU
RoHS: Directive 2011/65/EU, (EU) 2015/863

3. Applied Standards

- EMC: Emission: EN 61326-1: 2013 (Class A)
  Immunity: EN 61326-1: 2013 (Table 2)

	Performance Criteria*
IEC 61000-4-2 (ESD)	B
IEC 61000-4-3 (EMF)	A
IEC 61000-4-4 (Burst)	B
IEC 61000-4-5 (Surge)	B
IEC 61000-4-6 (CRF)	A
IEC 61000-4-8 (RPFMF)	A
IEC 61000-4-11 (V dip/short)	B, C

*: Performance Criteria

A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the

equipment if used as intended.

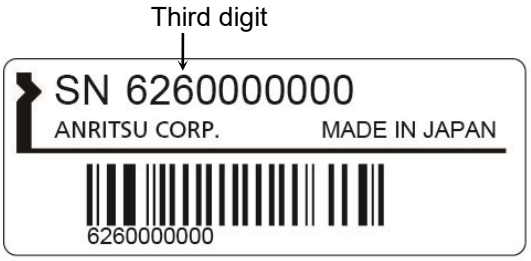
B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Harmonic current emissions:
EN 61000-3-2: 2014 (Class A equipment)

- LVD: EN 61010-1: 2010 +A1:2019 (Pollution Degree 2)
- RoHS: EN IEC 63000:2018 (Category 9)

If the third digit of the serial number is "7", the product complies with Directive 2011/65/EU as amended by (EU) 2015/863.
(Pb,Cd,Cr6+,Hg,PBB,PBDE,DEHP,BBP,DBP,DIBP)
If the third digit of the serial number is "6", the product complies with Directive 2011/65/EU.
(Pb,Cd,Cr6+,Hg,PBB,PBDE)



Serial number example

4. Contact

Name:	Anritsu GmbH
Address, city:	Nemetschek Haus, Konrad-Zuse-Platz 1 81829 München,
Country:	Germany

UKCA Marking

Anritsu affixes the UKCA marking on the following products in accordance with the guidance to indicate that they conform to the EMC, LVD, and RoHS regulations in the United Kingdom.

UKCA marking

1. Product Model

Model: MG3710E Vector Signal Generator
MG3740A Analog Signal Generator

2. Applied Regulations

EMC: S.I. 2016 No. 1091
LVD: S.I. 2016 No. 1101
RoHS: S.I. 2012 No. 3032

3. Applied Standards

- EMC: Emission: EN 61326-1: 2013 (Class A)
  Immunity: EN 61326-1: 2013 (Table 2)
- LVD: EN 61010-1: 2010 +A1:2019 (Pollution Degree 2)
- RoHS: EN IEC 63000: 2018 (Category 9)

4. Contact

Name: ANRITSU EMEA Ltd.
Address, city: 200 Capability Green, Luton
Bedfordshire, LU1 3LU
Country: United Kingdom

RCM Conformity Marking

Anritsu affixes the RCM mark on the following products in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

RCM marking



1. Product Model

Model: MG3710A Vector Signal Generator
MG3710E Vector Signal Generator
MG3740A Analog Signal Generator

2. Applied Standards

EMC: Emission: EN 61326-1: 2013 (Class A equipment)

About Eco label



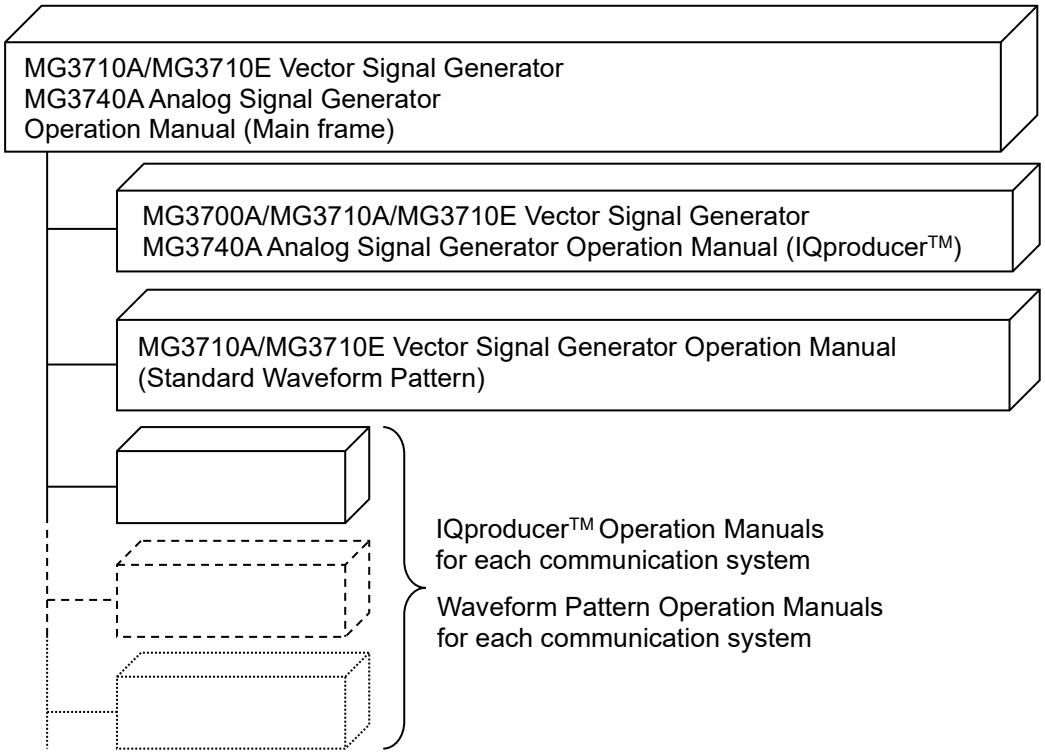
The label shown on the left is attached to Anritsu products meeting our environmental standards.

Details about this label and the environmental standards are available on the Anritsu website at https://www.anritsu.com

About This Manual

Composition of Operation Manuals

The operation manuals for the MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator are comprised as shown in the figure below. Details on the software application IQproducer™ and the standard waveform pattern are provided in each operation manual separately. Read them when needed in addition to this manual.



Scope of This Manual

This manual mainly describes operation, maintenance, and remote control of the MG3710A/MG3710E Vector Signal Generator. Description of the basic functions and the outline of operation start from Chapter 3 onwards.

Convention Used in This Manual

Throughout this document, the use of MG3710A is assumed unless otherwise specified. If you use MG3710E, read MG3710A as MG3710E.

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Chapter 1 Outline

This section provides an outline of the product and describes the product composition.

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1.1 Product Overview

The MG3710A/MG3710E is a vector signal generator that includes an arbitrary waveform generator. It can be used for a wide range of applications, from R&D to manufacturing of digital mobile communication systems, devices, and equipment.

The MG3710A/MG3710E has the following features, and one MG3710A/MG3710E can address from the current major mobile communications to the next-generation mobile communications.

- Frequency range covered: 100 kHz to 6000 MHz (with option installed)
- RF modulation bandwidth during internal modulation: 120 MHz
- Internal memory: 1024 M samples (with option installed)
- High-capacity memory included: provides ability of accelerating signals from multiple communication systems and outputting them for interference signals.

The MG3740A is an analog signal generator. It can be used for a wide range of applications, from R&D to manufacturing of analog radio base stations, devices, and equipment.

The MG3740A has the following features, and one MG3740A can address from the current major analog communications to the digitization of the conventional analog radio.

- Outstanding signal purity
- High output power
- High frequency stability
- Analog/pulse modulation supported
- Two SG units installed in one chassis available (with option added)
- Additional narrow band digital modulation function available

The supplied DVD-ROM contains application software. This application software allows baseband waveform data generation supporting communication systems, external data conversion, and transmission to the MG3710A/MG3710E/MG3740A.

The MG3710A/MG3710E/MG3740A is equipped with the hardware product made by National Instruments and comes with the license for NI-VISA. NI-VISA can be used for the purpose of controlling the MG3710A/MG3710E/MG3740A.

The built-in hard disk/SSD of the MG3710A/MG3710E is preinstalled standard with the standard waveform patterns.
For details of the standard waveform patterns, refer to:
MG3710A/MG3710E Vector Signal Generator Operation Manual (Standard Waveform Pattern)

1.2 Product Configuration

Table 1.2.1-1 lists the standard composition of the MG3710A/MG3710E/MG3740A. At unpacking, check that all items are included. If anything is missing or damaged, contact an Anritsu Service and Sales office.

Table 1.2.1-1 Standard Composition

Items	Model/ Symbol	Product Name	Q'ty	Remarks
Main unit	MG3710A MG3710E MG3740A	Vector Signal Generator Vector Signal Generator Analog Signal Generator	1	
Accessories		Power cord	1	
	P0031A	USB memory	1	256 MB or more USB 2.0 Flash Driver
	---	Installation DVD-ROM	1	Application software, operation manual DVD-ROM

1.2.2 Options

Tables 1.2.2-1 through 1.2.2-3 list the options for MG3710A. Tables 1.2.2-4 through 1.2.2-6 list the options for MG3710E. Tables 1.2.2-7 through 1.2.2-9 list the options for MG3740A. They are all sold separately.

Note:

There is a risk of losing the data when adding additional option(s), so **back up the data** stored on the hard disk/SSD, in advance. Anritsu is not responsible for any loss of data.

Table 1.2.2-1 Additional Options at Shipping (MG3710A)

Option No.	Product Name	Remarks
MG3710A-001	Rubidium Reference Oscillator	Discontinued $\pm 1 \times 10^{-10}$/month
MG3710A-002	High Stability Reference Oscillator	Discontinued $\pm 1 \times 10^{-7}$/year
MG3710A-011	2ndary HDD	Discontinued
MG3710A-017	Universal Input/Output	
MG3710A-018	Analog IQ Input/Output	
MG3710A-021	BER Test Function	
MG3710A-029	OS Upgrade to Windows7	
MG3710A-032	1st RF 100kHz to 2.7GHz	Discontinued Once this option is installed, you cannot change the frequency range.
MG3710A-034	1st RF 100kHz to 4GHz	
MG3710A-036	1st RF 100kHz to 6GHz	
MG3710A-041	High Power Extension for 1st RF	Discontinued
MG3710A-042	Low Power Extension for 1st RF	
MG3710A-043	Reverse Power Protection for 1st RF	
MG3710A-045	ARB Memory Upgrade 256M sample for 1st RF	
MG3710A-046	ARB Memory Upgrade 1024M sample for 1st RF	
MG3710A-048	Combination of Baseband Signal for 1st RF	
MG3710A-049	AWGN for 1st RF	
MG3710A-050	Additional Analog Modulation Input for 1st RF	
MG3710A-062	2nd RF 100kHz to 2.7GHz	Discontinued Once this option is installed, you cannot change the frequency range.
MG3710A-064	2nd RF 100kHz to 4GHz	
MG3710A-066	2nd RF 100kHz to 6GHz	
MG3710A-071	High Power Extension for 2nd RF	Discontinued
MG3710A-072	Low Power Extension for 2nd RF	
MG3710A-073	Reverse Power Protection for 2nd RF	
MG3710A-075	ARB Memory Upgrade 256M sample for 2nd RF	
MG3710A-076	ARB Memory Upgrade 1024M sample for 2nd RF	

Table 1.2.2-1 Additional Options at Shipping (MG3710A) (Cont'd)

Option No.	Product Name	Remarks
MG3710A-078	Combination of Baseband Signal for 2nd RF	Discontinued
MG3710A-079	AWGN for 2nd RF	
MG3710A-080	2nd RF Additional Analog Modulation Input	
MG3710A-313	Removable HDD	

Table 1.2.2-2 Additional Options after Shipping (MG3710A)

Option No.	Product Name	Remarks
MG3710A-101	Rubidium Reference Oscillator Retrofit	Discontinued $\pm 1 \times 10^{-10}$/month
MG3710A-102	High Stability Reference Oscillator Retrofit	Discontinued $\pm 1 \times 10^{-7}$/year
MG3710A-111	2ndary HDD Retrofit	Discontinued
MG3710A-117	Universal Input/Output Retrofit	
MG3710A-118	Analog IQ Input/Output	
MG3710A-121	BER Test Function Retrofit	
MG3710A-141	High Power Extension for 1st RF Retrofit	
MG3710A-142	Low Power Extension for 1st RF Retrofit	
MG3710A-143	Reverse Power Protection for 1st RF Retrofit	
MG3710A-145	ARB Memory Upgrade 256M sample for 1st RF Retrofit	
MG3710A-146	ARB Memory Upgrade 1024M sample for 1st RF Retrofit	
MG3710A-148	Combination of Baseband Signal for 1st RF Retrofit	
MG3710A-149	AWGN for 1st RF Retrofit	
MG3710A-150	Additional Analog Modulation Input Retrofit for 1st RF	
MG3710A-162	2nd RF 100kHz to 2.7GHz Retrofit	
MG3710A-164	2nd RF 100kHz to 4GHz Retrofit	
MG3710A-166	2nd RF 100kHz to 6GHz Retrofit	
MG3710A-171	High Power Extension for 2nd RF Retrofit	
MG3710A-172	Low Power Extension for 2nd RF Retrofit	
MG3710A-173	Reverse Power Protection for 2nd RF Retrofit	
MG3710A-175	ARB Memory Upgrade 256M sample for 2nd RF Retrofit	
MG3710A-176	ARB Memory Upgrade 1024M sample for 2nd RF Retrofit	
MG3710A-178	Combination of Baseband Signal for 2nd RF Retrofit	
MG3710A-179	AWGN for 2nd RF Retrofit	
MG3710A-180	2nd RF Additional Analog Modulation Input Retrofit	
MG3710A-181	CPU/Windows7 Upgrade Retrofit	
MG3710A-182	CPU/Windows10 Upgrade Retrofit	

Table 1.2.2-3 Warranty Period Extension Options (MG3710A)

Option No.	Product Name	Remarks
MG3710A-ES210	Extended 2-year warranty service	Discontinued
MG3710A-ES310	Extended 3-year warranty service	
MG3710A-ES510	Extended 5-year warranty service	

Table 1.2.2-4 Additional Options at Shipping (MG3710E)

Option No.	Product Name	Remarks
MG3710E-001	Rubidium Reference Oscillator	$\pm 1 \times 10^{-10}$/month
MG3710E-002	High Stability Reference Oscillator	$\pm 1 \times 10^{-7}$/year
MG3710E-011	2ndary HDD	
MG3710E-014	Removable HDD, Win10	
MG3710E-017	Universal Input/Output	
MG3710E-018	Analog IQ Input/Output	
MG3710E-021	BER Test Function	
MG3710E-032	1st RF 100kHz to 2.7GHz	Once this option is installed, you cannot change the frequency range.
MG3710E-034	1st RF 100kHz to 4GHz	
MG3710E-036	1st RF 100kHz to 6GHz	
MG3710E-041	High Power Extension for 1st RF	
MG3710E-042	Low Power Extension for 1st RF	
MG3710E-043	Reverse Power Protection for 1st RF	
MG3710E-045	ARB Memory Upgrade 256M sample for 1st RF	
MG3710E-046	ARB Memory Upgrade 1024M sample for 1st RF	
MG3710E-048	Combination of Baseband Signal for 1st RF	
MG3710E-049	AWGN for 1st RF	
MG3710E-050	Additional Analog Modulation Input for 1st RF	
MG3710E-062	2nd RF 100kHz to 2.7GHz	Once this option is installed, you cannot change the frequency range.
MG3710E-064	2nd RF 100kHz to 4GHz	
MG3710E-066	2nd RF 100kHz to 6GHz	
MG3710E-071	High Power Extension for 2nd RF	
MG3710E-072	Low Power Extension for 2nd RF	
MG3710E-073	Reverse Power Protection for 2nd RF	
MG3710E-075	ARB Memory Upgrade 256M sample for 2nd RF	
MG3710E-076	ARB Memory Upgrade 1024M sample for 2nd RF	
MG3710E-078	Combination of Baseband Signal for 2nd RF	
MG3710E-079	AWGN for 2nd RF	
MG3710E-080	2nd RF Additional Analog Modulation Input	

Table 1.2.2-5 Additional Options after Shipping (MG3710E)

Option No.	Product Name	Remarks
MG3710E-101	Rubidium Reference Oscillator Retrofit	±1 × 10^{-10}/month
MG3710E-102	High Stability Reference Oscillator Retrofit	±1 × 10^{-7}/year
MG3710E-111	2ndary HDD Retrofit	
MG3710E-114	Removable HDD, Win10 Retrofit	
MG3710E-117	Universal Input/Output Retrofit	
MG3710E-118	Analog IQ Input/Output	
MG3710E-121	BER Test Function Retrofit	
MG3710E-141	High Power Extension for 1st RF Retrofit	
MG3710E-142	Low Power Extension for 1st RF Retrofit	
MG3710E-143	Reverse Power Protection for 1st RF Retrofit	
MG3710E-145	ARB Memory Upgrade 256M sample for 1st RF Retrofit	
MG3710E-146	ARB Memory Upgrade 1024M sample for 1st RF Retrofit	
MG3710E-148	Combination of Baseband Signal for 1st RF Retrofit	
MG3710E-149	AWGN for 1st RF Retrofit	
MG3710E-150	Additional Analog Modulation Input Retrofit for 1st RF	
MG3710E-162	2nd RF 100kHz to 2.7GHz Retrofit	Available only when 2nd RF is not installed. Once this option is installed, you cannot change the frequency range.
MG3710E-164	2nd RF 100kHz to 4GHz Retrofit	
MG3710E-166	2nd RF 100kHz to 6GHz Retrofit	
MG3710E-171	High Power Extension for 2nd RF Retrofit	
MG3710E-172	Low Power Extension for 2nd RF Retrofit	
MG3710E-173	Reverse Power Protection for 2nd RF Retrofit	
MG3710E-175	ARB Memory Upgrade 256M sample for 2nd RF Retrofit	
MG3710E-176	ARB Memory Upgrade 1024M sample for 2nd RF Retrofit	
MG3710E-178	Combination of Baseband Signal for 2nd RF Retrofit	
MG3710E-179	AWGN for 2nd RF Retrofit	
MG3710E-180	2nd RF Additional Analog Modulation Input Retrofit	
MG3710E-182	CPU/Windows10 Upgrade Retrofit	

Table 1.2.2-6 Warranty Period Extension Options (MG3710E)

Option No.	Product Name	Remarks
MG3710E-ES210	Extended 2-year warranty service	
MG3710E-ES310	Extended 3-year warranty service	
MG3710E-ES510	Extended 5-year warranty service	

Table 1.2.2-7 Additional Options at Shipping (MG3740A)

Option No.	Product Name	Remarks
MG3740A-001	Rubidium Reference Oscillator	±1 × 10^{-10}/month
MG3740A-002	High Stability Reference Oscillator	±1 × 10^{-7}/year
MG3740A-011	2ndary HDD	
MG3740A-014	Removable HDD, Win10	
MG3740A-017	Universal Input/Output	
MG3740A-020	Digital Modulation	
MG3740A-021	BER Test Function	
MG3740A-029	OS Upgrade to Windows7	Discontinued
MG3740A-032	1st RF 100kHz to 2.7GHz	Once this option is installed, you cannot change the frequency range.
MG3740A-034	1st RF 100kHz to 4GHz	
MG3740A-036	1st RF 100kHz to 6GHz	
MG3740A-041	High Power Extension for 1st RF	
MG3740A-042	Low Power Extension for 1st RF	
MG3740A-043	Reverse Power Protection for 1st RF	
MG3740A-045	ARB Memory Upgrade 256M sample for 1st RF	
MG3740A-048	Combination of Baseband Signal for 1st RF	
MG3740A-050	Additional Analog Modulation Input for 1st RF	
MG3740A-062	2nd RF 100kHz to 2.7GHz	Once this option is installed, you cannot change the frequency range.
MG3740A-064	2nd RF 100kHz to 4GHz	
MG3740A-066	2nd RF 100kHz to 6GHz	
MG3740A-071	High Power Extension for 2nd RF	
MG3740A-072	Low Power Extension for 2nd RF	
MG3740A-073	Reverse Power Protection for 2nd RF	
MG3740A-075	ARB Memory Upgrade 256M sample for 2nd RF	
MG3740A-078	Combination of Baseband Signal for 2nd RF	
MG3740A-080	2nd RF Additional Analog Modulation Input	
MG3740A-313	Removable HDD	Discontinued

Table 1.2.2-8 Additional Options after Shipping (MG3740A)

Option No.	Product Name	Remarks
MG3740A-101	Rubidium Reference Oscillator Retrofit	±1 × 10^{-10}/month
MG3740A-102	High Stability Reference Oscillator Retrofit	±1 × 10^{-7}/year
MG3740A-111	2ndary HDD Retrofit	
MG3740A-114	Removable HDD, Win10 Retrofit	
MG3740A-117	Universal Input/Output Retrofit	
MG3740A-120	Digital Modulation Retrofit	
MG3740A-121	BER Test Function Retrofit	
MG3740A-141	High Power Extension for 1st RF Retrofit	
MG3740A-142	Low Power Extension for 1st RF Retrofit	
MG3740A-143	Reverse Power Protection for 1st RF Retrofit	
MG3740A-145	ARB Memory Upgrade 256M sample for 1st RF Retrofit	
MG3740A-148	Combination of Baseband Signal for 1st RF Retrofit	
MG3740A-150	Additional Analog Modulation Input Retrofit for 1st RF	
MG3740A-162	2nd RF 100kHz to 2.7GHz Retrofit	Available only when 2nd RF is not installed. Once this option is installed, you cannot change the frequency range.
MG3740A-164	2nd RF 100kHz to 4GHz Retrofit	
MG3740A-166	2nd RF 100kHz to 6GHz Retrofit	
MG3740A-171	High Power Extension for 2nd RF Retrofit	
MG3740A-172	Low Power Extension for 2nd RF Retrofit	
MG3740A-173	Reverse Power Protection for 2nd RF Retrofit	
MG3740A-175	ARB Memory Upgrade 256M sample for 2nd RF Retrofit	
MG3740A-178	Combination of Baseband Signal for 2nd RF Retrofit	
MG3740A-180	2nd RF Additional Analog Modulation Input Retrofit	
MG3740A-181	CPU/Windows7 Upgrade Retrofit	Discontinued
MG3740A-182	CPU/Windows10 Upgrade Retrofit	

Table 1.2.2-9 Warranty Period Extension Options (MG3740A)

Option No.	Product Name	Remarks
MG3740A-ES210	Extended 2-year warranty service	
MG3740A-ES310	Extended 3-year warranty service	
MG3740A-ES510	Extended 5-year warranty service	

1.2.3 Applicable parts

Table 1.2.3-1 lists the applicable parts for MG3710A/MG3710E/MG3740A. They are all sold separately.

Table 1.2.3-1 Applicable Parts

Model/Symbol	Product Name	Remarks
W3580AE	MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (Mainframe)	Printed version
W2496AE	MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)	Printed version
W3581AE	MG3710A/MG3710E Vector Signal Generator Operation Manual (Standard Waveform Pattern)	Printed version
K240B	Power divider (K connector)	DC to 26.5 GHz, 50 Ω K-J, 1 W max
MA1612A	Four-port junction pad	Discontinued. 5 MHz to 3 GHz, N-J
MP752A	Termination	Discontinued. DC to 12.4 GHz, 50 Ω N-P
J1755A	Termination	Discontinued. DC to 18 GHz, 50 Ω N-P
MA2512A	Bandpass filter	Discontinued. Supports W-CDMA, Passband: 1.92 to 2.17 GHz
J0576B	Coaxial cord	Length: Approx. 1 m (N-P・5D-2W・N-P)
J0576D	Coaxial cord	Length: Approx. 2 m (N-P・5D-2W・N-P)
J0127A	Coaxial cord	Length: Approx. 1 m (BNC-P・RG58A/U・BNC-P)
J0127B	Coaxial cord	Length: Approx. 2 m (BNC-P・RG58A/U・BNC-P)
J0127C	Coaxial cord	Length: Approx. 0.5 m (BNC-P・RG58A/U・BNC-P)
J0322A	Coaxial Cable	DC to 18 GHz, Length: Approx. 0.5 m (SMA-P・50 Ω SUCOFLEX104・SMA-P)
J0322B	Coaxial Cable	DC to 18 GHz, Length: Approx. 1 m (SMA-P・50 Ω SUCOFLEX104・SMA-P)
J0322C	Coaxial Cable	DC to 18 GHz, Length: Approx. 1.5 m (SMA-P・50 Ω SUCOFLEX104・SMA-P)
J0322D	Coaxial Cable	DC to 18 GHz, Length: Approx. 2 m (SMA-P・50 Ω SUCOFLEX104・SMA-P)
J0004	Coaxial adapter	DC to 12.4 GHz, 50 Ω N-P, SMA-J
J1261B	Shielded Ethernet cable	Straight cable, length: Approx. 3 m
J1261D	Shielded Ethernet cable	Cross cable, length: Approx. 3 m
J0008	GPIB connection cable	Length: Approx. 2 m
J1539A	Aux Conversion Adaptor	BNC-J – DX30A-50P (50)

Table 1.2.3-1 Applicable Parts (Cont'd)

Model/Symbol	Product Name	Remarks
B0635A	Rack mount kit (EIA)	
B0657A	Rack mount kit (JIS)	
B0636A	Carrying case (hard type)	Discontinued. With casters
B0636C	Carrying case (hard type)	With casters
B0645A	Soft carrying case	
MA24106A	USB Power Sensor	(50 MHz to 6 GHz, With USB/Mini B cable)
MA24118A	USB Power Sensor	(10 MHz to 18 GHz, With USB/Micro B cable)
MA24126A	USB Power Sensor	(10 MHz to 26 GHz, With USB/Micro B cable)
Z0541A	USB Mouse	
Z0975A	Keyboard (USB)	
Z1594A	Standard Waveform Pattern for Backup	Discontinued. DVD 5-disc set

1.2.4 Application software

For the latest information on the application software, either visit the MG3710A/MG3710E/MG3740A page on the Anritsu website or contact an Anritsu sales representative.
Application software is sold separately.

Anritsu homepage: https://www.anritsu.com/

Table 1.2.4-1 lists examples of application software that are available for the MG3710A and MG3710E. Table 1.2.4-2 lists examples of application software that are available for the MG3740A (required to install option-020/120). They are all sold separately.

Table 1.2.4-1 Application Software (MG3710A/MG3710E)

Option No.	Product Name	Remarks
MX370101A	HSDPA IQproducer™	DVD-ROM containing a license and operation manual
MX370102A	TDMA IQproducer™	
MX370104A	Multi-carrier IQproducer™	
MX370106A	DVB-T/H IQproducer™	
MX370107A	Fading IQproducer™	
MX370108A	LTE IQproducer™	
MX370110A	LTE TDD IQproducer™	
MX370111A	WLAN IQproducer™	
MX370112A	TD-SCDMA IQproducer™	
MX370113A	5G NR TDD sub-6GHz IQproducer™	
MX370114A	5G NR FDD sub-6GHz IQproducer™	
MX370103A	CDMA2000 1xEV-DO IQproducer™	Discontinued.
MX370105A	Mobile WiMAX IQproducer™	

Table 1.2.4-2 Application Software (MG3740A installed option-020/120)

Option No.	Product Name	Remarks
MX370102A	TDMA IQproducer™	DVD-ROM containing a license and operation manual
MX370107A	Fading IQproducer™	

Chapter 2 Preparation

This section describes items that you should know before using the MG3710A/MG3710E/MG3740A. Be sure to read this section at least once as it contains safety tips and cautions for avoiding equipment failure during use.

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2.1 Installation Location

2.1.1 Installation orientation

Set the MG3710A/MG3710E/MG3740A horizontally as shown in the figure below.

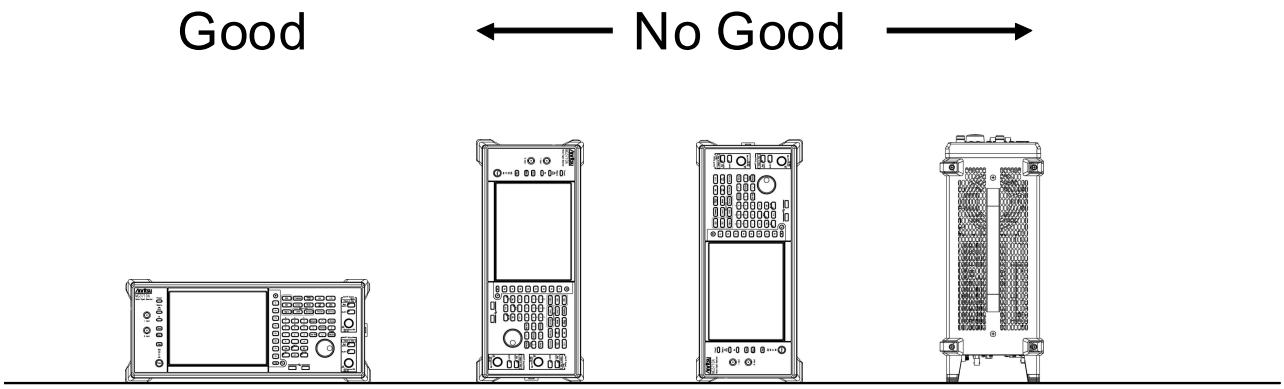


Figure 2.1.1-1 Installation Orientation

⚠ CAUTION

If the MG3710A/MG3710E/MG3740A is not installed in a "good" direction as above, a small shock may turn it over and harm the user.

2.1.2 Distance from surrounding objects

A fan is installed at the back of the MG3710A/MG3710E/MG3740A to prevent the internal temperature from rising. When installing the MG3710A/MG3710E/MG3740A, be sure to keep its sides at a distance of 10 cm or more from surrounding objects such as walls and peripheral units, to secure sufficient space around the fan.

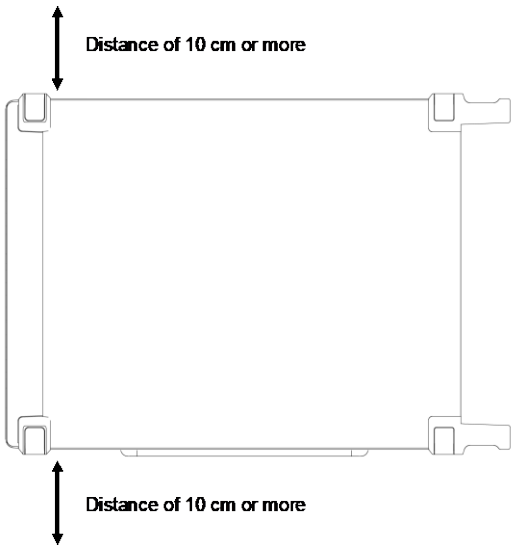


Figure 2.1.2-1 Distance From Surrounding Objects

2.1.3 Installation location conditions

The MG3710A/MG3710E/MG3740A can operate in locations with temperatures between 5 ºC and 45 ºC, but it should not be used in locations such as the following or failure may result.

- Location with a lot of vibration
- Location with high moisture or a lot of dust
- Location exposed to direct sunlight
- Location where exposure to active gases may occur
- Location where large fluctuations in power voltage occur

2.2 Items to Check Before Use

2.2.1 Safety labels

To ensure the safety of the operator, the WARNING labels shown below are affixed on the back panel, as shown. Be sure to observe the instructions on these labels.

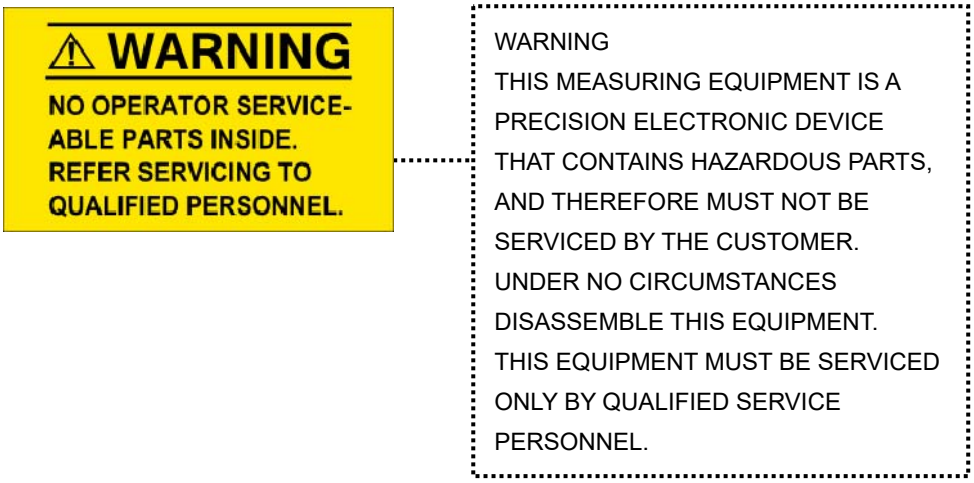


Figure 2.2.1-1 WARNING Label

2.2.2 Reverse power

The maximum reverse power input of the RF output connector of the MG3710A/MG3710E/MG3740A is as follows for both 1st RF and 2nd RF. Be careful not to apply reverse input power which exceeds the following.

DC input

±50 V DC Max

AC input

When both 1st RF and 2nd RF do not have the Option-043/143/073/173 installed.

2 W (nominal)

When the Option-043/143/073/173 installed.

20 W (1 MHz < Reverse input power frequency ≤ 1 GHz) (nominal)

20 W (1 GHz < Reverse input power frequency ≤ 2 GHz) (nominal)

10 W (2 GHz < Reverse input power frequency ≤ 6 GHz) (nominal)

Installing the Option-043/143/073/173 (Reverse power protection) does not guarantee the protection from damages by reverse power. Be careful not to apply reverse power.

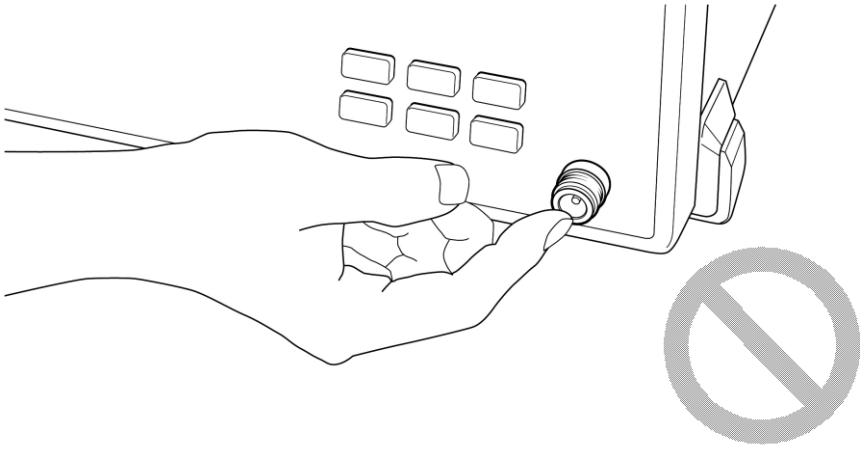
2.2.3 Electrostatic

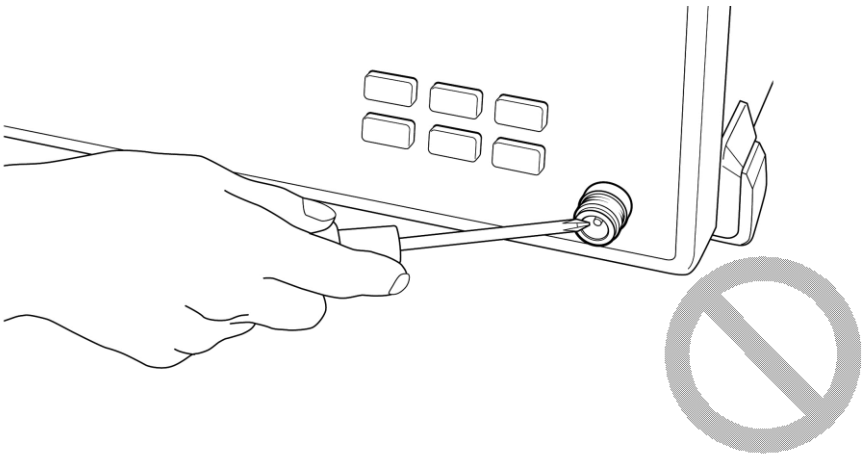
⚠ CAUTION

- **Always use the supplied 3-pin power cord to ground both the mainframe and DUT (included in test circuit). After confirming that both the mainframe and DUT are grounded, use coaxial cables to connect them.**

  NEVER connect the mainframe and DUT without grounding, otherwise electrostatic discharge may damage the mainframe.

- **Do not touch the core conductor of the coaxial cable connected to the input connector or bring it into contact with metal. Doing so may damage the input circuit of the mainframe.**

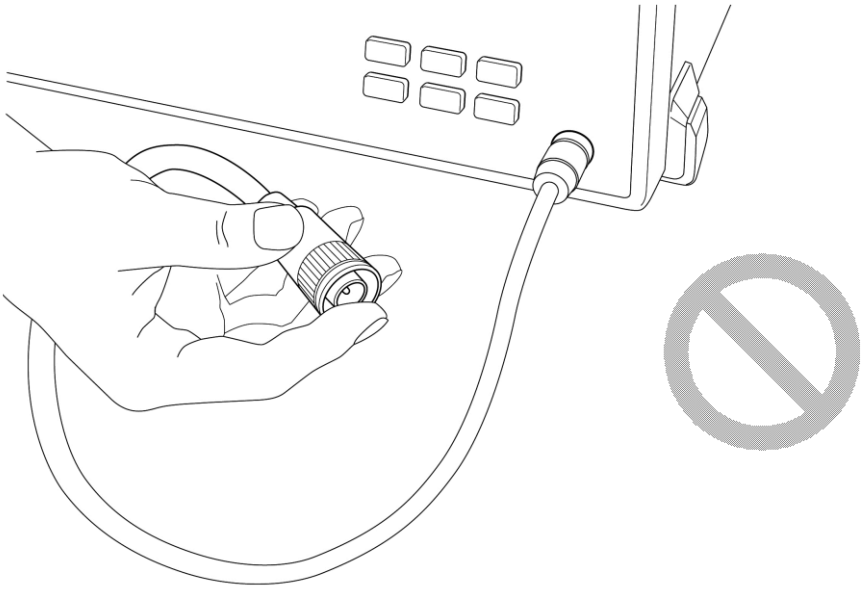




⚠ CAUTION

Do not touch the core conductor to the metal when connecting the coaxial cable to the connector.

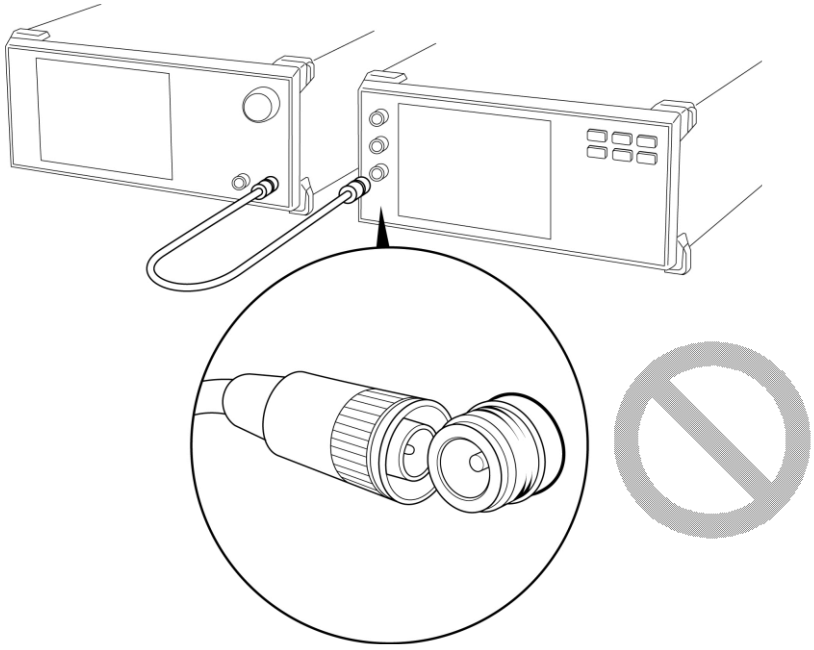
Doing so may damage the input circuit of the mainframe.



⚠ CAUTION

Do not touch the core conductor to the metal when connecting the coaxial cable to the connector.

Doing so may damage the input circuit of the mainframe.



2.2.4 Notes on handling RF output connector

Only connect N-type connector to RF Output. Connecting a different connector will damage the connector.

2.2.5 USB flash drive

Note the orientation of the connection when using a USB flash drive. Plugging in a USB flash drive in the wrong direction may damage the connector.

2.3 Power Connection

This section describes the procedures for supplying power.

2.3.1 Power requirements

For normal operation of the instrument, observe the power voltage range described below.

Power supply	Voltage range	Frequency
100 Vac system	100 to 120 V	50 to 60 Hz
200 Vac system	200 to 240 V	50 to 60 Hz

Vac-system changeover is automatically made between 100 Vac and 200 Vac.

⚠ CAUTION

Supplying power exceeding the above range may result in electrical shock, fire, failure, or malfunction.

2.3.2 Connecting power cord

Insert the power plug into a grounded outlet, and connect the other end to the power inlet on the rear panel. To ensure that the instrument is properly grounded, always use the supplied 3-pin power cord.

⚠ WARNING

Always connect the instrument to a properly grounded outlet. Do not use the instrument with an extension cord or transformer that does not have a ground wire.

If the instrument is connected to an ungrounded outlet, there is a risk of receiving a fatal electric shock. In addition, the peripheral devices connected to the instrument may be damaged.

Unless otherwise specified, the signal-connector ground terminal, like an external conductor of the coaxial connector, of the instrument is properly grounded when connecting the power cord to a grounded outlet. Connect the ground terminal of DUT to a ground having the same potential before connecting with the instrument. Failure to do so may result in an electric shock, fire, failure, or malfunction.

⚠ CAUTION

If an emergency arises causing the instrument to fail or malfunction, disconnect the instrument from the power supply by disconnecting either end of the power cord.

When installing the instrument, arrange the power inlet and outlet so that an operator may easily connect or disconnect the power cord. Moreover, DO NOT fix the power cord around the plug and the power inlet with a holding clamp or similar device.

If the instrument is mounted in a rack, a power switch for the rack or a circuit breaker may be used for power disconnection.

It should be noted that, the power switch on the front panel of the instrument is a standby switch, and cannot be used to cut the main power.

Chapter 3 Operation

This chapter describes information you should know to operate the MG3710A/MG3710E/MG3740A, including names of parts and how to set basic parameters.

Note on remote command:
When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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3.1 Part Names

3.1.1 Front panel

This section describes the front-panel keys and connectors.

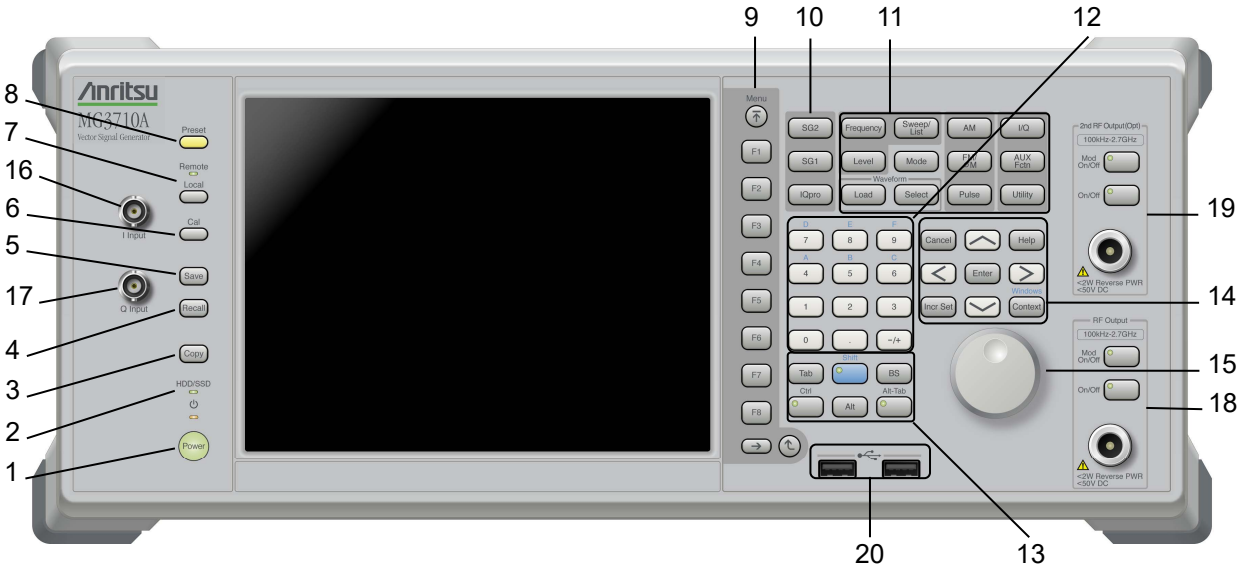


Figure 3.1.1-1 Front Panel

1 

Power switch

Press to switch between the standby state (AC power supplied) and power-on state. The Power lamp lights orange at Standby and green at Power On. Press the power switch for about 2 seconds.

2 

Hard disk/SSD access lamp

Lights when accessing the internal hard disk/SSD

3 

Copy key

Press to capture display screen and save to file.

4 

Recall key

Press to display the function menu to recall the parameter file.

5 

Save key

Press to display the function menu to save the parameter file.

6 

Cal key

Press to display the Calibration menu.

7 

Remote lamp/Local key

Remote lamp Lights when in remote-control state

Local key Press to reset the remote-control state with GPIB, Ethernet, or USB (B) to the local-control state and enable the panel setting.

8 

Preset key

Press to display the Preset menu. Resets parameters to initial settings

9 

Function keys

Selects or configures function menu displayed on the right of the screen. The function menu is provided in multiple pages and layers.
The number on the bottom of the screen indicates the menu page number.



Top key

Press to go back to the uppermost (top) layer.



Next key

Press to go to the next page.



Back key

Press to go back to the previous layer within the function menu.

10 

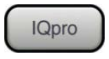
SG1/SG2/IQ Pro key



Press to set and control SG1.



Press to set and control SG2.



Press to load IQproducer.
Sometimes, there may be a delay of several to 20 or so seconds until IQproducer starts after pressing the **IQpro** key. Subsequent key presses are ignored until IQproducer is running.

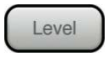
11 

Main function keys

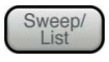
Display function menus to set and execute main functions



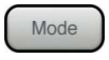
Press to set items of Frequency.



Press to set items of Level.



Press to set items of Sweep/List.



Press to set items of Mode of the Baseband function.



Press to set items of AM modulation.



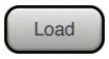
Press to set items of FM/ϕM modulation.



Press to set items of Pulse modulation.



Press to set items of I/Q signals.



Press to recall the Load function of ARB/Waveform function menu.



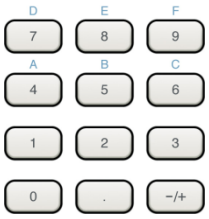
Press to recall the Select function of ARB/Waveform function menu.



Press to recall the Auxiliary function.



Press to recall the Utility function.

12 

Numeric keypad

Enters numbers on parameter setup screens.
[A] to [F] in hexadecimal formats can be entered by pressing  to  sequentially while  lights.

13 

Tab/Alt/BS/Ctrl/Shift/Alt-Tab keys



Behaves same as the **Tab** key.



Behaves same as the **Alt** key.



Press to delete the last entered digit or character.



Behaves same as the **Ctrl** key.



Operates keys with functions in blue characters on panel. Press the **Shift** key so the key lamp is green and then press the target key.



Alt-Tab key.
Behaves same as the **Alt** key + **Tab** key.

14 

Arrow keys/Enter/Cancel/Help/Incr Set/Context key



Arrow keys

Press to select items or change settings.



Press to cancel the entered or selected data.



Pressing this key while pressing a function key displays the **Help** for the pressed function key.



Press to set the entered or selected data.



Press to set a resolution for each parameter.



Context: Behaves same as right-click.
Windows: Behaves same as pressing **Windows** key.

15 

Rotary knob

Rotate the knob to select an item or change a setting. Spin faster to increase the amount of change.

16



I Input connector

Inputs signals of I-phase when executing vector modulation of external baseband signals.
MG3740A is not equipped with this connector.

17



Q Input connector

Inputs signals of Q-phase when executing vector modulation of external baseband signals.
MG3740A is not equipped with this connector.

18



RF Output



Modulation control key

This command sets the SG1 Modulation On/Off. The lamp lights when RF signals are being modulated.



RF Output Control key

This command sets the SG1 Output On/Off. The lamp lights when RF signals are being modulated.



RF Output connector

Outputs RF signal.

19



2nd RF Output (Option)



Modulation control key

This command sets the SG2 Modulation On/Off. The lamp lights when RF signals are being modulated.



RF Output control key

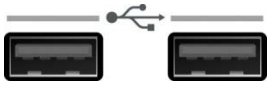
This command sets the SG2 Output On/Off. The lamp lights when RF signals are being output.



RF Output connector

Outputs RF signal.

20



USB connector (type A)

Connect the accessory USB keyboard, mouse or USB flash drive.

3.1.2 Rear panel

This section describes the rear-panel connectors.

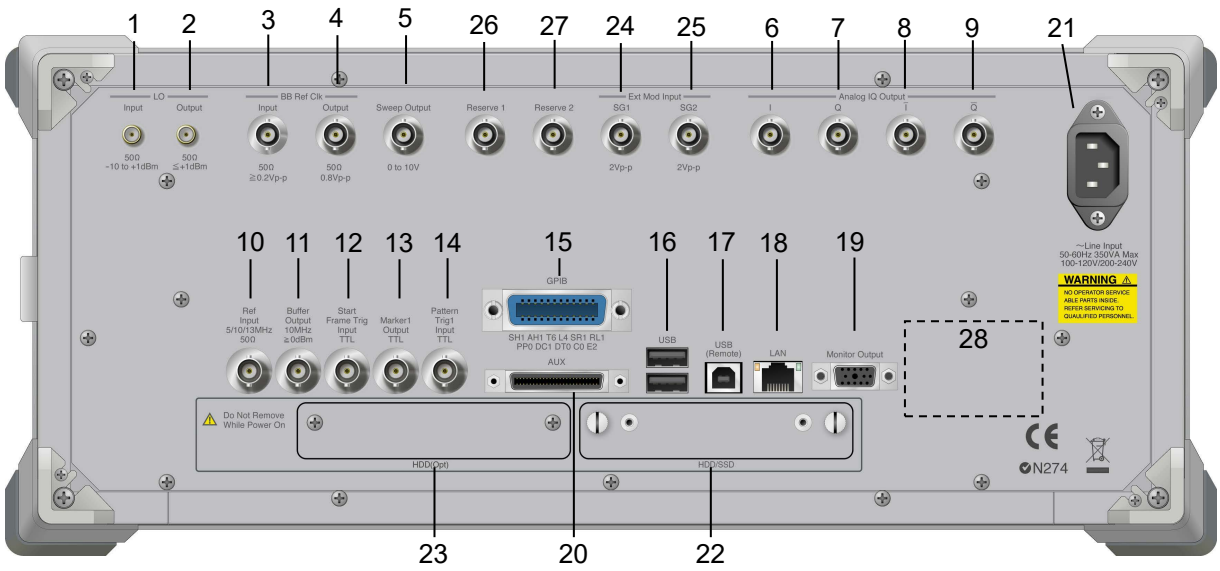


Figure 3.1.2-1 Rear Panel

1 LO Input



50Ω
−10 to +1dBm

Local Input connector

Outputs external local signal.
This connector cannot be used in MG3740A.

2 LO Output



50Ω
≦+1dBm

Local Output connector

Outputs Local signal.
This connector cannot be used in MG3740A.

3 BB REF CLK Input



50Ω
≧0.2Vp-p

Baseband Reference Clock Input connector

Inputs clock signals that is the reference values for sampling clocks of the internal arbitrary waveform generator.
This connector cannot be used in MG3740A.

4 BB REF CLK Output



50Ω
0.8Vp-p

Baseband Reference Clock Output connector

Outputs sampling clock signals of the internal arbitrary waveform generator.
This connector cannot be used in MG3740A.

5 Sweep Output



0 to 10V

Sweep Output connector

Outputs 10 V Sweep Signal or Sweep Status signal synchronized with Sweep operations.

6 I Output



I Output connector

Outputs I-phase signals of internal baseband signals.
This connector cannot be used in MG3740A.

7 Q Output



Q Output connector

Outputs Q-phase signals of internal baseband signals.
This connector cannot be used in MG3740A.

8 $\overline{\text{I}}$ Output



$\overline{\text{I}}$ (Inverted I) Output connector

Outputs I-phase signals of internal baseband signals.
This connector cannot be used in MG3740A.

9 $\overline{\text{Q}}$ Output



$\overline{\text{Q}}$ (Inverted Q) Output connector

Outputs Q-phase signals of internal baseband signals.
This connector cannot be used in MG3740A.

10 REF Input 5/10/13MHz 50Ω



Reference Input connector (reference frequency signal input connector)

Inputs external reference frequency signal (5 MHz/10 MHz/13 MHz). It is for inputting reference frequency signals with higher accuracy than the instrument's internal reference signal, or for synchronizing the frequency of the MG3710A/MG3710E/MG3740A to that of other equipment.

11 Buffer Output 10MHz ≧0dBm



Buffer Output connector (reference frequency signal output connector)

Outputs the internal reference frequency signal (10 MHz). It is for synchronizing frequencies between other equipment and the MG3710A/MG3710E/MG3740A.

12 Start Frame TRIG Input TTL



Start Frame Trigger Input connector

Inputs external signals to be used for trigger signals.
The setting of input signals is based on the Table 7.4.1-1 “Input Connectors Function Menu”.
This connector is pulled up internally.

13



Marker1 Output connector

Outputs Marker signal.
The setting of output signals is based on the Table 7.4.2-1 "Output Connectors Function Menu".

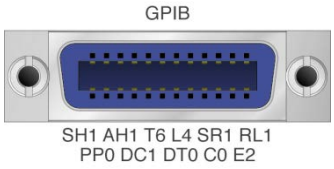
14



Pattern Trigger1 Input connector

Inputs external signals to be used for trigger signals.
The setting of input signals is based on the Table 7.4.1-1 "Input Connector Function Menu".
This connector is pulled up internally.

15



GPIB connector

For external control via GPIB

16



USB connector (type A)

Connect the accessory USB keyboard, mouse or USB flash drive.

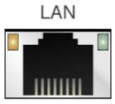
17



USB connector (type B)

For external control via USB

18



Ethernet connector

Connects PC or Ethernet network.

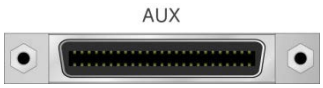
19



Monitor Out connector

This is a RGB connector to connect an external display.

20



AUX connector

This is a complex connector to input baseband clock reference or error rate measurement of vector signal generator option. See Table 3.1.2-1 for internal pin assignment.

21



AC inlet

Supplies power.

22 **HDD/SSD**

HDD/SSD slot

This is a hard disk/SSD slot.
The type of installed storage can be checked by label as follows:

- SSD: The "SSD" label is affixed on the slot cover.
- HDD: No label.

23 **HDD(Opt)**

HDD slot for options

This is a hard disk slot for the options.

24



External Modulation Input SG1 connector

This is an option connector for additional analog modulation input for the SG1.

25



External Modulation Input SG2 connector

This is an option connector for additional analog modulation input for the SG2.

26



Reserve 1

Terminal for future extension

27



Reserve 2

Terminal for future extension

28 **Label**

S/N	Serial number
Opt.	Installed option number
C1	Indicates that the operating system is WES7.
RF1 E	For MG3710A, indicates that VSG1 Revision is 6 or later.
RF2 E	For MG3710A, indicates that VSG2 Revision is 6 or later.

Table 3.1.2-1 AUX Connectors

Function	Terminal No.	In/Out	Signal Name
SG	2	In	Pattern Status1 *2
	6		GND
	15	In	Pattern Trigger3/Pattern Status3 *2
	16		GND
	26		GND
	27	Out	Pulse Video
	28	Out	Pulse Sync
	29	Out	Sync Trigger Out
	31		GND
	36		GND
	38	Out	Marker 2
	39	Out	Marker 3
	40	In	Pattern Trigger2/Pattern Status2 *2
	41		GND
	42	In	Pulse Mod *1
	45		GND
BER	23		GND
	24	In	BER CLK *2
	48	In	BER Enable *2
	49	In	BER Data *2
	50		GND

Because terminals not included in Table 3.1.2-1 are interfaces for maintaining equipment, do not connect them to any.

For signal setting details, refer to Table 7.4.1-1 “Input Connectors Function Menu” and Table 7.4.2-1 “Output Connectors Function Menu”.

*1: This connector is pulled down internally.

*2: This connector is pulled up internally.

3.2 Power On/Off

3.2.1 Power on

The procedure for turning the power on is as follows:

1. Connect the jack-side end of power cord to the AC power inlet on the rear panel. Plug in the cord deep into the inlet.
2. Connect the plug-side end of power cord to the AC power outlet. The MG3710A/MG3710E/MG3740A goes into the standby state, and ⏻ lamp on the power switch lights orange.
3. When you press the power switch, the power turns on, and Power lamp lights green, and loading starts. ⏻ lamp (orange) goes off.

When the power turns on, Windows starts, and then the software of the MG3710A/MG3710E/MG3740A starts. While it is starting, the start screen below is displayed. Do not press the power switch when the start screen is displayed. Pressing the switch may prevent the software from starting successfully.

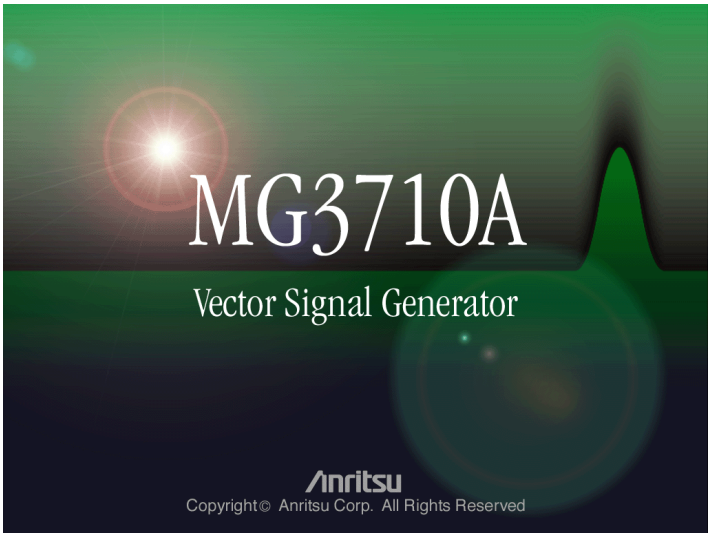


Figure 3.2.1-1 Start Screen

3.2.2 Power off

The procedure for turning the power off is as follows:

To use panel keys to turn the power off:

- When you press the power switch, the applications start closing, shutdown starts, the lamp (green) of the power switch goes off,  lamp lights orange, and the power turns off. The MG3710A/MG3710E/MG3740A goes into the standby state.

Note:

Do not press the power switch for more than 4 seconds. If you do so, a forced-end is performed when exiting the software.

To use the mouse connected to the MG3710A/MG3710E/MG3740A to turn the power off:

Other than Windows 10

1. Connect the mouse to the MG3710A/MG3710E/MG3740A, and open the Start menu on the Windows task bar.

   Refer to 9.7.1 “Displaying Windows Desktop”.

2. Select **Shut down**.
3. Select **Shut down**.
4. Shutdown starts, the Power lamp (green) of the power switch 

goes off,  lamp lights orange, and the power turns off. The MG3710A/MG3710E/MG3740A goes into the standby state.

Windows 10

1. Connect the mouse to the MG3710A/MG3710E/MG3740A and open the Start Menu from the Windows Taskbar.
   Refer to 9.7.1 “Displaying Windows Desktop”.
2. Select **Power**.
3. Select **Shut down**.
4. Shutdown starts, the Power lamp (green) of the power switch 

goes off,  lamp lights orange, and the power turns off. The MG3710A/MG3710E/MG3740A goes into the standby state.

To perform a forced-end:

- Press the power switch for more than 4 seconds. The Power lamp (green) of the power switch 

goes off,  lamp lights orange, and the power turns off. The MG3710A/MG3710E/MG3740A goes into the standby state.

Notes:

- You should perform a forced-end as an emergency operation only when keys, mouse, or keyboard cannot be controlled for any reason. If you press the power switch for more than 4 seconds, and the power does not turn off, a failure may have occurred. Unplug it, and contact an Anritsu Service and Sales office.
- Unplugging while you are accessing to the hard disk/SSD may cause a failure of the hard disk/SSD. You must unplug the MG3710A/MG3710E/MG3740A when the power is off.

Restoring parameters

After the power on, parameters are restored to the state of the last time the power was off or the state of defaults setting.

3.3 Screen Layout

After the power turns on and Self Check completes, the basic screen (Figure 3.3-1) is displayed.

1SG:

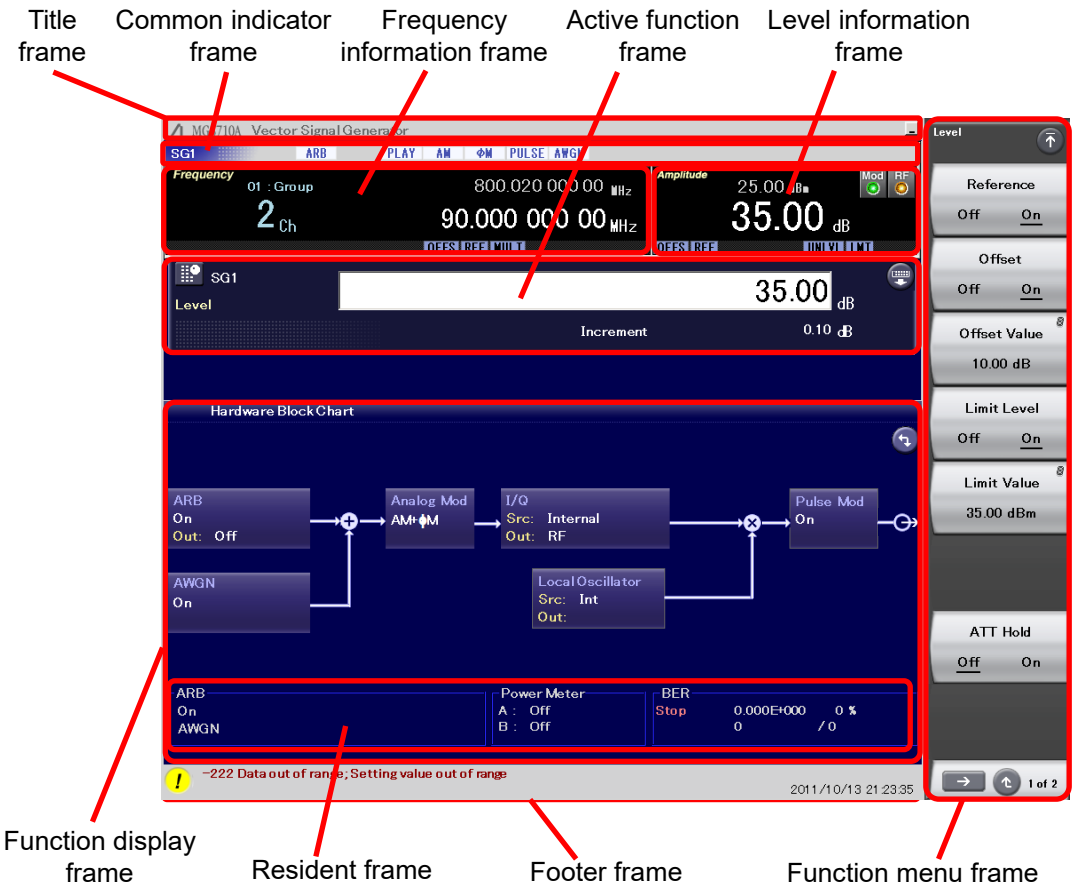


Figure 3.3-1 Basic Screen (1SG)

Title frame

Displays a model, name (Vector Signal Generator/Analog Signal Generator), and window-minimize switch.

Common indicator frame

Displays the status of SG common settings.

Frequency information frame

Displays the information of frequencies.

Level information frame

Displays the information of levels.

Active function frame

Displays input dialog boxes for setting parameters.

Function display frame

Displays the current setting of SG in a block diagram and displays necessary information for each function.

Resident frame

Displays Power Meter and measured results of BER.

Footer frame

Displays error messages, error information, and the current time.

Function menu frame

The function menu frame on the right-side of the screen displays the function menu. The content depends on a screen.

2SG:

Displays 2SG-specific functions.

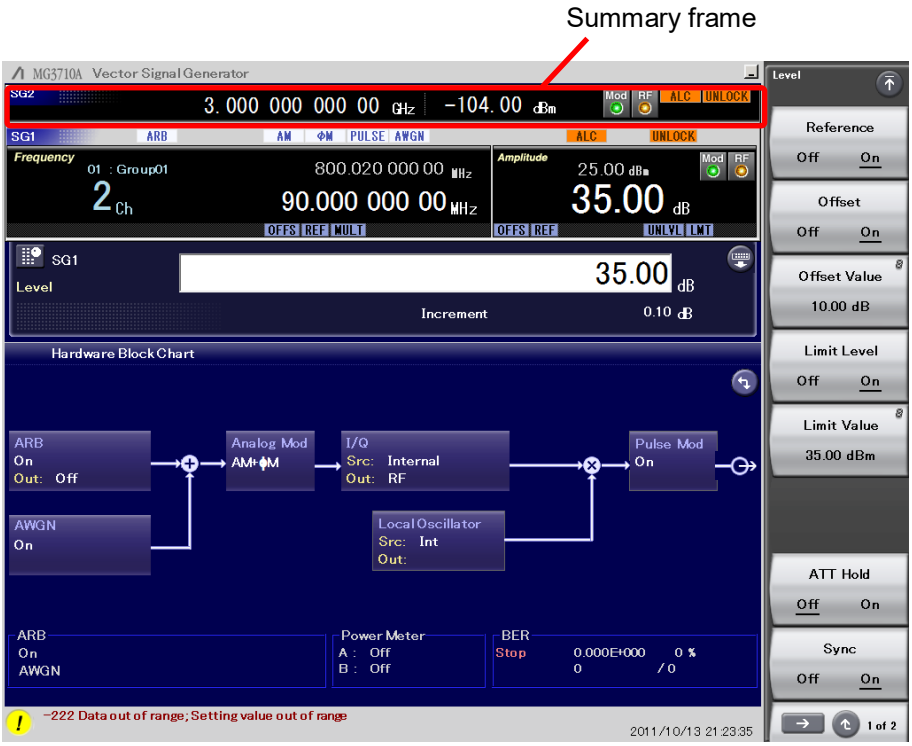


Figure 3.3-2 Basic Screen (2SG)

Summary frame

Displays the information of uncontrolled SG frequencies, levels, output status, and alarms.

3.3.1 Common indicator frame

The common indicator frame displays indicators described in Table 3.3.1-1 and Table 3.3.1-2 to indicate the current status.

Table 3.3.1-1 Common Indicators Alarm Information

Indicator	Display	Description
Alarm information	May be displayed even when there is no error.	
ALC	ALC Auto Level Control	Indicates that the output level may not have been reached a certain value.
BBDAC	BBDAC Baseband Digital to Analog Converter	Indicates that clipping occurred in Baseband DAC or the digital block due to overflow.
OVENCOLD	OVEN COLD	Indicates that the internal reference oscillator frequency may not be stable within three minutes after the power is turned on.
Alarm information	Displayed for errors.	
UNLOCK	UNLOCK	Indicates that Baseband Reference Clock is not synchronized, that the internal reference oscillator has stopped synchronizing after 3 minutes or more since the power is turned on, or that the external reference oscillator is not synchronized.
EXTMOD	EXTMOD	Indicates that the level of signal input to the External Modulation Input connector is greater than 2.03 Vp-p.

For handling when the alarm information is displayed, refer to 11.6 “Troubleshooting”.

ALC Alarm

Remote command

Query the status of ALC

Query

```
[:SOURce[1]|2]:POWer:ALC:ERRor?
```

Response

```
<status>
```

Parameter

<status>	Status
ALAR	Alarm
NORM	Normal

Programming Example

To query the status of ALC.

```
POW:ALC:ERR?
> NORM
```

BBDAC Alarm

Remote command

Query the status of BBDAC

Query

```
[:SOURce[1]|2]:DM:DAC:ERRor?
```

Response

```
<status>
```

Parameter

<status>	Status
CLIP	Clipped
NORM	Normal

Programming Example

To query the status of BBDAC.

```
DM:DAC:ERR?
> NORM
```

UNLOCK Alarm

Remote command

UNLOCK: Query the status of Baseband Reference

Query

```
[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence:ERRor?
```

Response

```
<status>
```

Parameter

`<status>`	Status
`LINT`	Lock BB Int Clock
`UINT`	Unlock BB Int Clock
`LEXT`	Lock BB Ext Clock
`UEXT`	Unlock BB Ext Clock

Programming Example

To query the status of Baseband Reference.

```
RAD:ARB:CLOC:REF:ERR?
> LINT
```

UNLOCK/OVEN COLD Alarm

Remote command

UNLOCK/OVEN COLD: Query the status of the reference oscillator

Query

```
[:SOURce]:ROSCillator:STATus?
```

Response

```
<status>
```

Parameter

`<status>`	Status
`0`	Lock
`1`	Unlock
`2`	Oven Cold

Programming Example

To query the status of the reference oscillator.

```
ROSC:STAT?
> 2
```

EXTMOD Alarm

Remote command

EXTMOD: Check the external modulation input for “clipping” caused by overflow.

Query

```
[:SOURce[1]|2]:EXTMod:ERRor?
```

Response

`<boolean>` `NORM` (Normal) or `CLIP` (Clipping)

Programming Example

To check the external modulation input for “clipping” caused by overflow.

```
EXTM:ERR?
> NORM
```

Table 3.3.1-2 Common Indicator Status Information

Status information		
ARB	ARB	Indicates that the ARB function is being used.
SWEEP	SWEEP	Indicates that the SWEEP function is being used.
AM	AM	Indicates AM modulation is being executed.
FM	FM	Indicates FM modulation is being executed.
ΦM	ϕM	Indicates ϕM modulation is being executed.
PULSE	PULSE	Indicates Pulse modulation is being executed.
CORR	CORR User Correction	Indicates that the User Correction function is on.
AWGN	AWGN Additive White Gaussian Noise	Indicates AWGN signals are being output.
PLAY	PLAY	Indicates waveform patterns are being output.
WAIT	WAIT	Indicates waveform patterns has stopped.
WIDE	WIDE Wideband	Indicates that the bandwidth characteristic of RF output is Wideband mode.
INTCORR	INTCORR Internal Channel Correction	Indicates that correction in the baseband bandwidth is enabled.

3.3.2 Frequency information frame

The frequency information frame displays the information of frequencies.

There are two modes: frequency display and channel display.
Refer to Chapter 4 “Frequency”.



Figure 3.3.2-1 Frequency Information Frame (Frequency Display)



Figure 3.3.2-2 Frequency Information Frame (Channel Display)

3.3.3 Level information frame

The level information frame displays the information of levels.
Refer to Chapter 5 “Output Level”.

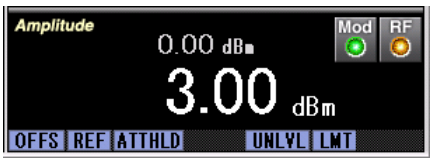


Figure 3.3.3-1 Level Information Frame

3.3.4 Active function frame

On the active function frame, you can enter numbers and characters for setting all parameters. When you select a parameter on the function menu, a dialog box is displayed. This frame is not displayed when there is no parameter to be set or when it is in the remote-control state.

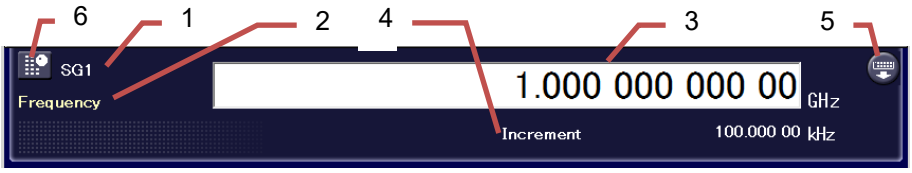


Figure 3.3.4-1 Numeric Input Dialog Box

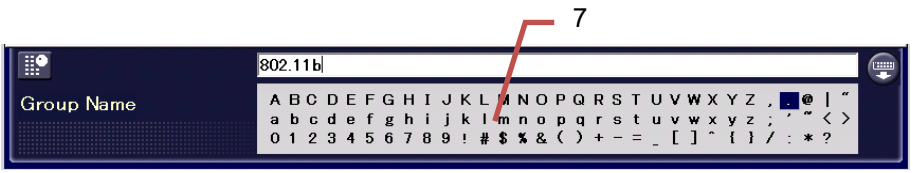


Figure 3.3.4-2 Character Input Dialog Box (Except for File Names)

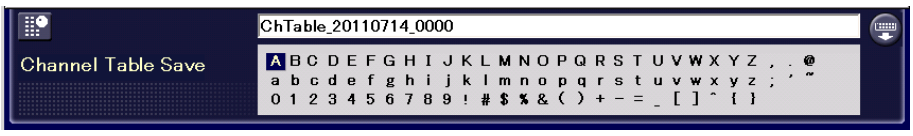


Figure 3.3.4-3 Character Input Dialog Box (File Names)

1. SG number
   Displays SG1 or SG2 to be set.
2. Function name
   Displays a function name to be set.
3. Text box
   Inputs or changes numeric values or character strings to be set.
4. Increment
   Displays a unit of step for setting with rotary knob or arrow keys.
5. Touch panel display switch
   Displays a touch panel for input.
   Refer to 3.5.1 “Specifying parameters as numeric values” and 3.5.2 “Setting character strings”.
6. Rotary knob switch
   Enables/locks the rotary knob.
   Refer to 3.5.1 “Specifying parameters as numeric values”.

7. Character pallet
   Displays available characters. The character selection cursor and the mouse can be used for input.
   Refer to 3.5.2 “Setting character strings”.
   Note:
   Character types available for file names and for names other than file names are different.

3.3.5 Function display frame

The function display frame displays the information of each function and setting in block diagrams and controls on the screen. This is not displayed in the remote-control state.

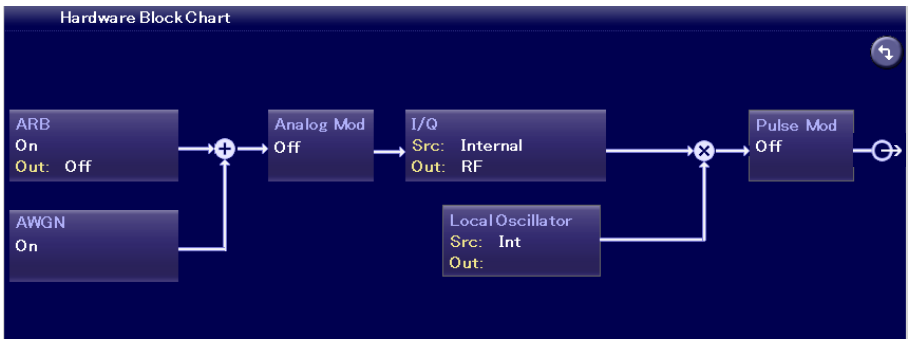


Figure 3.3.5-1 Function Display Frame Example

Hardware Block Chart

Displays the setting of the MG3710A/MG3710E/MG3740A, signal flow, and the current I/O setting status.

ARB Info

Shows the current waveform output status.

Sweep/List Info

Shows the setting status and progress of Sweep and List function.

BER

Shows the BER measurement status.

Table

Includes the channel table, correction table, and list table.

List

Includes the waveform file list, BER Log, and Alarm History.

The following keys can be used for creating and editing lists and tables.

Table 3.3.5-1 Keys Available for Creating and Editing Lists and Tables

Key name	Function
Rotary knob	Clockwise Moves the cursor from the left top to the right bottom sequentially. Counter clockwise Moves the cursor in reverse to the above.
	Moves the cursor horizontally.
	Moves the cursor vertically.
Enter key	Opens the setting dialog box of the item selected with the cursor.
Cancel key	Cancels the entered value and closes the setting dialog box.

3.3.6 Resident frame

The resident frame displays parameters of ARB, Power Meter, BER setting, and measured results.

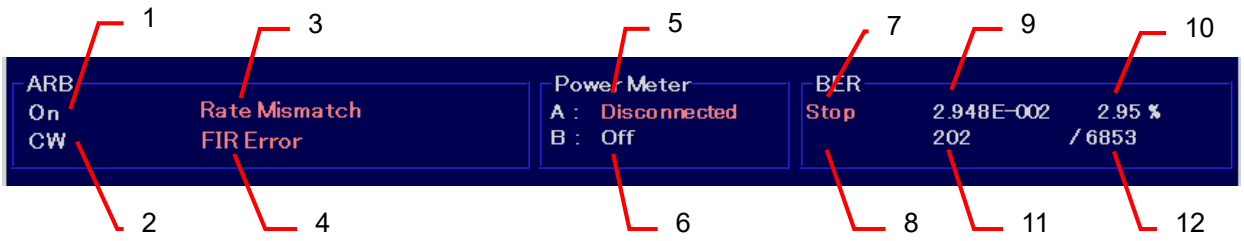


Figure 3.3.6-1 Resident Frame

ARB (Refer to Table 7.1.1-2 “Resident Display Frame ARB”.)

1 ARB On/Off information

2 Displays the combination of the waveform memory, CW, AWGN, and others output from ARB.

3 Rate Mismatch display

4 FIR Error display

Power Meter

5 A: On/Off/Disconnect information/Measured value

6 B: On/Off/Disconnect information/Measured value

BER Test

7 Status Stopped

Sync

Measuring

8 Error Clock ERR (Input clock error)

Enable ERR (Input enable signal error)

Sync Loss (Sync Loss occurred)

9 Rate An index is displayed.

10 Rate % display

11 Count Error count

12 Count Measured bits

3.3.7 Footer frame

The footer frame displays reasons and time of error messages or error information of indicators.



Figure 3.3.7-1 Footer Frame

1 Displays the error message ID.

2 Displays the error message.

(Ex: Data out of range)

3 Displays the error information (cause of the error).

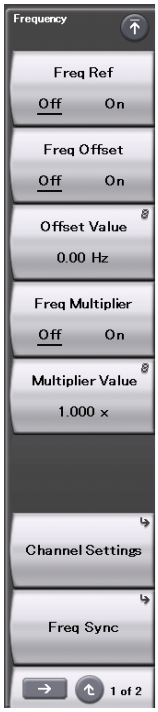
(Ex: Setting value out of range)

4 Displays the current time.

For explanations of error messages, refer to Appendix B “Error Messages”.

3.3.8 Function menu frame

The function menu frame is displayed on the right side of the screen and contains the following items. Items on the menu depend on the screen.



Function menu name		Displays the current function menu name.
Frequency	Others	
	Top key	Press to open the top function menu.
Function menu		Maximum 8 menus. Grayed out items cannot be used.
	Next key	Press to display the next page of the Function menu.
	Back key	Press to go back to the previous layer within the function menu.
1 of 2	**Page**	Indicates the page of the function menu.

Figure 3.3.8-1 Function Menu

The symbol on the upper right of each function menu key represents a behavior when pressing the function key. The meanings of each symbol are explained below.

- Press the soft function key to display the function menu on the next layer.

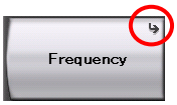


Figure 3.3.8-2 Function Key with Symbol

• Function key without a symbol. There are 2 types.

The function key with multiple options:

Each time you press the function key, the underline of option moves in the function menu.

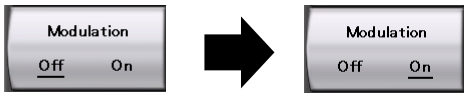


Figure 3.3.8-3 Function Key without a Symbol

The function key to execute operation immediately:

Press the soft function key to execute the menu immediately. The display does not change.



Figure 3.3.8-4 Function Key without a Symbol

• Press the soft function key to display an input dialog box in the active function frame.

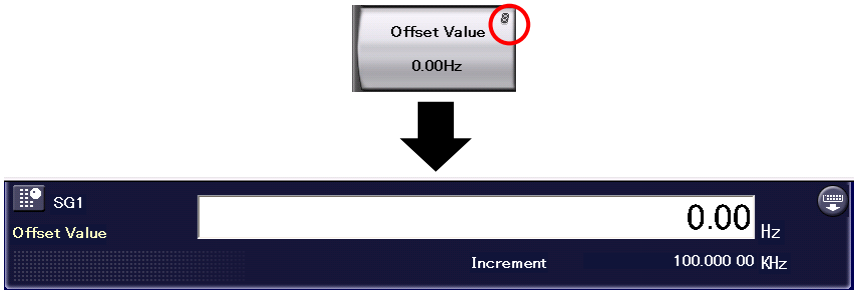


Figure 3.3.8-5 Function Key with Symbol

3.3.9 Display of 2SG

When two SGs are installed, SG that is not selected for control is displayed in the summary frame as below. The figure below shows the summary frame when SG2 is not selected.



Figure 3.3.9-1 Summary Frame

1 Displayed frequency

Displays the specified frequency. The relative display or the value with the offset is displayed.

2 Displayed output level

Displays the specified output. The relative display or the value with the offset is displayed.

3 Output status

Displays the RF output status.

Mod When it lights green, the RF output signals are modulated.

RF When it lights orange, the RF signals are output.

4 Alarm

Displays the alarm information of the common indicator only.

3.3.10 RPP

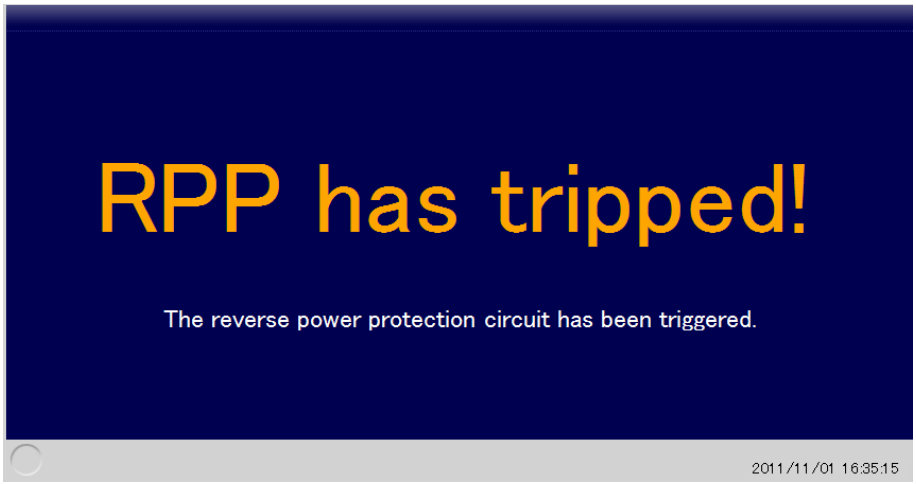


Figure 3.3.10-1 RPP Message

RPP (Reverse Power Protection) is a function to protect the internal circuit of the MG3710A/MG3710E/MG3740A against the reverse input signals. When the external high level RF signal is input to the RF Output terminal, the excessive reverse input is blocked by the relay circuit to prevent from being input to the MG3710A/MG3710E/MG3740A.

The RPP function is available only when the Option 043/143 and 073/173 are installed.

When the RPP function has worked, the message above is displayed. The RPP function menu is displayed, too.

Table 3.3.10-1 RPP Function Menu

Page	Key No.	Menu Display	Function
1	F1	Resume SG1&SG2 RPP	Unblocks signals and recovers to the normal operation if RPP blocks signals.

Remote command **Cancel the signal-block executed by RPP**

Command

```
:OUTPut:PROTection:RESume
```

Details

This command recovers both SG1 and SG2.

Programming Example

To cancel the signal-block executed by RPP.

```
OUTP:PROT:RES
```

Remote command

Query RPP Status

Query

```
:OUTPut[1]|2:PROTection:ERRor?
```

Response

```
<boolean>
```

Parameter

<boolean>	RPP Status
0	RPP does not block signals.
1	RPP blocks signals.

Programming Example

To query RPP Status of SG1.

```
OUTP:PROT:ERR?
> 1
```

Remote command

Query the count of RPP

Query

```
:OUTPut[1]|2:PROTection:COUNt?
```

Response

<integer>	Count of RPP
Range	0 to 4294967295 (= 2^32 – 1)
Resolution	1

Programming Example

To query the RPP count of SG2.

```
OUTP2:PROT:COUN?
> 10
```

3.4 Top Function Menu

Press Menu to display the top function menu.

Table 3.4-1 Top Function Menu

Page	Key No.	Menu Display	Function
1	F1	Frequency	Displays the Frequency function menu. Refer to Chapter 4 “Frequency”
	F2	Level	Displays the Level function menu. Refer to Chapter 5 “Output Level”
	F3	Sweep/List	Displays the Sweep/List function menu. Refer to Chapter 6 “Sweep/List”
	F4	Mode	Displays the Mode function menu. Refer to Chapter 7 “Modulation”
	F6	Modulation Off On	Turns On/Off the RF signal modulation. When Off is selected, carrier waves (CW) are output. Refer to 3.4.1 “Modulation”
	F7	RF Output Off On	Enables/disables the RF signal output. Refer to 3.4.2 “RF Output”
	F8	SG Port 1 2	Selects the SG to be controlled. Refer to 3.4.3 “SG Port”
2	F1	AWGN	Displays the AWGN function menu. They are not displayed in MG3740A Refer to 7.5 “AWGN”
	F2	I/Q	Displays the I/Q function menu. Refer to 7.6 “I/Q Modulation”.
	F3	Analog/Pulse	Displays the Analog/Pulse function menu. Refer to 7.2 “Analog Modulation: Analog/Pulse”.
	F4	Route Connectors	Displays the Route Connectors function menu. Refer to 7.4 “Route Connectors”.
	F5	Auxiliary	Displays the Auxiliary function menu. Refer to 9.1 “Auxiliary Function”.
	F6	Utility	Displays the Utility function menu. Refer to 9.4 “Utility Function”.

3.4.1 Modulation



or **Top**>**Modulation**

Turns On/Off the RF signal modulation .

Press **F6 Modulation** to set the SG output signal modulation to On/Off. This behaves same as **Mod On/Off** on the front panel.

Off	Turns the modulation of SG output signals Off (no modulation, Default).
On	Modulates SG output signals. The **Mod On/Off** LED (green) on the front panel and "Mod" of the output status (green) in the level information frame light.

Remote command

Toggle On/Off RF signal modulation

Command

```
:OUTPut[1]|2:MODulation[:STATe] <boolean>
```

Query

```
:OUTPut[1]|2:MODulation[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Modulation On/Off
OFF|0	Modulation Off (Default)
ON|1	Modulation On

Programming Example

To turn the modulation On.

```
OUTP:MOD ON
OUTP:MOD?
> 1
```

3.4.2 RF Output

On/Off or **Top**>**RF Output**

Enables/disables the RF signal output.

Press **F7 RF Output** to turn the output of SG signals On/Off. When RF Output is On, the **SG On/Off** LED (yellow) on the front panel and "RF" display of the output status (yellow) in the level information frame light. This behaves same as **RF On/Off** on the front panel.

Off	Stops outputting RF signals (Default).
On	Outputs RF signals from the connector on the front panel. The **SG On/Off** LED (yellow) on the front panel and "RF" display of the output status (yellow) in the level information frame light.

Remote command

Toggle On/Off RF signal output

Command

```
:OUTPut[1]|2[:STATe] <boolean>
```

Query

```
:OUTPut[1]|2[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Output On/Off
OFF|0	Output Off (Default)
ON|1	Output On

Programming Example

To turn the output On.

```
OUTP ON
OUTP?
> 1
```

3.4.3 SG Port

SG1 SG2 or **Top**>**SG Port**

Selects the SG to be controlled.

Press **F8 SG Port** to select SG to be controlled. This is available when SG2 (Option 062/162, 064/164, 066/166) is installed. These behave same as **SG1** and **SG2** on the front panel.

1 Controls SG1 (Default).

2 Controls SG2.

Remote command

Select SG to be controlled

Command

```
[:SOURce]:PORT 1|2
```

Query

```
[:SOURce]:PORT?
```

Response

```
<port>
```

Parameter

<port>	Controlled
1	SG1 (Default)
2	SG2

Programming Example

To control SG2.

```
PORT 2
PORT?
> 2
```

3.5 Common Setting Operations

This section describes basic operations common to each screens.

3.5.1 Specifying parameters as numeric values

When you press a function key, the active function frame displays a numeric input dialog box where you can set parameters such as frequencies or output levels.



Figure 3.5.1-1 Numeric Input Dialog Box

A text box for numeric input is displayed in the upper part of the dialog box, while the increment step specified with rotary knob or arrow keys is displayed in the lower part.
The touch panel or the numeric keypad can be used for numeric input.

To input a numeric value using the touch panel:
The display of the MG3710A/MG3710E/MG3740A is a touch panel. Press the arrow key on the upper right of the numeric input dialog box to display the numeric keypad panel. Touch a number on the display to input the value. You can also enter a number by clicking it with a mouse.

 Displays the numeric keypad panel.

 Hides the numeric keypad panel.

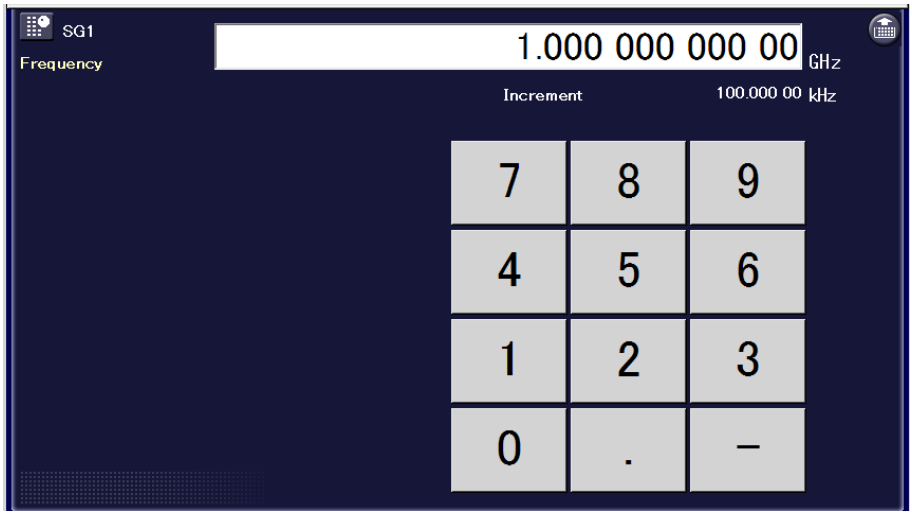


Figure 3.5.1-2 Numeric Keypad

To input a numeric value using the numeric keypad:
When you enter a numeric value using the numeric keypad, the value you entered is displayed in the text box. After inputting a numeric value, press the **Enter**, **Enter Item**, or unit key on the function menu to finalize it. When you press **Cancel** during the input process, the entered value becomes invalid and returns to the state before your input.

To increase/decrease a numeric values using the rotary knob:
Select a highlighted resolution using an arrow key (<)(>), and then rotate the rotary knob to the right to increase the digit. Rotate the rotary knob to the left to decrease the digit. Rotating the rotary knob specifies a number in real time.

Note:

The rotary knob has the lock function to avoid a misoperation. Pressing the lock key on the upper left allows you to lock the rotary knob. This function can be set only from the screen.


Enables the rotary knob.


Locks the rotary knob.



Figure 3.5.1-3 Locked Rotary Knob

To increase/decrease a numeric values using arrow keys:
Increase/decrease a numeric value using (^)(v). The step in which a numeric value is increased/decreased each time a step key is pressed varies according to the parameter. Handling arrow keys specifies a value in real time.

3.5.2 Setting character strings

When you set a character string, the active function frame displays a dialog box to input character strings.

When you enter Group Name, the **Group Name** dialog box is displayed.

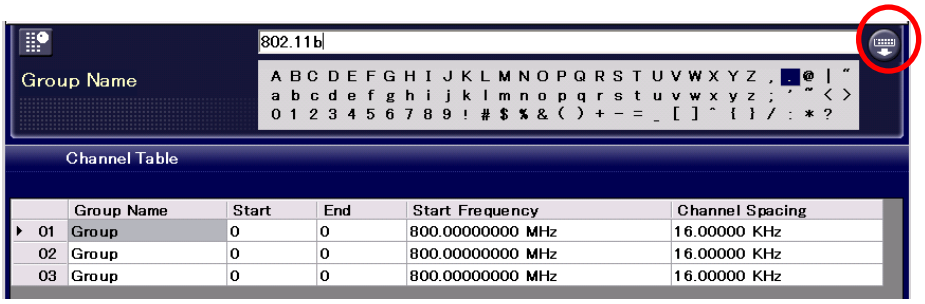


Figure 3.5.2-1 Character String Input Dialog Box

A text box for character string input is displayed in the upper part of the dialog box, while the character pallet containing available characters is displayed in the lower part. You can enter characters by directly clicking on the character pallet with the mouse.

Press the arrow key on the upper right of the numeric input dialog box to display the character string input panel. Touch a character on the display to input it. You can also enter a character by clicking it with the mouse.

 Displays the character string input panel.

 Hides the character string input panel.

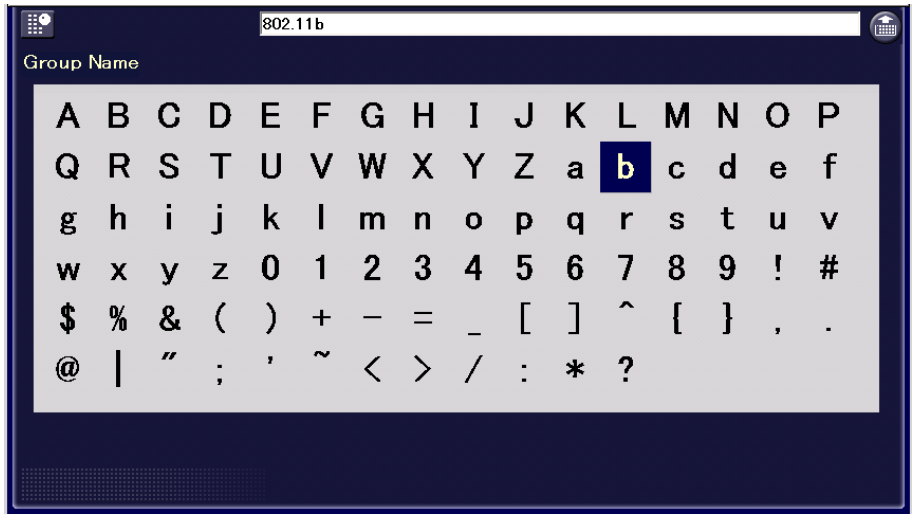


Figure 3.5.2-2 Character String Input Panel

Keys available for character string input are as follows:

Table 3.5.2-1 Keys Available for Character String Input

Key name	Function
Rotary knob	Moves character string input pallet/panel character selection cursor horizontally
Arrow keys, 	Moves character string input text box input cursor horizontally
Numeric keypad	Directly inputs numbers (from 0 to 9), ".", and "-". After pressing **Shift**, you can input alphabets (from A to F).
Enter	Inserts the character selected by the character selection cursor on the position where the input cursor locates.
BS	Deletes the character before the input cursor.
Cancel	Stops inputting character strings and closes the window.

Notes:

- The maximum of 100 characters can be input as character strings.
- Characters available for character strings are displayed on the character pallet.
- The following characters cannot be used:
  \

3.5.3 Setting file names

When a file name such as a channel table must be set, the active function frame displays a dialog box to input file names, for example **Channel Table Save** dialog box.

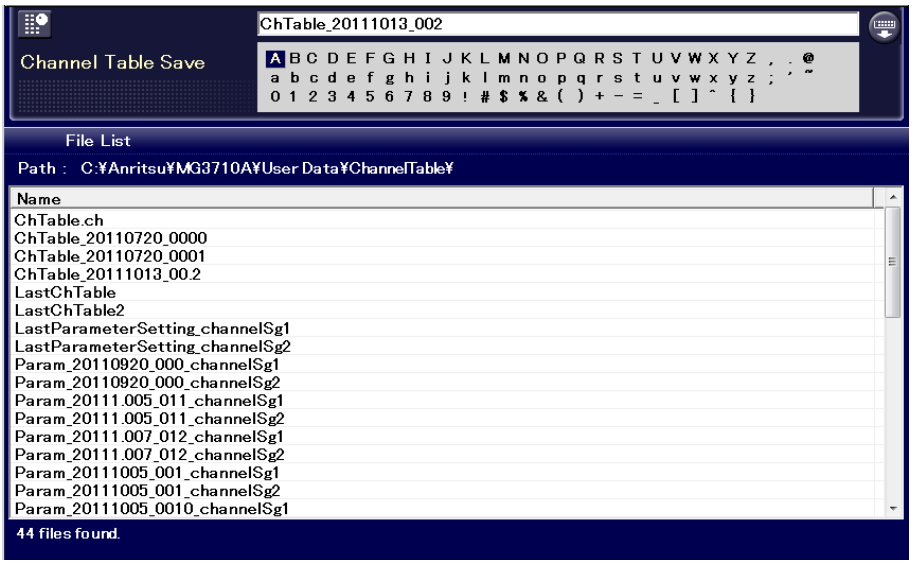


Figure 3.5.3-1 File Name Input Dialog Box

A text box for character string input is displayed in the upper part of the dialog box, while the character pallet containing available characters is displayed in the lower part.
You can also enter characters by directly clicking it on the character pallet with the mouse.

Refer to Table 3.5.2-1 “Keys Available for Character String Input” for keys available for character string input.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Example of a destination path:
  Anritsu\MG3710A\User Data\XXXXX\
- Example of a default destination name:
  XXXXXX_[Date]_[Additional number].xxx
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
  XXXXXX and xxx depend on file types.

- Characters available for file names are displayed on the character palette.
- The following characters cannot be used:
  \ / : * ? " ″ ' ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Chapter 4 Frequency

This chapter describes the functions for setting frequencies.

Note on remote command:
When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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4.1 Frequency

Frequency or **Top>Frequency**

When you press **Frequency** of the main function key or **F1 Frequency** on the top function menu, the MG3710A/MG3710E/MG3740A becomes the frequency setting mode and the **Frequency** or **Channel** dialog box is displayed in the active function frame. The Frequency function menu is displayed, too.

This chapter assumes that you press **Frequency** or **F1 Frequency** on the top function menu and the MG3710A/MG3710E/MG3740A is in the frequency setting mode, unless otherwise specified.

Frequency setting range and resolution

Frequency setting range

9 kHz to 2700 GHz (With MG3710A/MG3710E/MG3740A-032)
9 kHz to 4000 MHz (With MG3710A/MG3710E/MG3740A-034)
9 kHz to 6000 MHz (With MG3710A/MG3710E/MG3740A-036)
9 kHz to 2700 MHz (With MG3710A/MG3710E/MG3740A-062/162)
9 kHz to 4000 MHz (With MG3710A/MG3710E/MG3740A-064/164)
9 kHz to 6000 MHz (With MG3710A/MG3710E/MG3740A-066/166)

Frequency setting resolution 0.01 Hz

A frequency out of the range cannot be set or finalized, and the error screen is displayed.

Frequency setting methods are as follows:

- Frequency setting with the numeric keypad
- Frequency setting with the rotary knob
- Frequency setting with step keys

4.1.1 Display description

This section describes screens of the frequency information frame.

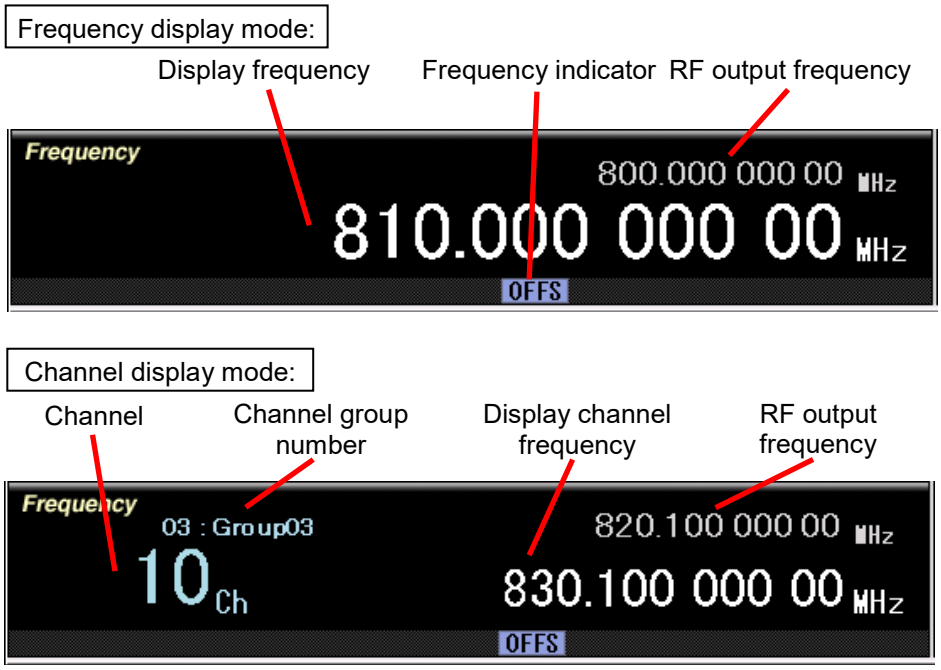


Figure 4.1.1-1 Frequency Setting Screen

Table 4.1.1-1 Items of Frequency Setting Screen

Display	Description
Display frequency	Indicates the specified frequency. A value is changed by enabling/disabling Freq Ref or Freq Offset.
RF output frequency	Indicates the actually output frequency.
Channel	Indicates the currently selected channel number.
Channel group number	Indicates a number of the channel group.
Display channel frequency	Indicates the frequency corresponding to the channel number.
Frequency indicator	Indicates the status of frequency setting.

4.1.2 Frequency indicator

Items of frequency indicators are as follows:

Table 4.1.2-1 Frequency Indicator

Display	Name	Description
OFFS	Offset	Indicates that the frequency offset function is on.
REF	Reference	Indicates that the frequency relative value display function is on.
MULT	Multiplier	Indicates that the frequency offset multiplier function is on.
OSYNC	Offset	Indicates that the frequency of either one of SGs is out of the specified range and cannot be synchronized when frequency synchronization is executed for SG1 and SG2.
EXTREF	Reference	Indicates that an external signal is used as a reference signal source.

Remote commands for items in the frequency indicator frame are as follows:

Out of specified range: OSYNC

Remote command

OSYNC: Query the status of frequency synchronization for SG 1 and SG2

Query

```
[:SOURce[1]|2]:FREQuency:SYNC:STATus?
```

Response

```
<status>
```

Parameter

<status>		Synchronization of frequencies
OOS	Out of Sync	Cannot synchronize frequencies because it stands out of the specified range.
NORM	Normal	Normal

Programming Example

To query the information of frequency synchronization for SG1 and SG2.

```
FREQ:SYNC:STAT?
> NORM
```

External reference signal: EXTREF

Remote command

EXTREF: Query the setting of the reference oscillator

Query

```
[:SOURce]:ROSCillator:SOURce?
```

Response

```
<status>
```

Parameter

<status>	Status

When the language mode is SCPI/MG3700:

INT	Internal reference signal source
EXT	External reference signal source

When the language mode is MS269X/MS2830:

INT	Internal reference signal source
INTU	Internal reference signal source (Unlock state)
EXT	External reference signal source
EXTU	External reference signal source (Unlock state)

Programming Example

To query the setting of the reference oscillator.

```
ROSC:SOUR?
> INT
```

4.2 Frequency Setting Method: Frequency

Frequency or **Top>Frequency**

When you press **Frequency** of the main function key or **F1 Frequency** on the top function menu, the MG3710A/MG3710E/MG3740A becomes the frequency setting mode and the **Frequency** dialog box is displayed in the active function frame. Enter numbers in the **Frequency** dialog box to set frequencies.

Remote command

Set Frequencies

Command

```
[:SOURce[1]|2]:FREQuency[:CW|:FIXed] <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency[:CW|:FIXed]?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Frequency
Range	Refer to 4.1 “Frequency”.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ
	When omitted Hz

Programming Example

To set the frequency to 800 MHz.

```
FREQ 800MHZ
FREQ?
> 800000000.00
```

4.2.1 Frequency setting with numeric keypad

Enter numbers in the Frequency dialog box.

Setting method

The procedure for setting frequencies with the numeric keypad is as follows.

Example: To set the frequency to 360.3 MHz

1. Press "**3**", "**6**", "**0**", "**.**", and "**3**" using number buttons of the numeric keypad or numbers on the screen. The screen below is displayed.



Figure 4.2.1-1 Frequency Dialog Box

2. Press the unit **F2 MHz** on the function key to finalize the numbers and the unit. The "360.300 000 00 MHz" is displayed in the **Frequency** dialog box and in the frequency information frame.



Figure 4.2.1-2 Frequency Dialog Box

360.3 MHz can be also set using one of the following:

- "0", ".", "3", "6", "0", "3", F1 GHz
- "3", "6", "0", "3", "0", "0", F3 kHz
- "3", "6", "0", "3", "0", "0", "0", "0", "0", F4 Hz

Digits of 0.01 Hz or smaller are truncated.

4.2.2 Changing frequencies with rotary knob

The rotary knob allows you to increase or decrease a digit of resolution selected by arrow keys (<)(>). The cursor shows the position of the digit.

Default value of the digit of resolution (the position of the cursor): 0.01 Hz.

Setting method

The procedure for setting frequencies with the rotary knob is as follows:

Example: To change the frequency from 360.3 MHz to 360.7 MHz by 100 kHz.

1. Use the arrow keys (<)(>) to place the cursor on the digit of 100 kHz.



Figure 4.2.2-1 Frequency Dialog Box

2. Rotate the rotary knob to the right to increase a frequency by 100 kHz step. Rotate it to the left to decrease the frequency by 100 kHz. Using this method, rotate the rotary knob to the right and specify the frequency to 360.7 MHz.

4.2.3 Changing frequencies with arrow keys

Arrow keys ↑↓ enable you to increase or decrease a digit of resolution selected by arrow keys ←→. The cursor shows the position of the digit.

Default value of frequency step: 100 kHz

Setting method

The procedure for setting frequencies with the arrow keys is as follows:

Example: To change the frequency from 360.3 MHz to 360.7 MHz by 100 kHz.

1. Set the frequency to 360.3 MHz.
2. Use the arrow keys ←→ to place the cursor on the digit of 100 kHz.



Figure 4.2.3-1 Frequency Dialog Box

3. Use the arrow keys ↑↓ to increase or decrease the frequency by 100 kHz step.

4.2.4 Frequency setting resolution

Frequency or **Top>Frequency** Incr Set

Sets a resolution of arrow keys ⌃⌄ for setting frequencies.

When the MG3710A/MG3710E/MG3740A is in the frequency setting mode, press **Incr Set** of the main function key to display the **Increment** dialog box. Enter numbers in the **Increment** dialog box to specify a resolution of arrow keys ⌃⌄.

Remote command

Specify a frequency setting resolution

Command

```
[:SOURce[1]|2]:FREQuency:STEP[:INCRement] <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:STEP[:INCRement]?
```

Response

`<freq>`	Unit: Hz

Parameter

`<freq>`	Step level
Range	0.01 Hz to 1 GHz
Resolution	0.01 Hz
Default	100 kHz
Suffix code	`HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ`
	When omitted Hz

Programming Example

To set the frequency step level to 200 kHz.

```
FREQ:STEP 200KHZ
FREQ:STEP?
>200000.00
```

Setting method

The procedure for specifying frequency setting resolution with the arrow keys is as follows:

Example: To change the frequency with the frequency setting resolution 9 kHz.

1. When the MG3710A/MG3710E/MG3740A is in the frequency setting mode, press **Incr Set** of the main function key to display the **Increment** dialog box in the active function frame.

2. Set the numeric value “9” to set the step frequency to 9 kHz.



Figure 4.2.4-1 Increment Dialog Box

3. Press the unit key “kHz” of the function key to set the step frequency to 9 kHz.



Figure 4.2.4-2 Increment Dialog Box

4. Use the arrow keys to increase or decrease the frequency by 9 kHz step.

4.3 Frequency Setting Items

Frequency or **Top>Frequency**

When you press **Frequency** of the main function key or **F1 Frequency** on the main function menu, the MG3710A/MG3710E/MG3740A becomes the frequency setting mode and the Frequency function menu is displayed.

Table 4.3-1 Frequency Function Menu

Page	Key No.	Menu Display	Function
1	F1	Freq Ref Off On	Enables/disables the frequency relative display. Refer to 4.3.1 “Frequency relative display”.
	F2	Freq Offset Off On	Enables/disables the frequency offset. Refer to 4.3.2 “Frequency offset”.
	F3	Offset Value 0.00 Hz	Sets the frequency offset value. Refer to 4.3.2 “Frequency offset”.
	F4	Freq Multiplier Off On	Enables/disables the frequency offset multiplier. Refer to 4.3.3 “Frequency offset multiplier”.
	F5	Multiplier Value 1.000 x	Sets the value of the frequency offset multiplier. Refer to 4.3.3 “Frequency offset multiplier”.
	F7	Channel Settings	Displays the channel setting function menu. Refer to 4.4 “Channel Setting”.
	F8	Freq Sync	Sets the frequency synchronization of SG1 and SG2. Refer to 4.6.1 “Frequency synchronization: Freq Sync”.

Table 4.3-1 Frequency Function Menu (Cont'd)

Page	Key No.	Menu Display	Function
2	F1	Phase Noise Opt. <200 kHz >300 kHz	Sets the phase noise optimization. Refer to 4.6.2 "Phase noise optimization: Phase Noise Optimize".
	F2	RF Spectrum Normal Reverse	Inverts the spectrum of RF output. This is available in MG3740A only when option-020/120 is installed. Refer to 4.6.3 "Spectrum reverse: RF Spectrum".
	F3	Ref Source Auto Int	Sets reference frequency source. Refer to 4.6.4 "Reference oscillator".
	F4	Ref Freq 10 MHz	Selects a frequency of external reference signal from 5 MHz, 10 MHz, and 13 MHz. Refer to 4.6.4 "Reference oscillator".
	F5	LO Source Int Ext/Sync	Sets a local signal source. This is available when the MG3710A/MG3710E-017/117 is installed. This is not available in MG3740A. Refer to 4.6.5 "Local signal source".
	F6	LO Out Off On	Adjusts the phase of a local signal. This is available when the MG3710A/MG3710E-017/117 is installed. This is not available in MG3740A. Refer to 4.6.5 "Local signal source".
	F7	LO Phase 0.00 deg	Displays the LO Phase screen and adjusts the LO phase. This is not available in MG3740A. Refer to 4.6.5 "Local signal source".
	F8	Ref Clock Adjustment	Displays the Freq Adjustment function menu and adjusts the frequency of the internal reference frequency signal. Refer to 4.6.6 "Ref Clock Adjustment".

4.3.1 Frequency relative display: Freq Ref

Frequency or **Top**>**Frequency,** >**Freq Ref**: Freq Ref
Enables/disables the frequency relative display.

The frequency relative display shows a difference from the reference output frequency.
When you turn the frequency relative display from Off to On, a difference from 0 Hz, which is the reference frequency, is displayed. Above it, the actual output frequency is displayed.

RF output frequency = display frequency + output frequency in the relative value display

Table 4.3.1-1 Frequency Relative Display Setting Example

	Example 1	Example 2	Example 3	Example 4
Output frequency	1.000 GHz	1.000 GHz	1.010 GHz	0.990 GHz
Frequency relative display	Off	0.00 Hz	10 MHz	–10 MHz
Displayed frequency	1.000 GHz	0.00 Hz	10 MHz	–10 MHz

Press **F1 Freq Ref** to switch the frequency relative display.
Off Displays frequencies in absolute values (Default).

On Display frequencies in relative values. The "REF" is displayed in the frequency indicator.

Remote command

Enable/disable the frequency relative display

Command

```
[:SOURce[1]|2]:FREQuency:REFerence:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:FREQuency:REFerence:STATe?
```

Response

<boolean> 0 or 1

Parameter

<boolean>	Frequency relative display On/Off
OFF|0	In absolute values (Default)
ON|1	In relative values

Programming Example

To enable the frequency relative display.

```
FREQ:REF:STAT ON
FREQ:REF:STAT?
> 1
```

4.3.2 Frequency offset

Freq Offset

Frequency or **Top**>**Frequency,** >**Freq Offset**

Enables/disables the frequency offset.

When the frequency offset is on, the frequency offset value specified with **F3 Offset Value** is added to the display frequency, and the actual output frequency is displayed above it.

Table 4.3.2-1 Frequency Offset Setting Example

	Example 1	Example 2	Example 3
Output frequency	1.000 GHz	1.000 GHz	1.000 GHz
Frequency offset	Off	10 MHz	–10 MHz
Displayed frequency	1.000 GHz	1.010 GHz	0.990 GHz

Press **F2 Freq Offset** to toggle On/Off of the frequency offset.

Off Does not use the frequency offset (Default).

On Uses the frequency offset. The "OFFS" is displayed in the frequency indicator.

Remote command

Enable/disable the frequency offset

Command

```
[:SOURce[1]|2]:FREQuency:OFFSet:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:FREQuency:OFFSet:STATe?
```

Response

`<boolean>` `0` or `1`

Parameter

`<boolean>`	Frequency offset On/Off
`OFF|0`	Does not use the frequency offset (Default).
`ON|1`	Uses the frequency offset.

Programming Example

To use the frequency offset.

```
FREQ:OFFS:STAT ON
FREQ:OFFS:STAT?
> 1
```

Frequency Offset Value: Offset Value

Frequency or **Top**>**Frequency, >Offset Value**

Sets the frequency offset value.

Press **F3 Offset Value** to set a frequency offset value in the Offset Value dialog box in the active function frame.

Setting range	–200 GHz to 200 GHz
Resolution	0.01 Hz
Default	0 Hz

Remote command

Set the frequency offset value

Command

```
[:SOURce[1]|2]:FREQuency:OFFSet <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:OFFSet?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Offset value
Setting range	–200 GHz to 200 GHz
Resolution	0.01 Hz
Default	0 Hz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Programming Example

To set the frequency to 50 MHz.

```
FREQ:OFFS 50MHZ
FREQ:OFFS?
> 50000000.00
```

4.3.3 Frequency offset multiplier

Frequency offset multiplier: Freq Multiplier

Frequency or **Top**>**Frequency,** >**Freq Multiplier**

Sets a frequency offset multiplier.

When this function is on, the actual output frequency is multiplied by a frequency offset multiplier and the result is displayed. Above the result, the actual output frequency is displayed.

Table 4.3.3-1 Frequency Offset Multiplier Setting Example

	Example 1	Example 2	Example 3
Output frequency	1.000 GHz	1.000 GHz	1.000 GHz
Frequency offset multiplier	Off	2	–2
Displayed frequency	1.000 GHz	2.000 GHz	–2.000 GHz

Press **F4 Freq Multiplier** to enable/disable the frequency offset multiplier.

Off	Does not use the frequency offset multiplier. (Default)
On	Uses the frequency offset multiplier. The "MULT" is displayed in the frequency indicator.

Remote command

Enable/disable the frequency offset multiplier

Command

```
[:SOURce[1]|2]:FREQuency:MULTiplier:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:FREQuency:MULTiplier:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Frequency offset multiplier On/Off
OFF|0	Does not use the frequency offset multiplier. (Default)
ON|1	Uses the frequency offset multiplier.

Programming Example

To enable the frequency offset multiplier.

```
FREQ:MULT:STAT 1
FREQ:MULT:STAT?
> 1
```

Frequency offset multiplier: Multiplier Value

Frequency or **Top**>**Frequency,** >**Multiplier Value**

Sets the value of the frequency offset multiplier.

Press **F5 Multiplier Value** to set a value in the Multiplier Value dialog box in the active function frame.

Setting range	–1000 to –0.001, 0.001 to 1000
Resolution	0.001
Default	1

Remote command

Set a frequency offset multiplier

Command

```
[:SOURce[1]|2]:FREQuency:MULTiplier <ext_numeric>
```

Query

```
[:SOURce[1]|2]:FREQuency:MULTiplier?
```

Response

```
<ext_numeric>
```

Parameter

```
<ext_numeric>
```

Setting range	–1000 to –0.001, 0.001 to 1000
Resolution	0.001
Default	1

Programming Example

To set a frequency offset multiplier to 0.5.

```
FREQ:MULT 0.5
FREQ:MULT?
> 0.500
```

4.4 Channel Setting

Frequency or **Top>Frequency, >Channel Settings**

When you press Frequency of the main function key or **F1 Frequency** on the main function menu, the MG3710A/MG3710E/MG3740A becomes the frequency setting mode. When you press **F7 Channel Settings** on the Frequency function menu, the Channel Setting function menu is displayed and the MG3710A/MG3710E/MG3740A becomes the channel setting mode. Refer to 4.5 "Channel Table: Edit Table" for the explanation about channels.

This section assumes that you press **F7 Channel Settings** and the MG3710A/MG3710E/MG3740A is in the channel setting mode, unless otherwise specified.

Table 4.4-1 Channel Settings Function Menu

Page	Key No.	Menu Display	Function
1	F1	Display Freq Channel	Selects either frequency or channel for inputting and displaying the RF frequency. Refer to 4.4.1 "Frequency/channel display: Display".
	F2	Frequency Off On	Selects whether or not to display the frequency when Channel is selected by **F1 Display**. Refer to 4.4.2 "Frequency display: Frequency".
	F3	Channel 0	Selects a Channel number when Channel is selected by **F1 Display**. Refer to 4.4.3 "Channel selection: Channel".
	F4	Channel Group No Group	Selects a Channel Group. Refer to 4.4.4 "Channel Group".
	F8	Edit Table	Creates and edits a channel table. Refer to 4.5 "Channel Table: Edit Table".

4.4.1 Frequency/channel display: Display

Frequency or **Top>Frequency, >Channel Settings >Display**

Selects either frequency or channel for inputting and displaying the RF frequency.

Press **F1 Display** on the Channel Settings function menu to switch "Freq" and "Channel".

Freq	Frequency display (Default)
Channel	Channel display

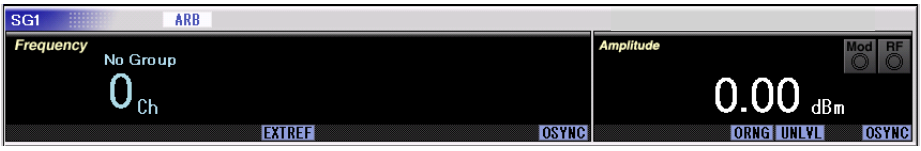


Figure 4.4.1-1 Channel Display

Remote command

Select either frequency or channel for inputting and displaying the RF frequency

Command

```
[:SOURce[1]|2]:FREQuency:TYPE FREQuency|CHANnel
```

Query

```
[:SOURce[1]|2]:FREQuency:TYPE?
```

Response

```
<mode>
```

Parameter

```
<mode>
```

FREQuency	Frequency display (Default)
CHANnel	Channel display

Programming Example

To set channel for inputting and displaying the RF frequency.

```
FREQ:TYPE CHAN
FREQ:TYPE?
> CHAN
```

4.4.2 Frequency display: Frequency

Frequency or **Top>Frequency, >Channel Settings>Frequency**

Displays/hides the frequency when a channel number is displayed on the screen. This function is available only in the channel setting mode.

Press **F2 Frequency** on the Channel Settings function menu to toggle On/Off.

Off	Does not display Frequency
On	Displays frequency (Default)

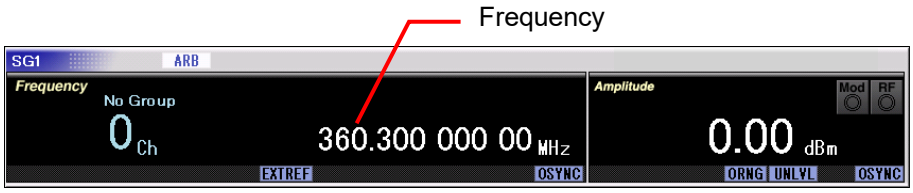


Figure 4.4.2-1 Channel and Frequency Display

Remote command

Display/hide the frequency in the channel setting mode

Command

```
[:SOURce[1]|2]:FREQuency:CHANnels:DISPlay <boolean>
```

Query

```
[:SOURce[1]|2]:FREQuency:CHANnels:DISPlay?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Frequency display
OFF|0	Does not display Frequency
ON|1	Displays frequency (Default)

Programming Example

To display the frequency.

```
SOUR2:FREQ:CHAN:DISP ON
SOUR2:FREQ:CHAN:DISP?
> ON
```

4.4.3 Channel selection: Channel

Frequency or **Top**>**Frequency,** >**Channel Settings**>**Channel**

Sets a channel specified in the channel table.
This function is available only in the channel setting mode.

Press **F3 Channel** on the Channel Settings function menu to set a channel in the **Channel** dialog box in the active function frame.

Remote command

Set a channel number

Command

```
[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer <ext_integer>
```

Query

```
[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Channel number
Setting range	The channel range of a channel group (Up to 20000)
Resolution	1
Default	0

Programming Example

To set a channel number to 100.

```
FREQ:CHAN:NUMB 100
FREQ:CHAN:NUMB?
> 100
```

Setting method

Using the rotary knob or arrow keys

Use the arrow keys to place the cursor on the digit to be changed, and use the rotary knob or the arrow keys to specify a number. Rotate the rotary knob to the right or press to increase the channel number. Rotate the rotary knob to the left or press to decrease the channel number.

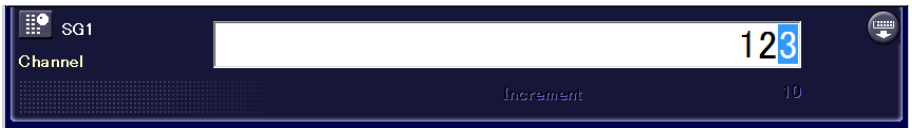


Figure 4.4.3-1 Channel Dialog Box

If the rotary knob is turned clockwise or ⌒ is pressed with the end channel number selected, the cursor moves to the start channel of the next channel group. This rule, however, does not apply to the end channel number of the end channel group.

If the rotary knob is turned counterclockwise or ⌒ is pressed with the start channel number selected, the cursor moves to the end channel of the previous channel group. This rule, however, does not apply to the start channel number of the start channel group.

Using the numeric keypad

Enter a number in the **Channel** dialog box using the numeric keypad, and then press **F1 Enter** to finalize the value. The channel is displayed in the SG information display frame. If you press **Cancel** before pressing **F1 Enter**, the entered value becomes invalid and returns to the state before your input.

Only a channel belonging to the same group as the current channel can be specified using the numeric keypad.

4.4.4 Channel Group

Frequency or **Top**>**Frequency, >Channel Settings**>**Channel Group**

Sets a channel group specified in the channel table.
This function is available only in the channel setting mode.

Press **F4 Channel Group** on the Channel Settings function menu to display the Channel Group function menu and select Channel Group to be used. Press → to display page 2 and 3.

Setting range 1 to 19

Remote command

Set a channel group

Command

```
[:SOURce[1]|2]:FREQuency:CHANnels:GROup <ext_integer>
```

Query

```
[:SOURce[1]|2]:FREQuency:CHANnels:GROup?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Channel group number
Setting range	1 to groups of the channel group table (up to 19)

Programming Example

To set a channel group to 2.

```
FREQ:CHAN:GRO 2
FREQ:CHAN:GRO?
> 2
```

4.5 Channel Table: Edit Table

Frequency or **Top**>**Frequency,** >**Channel Settings**>**Edit Table**

This function is available only in the channel setting mode.

On the MG3710A/MG3710E/MG3740A, you can assign a channel number to any frequency. In addition, channels with a certain frequency interval can be registered as a channel group. The maximum 19 channel groups can be registered as a channel table.

Press **F8 Edit Table** on the Channel Settings function menu to display the Channel Table and the Channel Table Edit function menus.

Select items to set using the cursor on the table and press **F1 Edit Item** to enter values in the displayed dialog boxes. Refer to 4.5.1 "Registering channel groups" for setting methods.

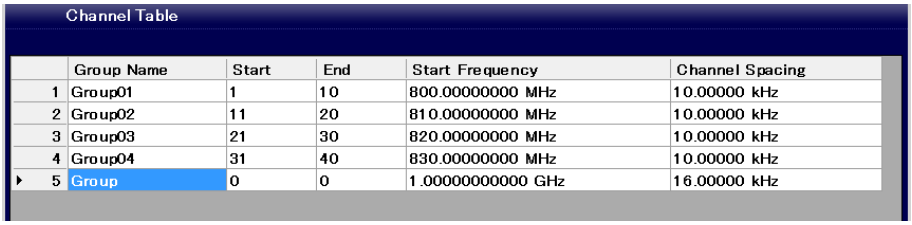


Figure 4.5-1 Channel Table Dialog Box

Table 4.5-1 Display Items of Channel Table

Display	Description
Group Name	Channel group name
Start	The beginning channel number of the channel group
End	The last channel number of the channel group
Start Frequency	The beginning channel frequency
Channel Spacing	The interval in frequency between channels

Table 4.5-2 Channel Table Edit Function Menu

Page	Key No.	Menu Display	Function
1	F1	Edit Item	Displays input dialog boxes for items selected by the cursor in the Channel Table of the active function frame where you can enter appropriate numbers. Refer to 4.5.1 “Registering channel groups”.
	F2	Insert Row	Adds a channel group row above the Channel Table. Refer to 4.5.2 “Adding channel groups: Insert Row”.
	F3	Delete Row	Deletes one row of Channel Group selected by cursor on Channel Table. Refer to 4.5.3 “Deleting channel groups: Delete Row”.
	F4	Clear	Clears the data of all channel groups in the Channel Table. Refer to 4.5.4 “Deleting channel tables: Clear”.
	F7	Open	Recalls the data of the Channel Table. Refer to 4.5.5 “Recalling channel tables: Open”.
	F8	Save	Saves the data of the Channel Table. Refer to 4.5.6 “Saving channel tables: Save”.

4.5.1 Registering channel groups

Frequency or **Top**>**Frequency**, >**Channel Settings**>**Edit Table**

Registers channel groups for setting channels.

Remote command

Register channel groups

Command

```
[:SOURce[1]|2]:FREQuency:CHANnels:EDIT
<ext_integer1>,<string>,<ext_integer2>,<ext_integer3>,<f
req1>,<freq2>
```

Parameter

<ext_integer1>	Group Number
Setting range	1 to 19
Default	1
<string>	Group Name Character string within 100 characters enclosed by double quotes (“ ”) or single quotes (‘ ’)
Default	Group
<ext_integer2>	Start Channel
Setting range	0 to 20000
Resolution	1
Default	0
<ext_integer3>	End Channel The End Channel setting must be larger than the Start Channel setting.
Setting range	0 to 20000
Resolution	1
Default	0
<freq1>	Start Frequency
Setting range	Frequency setting range of MG3710A/MG3710E/MG3740A Refer to 4.1 “Frequency”.
Resolution	0.01 Hz
Default	1 GHz
<freq2>	Channel Spacing
Setting range	1 Hz to 999.999999 MHz
Resolution	1 Hz
Default	16 kHz

Details

A blank row before the specified row position is padded with default values.

Programming Example

To set Group Number 03: Group Name 802.11b, Start Channel 1, End Channel 13, Start Freq. 2.412 GHz, and Channel Space 5 MHz.

```
FREQ:CHAN:EDIT 3,"802.11b",1,13,2.412GHZ,5MHZ
```

Setting method

The procedure for registering channel groups is as follows:

Example: To create a channel group on the fifth row of the channel table under the following condition:

- Group name: 802.11b
- Channels to be used: 1 to 13 channels
- The beginning channel frequency: 2.412 GHz
- The interval in frequency between channels: 5 MHz

(1) Specifying a group name

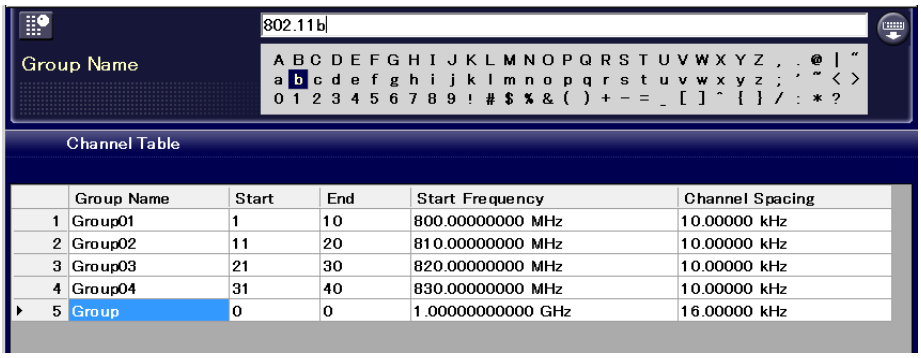


Figure 4.5.1-1 Group Name Dialog Box

1. Press **F2 Insert Row** to add an input row and place the cursor on the "Group Name" of the fifth row.
2. When you press **F1 Edit Item**, the **Group Name** dialog box and the Enter Item function menu is displayed in the active function frame.

Table 4.5.1-1 Enter Item Function Menu

Page	Key No.	Menu Display	Function
1	F1	Enter Item	Edits values and returns to the previous menu.
	F8	Cancel	Returns to the previous menu.

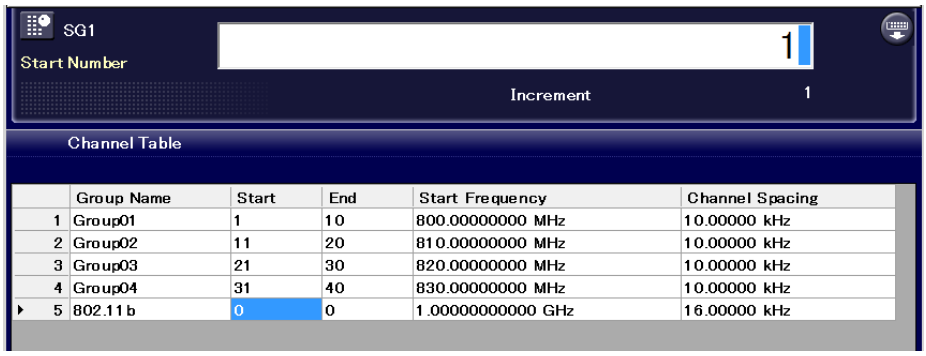
3. Enter a group name, "802.11b", in the **Group Name** dialog box.
4. Press **F1 Enter Item** to set the group name specified in the Channel Table and close the **Group Name** dialog box.

Notes:

- The maximum 100 characters are allowed for a group name.

- Characters in the character palette are available for group names.
- The following restrictions apply to group names with long character strings:
  Channel Setting, Channel Group Function Menus
  If the display range is exceeded, the display is zoomed-out. If the display range is still exceeded after zooming-out, the out-of-range parts are omitted.
- Group Name Display of Frequency Data Frame
  If the display range is exceeded, the out-of-range parts are omitted.

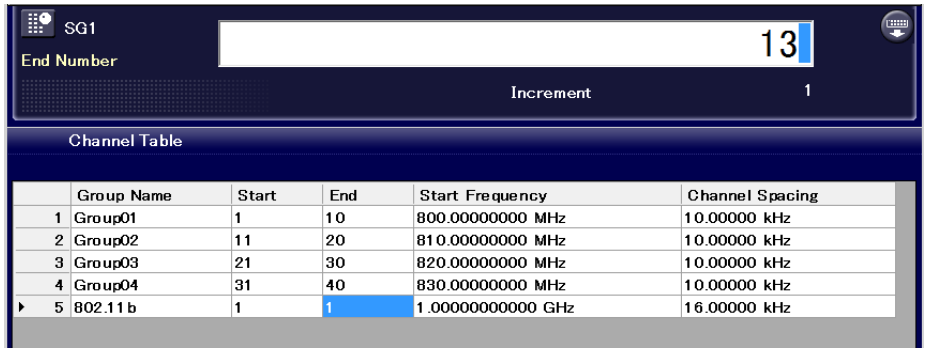
(2) Specifying channels to be used



	Group Name	Start	End	Start Frequency	Channel Spacing
1	Group01	1	10	800.00000000 MHz	10.00000 kHz
2	Group02	11	20	810.00000000 MHz	10.00000 kHz
3	Group03	21	30	820.00000000 MHz	10.00000 kHz
4	Group04	31	40	830.00000000 MHz	10.00000 kHz
▸ 5	802.11b	0	0	1.00000000000 GHz	16.00000 kHz

Figure 4.5.1-2 Start Number Dialog Box

1. Place the cursor on the “Start” of the fifth row.
2. Press **F1 Edit Item** to display the **Start Number** dialog box in the active function frame.
3. Use the numeric keypad to enter “1” in the **Start Number** dialog box.
4. Press **F1 Enter** to set the Start channel in the Channel Table and close the **Start Number** dialog box.



	Group Name	Start	End	Start Frequency	Channel Spacing
1	Group01	1	10	800.00000000 MHz	10.00000 kHz
2	Group02	11	20	810.00000000 MHz	10.00000 kHz
3	Group03	21	30	820.00000000 MHz	10.00000 kHz
4	Group04	31	40	830.00000000 MHz	10.00000 kHz
▸ 5	802.11b	1	1	1.00000000000 GHz	16.00000 kHz

Figure 4.5.1-3 End Number Dialog Box

5. Place the cursor on the “End” of the fifth row.
6. Press **F1 Edit Item** to display the **End Number** dialog box in the active function frame.
7. Use the numeric keypad to enter “13” in the **End Number** dialog box.
8. Press **F1 Enter** Item to set the End channel in the Channel Table and close the **End Number** dialog box.

Note:

The channel setting ranges 0 to 20000. The End channel, however, must be set to a number same as or more than the Start channel.

(3) Specifying the Start channel frequency and a frequency interval

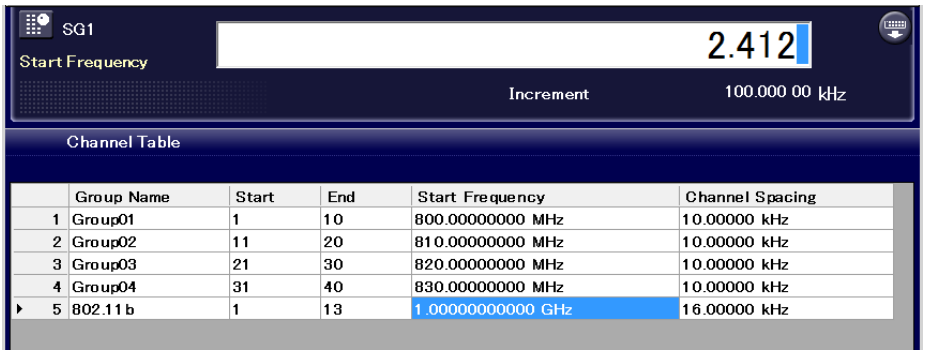
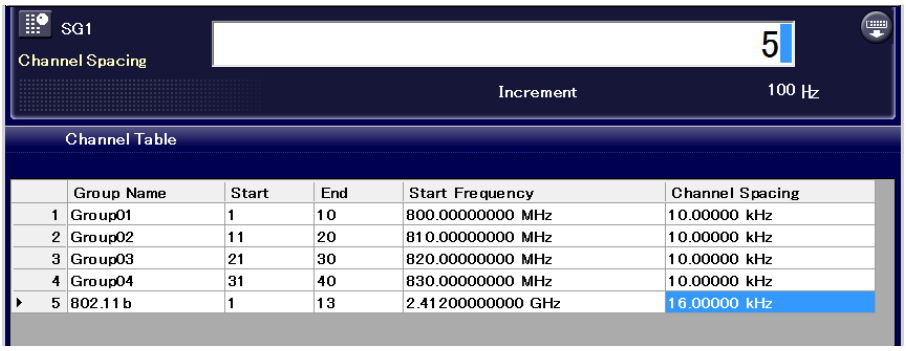


Figure 4.5.1-4 Start Frequency Dialog Box

1. Place the cursor on the “Start Frequency” of the fifth row.
2. Press **F1 Edit Item** to display the **Start Frequency** dialog box in the active function frame.

Settable range	Refer to 4.1 “Frequency”.
Resolution	0.01 Hz
Default	1 GHz

3. Use the numeric keypad to enter “2.412” in the **Start Frequency** dialog box.
4. Press the unit **F1 GHz** on the function menu to set a frequency of the Start channel in the Channel Table and close the **Start Frequency** dialog box.



	Group Name	Start	End	Start Frequency	Channel Spacing
1	Group01	1	10	800.00000000 MHz	10.00000 kHz
2	Group02	11	20	810.00000000 MHz	10.00000 kHz
3	Group03	21	30	820.00000000 MHz	10.00000 kHz
4	Group04	31	40	830.00000000 MHz	10.00000 kHz
5	802.11b	1	13	2.41200000000 GHz	16.00000 kHz

Figure 4.5.1-5 Channel Spacing Dialog Box

5. Place the cursor on the "Channel Spacing" of the fifth row.
6. Press **F1 Edit Item** to display the **Channel Spacing** dialog box in the active function frame.

Settable range	1 Hz to 999.999999 MHz
Resolution	1 Hz
Default	16 kHz

7. Use the numeric keypad to enter "5" in the **Channel Spacing** dialog box.
8. Press the unit **F2 MHz** on the function menu to set a frequency interval and close the **Channel Spacing** dialog box.

4.5.2 Adding channel groups: Insert Row

Frequency or **Top**>**Frequency,** >**Channel Settings**>**Edit Table**>**Insert Row**

Adds a row to create a channel group.

Use the following procedure to add a row using **F2 Insert Row**.

- When editing by creating a new setting, a row is added to the top of the Channel Group selected by the cursor on the Channel Table.
- When editing by reading an existing Channel Table using **F7 Open**, a row is added to the final row irrespective of the cursor position.

The procedure for inserting a row in the channel table is as follows:

Operation Example: To read existing Channel Table and insert new row

1. After loading the existing channel table by pressing **F7 Open**, press **F2 Insert Row** to insert a new row on the 6th row which is the last row.

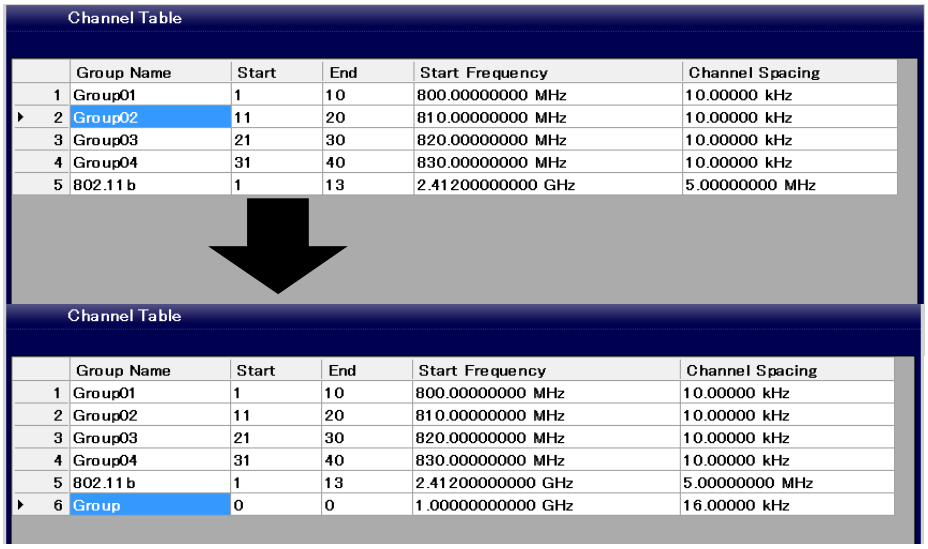


Figure 4.5.2-1 Inserted New Row

4.5.3 Deleting channel groups: Delete Row

Frequency or **Top**>**Frequency, >Channel Settings**>**Edit Table**>**Delete Row**

Deletes the selected channel group.

Use the cursor to select a group to delete, and press **F3 Delete Row** to delete it.

Remote command

Delete a channel group

Command

`[:SOURce[1]|2]:FREQuency:CHANnels:DELete <integer>`

Parameter

`<integer>`	No.
Setting range	1 to 19

Programming Example

To delete the 2nd channel group.

```
FREQ:CHAN:DEL 2
```

Setting method

Example: To delete the “Group” channel group on the 2nd row of the channel group

1. Press ↓ once and place the cursor on the “Group” of the 2nd row.
2. Press **F3 Delete Row** to delete a channel group on the 2nd row.
   The existing channel groups move up and are placed on the 2nd row or later.

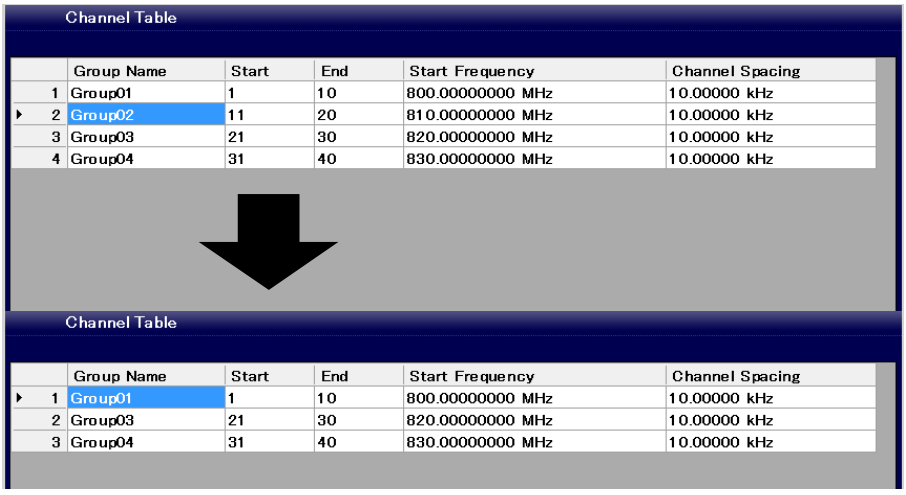


Figure 4.5.3-1 Deleted Channel Group

4.5.4 Deleting channel tables: Clear

Frequency or **Top**>**Frequency,** >**Channel Settings**>**Edit Table**>**Clear**

Press **F4 Clear** to delete all data in the channel table.

Remote command

Delete a channel table

Command

```
[:SOURce[1]|2]:FREQuency:CHANnels:DELete:ALL
```

Programming Example

To delete all data of the channel table.

```
FREQ:CHAN:DEL:ALL
```

Setting method

Press **F4 Clear** to delete all data in the channel table.

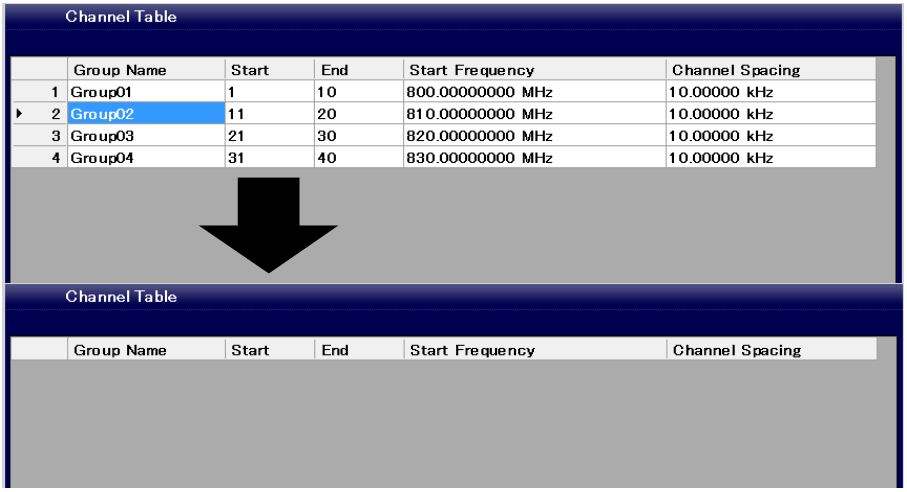


Figure 4.5.4-1 Deleted Channel Table

4.5.5 Recalling channel tables: Open

Frequency or **Top** >**Frequency,** >**Channel Settings**>**Edit Table**>**Open**

Recalls the saved channel table file.

Remote command

Recalls a channel table file

Command

```
:MMEMory[1]|2:LOAD:FREQuency:CHANnels <string>[,<device>]
```

Parameter

<string>	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Drive number
Options	A to Z, currently selected drive when omitted

Programming Example

To recall the "ABC" channel table file from D drive.

```
MMEM:LOAD:FREQ:CHAN "ABC",D
```

Setting method

The procedure is as follows:

1. Press **F7 Open** to open the Channel Table Recall function menu.

Table 4.5.5-1 Channel Table Recall Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies the Drive containing the channel table to recall.
	F7	Open	Recalls the channel table file in the folder specified in Drive.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select a drive containing the channel table file to recall.
3. The **Channel Table Recall** dialog box is displayed in the active function frame, and File List is displayed in the function display frame.

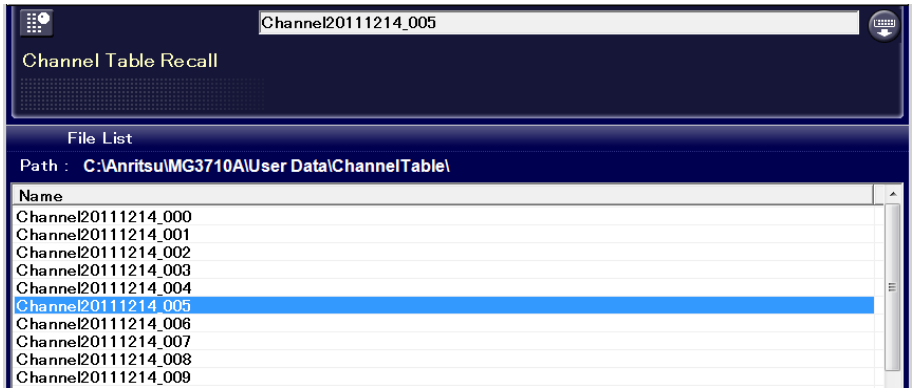


Figure 4.5.5-1 Channel Table Recall Dialog Box

4. Use the rotary knob or arrow keys to select a channel table file to recall.
5. Press **F7 Open** to recall the selected channel table file. Press **F8 Chancel** to return to the previous screen without recall the channel table file.

Notes:

- File names are listed in alphanumeric order.
- If no channel table file exists, “File not found” is displayed.

4.5.6 Saving channel tables: Save

Frequency or **Top**>**Frequency,** >**Channel Settings**>**Edit Table**>**Save**

Saves a channel table containing the specified parameters.

Remote command

Save a channel table

Command

```
:MMEMory[1]|2:STORe:FREQuency:CHANnels
[<string>[,<device>]]
```

Parameter

<string>	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " < > | Automatically named as "Channel_[Date]_[Additional number].ch" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Drive number
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.

A destination path to save the file will be the following directory in the specified drive.

Anritsu\MG3710A\User Data\ChannelTable\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To save the "ABC" channel table file in D drive.

```
MMEM2:STOR:FREQ:CHAN "ABC",D
```

Setting method

The procedure for saving a channel table is as follows:

Example: To name the channel table file currently displayed as "W-LAN" and save it

1. Press **F8 Save** to open the Channel Table Save function menu.

Table 4.5.6-1 Channel Table Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies a Drive where the channel table is saved.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F7	Save	Saves the channel table in the folder specified in Drive.
	F8	Cancel	Returns to the previous menu.

2. The **Channel Table Save** dialog box is displayed in the active function frame.
3. Press **F1 Drive** to select a destination drive. File List of the selected drive is displayed in the function display frame.

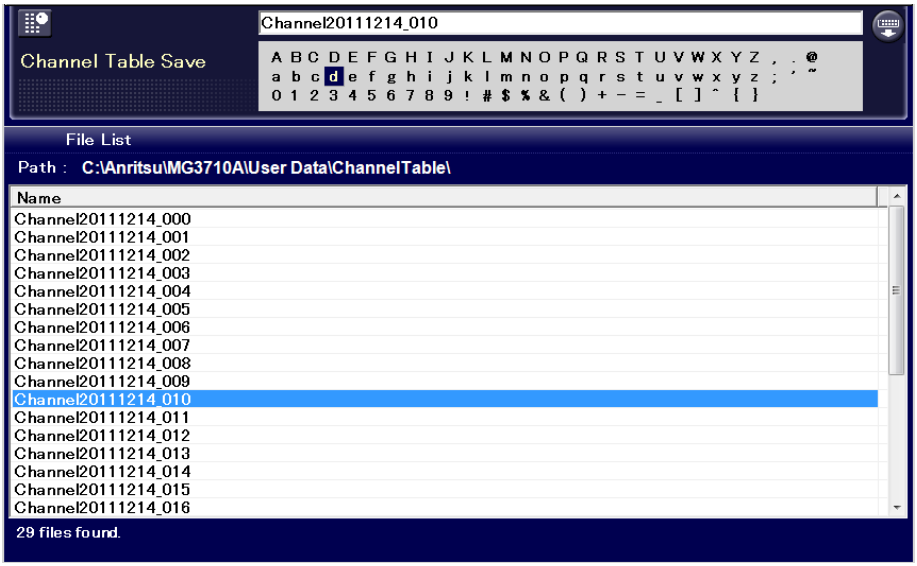


Figure 4.5.6-1 Channel Table Save Dialog Box

4. Enter a file name in the **Channel Table Save** dialog box.
   By default, the “Channel_Date_Additional number” is displayed in the text box.
5. Enter "W-LAN" in the dialog box and press **F7 Save**. The channel table file with the entered file name is saved, and the **Channel Table Save** dialog box closes.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path:
  Anritsu\MG3710A\User Data\ChannelTable\
- Default destination name:
  Channel_[Date]_[Additional number].ch
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character palette.
- The following characters cannot be used:
  \ / : * ? " ″ ` ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

4.6 Frequency-Related Functions

When you press **Frequency** of the main function key or **F1 Frequency** on the main function menu, the MG3710A/MG3710E/MG3740A becomes the frequency setting mode. This section assumes that you press **Frequency** and the MG3710A/MG3710E/MG3740A is in the Frequency Setting mode, unless otherwise specified.

4.6.1 Frequency synchronization: Freq Sync

Frequency or **Top>Frequency, >Freq Sync**

Sets the frequency synchronization of SG1 and SG2.

When you change the SG-side frequency specified for SG Port, the changed value is added to (Parallel) or decreased from (Symmetry) the other SG-side frequency.

Press **F8 Freq Sync** to display the Freq Sync function menu. Set the frequency synchronization of SG1 and SG2 and adjust frequencies.

This is available when the MG3710A/MG3710E/MG3740A-062/064/066/162/164/166 is installed.

Table 4.6.1-1 Freq Sync Function Menu

Page	Key No.	Menu Display	Function
1	F1	Freq Sync with SG Off On	Sets the frequency synchronization of SG1 and SG2. Synchronization cannot be enabled by a change such as the frequency offset.
	F2	Freq Sync Mode Parallel Symmetry	Sets a frequency synchronization mode when Freq Sync is On.

Frequency synchronization On/Off: Freq Sync

Frequency or **Top**>**Frequency,** >**Freq Sync**>**Freq Sync with SG**

Enables/disables the frequency synchronization of SG1 and SG2.

Press **F1 Freq Sync** on the Freq Sync function menu to set the frequency synchronization of SG1 and SG2.

Off	Does not synchronize frequencies (Default).
On	Synchronizes frequencies.

Remote command

Enable/disable the frequency synchronization of SG1 and SG2

Command

```
[:SOURce]:FREQuency:SYNC <boolean>
```

Query

```
[:SOURce]:FREQuency:SYNC?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Frequency synchronization
`OFF|0`	Does not synchronize frequencies (Default)
`ON|1`	Synchronizes frequencies

Details

This is available when the MG3710A/MG3710E/MG3740A-062/064/066/162/164/166 is installed.

Programming Example

To synchronize frequencies of SG1 and SG2.

```
FREQ:SYNC ON
FREQ:SYNC?
> 1
```

Frequency synchronization: Freq Sync Mode

Frequency or **Top**>**Frequency,** >**Freq Sync**>**Freq Sync Mode**

Sets a frequency synchronization mode when Freq Sync with SG is On.

Press **F2 Freq Sync Mode** on the Freq Sync function menu to set values.

Parallel	Parallel mode (Default) When you change the SG-side frequency specified for SG Port, the changed value is added to the other SG-side frequency.
Symmetry	Symmetry mode When you change the SG-side frequency specified for SG Port, the changed value is decreased from the other SG-side frequency.

Example:

Parallel	When you add 100 MHz to the frequency of SG1 Port, 100 MHz is also added to the SG2 Port frequency.
Symmetry	When you add 100 MHz to the frequency of SG1 Port, 100 MHz is decreased from the SG2 Port frequency.

Remote command

Set a frequency synchronization mode

Command

```
[:SOURce]:FREQuency:SYNC:MODE PARallel|SYMMetry
```

Query

```
[:SOURce]:FREQuency:SYNC:MODE?
```

Response

<mode>	1 or 0

Parameter

<mode>	Frequency synchronization
PARallel	Parallel mode (Default)
SYMMetry	Symmetry mode

Details

This is available when the MG3710A/MG3710E/MG3740A-062/064/066/162/164/166 is installed.

Programming Example

To set the frequency synchronization mode to Parallel.

```
FREQ:SYNC:MODE PAR
FREQ:SYNC:MODE?
> PAR
```

4.6.2 Phase noise optimization: Phase Noise Optimize

Frequency or **Top**>**Frequency,** >(→)>**Phase Noise Opt.**

Switching a loop character of PLL synthesizer circuit allows you to select a character of phase noise between Close-in Phase and Wide-Offset Phase.

Press (→) to switch the function menu to page 2.
Press **F1 Phase Noise Opt.** to select a character of phase noise.

Offset < 200 kHz	Best Close-in Phase noise (Default) Optimizes the Close-in Phase noise (Offset < 200 kHz).
Offset > 300 kHz	Best Wide-Offset Phase noise Optimizes the Wide-Offset Phase noise (Offset > 300 kHz).

Remote command

Select a character of phase noise

Command

```
[:SOURce[1]|2]:FREQuency:SYNThesis[:STATe] 1|2
```

Query

```
[:SOURce[1]|2]:FREQuency:SYNThesis[:STATe]?
```

Response

```
<mode>
```

Parameter

<mode>	Character of phase noise
1	Optimized Close-in Phase noise (Default)
2	Optimized Wide-Offset Phase noise

Programming Example

To set the phase noise character of SG2 to Best Wide-Offset Phase noise.

```
SOUR2:FREQ:SYNT 2
SOUR2:FREQ:SYNT?
> 2
```

4.6.3 Spectrum reverse: RF Spectrum

Frequency or **Top>Frequency, >(→)>RF Spectrum**

You can use the spectrum reverse function when reversed modulation signals must be input, for example evaluating DUT for IF.
In MG3740A, you can use the spectrum reverse function only when option-020/120 is installed.
When the modulation is on, this function swaps I and Q and inverts the spectrum of RF signals. For both the waveform memory A and B, the spectrum is inverted.
Similar to this, **F6 Spectrum A** and **F7 Spectrum B** of the ARB Setup function menu on page 2 invert the spectrum of the waveform memory A and the waveform memory B, respectively. Reversing RF Spectrum and Spectrum A or B simultaneously returns the status of output waveform to Normal.

Press (→) to switch the function menu to page 2.
Press **F2 RF Spectrum** to select spectrum of RF signals.

`Normal`	Does not invert the spectrum of output waveform. (Default)
`Reverse`	Inverts the spectrum of output waveform.

Remote command

Enable/disable the spectrum reverse

Command

```
[:SOURce[1]|2]:DM:POLarity[:ALL] NORMal|INVert
```

Query

```
[:SOURce[1]|2]:DM:POLarity[:ALL]?
```

Response

```
<mode>
```

Parameter

`<mode>`	Whether to invert output waveform
`NORMal`	Normal: Do not invert (Default)
`INVert`	Reverse: Invert

Programming Example

To invert the output waveform of SG1.

```
DM:POL INV
DM:POL?
> INV
```

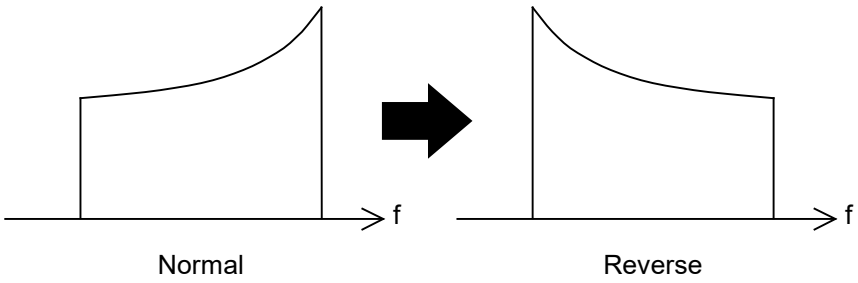


Figure 4.6.3-1 RF Spectrum: Two Waves Not Added

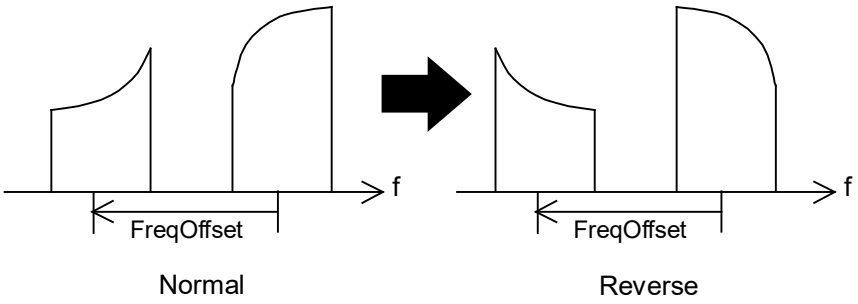


Figure 4.6.3-2 RF Spectrum: Two Waves Added

4.6.4 Reference oscillator

Reference oscillator: Ref Source

Frequency or **Top**>**Frequency,** >→>**Ref Source**

Sets reference frequency source.

Press → to switch the function menu to page 2.

Press **F3 Ref Source** to select a reference frequency source between Int and Auto. The "EXTREF" is displayed in the frequency indicator when the external signal is used as the reference frequency source.

Int	Uses the internal frequency source of the MG3710A/MG3710E/MG3740A as the reference frequency source.
Auto	Uses the internal frequency source of the MG3710A/MG3710E/MG3740A as the reference frequency source, when a reference signal is not detected from the REF IN connector on the rear panel. Uses an external frequency source as the reference frequency source, when a reference signal is detected from the REF IN connector on the rear panel. (Default)

Remote command

Set a reference frequency source

Command

```
[:SOURce]:ROSCillator:SOURce:AUTO <boolean>
```

Query

```
[:SOURce]:ROSCillator:SOURce:AUTO?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Frequency reference signal source
OFF|0	Sets a source to Int.
ON|1	Sets a source to Auto (Default).

Programming Example

To invert the output waveform.

```
ROSC:SOUR:AUTO OFF
ROSC:SOUR:AUTO?
> 0
```

External signal frequency: Ref Freq

Frequency or **Top**>**Frequency,** >→>**Ref Freq**

Set a frequency of external reference signal for the MG3710A/MG3710E /MG3740A.

When an external signal is used for a reference signal source, the frequency of the external signal must be set for the MG3710A/MG3710E /MG3740A.

Press → to switch the function menu to page 2.
Press **F4 Ref Freq** to display the Ref Oscillator Freq function menu and select a frequency of the signal from 5 MHz, 10 MHz (default), and 13 MHz.

Remote command

Set a frequency of the external reference signal

Command

```
[:SOURce]:ROSCillator:FREQuency:EXTernal <freq>
```

Query

```
[:SOURce]:ROSCillator:FREQuency:EXTernal?
```

Response

`<freq>`	Unit: Hz

Parameter

`<freq>`	Frequency of the external signal
Setting range	Either value of 5 MHz, 10 MHz (Default), or 13 MHz
Suffix code	`HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ` When omitted: HZ

Programming Example

To set the frequency of the reference frequency signal to 13 MHz.

```
ROSC:FREQ:EXT 13MHZ
ROSC:FREQ:EXT?
> 13000000
```

4.6.5 Local signal source

Local signal source: LO Source

Frequency or **Top>Frequency, >(→)>LO Source**

Sets a Local signal source.

This is available when the MG3710A/MG3710E-017/117 is installed.
This is not available in MG3740A.

This is an independent parameter for each SG. It can be set when in the modulation output status (when either AM, FM, ϕM, or Pulse modulation is On, or when the selected waveform setting is Mod = On).

Press (→) to switch the function menu to page 2.
Press **F5 LO Source** to select a signal source.

Int	Uses the internal Local signal source (Default).
Ext/Sync	SG1:Ext Uses the external Local signal source. SG2:Sync Uses the same local signal source of SG1.

Remote command

Set a Local signal source

Command

SG1:	[:SOURce[1]]:LOCal:SOURce INT|EXT
SG2:	[:SOURce2]:LOCal:SOURce INT|SYNC

Query

SG1:	[:SOURce[1]]:LOCal:SOURce?
SG2:	[:SOURce2]:LOCal:SOURce?

Response

<mode>

Parameter

<mode>	Local signal source
INT	Uses the internal Local signal source (Default).
EXT	Uses the external Local signal source. This is available only for SG1.
SYNC	Uses the Local of SG1. This is available only for SG2.

Details

This is available when the MG3710A/MG3710E-017/117 is installed.

Programming Example

To set a Local signal source to the external Local signal source.

```
LOC:SOUR EXT
LOC:SOUR?
> EXT
```

Local signal output: LO Out

Frequency or **Top>Frequency, >(→)>LO Out**

Selects the external output of Local signal between On and Off.

This is available when the MG3710A/MG3710E-017/117 is installed. This is not available in MG3740A.

This is a shared parameter for each SG. It can be set when the installed SG1 and SG2 are in the modulation status (when either AM, FM, ϕM, or Pulse modulation is On, or when the selected waveform setting is Mod = On).

Note:

When the MG3710A/MG3710E/MG3740A output signal EVM is to be measured, set LO Out to Off. If LO Out is set to On while the LO Out connector is opened, the MG3710A/MG3710E/MG3740A output signal EVM is degraded because of reflection.

Press (→) to switch the function menu to page 2.

Press **F6 LO Out** to select the external output between On and Off.

Off	Does not externally output Local signals (Default).
On	Externally outputs Local signals.

Remote command

Select the external output of Local signal between On and Off

Command

```
[:SOURce]:LOCal:OUT <boolean>
```

Query

```
[:SOURce]:LOCal:OUT?
```

Response

<boolean> 0 or 1

Parameter

<boolean>	Local signal source
OFF|0	Does not externally output Local signals (Default).
ON|1	Externally outputs Local signals.

Details

This is available when the MG3710A/MG3710E-017/117 is installed.

Programming Example

To externally output Local signals.

```
LOC:OUT ON
LOC:OUT?
> 1
```

Local phase adjustment: LO Phase

Frequency or **Top**>**Frequency,** >→>**LO Phase**

Adjusts phases of Local signals.

This is not available in MG3740A.

Press → to switch the function menu to page 2.

Press **F7 LO Phase** to display the **LO Phase** dialog box and set a phase.



Figure 4.6.5-1 LO Phase Dialog Box

Set a phase of RF output.

Setting range	–180.00 deg to 180.00 deg.
Resolution	0.01
Default	0

If the Local synchronization of the Baseband function is changed to On:
A phase cannot be set when the Local signal source of SG1 is External.
A phase cannot be set when the Local signal source of SG2 is Sync.

Remote command

Adjust a phase of Local signals

Command

```
[:SOURce[1]|2]:PHASe[:ADJust] <phase>
```

Query

```
[:SOURce[1]|2]:PHASe[:ADJust]?
```

Response

```
<phase>
```

Parameter

<phase>	Phase of Local signals
Setting range	–180.00 deg to 180.00 deg
Resolution	0.01
Default	0

Programming Example

To set a phase of the Local signal to 4.25 deg.

```
PHAS 4.25
PHAS?
> 4.25
```

4.6.6 Ref Clock Adjustment

Frequency or **Top>Frequency, >(→)>Ref Clock Adjustment**

Used for frequency calibration. For the calibration method, refer to 11.4 "Calibration".

Press (→) to switch the function menu to page 2.
Press **F8 Ref Clock Adjustment** to display the Freq Adjustment function menu and adjust frequencies of the internal reference frequency signals.

Table 4.6.6-1 Freq Adjustment Function Menu

Page	Key No.	Menu Display	Function
1	F1	Reference Clock 0	Adjusts the frequency of the internal reference frequency signal.
	F2	Preset Reference Clock	Resets the internal reference frequency signal to factory shipment defaults.

Reference clock frequency: Reference Clock

Frequency or **Top>Frequency, (→)>Ref Clock Adjustment>Reference Clock**

Adjusts the internal reference frequency signals.

Press **F1 Reference Clock** on the Freq Adjustment function menu to display the **Reference Clock** dialog box. Adjust the internal reference frequency signals.

Setting range	0 to 1023
Resolution	1
Default	Factory shipment defaults



Figure 4.6.6-1 Reference Clock Dialog Box

Remote command

Set the adjustment value of the internal reference frequency signals

Command

```
:CALibration:RCLock[:VALue] <integer>
```

Query

```
:CALibration:RCLock[:VALue]?
```

Response

```
<integer>
```

Parameter

<integer>	Adjustment value
Setting range	0 to 1023
Resolution	1
Default	Factory shipment defaults

Programming Example

To set the adjustment value of the internal reference frequency signal to 511.

```
CAL:RCL 511
CAL:RCL?
> 511
```

Preset reference clock: Preset Reference Clock

Frequency or **Top**>**Frequency**, >→>**Ref Clock Adjustment**>**Preset Reference Clock**

Resets adjustments of the internal reference frequency signal to factory shipment defaults.

Press **F2 Preset Reference Clock** on the Freq Adjustment function menu to reset values.

Remote command

Reset adjustment values of the internal reference frequency signal to factory shipment defaults

Command

```
:CALibration:RCLock[:VALue]:PRESet
```

Programming Example

To reset adjustment values of the internal reference frequency signal to factory shipment defaults.

```
CAL:RCL:PRES
```

Chapter 5 Output Level

This chapter describes the functions related to the level setting.

Note on remote command:

When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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5.1 Output Level

Level or **Top>Level**

When you press **Level** of the main function key or **F2 Level** on the top function menu, the MG3710A/MG3710E/MG3740A enters the output level setting mode and the **Level** dialog box is displayed in the active function frame.

This section assumes that you press **Level** and the MG3710A/MG3710E/MG3740A is in the output level setting mode, unless otherwise specified.

Output level setting range and resolution

The output level setting range varies depending on the options as follows:

Table 5.1-1 Output Level Setting Range

MG3710A/MG3710E/MG3740A-options				
SG1		SG2		
043/143 not installed		073/173 not installed		Setting range
042/142	041/141	072/172	071/171	
Not installed	Not installed	Not installed	Not installed	–110 dBm to +17 dBm
Installed	Not installed	Installed	Not installed	–144 dBm to +17 dBm
Not installed	Installed	Not installed	Installed	–110 dBm to +30 dBm
Installed	Installed	Installed	Installed	–144 dBm to +30 dBm
043/143 installed		073/173 installed		Setting range
042/142	041/141	072/172	071/171	
Not installed	Not installed	Not installed	Not installed	–110 dBm to +17 dBm
Installed	Not installed	Installed	Not installed	–144 dBm to +17 dBm
Not installed	Installed	Not installed	Installed	–110 dBm to +25 dBm
Installed	Installed	Installed	Installed	–144 dBm to +25 dBm

Output level resolution 0.01 dB

An output level out of the range cannot be set, and the error screen is displayed.

Output level setting methods are as follows:

- Output level setting with the numeric keypad
- Output level setting with the rotary knob
- Output level setting with the step keys

The setting methods are explained in the following pages.

5.1.1 Display description

Level or **Top>Level**

This section describes screens of the level information frame.

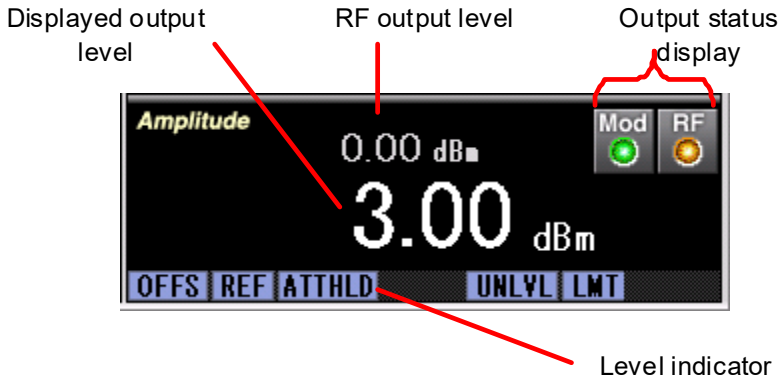


Figure 5.1.1-1 Output Level Setting Screen

Table 5.1.1-1 Output Level Setting Screen Display Item

Display	Description
Displayed output level	Indicates the output level setting value. A value is changed by enabling/disabling Ref (relative level display) or Offset.
RF output level	Indicates the actually output level.
Level indicator	Indicates the current status/warning of output level setting.
Output status display	Mod Green light indicates the output is a modulated signal. RF Orange light indicates the signal is being output.

Remote command

Query the RF output level

Query

```
[:SOURce[1]|2]:POWer:CURRent?
```

Response

<ampl> Unit: dBm

Parameter

<ampl>	Current output level
Range	Depends on the range set in Table 5.1-1 “Output Level Setting Range”.
Resolution	0.01 dB
Default	Depends on the range set in Table 5.1-1 “Output Level Setting Range”.

Example of Use

To query the actual output level.

```
POW:CURR?
> 10.00
```

5.1.2 Level indicator

Shows the display items of the level indicator.

Table 5.1.2-1 Level Indicator

Display	Name	Description
OFFS	Level Offset	Indicates the level offset function is On.
REF	Reference	Indicates the relative level display function is On.
ATTHLD	Attenuator Hold	Indicates the ATT Hold function is On.
UNLVL	Unleveled	Indicates the level is out of the guaranteed range.*
ORNG	Out of Range	Indicates the level is out of the setting range.
LMT	Limit	Indicates the Limit Level function is On.
OSYNC	Out of Sync	Indicates that levels of SG1 and SG2 cannot be synchronized due to out of the specified range.

*: No display of "UNLVL" does not guarantee that the level is within the specification.

Remote commands for items in the level indicator frame are as follows:

Remote command

Query the status of UNLEVEL

Query

```
[:SOURce[1]|2]:POWer:UNLeveled:ERRor?
```

Response

```
<status>
```

Parameter

<status>	Measurement status
OOL	Out of Level: The output level is out of the guaranteed range.
NORM	Normal: Not unlevel

Example of Use

To query the current operation status.

```
POW:UNL:ERR?
> NORM
```

Remote command **Query the status of OSYNC**

Query

```
[:SOURce[1]|2]:POWer:SYNC:ERRor?
```

Response

```
<status>
```

Parameter

`<status>`	Measurement status
`OOS`	Out of Sync: The level synchronization has been disabled.
`NORM`	Normal: The level synchronization is enabled or the synchronization setting is Off.

Example of Use

To query the current operation status.

```
POW:SYNC:ERR?
> NORM
```

Remote command **Query the status of ORNG**

Query

```
[:SOURce[1]|2]:POWer:RANGe:ERRor?
```

Response

```
<status>
```

Parameter

`<status>`	Measurement status
`OOR`	Out of Range: The level is out of the setting range.
`NORM`	Normal: The level is within the setting range.

Example of Use

To query the current operation status.

```
POW:RANG:ERR?
> NORM
```

5.2 Output Level Setting Method: Level

Level or **Top>Level**

When you press **Level** of the main function menu or **F2 Level** on the top function menu, the **Level** dialog box is displayed in the active function frame. Enter numbers in the **Level** dialog box to set levels.

Remote command

Set the display level

Command

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl>
```

Query

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude]?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Output level
Range	Output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Minimum output level of MG3710A/MG3710E/MG3740A
Suffix code	DBM, DM, DBUV, DBUVE DBM when omitted
UP	Increase output by one step
DOWN	Decrease output by one step

Refer to 5.2.4 “Output level setting resolution”

Example of Use

To set the SG2 output level to –30.00 dBm.

```
SOUR2:POW -30.00
SOUR2:POW UP
SOUR2:POW DOWN
SOUR2:POW?
> -30.00
```

Remote command

Set the output level unit

Command

```
:UNIT[1]|2:POWer <unit>
```

Query

```
:UNIT[1]|2:POWer?
```

Response

```
<unit>
```

Parameter

<unit>	Output level unit
DBM	dBm (Default)
DBUV	dBμV (Termination voltage display)
DBUVEMF	dBμVemf (Open voltage display)

Details

Only the unit changes.

Example of Use

To set the level setting unit to dBμVemf (open voltage display).

```
UNIT:POW DBUVEMF
UNIT:POW?
> DBUVEMF
```

Remote command

Set the displayed output level with the relative level when the relative level display is On

Command

```
[:SOURce[1]|2]:POWer:REFerence:AMPLitude <rel_ampl>
```

Query

```
[:SOURce[1]|2]:POWer:REFerence:AMPLitude?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Relative output level
Range	Output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Minimum output level of MG3710A/MG3710E/MG3740A

Example of Use

To set the relative output to +10.00 dB.

```
POW:REF:AMPL 10.00DB
POW:REF:AMPL?
> 10.00
```

5.2.1 Output level setting with numeric keypad

Enter numbers in the **Level** dialog box.

Setting method

The procedure for setting output levels with the numeric keypad is as follows.

Example: To set the output level to –47 dBm.

1. Press "**–**", "**4**", and "**7**" using number buttons of the numeric keypad or numbers on the screen. The screen below is displayed.



Figure 5.2.1-1 Level Dialog Box

2. Press the unit **F1 dBm** on the function key to finalize the numbers and the unit. The "–47.00 dBm" is displayed in the **Level** dialog box and in the frequency information frame.



Figure 5.2.1-2 Level Dialog Box

The output level setting allows the setting and display with dBm of the power unit and dBµV (termination voltage display)/dBµVemf (open voltage display).

- "**–**", "**1**", "**2**", "**.**", "**3**", **F2 dBµV** –12.3 dBµV is set. (Termination voltage display)
- "**–**", "**1**", "**2**", "**.**", "**3**", **F3 dBµVemf** –12.3 dBµVemf is set. (Open voltage display)

The digit less than 0.01 dB is rounded.

5.2.2 Changing output level with rotary knob

The rotary knob allows you to increase or decrease a digit of resolution selected by arrow keys (<)(>). The cursor shows the position of the digit.

Setting method

The procedure for setting the output level with the rotary knob is as follows.

Example: To change the output level from the current –47 dBm to –37 dBm by 1 dB.

1. Use the arrow keys (<)(>) to place the cursor on the digit of 1 dB (Press (<) twice to move it to 1 dB).



Figure 5.2.2-1 Level Dialog Box

2. Rotate the rotary knob to the right to increase the frequency by 1 dB step. Rotate it to the left to decrease the frequency by 1 dB. Using this method, rotate the rotary knob to the right and specify the output level to –37 dBm.

5.2.3 Changing output level with arrow keys

Arrow keys ↑↓ enable you to increase or decrease a digit of resolution selected by arrow keys ←→. The cursor shows the position of the digit.

Default value of output level step: 0.1 dB

Setting method

The procedure for setting output level with the arrow keys is as follows.

Example: To increase/decrease the output level from –47 dBm to –55 dBm by 1 dB step.

1. Set the output level to –47 dBm.
2. Use the arrow keys ←→ to place the cursor on the digit of 1 dB.

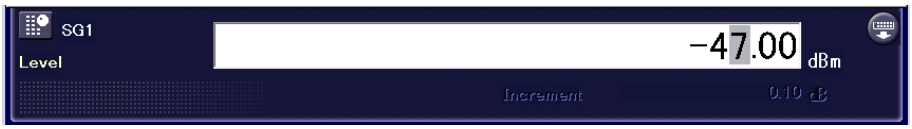


Figure 5.2.3-1 Level Dialog Box

3. Use the arrow keys ↑↓ to increase or decrease the frequency by 1 dB step.

5.2.4 Output level setting resolution

Level or **Top**>**Level,** Incr Set

Sets a resolution of arrow keys ↑↓ for setting the output level.

When the MG3710A/MG3710E/MG3740A is in the output level setting mode, press **Incr Set** of the main function key to display the **Increment** dialog box. Enter numbers in the **Increment** dialog box to specify a resolution of arrow keys ↑↓.

Remote command

Set the level setting resolution

Command

```
[:SOURce]:POWer[:LEVel][:IMMediate]:STEP[:INCRement]
<rel_ampl>
```

Query

```
[:SOURce]:POWer[:LEVel][:IMMediate]:STEP[:INCRement]?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Step level
Range	0.01 dB to 100 dB
Resolution	0.01 dB
Default	0.1 dB

Example of Use

To set the level step to 3 dB.

```
POW:STEP 3.00DB
POW:STEP?
> 3.00
```

Setting method

The procedure for specifying level setting resolution with the arrow keys is as follows:

Example: To change the output level with 0.3 dB of the level setting resolution.

1. Press **Incr Set** while in the Output Level Setting mode to display the **Increment** dialog box in the active function frame.

2. Set 0.3 dB.

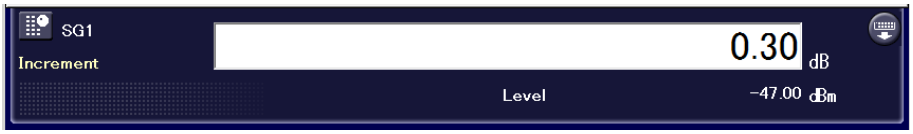


Figure 5.2.4-1 Increment Dialog Box

3. Press **F1 dB** to set the level setting resolution and return to the **Level** dialog box.
4. Use the arrow keys to increase or decrease the frequency by 0.3 dB step.

5.3 Output Level Setting Item

Level or **Top>Level**

When you press **Level** of the main function key or **F2 Level** in the top function menu, the MG3710A/MG3710E/MG3740A enters the output level setting mode and the **Level** function menu is displayed.

Table 5.3-1 Level Function Menu

Page	Key No.	Menu Display	Function
1	F1	Reference Off On	Enables/disables the level relative display. Refer to 5.3.1 "Relative level display: Reference".
	F2	Offset Off On	Enables/disables the level offset value. Refer to 5.3.2 "Level offset: Offset".
	F3	Offset Value 0.00 dB	Sets the level offset value. Refer to 5.3.2 "Level offset: Offset".
	F4	Limit Level Off On	Enables/disables the Limit Level function. Refer to 5.3.3 "Output level limit".
	F5	Limit Value 25.00 dBm	Sets the maximum output level. Refer to 5.3.3 "Output level limit".
	F7	ATT Hold Off On	Sets On/Off of the ATT Hold function. Refer to 5.3.4 "ATT Hold".
	F8	Sync Off On	Function to synchronize the 1st SG with 2nd SG output level settings. It is used when the levels of SG1 and SG2 are to be changed simultaneously. Refer to 5.3.5 "Level synchronization: Sync".
2	F1	Correction Off On	Enables/disables the User Correction function. Function to adjust the RF output level of arbitrary frequency points to correct the external loss or external gain. Refer to 5.4 "User Correction: Correction".
	F2	Configure Correction	Opens the User Correction function menu to set the user correction table. Refer to 5.4.1 "User correction setting: Configure Correction".
	F3	Calibrate Level	Performs the level calibration. Refer to 5.3.6 "Calibrate Level".
	F4	Optimize S/N Off On	Enables/disables the Optimize S/N mode. When it is set to On, CW is output with S/N priority. When it is set to Off, CW is output with distortion characteristic priority. When modulated waves are output, this function has no effect. Refer to 5.3.7 "Optimize S/N".

Table 5.3-1 Level Function Menu (Cont'd)

Page	Key No.	Menu Display	Function
2	F6	Start BER Measurement	Starts the BER measurement. If MeasureStart is executed during measurement, the measurement is stopped once and restarted. It is displayed when the BER measurement function option is installed. Refer to Chapter 8 "BER Measurement".
	F7	Stop BER Measurement	Stops the BER measurement. It is displayed when the BER measurement function option is installed. Refer to Chapter 8 "BER Measurement".
	F8	Clear BER Count	Clears ErrorCount and SyncLossCount (The measurement is continued).It is displayed when the BER measurement function option is installed. Refer to Chapter 8 "BER Measurement".

5.3.1 Relative level display: Reference

Level or **Top**>**Level, >Reference**

Enables/disables the relative level display.

The relative level display displays the output level difference from the reference output level.

When you turn the relative level display from Off to On, a difference from 0 dB, which is the reference level of output level, is displayed. Above it, the actual output level is displayed.

RF output level = display level
+ output level when the relative level display is enabled

Press **F1 Reference** to switch the level display.

Off	Displays output level in absolute values (Default).
On	Display output level in relative values. The "REF" is displayed in the level indicator.

Remote command

Enable/disable the relative level display

Command

```
[:SOURce[1]|2]:POWer:REFerence:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:POWer:REFerence:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Output level display
OFF|0	Switches to the absolute value display (Default).
ON|1	Switches to the relative display.

Example of Use

To switch the output level display to the relative display.

```
POW:REF:STAT ON
POW:REF:STAT?
> 1
```

Remote command

Query the reference level (output level when the relative level display is set to ON) for relative level display

Query

```
[:SOURce[1]|2]:POWer:REFerence?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Reference level
Range	Output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Minimum output level of MG3710A/MG3710E/MG3740A

Example of Use

To query the reference level for relative output level.

```
POW:REF?
> -5.00
```

Setting method

The relative level setting procedure is as follows.

Example: To increase by 7.5 dB with –47 dBm as the reference.

1. Set the output level to –47 dBm.
2. Press **F1 Reference** to switch the relative level display to On, and then the relative level display is enabled with –47 dBm of the current output level as the reference. The displayed output level value is changed from "–47.00 dBm" to "+0.00 dB", and the RF output level (actual output level) is displayed above it. In addition, "REF" is displayed in the level indicator of the screen to indicate the relative level display is enabled.

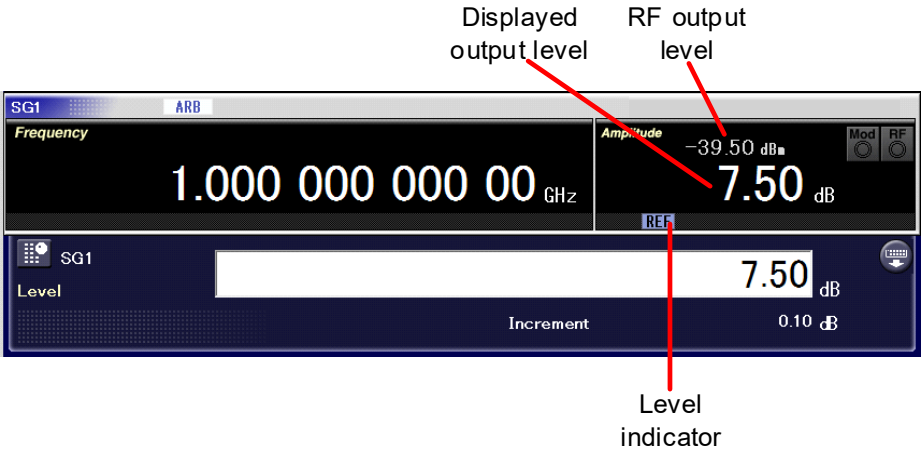


Figure 5.3.1-1 Relative Level Display

3. Set the relative level to 7.5 dB. At this time the displayed level is also “7.50 dB”, however, the actual level output from SG is –47 dBm + 7.5 dB = –39.5 dBm as the RF output level.

5.3.2 Level offset: Offset

Offset

Level or **Top**>**Level, >Offset**

Enables/disables the output level offset.

When the frequency offset is on, the output level offset value specified with **F3 Offset Value** is added to the display output level, and the actual output level is displayed above it.

Press **F2 Offset** to toggle On/Off of the output level offset.

Off	Does not use the output level offset (Default).
On	Uses the output level offset. The "OFFS" is displayed in the level indicator.

When this function is used, the displayed output level is offset with the value specified to LevelOffsetValue. This function is used when the path loss or gain from SG to DUT is corrected.

Output level after offset = RF output level + offset level

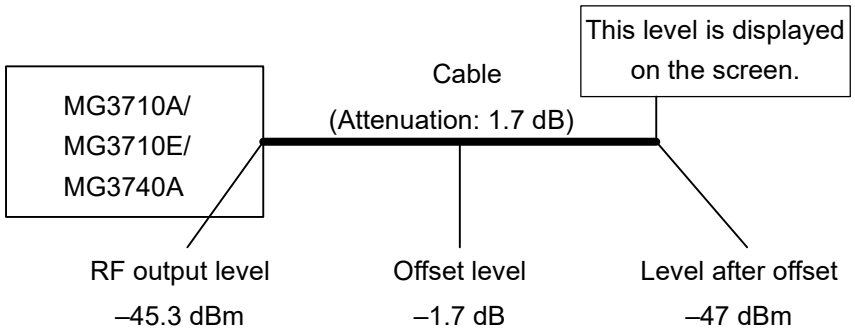


Table 5.3.2-1 Overview of Offset Level

The level offset function cannot perform settings that have frequency characteristics. To change the offset level for each frequency, refer to 5.4 "User Correction: Correction".

Remote command

Enable/disable the output level offset

Command

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet:STATe
<boolean>
```

Query

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet:STATe?
```

Response

`<boolean>` 0 or 1

Parameter

<boolean>	Output level offset On/Off
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the output level offset to ON.

```
POW:OFFS:STAT ON
POW:OFFS:STAT?
> 1
```

Offset level: Offset Value

Level or **Top**>**Level, >Offset Value**

Sets the output offset level.

Press **F3 Offset Value** to set a offset level in the **Offset Value** dialog box in the active function frame.

Setting range	–100 to +100 dB
Resolution	0.01 dB
Default	0 dB

Remote command

Set the output offset level

Command

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet
<rel_ampl>
```

Query

```
[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Output offset level
Setting range	–100 to +100 dB
Resolution	0.01 dB
Default	0.00 dB
Suffix code	DB Handled as DB when omitted.

Example of Use

To set the output offset level to –15.00 dB.

```
POW:OFFS -15.00
POW:OFFS?
> -15.00
```

Setting method

The output offset level setting procedure is as follows.

Example: To set for the offset level to be –1.7 dB and output level after offset to be –47 dBm.

1. Press **F3 Offset Value** to display the **Offset Value** dialog box in the active function frame.

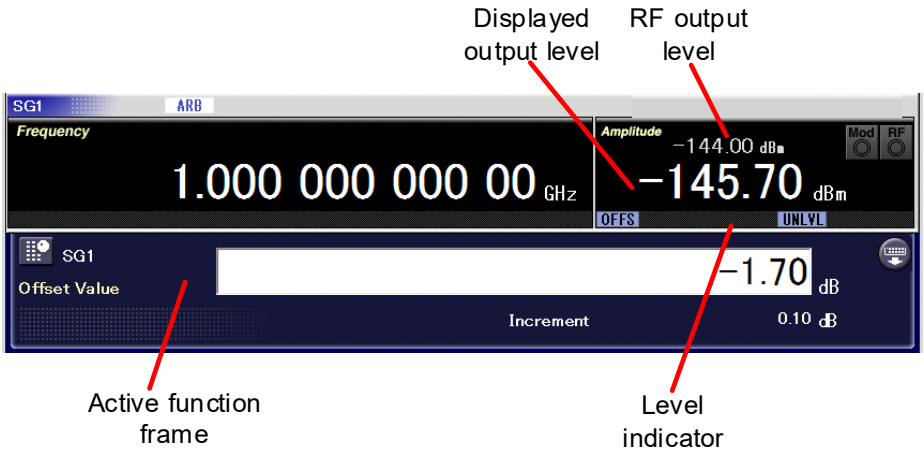


Figure 5.3.2-2 Offset Level Setting

2. Press **–**, **1**, **.**, **7**, and **F1 dB** to set the offset level to –1.7 dB.
3. Press **F2 Offset** to set the offset mode to On. The "OFFS" is displayed in the level indicator to indicate the offset setting is enabled.
4. Press **Level** to set the Level setting mode in the active function area, and press **–**, **4**, **7**, and **F1 dBm** to set the output level to –47 dBm. The "–47.00 dBm" is displayed in the displayed output level. At this time, the actual level output from SG is –45.3 dBm as shown in the RF output level.

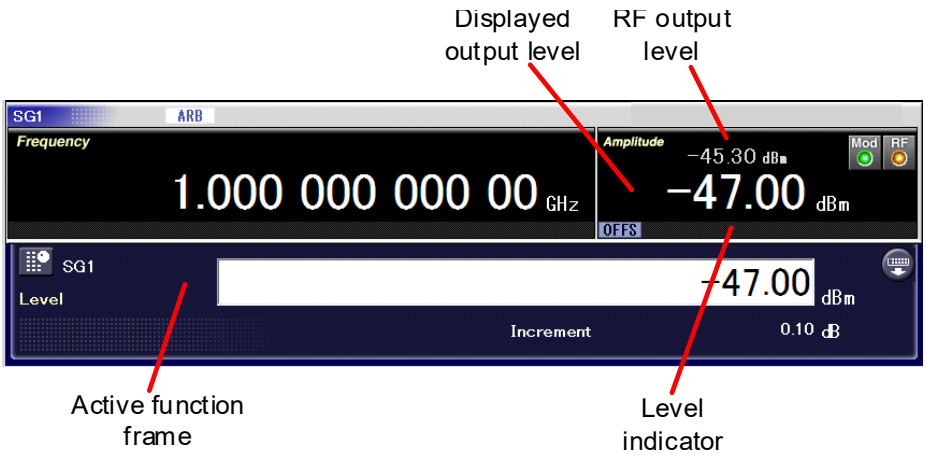


Figure 5.3.2-3 Output Level Confirmation

5.3.3 Output level limit

Output level limit: Limit Level

Level or **Top**>**Level, >Limit Level**

Enables/disables the Limit Level function to limit the output level.

Press **F4 Limit Level** to set the Limit Level function to On/Off.
Selecting "On" displays "LMT" in the level indicator.

Off	Sets the Limit Level function to Off (Default).
On	The output level is limited to the level set with **F5 Limit Value**. The "LMT" is displayed in the level indicator.

Remote command

Set the Limit Level function On/Off

Command

```
[:SOURce[1]|2]:POWer:USER:ENABle <boolean>
```

Query

```
[:SOURce[1]|2]:POWer:USER:ENABle?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Limit Level function On/Off
`OFF|0`	Off (Default)
`ON|1`	On

Example of Use

To set the Limit Level function to ON.

```
POW:USER:ENAB ON
POW:USER:ENAB?
> 1
```

Output limit level: Limit Value

Level or **Top**>**Level, >Limit Value**

Sets the output level limit value (Limit Level).

Press **F5 Limit Value** to set the Limit Level in the **Limit Value** dialog box in the active function frame.

Setting range	RFLevelMin + LevelOffset + UnitCoef to RFLevelMax + LevelOffset + UnitCoef (with the output level display) RFLevelMax: Maximum output level of MG3710A/MG3710E/MG3740A RFLevelMin: Minimum output level of MG3710A/MG3710E/MG3740A LevelOffset: Offset level The UnitCoef value is as follows: When LevelUnit is dBm: UnitCoef = 0 When LevelUnit is dBμV (Term): UnitCoef = 106.99 When LevelUnit is dBμV (EMF): UnitCoef = 113.01
Resolution	0.01 dB
Default	RFLevelMax + LevelOffset + UnitCoef

Remote command

Set the output level limit value (Limit Level)

Command

```
[:SOURce[1]|2]:POWer:USER:MAX <ampl>
```

Query

```
[:SOURce[1]|2]:POWer:USER:MAX?
```

Response

```
<ampl>
```

Parameter

<ampl>	Maximum output level
Setting range	See above.
Resolution	See above.
Default	See above.
Suffix code	DBM, DM, DBUV, DBUVEMF Handled as DBM when omitted.

Example of Use

To set the Limit Level to 30 dBm.

```
POW:USER:MAX 30
POW:USER:MAX?
> 30.00
```

Setting method

The Limit Level setting procedure is as follows.

Example: To set the Limit Level to 10 dBm.

1. Press **F5 Limit Value** to display the **Limit Value** dialog box in the active function frame.

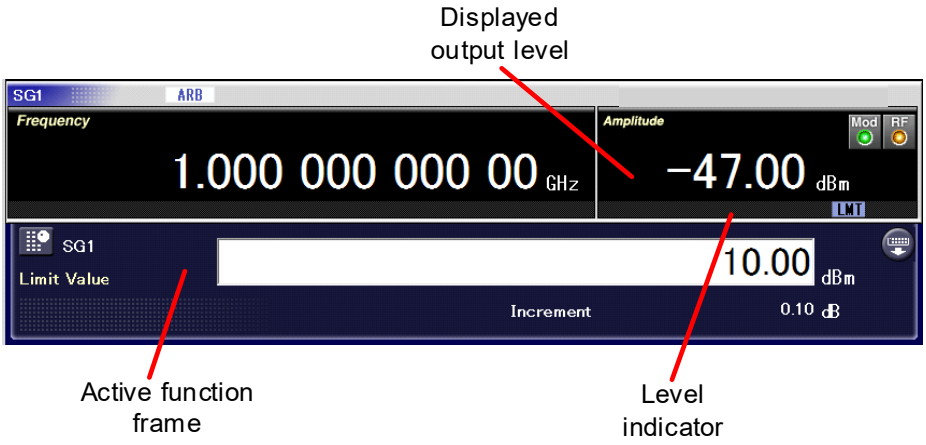


Figure 5.3.3-1 Output Limit Level

2. Press **1**, **0**, and **F1 dBm** to set the Limit Value to 10 dBm.
3. Press **F4 Limit Level** to set the Limit Level function to On. The "LMT" is displayed in the level indicator to indicate the Limit Level is set.

5.3.4 ATT Hold

Level or **Top**>**Level, >ATT Hold**

Enables/disables the ATT Hold function to prevent the signal dropout on ATT switching.

Press **F7 ATT Hold** to set the ATT Hold function to On.

Off	Sets the ATT Hold function to Off(Default). Signal dropouts occur on ATT switching.
On	Sets the ATT Hold function to On. Signal dropouts do not occur on ATT switching, however, the settable level range is limited to ±10 dB. The "ATTHLD" is displayed in the level indicator.

Signal dropouts which occur on ATT switching may generate the following problems.

- Increase in BER
- Damage with spike noise entry to devices
- Level gap by ATT switching within VSG (Even if a change by 0.01 dB is given, the level is not changed by 0.01 dB due to ATT switching errors).

This function fixes ATT and adjust the output level to prevent these problems.

This function is restricted as follows:

- CAL is not executed automatically each time the output level is changed.
- The level adjustable range is ±10 dB to the output level when this function is set to On.
- IQ Calibration function (refer to 7.6.1 "IQ Calibration") is not available.
- This setting is not available in the following case(s).
  Output level is less than –127 dBm
  Optimize S/N is On
  Sweep/List is in use
  Sequence Mode waveform file is in use

Remote command

Set the ATT Hold function On/Off

Command

```
[:SOURce[1]|2]:POWer:ATTenuation:AUTO <boolean>
```

Query

```
[:SOURce[1]|2]:POWer:ATTenuation:AUTO?
```

Response

`<boolean>` 0 or 1

Parameter

<boolean>	On/Off status of ATT Hold function
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the ATT Hold function to ON.

```
POW:ATT:AUTO ON
POW:ATT:AUTO?
> 1
```

5.3.5 Level synchronization: Sync

Level or **Top**>**Level, >Sync**

Enables/disables the function to synchronize the 1st SG with 2nd SG output level settings. It is used when the levels of SG1 and SG2 are to be changed simultaneously.

This is available when the MG3710A/MG3710E/MG3740A-062/162/064/164/066/166 is installed.

Press **F8 Sync** to set the level synchronization function to On.

The level synchronization function is parallel. When you change the SG-side level specified for SG Port, the changed value is added to the other SG-side level.

Off	Sets the level synchronization function to Off (Default).
On	Sets the level synchronization function to On. The output level settings are synchronized between SG1 and SG2.

Remote command

Enable/disable the level synchronization function

Command

```
[:SOURce]:POWer:SYNC:STATe <boolean>
```

Query

```
[:SOURce]:POWer:SYNC:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	On/Off of the level synchronization function
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the level synchronization function to ON.

```
POW:SYNC:STAT ON
POW:SYNC:STAT?
> 1
```

5.3.6 Calibrate Level

Level or **Top>Level, >**→**>Calibrate Level**,
or Cal> **Calibrate Level**

Calibrates the output level.
Pressing → switches the function menu to the second page, and pressing **F3 Calibrate Level** calibrates the output level.

In the normal operation status, signals with the stable level are always output by the ALC loop circuit.

However, when the modulation is set to On, the ALC loop circuit is held and becomes nonfunctional. If the MG3710A/MG3710E/MG3740A is used with the same setting for a long period, level calibration is recommended to eliminate fluctuations with temperature drift.

In addition, even when the modulation is set to On, if any of the following operations is executed, the level is calibrated automatically.

- Frequency change
- Output level change
- Pattern selection

Notes:

- Execute Calibrate Level while the device to be tested is connected to the RF connector of the MG3710A/MG3710E/MG3740A.
- Executing Calibrate Level with the RF connector opened may degrade the level accuracy of output signals because of reflection.

Remote command

Calibrate the output level

Command

```
[:SOURce[1]|2]:POWer:ALC:SEARch [ONCE]
```

Example of Use

To calibrate the output level.

```
POW:ALC:SEAR
```

5.3.7 Optimize S/N

Level or **Top**>**Level,** >→>**Optimize S/N**

The function to improve the S/N of CW signals. When it is set to On, CW is output with S/N priority. When it is set to Off, CW is output with distortion characteristic priority. When modulated waves are output, this function has no effect.

Press → to switch the function menu to the second page, and press **F4 Optimize S/N** to set the Optimize S/N function to On.

Off	Distortion characteristic has priority (Default).
On	S/N has priority.

Remote command

Enables/disables the Optimize S/N function

Command

```
[:SOURce[1]|2]:POWer:NOISe[:STATe] <boolean>
```

Query

```
[:SOURce[1]|2]:POWer:NOISe[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	On/Off of the Optimize S/N function
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the Optimize S/N function to ON.

```
POW:NOIS ON
POW:NOIS?
> 1
```

5.4 User Correction: Correction

Level or **Top>Level, >→>Correction**

This function is to adjust the RF output level of arbitrary frequency points to correct the external loss or external gain.

Interpolate the correction value linearly with a logarithm. When it becomes the value between resolutions, drop the digits less than the resolution.

For the frequency which is smaller than the minimum frequency of the correction value data, use the correction value data of the minimum frequency.

For the frequency which is higher than the maximum frequency of the correction value data, use the correction value of the maximum frequency.

For correction for the baseband, use the correction value corresponding to the center frequency of the baseband.(Even if multiple correction points exist in the baseband, use the correction value corresponding to 0 Hz of the baseband.)

When this function is used, the output level is offset with the value specified to the correction level and used for correction of path loss or gain from SG to DUT.

Output level after correction = RF output level + correction level

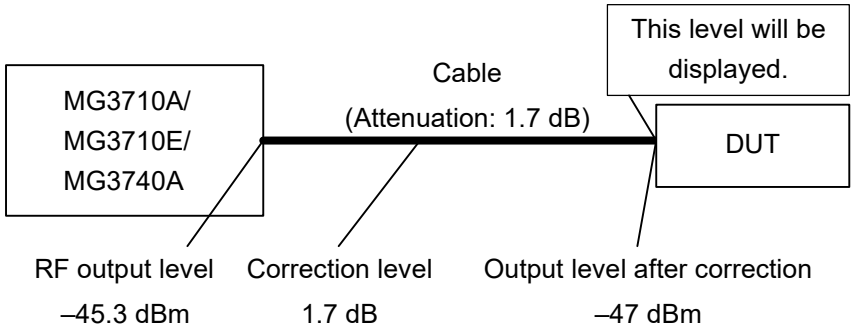


Figure 5.4-1 Overview of User Correction

Press → to switch the function menu to the second page, and press **F1 Correction** to set the user correction function to On.

Off	Sets the user correction function to Off. (Default)
On	Sets the user correction set with **F2 Configure Correction** to On. The "CORR" is displayed on the common indicator.

Remote command

Set the user correction to On/Off

Command

```
[:SOURce[1]|2]:CORRection[:STATe] <boolean>
```

Query

```
[:SOURce[1]|2]:CORRection[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	On/Off of the user correction function
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the user correction function to ON.

```
CORR ON
CORR?
> 1
```

5.4.1 User correction setting: Configure Correction

Level or **Top>Level, >(→)>Configure Correction**

Sets the user correction value.

Press (→) to switch the function menu to the second page, and press **F2 Configure Correction** to display the Correction Table and Correction function menu.

To set the user correction value, you can set the correction value measured in advance to the Correction Table or measure the correction value with the power sensor connected to the MG3710A/MG3710E/MG3740A to create the correction table.

Selecting the item to be set with the cursor on the Table and pressing **F1 Edit Item** displays the dialog box for setting. For the setting method, refer to 5.4.2 “Edit Item”.

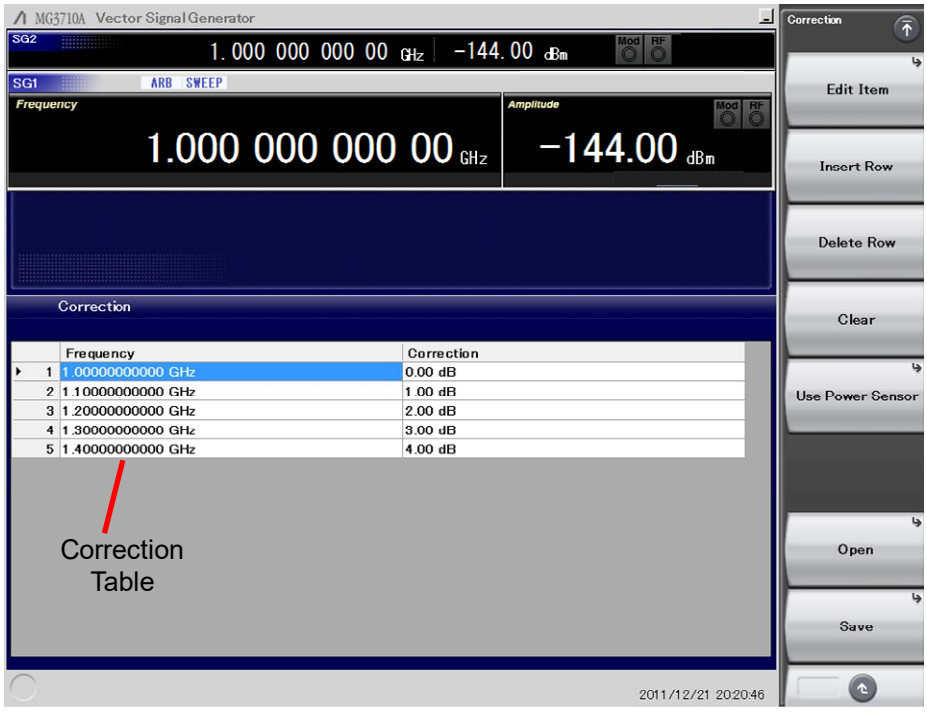


Figure 5.4.1-1 Correction Table

Table 5.4.1-1 Correction Function Menu

Page	Key No.	Menu Display	Function
1	F1	Edit Item	Sets the user correction table correction value. Refer to 5.4.2 “Edit Item”.
	F2	Insert Row	Adds the correction value to the user correction table. Refer to 5.4.3 “Adding correction data: Insert Row”.
	F3	Delete Row	Deletes the correction value in the user correction table. Refer to 5.4.4 “Deleting correction data: Delete Row”.
	F4	Clear	Deletes the user correction table expanded in the memory. Refer to 5.4.5 “Deleting correction table: Clear”.
	F5	Use Power Sensor	Displays the Use Power Sensor function menu. They are not displayed when the Power Sensor is not connected. Refer to 5.5 “Use Power Sensor”.
	F7	Open	Recalls the saved user correction table. Refer to 5.4.6 “Recalling user correction table: Open”.
	F8	Save	Saves the user correction table. Refer to 5.4.7 “Saving user correction table: Save “.

5.4.2 Edit Item

Level or **Top**>**Level,** >→>**Configure Correction**>**Edit Item**

Sets the correction value of the user correction table.

Remote command

Add the correction value to the correction table

Command

`[:SOURce[1]|2]:CORRection:FLATness:PAIR <freq>,<rel_ampl>`

Parameter

`<freq>`	Frequency
Setting range	Frequency setting range of MG3710A/MG3710E /MG3740A
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ Handled as HZ when omitted.
`<rel_ampl>`	
Setting range	–100 dB to +100 dB
Resolution	0.01 dB
Default	–999.00 (Undefined) Undefined is displayed when the value has not been set. –999.00 dB can be assigned as a numeric value but the Undefined row is not used at correction.
Suffix code	`DB` Handled as DB when omitted.

Example of Use

To add 1 GHz of the frequency and 4 dB of the correction value to the correction table.

```
CORR:FLAT:PAIR 1GHZ,4
```

Setting method

The user correction value setting procedure is as follows.

Example: To create a user correction table under the following conditions.

- Frequency: 2.412 GHz
- Correction value: 3 dB

(1) Setting the frequency

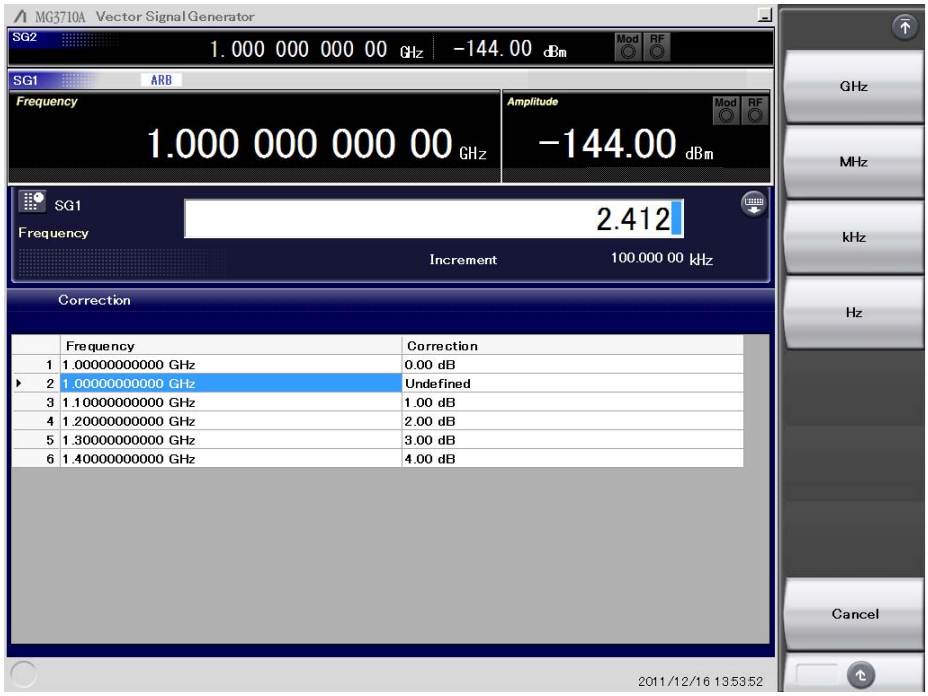


Figure 5.4.2-1 Frequency Setting

1. Align the cursor with row 1 and press **F2 Insert Row** to copy only the frequency and add a new input row under the cursor row. The cursor moves to the new row automatically.
2. Confirm that the cursor is at "Frequency". Press **F1 Edit Item** to display **Frequency** dialog box and **Enter Item** function menu.

Table 5.4.2-1 Enter Item Function Menu

Page	Key No.	Menu Display	Function
1	F1	Enter Item	Edits values and returns to the previous menu.
	F8	Cancel	Returns to the previous menu.

3. Enter "2.412" of frequency to the **Frequency** dialog box.
4. Press the unit **F1 GHz** on the function menu to set a frequency and close the **Correction Table** dialog box. At this time the order of user correction tables changes in the order of frequencies. In this case, moves to row 6.

(2) Setting the correction level

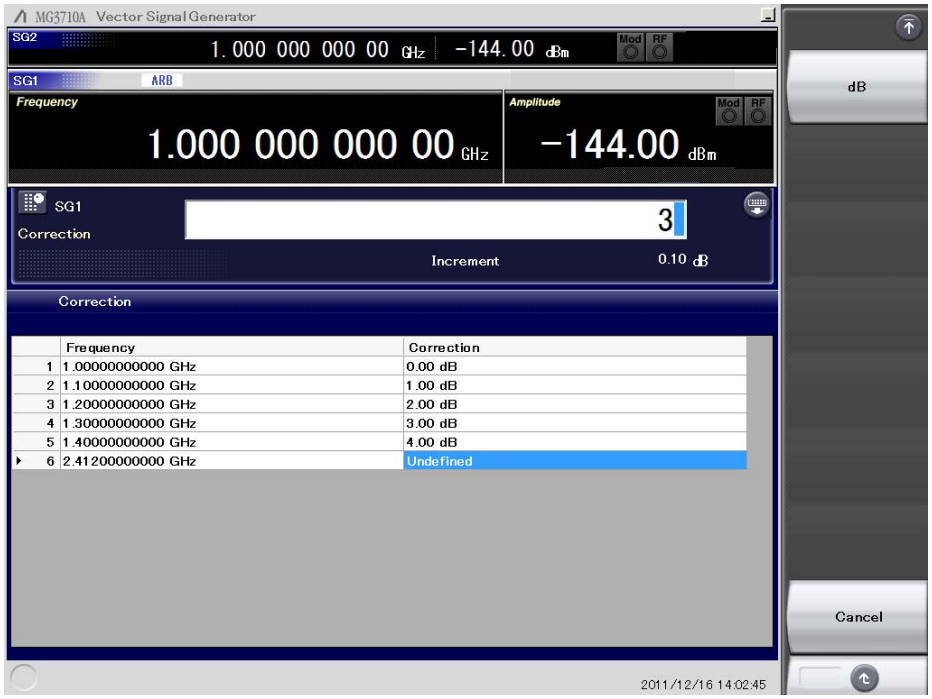


Figure 5.4.2-2 Correction Level Setting

1. Place the cursor on the "Correction" of the sixth row.
2. Press **F1 Edit Item** to display **Correction** dialog box and Enter Item function menu.
3. Enter "3" of correction level to the **Correction** dialog box.
4. Press the unit **F1 dB** on the function menu to set a correction level and close the **Correction** dialog box.

5.4.3 Adding correction data: Insert Row

Level or **Top**>**Level,** >(→)>**Configure Correction**>**Insert Row**

Inserts a row to add the correction value to the correction table.

Press **F2 Insert Row** at the User Correction function menu to copy only the frequency and add a correction data setting row at the row under the Correction Table cursor row. Also the Correction function menu-related switch is displayed additionally.

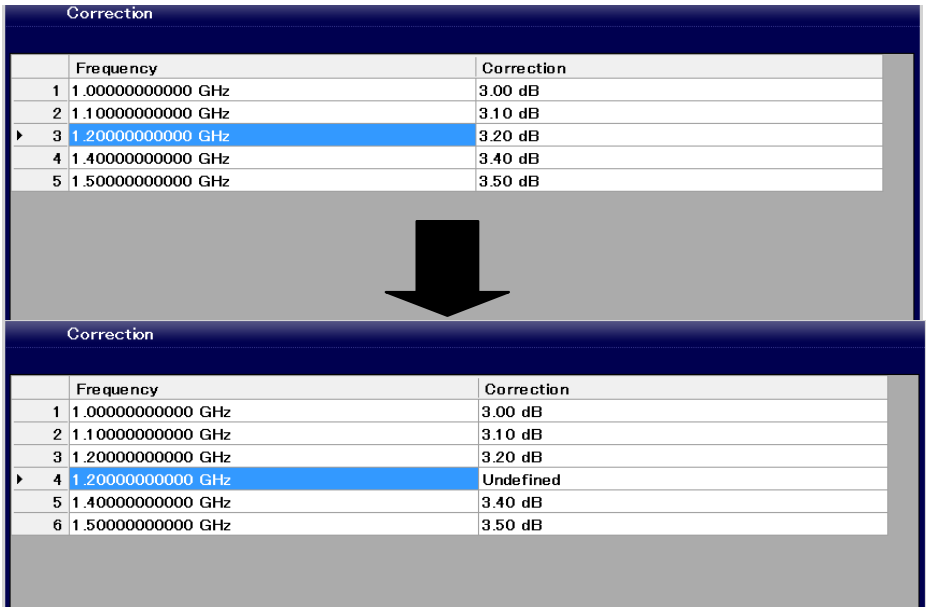


Figure 5.4.3-1 Adding Correction Data

5.4.4 Deleting correction data: Delete Row

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Delete Row**

One row of the correction value of the correction table expanded in the memory is deleted.

Press **F3 Delete Row** at the User Correction function menu to delete the correction data of the Correction Table cursor row.
The rows below the deleted row will move up to the upper rows in sequence.

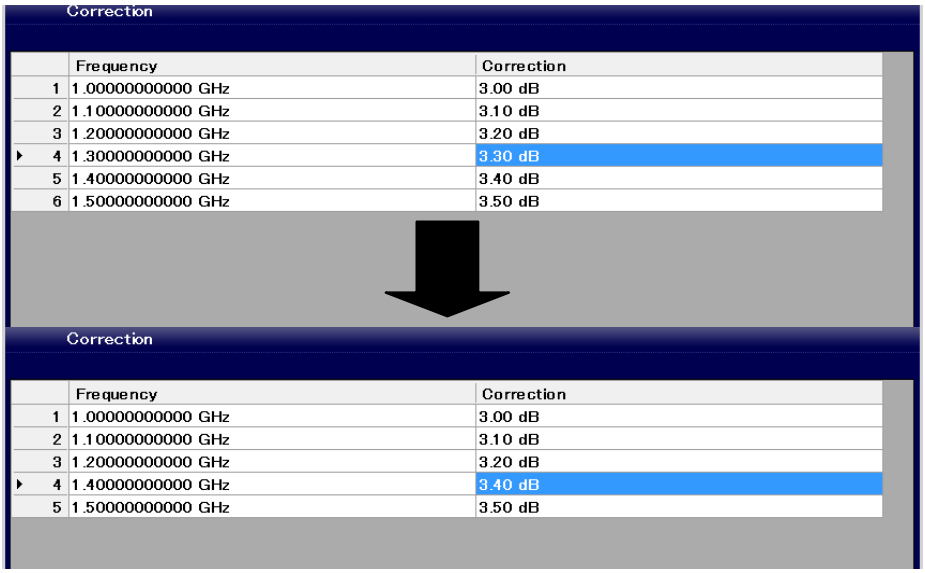


Figure 5.4.4-1 Deleting Correction Data

5.4.5 Deleting correction table: Clear

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Clear**

Deletes all of the correction table expanded in the memory.

Remote command

Delete all of the correction table

Command

```
[:SOURce[1]|2]:CORRection:FLATness:PRESet
```

Example of Use

To delete all of the correction table.

```
CORR:FLAT:PRES
```

Setting method

Press **F4 Clear** to delete all data in the correction table.

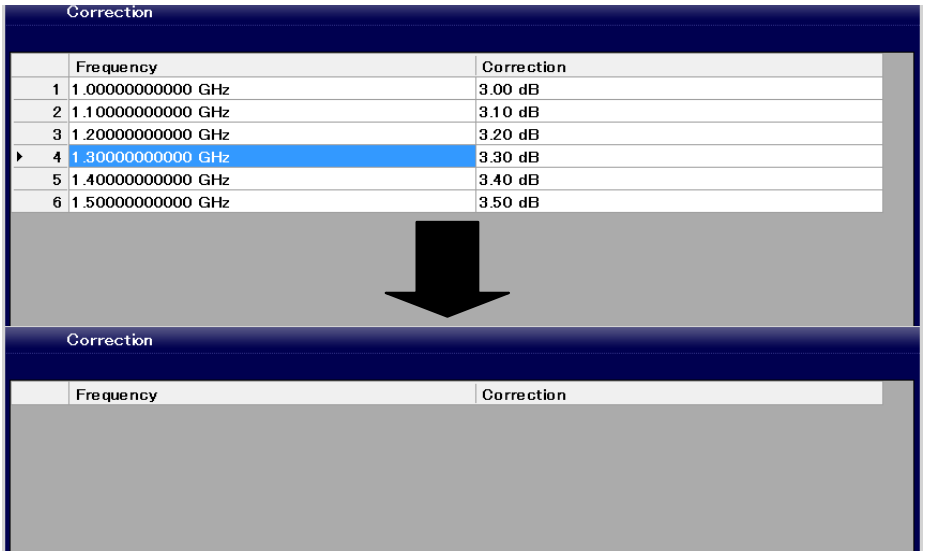


Figure 5.4.5-1 Deleting Correction Table

5.4.6 Recalling user correction table: Open

Level or **Top**>**Level,** >→>**Configure Correction**>**Open**

Recalls the saved user correction table.

Remote command

Recall the user correction table

Command

```
:MMEMory [1]|2:LOAD:CORRection:FLATness
<string>[,<device>]
```

Parameter

<string>	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Drive number
Options	A to Z, currently selected drive when omitted

Example of Use

To recall the user correction table file with the file name of "ABC" from the D drive.

```
MMEM:LOAD:CORR:FLAT "ABC",D
```

Setting method

The recalling procedure is as follows.

1. Press **F7 Open** to open the Correction Recall function menu.

Table 5.4.6-1 Correction Recall Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies the Drive containing the user correction table to recall.
	F7	Open	Recalls the user correction table file in the folder specified in Drive and expands it in the memory.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select a drive containing the user correction table file is saved to recall.
3. The **Correction Recall** dialog box is displayed in the active function frame, and File List is displayed in the function display frame.

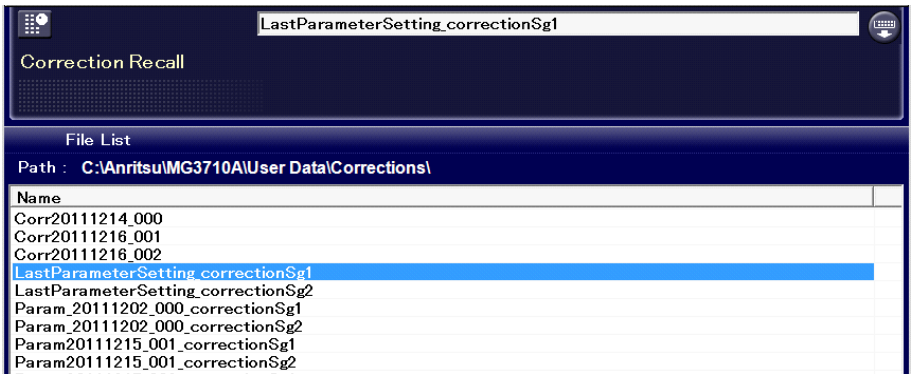


Figure 5.4.6-1 Correction Recall Dialog Box

4. Use the rotary knob or arrow keys to select the user correction table file to recall.
5. Press **F7 Open** to recall the selected user correction table file. Press **F8 Cancel** to return to the previous screen without recalling the user correction table file.

Notes:

- File names are listed in alphanumeric order.
- If no user correction table file exists, “File not found” is displayed.

5.4.7 Saving user correction table: Save

Level or **Top**>**Level,** >→>**Configure Correction**>**Save**

Saves the user correction table with set parameters.

Remote command

Save the user correction table

Command

```
:MMEMory[1]|2:STORe:CORRection:FLATness
[<string>[,<device>]]
```

Parameter

`<string>`	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: `\ / : * ? " < > |` Automatically named as "Corr[Date]_[Additional number].csv" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
`<device>`	Drive number
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
A destination path to save the file is the following directory in the specified drive.
Anritsu\MG3710A\User Data\Corrections\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Example of Use

To save the user correction table file with the file name of "ABC" to the D drive.

```
MMEM:STOR:CORR:FLAT "ABC",D
```

Setting method

The user correction table saving procedure is as follows.

Example: To name the user correction table currently displayed as “W-LAN” and save it.

1. Press **F8 Save** to open the Correction Save function menu.

Table 5.4.7-1 Correction Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies a Drive where the user correction table is saved.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F7	Save	Saves the user correction table in the folder specified with Drive in csv format.
	F8	Cancel	Returns to the previous menu.

2. The **Correction Save** dialog box is displayed in the active function frame.
3. Press **F1 Drive** to select a destination drive. File List of the selected drive is displayed in the function display frame.

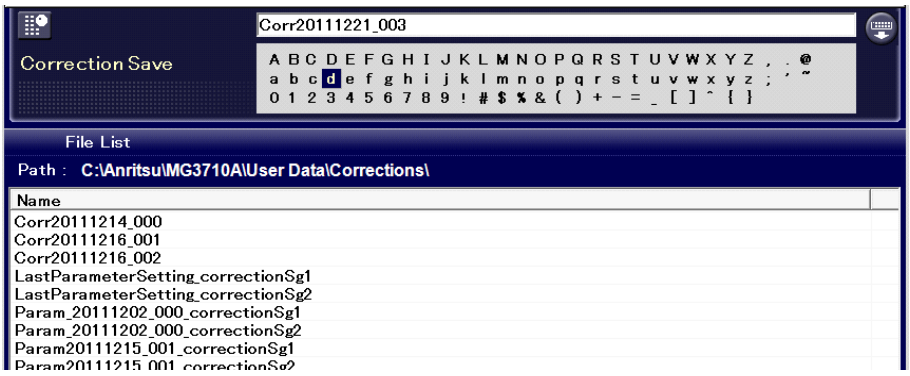


Figure 5.4.7-1 Correction Save Dialog Box

4. Enter a file name in the **Correction Save** dialog box. By default, the “CorrDate_Additional number” is displayed in the text box.
5. Enter “W-LAN” in the dialog box and press **F7 Save**. The user correction table file with the entered file name is saved, and the **Correction Save** dialog box closes.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path:
  Anritsu\MG3710A\User Data\Corrections\
- Default destination name:
  Corr[Date]_[Additional number].csv
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character palette.
- The following characters cannot be used:
  \ / : * ? " ″ ` ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

5.5 Use Power Sensor

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Use Power Sensor**

The power sensor to be used for the user correction table is set.

Press **F5 Use Power Sensor** in the Correction function menu to open the USB Power Sensor function menu.

Table 5.5-1 USB Power Sensor Function Menu

Page	Key No.	Menu Display	Function
1	F1	Connection Setting	Displays the PM Connection function menu. Refer to 5.5.1 “Connection Settings”.
	F2	Settings	Displays the Settings function menu. Refer to 5.5.2 “Settings”.
	F4	Zero Sensor	Executes the zero level adjustment for the power sensor. Refer to 5.5.3 “Zero adjustment: Zero Sensor”.
	F6	Create Correction File	Executes the calibration measurement with the power sensor and creates the user correction table file. Refer to 5.5.4 “Creating correction table: Create Correction File”.

5.5.1 Connection Settings

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Connection Settings**

Press **F1 Connection Settings** in the Use Power Sensor function menu to open the PM Connection function menu.

Table 5.5.1-1 PM Connection Function Menu

Page	Key No.	Menu Display	Function
1	F1	COM Port 2	Sets the COM Port number allocated to the power sensor.
	F2	Model MA24106A	Displays the Model function menu for selection of the model name of the power sensor to be used.
	F3	Open Device Manager	Displays Windows Device Manager. This is used for checking the COM port number of connected power sensor.

COM Port setting: COM Port

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Connection Settings**>**COM Port**

Sets the COM Port number of the power sensor.

Press **F1 COM Port** to display the **COM Port** dialog box in the active function frame. Enter numbers and press **F1 Enter** to set the COM Port number.

Setting range	2 to 8
Resolution	1
Default	2

Remote command

Set the COM Port number

Command

```
[:SOURce[1]|2]:CORRection:PMETer:COMMunicate:USB:PORT
<ext_integer>
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:COMMunicate:USB:PORT?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	COM Port number
Setting range	2 to 8
Resolution	1
Default	2

Example of Use

To set the COM Port number of SG1 power sensor to 8.

```
CORR:PMET:COMM:USB:PORT 8
CORR:PMET:COMM:USB:PORT?
> 8
```

Model setting: Model

Level or **Top>Level, >(→)>Configure Correction>Use Power Sensor>Connection Settings>Model**

Selects the model name of the power sensor.

Press **F2 Model** to display the Model function menu, and press the function key of the power sensor to be used to set the model.

Table 5.5.1-2 Model Function Menu

Page	Key No.	Menu Display	Function
1	F1	MA24104A	600 MHz to 4 GHz
	F2	MA24105A	350 MHz to 4 GHz
	F3	MA24106A	50 MHz to 6 GHz (Default)
	F4	MA24108A	10 MHz to 8 GHz
	F5	MA24118A	10 MHz to 18 GHz
	F6	MA24126A	10 MHz to 26 GHz

Notes:

- The range of frequencies that can be used for user correction are listed in Table 5.5.2-2 Frequency Setting Range.
- If Windows Device Manager does not display the available USB power sensor, the older version of PowerXpert software may be the cause.
  Download and install the latest PowerXpert software from Anritsu website.
- Use PowerXpert Ver. 2.11 or later for MA24105A, use PowerXpert Ver. 2.00 or later for other sensor.

Remote command

Select the model name

Command

```
[:SOURce[1]|2]:CORRection:PMETer:MODel
MA24104A|MA24105A|MA24106A|MA24108A|MA24118A|MA24126A
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:MODel?
```

Response

```
<model>
```

Parameter

`<model>`	Power sensor model name
Options	MA24104A, MA24105A, MA24106A (Default), MA24108A, MA24118A, MA24126A

Example of Use

To select the MA24118A for the power sensor of SG1.

```
CORR:PMET:MOD MA24118A
CORR:PMET:MOD?
> MA24118A
```

5.5.2 Settings

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Use Power Sensor**>**Settings**

Press **F2 Settings** in the Use Power Sensor function menu to open the Settings function menu.

Table 5.5.2-1 Settings Function Menu

Page	Key No.	Menu Display	Function
1	F1	Start Freq 1.00000000000 GHz	Specifies the start frequency when the correction table is created with the power sensor.
	F2	Stop Freq 1.00000000000 GHz	Specifies the stop frequency when the correction table is created with the power sensor.
	F3	Level Offset Off On	Sets the level offset adding On/Off for the power sensor reading.
	F4	Level Offset Value 0.00 dB	Sets the offset level value to be added to the power sensor reading.
	F5	Correction Points 2	Sets the measurement point number when the correction table is created with the power sensor.
	F6	Averaging Off On	Sets the averaging On/Off for the measurement values with the power sensor.
	F7	Averaging Count 10	Sets the averaging count for the measurement values with the power sensor.

Start Freq

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Settings**>**Start Freq**

Sets the start frequency when the correction table is created with the power sensor.

Press **F1 Start Freq** in the Settings function menu to display the **Start Freq** dialog box in the active function frame. Enter the numbers and press the unit key of the Unit function menu to set the start frequency.

Setting range	See Table 5.5.2-2 Frequency Setting Range.
Resolution	0.01 Hz
Default	1 GHz

Table 5.5.2-2 Frequency Setting Range

Power Sensor	Minimum Value	Maximum Value		
		MG3710A/MG3710E/MG3740A Options		
		032/062/162	034/064/164	036/066/166
MA24104A	600 MHz	2.7 GHz	4 GHz	4 GHz
MA24105A	350 MHz	2.7 GHz	4 GHz	4 GHz
MA24106A	50 MHz	2.7 GHz	4 GHz	6 GHz
MA24108A	10 MHz	2.7 GHz	4 GHz	6 GHz
MA24118A	10 MHz	2.7 GHz	4 GHz	6 GHz
MA24126A	10 MHz	2.7 GHz	4 GHz	6 GHz

Remote command

Set the start frequency

Command

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:STARt <freq>
```

Query

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:STARt?
```

Response

`<freq>`	Unit: Hz

Parameter

`<freq>`	Start frequency
Setting range	Refer to Table 5.5.2-2 Frequency Setting Range.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ Handled as HZ when omitted.

Example of Use

To set the start frequency to 600 MHz.

```
CORR:FLAT:STEP:STAR 600MHZ
CORR:FLAT:STEP:STAR?
> 600000000.00
```

Stop Freq

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Settings**>**Stop Freq**

Sets the stop frequency when the correction table is created with the power sensor.

Press **F2 Stop Freq** in the Settings function menu to display the **Stop Freq** dialog box in the active function frame. Enter the numbers and press the unit key of the Unit function menu to set the stop frequency.

Setting range	Refer to Table 5.5.2-2 Frequency Setting Range.
Resolution	0.01 Hz
Default	1 GHz

Remote command

Set the stop frequency

Command

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:STOP <freq>
```

Query

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:STOP?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Refer to Table 5.5.2-2 Frequency Setting Range.
Setting range	Frequency range of the power sensor
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ Handled as HZ when omitted.

Example of Use

To set the stop frequency to 5 GHz.

```
CORR:FLAT:STEP:STOP 5GHZ
CORR:FLAT:STEP:STOP?
> 5000000000.00
```

Level Offset

Level or **Top**>**Level,** >→>**Configure Correction**>**Use Power Sensor**>**Settings**>**Level Offset**

Enables/disables the offset level adding for the power sensor reading.

Press **F3 Level Offset** in the Settings function menu to set the level offset On/Off.

Off	Does not add the offset level (Default).
On	Adds the offset level.

When this function is used, the displayed power sensor value is offset with the value specified to Level Offset Value. It is used when the path loss or gain from SG to DUT is corrected.

Power sensor reading after offset = power sensor reading + offset level

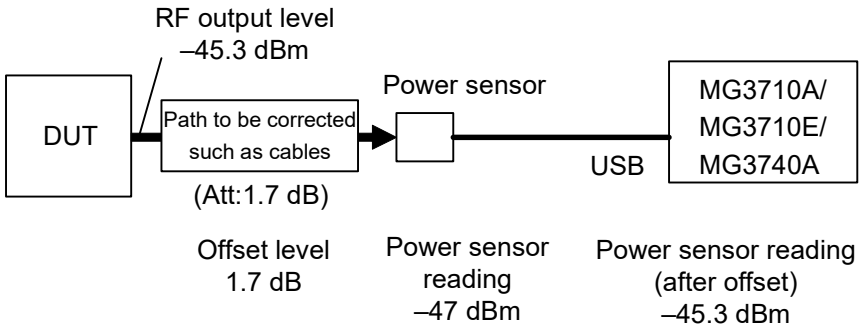


Figure 5.5.2-1 Overview of Offset Level

Remote command

Set the level offset to On/Off

Command

```
[:SOURce[1]|2]:CORRection:PMETer:GAIN2:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:GAIN2:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	On/Off of the level offset
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the level offset to ON.

```
CORR:PMET:GAIN2:STAT ON
CORR:PMET:GAIN2:STAT?
> 1
```

Level Offset Value

Level or **Top**>**Level,** >→>**Configure Correction**>**Use Power Sensor**>**Settings**>**Level Offset Value**

Sets the offset level value to be added to the power sensor reading.

Press **F4 Level Offset Value** in the Settings function menu to display the **Level Offset Value** dialog box in the active function frame. Enter the numbers and press the unit key of the Unit function menu to set the offset level value.

Setting range	–100 dB to 100 dB
Resolution	0.01 dB
Default	0 dB

Remote command

Set the offset level

Command

```
[:SOURce[1]|2]:CORRection:PMETer:GAIN2[:INPut][:MAGNitude] <rem_ampl>
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:GAIN2[:INPut][:MAGNitude]?
```

Response

```
<rem_ampl>
```

Parameter

<rem_ampl>	Offset level
Setting range	–100 dB to 100 dB
Resolution	0.01 dB
Default	0 dB

Example of Use

To set the offset level to 20 dB.

```
CORR:PMET:GAIN2 20
CORR:PMET:GAIN2?
> 20.00
```

Correction Points

Level or **Top>Level, >(→)>Configure Correction>Use Power Sensor>Settings>Correction Points**

Sets the measurement point number when the correction table is created with the power sensor.

The measurement point interval is by the following:

(Start frequency – stop frequency) / (correction point – 1)

Press **F5 Correction Points** in the Settings function menu to display the **Correction Points** dialog box in the active function frame. Enter the numbers and press **F1 Enter** to set the correction points.

Setting range	2 to 4096
Resolution	1
Default	2

Remote command

Set the measurement point number

Command

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:POINts
<ext_integer>
```

Query

```
[:SOURce[1]|2]:CORRection:FLATness:STEP:POINts
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Measurement point number
Setting range	2 to 4096
Resolution	1
Default	2

Example of Use

To set the measurement point number to 1000 points.

```
CORR:FLAT:STEP:POIN 1000
CORR:FLAT:STEP:POIN?
> 1000
```

Averaging

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Settings**>**Averaging**

Enables/disables the averaging for the measurement value with the power sensor.

Pressing **F6 Averaging** in the Setting function menu sets the averaging.

Off	Does not execute the averaging(Default).
On	Executes the averaging.

Remote command

Set the averaging to On/Off

Command

```
[:SOURce[1]|2]:CORRection:PMETer:AVERage[:STATe]
<boolean>
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:AVERage[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Averaging On/Off
OFF|0	Off (Default)
ON|1	On

Example of Use

To set the averaging for SG2 power sensor measurement to On.

```
SOUR2:CORR:PMET:AVER ON
SOUR2:CORR:PMET:AVER?
> 1
```

Averaging Count

Level or **Top**>**Level, >**→**>Configure Correction**>**Use Power Sensor**>**Settings**>**Averaging Count**

Sets the averaging count for the measurement values with the power sensor.

Press **F7 Averaging Count** in the Settings function menu to display the **Averaging count** dialog box in the active function frame. Enter the numbers and press **F1 Enter** to set the averaging count.

Setting range	1 to 2048
Resolution	1
Default	10

Remote command

Set the averaging count

Command

```
[:SOURce[1]|2]:CORRection:PMETer:AVERage:COUNt
<ext_integer>
```

Query

```
[:SOURce[1]|2]:CORRection:PMETer:AVERage:COUNt?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Measurement point number
Setting range	1 to 2048
Resolution	1
Default	10

Example of Use

To set the averaging count for SG2 power sensor measurement to 1024.

```
SOUR2:CORR:PMET:AVER:COUN 1024
SOUR2:CORR:PMET:AVER:COUN?
> 1024
```

5.5.3 Zero adjustment: Zero Sensor

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Use Power Sensor**>**Zero Sensor**

Executes the zero adjustment for the power sensor.

Press **F4 Zero Sensor** in the Use Power Sensor function menu to execute the zero adjustment for the power sensor.

"Zeroing the Sensor" is displayed and the output of the MG3710A/MG3710E/MG3740A is Off during the adjustment. Also keys other than the power key are disabled.

⚠ CAUTION

The power sensor may be damaged depending on the output level of the MG3710A/MG3710E/MG3740A. Beware not to apply excessive input when the terminal is connected.

Remote command

Execute the zero adjustment

Command

```
[:SOURce[1]|2]:CORRection:PMETer:ZERoset
```

Example of Use

To execute the zero adjustment for the power sensor.

```
CORR:PMET:ZER
```

Setting method

Example: To execute the zero adjustment for the power sensor

1. Connect the USB terminal of the power sensor to the USB terminal of the MG3710A/MG3710E/MG3740A.
2. Connect the RF Input terminal of the power sensor to the terminal to be measured. At this time, the power sensor may be damaged depending on the output level of the MG3710A/MG3710E/MG3740A. Beware not to apply excessive input when the terminal is connected.
3. Enter the information of the connected power sensor with ComPort number and Model to the MG3710A/MG3710E/MG3740A.
4. Set the MG3710A/MG3710E/MG3740A RF Output to Off.
5. Press **F4 Zero Sensor to** execute the zero adjustment for the power sensor.

5.5.4 Creating correction table: Create Correction File

Level or **Top**>**Level, >**(→)>**Configure Correction**>**Use Power Sensor**>**Create Correction File**

This connects the PowerSensor and creates the Correction Table. The Correction Table cannot be created if it is not executed when a USB power sensor is connected.

Save and recall to use the created Correction Table according to sections below:

- 5.4.7 “Saving user correction table: Save”
- 5.4.6 “Recalling user correction table: Open”

This function cannot be executed during Sweep/List.

Press **F6 Create Correction File** in the USB Power Sensor function menu to create the correction table.

The progress bar is displayed and the stop confirmation is displayed on the function menu during execution. When the stop confirmation is displayed, keys other than the function keys, power key, and cancel key are disabled. When the cancel key or power key is pressed, selection of Yes with the stop confirmation is assumed.

Remote command

Create the correction table

Command

Execution command

```
[:SOURce[1]|2]:CORRection:PMETer:CREate
```

Processing stop command

```
[:SOURce[1]|2]:CORRection:PMETer:CREate:ABORt
```

Query

Confirms the execution status.

```
[:SOURce[1]|2]:CORRection:PMETer:STATus?
```

Response

```
<status>
```

Parameter

`<status>`	CreateCorrectionTable execution status
`0`	Not executed
`1`	Being executed

Details

This function cannot be set during Sweep/List.

Example of Use

To create the correction table, confirms the execution status, and stops the execution.

```
CORR:PMET:CRE
CORR:PMET:STAT?
> 1
CORR:PMET:CRE:ABOR
```

Setting method

Example: To create the correction table.

1. Connect the USB terminal of the power sensor to the USB terminal of the MG3710A/MG3710E/MG3740A.
2. Connect the RF Input terminal of the power sensor to the end of the path to be corrected.

⚠ CAUTION

The power sensor may be damaged depending on the output level of the MG3710A/MG3710E/MG3740A. Beware not to apply excessive input when the terminal is connected.

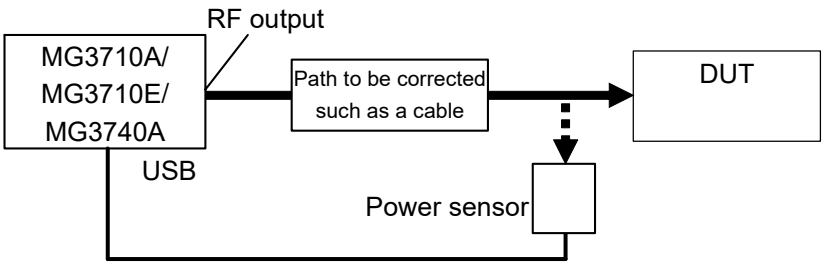


Figure 5.5.4-1 Connection

3. Press **F1 Connection Settings** in the USB Power Sensor function menu, and enter the information of the connected power sensor to ComPort number and Model with **F1 COM Port** and **F2 Model**.
4. Press **F2 Settings** in the USB Power Sensor function menu to open the Settings function menu, and enter the information of the frequency range and measurement point number of the measurement target to **F1 Start Freq**, **F2 Stop Freq**, and **F5 Correction Points**.

5. Set the path loss/gain between the MG3710A/MG3710E/MG3740A and the power sensor to **F4 Level Offset Value** in the Settings function menu, and set **F3 Level Offset** to On. Set the output level of the MG3710A/MG3710E/MG3740A to the level of the test target.
6. Press **F6 Create Correction File** in the USB Power Sensor function menu to output the CW signal from the MG3710A/MG3710E/MG3740A and sweep frequency between Start Frequency and Stop Frequency. The signal is received by the power sensor, and the difference from the MG3710A/MG3710E/MG3740A output level is created as the correction table.
7. Save the created Correction Table according to 5.4.7 “Saving user correction table: Save”.

Chapter 6 Sweep/List

This chapter describes the operations and screen display of the Sweep/List function.

Note on remote command:

When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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6.1 Sweep/List Function

Sweep/List or **Top>Sweep/List**

MG3710A/MG3710E/MG3740A has the Sweep function for frequencies and levels to be changed within the specified range and the List function for frequencies and levels to be changed according to the List created with setting values in advance.
The Sweep function divides the specified range with the sweep point number set with Step Points and executes the sweep operation in a step-like form.
The List function assumes one row of the List Table as one sweep point and changes settings according to the List.

Notes:

- The Sweep function cannot be executed for SG1 and SG2 simultaneously.
- The analog modulation (AM/FM/ϕM) cannot be used during Sweep/List.

Pressing **Sweep/List** of the main function key or **F3 Sweep/List** in the top function menu displays the Sweep/List function menu and **Sweep/List Info** dialog box.

This chapter assumes that you press **Sweep/List** of the main function key or **F3 Sweep/List** in the top function menu, unless otherwise specified.

6.1.1 Display description

The display items of the **Sweep/List Info** dialog box differs between the Sweep function and List function.

The progress status is displayed with the progress bar at the bottom of this screen.

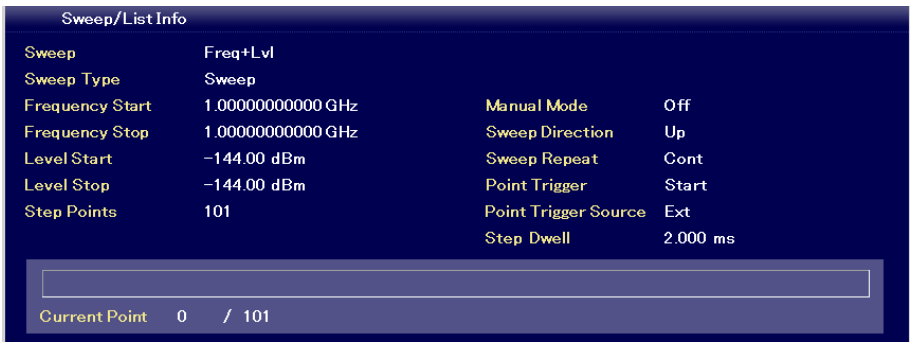


Figure 6.1.1-1 Sweep/List Info Dialog Box (Sweep Type: "Sweep")



Figure 6.1.1-2 Sweep/List Info Dialog Box (Sweep Type: "List")

Table 6.1.1-1 Sweep/List Info Display Items

type	Display	Description
Sweep /List	Sweep	Indicates items, frequency (Freq), and level (Lvl) to execute the Sweep/List function.
	Sweep Type	Distinguishes the Sweep function (Sweep) and List function (List).
Sweep	Frequency Start	Display start frequency of the Sweep function
	Frequency Stop	Display stop frequency of the Sweep function
	Level Start	Display start level of the Sweep function
	Level Stop	Display stop level of the Sweep function
	Step Points	Sweep point number on the Sweep function
List	Step Points	Number of sweep points for List function
	Dwell Types	Distinguishes the reference Sweep/List of DwellTime on the List function.
Sweep /List	Manual Mode	Distinguishes Automatic (Off) and Manual (On) for the operation to move to the next sweep point.
	Sweep Direction	Distinguishes the Up/Down of the execution order of the Sweep/List function.
	Sweep Repeat	Distinguishes the Continuous (Cont)/Once (Single) of the Sweep/List function.
	Point Trigger	Distinguishes the point trigger On/Off and Start/Point trigger.
	Point Trigger Source	Distinguishes the External (Ext)/Key (Key)/Remote command (Bus)/Timer (Timer) of point trigger source
	Current Point	Indicates the sweep point/ the number of sweep points being executed .
	Step Dwell	Indicates the output dwell time on Sweep/List function. Displayed when Dwell Type is Sweep.

The following are remote commands for items displayed in the **Sweep/List Info** dialog box.

Recalling sweep point being executed: Current Point

This command recalls the sweep point being executed.

Remote command

Query the current sweep point

Query

```
[:SOURce]:SWEep:CPOint?
```

```
[:SOURce]:LIST:CPOint?
```

Response

<point>

Parameter

<point>	Sweep point being executed

Programming Example

To recall the sweep point being executed.

```
SWE:CPO?
> 100
```

Recalling sweep point number: Current Point

The sweep point number is recalled.

Remote command

Recall the sweep point number

Query

```
[:SOURce]:LIST:POINts?
```

Response

<point>

Parameter

<point>	Sweep point number

Programming Example

To recall the sweep point number.

```
LIST:POIN?
> 100
```

6.2 Setting Item

The Sweep/List function menu is described below.

Sweep/List function menu: Sweep/List

Table 6.2-1 Sweep/List Function Menu

Page	Key No.	Menu Display	Function
1	F1	Sweep Off	Opens the Sweep Mode function menu and sets the execution of Sweep/List function. Refer to 6.2.1 “Setting operation item: Sweep”.
	F2	Sweep Type Sweep List	Selects the Sweep function or List function. Refer to 6.2.2 “Sweep Type”.
	F3	Sweep Repeat Cont Single	Sets the operation count for Sweep/List function to Single/Continuous. Refer to 6.2.3 “Sweep Repeat”.
	F4	Start Sweep/Stop Sweep	Starts and stops the Sweep/List function. Refer to 6.2.4 “Start/Stop Sweep”.
	F5	Sweep Direction Up Down	Sets the direction of execution order for Sweep/List function. Refer to 6.2.5 “Sweep Direction”.
	F6	Configure Step Sweep	Displays the Sweep function menu and executes the Sweep function-related settings. Refer to 6.3 “Sweep Function”.
	F7	Configure List Sweep	Displays the List Table function menu and executes the List function-related settings. List Table is displayed in the function display area. Refer to 6.4 “List Function: Configure Step Sweep”.
	F8	Point Trigger	Displays the Point Trigger function menu and sets the trigger. Refer to 6.5 “Point Trigger”.
2	F1	Manual Mode Off On	Sets Automatic (Off) and Manual (On) for the operation to move to the next point on Sweep function and List function. Refer to 6.2.6 “Manual mode”.
	F2	Manual Point 1	Sets the sweep point manually on Sweep function and List function. Refer to 6.2.6 “Manual mode”.
	F4	Sweep Out Sweep Status	Displays the Sweep Out function menu and sets the signal output from the SweepOut terminal. Refer to 6.2.7 “Sweep Out”.
	F5	Trigger Out Polarity Positive Negative	Sets the polarity of Point Trigger Out signal. Refer to 6.2.8 “Trigger Out Polarity”.

6.2.1 Setting operation item: Sweep

Sweep/List or **Top**>**Sweep/List, >Sweep**

Selects the items (frequency and level) to be executed with the setting parameters of the Sweep/List function.

Press **F1 Sweep** to display the Sweep Mode function menu.
The parameters to execute the Sweep/List function are set from the frequency and level.

The setting status of the Sweep Mode function menu is displayed under the **F1 Sweep** in the **Sweet/List** function menu.

Example:

Freq + Lvl — To execute the Sweep function or List function for Freq (frequency) and Lvl (level)

Table 6.2.1-1 Sweep Mode Function Menu

Page	Key No.	Menu Display	Function
1	F1	Off	Stops all execution of the Sweep function and List function for **F2 Freq** and **F3 Level**.
	F2	Freq Off On	Sets Stop (Off) or Execution (On) of the Sweep/List function for the frequency.
	F3	Level Off On	Sets Stop (Off) or Execution (On) of the Sweep/List function for the level.

Setting all Sweep/List function to Off: Off

Sweep/List or **Top**>**Sweep/List, >Sweep**>**Off**

Sets all of the Sweep/List function to Off.

Press **F1 Off** to set the Sweep/List function for the frequency and level to Off.

Remote command

Set all of the Sweep/List function to Off

Command

```
[:SOURce]:LIST:OFF
```

Programming Example

To set all of the Sweep/List function to Off.

```
LIST:OFF
```

Sweep/List function for frequency: Freq

Sweep/List or **Top**>**Sweep/List, >Sweep**>**Frequency**

The Sweep/List function for frequency is set.

Press **F2 Freq** to set the Sweep/List function for frequency to On/Off.

On	Executes
Off	Stops (Default)

Remote command

Enables/disables the Sweep/List function for frequency

Command

```
[:SOURce[1]|2]:FREQuency:MODE CW|FIXed|LIST
```

Query

```
[:SOURce[1]|2]:FREQuency:MODE?
```

Response

<mode>	CW, FIX, or LIST For Freq = Off, CW

Parameter

<mode>	Sweep function
CW	Does not execute the frequency sweep
FIXed	Does not execute the frequency sweep (Default)
LIST	Executes the sweep function.

Programming Example

To execute the sweep function for frequency.

```
FREQ:MODE LIST
FREQ:MODE?
> LIST
```

Sweep/List function for level: Level

Sweep/List or **Top**>**Sweep/List, >Sweep**>**Level**

Sets the Sweep/List function for output level.

Press **F3 Level** to set the Sweep/List function for output level to On/Off.

On	Executes
Off	Stops (Default)

Remote command

Enables/disables the Sweep/List function for level

Command

```
[:SOURce[1]|2]:POWer:MODE FIXed|LIST
```

Query

```
[:SOURce[1]|2]:POWer:MODE?
```

Response

<mode>	FIX or LIST

Parameter

<mode>	Sweep function
FIXed	Fixed level (Default)
LIST	Executes the sweep function.

Programming Example

To execute the sweep function for level.

```
POW:MODE LIST
POW:MODE?
> LIST
```

6.2.2 Sweep Type

Sweep/List or **Top**>**Sweep/List, >Sweep Type**

Selects the Sweep function or List function.

Press **F2 Sweep Type** to select.

Sweep	Step Sweep function (Default)
List	List Sweep function

Remote command

Select the Sweep function or List function

Command

```
[:SOURce]:LIST:TYPE LIST|STEP
```

Query

```
[:SOURce]:LIST:TYPE?
```

Response

<type>	LIST or STEP

Parameter

<type>	Type of Sweep
STEP	Step Sweep function (Default)
LIST	List Sweep function

Programming Example

To select the List function from the Sweep function and List function.

```
LIST:TYPE LIST
LIST:TYPE?
> LIST
```

6.2.3 Sweep Repeat

Sweep/List or **Top**>**Sweep/List,** >**Sweep Repeat**

Selects the operation count for the Sweep/List function from Continuous/Single.

Press **F3 Sweep Repeat** to select.

Cont	Continuous (Default)
Single	Once (Single)

Remote command

Select the operation count for the Sweep/List function from Continuous/Single

Command

```
:INITiate:CONTinuous[:ALL] <boolean>
```

Query

```
:INITiate:CONTinuous[:ALL]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Repetition count
OFF|0	Once (Single)
ON|1	Continuous (Default)

Programming Example

To set the sweep count to Continuous.

```
INIT:CONT ON
INIT:CONT?
> 1
```

6.2.4 Start/Stop Sweep

Sweep/List or **Top**>**Sweep/List,** >**Start/Stop Sweep**

Sets the Sweep/List function to Start/Stop every time the button is pressed.

Press **F4 Start/Stop Sweep** to execute.

Note:

This function is unavailable when the setting explained in 6.2.1 "Setting operation item: Sweep" is set to Off.

Remote command

Execute the sweep operation

Command

```
:INITiate[:IMMediate][:ALL]

[:SOURce]:TSWeep
```

Programming Example

To execute the sweep operation.

```
INIT
TSW
```

6.2.5 Sweep Direction

Sweep/List or **Top**>**Sweep/List, >Sweep Direction**

Sets the execution order for Sweep/List function.

Press **F5 Sweep Direction** to set.

Up	From the start to the stop for Sweep function, and from the first to the end for List function (Default)
Down	In reverse order of Up

Remote command

Set the execution order for Sweep/List function

Command

```
[:SOURce]:LIST:DIRection UP|DOWN
```

Query

```
[:SOURce]:LIST:DIRection?
```

Response

<direction>	UP or DOWN

Parameter

<direction>	Execution order
UP	From the start to the stop for Sweep function, and from the first to the end for List function (Default)
DOWN	In reverse order of Up

Programming Example

To set the execution order to Up.

```
LIST:DIR UP
LIST:DIR?
> UP
```

6.2.6 Manual mode

Sets the method to move to the next point on Sweep function and List function.

Manual Mode

Sweep/List or **Top**>**Sweep/List,** >→>**Manual Mode**

Enables/disables the Manual Mode on Sweep function and List function.

Press **F1 Manual Mode** in the second page of the Sweep/List function menu to switch

Off	Sets the automatic movement to the next point (Default).
On	Sets the manual movement to the point set with Manual Point.

Remote command

Enables/disables the Manual Mode

Command

```
[:SOURce]:LIST:MODE AUTO|MANual
```

Query

```
[:SOURce]:LIST:MODE?
```

Response

<mode>	AUTO or MAN

Parameter

<mode>	Operation mode
AUTO	Auto (Default)
MANual	Manual

Programming Example

To set the point movement to Manual.

```
LIST:MODE MAN
LIST:MODE?
> MAN
```

Manual Point

Sweep/List or **Top**>**Sweep/List,** >→>**Manual Point**

Sets the sweep point manually on Sweep function and List function.

Press **F2 Manual Point** in the second page of the Sweep/List function menu to display the **Manual Point** dialog box in the active function frame. Set the Manual Point.

Range	On the Sweep function: 1 to the Step Point of SG1/2 On the List function: 1 to the Step Point of SG1/2
Default	1



Figure 6.2.6-1 Manual Point Dialog Box

Remote command

Set the sweep point

Command

```
[:SOURce]:LIST:MANual <ext_integer>
```

Query

```
[:SOURce]:LIST:MANual?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Sweep point number
Range	Refer to the above description.
Default	Refer to the above description.

Programming Example

To set the sweep points to 100.

```
LIST:MAN 100
LIST:MAN?
> 100
```

6.2.7 Sweep Out

Sweep/List or **Top**>**Sweep/List,** >→>**Sweep Out**

Sets the signal (information) output from the SweepOut terminal.

To use this function, the general purpose input/output option is required. This function is unavailable when Sweep/List Type is set to Sweep for SG2.

Press **F4 Sweep Out** in the second page of the Sweep/List function menu to display the Sweep Out function menu for selection.

10 V Sweep Signal	Outputs the sweep position with 0 to 10 V.
Sweep Status	Outputs the identifying signal for sweeping and non-sweeping (Default).

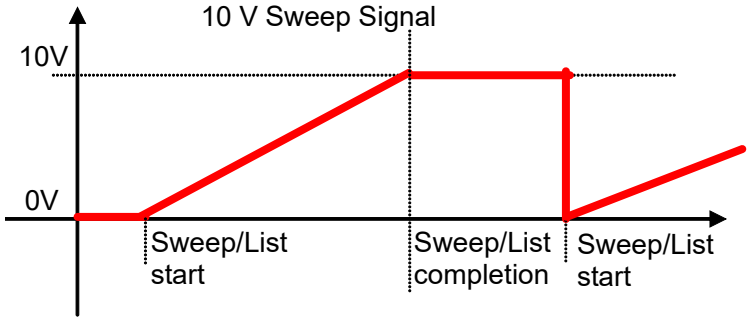


Figure 6.2.7-1 10 V Sweep Signal

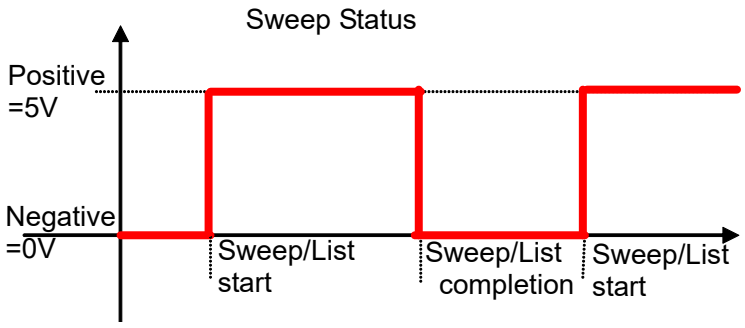


Figure 6.2.7-2 Sweep Status

Remote command

Select the SweepOut terminal output format

Command

```
:ROUTe[:CONNectors]:OUTPut:SOUT SWEep|SETTled
```

Query

```
:ROUTe[:CONNectors]:OUTPut:SOUT?
```

Response

<mode>	SWE or SETT

Parameter

<mode>	Output signal
SWEep	10 V Sweep Signal
SETTled	Sweep Status (Default)

Details

To use this function, the general purpose input/output option 017/117 is required.
This function is unavailable when Sweep/List Type is set to Sweep for SG2.

Programming Example

To set the output signal to Sweep Status.

```
ROUT:OUTP:SOUT SETT
ROUT:OUTP:SOUT?
> SETT
```

6.2.8 Trigger Out Polarity

Sweep/List or **Top>Sweep/List, >(→)>Trigger Out Polarity**

Sets the polarity of Point Trigger Out signal.

Note:

For the output connector setting, refer to 7.4.2 “Route Output Connectors”.

Press **F5 Trigger Out Polarity** in the second page of the Sweep/List function menu to set the polarity of Point Trigger Out signal.

Positive	Positive polarity (Default)
Negative	Negative polarity

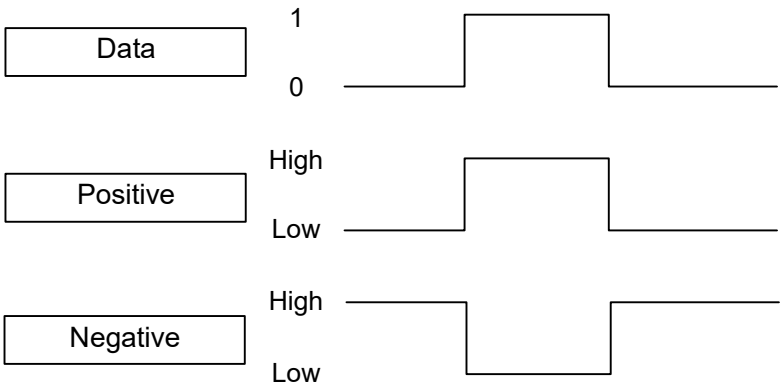


Figure 6.2.8-1 Polarity

Remote command

Set the polarity of Point Trigger Out signal

Command

```
:TRIGger:OUTPut:POLarity POSitive|NEGative
```

Query

```
:TRIGger:OUTPut:POLarity?
```

Response

<polarity>	POS or NEG

Parameter

<polarity>	Signal polarity
POSitive	Positive polarity (Default)
NEGative	Negative polarity

Programming Example

To set the signal polarity to negative.

```
TRIG:OUTP:POL NEG
TRIG:OUTP:POL?
> NEG
```

6.3 Sweep Function

6.3.1 Configure Step Sweep

Sweep/List or **Top**>**Sweep/List, >Configure Step Sweep**

Execute the settings to execute the Sweep function.

Press **F6 Configure Step Sweep** in the Sweep/List function menu to display the Sweep function menu.

Table 6.3.1-1 Sweep Function Menu

Page	Key No.	Menu Display	Function
1	F1	Freq Start 1.00000000000 GHz	Sets the start frequency of the Sweep function.
	F2	Freq Stop 1.00000000000 GHz	Sets the stop frequency of the Sweep function.
	F3	Level Start –144.00 dBm	Sets the start level of the Sweep function.
	F4	Level Stop –144.00 dBm	Sets the stop level of the Sweep function.
	F5	Points 101	Sets the point number on the Sweep function.
	F6	Dwell Time 2.000 ms	Sets the dwell time at each point on the Sweep function execution.
	F8	Step Shape SawTooth Triangle	Selects the normal sweep or triangle sweep on the Sweep function.

Sweep start frequency: Freq Start

Sweep/ List or **Top**>**Sweep/List, >Configure Step Sweep**>**Freq Start**

Sets the start frequency of the Sweep function.

Press **F1 Freq Start** to display the **Freq Start** dialog box in the active function frame. Set the start frequency.

Range	Same as the frequency setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 Hz
Default	1 GHz



Figure 6.3.1-1 Freq Start Dialog Box

Remote command

Set the start frequency of the Sweep function

Command

```
[:SOURce[1]|2]:FREQuency:STARt <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:STARt?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Start frequency
Range	Depends on the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted Hz

Programming Example

To set the start frequency to 800 MHz.

```
FREQ:STAR 800MHZ
FREQ:STAR?
> 800000000.00
```

Sweep stop frequency: Freq Stop

Sweep/List or **Top**>**Sweep/List, >Configure Step Sweep**>**Freq Stop**

Sets the stop frequency of the Sweep function.

Press **F2 Freq Stop** to display the **Freq Stop** dialog box in the active function frame. Set the stop frequency.

Range	Same as the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz



Figure 6.3.1-2 Freq Stop Dialog Box

Remote command

Set the sweep stop frequency of the Sweep function

Command

```
[:SOURce[1]|2]:FREQuency:STOP <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:STOP?
```

Response

```
<freq>
```

Parameter

<freq>	Stop frequency
Range	Depends on the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted Hz

Programming Example

To set the frequency to 1,800 MHz.

```
FREQ:STOP 1800MHZ
FREQ:STOP?
> 1800000000.00
```

Related command

This command sets the sweep center frequency of the Sweep function.
Using this command with the command to set the span frequency sets the start and stop frequencies as a result.
This is a function only with remote commands.

Remote command

Set the sweep center frequency of the Sweep function

Command

```
[:SOURce[1]|2]:FREQuency:CENTer <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:CENTer? [MAXimum|MINimum]
```

Response

<freq>

MAXimum	Maximum settable frequency of MG3710A/MG3710E/MG3740A
MINimum	Minimum settable frequency of MG3710A/MG3710E/MG3740A (9 kHz)
Omitted	Center frequency

Parameter

<freq>	Sweep center frequency
Range	Depends on the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted Hz

Programming Example

To set the center frequency to 800 MHz.

```
FREQ:CENT 800MHZ
FREQ:CENT?
> 800000000.00
```

Related command

This command sets the sweep span frequency of the Sweep function.
Using this command with the command to set the center frequency sets the start and stop frequencies as a result.
This is a function only with remote commands.

Remote command

Set the sweep span frequency of the Sweep function

Command

```
[:SOURce[1]|2]:FREQuency:SPAN <freq>
```

Query

```
[:SOURce[1]|2]:FREQuency:SPAN? [MAXimum|MINimum]
```

Response

<freq>

MAXimum	Maximum settable frequency span (Maximum settable frequency of MG3710A/MG3710E/MG3740A – 9 kHz)
MINimum	Minimum settable frequency (0 Hz)
Omitted	Sweep span frequency

Parameter

<freq>	Sweep span frequency
Range	Depends on the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted Hz

Programming Example

To set the span frequency to 800 MHz.

```
FREQ:SPAN 800MHZ
FREQ:SPAN?
> 800000000.00
```

Sweep start level: Level Start

Sweep/ List or **Top**>**Sweep/List, >Configure Step Sweep**>**Level Start**

Sets the start output level of the Sweep function.

Press **F3 Level Start** to display the **Level Start** dialog box in the active function frame. Set the start output level.

Range	Same as the output level setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 dB
Default	Same as the output level initial value of MG3710A/MG3710E/MG3740A.



Figure 6.3.1-3 Level Start Dialog Box

Remote command

Set the start output level of the Sweep function

Command

```
[:SOURce[1]|2]:POWer:STARt <ampl>
```

Query

```
[:SOURce[1]|2]:POWer:STARt?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Start output level
Range	Same as the output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Same as the output level initial value of MG3710A/MG3710E/MG3740A

Programming Example

To set the sweep start output level to –30.00 dBm.

```
POW:STAR -30.00
POW:STAR?
> -30.00
```

Sweep stop level: Level Stop

Sweep/List or **Top**>**Sweep/List, >Configure Step Sweep**>**Level Stop**

Sets the stop output level of the Sweep function.

Press **F4 Level Stop** to display the **Level Stop** dialog box in the active function frame. Set the stop output level.

Range	Same as the output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Same as the output level initial value of MG3710A/MG3710E/MG3740A



Figure 6.3.1-4 Level Stop Dialog Box

Remote command

Set the stop output level of the Sweep function

Command

```
[:SOURce[1]|2]:POWer:STOP <ampl>
```

Query

```
[:SOURce[1]|2]:POWer:STOP?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Stop output level
Range	Same as the output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Same as the output level initial value of MG3710A/MG3710E/MG3740A

Programming Example

To set the sweep stop output level to –50.00 dBm.

```
POW:STOP -50.00
POW:STOP?
> -50.00
```

Sweep points: Points

Sweep/List or **Top**>**Sweep/List, >Configure Step Sweep**>**Points**

Sets the point number on the Sweep function.

Press **F5 Points** to display the **Points** dialog box in the active function frame. Set the point number.

Range	Minimum value	2	
	Maximum value	1000	Normal sweep
		500	Triangle sweep
Resolution	1		
Default	101		



Figure 6.3.1-5 Points Dialog Box

Remote command

Set the point number on the Sweep function

Command

```
[:SOURce[1]|2]:SWEep:POINts <value>
```

Query

```
[:SOURce[1]|2]:SWEep:POINts?
```

Response

```
<value>
```

Parameter

<value>	Point number		
Range	Minimum value	2	
	Maximum value	1000	Normal sweep
		500	Triangle sweep
Resolution	1		
Default	101		

Programming Example

To set the point number to 300.

```
SWE:POIN 300
SWE:POIN?
> 300
```

Dwell Time

Sweep/List or **Top**>**Sweep/List,** >**Configure Step Sweep**>**Dwell Time**

Sets the dwell time at each point on the Sweep function execution.

Press **F6 Dwell Time** to display the **Dwell Time** dialog box in the active function frame. Set the dwell time.

Range	100 µs to 16 s
Resolution	1 µs
Default	2 ms



Figure 6.3.1-6 Dwell Time Dialog Box

Remote command

Set the dwell time at each point on the Sweep function execution

Command

```
[:SOURce[1]|2]:SWEep:DWELl <time>
```

Query

```
[:SOURce[1]|2]:SWEep:DWELl?
```

Response

<time>	Unit: s

Parameter

<time>	Dwell time
Range	100 µs to 16 s
Resolution	1 µs
Default	2 ms
Suffix code	S, MS, US, NS, PS
	When omitted S

Programming Example

To set the dwell time to 200 µs.

```
SWE:DWEL 200US
SWE:DWEL?
> 0.000200
```

Step Shape

Sweep/ List or **Top**>**Sweep/List,** >**Configure Step Sweep**>**Step Shape**

Selects the sweep shape from normal sweep or triangle sweep on the Sweep function.

Press **F8 Step Shape** to switch the normal sweep/triangle sweep.

Saw Tooth	Normal sweep (Default)
Triangle	Triangle sweep

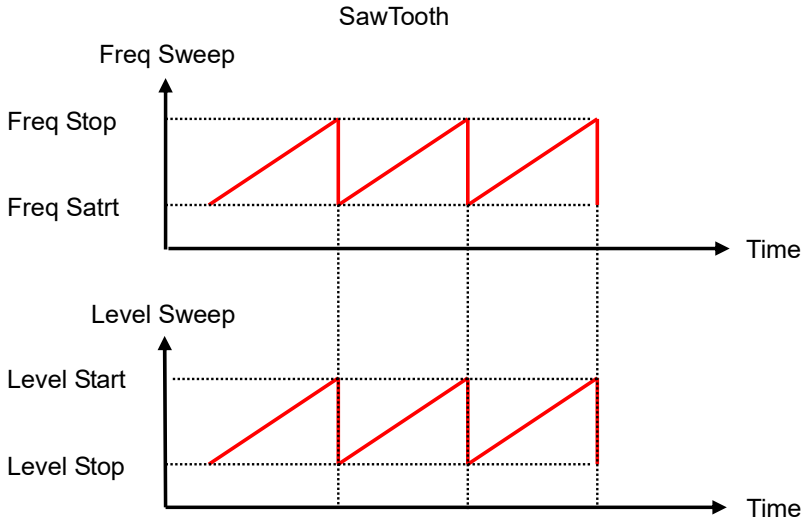


Figure 6.3.1-7 Saw Tooth (Normal) Sweep

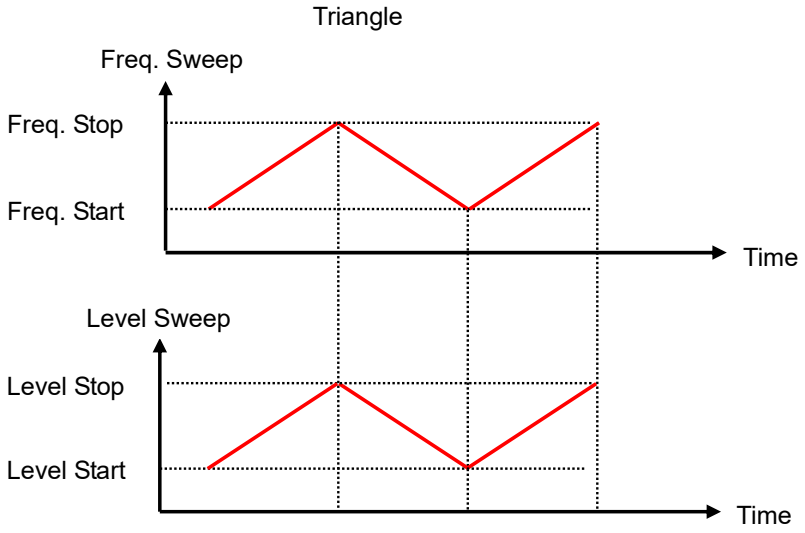


Figure 6.3.1-8 Triangle Sweep

Remote command

Select the sweep shape on the Sweep function

Command

```
[:SOURce[1]|2]:SWEep:SHAPe <shape>
```

Query

```
[:SOURce[1]|2]:SWEep:SHAPe?
```

Response

```
<shape>
```

Parameter

`<shape>`	Sweep shape
`SAWTooth`	Normal sweep (Default)
`TRIangle`	Triangle sweep

Programming Example

To set the sweep shape to the triangle sweep.

```
SWE:SHAP TRI
SWE:SHAP?
> TRI
```

6.4 List Function: Configure List Sweep

Sweep/ List or **Top>Sweep/List, >Configure List Sweep**

Configures the settings to execute the List function.

Press **F7 Configure List Sweep** in the Sweep/List function menu to display the List Table function menu and List Table.

Table 6.4-1 List Table Function Menu

Page	Key No.	Menu Display	Function
1	F1	The function displayed on **F1** depends on the cursor position on List Table.	
		Edit Item	Displayed when the cursor is on Frequency, Level or Dwell on List Table. The input dialog box for the selected item is displayed in the active function frame. Enter the appropriate number. Refer to 6.4.1 “List Table setting”.
		SG SG1 SG2	Displayed when the cursor is on SG of the List Table. Select SG to be applied. Refer to 6.4.1 “List Table setting”.
	F2	Insert Row	Inserts a row to the list. The row is added above the row where the cursor is positioned. Refer to 6.4.2 “Inserting/deleting row for List Table”.
	F3	Delete Row	Deletes the row where the cursor is positioned in the list. Refer to 6.4.2 “Inserting/deleting row for List Table”.
	F4	Clear	Deletes all of the list and initializes it. Refer to 6.4.2 “Inserting/deleting row for List Table”.
	F6	Dwell Type Sweep List	Selects the application origin for DwellTime on the List function. Refer to 6.4.3 “Selecting dwell time: Dwell Type”.
	F7	Open	Displays the Recall List Table function menu and recalls the List Table data. Refer to 6.4.4 “Recalling List Table: Open”.
	F8	Save	Displays the Save List Table function menu and saves the List Table. Refer to 6.4.5 “Saving List Table: Save”.

6.4.1 List Table setting

Sweep/ List or **Top>Sweep/List, >Configure List Sweep**

F1 key in the function menu depends on the item selected with the cursor on List Table.

Move the cursor with the rotary knob or step key to set items.

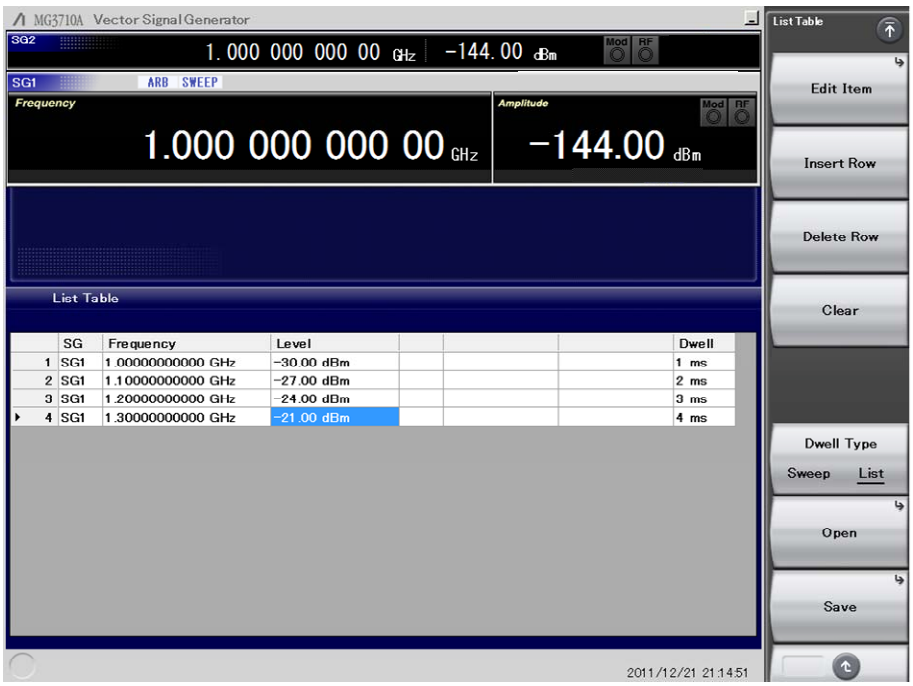


Figure 6.4.1-1 List Table

SG setting: SG

Sweep/ List or **Top>Sweep/List, >Configure List Sweep>SG**

When the cursor is on "SG", F1 key is "SG". Press **F1 SG** to select SG to apply List Table.

SG1	Targets SG1. (Default)
SG2	Targets SG2.

Remote command

Set SG1 and SG2 specifying the list number

Command

```
[:SOURce]:LIST:SOURce:SPECify <integer>,1|2
```

Query

```
[:SOURce]:LIST:SOURce:SPECify? <integer>
```

Response

<SG>	1 or 2

Parameter

<integer>	List number
Range	1 to 500
Resolution	1
Default	1
<SG>	SG number
1	SG1 (Default)
2	SG2

Programming Example

To set SG2 to the list number 20.

```
LIST:SOUR:SPEC 20,2
LIST:SOUR:SPEC? 20
> 2
```

Setting frequency: Edit Item

Sweep/List or **Top>Sweep/List, >Configure List Sweep>Edit Item**

When the cursor is on "Frequency", **F1** key is "Edit Item". Press **F1 Edit Item** to display the **Frequency** dialog box in the active function frame. Set the frequency.

Range	Same as the frequency setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 Hz
Default	1 GHz



Figure 6.4.1-2 Frequency Dialog Box

Remote command

Set the frequency specifying the list number

Command

```
[:SOURce]:LIST:FREQuency:SPECify <integer>,<freq>
```

Query

```
[:SOURce]:LIST:FREQuency:SPECify? <integer>
```

Response

<freq>	Unit: Hz

Parameter

<integer>	List number
Range	1 to 500
Resolution	1
Default	1
<freq>	Frequency
Range	Depends on the frequency setting range of MG3710A/MG3710E/MG3740A.
Resolution	0.01 Hz
Default	1 GHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted Hz

Programming Example

To set 800 MHz to the list number 1.

```
LIST:FREQ:SPEC 1,800MHZ
LIST:FREQ:SPEC? 1
> 800000000.00
```

Setting Level: Edit Item

Sweep/List or **Top>Sweep/List, >Configure List Sweep>Edit Item**

When the cursor is on "**Level**", **F1** key is "Edit Item". Press **F1 Edit Item** to display the **Level** dialog box in the active function frame. Set the level.

Range	Same as the output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Same as the output level initial value of MG3710A/MG3710E/MG3740A



Figure 6.4.1-3 Level Dialog Box

Remote command

Set the level specifying the list number

Command

```
[:SOURce]:LIST:POWer:SPECify <integer>,<ampl>
```

Query

```
[:SOURce]:LIST:POWer:SPECify? <integer>
```

Response

<ampl>	Unit: dBm

Parameter

<integer>	List number
Range	1 to 500
Resolution	1
Default	1
<ampl>	Output level
Range	Output level setting range of MG3710A/MG3710E/MG3740A
Resolution	0.01 dB
Default	Minimum output level of MG3710A/MG3710E/MG3740A
Suffix code	DBM, DM, DBUV, DBUVE DBM when omitted

Programming Example

To set –30.00 dBm to the list number 1.

```
LIST:POW:SPEC 1,-30.00
LIST:POW:SPEC? 1
> -30.00
```

Setting dwell time: Edit Item

Sweep/ List or **Top>Sweep/List, >Configure List Sweep>Edit Item**

When the cursor is on "**Dwell**", **F1** key is "Edit Item". Press **F1 Edit Item** to display the **Dwell** dialog box in the active function frame. Set the Dwell Time.

Range	100 µs to 16 s
Resolution	1 µs (990 ns)
Default	2 ms



Figure 6.4.1-4 Dwell Dialog Box

Remote command

Set the dwell time specifying the list number

Command

```
[:SOURce]:LIST:DWELl:SPECify <integer>,<time>
```

Query

```
[:SOURce]:LIST:DWELl:SPECify? <integer>
```

Response

<time>	Unit: s

Parameter

<integer>	List number
Range	1 to 500
Resolution	1
Default	1
<time>	Dwell time
Range	100 µs to 16 s
Resolution	1 µs (990 ns)
Default	2 ms
Suffix code	S, MS, US, NS, PS S when omitted

Programming Example

To set 200 µs to the list number 1.

```
LIST:DWEL:SPEC 1,200US
LIST:DWEL:SPEC? 1
> 0.000200
```

Operation description

Operation of Dwell Time

Dwell Time operation differs between SG with one list and SG with two lists.

1. For SG with one list

The signal of each element has the dwell time specified with Dwell Time.

Table 6.4.1-1 Setting Example of Dwell Time

No.	Type of SG	Frequency	Dwell Time
1	SG1	F1	1 ms
2	SG1	F2	2 ms
3	SG1	F3	3 ms
4	SG1	F4	4 ms
5	SG1	F5	5 ms

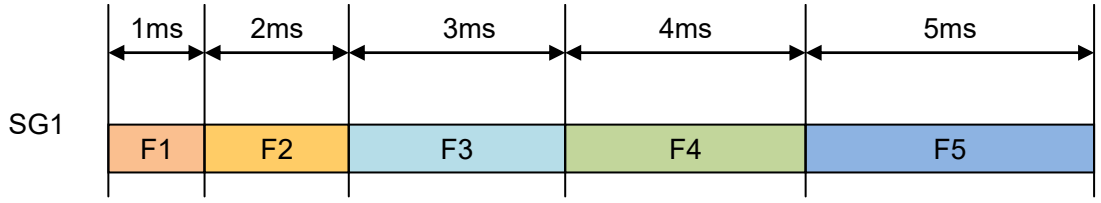


Figure 6.4.1-5 Dwell Time Operation (1SG)

2. For SG with two lists

It is same as the SG with one list that the signal output of the next Element is started after Dwell Time; however, the other SG which is not the target SG for the next Element keeps unchanged status (the signal output is not stopped).

Table 6.4.1-2 Setting Example of Dwell Time

No.	Type of SG	Frequency	Dwell Time
1	SG1	F1	1 ms
2	SG2	F2	2 ms
3	SG1	F3	3 ms
4	SG1	F4	4 ms
5	SG2	F5	5 ms

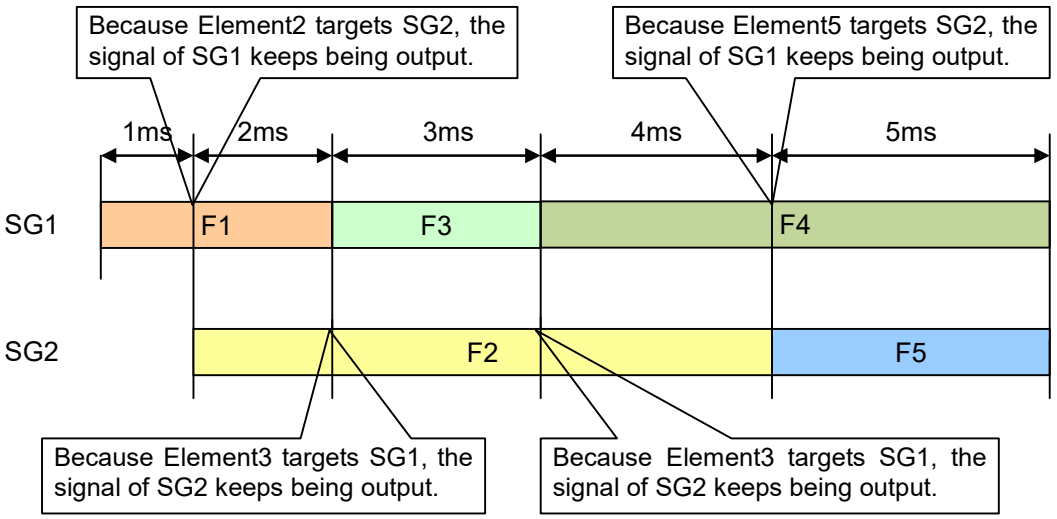


Figure 6.4.1-6 Dwell Time Operation (2SG)

6.4.2 Inserting/deleting row for List Table

Insertion/deletion of input row for List Table is executed.

Inserting row to List Table: Insert Row

Sweep/List or **Top>Sweep/List, >Configure List Sweep>Insert Row**

Press **F2 Insert Row** to add a row beneath the row where the cursor is positioned and existed rows are replaced down by one row. The added row is a copy of the specified row.

List Table can have up to 500 rows.

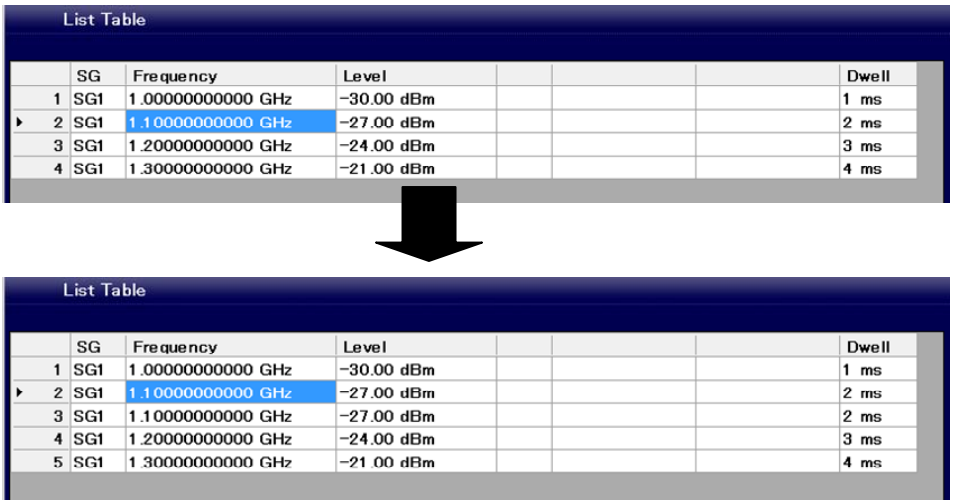


Figure 6.4.2-1 Insert Row

Remote command

Add a new row above the specified row
(The added row will be a copy of the specified row)
Command

```
[:SOURce]:LIST:TYPE:LIST:INSert [<integer>]
```

Parameter

<integer>	Position for the row to be inserted
Range	1 to the sweep point number The last row when omitted
Resolution	1
Default	1

Programming Example

To add a new row above the 10th row.

```
LIST:TYPE:LIST:INS 10
```

Deleting row from List Table: Delete Row

Sweep/ List or **Top>Sweep/List, >Configure List Sweep>Delete Row**

Press **F3 Delete Row** to delete the row where the cursor is positioned and existed rows are replaced up by one row.

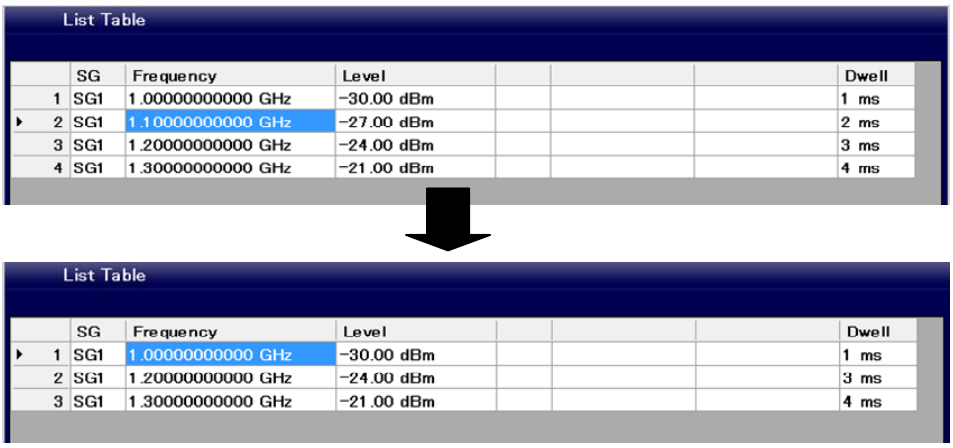


Figure 6.4.2-2 Delete Row

Remote command

Delete the specified row

(When there is only one row, the row is changed to the initial value)

Command

`[:SOURce]:LIST:TYPE:LIST:DELete [<integer>]`

Parameter

`<integer>`	Position of the row to be deleted
Range	1 to the sweep point number
	The last row when omitted
Resolution	1
Default	1

Programming Example

To delete the 10th row.

```
LIST:TYPE:LIST:DEL 10
```

Clearing List Table: Clear

Sweep/ List or **Top>Sweep/List, >Configure List Sweep>Clear**

Press **F4 Clear** to delete all rows of List Table.

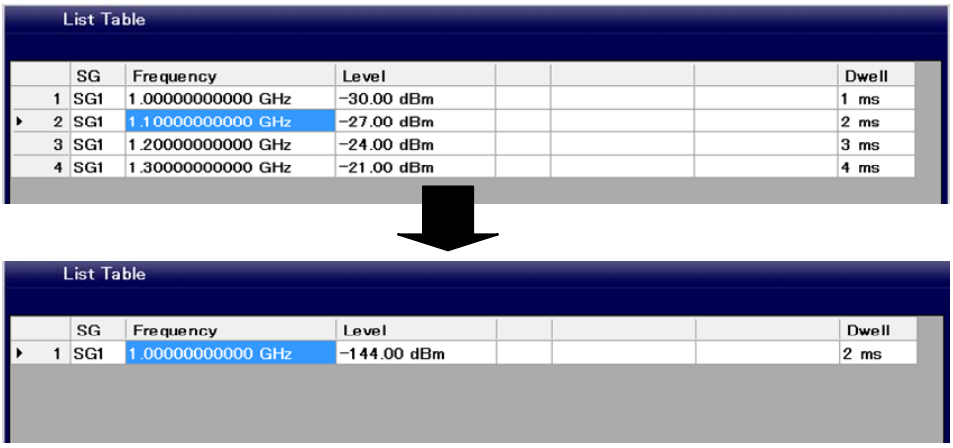


Figure 6.4.2-3 Clear

Remote command

Delete all rows of List Table

Command

```
[:SOURce]:LIST:TYPE:LIST:INITialize:PRESet
```

Programming Example

To delete all rows of List Table.

```
LIST:TYPE:LIST:INIT:PRES
```

6.4.3 Selecting dwell time: Dwell Type

Sweep/List or **Top**>**Sweep/List, >Configure List Sweep**>**Dwell Type**

Selects the Dwell Time used on the List function.

Press **F6 Dwell Type** to switch List/Sweep.

List	Applies the Dwell Time in List. (Default)
Sweep	Applies the Dwell Time set with the Sweep function menu.

Remote command

Select the dwell time applied on the List function

Command

```
[:SOURce]:LIST:DWELl:TYPE LIST|STEP
```

Query

```
[:SOURce]:LIST:DWELl:TYPE?
```

Response

<type>	LIST or STEP

Parameter

<type>	Dwell time to be applied
LIST	Dwell Time in List (Default)
STEP	Dwell Time set with the Sweep function menu

Programming Example

To apply the Dwell Time in List.

```
LIST:DWEL:TYPE LIST
LIST:DWEL:TYPE?
> LIST
```

6.4.4 Recalling List Table: Open

Sweep/List or **Top**>**Sweep/List, >Configure List Sweep**>**Open**

Recalls the saved List Table file.

Remote command

Recall the saved List Table file

Command

```
:MMEMory:LOAD:LIST <string>[,<device>]
```

Parameter

<string>	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Drive number
Options	A to Z, currently selected drive when omitted

Programming Example

To recall the List file with the file name of "ABC" from the D drive.

```
MMEM:LOAD:LIST "ABC", D
```

Setting method

Example: To recall the List Table file.

1. Press **F7 Open** in the List Table function menu to display the **List Table Recall** dialog box in the active function frame, **File List** dialog box in the function display frame, and List Table Recall function menu in the function menu frame.

Table 6.4.4-1 List Table Recall Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Opens the Device function menu for selection of Device where List Table to be recalled is saved.
	F7	Open	Recalls the List Table file in Device selected with **F1 Drive**.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select Device containing the List Table file to be recalled.

   Options All connected Drives
   Default C

3. The **File List** dialog box of the device selected in Step 2 is displayed, and the csv files are displayed.

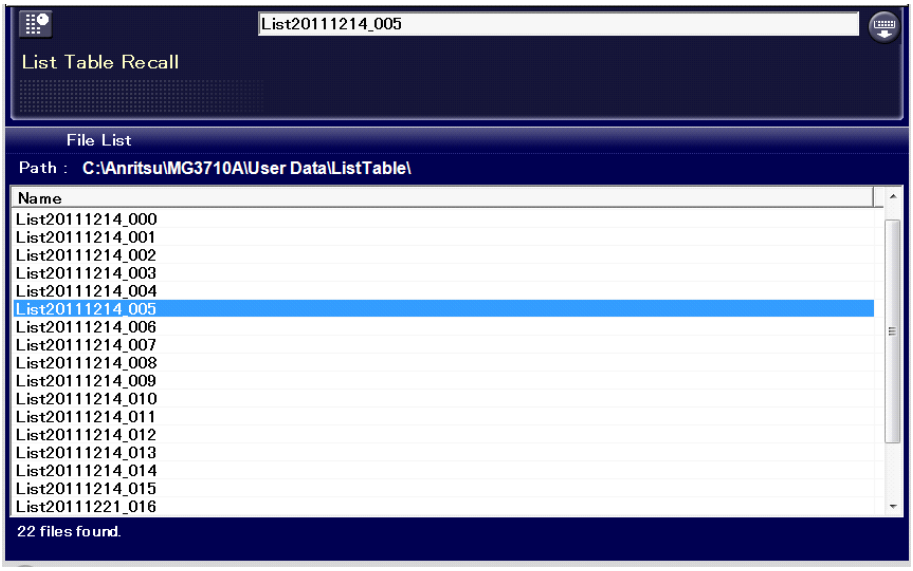


Figure 6.4.4-1 List Table Recall Screen

4. Select the List Table file to be recalled.
5. Press **F7 Open** to recall the selected List Table file.

Notes:

- File names are listed in alphanumeric order.
- If no List Table file exists, “File not found” is displayed.

6.4.5 Saving List Table: Save

Sweep/List or **Top**>**Sweep/List, >Configure List Sweep**>**Save**

Saves the List Table with set parameters in the internal hard disk/SSD.

Remote command

Save the List Table with set parameters

Command

```
:MMEMory:STORe:LIST [<string>[,<device>]]
```

Parameter

<string>	File name without an extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " ″ ` ′ < > | Automatically named as "List[Date]_[Additional number].csv" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Drive number
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.

A destination path to save the file is the following directory in the specified drive.

Anritsu\MG3710A\User Data\ListTable\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To save the LIST file with the file name of "ABC" to the D drive.

```
MMEM:STOR:LIST "ABC",D
```

Setting method

Example: To save the currently displayed List Table with the file name of "ABC".

1. Press **F8 Save** in the List Table function menu to display the **List Table Save** dialog box in the active function frame, **File List** dialog box in the function display frame, and List Table Save function menu in the function menu frame.

Table 6.4.5-1 List Table Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Device function menu and sets the destination Drive.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F7	Save	Saves the file to the Device selected with **F1 Drive**.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select the destination Device.

   Options All connected Drives
   Default C

3. The **File List** dialog box of the device selected in Step 2 is displayed, and the csv files are displayed.

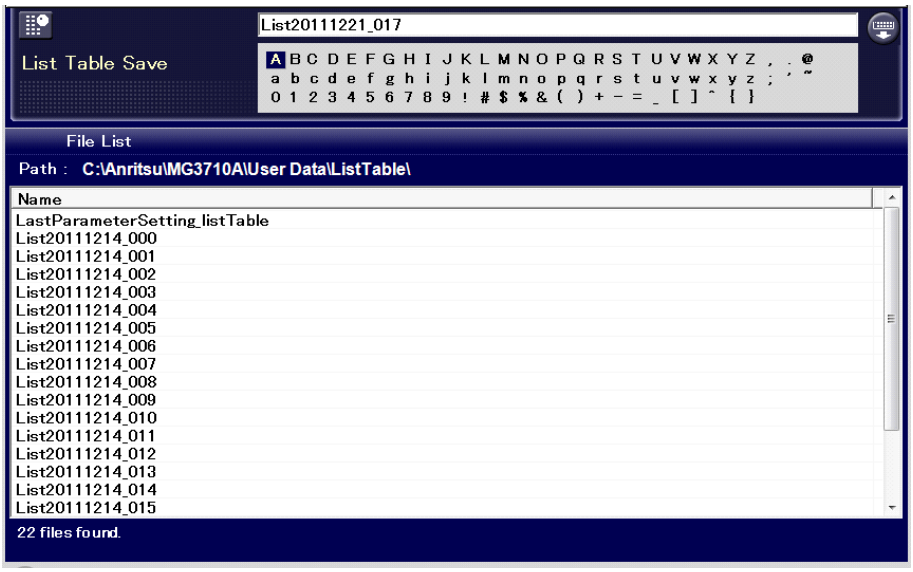


Figure 6.4.5-1 List Table Save Screen

4. Enter the file name to the text box in the active function frame. By default, the "ListDate_Additional number" is displayed in the text box.

5. Enter “ABC” in the text box and press **F7 Save**. The List Table file with the entered file name is saved, and the **List Table Save** dialog box closes. Press **F8 Cancel** to return to the previous screen without saving the List Table file.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path:
  Anritsu\MG3710A\User Data\ListTable\
- Default destination name:
  List[date]_[additional number].csv
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character palette.
- The following characters cannot be used:
  \ / : * ? " ″ ‘ ’ < > |
- A space or dot “.” at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

6.5 Point Trigger

Sweep/List or **Top**>**Sweep/List, >Point Trigger**

Sets the point trigger to move to the next point on Sweep/List function.

Note:

The Point Trigger uses the trigger signal input as Pattern Trigger1. For the input connector setting, refer to Section 7.4.1 "Route Input Connectors".

Press **F8 Point Trigger** in the Sweep/List function menu to display the Point Trigger function menu.

Table 6.5-1 Point Trigger Function Menu

Page	Key No.	Menu Display	Function
1	F1	Point Trigger Off On	Enables/disables the trigger on Sweep/List function.
	F2	Mode Start Point	Selects the trigger mode on Sweep/List function.
	F3	Source Ext	Displays the Point Trigger Source function menu and sets the trigger source on Sweep/List function.
	F4	Delay 0.00000000 s	Sets the delay time from Point Trigger input to hardware settings on Sweep/List function.
	F5	Edge Rise Fall	Sets the polarity to be triggered for External PointTriggerSource.
	F6	Timer Period 1.000 ms	Sets the timer trigger period.
	F8	Trigger Key	Executes Point Trigger if the key is pressed when Source is Trigger Key.

Point Trigger

Sweep/List or **Top**>**Sweep/List, >Point Trigger**>**Point Trigger**

Enables/disables the trigger on Sweep/List function.

Press **F1 Point Trigger** to switch the trigger On/Off.

Off	Does not use the trigger (Default).
On	Uses the trigger.

When Manual Mode is On, Manual has priority and Trigger is ignored.

Remote command

Enables/disables the trigger

Command

```
[:SOURce]:LIST:TRIGger[:STATe] <boolean>
```

Query

```
[:SOURce]:LIST:TRIGger[:STATe]?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Trigger setting
`OFF|0`	Does not use the trigger (Default).
`ON|1`	Uses the trigger.

Details

When Manual Mode is On, Manual has priority and Trigger is disabled.

Programming Example

To set the trigger to On.

```
LIST:TRIG ON
LIST:TRIG?
> 1
```

Trigger mode: Mode

Sweep/List or **Top**>**Sweep/List, >Point Trigger**>**Mode**

The trigger mode on Sweep/List function is selected.

Press **F2 Mode** to switch Start/Point trigger.

Start	Start trigger (Default)
Point	Point trigger

Remote command

Set the trigger mode

Command

```
[:SOURce]:LIST:TRIGger:MODE STARt|POINts
```

Query

```
[:SOURce]:LIST:TRIGger:MODE?
```

Response

<mode>	STAR or POIN

Parameter

<mode>	Trigger setting
STARt	Start trigger (Default)
POINts	Point trigger

Programming Example

To set the trigger mode to Start trigger.

```
LIST:TRIG:MODE STAR
LIST:TRIG:MODE?
> STAR
```

Operation description

Start trigger and Point trigger

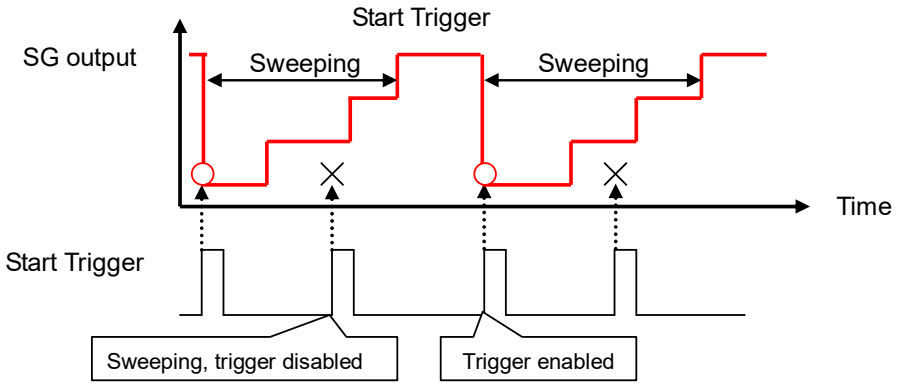


Figure 6.5-1 Start Trigger

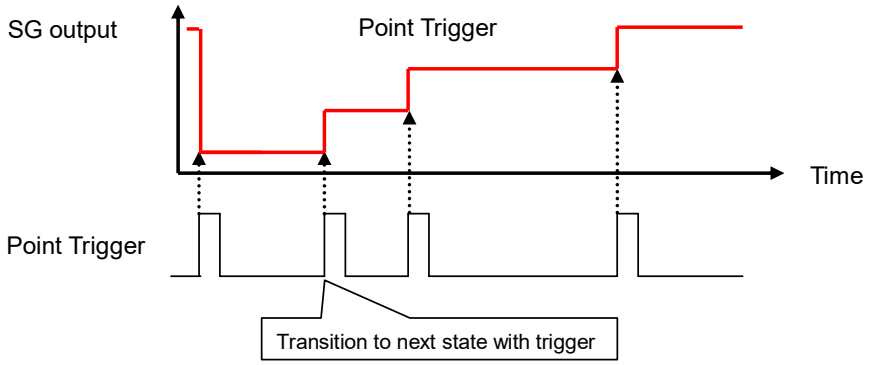


Figure 6.5-2 Point Trigger

Trigger source: Source

Sweep/List or **Top>Sweep/List, >Point Trigger>Source**

Sets the trigger source on Sweep/List function.

Press **F3 Source** to display the Point Trigger function menu and select the trigger source.

Ext	External input (PatternTrigger1) (Default)
Key	Trigger key **F8 Trigger Key**
Bus	Remote command
Timer	Trigger with the internal timer

Remote command

Set the trigger source

Command

```
[:SOURce]:LIST:TRIGger:SOURce BUS|EXTernal|KEY|TIMer
```

Query

```
[:SOURce]:LIST:TRIGger:SOURce?
```

Response

<source>	BUS,EXT,KEY or TIM

Parameter

<source>	Trigger source
BUS	Remote command
EXTernal	External input (PatternTrigger1) (Default)
KEY	Trigger key **F8 Trigger Key**
TIMer	Trigger with the internal timer

Programming Example

To set the trigger source to the internal timer.

```
LIST:TRIG:SOUR TIM
LIST:TRIG:SOUR?
> TIM
```

Trigger delay: Delay

Sweep/List or **Top**>**Sweep/List,** >**Point Trigger**>**Delay**

Sets the delay time from Point Trigger input to hardware settings on Sweep/List function.

Press **F4 Delay** to display the **Delay** dialog box in the active function frame. Set the delay time.

Range	0 s to 2.5 s
Resolution	10 ns
Default	0 s

Remote command

Set the delay time from the Point Trigger input

Command

```
[:SOURce]:LIST:TRIGger:DELay <time>
```

Query

```
[:SOURce]:LIST:TRIGger:DELay?
```

Response

<time>	Unit: s

Parameter

<time>	Delay time
Range	0 s to 2.5 s
Resolution	10 ns
Default	0 s
Suffix code	S, MS, US, NS, PS S when omitted

Programming Example

To set the delay time from the Point Trigger input to 200 µs.

```
LIST:TRIG:DEL 200US
LIST:TRIG:DEL?
> 0.00020000
```

Trigger edge: Edge

Sweep/List or **Top**>**Sweep/List, >Point Trigger**>**Edge**

Sets the polarity to be triggered for External PointTriggerSource.
Press **F5 Edge** to switch Rise/Fall.

Rise	Rise (Default)
Fall	Fall

Remote command

Set the trigger polarity

Command

```
:TRIGger[:SEQuence]:SLOPe POSitive|NEGative
```

Query

```
:TRIGger[:SEQuence]:SLOPe?
```

Response

<edge>	POS or NEG

Parameter

<edge>	Trigger polarity
POSitive	Rise (Default)
NEGative	Fall

Programming Example

To set the trigger polarity to fall.

```
TRIG:SLOP NEG
TRIG:SLOP?
> NEG
```

Timer Period

Sweep/List or **Top**>**Sweep/List, >Point Trigger**>**Timer Period**

Sets the timer trigger period.

Press **F6 Timer Period** to display the **Timer Period** dialog box in the active function frame. Set the period.

Range	500 µs to 4000 s
Resolution	1 µs
Default	1 ms

Remote command

Set the timer trigger period

Command

```
:TRIGger[:SEQuence]:TIMer <time>
```

Query

```
:TRIGger[:SEQuence]:TIMer?
```

Response

```
<time>
```

Parameter

<time>	Timer trigger period
Range	500 µs to 4000 s
Resolution	1 µs
Default	1 ms
Suffix code	S, MS, US, NS, PS
	S when omitted

Programming Example

To set the timer trigger period to 10 ms.

```
TRIG:TIM 10MS
TRIG:TIM?
> 0.010000
```

Trigger Key

Sweep/List or **Top**>**Sweep/List, >Point Trigger**>**Trigger Key**

Generates the trigger manually.

When the trigger source is set to Trigger Key, press **F8 Trigger Key** to allow manual generation of the trigger.

Chapter 7 Modulation

This chapter describes the operations and input/output signal settings related to the modulation function of MG3710A/MG3710E/MG3740A.

Note on remote command:
When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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7.1 Setting Digital Modulation Analysis

Mode or **Top>Mode**

Press **Mode** of the main function key or **F4 Mode** on the top function menu to activate the digital modulation setting mode and the ARB/Waveform function menu is displayed.

In MG3740A, **Mode** can be set only when option-020/120 is installed.

This section assumes that you press **Mode** and the digital modulation setting mode has been activated, unless otherwise specified.

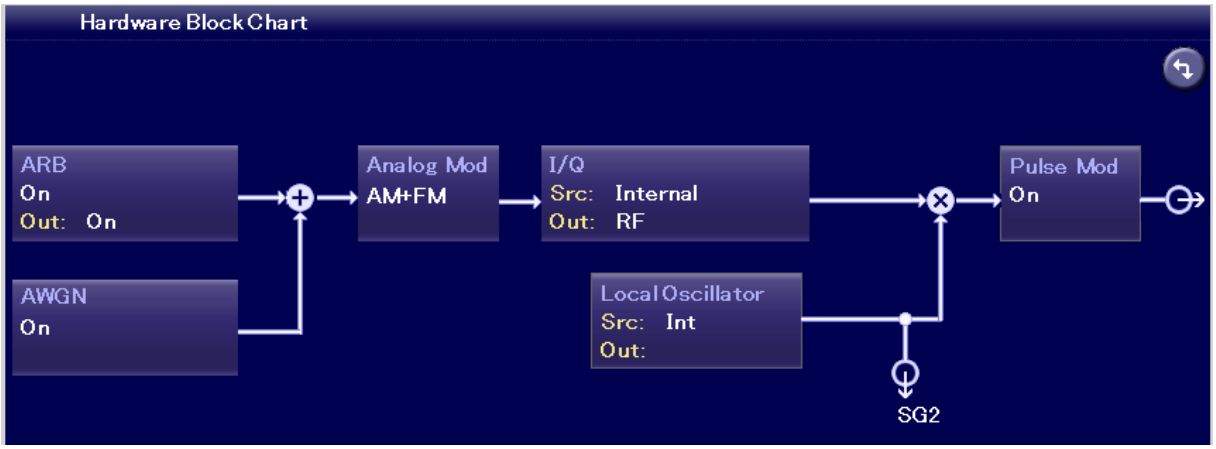


Figure 7.1-1 Outline of MG3710A/MG3710E/MG3740A modulation circuit

Settings of ARB of the digital modulation setting mode and AWGN, Analog/Pulse, I/Q, Modulation, and SG Output on the Top function menu switch the flow of modulated signals and decide the type of signals output from the RF and I/Q output.

The digital modulation states of RF and I/Q output corresponding to each setting are described on the next page.

Table 7.1-1 Digital modulation Setup State and Signal Output

Settings			Output Signal	
I/Q Src	I/Q Out	Modulation	I/Q Out	RF Output
Internal, Analog I/Q In	RF	Off	No output	CW
Analog I/Q In		On		External vector modulation
Internal				Internal vector modulation
Internal, Analog I/Q In	Analog I/Q Out	Off	No output	CW
Analog I/Q In		On	Internal I/Q signal	External vector modulation*
Internal				CW*

* If I/Q Out is set to **Analog I/Q Out** and Modulation is **On**, the RF output level is not guaranteed.

7.1.1 Display description

This section describes the Hardware Block Chart. For the ARB Info display description, refer to 7.3.1 “ARB”.

Press the Top menu to display the Hardware Block Chart and each of SG1 and SG2 has the independent display screen.

Press each displayed block to display the function menu and dialog box necessary for setting.

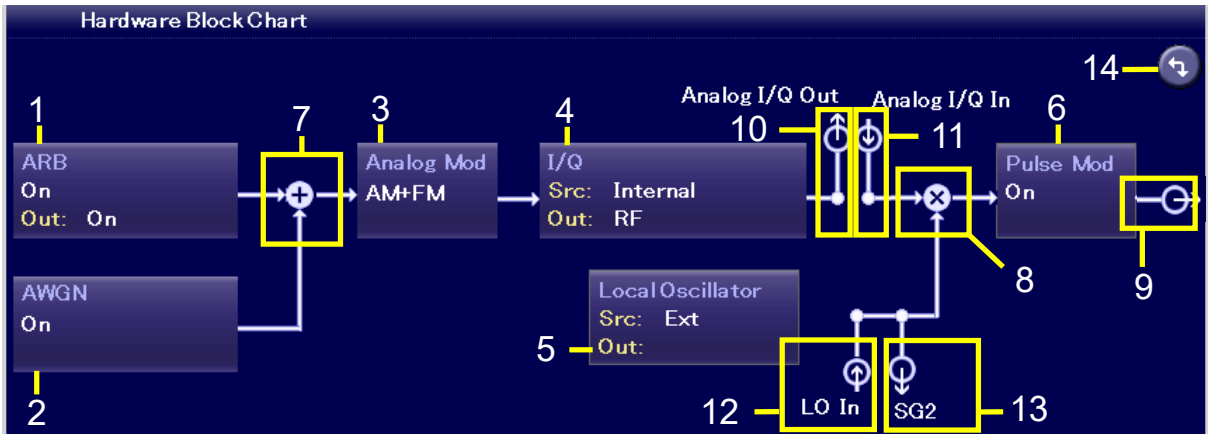


Figure 7.1.1-1 Hardware Block Chart

Note:

The figure above is for explanation; it is different from the actual display.

Table 7.1.1-1 Hardware Block Chart Display Details

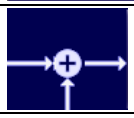
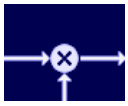
No.	Display Example	Display	Description
1		ARB	ARB block
		On/Off	Indicates On/Off of ARB (function to generate modulated signals with arbitrary waveform patterns).
		Out:	Indicates On/Off of the arbitrary waveform pattern output.
2		AWGN	AWGN block
		On/Off	Indicates On/Off of AWGN addition.
3		Analog Mod	Analog Modulation block
		AM/FM/ϕM	Indicates the analog modulation (AM/FM/ϕM) during modulation.
4		I/Q	I/Q block
		Src:Internal/ Analog I/Q In	Indicates the I/Q signal source.
		Out: RF/ Analog I/Q Out	Indicates the output destination for baseband signals.
5		Local Oscillator	Local Oscillator block
		Src: Int/Ext/Sync	Indicates the Local signal source.
		Out: ---/On/Off	Indicates On/Off of the Local signal external output.
6		Pulse Mod	Pulse Modulation block
		On/Off	Indicates On/Off of Pulse modulation.
7		---	Indicates that inputs from two function blocks of the left side and bottom side are combined and output to the function block of the right side.
8		---	Indicates that the input Local signal from the bottom side is modulated with the input signal from the left side and output to the function block of the right side.
9		---	Indicates the RF Output is On.
10		Analog I/Q Out	Indicates the Analog I/Q signal is set to the external output.

Table 7.1.1-1 Hardware Block Chart Display Details (Cont'd)

No.	Display Example	Display	Description
11		Analog I/Q In	Indicates the Analog I/Q signal is set to the external input.
12		LO In (For SG1)	Indicates the SG1 Local signal source is set to Ext (input from the rear LO Input connector).
		SG1 (For SG2)	Indicates the SG2 Local signal source is set to Sync and the signal is input from SG1.
13		SG2 (For SG1)	Indicates the SG1 Local signal external output setting is On and the signal is output to SG2. If SG2 is not installed, "LO Out" (output from the rear LO Output connector) is displayed.
		LO Out (For SG2)	Indicates the Local signal external output setting (output from the rear LO Output connector) is On.
14		---	Click to switch Hardware Block Chart and ARB Info display. The switching button appears only in the MG3740A with option-020/120 installed. Refer to 7.3.1 "ARB".

Remote command

Query the pattern playback status

Query

```
[:SOURce[1]|2]:RADio:ARB:REGister[:STATus]?
```

Response

```
<status>
```

Parameter

<status>	Playback status
Value	= bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7
bit2: 2^2 = 4	Playing
bit0, 1, 3 to 15	Not used
Range	0 to 255
Default	0 (Paused)

Details

"Paused" is returned while waiting for trigger.

Programming Example

To query the playback status of SG1 output pattern.

```
RAD:ARB:REG?
> 4
```

Resident display frame ARB

Information of the waveform pattern selected with ARB function is displayed in the resident display frame in the lower function display frame. In MG3740A, resident display frame ARB is available only when option-020/120 is installed.

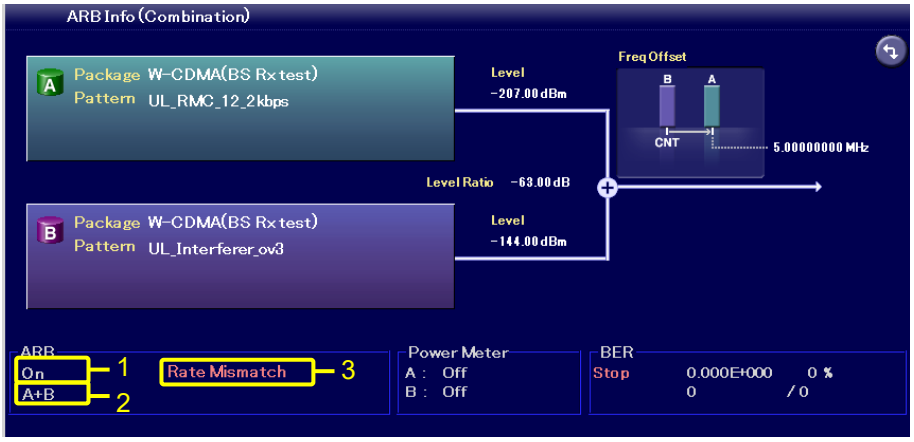


Figure 7.1.1-2 Resident Display Frame ARB

Table 7.1.1-2 Resident Display Frame ARB

No	Function	Display Example	Description
1	ARB status	On	Indicates On/Off of the ARB function. On: ARB On Off: ARB Off
2	Output waveform status	A+B	Indicates the status of output waveform. CW: CW A: Outputs the waveform pattern of Memory A. B: Outputs the waveform pattern of Memory B. A+B: Outputs the waveform patterns of Memory A and Memory B. A+AWGN: Outputs the waveform pattern of Memory A and AWGN. B+AWGN: Outputs the waveform pattern of Memory B and AWGN. Multiplex: Outputs the Multiplex waveform. Long: Outputs the Long waveform. Seq.(A): Outputs the Sequence waveform (Only Memory A is used). Seq.(A+B): Outputs the Sequence waveform (Add Pattern is added). Seq.(A+AWGN): Outputs the Sequence waveform (AWGN is added).

Table 7.1.1-2 Resident Display Frame ARB (Cont'd)

No	Function	Display Example	Description
3	Rate Mismatch display	Rate Mismatch	Displays the Rate Mismatch information. This is displayed when the rate matching is unavailable due to internal operation clock limitation of the MG3710A/MG3710E/MG3740A. Refer to Figure 7.3.2-6 "Rate Matching Function".
4	FIR Error display	FIR Error	Displays the FIR Error information. This is displayed for the condition of no correct signal output when the waveform is to be output which uses the internal FIR filter of the MG3710A/MG3710E/MG3740A.

Note:

For Add Pattern, refer to 4.8.2 "Combination File Edit screen" in *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

Rate Mismatch

The Rate Mismatch message is displayed only when "Mismatch" of Rate Matching has occurred in the ARB field of the resident display frame.

Remote command

Query the status of Rate Matching

Query

```
[:SOURce[1]|2]:RADio:ARB:RMATching:ERRor?
```

Response

```
<status>
```

Parameter

`<status>`	Status of Rate Matching
`NORM`	Normal A mismatch of sampling rates does not occur.
`MISS`	Mismatch A mismatch of sampling rates occurs. The sampling rate of Pattern B was changed to that of Pattern A.

Programming Example

To query the Rate Matching status of SG1.

```
RAD:ARB:RMAT:ERR?
> NORM
```

FIR Error

The FIR Error message is displayed for the condition of no correct signal output when the waveform is to be output which uses the internal FIR filter of the MG3710A/MG3710E/MG3740A.

With the Internal FIR function, the signal to which the FIR filter is applied can be output within the MG3710A/MG3710E/MG3740A under the following conditions.

- Combination file
Waveform of Data Width of 1, 2, or 4 with the use of Internal FIR at Memory A side
Waveform of Data Width of 16 with the use of Internal FIR at Memory B side

- Pattern file
Waveform of Data Width of 1, 2, or 4 with the use of Internal FIR at Memory A side
No output at Memory B side

If the waveform with the use of Internal FIR is output under the conditions other than the above, FIR Error is displayed and no correct signal is output.

7.2 Analog Modulation: Analog/Pulse

Top>(→)>Analog/Pulse

Executes the analog modulation (AM/FM/ϕM) for modulated signals created by CW signal or ARB. In addition, when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed, the analog modulation can be executed with the external input signal.
For usage with low output frequency, the impact of second harmonic wave cut filter may degrade characteristics of high-frequency wave side.

Pulse modulation is executed with arbitrary frequency and timing settings. Modulation by external input signals is also supported. The RF Gate function which runs in tandem with the waveform pattern and the pulse modulation can be applied simultaneously, and the pulse modulation is executed because of OR.

Notes:

- If the output modulated wave exceeds the modulation bandwidth of the MG3710A/MG3710E/MG3740A, a missing signal/alias may occur. When AM modulation, FM modulation, or ϕM modulation is executed, be careful that the bandwidth used does not to exceed the modulation bandwidth.
- The analog modulation (AM/FM/ϕM) cannot be used during Sweep/List.
- The FM modulation and ϕM modulation cannot be executed simultaneously. Other combinations can be executed simultaneously.
- When additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed, using the analog modulation input may cause analog modulation input overflow.

Press **F3 Analog/Pulse** on page 2 of the top function key to open the **Analog Modulation Info** dialog box and the Analog Pulse function menu.

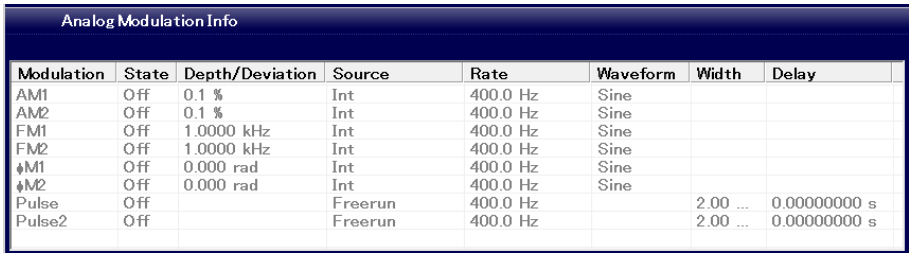


Figure 7.2-1 Analog Modulation Info

Table 7.2-1 Analog Pulse Function Menu

Page	Key No.	Menu Display	Function
1	F1	AM	Displays the AM function menu to set the settings related to AM (amplitude) modulation. Refer to 7.2.1 “AM Modulation: AM”.
	F2	FM/ϕM	Displays the FM/ϕM function menu to set the settings related to FM (frequency) modulation/ϕM (phase) modulation. Refer to 7.2.2 “FM/ϕM”.
	F3	Pulse	Displays the Pulse function menu to set the settings related to Pulse modulation. Refer to 7.2.3 “Pulse”.
	F8	Optimize Spurious Distortion	Selects Spurious Mode or Distortion Mode to optimize analog modulation. Refer to 7.2.4 “Optimize Function for the Analog Modulation: Optimize”.

7.2.1 AM modulation: AM

AM or **Top**>(→)>**Analog/Pulse**>**AM**

Sets the settings related to AM (amplitude) modulation.

Press **AM** on the main function menu or **F1 AM** on the Analog Pulse function menu to open the AM function menu.

Note:

Settings related to the AM modulation are disabled when Sweep/List is being executed.

Out Of Range status may be displayed while the AM modulation is applied. This indicates the status where the output level has been adjusted automatically not to exceed the output upper level of the MG3710A/MG3710E/MG3740A.
In this case, the operations below allows avoiding the Out Of Range.

- Disable the AM modulation.
- Lower the AM modulation depth.
- Lower the Level.

Table 7.2.1-1 AM Function Menu

Page	Key No.	Menu Display	Function
1	F1	AM1 Setup	Sets the AM1.
	F2	AM2 Setup	Sets the AM2. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **AM1 Setup (AM2 Setup)** on the AM function menu to open the AM1 setup (AM2 setup) function menu.

Example: To execute the AM modulation.

1. Set the AM modulation to On with **F1 AM**.
2. Select the AM modulation application type with **F2 AM Depth Type**.
3. Set the AM modulation depth with **F3 AM Depth (Lin)** or **F4 AM Depth (Log)**.
4. Set the modulation frequency with **F5 AM Rate**.
5. Press **RF Output On/Off** to light the LED to set the RF output to On.
6. Press **Mod On/Off** to light the LED to start the AM modulation.

Table 7.2.1-2 AM Function Menu

Page	Key No.	Menu Display	Function
1	F1	AM Off On	Enables/disables the AM (amplitude) modulation.
	F2	AM Depth Type Lin Exp	Selects the AM modulation application type.
	F3	AM Depth (Lin) 0.1 %	Sets the AM modulation depth with the linear value.
	F4	AM Depth (Log) 3.00 dB	Sets the AM modulation depth with the Log value.
	F5	AM Rate 400.0 Hz	Sets the AM modulation frequency.
	F6	Setup AM Source	Sets the AM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.
	F7	Phase Adjust 0.0 deg	Adjusts the phase of internal AM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

AM Modulation On/Off: AM

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup), AM**

Enables/disables AM (amplitude) modulation.

Press **F1 AM** on the AM1 Setup (AM2 Setup) Function Menu to turn on/off.

Off	Disables AM Modulation (Default).
On	Enables AM Modulation.

Remote command

To enable/disable AM Modulation

Command

```
[:SOURce[1]|2]:AM[1]|2:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:AM[1]|2:STATe?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	AM Modulation On/Off
`OFF|0`	Disables AM Modulation (Default).
`ON|1`	Enables AM Modulation.

Programming Example

To set the AM Modulation to On.

```
AM:STAT ON
AM:STAT?
> 1
```

AM Depth Type: AM Depth Type

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup), AM Depth Type**

Selects the AM modulation application type.

Note:

AM Depth Type is a shared parameter for the AM1 and the AM2. The same value is set.

Press **F2 AM Depth Type** on the AM1 Setup (AM2 Setup) function menu for selection.

Lin	Linear format (Default)
Exp	Exponential format

Remote command

Select the AM modulation application type

Command

```
[:SOURce[1]|2]:AM:TYPE LINear|EXPonential
```

Query

```
[:SOURce[1]|2]:AM:TYPE?
```

Response

<type>	LIN or EXP

Parameter

<type>	Type
LINear	Linear format (Default)
EXPonential	Exponential format

Programming Example

To set the AM modulation application type to the linear format.

```
AM:TYPE LIN
AM:TYPE?
> LIN
```

AM Depth (Lin)

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup)**, **AM Depth (Lin)**

Sets the AM modulation depth with the linear value.

Press **F3 AM Depth (Lin)** on the AM1 Setup (AM2 Setup) function menu to set with the **AM Depth (Lin)** dialog box. This can be selected when **Lin** is selected at AM Depth Type.

Range	0 % to 100 %
Resolution	0.1 %
Default	0.1 %

When the AM modulation is executed for the CW signal with the amplitude A, the signal below is created.

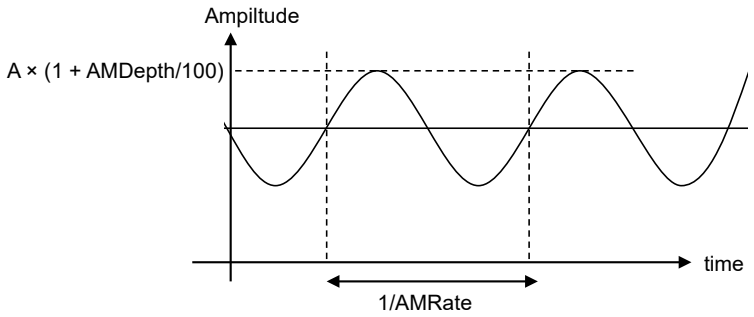


Figure 7.2.1-1 AM Modulation (Lin)

Remote command

Set the AM modulation depth with the linear value

Command

```
[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear] <percent>
```

Query

```
[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear]?
```

Response

<percent>	Unit: %

Parameter

<percent>	Linear value for AM modulation depth
Range	0 % to 100 %
Resolution	0.1 %
Default	0.1 %
Unit	%
Suffix code	PCT (%), When omitted: PCT

Details

This can be set when a linear waveform is set at AM Depth Type.

Programming Example

To set the AM modulation depth to 5 % with the linear value.

```
AM 5
AM?
> 5.0
```

AM Depth (Log)

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup), AM Depth (Log)**

Sets the AM modulation depth with the Log value.

This cannot be set when the external modulation signal is selected (Ext is selected in the AM source).

Press **F4 AM Depth (Log)** on the AM1 Setup (AM2 Setup) function menu to set with the **AM Depth (Log)** dialog box. This can be selected when **Exp** is selected at AM Depth Type.

Range	0 dB to 10 dB
Resolution	0.01 dB
Default	3 dB

When the AM modulation is executed for the CW signal with the amplitude A, the signal below is created.

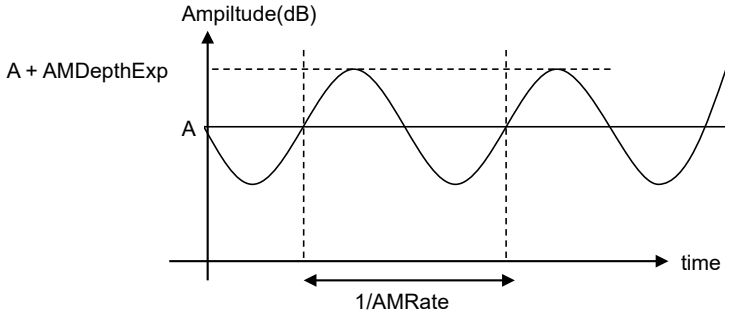


Figure 7.2.1-2 AM Modulation (Log)

Remote command

Set the AM modulation depth with the Log value

Command

```
[:SOURce[1]|2]:AM[1]|2[:DEPTh]:EXPonential <rel_ampl>
```

Query

```
[:SOURce[1]|2]:AM[1]|2[:DEPTh]:EXPonential?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Log value for AM modulation depth
Setting	0 to 10 dB
Resolution	0.01 dB
Default	3 dB
Suffix code	DB, When omitted: DB

Details

This can be set when an exponential function waveform is set at AM Depth Type.

Programming Example

To set the AM modulation depth to 5 dB with the Log value.

```
AM:EXP 5
AM:EXP?
> 5.00
```

AM Rate

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup), AM Rate**

Sets the AM modulation frequency.

Press **F5 AM Rate** on the AM1 Setup (AM2 Setup) function menu to set with the **AM Rate** dialog box.

This cannot be set when the external modulation signal is selected (**Ext** is selected in the AM source).

Range	0.1 Hz to 50 MHz
Resolution	0.1 Hz
Default	400 Hz

Remote command

Set the AM modulation frequency

Command

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FREQuency <freq>
```

Query

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FREQuency?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	AM modulation frequency
Range	0.1 Hz to 50 MHz
Resolution	0.1 Hz
Default	400 Hz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Programming Example

To set the AM modulation frequency to 500 Hz.

```
AM:INT:FREQ 500
AM:INT:FREQ?
> 500.0
```

Setup AM Source

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup)**, **Setup AM Source**

Sets the AM modulation signals.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

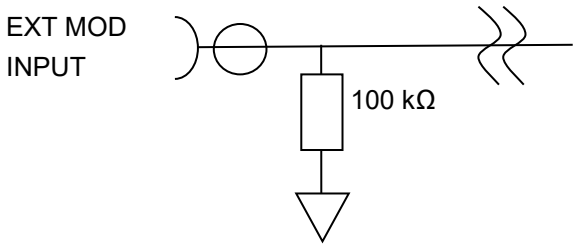
Press **F6 Setup AM Source** on the AM1 Setup (AM2 Setup) function menu to open the Setup AM Source function menu.

Table 7.2.1-3 Setup AM Source Function Menu

Page	Key No.	Menu Display	Function
1	F1	AM Source Int Ext	Switches the internal modulation signal/external modulation signal.
	F2	Waveform Sine	Selects the waveform of the internal modulation signal. This can be select when **Int** is selected in the AM source.
	F6	Coupling DC AC	Sets the DC coupling or AC coupling for the external modulation signal.
	F7	Impedance 600 Ω	Sets the termination for the external modulation signal.
	F8	Ext DC Cal	Adjusts the DC offset for the external modulation signal.

Note:

Because the external modulation signal has terminating resistance, some voltage may be generated even if the coupling is set to AC.



Switching AM Source: AM Source

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup)**>**Setup AM Source, AM Source**

Switches the AM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F1 AM Source** on the Setup AM Source function menu for selection.

Int	Internal modulation signal (Default)
Ext	External modulation signal

Remote command

Switch the AM modulation signal

Command

```
[:SOURce[1]|2]:AM[1]|2:SOURce INT|INT1|INT2|EXT
```

Query

```
[:SOURce[1]|2]:AM[1]|2:SOURce?
```

Response

`<type>`	`INT` or `EXT`

Parameter

`<type>`	Type
`INT`	Internal modulation signal (Default)
`INT1`	Internal modulation signal (Processed as `INT`)
`INT2`	Internal modulation signal (Processed as `INT`)
`EXT`	External modulation signal

Programming Example

To switch the AM modulation signal to the external modulation signal.

```
AM:SOUR EXT
AM:SOUR?
> EXT
```

AM Waveform: Waveform

AM or **Top**>  >**Analog/Pulse**>**AM>AM1 Setup (AM2 Setup)>**
Setup AM Source, Waveform

Selects the waveform of the internal modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F2 Waveform** on the Setup AM Source function menu for selection.

This can be set when **Int** is selected in the AM source.

Options	Sine (Sine wave)
	Triangle (Triangular waveform)
	Square (Square wave)
	Positive Ramp (Ramp wave (positive))
	Negative Ramp (Ramp wave (negative))
Default	Sine

Figure 7.2.1-3 shows the types of selectable waveforms.

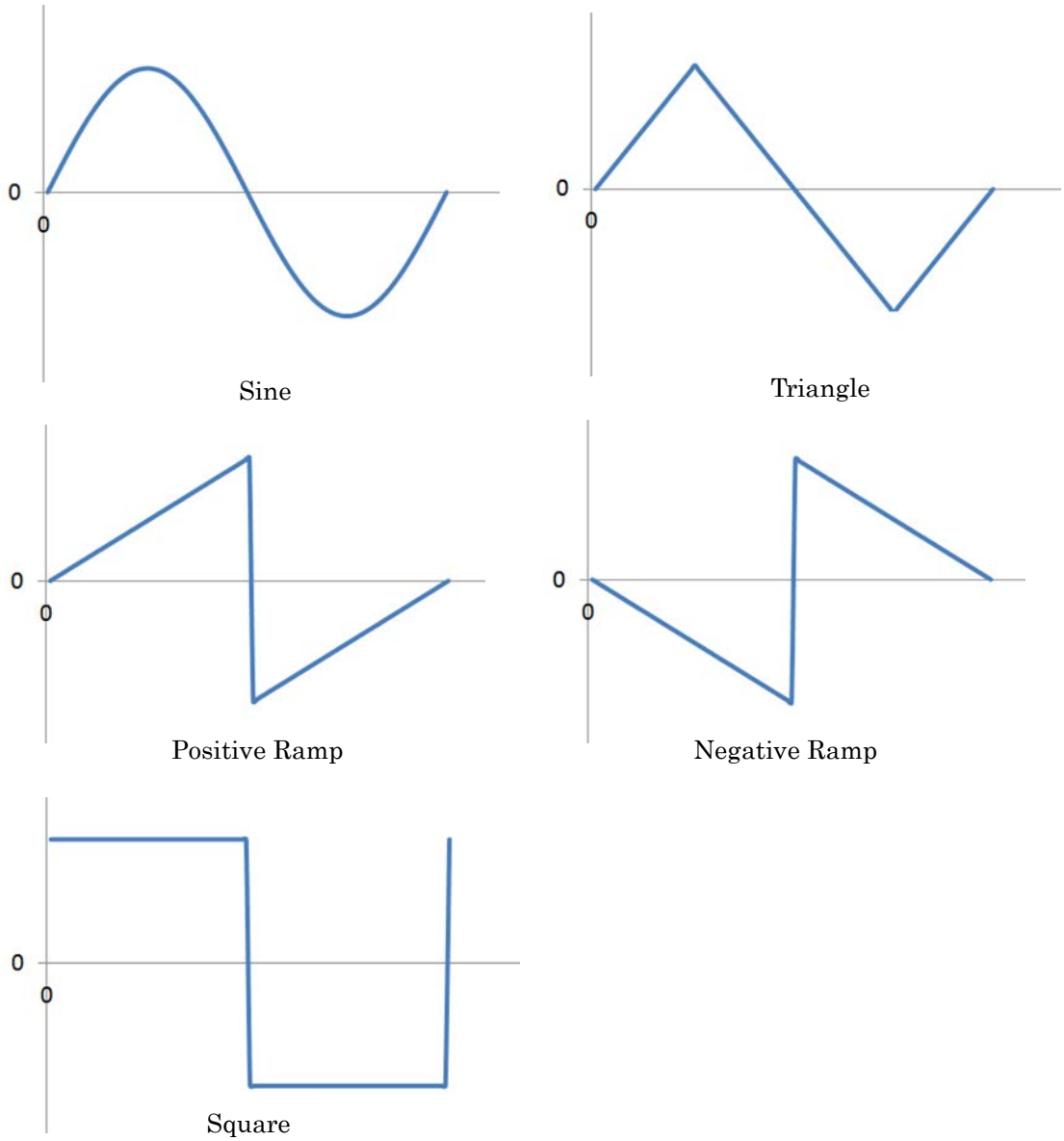


Figure 7.2.1-3 Type of Analog Waveform

Remote command

Select the waveform of the internal AM modulation signal

Command

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion[1]|2:SHAPe
SINE|TRIangle|SQUare|RAMP
```

Query

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion[1]|2:SHAPe?
```

Response

```
<type>                SINE,TRI,SQU,RAMP
```

Parameter

<type>	waveform
SINE	Sine (Default)
TRIangle	Triangle
SQUare	Square
RAMP	Ramp

Programming Example

To set the waveform of the internal AM modulation signal to the Triangle.

```
AM:INT:FUNC:SHAP TRI
AM:INT:FUNC:SHAP?
> TRI
```

Remote command

Select the shape of the ramp wave

Command

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion:SHAPe:RAMP
POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion:SHAPe:RAMP?
```

Response

<type>	POS,NEG

Parameter

<type>	waveform
POSitive	Positive Ramp (Default)
NEGative	Negative Ramp

Programming Example

To set the shape of the ramp wave to the negative ramp.

```
AM:INT:FUNC:SHAP RAMP
AM:INT:FUNC:SHAP:RAMP NEG
AM:INT:FUNC:SHAP:RAMP?
> NEG
```

Coupling: Coupling

AM or **Top**>  >**Analog/Pulse>AM>AM1 Setup (AM2 Setup)> Setup AM Source, Coupling**

Sets the DC coupling or AC coupling for the external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F6 Coupling** on the Setup AM Source function menu for selection.

DC	DC coupling (Default)
AC	AC coupling

Remote command

Set the DC coupling or AC coupling for the external modulation signal

Command

```
[:SOURce[1]|2]:EXTMod:COUPling DC|AC
```

Query

```
[:SOURce[1]|2]:EXTMod:COUPling?
```

Response

<type>	DC,AC

Parameter

<type>	Coupling
DC	DC coupling (Default)
AC	AC coupling

Programming Example

To set the DC coupling for the external modulation signal.

```
EXTM:COUP DC
EXTM:COUP?
> DC
```

Impedance: Impedance

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup)**>**Setup AM Source, Impedance**

Sets the termination for the external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F7 Impedance** on the Setup AM Source function menu for selection.

50 Ω	50 Ω termination
600 Ω	600 Ω termination (Default)
Hi-Z	High impedance (100 kΩ/70 pF)

Remote command

Set the termination for the external modulation signal

Command

```
[:SOURce[1]|2]:EXTMod:IMPedance 50|600|HIZ
```

Query

```
[:SOURce[1]|2]:EXTMod:IMPedance?
```

Response

<type>	50,600,HIZ

Parameter

<type>	Termination
50	50 Ω termination
600	600 Ω termination (Default)
HIZ	High impedance (100 kΩ/70 pF)

Programming Example

To set the 50 Ω termination for the external modulation signal.

```
EXTM:IMP 50
EXTM:IMP?
> 50
```

Ext DC Cal: Ext DC Cal

AM or **Top**>→>**Analog/Pulse**>**AM**>**AM1 Setup (AM2 Setup)**>**Setup AM Source, Ext DC Cal**

Adjusts the DC offset for external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

This can be used when in the modulation output status (setting either AM, FM, ϕM, or Pulse modulations to On, and Mod to On).

When one of the following conditions is met, press **F8 Ext DC Cal** on the Setup AM Source function menu to adjust the DC offset.

- AM = On and AM Source = Ext in AM1 Setup
- AM = On and AM Source = Ext in AM2 Setup
- FM = On and FM Source = Ext in FM1 Setup
- FM = On and FM Source = Ext in FM2 Setup
- ϕM = On and ϕM Source = Ext in ϕM1 Setup
- ϕM = On and ϕM Source = Ext in ϕM2 Setup

Remote command

Adjust the DC offset for external modulation signal

Command

```
:CALibration:EXTernal[1]|2:DC
```

Parameter

None

Details

As for node `:EXTernal[1]|2`, select the external modulation signal for SG1 or the external modulation signal for SG2. Set as follows:

External modulation signal for SG1: `:EXTernal1` or `EXTernal`
External modulation signal for SG2: `:EXTernal2`

Programming Example

To Adjust the DC offset for external modulation signal.

```
CAL:EXT:DC
```

AM Phase Adjust: Phase Adjust

AM or **Top**>→>**Analog/Pulse**>**AM>AM1 Setup (AM2 Setup)**, **Phase Adjust**

Adjusts a phase of internal AM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F7 Phase Adjust** on the AM1 Setup (AM2 Setup) function menu to set with the **Phase Adjust** dialog box.

Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg

Remote command

Adjust the phase of internal AM modulation signal

Command

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion[1]|2:POFFset
<phase>
```

Query

```
[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion[1]|2:POFFset?
```

Response

<phase>	Unit: deg

Parameter

<phase>	Phase of internal AM modulation signal
Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To set the phase of internal AM modulation signal to 10 deg.

```
AM:INT:FUNC:POFF 10
AM:INT:FUNC:POFF?
> 10.0
```

7.2.2 FM/ϕM

FM/ϕM or **Top**>(→)>**Analog/Pulse**>**FM/ϕM**

Sets the settings related to FM (frequency) modulation or ϕM (phase) modulation.

Press **FM/ϕM** on the main function menu or **F2 FM/ϕM** on the Analog Mod function menu to open the FM/ϕM function menu.

Notes:

- The FM modulation and ϕM modulation cannot be set to on simultaneously.
- Settings related to FM modulation and ϕM modulation are disabled when Sweep/List is being executed.

Table 7.2.2-1 FM/ϕM Function Menu

Page	Key No.	Menu Display	Function
1	F1	FM/ϕM1 Setup	Sets the FM/ϕM1.
	F2	FM/ϕM2 Setup	Sets the FM/ϕM2. This is available only when additional analog modulation input option (MG3710A/MG3710E /MG3740A-050/080/150/180) is installed.

Press **FM/ϕM1 Setup (FM/ϕM2 Setup)** on the AM function menu to open the FM/ϕM1 (FM/ϕM2) function menu.

Example: To execute the FM modulation.

<Procedure>

1. Set the FM modulation to On with **F1 FM**.
2. Set the FM frequency deviation with **F2 FM Deviation**.
3. Set the FM modulation frequency with **F3 AM Rate**.
4. Press **RF Output On/Off** to light the LED to set the RF output to On.
5. Press **Mod On/Off** to light the LED to start the FM modulation.

Example: To execute the ϕM modulation.

<Procedure>

1. Selects Page 2 of M/ϕM1 (FM/ϕM2) Setup Function Menu.
2. Set the ϕM modulation to On with **F1 ϕM**.
3. Set the ϕM deviation angle with **F2 ϕM Deviation**.
4. Set the ϕM modulation frequency with **F3 ϕM Rate**.
5. Press **RF Output On/Off** to light the LED to set the RF output to On.
6. Press **Mod On/Off** to light the LED to start the ϕM modulation.

Table 7.2.2-2 FM/ϕM1 Setup / FM/ϕM2 Setup Function Menu

Page	Key No.	Menu Display	Function
1	F1	FM Off On	Enables/disables the FM (Frequency Modulation).
	F2	FM Deviation 1.0000 kHz	Sets the FM frequency deviation.
	F3	FM Rate 400.0 Hz	Sets the FM modulation frequency.
	F4	Setup FM Source	Sets the FM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.
	F5	Phase Adjust 0.0 deg	Adjusts the phase of internal FM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.
2	F1	ϕM Off On	Sets the ϕM (phase modulation) On/Off.
	F2	ϕM Deviation 1.0000 rad	Sets the ϕM deviation angle.
	F3	ϕM Rate 400.0 Hz	Sets the ϕM modulation frequency.
	F4	Setup ϕM Source	Sets the ϕM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.
	F5	Phase Adjust 0.0 deg	Adjusts the phase of internal FM modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

FM modulation On/Off: FM

FM/ØM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup), FM**

Enables/disables the FM (frequency) modulation.

Press **F1 FM** on the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set On/Off.

Off	Disables FM Modulation (Default).
On	Enables FM Modulation.

The FM modulation cannot be set to On at the same time with the ϕM modulation.

Remote command

Enable/disable the FM modulation

Command

```
[:SOURce[1]|2]:FM[1]|2:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:FM[1]|2:STATe?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	FM Modulation On/Off
`OFF|0`	Disables FM Modulation (Default).
`ON|1`	Enables FM Modulation.

Programming Example

To set the FM modulation to On.

```
FM:STAT ON
FM:STAT?
> 1
```

FM Deviation

FM/øM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup), FM Deviation**

The FM frequency deviation is set.

Press **F2 FM Deviation** on the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **FM Deviation** dialog box.

Range When FM Waveform is Sine:
0 Hz to 40 MHz*1*2,
or 0 Hz to (50 MHz – FM Rate)*3
the maximum is whichever smaller.
When FM Waveform is other than Sine:
0 Hz to 4 MHz,
or 0 Hz to (5 MHz – FM Rate)*4
or 0 Hz to 40 MHz*1*2
the maximum is the smallest of the three.

Resolution 0.1 Hz

Default 1 kHz (FM/ϕM1)
0 Hz (FM/ϕM2)

*1: FM Deviation (FM/ϕM2) is the frequency deviation of FM/ϕM2 available when MG3710A/MG3710E/MG3740A-050/150/080/180 is installed.

*2: FM Deviation (FM/ϕM1) + FM Deviation (FM/ϕM2) ≤ 40 MHz

*3: FM Rate + FM Deviation ≤ 50 MHz

*4: FM Rate + FM Deviation ≤ 5 MHz

When the FM modulation is executed for the CW signal with fc [Hz], the signal below is created.

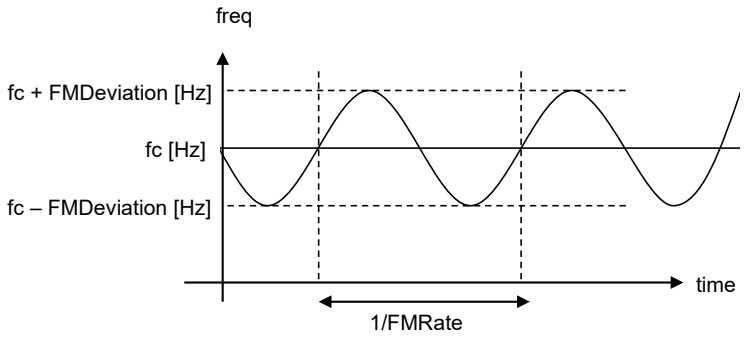


Figure 7.2.2-1 FM Modulation

Remote command

Set the FM frequency deviation

Command

```
[:SOURce[1]|2]:FM[1]|2[:DEViation] <freq>
```

Query

```
[:SOURce[1]|2]:FM[1]|2[:DEViation]?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	FM frequency deviation
Range	When FM Waveform is Sine: 0 Hz to (40 MHz – FMDeviation2nd[*1])[*2], or 0 Hz to (50 MHz – FM Rate)[*3] the maximum is whichever smaller. When FM Waveform is other than Sine: 0 Hz to 4 MHz, or 0 Hz to (5 MHz – FM Rate)[*4] or 0 Hz to (40 MHz – FMDeviation2nd[*1])[*2] the maximum is the smallest of the three.
Resolution	0.1 Hz
Default	1 kHz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Programming Example

To set the FM frequency deviation to 500 Hz.

```
FM 500
FM?
> 500.0
```

FM modulation frequency: FM Rate

FM/øM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup), FM Rate**

Sets the FM modulation frequency.

Press **F3 FM Rate** on the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **FM Rate** dialog box.

Range	When FM Waveform is Sine: 0.1 Hz to 40 MHz, or (50 MHz – FM Deviation), whichever smaller*1 When FM Waveform is other than Sine: 0.1 Hz to 4 MHz, or (5 MHz – FM Deviation), whichever smaller*2
Resolution	0.1 Hz
Default	400 Hz

*1: FM Rate + FM Deviation ≤ 50 MHz

*2: FM Rate + FM Deviation ≤ 5 MHz

Remote command

Set the FM modulation frequency

Command

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FREQuency <freq>
```

Query

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FREQuency?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	FM modulation frequency
Range	When FM Waveform is Sine: 0.1 Hz to 40 MHz, or (50 MHz – FM Deviation), whichever smaller*1 When FM Waveform is other than Sine: 0.1 Hz to 4 MHz, or (5 MHz – FM Deviation), whichever smaller*2
Resolution	0.1 Hz
Default	400 Hz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Programming Example

To set the FM modulation frequency to 500 Hz.

```
FM:INT:FREQ 500
FM:INT:FREQ?
> 500.0
```

Setup FM Source

AM or **Top>(→)>Analog/Pulse>FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup), Setup FM Source**

Sets the FM modulation signals.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

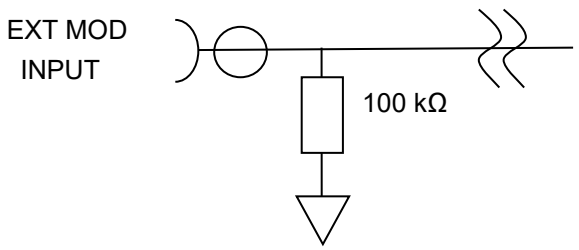
Press **F4 Setup FM Source** on the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to open the Setup FM Source function menu.

Table 7.2.2-3 Setup FM Source Function Menu

Page	Key No.	Menu Display	Function
1	F1	FM Source Int Ext	Switches the internal modulation signal/external modulation signal.
	F2	Waveform Sine	Selects the waveform of the internal modulation signal.
	F6	Coupling DC AC	Sets the DC coupling or AC coupling for the external modulation signal.
	F7	Impedance 600 Ω	Sets the termination for the external modulation signal.
	F8	Ext DC Cal	Adjusts the DC offset for the external modulation signal.

Note:

Because the external modulation signal has terminating resistance, some voltage may be generated even if the coupling is set to AC.



Switching FM Source: FM Source

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>**Setup FM Source, FM Source**

Switches the FM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F1 FM Source** on the Setup FM Source function menu for selection.

Int	Internal modulation signal (Default)
Ext	External modulation signal

Remote command

Switch the FM modulation signal

Command

```
[:SOURce[1]|2]:FM[1]|2:SOURce INT|INT1|INT2|EXT
```

Query

```
[:SOURce[1]|2]:FM[1]|2:SOURce?
```

Response

<type>	INT or EXT

Parameter

<type>	Type
INT	Internal modulation signal (Default)
INT1	Internal modulation signal (Processed as INT)
INT2	Internal modulation signal (Processed as INT)
EXT	External modulation signal

Programming Example

To switch the FM modulation signal to the external modulation signal.

```
FM:SOUR EXT
FM:SOUR?
> EXT
```

FM Waveform: Waveform

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>**Setup FM Source, Waveform**

Selects the waveform of the internal modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F2 Waveform** on the Setup FM Source function menu for selection. This can be set when **Int** is selected in the FM source.

Options	Sine (Sine wave)
	Triangle (Triangular waveform)
	Square (Square wave)
	Positive Ramp (Ramp wave (positive))
	Negative Ramp (Ramp wave (negative))
Default	Sine

See Figure 7.2.1-3 for the types of selectable waveforms.

Remote command

Select the waveform of the internal FM modulation signal

Command

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:SHAPe
SINE|TRIangle|SQUare|RAMP
```

Query

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:SHAPe?
```

Response

<type>	SINE,TRI,SQU,RAMP

Parameter

<type>	waveform
SINE	Sine (Default)
TRIangle	Triangle
SQUare	Square
RAMP	Ramp

Programming Example

To set the waveform of the internal FM modulation signal to the Triangle.

```
FM:INT:FUNC:SHAP TRI
FM:INT:FUNC:SHAP?
> TRI
```

Remote command

Select the shape of the ramp wave

Command

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:SHAPe:RAMP
POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:SHAPe:RAMP
?
```

Response

<type>	POS,NEG

Parameter

<type>	waveform
POSitive	Positive Ramp (Default)
NEGative	Negative Ramp

Programming Example

To set the shape of the ramp wave to the negative ramp.

```
FM:INT:FUNC:SHAP RAMP
FM:INT:FUNC:SHAP:RAMP NEG
FM:INT:FUNC:SHAP:RAMP?
> NEG
```

Coupling: Coupling

AM or **Top**>  **>Analog/Pulse>FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)>Setup FM Source, Coupling**

Sets the DC coupling or AC coupling for the external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F6 Coupling** on the Setup FM Source function menu for selection.

DC	DC coupling (Default)
AC	AC coupling

Remote command

Set the DC coupling or AC coupling for the external modulation

Command

```
[:SOURce[1]|2]:EXTMod:COUPling DC|AC
```

Query

```
[:SOURce[1]|2]:EXTMod:COUPling?
```

Response

<type>	DC,AC

Parameter

<type>	Coupling
DC	DC coupling (Default)
AC	AC coupling

Programming Example

To set the DC coupling for the external modulation.

```
EXTM:COUP DC
EXTM:COUP?
> DC
```

Impedance: Impedance

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>**Setup FM Source, Impedance**

Sets the termination for the external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F7 Impedance** on the Setup FM Source function menu for selection.

50 Ω	50 Ω termination
600 Ω	600 Ω termination (Default)
Hi-Z	High impedance (100 kΩ/70 pF)

Remote command

Set the termination for the external modulation signal

Command

```
[:SOURce[1]|2]:EXTMod:IMPedance 50|600|HIZ
```

Query

```
[:SOURce[1]|2]:EXTMod:IMPedance?
```

Response

<type>	50,600,HIZ

Parameter

<type>	Termination
50	50 Ω termination
600	600 Ω termination (Default)
HIZ	High impedance (100 kΩ/70 pF)

Programming Example

To set the 50 Ω termination for the external modulation signal.

```
EXTM:IMP 50
EXTM:IMP?
> 50
```

Ext DC Cal: Ext DC Cal

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>**Setup FM Source, Ext DC Cal**

Adjusts the DC offset for external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

This can be used when in the modulation output status (setting either AM, FM, ϕM, or Pulse modulations to On, and Mod to On).

When one of the following conditions is met, press **F8 Ext DC Cal** on the Setup FM Source function menu to adjust the DC offset.

- AM = On and AM Source = Ext in AM1 Setup
- AM = On and AM Source = Ext in AM2 Setup
- FM = On and FM Source = Ext in FM1 Setup
- FM = On and FM Source = Ext in FM2 Setup
- ϕM = On and ϕM Source = Ext in ϕM1 Setup
- ϕM = On and ϕM Source = Ext in ϕM2 Setup

Remote command

Adjust the DC offset for external modulation signal

Command

```
:CALibration:EXTernal[1]|2:DC
```

Parameter

None

Details

As for node `:EXTernal[1]|2`, select the external modulation signal for SG1 or the external modulation signal for SG2 .Set as follows:

External modulation signal for SG1: `:EXTernal1` or `EXTernal`

External modulation signal for SG2: `:EXTernal2`

Programming Example

To Adjust the DC offset for external modulation signal.

```
CAL:EXT:DC
```

FM Phase Adjust: Phase Adjust

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**, **Phase Adjust**

Adjusts a phase of internal FM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F5 Phase Adjust** on the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **Phase Adjust** dialog box.

Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg

Remote command

Adjust the phase of internal FM modulation signal

Command

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:POFFset
<phase>
```

Query

```
[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion[1]|2:POFFset?
```

Response

<phase>	Unit: deg

Parameter

<phase>	Phase of internal FM modulation signal
Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To set the phase of internal FM modulation signal to 10 deg.

```
FM:INT:FUNC:POFF 10
FM:INT:FUNC:POFF?
> 10.0
```

ϕM modulation On/Off: ϕM

FM/ØM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>→, **ϕM**

Enables/disables the ϕM (phase) modulation.

Press **F1 ϕM** in the second page of the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set On/Off.

Off	Disables ϕM Modulation (Default).
On	Enables ϕM Modulation.

The ϕM modulation cannot be set to On at the same time with the FM modulation.

Remote command

Enable/disable the ϕM modulation

Command

```
[:SOURce[1]|2]:PM[1]|2:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:PM[1]|2:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	ϕM Modulation On/Off
OFF|0	Disables ϕM Modulation (Default).
ON|1	Enables ϕM Modulation.

Programming Example

To set the ϕM modulation to On.

```
PM:STAT ON
PM:STAT?
> 1
```

ϕM Deviation

FM/ØM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>→, **ϕM Deviation**

Sets the ϕM deviation angle.

Press **F2 ϕM Deviation** in the second page of the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **ϕM Deviation** dialog box.

Range	When ϕM Waveform is Sine: 0 rad to 160 rad, or (40 MHz ÷ ϕM Rate) rad, whichever smaller*1 When ϕM Waveform is other than Sine: 0 rad to 160 rad, or (4 MHz ÷ ϕM Rate) rad, whichever smaller*2
Resolution	0.001 rad
Default	0 rad

*1: ϕM Rate × ϕM Deviation ≤ 40 MHz

*2: ϕM Rate × ϕM Deviation ≤ 4 MHz

When the ϕM modulation is executed for the CW signal, the signal below is created.

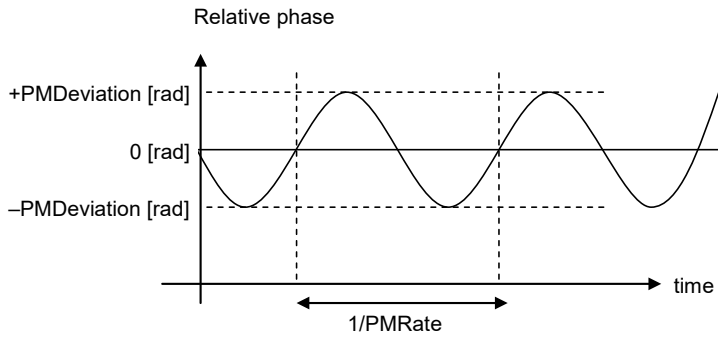


Figure 7.2.2-2 ϕM Modulation

Remote command

Set the ϕM deviation angle

Command

```
[:SOURce[1]|2]:PM[1]|2[:DEViation] <ext_numeric>
```

Query

```
[:SOURce[1]|2]:PM[1]|2[:DEViation]?
```

Response

`<ext_numeric>` Unit: rad

Parameter

<ext_numeric>	ϕM deviation angle
Range	When ϕM Waveform is Sine: 0 rad to 160 rad, or (40 MHz ÷ ϕM Rate) rad, whichever smaller*1 When ϕM Waveform is other than Sine: 0 rad to 160 rad, or (4 MHz ÷ ϕM Rate) rad, whichever smaller*2
Resolution	0.001 rad
Default	0 rad
Suffix code	None

Programming Example

To set the ϕM frequency deviation to 50 rad.

```
PM 50
PM?
> 50.000
```

ϕM modulation frequency: ϕM Rate

FM/ØM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>→, **ϕM Rate**

Sets the ϕM modulation frequency.

Press **F3 ϕM Rate** in the second page of the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **ϕM Rate** dialog box.

Range	When ϕM Waveform is Sine: 0.1 Hz to 40 MHz, or (40 MHz ÷ ϕM Deviation) MHz, whichever smaller*1 When ϕM Waveform is other than Sine: 0.1 Hz to 4 MHz, or (4 MHz ÷ ϕM Deviation) MHz, whichever smaller*2
Resolution	0.1 Hz
Default	400 Hz

*1: ϕM Rate × ϕM Deviation ≤ 40 MHz

*2: ϕM Rate × ϕM Deviation ≤ 4 MHz

Remote command

Set the ϕM modulation frequency

Command

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FREQuency <freq>
```

Query

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FREQuency?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	ϕM modulation frequency
Range	When ϕM Waveform is Sine: 0.1 Hz to 40 MHz, or (40 MHz ÷ ϕM Deviation) MHz, whichever smaller When ϕM Waveform is other than Sine: 0.1 Hz to 4 MHz, or (4 MHz ÷ ϕM Deviation) MHz, whichever smaller
Resolution	0.1 Hz
Default	400 Hz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Programming Example

To set the ϕM modulation frequency to 500 Hz.

```
PM:INT:FREQ 500
PM:INT:FREQ?
> 500.0
```

Setup ϕM Source

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>→, **Setup ϕM Source**

Sets the ϕM modulation signals.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

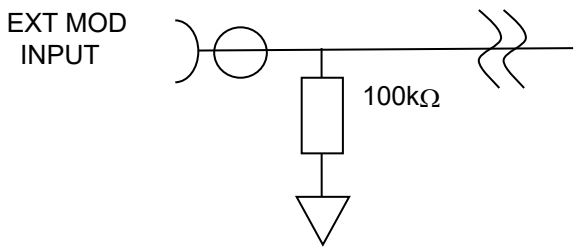
Press **F4 Setup ϕM Source** in the second page of the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to open the Setup ϕM Source function menu.

Table 7.2.2-4 Setup ϕM Source Function Menu

Page	Key No.	Menu Display	Function
1	F1	ϕM Source Int Ext	Switch the internal modulation signal/external modulation signal.
	F2	Waveform Sine	Selects the waveform of the internal modulation signal. This can be selected when **Int** is selected in the ϕM source.
	F6	Coupling DC AC	Sets the DC coupling or AC coupling for the external modulation signal.
	F7	Impedance 600 Ω	Sets the termination for the external modulation signal.
	F8	Ext DC Cal	Adjusts the DC offset for the external modulation signal.

Note:

Because the external modulation signal has terminating resistance, some voltage may be generated even if the coupling is set to AC.



Switching ϕM Source: ϕM Source

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>→>**Setup ϕM Source, ϕM Source**

Switches the ϕM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F1 ϕM Source** on the Setup ϕM Source function menu for selection.

Int	Internal modulation signal (Default)
Ext	External modulation signal

Remote command

Switch the ϕM modulation signal

Command

```
[:SOURce[1]|2]:PM[1]|2:SOURce INT|INT1|INT2|EXT
```

Query

```
[:SOURce[1]|2]:PM[1]|2:SOURce?
```

Response

<type>	INT or EXT

Parameter

<type>	Type
INT	Internal modulation signal (Default)
INT1	Internal modulation signal (Processed as INT)
INT2	Internal modulation signal (Processed as INT)
EXT	External modulation signal

Programming Example

To switch the ϕM modulation signal to the external modulation signal.

```
PM:SOUR EXT
PM:SOUR?
> EXT
```

ϕM Waveform: Waveform

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>→>**Setup ϕM Source, Waveform**

Selects the waveform of the ϕM internal modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F2 Waveform** on the Setup ϕM Source function menu for selection. This can be set when **Int** is selected in the ϕM source.

Options	Sine (Sine wave)
	Triangle (Triangular waveform)
	Square (Square wave)
	Positive Ramp (Ramp wave (positive))
	Negative Ramp (Ramp wave (negative))
Default	Sine

See Figure 7.2.1-3 for the types of selectable waveforms.

Remote command

Select the waveform of the internal ϕM modulation signal

Command

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:SHAPe
SINE|TRIangle|SQUare|RAMP
```

Query

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:SHAPe?
```

Response

<type>	SINE,TRI,SQU,RAMP

Parameter

<type>	waveform
SINE	Sine (Default)
TRIangle	Triangle
SQUare	Square
RAMP	Ramp

Programming Example

To set the waveform of the internal ϕM modulation signal to the Triangle.

```
PM:INT:FUNC:SHAP TRI
PM:INT:FUNC:SHAP?
> TRI
```

Remote command

Select the shape of the ramp wave

Command

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:SHAPe:RAMP
POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:SHAPe:RAMP
?
```

Response

<type>	POS,NEG

Parameter

<type>	waveform
POSitive	Positive Ramp (Default)
NEGative	Negative Ramp

Programming Example

To set the shape of the ramp wave to the negative ramp.

```
PM:INT:FUNC:SHAP RAMP
PM:INT:FUNC:SHAP:RAMP NEG
PM:INT:FUNC:SHAP:RAMP?
> NEG
```

Coupling: Coupling

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>→>**Setup ϕM Source,Coupling**

Sets the DC coupling or AC coupling for the external modulation signal. This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F6 Coupling** on the Setup ϕM Source function menu for selection.

DC	DC coupling (Default)
AC	AC coupling

Remote command

Set the DC coupling or AC coupling for the external modulation

Command

```
[:SOURce[1]|2]:EXTMod:COUPling DC|AC
```

Query

```
[:SOURce[1]|2]:EXTMod:COUPling?
```

Response

<type>	DC,AC

Parameter

<type>	Coupling
DC	DC coupling (Default)
AC	AC coupling

Programming Example

To set the DC coupling for the external modulation.

```
EXTM:COUP DC
EXTM:COUP?
> DC
```

Impedance: Impedance

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM**>**FM/ϕM1 Setup (FM/ϕM2 Setup)**>→>**Setup ϕM Source,Impedance**

Sets the termination for the external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F7 Impedance** on the Setup ϕM Source function menu for selection.

50 Ω	50 Ω termination
600 Ω	600 Ω termination (Default)
Hi-Z	High impedance (100 kΩ/70 pF)

Remote command

Set the termination for the external modulation signal

Command

```
[:SOURce[1]|2]:EXTMod:IMPedance 50|600|HIZ
```

Query

```
[:SOURce[1]|2]:EXTMod:IMPedance?
```

Response

<type>	50,600,HIZ

Parameter

<type>	Termination
50	50 Ω termination
600	600 Ω termination (Default)
HIZ	High impedance (100 kΩ/70 pF)

Programming Example

To set the 50 Ω termination for the external modulation signal.

```
EXTM:IMP 50
EXTM:IMP?
> 50
```

Ext DC Cal: Ext DC Cal

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>→>**Setup ϕM Source,Ext DC Cal**

Adjusts the DC offset for external modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

This can be used when in the modulation output status (setting either AM, FM, ϕM, or Pulse modulations to On, and Mod to On).

When one of the following conditions is met, press **F8 Ext DC Cal** on the Setup ϕM Source function menu to adjust the DC offset.

- AM = On and AM Source = Ext in AM1 Setup
- AM = On and AM Source = Ext in AM2 Setup
- FM = On and FM Source = Ext in FM1 Setup
- FM = On and FM Source = Ext in FM2 Setup
- ϕM = On and ϕM Source = Ext in ϕM1 Setup
- ϕM = On and ϕM Source = Ext in ϕM2 Setup

Remote command

Adjust the DC offset for external modulation signal

Command

```
:CALibration:EXTernal[1]|2:DC
```

Parameter

None

Details

As for node `:EXTernal[1]|2`, select the external modulation signal for SG1 or the external modulation signal for SG2 .Set as follows:

External modulation signal for SG1: `:EXTernal1` or `EXTernal`
External modulation signal for SG2: `:EXTernal2`

Programming Example

To Adjust the DC offset for external modulation signal.

```
CAL:EXT:DC
```

ϕM Phase Adjust: Phase Adjust

AM or **Top**>→>**Analog/Pulse**>**FM/ϕM>FM/ϕM1 Setup (FM/ϕM2 Setup)**>→, **Phase Adjust**

Adjusts a phase of internal ϕM modulation signal.

This is available only when additional analog modulation input option (MG3710A/MG3710E/MG3740A-050/080/150/180) is installed.

Press **F5 Phase Adjust** in the second page of the FM/ϕM1 Setup (FM/ϕM2 Setup) function menu to set with the **Phase Adjust** dialog box.

Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg

Remote command

Adjust the phase of internal ϕM modulation signal

Command

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:POFFset
<phase>
```

Query

```
[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion[1]|2:POFFset?
```

Response

<phase>	Unit: deg

Parameter

<phase>	Phase of internal ϕM modulation signal
Range	–180 deg to +180 deg
Resolution	0.1 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To set the phase of internal ϕM modulation signal to 10 deg.

```
PM:INT:FUNC:POFF 10
PM:INT:FUNC:POFF?
> 10.0
```

7.2.3 Pulse

Pulse or **Top**>(→)>**Analog/Pulse**>**Pulse**

Sets the settings related to Pulse modulation.

Press **Pulse** of the main function key or **F3 Pulse** on the Analog Mod function menu to display the Pulse function menu.

Settings related to Pulse modulation are disabled when Sweep/List is being executed.

The pulse modulation can be executed as follows:

Pulse modulation with the internal signal

Set it with **Pulse Source** in the Pulse function menu.

Pulse modulation with RF Gate

For the pulse modulation method with the pulse modulation control bit (RF Gate) added to the waveform pattern, refer to 4.5.5 "Input file format" in the *MG3700A /MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*, and for the RF Gate setting method, refer to 7.3.7 "RF Gate" in this document.

Pulse modulation with the external signal

When the external signal is used, select **Ext Pulse** with the **Pulse Source** function menu in the Pulse function menu to input the modulated signal from the AUX connector on the rear panel. Refer to Table 3.1.2-1 "AUX Connectors".

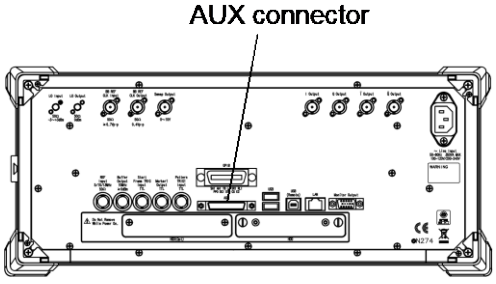


Figure 7.2.3-1 External Pulse Modulated Signal Input (Pulse Mod) Connector

Use the following terminals of the AUX connector to execute the Pulse modulation with the external signal.

- Pulse Mod terminal The Pulse modulation signal (TTL level and DC-coupling) is input.

Example: To execute the Pulse modulation.

1. Set the Pulse modulation to On with **F1 Pulse**.
2. Select the Pulse modulation signal source with **F2 Pulse Source**.
3. Set the settings of **F3 Pulse Rate** to **F8 Pulse 2 Width** according to the Pulse modulation signal source.
4. Set the output polarity of Pulse Sync signal and Pulse Video signal with **F1 Ext. Out Polarity** in Page 2.
5. Set the polarity of the signal input from the Pulse Mod connector with **F2 Ext. In Polarity** in Page 2.
6. Press **RF Output On/Off** to light the LED to set the RF output to On.
7. Press **Mod On/Off** to light the LED to start the Pulse modulation.

Table 7.2.3-1 Pulse Function Menu

Page	Key No.	Menu Display	Function
1	F1	Pulse Off On	Enables/disables the Pulse modulation.
	F2	Pulse Source Freerun	Selects the Pulse modulation signal source.
	F3	Pulse Rate 400.0 Hz	Sets the Pulse modulation frequency.
	F4	Pulse Period 4.00 µs	Sets the Pulse modulation period.
	F5	Pulse Delay 0.00000000 s	Sets the Pulse modulation delay time after the trigger event.
	F6	Pulse Width 2.00 µs	Sets the Pulse modulation width.
	F7	Pulse 2 Delay 0.00000000 s	Sets the delay time of the second Pulse after the first Pulse.
	F8	Pulse 2 Width 2.00 µs	Sets the second Pulse width.
2	F1	Ext Out Polarity Positive Negative	Selects the polarity of the Pulse Sync signal and Pulse Video signal.
	F2	Ext In Polarity Positive Negative	Selects the polarity of the signal input from the Pulse Mod terminal.

Pulse

Pulse or **Top**>  >**Analog/Pulse**>**Pulse**,**Pulse**

Enables/disables the Pulse modulation.

Press **F1 Pulse** on the Pulse function menu to set On/Off.

Off	Disables Pulse modulation (Default).
On	Enables Pulse modulation.

Remote command

Enable/disable the Pulse modulation

Command

```
[:SOURce[1]|2]:PULM:STATe <boolean>
```

Query

```
[:SOURce[1]|2]:PULM:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Pulse Modulation On/Off
OFF|0	Disables Pulse modulation (Default).
ON|1	Enables Pulse modulation.

Programming Example

To set the Pulse modulation to On.

```
PULM:STAT ON
PULM:STAT?
> 1
```

Pulse Source

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**,**Pulse Source**

Selects the Pulse modulation signal source.

Press **F2 Pulse Source** on the Pulse function menu to open the Pulse Source function menu for selection.

Table 7.2.3-2 Pulse Source Function Menu

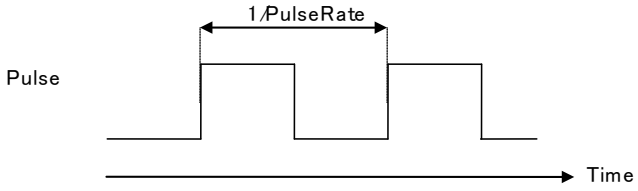
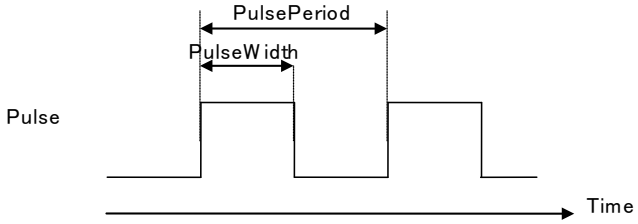
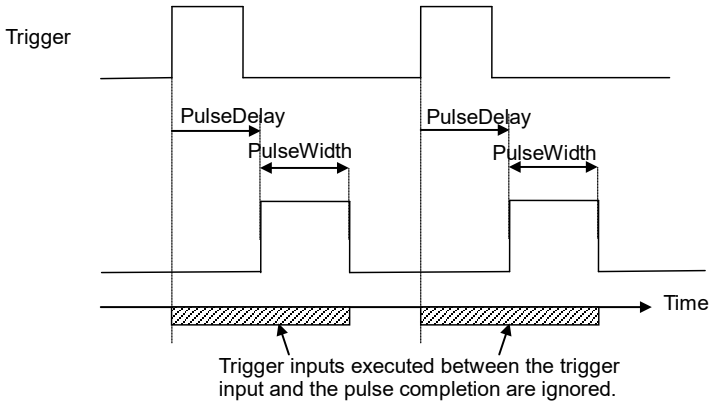
Page	Key No.	Menu Display	Function
1	F1	Square	Internal freerun pulse string with 50 % of duty cycle. The period is set with Pulse Rate. 
	F2	Freerun	Internal freerun pulse string (Default) The period and pulse width are set with Pulse Period and Pulse Width. 
	F3	Triggered	Generates the pulse in synchronization with the trigger event. The delay time after the trigger event and pulse width are set with Pulse Delay and Pulse Width. 

Table 7.2.3-2 Pulse Source Function Menu (Cont'd)

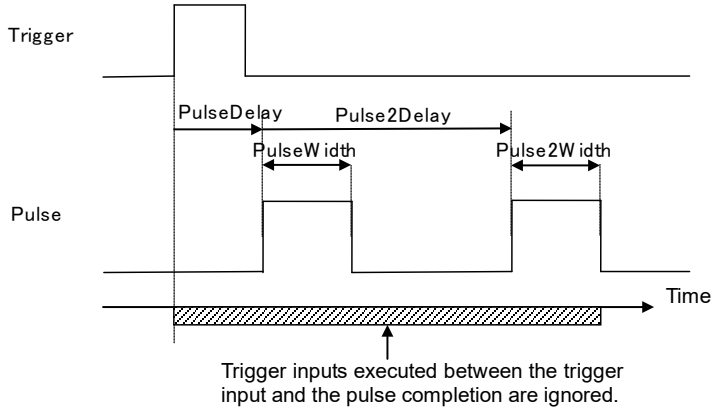
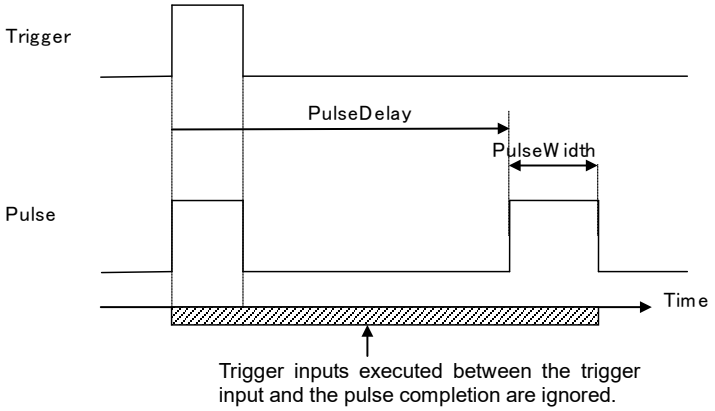
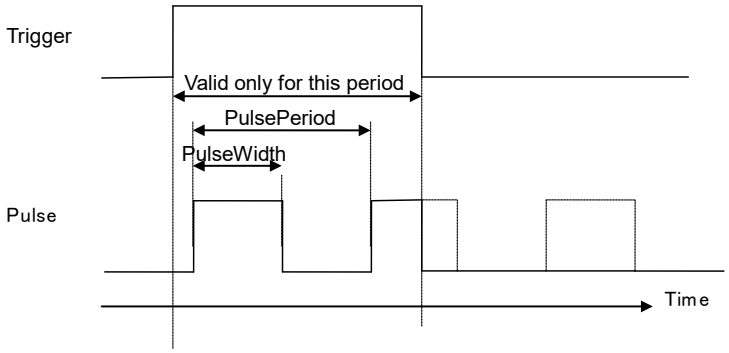
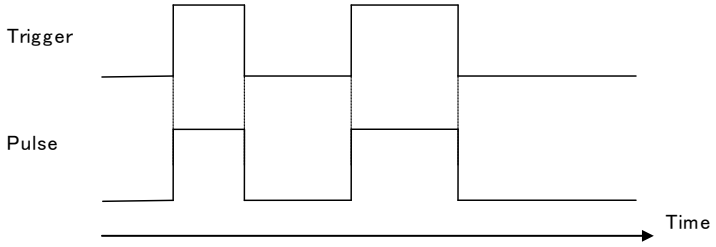
Page	Key No.	Menu Display	Function
1	F4	Adjustable Doublet	Generates two pulses in synchronization with the trigger event. The delay time after the trigger event and pulse width are set with Pulse Delay and Pulse 2 Delay, and Pulse Width and Pulse 2 Width. The second pulse delay is based on the first pulse rise. 
	F5	Trigger Doublet	Generates two pulses in synchronization with the trigger event. The delay time after the trigger event and pulse width are set with Pulse Delay and Pulse Width. The first pulse synchronizes with the external trigger signal. The second pulse delay is based on the first pulse rise. 

Table 7.2.3-2 Pulse Source Function Menu (Cont'd)

Page	Key No.	Menu Display	Function
1	F6	Gated	Generates the internal pulse string. However, pulses are valid only when the trigger is being input. The period and pulse width are set with Pulse Period and Pulse Width. 
	F7	Ext Pulse	Generates the pulse signal in synchronization with the external trigger signal. 

Note:

For specifications of pulse signal, refer to Appendix A, subsection "<Analog modulation/Pulse modulation>".

Remote command

Select the Pulse modulation signal source from Freerun or Ext Pulse

Command

```
[:SOURce[1]|2]:PULM:SOURce INTernal|EXTernal
```

Query

```
[:SOURce[1]|2]:PULM:SOURce?
```

Response

<type>	INT or EXT

Parameter

<type>	Signal source
INTernal	Freerun (Default)
EXTernal	Ext Pulse

Programming Example

To set the Pulse modulation signal source to Freerun.

```
PULM:SOUR INT
PULM:SOUR?
> INT
```

Remote command

Select the Pulse modulation signal source from seven types

Command

```
[:SOURce[1]|2]:PULM:SOURce:INTernal
SQUare|FRUN|TRIGgered|ADOublet|DOUBlet|GATed|EXTPulse
```

Query

```
[:SOURce[1]|2]:PULM:SOURce:INTernal?
```

Response

<type>	SQU,FRUN,TRIG,ADO,DOUB,GAT or EXTP

Parameter

<type>	Signal source
SQUare	Square
FRUN	Freerun (Default)
TRIGgered	Triggered
ADOublet	Adjustable Doublet
DOUBlet	Trigger Doublet
GATed	Gated
EXTPulse	Ext Pulse

Programming Example

To set the Pulse modulation signal source to Freerun.

```
PULM:SOUR:INT FRUN
PULM:SOUR:INT?
> FRUN
```

Pulse Rate

Pulse or **Top**>→>**Analog/Pulse**>**Pulse, Pulse Rate**

Sets the Pulse modulation frequency.

Press **F3 Pulse Rate** on the Pulse function menu to set with the **Pulse Rate** dialog box. This can be set when **Square** is selected at **Pulse Source**.

Range	0.1 Hz to 10 MHz
Resolution	0.1 Hz
Default	400 Hz

Remote command

Set the Pulse modulation frequency

Command

```
[:SOURce[1]|2]:PULM:INTernal:FREQuency <freq>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:FREQuency?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Frequency
Range	0.1 Hz to 10 MHz
Resolution	0.1 Hz
Default	400 Hz
Suffix code	HZ, KHZ, MHZ, GHZ, KZ, MZ, GZ When omitted: HZ

Details

This can be set when **Square** is selected at Pulse modulation signal source.

Programming Example

To set the Pulse modulation frequency to 500 Hz.

```
PULM:INT:FREQ 500
PULM:INT:FREQ?
> 500.0
```

Pulse Period

Pulse or **Top**>→>**Analog/Pulse**>**Pulse**,**Pulse Period**

Sets the Pulse modulation period.

Press **F4 Pulse Period** on the Pulse function menu to set with the **Pulse Period** dialog box. This can be set when **Freerun**, **Gated** is selected at Pulse Source.

Range	10 ns to 20 s
Resolution	10 ns
Default	4 μs

Remote command

Set the Pulse modulation period

Command

```
[:SOURce[1]|2]:PULM:INTernal:PERiod <time>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:PERiod?
```

Response

<time>	Unit: s

Parameter

<time>	Period
Range	10 ns to 20 s
Resolution	10 ns
Default	4 μs
Suffix code	S, MS, US, NS, PS, When omitted: S

Details

This can be set when **Freerun, Gated** is selected at Pulse modulation signal source.

Programming Example

To set the Pulse modulation period to 15 μs.

```
PULM:INT:PER 15US
PULM:INT:PER?
> 0.00001500
```

Pulse Delay

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**, **Pulse Delay**

Sets the Pulse modulation delay time after the trigger event.

Press **F5 Pulse Delay** on the Pulse function menu to set with the **Pulse Delay** dialog box. This can be set when **Triggered**, **Adjustable Doublet**, **Trigger Doublet** is selected at Pulse Source.

Range	0 s to 20 s – Pulse Width
Resolution	10 ns
Default	0 s

Remote command

Set the Pulse modulation delay time

Command

```
[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2 <time>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2?
```

Response

`<time>`	Unit: s

Parameter

`<time>`	Delay time
Range	0 s to 20 s – Pulse Width
Resolution	10 ns
Default	0 s
Suffix code	S, MS, US, NS, PS, When omitted: S

Details

This can be set when **Triggered**, **Adjustable Doublet**, **Trigger Doublet** is selected at Pulse modulation signal source.

As for node `:DELay[1]|2`, select Pulse 1 Delay or Pulse 2 Delay. Set as follows:

Pulse Delay: `:DELay1` or `:DELay`

Pulse 2 Delay: `:DELay2`

Programming Example

To set the delay time after the first Pulse modulation trigger event to 15 μs.

```
PULM:INT:DEL 15US
PULM:INT:DEL?
> 0.00001500
```

Pulse Width

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**, **Pulse Width**

Sets the Pulse modulation width.

Press **F6 Pulse Width** on the Pulse function menu to set with the **Pulse Width** dialog box. This can be set when **Freerun**, **Triggered**, **Adjustable Doublet**, **Trigger Doublet**, **Gated** is selected at Pulse Source.

Setting range

Lower limit	10 ns
Upper limit	Pulse Period*1 20 s – Pulse Delay*2

*1: When Pulse Source is set to Freerun or Gated

*2: When Pulse Source is Triggered, Adjustable Doublet, or Trigger Doublet

Resolution	10 ns
Default	2 μs

Remote command

Set the Pulse modulation width

Command

```
[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2 <time>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2?
```

Response

`<time>`	Unit: s

Parameter

`<time>`	Pulse modulation width

Setting range

Lower limit	10 ns
Upper limit	Pulse Period (When Pulse Source is set to Freerun or Gated) 20 s – Pulse Delay (When Pulse Source is Triggered, Adjustable Doublet, or Trigger Doublet)
Resolution	10 ns
Default	2 μs
Suffix code	S, MS, US, NS, PS, When omitted: S

Details

This can be set when **Freerun**, **Triggered**, **Adjustable Doublet**, **Trigger Doublet**, **Gated** is selected at Pulse modulation signal source.

As for node `:PWIDth[1]|2`, select Pulse Width or Pulse 2 Width. Set as follows:

Pulse Width: `:PWIDth1` or `:PWIDth`

Pulse 2 Width: `:PWIDth2`

Programming Example

To set the first Pulse modulation width to 5 μs.

```
PULM:INT:PWID 5US
PULM:INT:PWID?
> 0.00000500
```

Pulse 2 Delay

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**, **Pulse 2 Delay**

Sets the delay time of the second Pulse after the first Pulse.

Press **F7 Pulse 2 Delay** on the Pulse function menu to set with the **Pulse 2 Delay** dialog box. This can be set when **Adjustable Doublet** is selected at **Pulse Source.**

Range	0 s to 20 s – Pulse 2 Width – Pulse Delay
Resolution	10 ns
Default	0 s

Remote command

Set the delay time of the second Pulse after the first Pulse

Command

```
[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2 <time>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2?
```

Response

`<time>`	Unit: s

Parameter

`<time>`	The delay time from the first Pulse to the second Pulse
Range	0 s to 20 s – Pulse 2 Width – Pulse Delay
Resolution	10 ns
Default	0 s
Suffix code	S, MS, US, NS, PS, When omitted: S

Details

This can be set when **Adjustable Doublet** is selected at Pulse modulation signal source.

As for node `:DELay[1]|2`, select `Pulse Delay` or `Pulse 2 Delay`. Set as follows:

Pulse Delay: `:DELay1` or `:DELay`.

Pulse 2 Delay: `:DELay2`.

Programming Example

To set the delay time from the first Pulse to the second Pulse to 5 μs.

```
PULM:INT:DEL2 5US
PULM:INT:DEL2?
> 0.00000500
```

Pulse 2 Width

Pulse or **Top**>→>**Analog/Pulse**>**Pulse, Pulse 2 Width**

Sets the second Pulse width.

Press **F8 Pulse 2 Width** on the Pulse function menu to set with the **Pulse 2 Width** dialog box. This can be set when **Adjustable Doublet** is selected at Pulse Source.

Range	10 ns to 20 s – Pulse Delay – Pulse 2 Delay
Resolution	10 ns
Default	2 μs

Remote command

Set the second Pulse width

Command

```
[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2 <time>
```

Query

```
[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2?
```

Response

`<time>`	Unit: s

Parameter

`<time>`	The second Pulse width
Range	10 ns to 20 s – Pulse Delay – Pulse 2 Delay
Resolution	10 ns
Default	2 μs
Suffix code	S, MS, US, NS, PS, When omitted: S

Details

This can be set when **Adjustable Doublet** is selected at Pulse modulation signal source.

As for node `:PWIDth[1]|2`, select Pulse Width or Pulse 2 Width. Set as follows:

Pulse Width: `:PWIDth1` or `:PWIDth`

Pulse 2 Width: `:PWIDth2`

Programming Example

To set the second Pulse width to 5 μs.

```
PULM:INT:PWID2 5US
PULM:INT:PWID2?
> 0.00000500
```

Pulse Sync/Pulse Video output signal polarity: Ext. Out Polarity

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**, >→> **Ext. Out Polarity**

Selects the output polarity of the Pulse Sync signal and Pulse Video signal.

Press **F1 Ext. Out Polarity** on page 2 of the Pulse function menu for selection.

Positive	Positive polarity (Default)
Negative	Negative polarity

Remote command

Select the output polarity of the Pulse Sync signal and Pulse Video signal

Command

```
[:SOURce[1]|2]:PULM:INTernal[1]:VIDeo:POLarity
NORMal|INVerted
```

Query

```
[:SOURce[1]|2]:PULM:INTernal[1]:VIDeo:POLarity?
```

Response

`<mode>`	`NORM` or `INV`

Parameter

`<mode>`	Output polarity of the Pulse Sync signal and Pulse Video signal
`NORMal`	Positive polarity (Default)
`INVerted`	Negative polarity

Programming Example

To set the output polarity of the Pulse Sync signal and Pulse Video signal to the negative polarity.

```
PULM:INT:VID:POL INV
PULM:INT:VID:POL?
> INV
```

Pulse Mod input signal polarity: Ext. In Polarity

Pulse or **Top**>→>**Analog**/**Pulse**>**Pulse**, >→> **Ext. In Polarity**

Selects the polarity of the signal input from the Pulse Mod terminal.

Press **F2 Ext. In Polarity** on page 2 of the Pulse function menu for selection.

Positive	Positive polarity (Default)
Negative	Negative polarity

Remote command

Select the polarity of the signal input from the Pulse Mod terminal

Command

```
[:SOURce[1]|2]:PULM:EXTernal:POLarity NORMal|INVerted
```

Query

```
[:SOURce[1]|2]:PULM:EXTernal:POLarity?
```

Response

<mode>	NORM or INV

Parameter

<mode>	Input polarity of the Pulse Sync signal and Pulse Video signal
NORMal	Positive polarity (Default)
INVerted	Negative polarity

Programming Example

To set the polarity of the signal input from the Pulse Mod terminal to the negative polarity.

```
PULM:EXT:POL INV
PULM:EXT:POL?
> INV
```

7.2.4 Optimize Function for the Analog Modulation: Optimize

AM or FM/ØM>(Back key)>**Optimize**,
or **Top**>(→)>**Analog/Pulse**>**Optimize**

Selects Spurious Mode or Distortion Mode to optimize analog modulation.

Press **F8 Optimize** on the Analog Pulse function menu for selection.

Spurious	Disables the frequency offset. (Default for MG3710A/MG3710E)
Distortion	Enables the frequency offset. (Default for MG3740A)

Because the MG3710A/MG3710E/MG3740A performs analog modulation by quadrature modulator, carrier leak causes distortions. To avoid the distortions, analog modulation is performed with frequency offset in the baseband (Distortion Mode).

However, when analog modulation is performed with frequency offset, carrier leak and image are generated in the frequency different from the original harmonic spurious. To avoid the problem, the mode is switchable to Spurious Mode which allows analog modulation without frequency offset.

When set to Distortion Mode, RF Frequency and Display Frequency are displayed in the Frequency Information Frame as in the figure below. The analog modulation signal is output in Display Frequency.

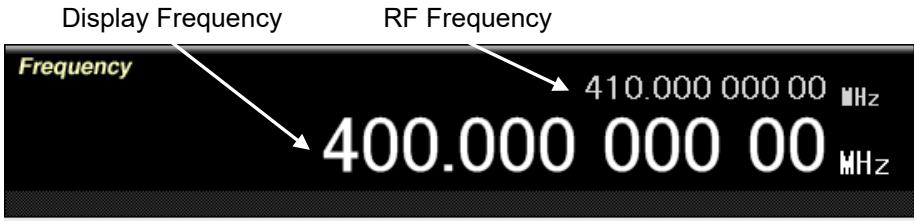


Figure 7.2.4-1 Frequency Information Frame in Distortion Mode

Notes:

- Distortion Mode's level accuracy is degraded because the frequency offset is applied.
- When the output frequency becomes under 7 MHz, Distortion Mode is automatically switched to Spurious Mode. To use Distortion Mode in 7 MHz or higher, execute re-setting.

Remote command

Select the frequency offset of the analog modulation

Command

```
[:SOURce[1]|2]:AOPTimize:MODE SPURious|DISTortion
```

Query

```
[:SOURce[1]|2]:AOPTimize:MODE?
```

Response

<type>	SPUR or DIST

Parameter

<type>	Type
SPURious	Disables the frequency offset. (Default for MG3710A/MG3710E)
DISTortion	Enables the frequency offset. (Default for MG3740A)

Programming Example

To enable the frequency offset of the analog modulation.

```
AOPT:MODE DIST
AOPT:MODE?
> DIST
```

7.3 Baseband Mode

Mode or **Top>Mode**

MG3710A/MG3710E/MG3740A allows reproducing the waveform pattern to execute the vector modulation with the pattern.

Note:

MG3740A allows to execute the vector modulation only when option-020/120 is installed.

The waveform patterns are stored as the pattern file in the internal HDD/SSD of MG3710A/MG3710E/MG3740A. Furthermore, a folder to classify the patterns according to the types is called a “package”.

When reproducing the waveform pattern, it is necessary first to load the package pattern stored in the internal hard disk/SSD into the waveform memory. MG3710A/MG3710E/MG3740A has two waveform memories of I and Q which have two channels configuration, and the package pattern is loaded into either one or both of them.

Next, the pattern to be output is selected among the patterns loaded into the waveform memory. One for each Memory A and B can be selected. Either one of patterns of Memory A and B or the combination of patterns of Memory A and B is output.

Note:

The operation to combine the patterns of Memory A and B to output requires the Combination of Baseband Signal option (option-048/148, option-078/178). If not installed, Memory B cannot be used.

In addition, a file called the combination file exists in the package. The combination of patterns to be output is specified and the output level ratio and others are set for this combination file. When the combination file is selected, the pattern is output as specified in the file; therefore the selection for each memory as above is not required.

The state where the pattern is output as the specification in the file after the combination file is selected or the pattern file is selected only for Memory A (B) is called the Defined mode. On the other hand, the state where the pattern is selected for each of Memory A and B, and the output level ratio and others are set on the digital modulation setting screen is called the Edit mode.

In this document, the pattern file and combination file are called the waveform file collectively, and in MG3710A/MG3710E/MG3740A, the pattern file and combination file are used unconsciously.

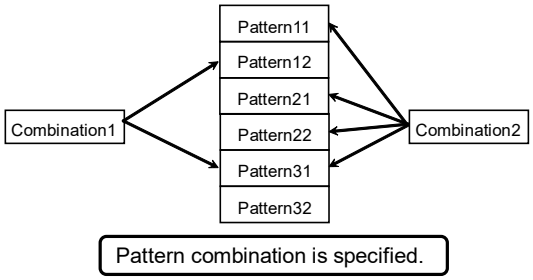


Figure 7.3-1 Relation of Pattern File and Combination File

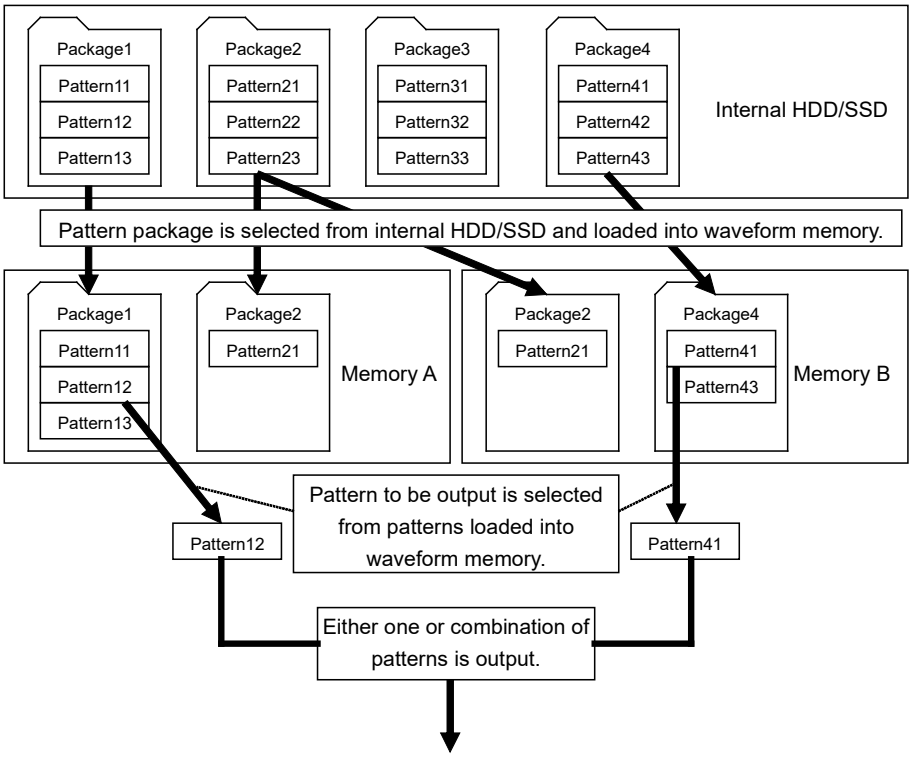


Figure 7.3-2 Outline of Waveform Pattern Output

The following are methods to add a new package pattern to the internal hard disk/SSD:

- Uses an USB flash drive or others.
  For the method using a USB flash drive, refer to 7.3.6 “Copying external waveform pattern: Copy”.
- Transfers from an external personal computer using IQproducer™ (supplied application software).
- Creates the waveform pattern with IQproducer™ (supplied application software) installed in the MG3710A/MG3710E/MG3740A.

For the method to transfer with IQproducer™, refer to the *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

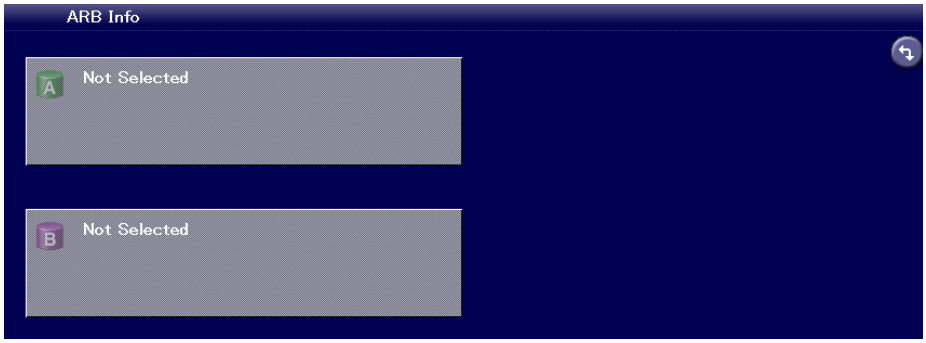
7.3.1 ARB

Mode or **Top>Mode**

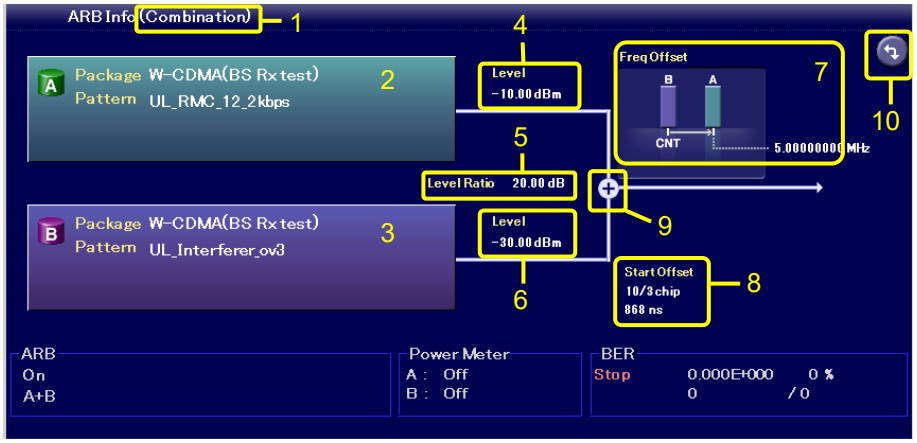
Generates modulated signals with arbitrary waveform patterns.

In MG3740A, the ARB function can be used only when option-020/120 is installed.

Press **Mode** of the main function key or **F4 Mode** on the top function menu to display the **ARB Info** dialog box and ARB/Waveform function menu.



Before waveform file is selected



After waveform file is selected

Figure 7.3.1-1 ARB Info Dialog Box

Table 7.3.1-1 ARB Info Dialog Box Display Contents

No.	Display Example	Display	Description
1	Combination	---	Other than the below
		Combination	Indicates to combine the waveform patterns of Memory A and Memory B to output. A+B
		Sequence	Indicates that it is in the sequence mode. Seq.(A), Seq.(A+AWGN)
		Sequence +	Indicates that it is in the sequence mode with Add Pattern. Seq.(A+B)
		Multiplex	Indicates Multiplex waveform output. (Multiplex)
2		---	Indicates Memory A.
		Not Selected	Indicates that no waveform is selected.
		Package	Waveform package name for the waveform output from Memory A
		Pattern	Waveform file name for the waveform output from Memory A
3		---	Indicates Memory B.
		Not Selected	Indicates that no waveform is selected.
		Package	Waveform package name for the waveform output from Memory B
		Pattern	Waveform file name for the waveform output from Memory B
		On	Indicates that the AWGN signal is on.
4	Level –207.00 dBm	---	Indicates the output level of the signal from Memory A.
5	Level Ratio –63 00 dBm	Level Ratio	Indicates the output level ratio of the signals from Memory A and Memory B.
		C/N Ratio	Indicates the output level ratio of the signal from Memory A or Memory B and AWGN signal.
6	Level –144 00 dBm	---	Indicates the output level of the signal from Memory B.
7	Freq Offset	A	Frequency image for the signal output from Memory A
		B	Frequency image for the signal output from Memory B
		CNT	Center Frequency displayed frequency
		Frequency	Offset frequency from Center Frequency
		N	AWGN signal
8	Start Offset 10/3 chip 868 ns	Start Offset	Indicates the offset time for the play start timing of Memory A and B. Memory A is the reference, and offset is applied to the B side.
		10/3 chip	Display with System Unit of Memory B
		868 ns	Display of the time above

Table 7.3.1-1 ARB Info Dialog Box Display Contents (Cont'd)

No.	Display Example	Display	Description
9		---	Indicates that the signal output from Memory A and the signal output from the waveform memory B are being combined.
10		---	Click to switch Hardware Block Chart and ARB Info display.

Table 7.3.1-2 ARB/Waveform Function Menu

Page	Key No.	Menu Display	Function
1	F1	ARB Off On	Enables/disables the function to generate modulated signals with arbitrary waveform patterns.
	F2	Combination Mode Edit Defined	Sets the function mode to generate the pattern with Baseband. Refer to 7.3.2 "Pattern generation mode".
	F3	ARB Setup	Displays the ARB Setup function menu. Refer to 7.3.3 "ARB Setup".
	F4	Load	Displays the Waveform Load function menu to load the waveform pattern from HDD/SSD to the waveform memory. Refer to 7.3.4 "Loading waveform pattern: Load".
	F5	Select	Displays the Waveform Select function menu to select the waveform pattern to be output. Refer to 7.3.5 "Selecting output waveform pattern: Select".
	F6	Copy	Displays the Waveform Copy function menu to copy the waveform pattern from the external device to HDD/SSD. Refer to 7.3.6 "Copying external waveform pattern: Copy".
	F8	Restart	Restarts the waveform pattern being played. Both Pattern A and B are targeted.
2	F1	RF Gate	Displays the RF Gate function menu. Refer to 7.3.7 "RF Gate".
	F2	Start/Frame Trigger	Displays the Start/Frame Trigger function menu. Refer to 7.3.8 "Start/Frame Trigger".
	F3	Baseband Clock	Displays the Baseband Clock function menu. Refer to 7.3.11 "Baseband Clock".
	F4	Marker Setup	Displays the Marker Setup function menu. Refer to 7.3.12 "Marker Setup".
	F6	RMS Value Tuning 0.00 dB	Tunes the RMS value input to D/A of the IQ waveform data.
	F7	Sequence Mode	Displays the Sequence Mode function menu. Refer to 7.3.13 "Sequence Mode".
	F8	Sync Multi SG	Displays the Sync Multi SG function menu. Refer to 7.3.15 "Sync Multi SG".

ARB On/Off: ARB

Mode or **Top**>**Mode, >ARB**

Enables/disables the function to generate modulated signals with arbitrary waveform patterns.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 ARB** of the ARB function menu for setting.

Off	Does not generate modulated signals with arbitrary waveform patterns.
On	Generates modulated signals with arbitrary waveform patterns. (Default)

Remote command

Enable/disable the function to generate modulated signals with arbitrary waveform patterns

Command

```
[:SOURce[1]|2]:RADio:ARB[:STATe] <boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Generation of modulated signals with arbitrary waveform patterns On/Off
OFF|0	Does not generate modulated signals with arbitrary waveform patterns.
ON|1	Generates modulated signals with arbitrary waveform patterns (Default).

Programming Example

To set the generation of modulated signals with arbitrary waveform patterns to On.

```
RAD:ARB ON
RAD:ARB?
> 1
```

Restart

Mode or **Top**>**Mode, >Restart**

Restarts the waveform pattern being played.
Both Pattern A and B are targeted.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 Restart** on the ARB function menu for execution.

Remote command

Restart the waveform pattern

Command

```
[:SOURce[1]|2]:RADio:ARB:WAVeform:RESTart
```

Programming Example

To playback the waveform pattern from the beginning.

```
RAD:ARB:WAV:REST
```

RMS Value Tuning

Mode or **Top**>**Mode, >**→**>RMS Value Tuning**

Tunes the IQ waveform data amplitude (RMS value) input to the D/A convertor of the internal arbitrary waveform generator.

This function is used for optimization of the output signal distortion or others.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 RMS Value Tuning** on page 2 of the ARB/Waveform function menu for setting.

Range	–8.00 dB to 8.00 dB
Resolution	0.01 dB
Default	0.00 dB

Remote command

Tune the IQ Waveform data input amplitude

Command

```
[:SOURce[1]|2]:RADio:ARB:RMSTuning <rel_ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:RMSTuning?
```

Response

`<rel_ampl>` Unit: dB

Parameter

<rel_ampl>	IQ waveform data input amplitude
Range	–8.00 dB to 8.00 dB
Resolution	0.01 dB
Default	0.00 dB
Suffix code	DB, When omitted: DB

Programming Example

To tune the IQ Waveform data input amplitude to 1 dB.

```
RAD:ARB:RMST 1.00
RAD:ARB:RMST?
> 1.00
```

Operational explanation

To avoid the DAC over-range:

Lower the RMS value with **RMS Value Tuning**. However, be careful about the dynamic range decrease.

To increase the dynamic range:

Raise the RMS value with **RMS Value Tuning**. However, be careful about the DAC over-range.

Note:

Even if the RMS value is changed with **RMS Value Tuning**, the output level is maintained; however, in some cases Unleveled is indicated. In this case, setting **RMS Value Tuning** to 0 dB allows avoiding Unleveled with this function.

7.3.2 Pattern generation mode: Combination Mode

Mode or **Top>Mode, >Combination Mode**

Sets the function mode to generate the pattern with Baseband.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Combination Mode** on the ARB/Waveform function menu for setting.

Edit	Mode to generate modulated signals with the combination of arbitrary waveform patterns.
Defined	Mode to generate modulated signals with the combination specified to the waveform file (Default).

Remote command

Select the function mode to generate the pattern with Baseband

Command

```
[:SOURce[1]|2]:RADio:ARB:PCOMbination EDIT|DEFined
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PCOMbination?
```

Response

<mode>	EDIT or DEF

Parameter

<mode>	The function mode to generate the pattern with Baseband.
EDIT	Mode to generate modulated signals with the combination of arbitrary waveform patterns.
DEFined	Mode to generate modulated signals with the combination specified to the waveform file (Default).

Programming Example

To set the function mode to generate the pattern with Baseband to the mode to generate modulated signals with the combination of arbitrary waveform patterns.

```
RAD:ARB:PCOM EDIT
RAD:ARB:PCOM?
> EDIT
```

To execute modulation with Defined mode

Mode or **Top>Mode>Combination Mode**

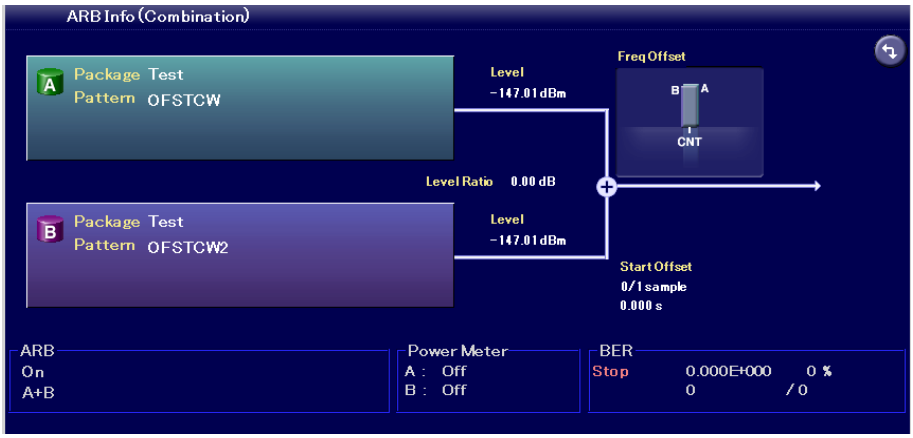


Figure 7.3.2-1 ARB Info (Combination) Dialog Box

With the Defined mode, the digital modulation setting screen display depends on the contents of the selected waveform file. However, the pattern is output according to the settings of the waveform file; therefore, basically the settings for output level ratio are not required. This mode is useful for simple evaluations such as the adjacent channel selectivity and sensitivity measurement in AWGN addition state.

In MG3740A, this can be used only when option-020/120 is installed.

The procedure is explained below.

Example: To select the waveform file and output the pattern in the Defined mode.

1. Press **F4 Load** to select the waveform file and load into the memory. Refer to 7.3.4 “Loading waveform pattern: Load”.
2. Press **F2 Combination Mode** to set to “Defined”.
3. Press **F5 Select** to select the waveform file loaded into the memory. Refer to 7.3.5 “Selecting output waveform pattern: Select”.
4. Light the lamp (green) of Mod On/Off key to start the vector modulation.
5. When the output level, offset reference signal, frequency offset, and others of the pattern in each memory are changed, change the settings in the same way as 7.3.3 “ARB Setup”.

To execute continuous operations in Defined mode.

Mode or **Top>Mode>Combination Mode**



Figure 7.3.2-2 ARB Info (Sequence+) Dialog Box

Selecting the combination file with the definition of continuous operations in the Defined mode activates the sequence mode. The sequence mode allows the continuous operations where the waveform pattern and output level are switched automatically according to the definition of the combination file. Manual operations is also possible, instead of using the continuous operations.
For details of the combination file for the sequence mode with the definition of the continuous operations, refer to the *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

In MG3740A, this can be used only when option-020/120 is installed.

The procedure is explained below.

Example: To execute the continuous operations in the sequence mode.

1. Select the combination file (for the sequence mode) to load into the memory. Refer to 7.3.4 “Loading waveform pattern: Load”.
2. Press **F2 Combination Mode** to set to Defined.
3. Press **F5 Select** to select the waveform file loaded into the memory. Refer to 7.3.5 “Selecting output waveform pattern: Select”.
4. Light the lamp (green) of Mod On/Off key to start the vector modulation and the continuous operations simultaneously. Press **F2 Sequence Restart** on the Sequence Mode function menu to restart the continuous operations from the beginning.

5. Press **F7 Sequence Mode** on page 2 of the ARB/Waveform function menu to display the **Sequence Progress** dialog box where the continuous operations state can be confirmed. The highlighted element indicates the pattern which is currently being output. The operations are repeated only for the number of times of Repeat where the one time is the data length of the waveform pattern of each element.

   Setting **F3 Play Mode** to "Manual" on the Sequence Mode function menu switches the continuous operations to Manual. Then the operation is unlimitedly repeated for the highlighted element. Press **F1 Next Pattern** to move the operation to the next element.

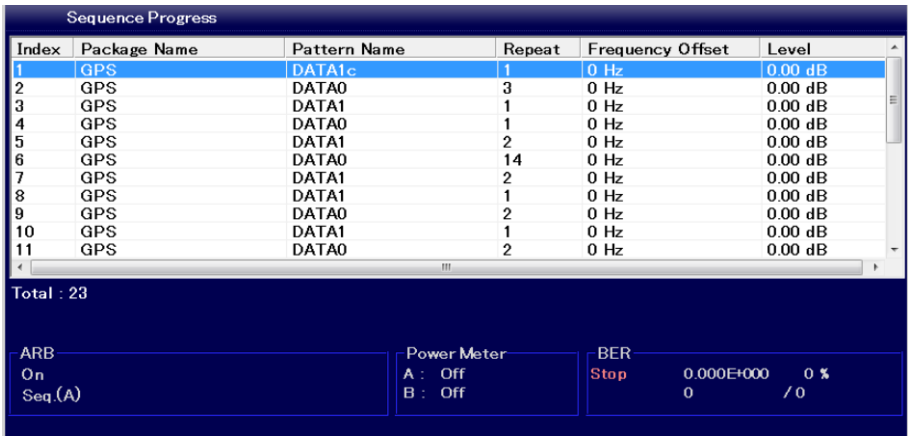


Figure 7.3.2-3 Sequence Progress Dialog Box

When Frequency or Level is changed during the sequence mode operation, Play Mode is changed to "Manual" and the sequence operation is stopped. To restart the sequence operation, set Play Mode to "Auto".

Sampling Rate A/B (Refer to 7.3.3 "ARB Setup") setting cannot be changed during the sequence operation. In addition, ATT Hold (Refer to 5.3.4 "ATT Hold") is always Off during the operation.

The displayed output level differs between On and Off of the vector modulation. The output level for each element and the maximum output level for all elements are displayed for On of the vector modulation and for Off of the vector modulation respectively.

Setting **F1 Pattern Trigger** on the Pattern Trigger function menu (Refer to 7.3.14 "Pattern Trigger") to "On" and inputting the external trigger to Pattern Trigger on the back of MG3710A/MG3710E (Refer to 7.4.1 "Route Input Connectors") moves the operation to the next element.

Setting **F5 Switching Point** on the Pattern Trigger function menu to "Pattern" switches the base unit for the switching time for the next element with **F1 Next Pattern** or external triggers to the data length of the waveform pattern of each element. On the other hand, setting to

"Frame" switches the base unit to the frame length of the waveform of each element.

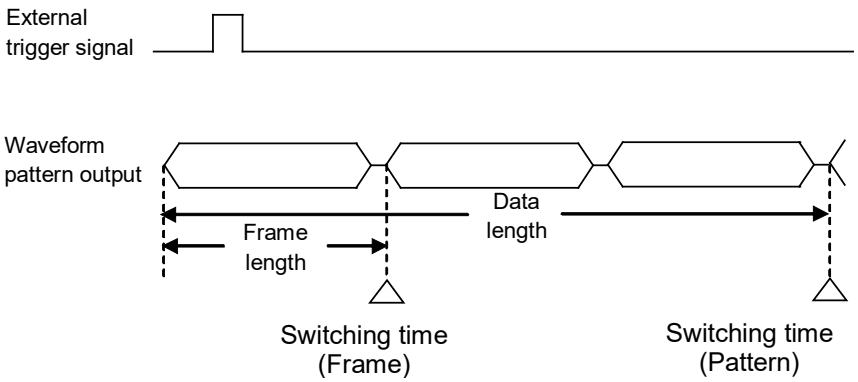


Figure 7.3.2-4 Switching Time

To output the pattern loaded into Memory A for modulation in Edit mode

Mode or **Top>Mode>Combination Mode**

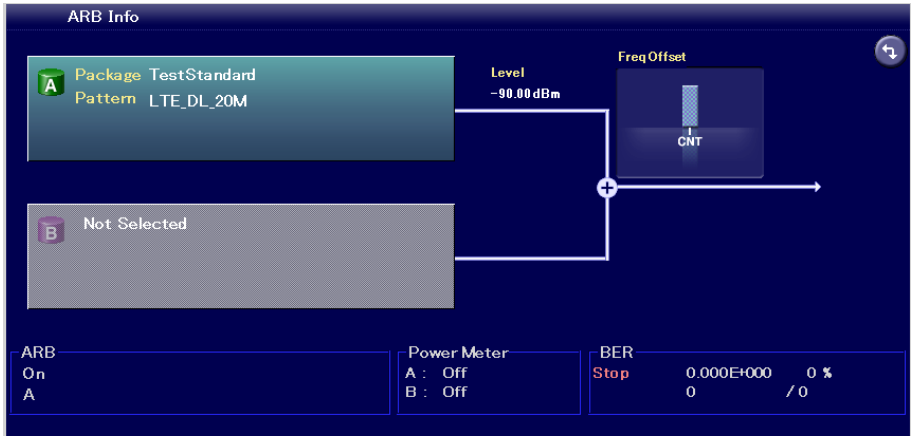


Figure 7.3.2-5 ARB Info Dialog Box

The pattern file is selected (the combination file cannot be selected) for modulation in the Edit mode. The pattern is selected for each memory for output. Here the pattern is output from Memory A.

In MG3740A, this can be used only when option-020/120 is installed.

The procedure is explained below.

1. Press **F4 Load** to select the waveform file and load into the memory. Refer to 7.3.4 “Loading waveform pattern: Load”.
2. Press **F2 Combination Mode** on the ARB/Waveform function menu for setting to Edit.
3. Press **F5 Select** to select the waveform file loaded into the memory. Refer to 7.3.5 “Selecting output waveform pattern: Select”.
4. Press **F3 ARB Setup** to display the ARB Setup function menu and set **F1 Output A** to On.
5. Press Mod On/Off to light the lamp (green) of the key to start the vector modulation.

To combine outputs from Memory A and B for modulation in Edit mode

Mode or **Top**>**Mode**>**ARB Setup**

The output level, sampling rate, frequency offset, start offset, and spectrum reverse of Memory A and B can be set on the screen for combination of two patterns in the Edit mode. Using this function requires the Combination of Baseband Signal option (MG3710A/MG3710E/MG3740A-048/078/148/178).

In MG3740A, this can be used only when option-020/120 is installed.

Here, operations for the case where the two signals with same frequency are added for the desired wave and delay wave and for the case where the offset is added between the frequencies of two signals such as the adjacent channel selectivity are explained.

Output level

Specify the output level of the pattern. It can be specified for each of Memory A and B. **Level A/B**

In addition, the setting with the output level ratio of Memory A and B is available. **A/B Ratio**

The target for the level change on output level ratio change is changed with the setting of **A/B Signal Setting**. The displayed RF output level may be lower than the minimum output level of the MG3710A/MG3710E/MG3740A depending on the setting of the output level ratio; however, actually there is no output with the level lower than the minimum output level of the MG3710A/MG3710E/MG3740A.

Sampling rate

The sampling rates of the waveform signals of patterns of Memory A and B are set.

Sampling Rate A/B

Frequency offset

Freq Offset when **Central Signal** is "A"

The center frequency of Memory B is displaced based on the pattern of Memory A (0 Hz).

Freq Offset when **Central Signal** is "B"

The center frequency of Memory A is displaced based on the pattern of Memory B (0 Hz).

Freq Offset A/B when **Central Signal** is "Baseband DC"

The center frequencies of patterns of Memory A and B are displaced based on the Baseband center frequency.

Settings are executed with this function when there is an offset between frequencies of two signals such as the adjacent channel selectivity.

Start offset

Different play start timing is set for the patterns of Memory A and B. Memory A is the reference, and offset is applied to the B side. This function is enabled when the same pattern is output from Memory A and B and the correlation of both is to be decreased. **Start Offset**

Spectrum reverse

I/Q of patterns of Memory A and B are swapped and the spectrum is reversed.

Spectrum A/B

Combination of signals with different sampling rates (Rate matching function)

When a signal with a different sampling rate has been set to Memory A and Memory B, a combined signal which maintains each sampling rate is output. It is useful for purposes with the use of combined signals with different rates such as Multi Standard signals.

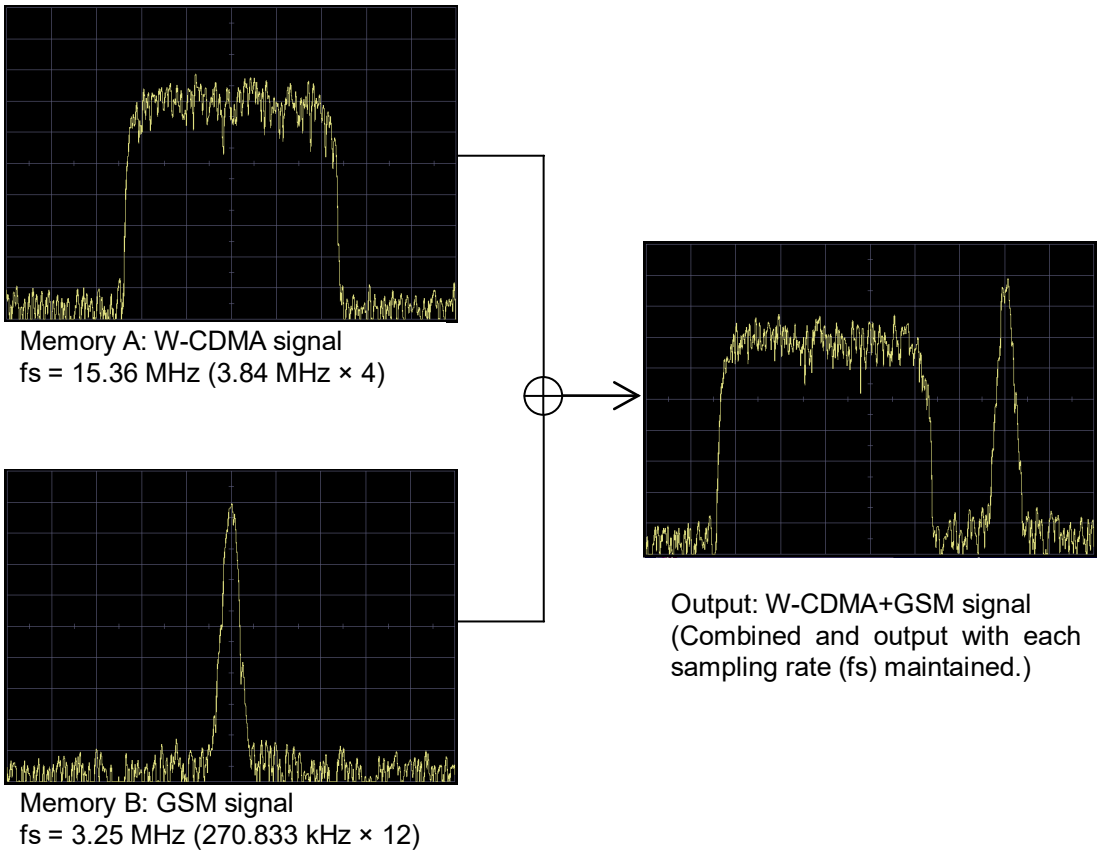


Figure 7.3.2-6 Rate Matching Function

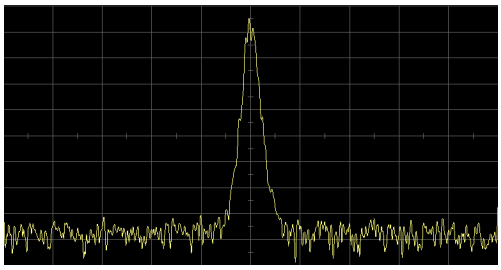
Some combinations of waveform sampling rates may disable rate matching due to internal operation clock limitation of the MG3710A/MG3710E/MG3740A. In this case, Rate Mismatch warning is displayed.



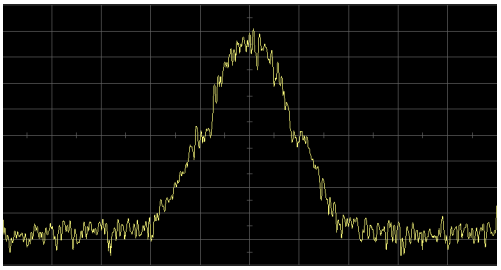
Figure 7.3.2-7 Rate Mismatch Display

Note:

When the Rate Mismatch is displayed, the sampling rate of Memory B side is changed to the frequency which is the same as the sampling rate of Memory A side. Therefore, the pattern of Memory B side operates with the sampling clock which differs from the pattern's clock, and is output in a bandwidth which differs from the normal status.



Memory B: GSM signal (Normal)



Memory B: GSM signal (Rate Mismatch)

Figure 7.3.2-8 Memory B Waveform of Rate Mismatch

When Rate Mismatch is displayed, the digital addition function (Rate Matching Function) does not work properly. Prepare a signal generator and add the signals externally.

To add two waves with same frequency in Edit mode

Mode or **Top>Mode**

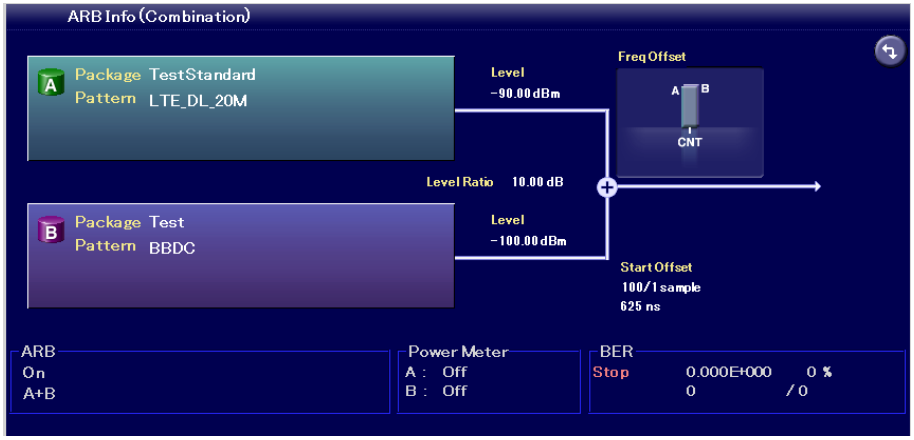


Figure 7.3.2-9 Two Waves Added Output

When the center frequencies of two patterns are to be set to the same value, set the frequency offset to 0 Hz. This function is useful when the transmission signal pattern of Memory A and the delay wave of Memory B are output for measurement of the performance of receiver.

In MG3740A, this can be used only when option-020/120 is installed.

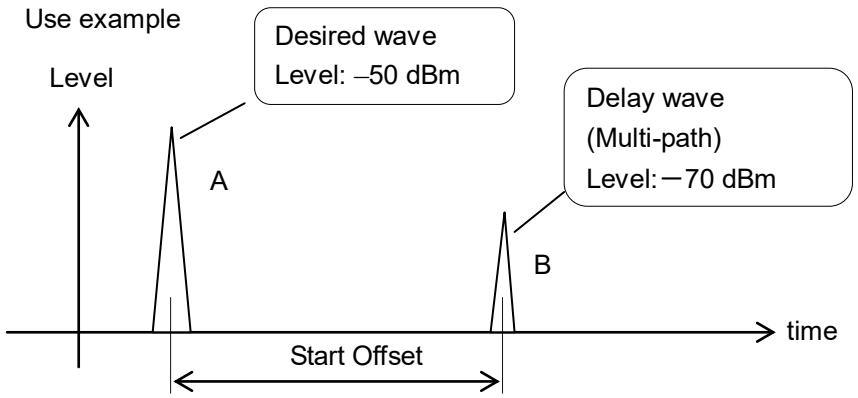


Figure 7.3.2-10 Example of Desired Wave and Delay Wave with Same Frequency

The procedure is explained below.

Example: To combine pattern files loaded into Memory A and B with the same frequency.

1. Press **F4 Load** to select the waveform file and load into the memory. Refer to 7.3.4 “Loading waveform pattern: Load”.
2. Press **F2 Combination Mode** on the ARB function menu to set to Edit.
3. Press **F5 Select** to select the waveform file loaded into the memory. Refer to 7.3.5 “Selecting output waveform pattern: Select”.
4. Press **F3 ARB Setup** to display the ARB Setup function menu and set **F1 Output A** and **F3 Output B** to On.
5. Set output levels with **F2 Level A** and **F4 Level B**.
   When the unit is changed, the unit of RF output level A and B are changed in tandem.
6. Set the time offset of Pattern B based on Pattern A side with **F5 Start Offset** in Page 2.
7. Press 

to light the lamp (green) of the key to start the vector modulation.

To give offsets to frequencies of two waves in Edit mode

Mode or **Top**>**Mode**>**ARB Setup**

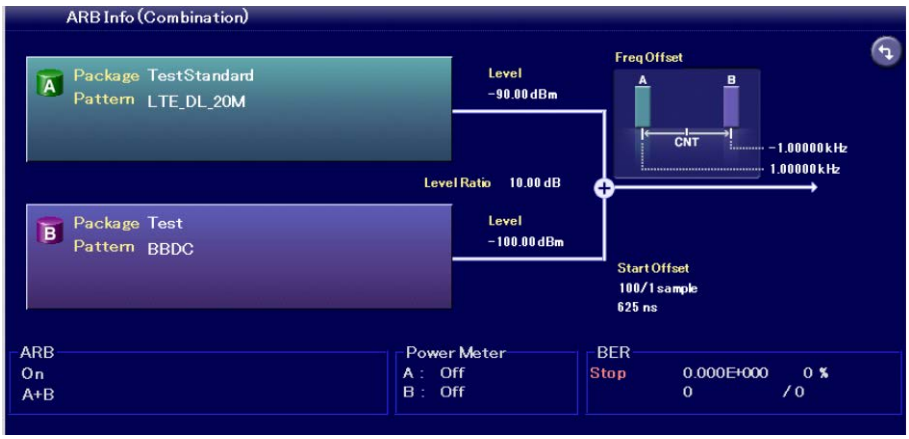


Figure 7.3.2-11 Frequency Offset Output

When the center frequencies of two patterns are to be displaced, set the frequency offset to the arbitrary value. This function is useful when the transmission signal pattern of Memory A and the interference signal from the adjacent channel of Memory B are output for measurement of the performance of the receiver.

In MG3740A, this can be used only when option-020/120 is installed.

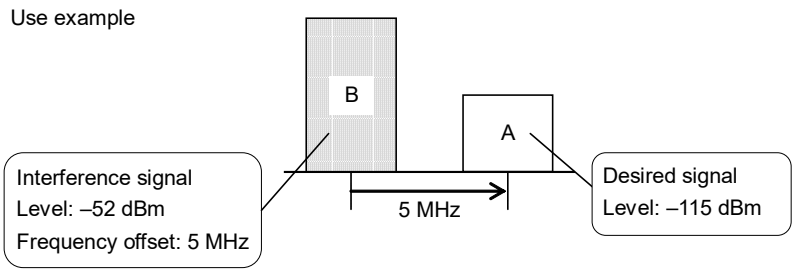


Figure 7.3.2-12 Example of Frequency Offset

The use example above is for Memory B as offset reference. It is also available that the offset reference is Memory A.

The procedure is explained below.

Example: To combine pattern files loaded into Memory A and B with the different frequency.

1. Press **F4 Load** to select the waveform file and load into the memory. Refer to 7.3.4 “Loading waveform pattern: Load”.
2. Press **F2 Combination Mode** on the ARB function menu to set to Edit.
3. Press **F5 Select** to select the waveform file loaded into the memory. Refer to 7.3.5 “Selecting output waveform pattern: Select”.
4. Press **F3 ARB Setup** to display the ARB Setup function menu and set **F1 Output A** and **F3 Output B** to On.
5. Set output levels with **F2 Level A** and **F4 Level B**.
   When the unit is changed, the unit of RF output level A and B are changed in tandem.
6. Next, set the frequency offset between A and B.
   Press **F4 Center Signal** on page 2 of ARB Setup function menu to set the pattern as the frequency reference to “B”.
7. Press **F1 Freq Offset** on page 2 of ARB Setup function menu to display the **Freq Offset A** dialog box to set the offset frequency.
8. Press 

to light the lamp (green) of the key to start the vector modulation.

Various settings for pattern output

Mode or **Top**>**Mode**

In MG3740A, this can be used only when option-020/120 is installed.

To re-output the pattern from the beginning.

Without the external trigger signal input, when the end of the waveform pattern is output, the pattern is automatically output from the beginning repeatedly. Press **F8 Restart** on the ARB function menu to allow re-output of the waveform pattern from the beginning with the arbitrary timing. However, pressing **F2 Sequence Restart** on the Sequence Mode function menu restarts the continuous operations from the first element in the sequence mode.

Switching I/Q signal source

To output the internal vector modulation signal with the waveform pattern, I/Q signal source must be set for the internal signal. Press **F2 I/Q** on page 2 of the top function menu to display the I/Q function menu, and press **F1 I/Q Source** to select "Internal".

When the modulated signal is the burst wave.

When the waveform pattern used is the burst wave, press **F4 RF Gate** on the ARB function menu, and press **F1 RF Gate** on the RF Gate function menu to set the RG Gate function to "On".

To output the pattern loaded into Memory B for modulation

Previously in this document, the procedure to output the pattern loaded into Memory A for modulation has been explained. In addition, the pattern loaded into Memory B can be output for modulation. In the procedure for this case, not **F1 Output A** but **F3 Output B** is set to "On". In addition, when patterns are loaded into both of Memory A and B, set both of **F1 Output A** and **F3 Output B** to "On" to output from patterns included in the both memories.

7.3.3 ARB Setup

Mode or **Top>Mode, >ARB Setup**

Press **F3 ARB Setup** on the ARB function menu to open the ARB Setup function menu.

In MG3740A, this can be used only when option-020/120 is installed.

Table 7.3.3-1 ARB Setup Function Menu

Page	Key No.	Menu Display	Function
1	F1	Output A Off On	Enables/disables the Pattern A output.
	F2	Level A –144.00 dBm	Sets the Pattern A output level.
	F3	Output B Off On	Enables/disables the Pattern B output.
	F4	Level B –144.00 dBm	Sets the Pattern B output level.
	F5	A/B Signal Setting A B A&B	Selects the target for level change on A/B Ratio change. (The option which is not selected is fixed.)
	F6	A/B Ratio 0.00 dB	Sets the level ratio of Pattern A and Pattern B.
	F7	Sampling Rate A 20.000000 Hz	Sets the Pattern A sampling rate.
	F8	Sampling Rate B 20.000000 Hz	Sets the Pattern B sampling rate.
2	F1	Freq Offset 0 Hz	Sets the frequency offset between Pattern A and B. When CenterSignal is A or B, the frequency offset is set with this parameter.
	F2	Freq Offset A 0 Hz	Sets the frequency offset of Pattern A based on Baseband center frequency.
	F3	Freq Offset B 0 Hz	Sets the frequency offset of Pattern B based on Baseband center frequency.
	F4	Center Signal Baseband DC	Selects the pattern to be the reference on frequency display.
	F5	Start Offset 0	Sets the time offset of Pattern B based on Pattern A side.
	F6	Spectrum A Normal Reverse	Swaps I/Q of Pattern A and reverses the spectrum.
	F7	Spectrum B Normal Reverse	Swaps I/Q of Pattern B and reverses the spectrum.

Output A/Output B

Mode or **Top**>**Mode**,>**ARB Setup**>**Output A** or **Output B**

Enables/disables the Pattern A/B output.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Output A/F3 Output B** on the ARB Setup function menu for setting.

Off	Does not output Pattern A/B.	
On	Outputs Pattern A/B.	
Default	Output A	On
	Output B	Off

Remote command

Enable/disable the Pattern A/B output

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:OUTPut <boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:OUTPut?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Frequency relative display On/Off	
OFF|0	Does not output Pattern A/B.	
ON|1	Outputs Pattern A/B.	
Default	Output A	On
	Output B	Off

Programming Example

To set Pattern B output to On.

```
RAD:ARB:WMB:OUTP ON
RAD:ARB:WMB:OUTP?
> 1
```

Level A/Level B

Mode or **Top**>**Mode**,>**ARB Setup**>**Level A** or **Level B**

Sets the Pattern A/B output level.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Level A/F4 Level B** on the ARB Setup function menu for setting.

Resolution	0.01 dB
Default	Minimum value of Output Level

Remote command

Set Pattern A/B output level

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:POWer <ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:POWer?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Pattern A/B output level
Resolution	0.01 dB
Suffix code	DBM, DM, DBUV, DBUVE, When omitted: DBM

Programming Example

To set Pattern A output level to –30.00 dBm.

```
RAD:ARB:WMA:POW -30.00
RAD:ARB:WMA:POW?
> -30.00
```

A/B Signal Setting

Mode or **Top**>**Mode**,>**ARB Setup**>**A/B Signal Setting**

Selects the target for level change on A/B Ratio change (The option which is not selected is fixed).

In MG3740A, this can be used only when option-020/120 is installed.

Press **F5 A/B Signal Setting** on the ARB Setup function menu for setting.

A	Fixes Level B and changes Level A.
B	Fixes Level A and changes Level B.
A&B	Fixes OutputLevel and changes Level A and Level B. (Default)

Remote command

Select the target for level change on A/B Ratio change

Command

```
[:SOURce[1]|2]:RADio:ARB:POWer:RATio:TARGet A|B|AB
```

Query

```
[:SOURce[1]|2]:RADio:ARB:POWer:RATio:TARGet?
```

Response

```
<mode>
```

Parameter

<mode>	Target for level change on A/B Ratio change
A	Fixes Level B and changes Level A.
B	Fixes Level A and changes Level B.
AB	Fixes OutputLevel and changes Level A and Level B. (Default)

Programming Example

To select Level B for the target for level change on A/B Ratio change.

```
RAD:ARB:POW:RAT:TARG B
RAD:ARB:POW:RAT:TARG?
> B
```

A/B Ratio

Mode or **Top**>**Mode**, >**ARB Setup**>**A/B Ratio**

Sets the level ratio of Pattern A and Pattern B.
A/B is indicated with dB.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 A/B Ratio** on the ARB Setup function menu for setting.

Range	–80 dB to 80 dB
Resolution	0.01 dB
Default	0 dB

Remote command

Set the level ratio of Pattern A and Pattern B

Command

```
[:SOURce[1]|2]:RADio:ARB:POWer:RATio <rel_ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:POWer:RATio?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Level ratio of Pattern A and Pattern B
Range	–80 dB to 80 dB
Resolution	0.01 dB
Default	0 dB
Suffix code	DB, When omitted: DB

Programming Example

To set the level ratio of Pattern A and Pattern B to –30.00 dB.

```
RAD:ARB:POW:RAT -30.00
RAD:ARB:POW:RAT?
> -30.00
```

Sampling Rate A/Sampling Rate B

Mode or **Top**>**Mode, >ARB Setup**>**Sampling Rate A** or **Sampling Rate B**

Sets the waveform signal sampling rate.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F7 Sampling Rate A/F8 Sampling Rate B** on the ARB Setup function menu for setting with the displayed dialog box.

Range	0.02 to 200 MHz	(MG3710A/MG3710E)
	0.02 to 8 MHz	(MG3740A)
Resolution	0.001 Hz	
Default	20 kHz	

Remote command

Query the baseband signal sampling rate

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:SCLock:RATE <freq>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:SCLock:RATE?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Sampling rate	
Range	0.02 to 200 MHz	(MG3710A/MG3710E)
	0.02 to 8 MHz	(MG3740A)
Resolution	0.001 Hz	
Default	20 kHz	
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ	
	When omitted: HZ	

Programming Example

To set SG1 waveform Memory A sampling rate.

```
RAD:ARB:WMA:SCL:RATE 80MHZ
RAD:ARB:WMA:SCL:RATE?
> 80000000.000
```

Freq Offset

Mode or **Top**>**Mode**,>**ARB Setup**>(→)>**Freq Offset**

Sets the frequency offset between Pattern A and B with this parameter, when CenterSignal is A or B.

The parameter is available only when the waveform is selected in Memory A and B and Output A and B are On at the same time.
This is disabled when CenterSignal is Baseband DC.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Freq Offset** on page 2 of the ARB Setup function menu for setting.

Range	–200 MHz/2 to 200 MHz/2 (MG3710A/MG3710E) –8 MHz to 8 MHz (MG3740A)
Resolution	1 Hz
Default	0 Hz

Note:

If the output modulated wave exceeds the modulation bandwidth of the MG3710A/MG3710E/MG3740A, a missing signal/alias may occur. When the frequency offset is used, be careful that the bandwidth used does not to exceed the modulation bandwidth.

Remote command

Set the frequency offset of Pattern A/Pattern B

Command

```
[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet <freq>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Frequency
Range	–200 MHz/2 to 200 MHz/2 (MG3710A/MG3710E) –8 MHz to 8 MHz (MG3740A)
Resolution	1 Hz
Default	0 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted: HZ

Details

When CenterSignal is A, the value is offset of B for A. When CenterSignal is B, the value is offset of A for B.

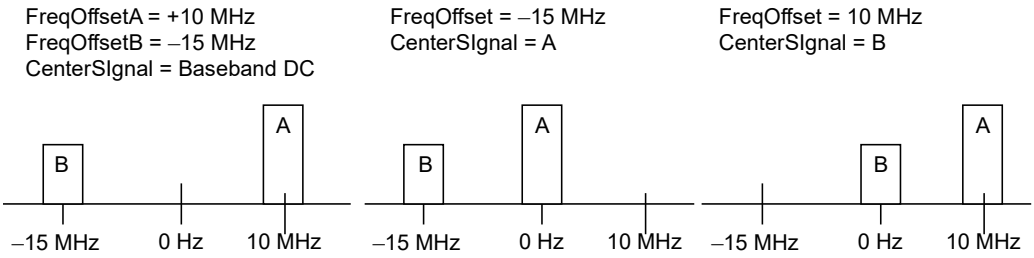


Figure 7.3.3-1 Example of Frequency Offset Setting

Programming Example

To set the SG1 frequency offset to 800 Hz.

```
RAD:ARB:FREQ:OFFS 800
RAD:ARB:FREQ:OFFS?
> 800
```

Freq Offset A/Freq Offset B

Mode or **Top**>**Mode,** >**ARB Setup**>(→)>**Freq Offset A** or **Freq Offset B**

Sets the frequency offset of Pattern A/Pattern B based on Baseband center frequency

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Freq Offset A/F3 Freq Offset B** on page 2 of the ARB Setup function menu for setting.

Range	–200 MHz/2 to 200 MHz/2 (MG3710A/MG3710E) –8 MHz/2 to 8 MHz/2 (MG3740A)
Resolution	1 Hz
Default	0 Hz

Note:

If the output modulated wave exceeds the modulation bandwidth of the MG3710A/MG3710E/MG3740A, a missing signal/alias may occur. When the frequency offset is used, be careful that the bandwidth used does not to exceed the modulation bandwidth.

Remote command

Set the frequency offset of Pattern A/Pattern B

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:FREQuency:OFFSet <freq>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:FREQuency:OFFSet?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Frequency
Range	–200 MHz/2 to 200 MHz/2 (MG3710A/MG3710E) –8 MHz/2 to 8 MHz/2 (MG3740A)
Resolution	1 Hz
Default	0 Hz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted: HZ

Programming Example

To set the SG1 Pattern A frequency offset to 800 Hz.

```
RADio:ARB:WMA:FREQ:OFFS 800
RADio:ARB:WMA:FREQ:OFFS?
> 800
```

Center Signal

Mode or **Top**>**Mode**,>**ARB Setup**>(→)>**Center Signal**

Selects the pattern to be the reference on frequency display.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Center Signal** on page 2 of ARB Setup function menu to open the Center Signal function menu for selection.

A	Pattern A is the reference.
B	Pattern B is the reference.
Baseband DC	DC position of Baseband is the reference (Default).

Note:

When the control language is set to MG3700A, B (Pattern B is the reference.) is a default. The default is effective after preset. For control languages, refer to "Selecting control language" in Section 9.4.1 "Interface Settings".

Remote command

Select the pattern to be referenced on frequency display

Command

```
[:SOURce[1]|2]:RADio:ARB:CSIGnal A|B|BDC
```

Query

```
[:SOURce[1]|2]:RADio:ARB:CSIGnal?
```

Response

```
<mode>
```

Parameter

<mode>	Pattern for frequency display
A	Pattern A is the reference.
B	Pattern B is the reference.
BDC	DC position of Baseband is the reference (Default).

Programming Example

To set the pattern to be the reference on frequency display to Pattern A.

```
RAD:ARB:CSIG A
RAD:ARB:CSIG?
> A
```

Start Offset

Mode or **Top**>**Mode**, >**ARB Setup**>(→)>**Start Offset**

Sets the time offset of Pattern B based on Pattern A side.

The parameter is available only when the waveform is selected in Memory A and B and Output A and B are On at the same time.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F5 Start Offset** on page 2 of ARB Setup function menu for setting.

Range	0 to the number of sampling data items of Pattern B – 1 or 9 999 999, whichever smaller
Resolution	1
Default	0
Unit	The number of samples with Sampling Rate B rate

Remote command

Set the time offset

Command

```
[:SOURce[1]|2]:RADio:ARB:TIME:SOFFset <ext_integer>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TIME:SOFFset?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Time offset value of Pattern B based on Pattern A side
Setting range	0 to the number of sampling data items of Pattern B – 1 or 9 999 999, whichever smaller
Resolution	1
Default	0
Unit	The number of samples with Sampling Rate B rate
Suffix code	None

Programming Example

To set the time offset of Pattern B based on Pattern A side to 800.

```
RAD:ARB:TIME:SOFF 800
RAD:ARB:TIME:SOFF?
> 800
```

Spectrum A/Spectrum B

Mode or **Top**>**Mode,** >**ARB Setup**>→>**Spectrum A** or **Spectrum B**

I/Q swap for Pattern A is executed and the spectrum is revered. Spectrum A reverses the spectrum of the waveform memory A, and Spectrum B reverses the spectrum of the waveform memory B. Similar to this, **F2 RF Spectrum** of the Frequency function menu on page 2 inverts the spectrum of the waveform memory A and B, respectively. Reversing RF Spectrum and Spectrum A or B simultaneously returns the status to Normal.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Spectrum A/F7 Spectrum B** on page 2 of ARB Setup function menu for setting.

Normal	Does not reverse (Default).
Reverse	Reverses.

Remote command

Set the spectrum reverse

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:SPECtrum NORMal|INVert
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:SPECtrum?
```

Response

<mode>	NORM or INV

Parameter

<mode>	Spectrum reverse On/Off
NORMal	Does not reverse (Default).
INVert	Inverts.

Programming Example

To set the spectrum reverse for Pattern A.

```
RAD:ARB:WMA:SPEC INV
RAD:ARB:WMA:SPEC?
> INV
```

7.3.4 Loading waveform pattern: Load

Load or **Top>Mode>Load**

Loads the waveform pattern from HDD/SSD into the waveform memory.

In MG3740A, this can be used only when option-020/120 is installed.

Notes:

- To load the waveform pattern to the memory, the license file corresponding to each pattern must be installed. Refer to 9.4.4 "Install" for installation of the license file.
- Do not plug in and out the USB flash drive while loading a waveform pattern.

Press **Load** of the main function key or **F4 Load** on the ARB/Waveform function menu to open the **Waveform List to Load** dialog box and Waveform Load function menu.

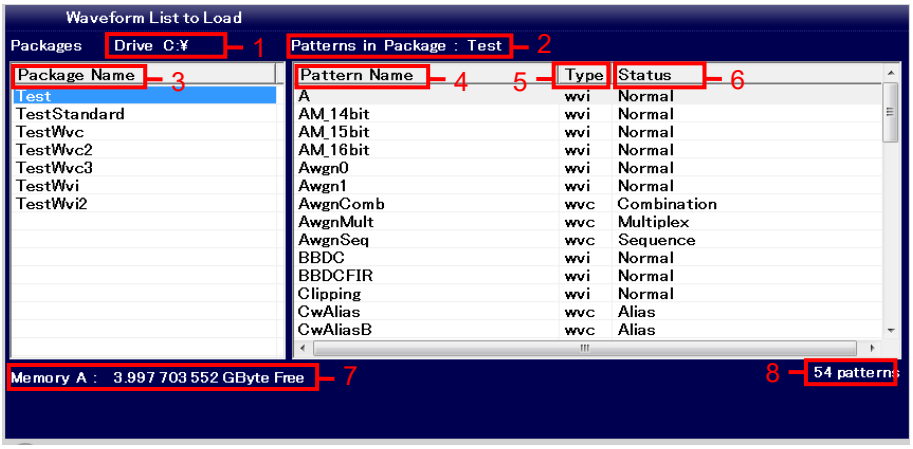


Figure 7.3.4-1 Waveform List to Load Dialog Box

Table 7.3.4-1 Waveform List to Load

No.	Display Example	Description	
1	Drive C:	Drive number	
2	Pattern in Packages: Test	Name of package displaying pattern	
3	Package Name	Package file name	
4	Pattern Name	Pattern file name	
5	Type	File type	
6	Status*	Status	File type
		Comment 1/2/3	Displays the Comment Lines 1/2/3
		Version	Version number
		Size	File size
		Sampling Rate	Sampling frequency
		RMS Value	RMS value
7	3.992 378 056 GByte Free	Remaining free Memory A or Memory B	
8	54 patterns	Number of patterns included in the selected package	

*: Displayed items switch according to Waveform Load function menu and Subitem Status.

Remote command

Query the waveform pattern file version on the hard disk/SSD

Query

To query the version of the single pattern file (wvi/wvd). The version of the combination file (wvc) cannot be confirmed with this command.

```
:MMEMory:WAVeform:VERSion? <string1>,<string2>[,<device>]

:MMEMory:WAVeform:SINGle:VERSion?
<string1>,<string2>[,<device>]
```

Response

```
<version>
```

Parameter

`<device>`	Source drive number A to Z, currently selected drive when omitted
`<string1>`	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
`<string2>`	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')
`<version>`	Version number: 00.00 to FF.FF in hexadecimal When patterns do not exist, *** is returned.

Details

This is a function only with remote commands.

Programming Example

To query the "TEST" pattern version number of the package "WCDMA" in C drive.

```
MMEM:WAV:VERS? "WCDMA","TEST"
> 1.00
```

Remote command **Query the hard disk/SSD free space information**

Query

```
:MMEMory:FREE[:ALL]? [<device>]
```

Response

<integer1>,<integer2> Unit: byte

Parameter

<device>	Source drive number A to Z, drive C when omitted
<integer1>	Number of bytes in whole HDD/SSD
<integer2>	Number of bytes of the remaining space -999.0 is returned when no devices exist.

Programming Example

To query the hard disk/SSD free space in C drive.

```
MMEM:FREE?
> 1234567890,123456789
```

Table 7.3.4-2 Waveform Load Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Selects the device which includes the waveform pattern to be queried.
	F2	Focus Package Pattern	Moves the cursor between Package/Pattern frames.
	F3	Update Info	Updates the waveform pattern information in HDD/SSD.
	F4	Subitem Status	Switches the Subitem displayed items in **Waveform List to Load** dialog box.
	F5	Show Details	Displays details of the selected waveform pattern information in HDD/SSD.
	F6	Load Pattern	Loads the selected pattern in **Waveform List to Load** dialog box.
	F7	Load All Patterns	Loads all of the patterns in selected package in **Waveform List to Load** dialog box.
	F8	To Memory A B	Selects the waveform memory for the pattern to be loaded into.
2	F5	Delete pattern from selected drive	Deletes the selected waveform pattern.

Example: To load the waveform pattern into the waveform memory of MG3710A/MG3710E/MG3740A.

The explanation is provided below with the assumption that the Load Waveform function menu is displayed.

1. Press **F1 Drive** to select the device which includes the waveform pattern to be loaded.
2. Press **F8 To Memory** to select the waveform memory for the waveform pattern to be loaded.
3. The list of packages is displayed in the **Waveform List to Load** dialog box. Select Package with **F2 Focus**, and move the cursor on the package which includes the waveform pattern to be loaded with the direction key or rotary knob.
4. The list of waveform files of the selected package is displayed. Select Pattern with **F2 Focus**, and move the cursor on the waveform file to be loaded with the direction key or rotary knob.
5. Press **F6 Load Pattern** to load the waveform file specified in Step 4 into the waveform memory.

Notes:

- Displays of **F6** and **F7** are displayed when Pattern is selected with **F2 Focus**.
- Press **F7 Load All Patterns** to load all of the waveform files of Package selected in Step 3 regardless of the setting in Step 4.
- If an unreadable (grayed out) Pattern file is selected, **F6** becomes unavailable.

6. When loading of waveform patterns is finished, the residual memory display is changed corresponding to the total space of loaded waveform patterns.

   4096 waveform files and 4096 packages can be loaded into the waveform memory. 4096 waveform files can be stored in one package.

Selecting device: Drive

Load or **Top**>**Mode**>**Load, >Drive**

Selects the device which includes the waveform pattern to be loaded.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Drive** on the Waveform Load function menu to display the Device function menu for selection.

Options	All connected Drives
Default	C

Moving cursor: Focus

Load or **Top**>**Mode**>**Load, >Focus**

Moves the cursor between Package/Pattern frames in the **Waveform List to Load** dialog box.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Focus** on the Waveform Load function menu for selection.

Package	Moves the cursor to Package List.
Pattern	Moves the cursor to Pattern List.

Update Info

Load or **Top**>**Mode**>**Load**, >**Update Info**

Updates the waveform pattern information in HDD/SSD.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Update Info** on the Waveform Load function menu for selection.

Remote command

Update the waveform pattern information in the HDD/SSD to enable loading

Command

To update all the waveform pattern information.

```
:MMEMory:UPDate:WAVeform:ALL
```

To update the single pattern file (wvi/wvd).

(If there is a wvc/wvi with the same name, both files are upload.)

```
:MMEMory:UPDate:WAVeform <string1>,<string2>[,<device>]
```

Parameter

<string1>	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
<string2>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')
<device>	Source drive number A to Z, drive C when omitted

Programming Example

To update all the waveform pattern information.

```
MMEM:UPD:WAV:ALL
```

To update the single pattern file "TEST" in the package "WCDMA" in drive D.

```
MMEM:UPD:WAV "WCDMA","TEST",D
```

Switching subitem: Subitem

Load or **Top**>**Mode**>**Load**,>**Subitem**

Selects the display items of Subitem in **Waveform List to Load** dialog box from the Subitem function menu.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Subitem** on the Waveform Load function menu for selection.

F1 Status	Pattern type
F2 Comment Line1	Comment Line 1
F3 Comment Line2	Comment Line 2
F4 Comment Line3	Comment Line 3
F5 Version	Version number
F6 Size	File size
F7 Sampling Rate	Sampling frequency
F8 RMS Value	RMS value

Show Details

Load or **Top**>**Mode**>**Load, >Show Details**

Displays the details of the selected waveform pattern information in HDD/SSD.

In MG3740A, this can be used only when option-020/120 is installed.

Select Pattern in the **Waveform List to Load** dialog box and press **F5 Show Details** on the Waveform Load function menu to display the **Details of Waveform Data** dialog box.



Figure 7.3.4-2 Details of Waveform Data

Package	Package file name
Pattern	Pattern file name
[Comment]	
Line1 =	Comment
Line2 =	Comment
Line3 =	Comment
Line4 =	Comment
Line5 =	Comment
Line6 =	Comment
Line7 =	Comment

Load Pattern

Load or **Top**>**Mode**>**Load**, >**Load Pattern**

Loads the selected waveform pattern in HDD/SSD.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Load Pattern** on the Waveform Load function menu for loading. This is displayed when Pattern is selected with **F2 Focus**.
If an unreadable (grayed out) Pattern file is selected, **F6** becomes unavailable.

Remote command

Start loading the waveform pattern from the hard disk/SSD to the waveform memory

Command

```
:MMEMory[1]|2:LOAD:WAVeform:WMA|WMB|LONG|COMBination
<string1>,<string2>[,<device>]
```

Query

```
:MMEMory[1]|2:LOAD:WAVeform:WMA|WMB|LONG|COMBination?
<string1>,<string2>[,<device>]
```

Response

```
<status>
```

Parameter

<string1>	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
<string2>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')
<device>	Source drive number A to Z, currently selected drive when omitted
WMA	Wave Memory A
WMB	Wave Memory B
LONG	Long Pattern
COMBination	Combination Pattern
<status>	Status
0	Already loaded
1	Can be loaded
2	License required
3	No corresponding file
4	Insufficient waveform memory free space
5	Internal error
6	Version mismatch
7	Pattern file/combination file analysis error
8	Illegal pattern file/combination file (.wvi)
9	Exceeded number of loadable waveform pattern files/combination files
10	Exceeded number of loadable packages

Details

If a waveform pattern is loaded when the same waveform pattern has already been loaded, the existing waveform pattern is overwritten.

Programming Example

To start loading “RMC15k” pattern file in package “WCDMA” in drive E into the SG2 waveform memory A.

```
MMEM2:LOAD:WAV:WMA "WCDMA","RMC15k",E
*OPC?                    // Loaded when 1 is returned
MMEM2:LOAD:WAV:WMA? "WCDMA","RMC15k",E
> 0                      // Already loaded
```

Remote command

Confirm the loading status

Query

```
:MMEMory[1]|2:LOAD:WAVeform:STATus?
```

Response

1	Being loaded.
0	Not being loaded.

Programming Example

To confirm SG2 loading status.

```
MMEM2:LOAD:WAV:STAT?
> 1
```

Remote command

Cancel the active loading operation

Command

```
:MMEMory[1]|2:LOAD:WAVeform:ABORt
```

Programming Example

To cancel SG2 loading.

```
MMEM2:LOAD:WAV:ABOR
```

When the pattern file (long pattern data file) which is larger than the space of Memory A is loaded, both Memory A and B are used for loading. However, the long pattern data file can be loaded only in the Defined mode.

When selecting Long Pattern, the following Confirmation function menu is displayed. Since Long Pattern is an extremely large file, all the previously opened contents in Memory A and Memory B are erased. The selected pattern file is loaded into Memory A from the beginning, and the part which does not fit into Memory A is loaded into Memory B.

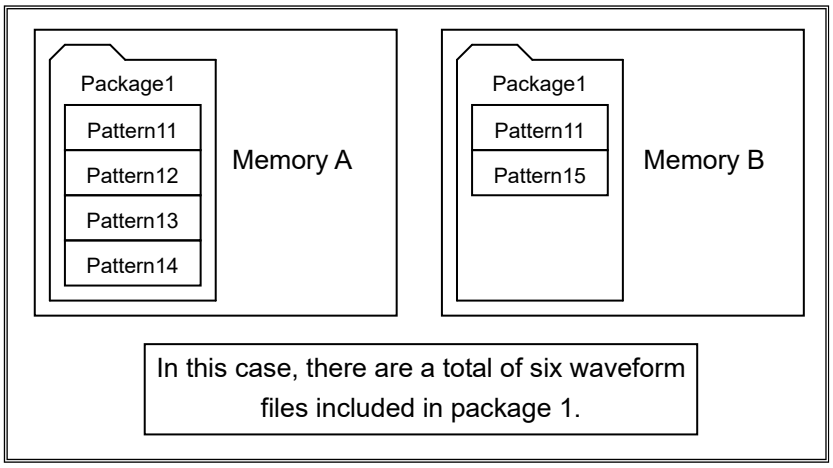
Table 7.3.4-3 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm overwriting All Loaded Pattern	Deletes contents of Memory A and Memory B and loads Long Pattern
	F8	Cancel	Returns to the menu before this menu is opened.

Select is executed by pressing **F7 Confirm overwriting All Loaded Pattern**.

Up to 4096 pattern files can be loaded into each Memory A and B. On the other hand, the number of combination files which can be loaded into the memory is 4096 at a maximum. Also, up to 4096 packages can be loaded into Memory A and B in total.

Up to 4096 waveform files can be stored in one package. If the same package exists in Memory A and B, the number of waveform files loaded into both memories are totaled. In that case, if the same pattern file is loaded into both Memory A and B, each pattern file in A and B are counted.



Load All Patterns

Load or **Top**>**Mode**>**Load**>,**Load All Pattern**

Loads all of the patterns in the selected package in **Waveform List to Load** dialog box.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F7 Load All Patterns** on the Waveform Load function menu for loading. This is displayed when Pattern is selected with **F2 Focus**.

Loading destination: To Memory

Load or **Top**>**Mode**>**Load**, >**To Memory**

Selects the waveform memory for the pattern to be loaded into.

In MG3740A, this can be used only when option-020/120 is installed.

This function specifies the loading destination waveform memory when the pattern file is loaded without being LongPattern. This function is disabled for the combination file and LongPattern because their loading destination waveform memory has been already determined.

Press **F8 To Memory** on the Waveform Load function menu for selection. This is not displayed when the waveform memory B option is not installed.

A	Waveform memory A (Default)
B	Waveform memory B

Delete

Load or **Top**>**Mode**>**Load,** >→> **Delete pattern from selected drive**

Deletes the selected waveform pattern.

In MG3740A, this can be used only when option-020/120 is installed.

Select the waveform pattern to be deleted in the **Waveform List to Load** dialog box and press **F5 Delete pattern from selected drive** on page 2 of Waveform Load function menu to display the Confirmation function menu and to highlight only the waveform pattern to be deleted.
Press **F7 Confirm Deletion** on the Confirmation function menu to execute the deletion.

Table 7.3.4-4 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Deletion	Deletes the waveform pattern.
	F8	Cancel	Returns the menu before this menu is opened.

Remote command

Delete the selected waveform pattern in HDD/SSD

Command

To delete the combination file (wvc) or single pattern (wvi/wvd).

If there is a wvc/wvi with the same name, the combination file has priority.

```
:MMEMory:DELete:WAVeform[:NAME]
<string1>,<string2>,[<device>]
```

To delete the single pattern file (wvi/wvd).

The combination file (wvc) cannot be deleted with this command.

```
:MMEMory:DELete:WAVeform:SINGle[:NAME]
<string1>,<string2>,[<device>]
```

Parameter

<string1>	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
<string2>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')
<device>	Source drive number A to Z, drive C when omitted

Details

This command does not delete waveform patterns in the waveform memory.

Programming Example

To delete the combination file "TESTALL" in the package "WCDMA" in drive D.

```
MMEM:DEL:WAV "WCDMA","TESTALL",D
```

To delete the single pattern file "TEST" in the package "WCDMA" in drive D.

```
MMEM:DEL:WAV:SING "WCDMA","TESTALL",D
```

7.3.5 Selecting output waveform pattern: Select

Select or **Top>Mode>Select**

Selects the waveform pattern to be output.

In MG3740A, this can be used only when option-020/120 is installed.

Press **Select** of the main function key or **F5 Select** on the ARB/Waveform function menu to display the **Waveform List to Play** dialog box and Waveform Select function menu.

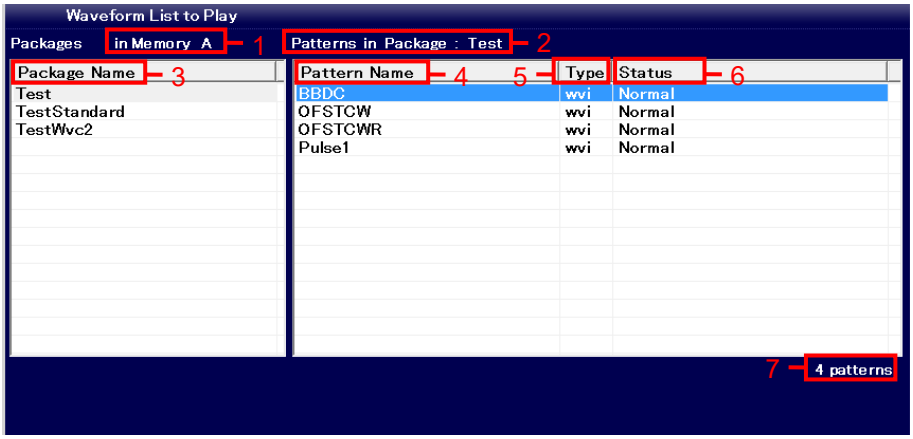


Figure 7.3.5-1 Waveform List to Play

Table 7.3.5-1 Waveform List to Play

No.	Display Example	Description	
1	in Memory A	Indicates the displayed memory when Combination Mode is Edit.	
2	Pattern in Packages: Test	Name of package displaying pattern	
3	Package Name	Package file name	
4	Pattern Name	Pattern file name	
5	Type	Indicates the memory type or comb (combination file) when Combination Mode is Edit. Indicates the file type when Combination Mode is Defined.	
6	Status*	Status	File type
		Comment 1/2/3	Displays the Comment Lines 1/2/3
		Version	Version number
		Size	File size
		Sampling Rate	Sampling frequency
		RMS Value	RMS value
7	4 patterns	Number of patterns included in the selected package	

*: Displayed items switch according to Waveform Select function menu and Subitem Status.

Table 7.3.5-2 Waveform Select Function Menu

Page	Key No.	Menu Display	Function
1	F2	Focus Package Pattern	Moves the cursor between Package/Pattern frames.
	F4	Subitem Status	Switches the Subitem displayed items in **Waveform List to Play** dialog box.
	F6	Select	Selects the waveform file to be output.
	F8	On Memory A B	Switches the Memory of the waveform pattern information to be displayed in **Waveform List to Play** dialog box.
2	F1	Delete	Deletes the selected package and pattern in the waveform memory.
	F2	Clear Memory	Deletes all patterns in the waveform memory.

Example: To select the waveform file to be output from the waveform memory.

The explanation is provided below with the assumption that the Waveform Select function menu is displayed.

1. The list of waveform patterns is displayed in the **Waveform List to Play** dialog box. Select Package with **F2 Focus**, and move the cursor on the package which includes the waveform file to be output with the direction key or rotary knob.
2. The list of waveform files is displayed. Select Pattern with **F2 Focus**, move the cursor on the waveform file to be output with the direction key or rotary knob, and press **F6 Select** to select the waveform file to be output.

The waveform pattern can be output with addition of AWGN. For the AWGN function, refer to 7.5 “AWGN”.

When “Preset” is done, the waveform file selection is released. However, the waveform pattern loaded into the waveform memory remains.

Example: To delete the waveform file from the waveform memory.

The explanation is provided below with the assumption that the Waveform Select function menu is displayed.

1. The list of waveform patterns is displayed in the **Waveform List to Play** dialog box. Select Package with **F2 Focus**, and move the cursor on the package which includes the waveform file to be deleted with the direction key or rotary knob.
2. The list of waveform files is displayed. Select Pattern with **F2 Focus**, move the cursor on the waveform file to be deleted with the direction key or rotary knob, and press **F1 Delete** in the page 2 of Waveform Select function menu to delete the waveform file.

Note:

Press **F2 Clear Memory** to delete all waveform files in the waveform memory A and B.

Even when the waveform file is deleted from the waveform memory, if the deleted waveform file remains in HDD/SSD, it can be loaded again.

Remote command

Query the waveform pattern name loaded into the waveform memory A/B

Query

```
:MEMory[1]|2:WAVeform:WMA|WMB|LONG|COMBination:NAME?
<ext_integer>
```

Response

```
<string1>,<string2>
```

Parameter

`<ext_integer>`	Random numbers allocated to waveform patterns.
Range	0 to (Number of waveform patterns in the waveform memory – 1)
Resolution	1
`<string1>`	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
`<string2>`	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')

Programming Example

To query the second waveform pattern name loaded in SG1 waveform memory A.

```
MEM:WAV:WMA:NAME? 2
> "WCDMA","TEST"
```

Remote command

Query the number of waveform patterns loaded in the waveform memory

Query

```
:MEMory[1]|2:WAVeform:WMA|WMB|LONG|COMBination:COUNt?
```

Response

```
<integer>
```

Parameter

<integer>	Number of waveform patterns loaded into waveform memory
Range	0 to 4096
Resolution	1

Programming Example

To query the number of waveform pattern files loaded into SG1 waveform memory A.

```
MEM:WAV:WMA:COUN?
> 2
```

Remote command

Query the waveform memory free space

Query

For the waveform memory A

```
:MEMory[1]|2:WAVeform:WMA:FREE?
```

For the waveform memory B

```
:MEMory[1]|2:WAVeform:WMB:FREE?
```

Response

```
<integer1>,<integer2>,<integer3>
```

Parameter

<integer1>	Free space (in byte)
<integer2>	Continuous free space (in byte)
<integer3>	Total waveform memory size (in byte)

Programming Example

To query the SG1 waveform memory A free space.

```
MEM:WAV:WMA:FREE?
> 1234567890,12345678,123456789
```

Moving cursor: Focus

Select or **Top**>**Mode**>**Select, >Focus**

Moves the cursor between Package/Pattern frames in the **Waveform List to Play** dialog box.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Focus** on the Waveform Select function menu for selection.

Package	Moves the cursor to Package List.
Pattern	Moves the cursor to Pattern List.

Switching subitem: Subitem

Select or **Top**>**Mode**>**Select, >Subitem**

Selects the display items of Subitem in **Waveform List to Play** dialog box from the Subitem function menu.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Subitem** on the Waveform Select function menu for selection.

F1 Status	Pattern type
F2 Comment Line1	Comment Line 1
F3 Comment Line2	Comment Line 2
F4 Comment Line3	Comment Line 3
F5 Version	Version number
F6 Size	File size
F7 Sampling Rate	Sampling frequency
F8 RMS Value	RMS value

Selecting waveform pattern: Select

Select or **Top**>**Mode**>**Select, >Select**

Selects the waveform pattern to be played from the waveform patterns loaded into the waveform memory.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Select** on the Waveform Select function menu to select the waveform pattern to be played.

Remote command

Select the waveform file to be played from the waveform patterns in the waveform memory

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB|LONG|COMBination:WAVeform <string1>,<string2>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB|LONG|COMBination:WAVeform?
```

Response

<string1>	"NONE" is returned when nothing is selected.
<string2>	"NONE" is returned when nothing is selected.

Parameter

<string1>	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
<string2>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')
WMA	Wave Memory A PatternCombination is automatically set to Edit.
WMB	Wave Memory B PatternCombination is automatically set to Edit.
LONG	Long Pattern PatternCombination is automatically set to Defined.
COMBination	Combination Pattern PatternCombination is automatically set to Defined.

Programming Example

To playback the combination file "RMC15k" in the package "WCDMA" on SG2.

```
SOUR2:RAD:ARB:COMB:WAV "W-CDMA","RMC15k"
SOUR2:RAD:ARB:COMB:WAV?
> "WCDMA","RMC15k"
SOUR2:RAD:ARB:LONG:WAV?
> "NONE","NONE"
```

Selecting waveform pattern: On Memory

Select or **Top**>**Mode**>**Select,** >**On Memory**

Switches the Memory of the waveform pattern information to be displayed in **Waveform List to Play** dialog box.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 On Memory** on the Waveform Select function menu to switch Memory A and B.

Note:

This is displayed when Combination Mode is set to Edit.

Delete

Select or **Top**>**Mode**>**Select,** >→>**Delete**

Deletes the specified waveform pattern in the waveform memory.

In MG3740A, this can be used only when option-020/120 is installed.

Select the waveform pattern to be deleted in the **Waveform List to Play** dialog box and press **F1 Delete** on page 2 of Waveform Select function menu to display the Confirmation function menu and to highlight only the waveform pattern to be deleted.
Press **F7 Confirm Delete** on the Confirmation function menu to execute the deletion.

Table 7.3.5-3 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Deletion	Deletes the waveform pattern.
	F8	Cancel	Returns the menu before this menu is opened.

Remote command **Delete the specified package and waveform file in the waveform memory**

Command

```
:MEMory[1]|2:DELete:WAVeform:WMA|WMB|LONG|COMBination:[:NAME] <string1>,<string2>
```

Parameter

<string1>	Package name Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')
<string2>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')

Details

This command does not delete waveform patterns on the hard disk/SSD.

Programming Example

To delete the pattern "TEST" in the package "WCDMA" in SG2 waveform memory A.

```
MEM2:DEL:WAV:WMA "WCDMA","TEST"
```

Clear Memory

Select or **Top**>**Mode**>**Select,** >→> **Clear Memory**

Deletes all patterns in the waveform memory. All patterns in both the waveform memory A and B are deleted.

In MG3740A, this can be used only when option-020/120 is installed.

Select the waveform pattern to be deleted in the **Waveform List to Play** dialog box and press **F2 Clear Memory** on page 2 of Waveform Select function menu to display the Confirmation function menu and to highlight only the waveform patterns to be deleted.
Press **F7 Confirm Delete** on the Confirmation function menu to execute the deletion.

Table 7.3.5-4 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Deletion	Deletes the waveform patterns.
	F8	Cancel	Returns the menu before this menu is opened.

Remote command

Delete all waveform patterns in the waveform memory

Command

```
:MEMory[1]|2:DELete:WAVeform:ALL
```

Details

This command does not delete waveform patterns on the hard disk/SSD.

Programming Example

To delete all waveform patterns in SG2 waveform memory.

```
MEM2:DEL:WAV:ALL
```

7.3.6 Copying external waveform pattern: Copy

Mode or **Top**>**Mode**,>**Copy**

Copies the waveform pattern of the external device such as USB flash drive to the internal HDD/SSD of MG3710A/MG3710E/MG3740A.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Copy** on the ARB/Waveform function menu to open the **Waveform List to Copy** dialog box and Waveform Copy function menu.

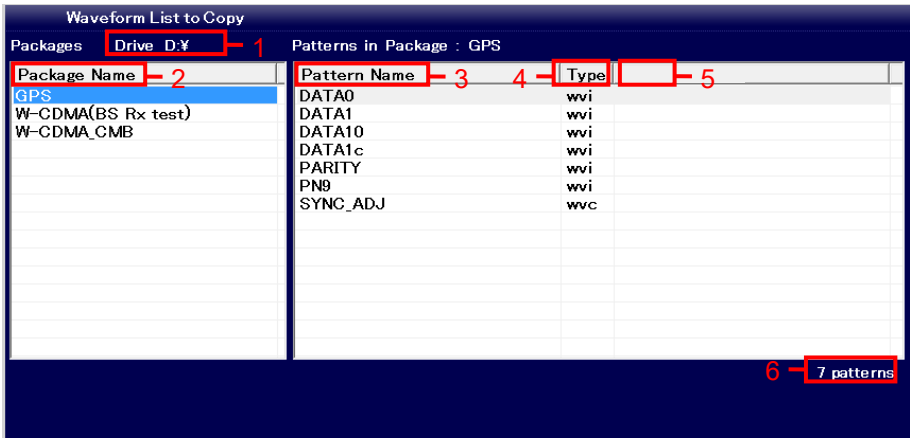


Figure 7.3.6-1 Waveform List to Copy Dialog Box

Table 7.3.6-1 Waveform List to Copy

No.	Display Example	Description
1	Drive C:	Drive number
2	Package Name	Package file name
3	Pattern Name	Pattern file name
4	Type	File type
5	Path	Location where pattern file saved
6	54 patterns	Number of patterns included in the selected package

Table 7.3.6-2 Waveform Copy Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C	Selects the copy source device for the waveform pattern.
	F2	Focus Package Pattern	Moves the cursor between Package/Pattern frames.
	F6	Copy Pattern/Package	Copies the selected waveform pattern to HDD/SSD.
	F7	Copy All Patterns/Packages	Copies all waveform files/packages to HDD/SSD.
	F8	To Drive C:	Sets the copy destination drive for the waveform file.

Example: To copy the waveform pattern of the external device such as USB flash drive to the specified drive.

The explanation is provided below with the assumption that the Waveform Copy function menu is displayed.

1. Press **F1 Drive** to select the device which includes the waveform pattern to be copied.
2. The list of waveform patterns is displayed in the **Waveform List to Copy** dialog box. Select Package with **F2 Focus**, and move the cursor on the waveform pattern to be copied with the direction key or rotary knob.
3. The list of waveform files of the selected package is displayed. Select Pattern with **F2 Focus**, and move the cursor on the waveform file to be copied with the direction key or rotary knob.

4 Press **F6 Copy Pattern** to copy the waveform file specified in Step 3 into the copy destination device.

Notes:

- Even when only the combination file is copied to the internal hard disk/SSD, if the pattern file specified with the combination file does not exist in the internal hard disk/SSD, the combination file cannot be loaded into the memory.
- When copying waveform file, copy the waveform file to the root directory of the target device, or make a sub-directory that bears the name of the package. See the example below.

  Example: Preparing waveform file ("test.wvi" or "test.wvd" – package name being "ABC") to be copied into the F drive.
  Copy the file into the following directory you are going to create, so that it will be:
  F:\test.wvi, F:\test.wvd
  or F:\ABC\test.wvi, F:\ABC\test.wvd
- Do not turn off the power while the waveform file is being copied.

Copy source drive: Drive

Mode or **Top**>**Mode**,>**Copy**>**Drive**

Selects the copy source drive for the waveform pattern.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Drive** on the Waveform Copy function menu to display the Drive function menu for selection.

Options	All connected Drives
Default	C

Moving cursor: Focus

Mode or **Top**>**Mode**,>**Copy**>**Focus**

Moves the cursor between Package/Pattern frames in the **Waveform List to Copy** dialog box.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Focus** on the Waveform Copy function menu for selection.

Package	Moves the cursor to Package List.
Pattern	Moves the cursor to Pattern List.

Switching subitem: Subitem

Mode or **Top**>**Mode**,>**Copy**>**Subitem**

Selects the display items of Subitem in **Waveform List to Copy** dialog box from the Subitem function menu.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Subitem** on the Waveform Copy function menu for selection.

F1 Status	Pattern type
F2 Comment Line1	Comment Line 1
F3 Comment Line2	Comment Line 2
F4 Comment Line3	Comment Line 3
F5 Version	Version number
F6 Size	File size
F7 Sampling Rate	Sampling frequency
F8 RMS Value	RMS value

Copy Pattern/Copy Package

Mode or **Top**>**Mode,** >**Copy**>**Copy Pattern/Copy Package**

Copies the selected waveform pattern of the specified drive to HDD/SSD.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Copy Pattern/Copy Package** on the Waveform Copy function menu for copy.

When Pattern is selected with **F2 Focus**, Copy Pattern is executed, and when Package is selected, Copy Package is executed.

Remote command

Copies the selected waveform pattern of the specified drive to HDD/SSD.

Command

To copy all waveform patterns in the specified folder.

```
:MMEMory:COPY:WAVeform:ALL
<device1>[,<string>|"ROOT"[,<device2>]]
```

To copy the combination file (wvc) or single pattern (wvi/wvd).
If there is a wvc/wvi with the same name, the combination file has priority.

```
:MMEMory:COPY:WAVeform
<device1>,<string>|"ROOT",<string1>[,<device2>]
```

To copy the single pattern file (wvi/wvd).
The combination file (wvc) cannot be copied with this command.

```
:MMEMory:COPY:WAVeform:SINGle
<device1>,<string>|"ROOT",<string1>[,<device2>]
```

Parameter

<device1>	Copy source drive drive C when omitted	A to Z,
<device2>	Copy destination drive drive C when omitted	A to Z,
<string>	Package name When omitted: all packages Character string within 31 characters enclosed by double quotes (" ") or single quotes (' ')	
"ROOT"	Root folder All packages when omitted.	
<string1>	Pattern name (excluding extensions) Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ')	

Programming Example

To copy all waveform patterns included in the package "WCDMA" in E drive to D drive.

```
MMEM:COPY:WAV:ALL E,"WCDMA",D
```

To copy the waveform file "TEST" included in the root folder in E drive to D drive.

```
MMEM:COPY:WAV E,"ROOT","TEST",D
```

To copy the single pattern file "TEST" included in the package "WCDMA" in E drive to C drive.

```
MMEM:COPY:WAV:SING E,"WCDMA","TEST"
```

Copy All Patterns/Copy All Packages

Mode or **Top**>**Mode**,>**Copy**>**Copy All Patterns**/**Copy All Packages**

Copies all waveform files/packages to HDD/SSD.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F7 Copy All Patterns/Copy All Packages** on the Waveform Copy function menu for copy. The progress bar and Progress function menu are displayed during execution.

When "Pattern" is selected with **F2 Focus**, Copy All Patterns is executed, and when "Package" is selected, Copy All Packages is executed.

Example: To copy the waveform files to HDD/SSD.

The explanation is provided below with the assumption that the Waveform Copy function menu is displayed.

1. Press **F1 Drive** to select the device which includes the waveform pattern to be copied.
2. The list of waveform patterns is displayed in the **Waveform List to Copy** dialog box. Select Package with **F2 Focus**, and move the cursor on the package which includes the waveform patterns to be copied with the direction key or rotary knob.
3. The list of waveform files of the selected package is displayed. Select Pattern with **F2 Focus**, and move the cursor on the waveform file to be copied with the direction key or rotary knob.

4 Press **F7 Copy All Patterns** on the Waveform Copy function menu to copy the waveform patterns.

Note:

Press **F7 Delete All** on the Waveform Copy function menu to delete all waveform patterns according to the setting with **F2 Focus** regardless of settings in Step 2 and 3.

5. The progress bar window is displayed during copying of pattern files.
6. When copying waveform patterns is finished, the progress bar window is closed.

Notes:

- When the deleted pattern file has been specified with the combination file, the combination file cannot be loaded into the memory any more.
- Do not turn off the power while the waveform pattern is being deleted.
- When the package is deleted, all waveform files included in the package are deleted.
- Note that the waveform pattern deleted from the internal hard disk/SSD cannot be recovered.

Setting copy destination drive: To Drive

Mode or **Top**>**Mode,** >**Copy**>**To Drive**

Sets the copy destination drive for the waveform file.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 To Drive** on the Waveform Copy function menu for setting.

7.3.7 RF Gate

Mode or **Top>Mode, >(→)>RF Gate**

Controls the RF output On/Off for the modulated wave to execute the pulse modulation. This function is used for the pulse modulation for the RF output when the burst signal such as TDMA is used. The RF On/Off control can be executed with the pulse modulation control bit (when Edit Mode = Off) added to the waveform pattern or user-specified interval/width (when Edit Mode = On/Sync).

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 RF Gate** on page 2 of ARB/Waveform function menu to open the RF Gate function menu.

Table 7.3.7-1 RF Gate Function Menu

Page	Key No.	Menu Display	Function
1	F1	RF Gate Off On	Enables/disables the RF Gate function.
	F2	Edit Mode Off On Sync	Sets the RF Gate edit function.
	F3	Type Single Double	Sets the number of RF Gate lines to be edited.
	F4	Offset 1 0.00	Sets Offset from the top output of Pattern to RF Gate1.
	F5	Width 1 1.00	Sets the RF Gate1 width.
	F6	Offset 2 0.00	Sets Offset for the RF Gate2 timing after Pattern top output.
	F7	Width 2 1.00	Sets the RF Gate2 width.
	F8	Cycle 1.00	Sets the cycle for RF Gate1 and RF Gate2. The cycle for RF Gate1 and RF Gate2 is common.

RF Gate

Mode or **Top**>**Mode**,>(→)>**RF Gate**>**RF Gate**

Enables/disables the RF Gate function.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 RF Gate** on the RF Gate function menu to set On/Off.

Off	RF Gate is not used. Constant output.
On	RF output On/Off control is executed with RF Gate (Default).

Remote command

Enable/disable the RF Gate function

Command

```
[:SOURce[1]|2]:RADio:ARB:RFGate <boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:RFGate?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	RF Gate function On/Off
OFF|0	RF Gate is not used. Constant output.
ON|1	RF output On/Off control is executed with RF Gate (Default).

Programming Example

To set the RF Gate function to On.

```
RAD:ARB:RFG ON
RAD:ARB:RFG?
> 1
```

Editing RF Gate: Edit Mode

Mode or **Top**>**Mode**,>(→)>**RF Gate**>**Edit Mode**

Enables/disables the RF Gate edit function.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Edit Mode** on the RF Gate function menu to set On/Off.

Off	RF Gate bit in Pattern is used. When both Pattern A and B have been selected, the RF Gate bit in Pattern A is used (Default).
On	RF Gate is edited. RF Gate frequency is set by the user. RF Gate bit in Pattern is disabled.

Sync	RF Gate is edited. RF Gate cycle synchronizes with the Pattern cycle. RF Gate bit in Pattern is disabled.

The MG3710A/MG3710E/MG3740A allows handling up to 16 bits of waveform data bit length. In this case, the RF Gate signal cannot be embedded in the waveform data; therefore, this function is used for editing.

If the RF Gate bit is not added to the waveform pattern, even setting the Edit Mode to Off does not allow the RF output On/Off control. The RF Gate bit can be added when the waveform pattern bit width is 14 or 15 bits.

For the method to add the bit to the waveform pattern, refer to the *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

Remote command

Enable/disable the RF Gate function

Command

```
[:SOURce[1]|2]:RADio:ARB:PULSe:EDIT[:STATe]
ON|OFF|PATSync
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PULSe:EDIT[:STATe]?
```

Response

<mode>	ON, OFF, or PATS

Parameter

<mode>	RF Gate edit function On/Off
OFF	RF Gate bit in Pattern is used. When both Pattern A and B have been selected, the RF Gate bit in Pattern A is used (Default).
ON	RF Gate is edited. RF Gate frequency is set by the user. RF Gate bit in Pattern is disabled.
PATSync	RF Gate is edited. RF Gate cycle synchronizes with the Pattern cycle. RF Gate bit in Pattern is disabled.

Programming Example

To set the RF Gate edit function to On (the cycle is set by the user).

```
RAD:ARB:PULS:EDIT ON
RAD:ARB:PULS:EDIT?
> ON
```

RF Gate line: Type

Mode or **Top**>**Mode,** >→>**RF Gate**>**Type**

Selects the number of RF Gate lines to be edited.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Type** on the RF Gate function menu for selection.

Single	The output signal is gated with one RF Gate (Default). Set RF Gate 1 with **F4**, **F5**, and **F8**.
Double	The output signal is gated with combined (OR) two RF Gate lines. Set two RF Gate 1/2 with **F4** to **F8**.

Remote command

Set the number of RF Gate lines to be edited

Command

```
[:SOURce[1]|2]:RADio:ARB:PULSe:TYPE SINGle|DOUBle
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PULSe:TYPE?
```

Response

<mode>	SING or DOUB

Parameter

<mode>	RF Gate edit function On/Off
SINGle	The output signal is gated with one RF Gate (Default).
DOUBle	The output signal is gated with combined (OR) two RF Gate lines.

Programming Example

To set the number of RF Gate lines to be edited to two lines.

```
RAD:ARB:PULS:TYPE DOUB
RAD:ARB:PULS:TYPE?
> DOUB
```

RF Gate offset 1/2: Offset 1/ Offset 2

Mode or **Top**>**Mode**,>(→)>**RF Gate**>**Offset 1/Offset 2**

Sets the offset from the top output of Pattern to RF Gate1/2.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Offset 1/F6 Offset 2** on the RF Gate function menu for setting.

Range	Lower limit	0
	Upper limit	(2^24 – 1) ÷ OverSampling A/B
Resolution	0.01	
Default	0	
Unit	SystemUnit A/B	
OverSampling A/B	Over sampling magnification ratio of the waveform data A/B	

Note:

The following are applied:
For Pattern A output: OverSampling A and SystemUnit A.
For Pattern B output: OverSampling B and SystemUnit B.
For Pattern A/B simultaneous output: OverSampling A and SystemUnit A.

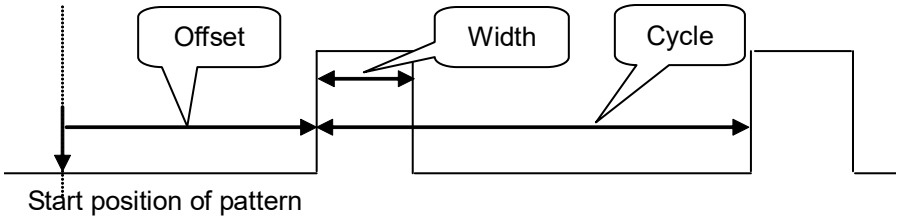


Figure 7.3.7-1 RF Gate Offset, Width, and Cycle

Remote command

Set the offset from the top output of Pattern to RF Gate1/2

Command

```
[:SOURce[1]|2]:RADio:ARB:PULSe[1]|2:EDIT:OFFSet
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PULSe[1]|2:EDIT:OFFSet?
```

Response

```
<ext_numeric>
```

Parameter

<ext_numeric>	Offset value from the top output of Pattern to RF Gate1/2	
Range	Lower limit	0
	Upper limit	(2^24 – 1) ÷ OverSampling A/B
Resolution	0.01	
Default	0	
Unit	SystemUnit A/B	
Suffix code	None	

Details

As for node :PULSe[1]|2, select RF Gate 1 or RF Gate 2. Set as follows:

RF Gate 1: :PULSe1 or :PULSe

RF Gate 2: :PULSe2

Programming Example

To set the RF Gate2 offset to 1.

```
RAD:ARB:PULS2:EDIT:OFFS 1
RAD:ARB:PULS2:EDIT:OFFS?
> 1.00
```

RF Gate width 1/2: Width 1/Width 2

Mode or **Top**>**Mode**,>(→)>**RF Gate**>**Width 1/Width 2**

Sets the RF Gate1/2 width.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F5 Width 1/F7 Width 2** on the RF Gate function menu for setting.

Setting range	
Minimum value	1 ÷ OverSampling A/B
Maximum value	When RF Gate Edit Mode1/2 is set to “On”, (2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places) or RF Gate Cycle, whichever smaller When RF Gate Edit Mode1/2 is set to “Sync”, (2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places) or DataPointA/B ÷ OverSampling A/B, whichever smaller
Resolution	0.01 [SystemUnit A/B]
Default	1
Unit	SystemUnit A/B

OverSampling A/B	Over sampling magnification ratio of the waveform data A/B
SystemUnit A/B	Data unit for each system (Symbol, Bit, Chip, and others)
DataPointA/B	Waveform pattern cycle

Note:

The following are applied:

When Pattern A is output,	OverSampling A, SystemUnit A.
When Pattern B is output,	OverSampling B, SystemUnit B.
When both A/B is output,	OverSampling A, SystemUnit A.

Remote command

Set the RF Gate1/2 width

Command

```
[:SOURce[1]|2]:RADio:ARB:PULSe[1]|2:EDIT:WIDTh
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PULSe[1]|2:EDIT:WIDTh?
```

Response

```
<ext_numeric>
```

Parameter

`<ext_numeric>`	RF Gate1/2 width

Setting range, resolution, and default

Refer to the above explanation.

Unit	SystemUnit A/B
Suffix code	None

Details

As for node `:PULSe[1]|2`, select RF Gate 1 or RF Gate 2. Set as follows:

RF Gate 1: `:PULSe1` or `:PULSe`

RF Gate 2: `:PULSe2`

Programming Example

To set the RF Gate1 width to 1.

```
RAD:ARB:PULS:EDIT:WIDT 1
RAD:ARB:PULS:EDIT:WIDT?
> 1.00
```

RF Gate cycle: Cycle

Mode or **Top**>**Mode**,>(→)>**RF Gate**>**Cycle**

Sets the cycle for RF Gate1 and RF Gate2. The cycle for RF Gate1 and RF Gate2 is common.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 Cycle** on the RF Gate function menu for setting.

Range	
Lower limit	1 ÷ OverSampling A/B
Upper limit	(2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places)
Resolution	0.01
Default	1
Unit	SystemUnit A/B
OverSampling A/B	Over sampling magnification ratio of the waveform data A/B
SystemUnit A/B	Data unit for each system (Symbol, Bit, Chip, and others)

Note:

The following are applied:

When Pattern A is output,	OverSampling A, SystemUnit A.
When Pattern B is output,	OverSampling B, SystemUnit B.
When both A/B is output,	OverSampling A, SystemUnit A.

Remote command

Set the cycle for RF Gate1 and RF Gate2

Command

```
[:SOURce[1]|2]:RADio:ARB:PULSe:EDIT:CYCLe <ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:PULSe:EDIT:CYCLe?
```

Response

```
<ext_numeric>
```

Parameter

<ext_numeric>	Cycle for RF Gate1 and RF Gate2
Range	1 ÷ OverSampling A/B to (2^24 – 1) ÷ OverSampling A/B
Resolution	0.01
Default	1
Unit	SystemUnit A/B
Suffix code	None

Programming Example

To set the cycle for RF Gate1 and RF Gate2 to 1.

```
RAD:ARB:PULS:EDIT:CYCL 1
RAD:ARB:PULS:EDIT:CYCL?
> 1.00
```

7.3.8 Start/Frame Trigger

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**

Sets the settings related to Start/Frame Trigger.
This is used to interlock the waveform pattern play operation with the external trigger input.

Press **F2 Start/Frame Trigger** on the ARB/Waveform function menu to open the Start/Frame Trigger function menu.

Table 7.3.8-1 Start/Frame Trigger Function Menu

Page	Key No.	Menu Display	Function
1	F1	Start/Frame Trigger Off On	Enables/disables the trigger to be used for Baseband signal output start. In MG3740A, this can be selected only when option-020/120 is installed.
	F2	Mode Start Frame	Selects the mode for the trigger to be used for Baseband signal output start. In MG3740A, this can be selected only when option-020/120 is installed.
	F3	Source Ext	Selects Start/Frame Trigger Source. In MG3740A, this can be selected only when option-020/120 is installed.
	F4	Delay 0.00	Sets the delay time from the Trigger input to RF signal output. In MG3740A, this can be selected only when option-020/120 is installed.
	F5	Edge Rise Fall	Sets the detection edge of Start/Frame trigger input. In MG3740A, this can be selected only when option-020/120 is installed.
	F6	Event Buffered Trig	Sets the trigger operation when Frame trigger is used. In MG3740A, this can be selected only when option-020/120 is installed. Refer to 7.3.9 “Setting Frame trigger operation: Event”.
	F7	Frame Count 1 Frame	Sets the number of frames to output when Frame trigger operation is executed. In MG3740A, this can be selected only when option-020/120 is installed. Refer to 7.3.10 “Frame Count”
	F8	Trigger Key	Generates Start/Frame Trigger manually. This is executable only from this menu. When SFTriggerSource is Trigger Key, executing this function applies the trigger.

Start/Frame Trigger

Mode or **Top**>**Mode,** >(→)>**Start/Frame Trigger**>**Start/Frame Trigger**

Enables/disables the trigger to be used for Baseband signal output start.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Start/Frame Trigger** on the Start/Frame Trigger function menu for setting.

Off	Does not use the trigger (Default).
On	Uses the trigger.

To output the signal in synchronization with the external trigger signal.

MG3710A/MG3710E/MG3740A allows output waveform patterns in synchronization with the trigger signal input from the external. The external trigger signal can be selected from the two types of Start Trigger to specify the waveform pattern output start position and Frame Trigger to specify the output timing for each burst when the burst signal is selected.

Also in the sequence mode, using Pattern Trigger allows specifying the element switching timing.

Start Trigger operation

In Start Trigger operation, after the waveform pattern is selected, output is started according to the rising timing of the first external trigger signal and continued. The second and later input external trigger signals are invalid. The relation between the external trigger signal and waveform pattern output can be set with Delay. When Delay is set to “0”, the waveform pattern is output 1 Frame (*) cycle behind which is determined with the waveform pattern after the external trigger signal rising.

*: 1 Frame cycle means values below.

(1) When the waveform pattern is generated with the use of Convert function of IQproducer™

The number of samples of 1 Frame is set with the settings of Burst Setting Frame Length (L_f) and Gap Length (L_g). 1 Frame cycle is $L_f + L_g$ which means the number of samples between 1 Frames.

Example: When the over sampling data of four times of W-CDMA is converted:

Frame Length = 3.84×10^6 [sample/s] × 0.01 [s] × 4 [Over sampling ratio] = 153600

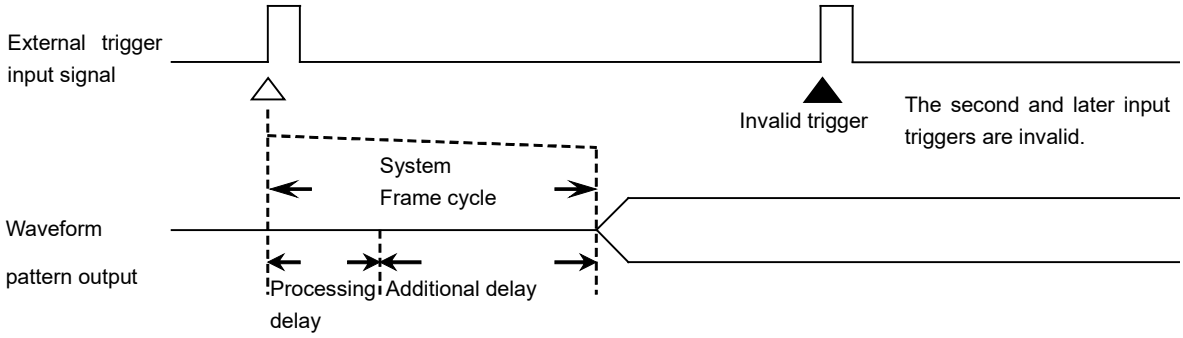
For details, refer to 4.5.3 “Editing Convert data” in the *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

(2) When the waveform pattern is generated with the application to generate the signal which is the option of IQproducer™

The frame length supporting each communications system is set automatically. In this case, the values of L_f and L_g change depending on whether the system used is for continuous waves or burst waves as follows:

- For continuous waves
  L_f = The number of samples for 1 Frame of the system is set.
  L_g = 0 is set.
- For burst waves
  L_f = The number of samples for 1 Slot or 1 Frame of the system is set.
  L_g = “The number of samples for 1 Frame”
  – “The number of samples for 1 Slot” or 0 is set.

The details for the above depend on systems; however, $L_f + L_g$ is the number of samples for 1 Frame determined with systems in each case.



* When Delay is set to 0, the waveform pattern is output Frame cycle and processing delay generated from trigger waveform pattern generation with internal delay (additional delay) behind.

* Frame cycle depends on systems. Refer to the operation manual for the selected waveform pattern.

Figure 7.3.8-1 Start Trigger Timing

Frame Trigger operation

In Frame Trigger operation, one frame of waveform pattern is output according to the rising timing of the external trigger signal. When the frame output is finished, it'll be in trigger wait state again. The relation between the external trigger signal and waveform pattern output is same as StartTrigger. The operation when Delay is set to "0" and the external trigger signal is input with Frame cycle is shown below.

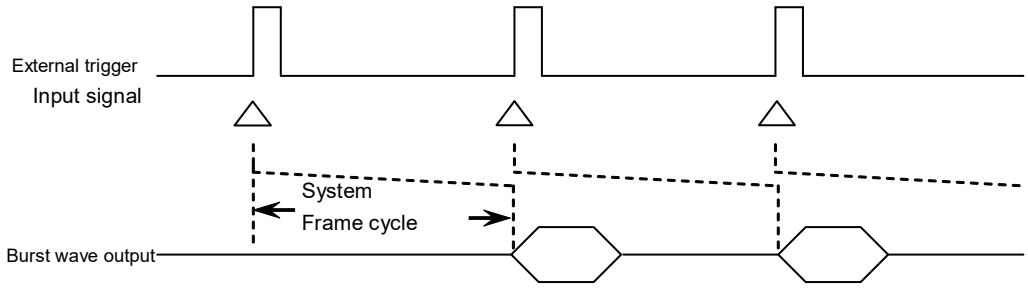


Figure 7.3.8-2 Frame Trigger Timing

When the external trigger signal input cycle is shorter than Frame cycle by N [sample] count or more, the external trigger signal is masked to be an invalid trigger and the burst wave corresponding to the trigger signal cannot be obtained.

$N\ [sample] = (L_f + L_g) - (L_f + 1)$

* For L_f and L_g, refer to Start Trigger in the previous section.
* When Delay is set to + side, Frame cycle is longer by the number of Samples set with Delay.
* The maximum value of N (N_{max}) can be calculated with the equation below according to the Interpolation Ratio (IPLR) determined with Sampling Clock (f_s).
* In the equation above, when N exceeds N_{max}, N is assumed to be N_{max}.

$N_{max} = 28/IPLR$

IPLR: 2^n value that satisfies $160\ MHz \geq IPLR \times f_s > 80\ MHz$
(n is an integer of 3 or higher)

However, for $f_s > 20$ MHz, IPLR is assumed to be 1.

Here, for example, when $L_f = 140$ symbol, $L_g = 280$ symbol, and Sampling Clock = 50 MHz, the right side of N equation above exceeds N_{max}; therefore, N = 28 is assumed, and the trigger input with the cycle which is shorter than Frame cycle ($L_f + L_g$) by 28 samples or more is invalid.

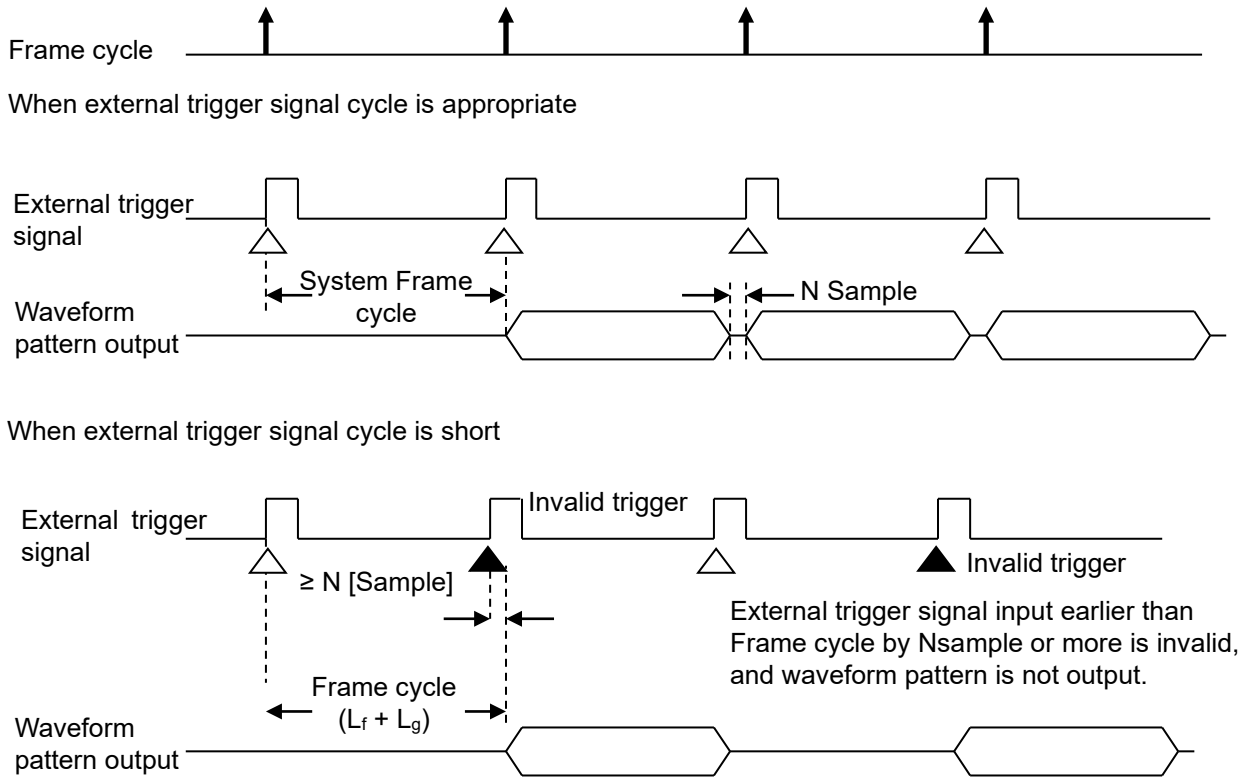


Figure 7.3.8-3 Frame Trigger Cycle

Remote command **Enable/disable the trigger to be used for Baseband signal output start**

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger[:STATe] <boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Trigger On/Off
ON|1	On
OFF|0	Off

Programming Example

To set trigger to On.

```
RAD:ARB:TRIG ON
RAD:ARB:TRIG?
> 1
```

Trigger mode: Mode

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Mode**

Selects the operation mode for the trigger to be used for Baseband signal output start.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Mode** on the Start/Frame Trigger function menu for selection.

Start	Start Trigger (Default)
Frame	Frame Trigger

Remote command

Set the operation mode for the trigger to be used for Baseband signal output start

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:MODE STARt|FRAMe
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:MODE?
```

Response

<mode>	STAR or FRAM

Parameter

<mode>	External trigger operation mode
STARt	Start trigger
FRAMe	Frame trigger

Programming Example

To set the operation mode for the external trigger to Start trigger.

```
RAD:ARB:TRIG:MODE STAR
RAD:ARB:TRIG:MODE?
> STAR
```

Trigger source: Source

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Source**

Selects Start/Frame Trigger Source.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Source** on the Start/Frame Trigger function menu to open the S/F Trigger function menu for selection of the trigger source.

Ext (External)	SG1: Input signal of the terminal allocated to SG1 S/F Trigger (Start/Frame Trigger for SG1) (Default) SG2: Input signal of the terminal allocated to SG2 S/F Trigger (Start/Frame Trigger for SG2) (Default) Refer to 7.4 “Route Connectors” for the allocated terminal.
Trigger Key	Press **F8 Trigger Key**.
Bus	Receives remote command * TRG.
Sync to SG1	The start of SG1 and SG2 signals are synchronized with the use of the same trigger source as SG1. If SG1 is freerun, they cannot be synchronized (Valid only with SG2).

Remote command

Select Start/Frame Trigger Source

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:SOURce KEY|EXT|BUS|SYNC
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:SOURce?
```

Response

```
<source>
```

Parameter

<source>	Trigger signal source
KEY	Press **F8 Trigger Key.**
EXT	SG1: Input signal of the terminal allocated to SG1 S/F Trigger (Start/Frame Trigger for SG1) (Default) SG2: Input signal of the terminal allocated to SG2 S/F Trigger (Start/Frame Trigger for SG2) (Default) Refer to 7.4 “Route Connectors” for the allocated terminal.
BUS	Receives remote command * TRG.
SYNC	The start of SG1 and SG2 signals are synchronized with the use of the same trigger

source as SG1. If SG1 is freerun, they cannot be synchronized (Valid only with SG2).

Programming Example

To set the trigger signal source to Trigger Key.

```
RAD:ARB:TRIG:SOUR KEY
RAD:ARB:TRIG:SOUR?
> KEY
```

Delay

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Delay**

Sets the delay time from the Trigger input to RF signal output.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Delay** on the Start/Frame Trigger function menu for setting.

Range	Varies depending on the selected waveform pattern.
Resolution	0.01 [SystemUnit]
Default	0
SamplingClock	Baseband signal output sampling clock Sampling Clock
SamplingRate	Sampling rate Sampling RateA/B
OverSampling	Over sampling magnification ratio of the waveform data
SystemUnit	Data unit for each system (Symbol, Bit, Chip, and others)

Remote command

Set the delay time from the Trigger input to RF signal output

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:DELay <ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:DELay?
```

Response

```
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:DELay:TIME?
```

Response

<time> Unit: s

Parameter

<ext_numeric>	Start trigger delay time
Range	Varies depending on the selected waveform pattern.
Resolution	0.01
Default	0
Unit	SystemUnit
Suffix code	None
<time>	Start trigger delay time
Unit	s
Resolution	1 ps

Programming Example

To set the start trigger delay time to 30 SystemUnit.

```
RAD:ARB:TRIG:DEL 30
RAD:ARB:TRIG:DEL?
> 30.00
RAD:ARB:TRIG:DEL:TIME?
> 3E-06
```

Detection edge: Edge

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Edge**

Sets the detection edge of Start/Frame trigger input.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F5 Edge** on the Start/Frame Trigger function menu for selection.

Options

Rise	The trigger is applied at the signal rising edge (Default).
Fall	The trigger is applied at the signal falling edge.

Remote command

Set the detection edge of Start/Frame trigger input

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:SLOPe POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:SLOPe?
```

Response

<edge> POS or NEG

Parameter

<edge>	Trigger input detection edge
POSitive	Rise, signal rising edge (Default)
NEGative	Fall, signal falling edge

Programming Example

To set the external trigger polarity to Fall.

```
RAD:ARB:TRIG:SLOP NEG
RAD:ARB:TRIG:SLOP?
> NEG
```

Trigger Key

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Trigger Key**

Generates Start/Frame Trigger manually. This is executable only from this menu. It is enabled only when Trigger Key is set with **F3 Source**.

Press **F8 Trigger Key** on the Start/Frame Trigger function menu to apply the trigger.

7.3.9 Setting Frame trigger operation: Event

Mode or **Top**>**Mode**,>(→)>**Start/Frame Trigger**>**Event**

Frame trigger has four types of operations. The trigger operation when it is used is set.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F6 Event** on the Start/Frame Trigger function menu to open the S/F Trigger Event function menu for selection.

Options

No Retrigger	The trigger received during pattern output is ignored (Default).
Buffered Trig	The trigger received during pattern output is waited until the current pattern output is completed, and after completion the next frame is output.
Restart on Trig	The pattern is immediately restarted with the trigger received during pattern output.

Remote command

Set the trigger operation when Frame trigger is used

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:RETRigger
BUFFered|NORetrig|RESTart
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:RETRigger?
```

Response

<mode>	BUFF, NOR, or REST

Parameter

<mode>	Trigger operation when Frame trigger is used
NORetrig	Triggers received during pattern output are ignored (Default).
BUFFered	The trigger received during pattern output is waited until the current pattern output is completed, and after completion the next frame is output.
RESTart	The pattern is immediately restarted with the trigger received during pattern output.

Programming Example

To set the trigger operation when Frame trigger is used to No Retrigger.

```
RAD:ARB:TRIG:RETR NOR
RAD:ARB:TRIG:RETR?
> NOR
```

Operation description

The trigger operations are described below.

No Retrigger

When Frame Trigger is received in the section where the pattern signal output is not finished and the second pattern start position is in the section where the first pattern signal output is not finished, the second pattern output is not executed, and the trigger is discarded.

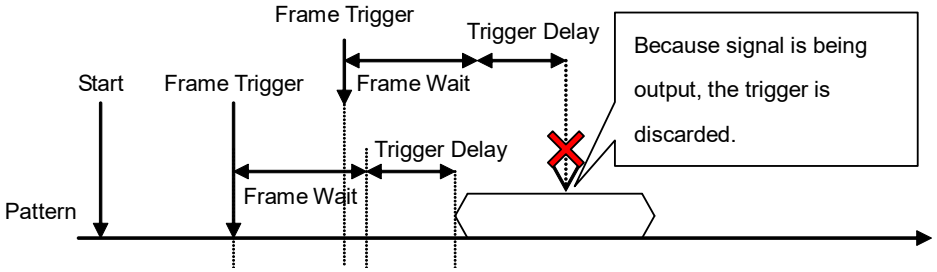


Figure 7.3.9-1 Frame Trigger No Retrigger

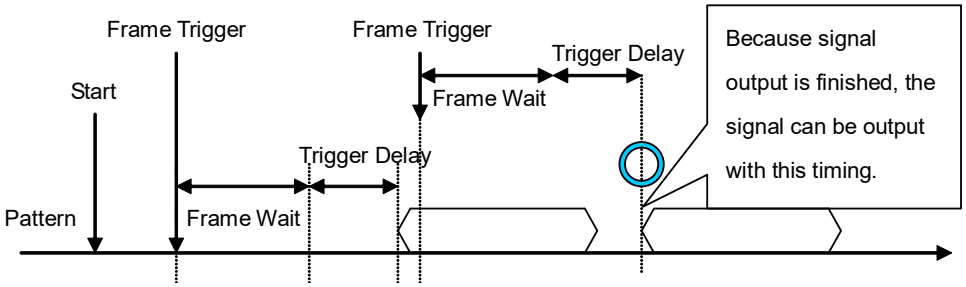


Figure 7.3.9-2 Frame Trigger No Retrigger

Buffered Trigger

When Frame Trigger is received in the section where the pattern signal output is not finished, the second pattern start position is placed to meet the first pattern finish position for output to avoid pattern output overlap.

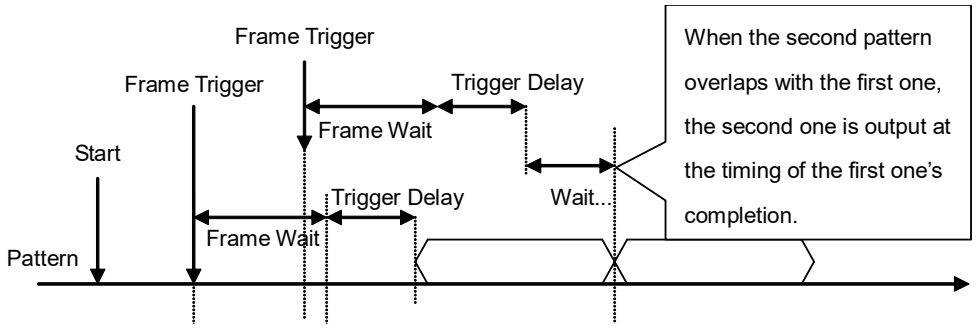


Figure 7.3.9-3 Frame Trigger Buffered Trigger

Restart on Trigger

When Frame Trigger is received in the section where the pattern signal output is not finished and patterns are to be overlapped, the first pattern output is stopped, and the second pattern is overwritten.

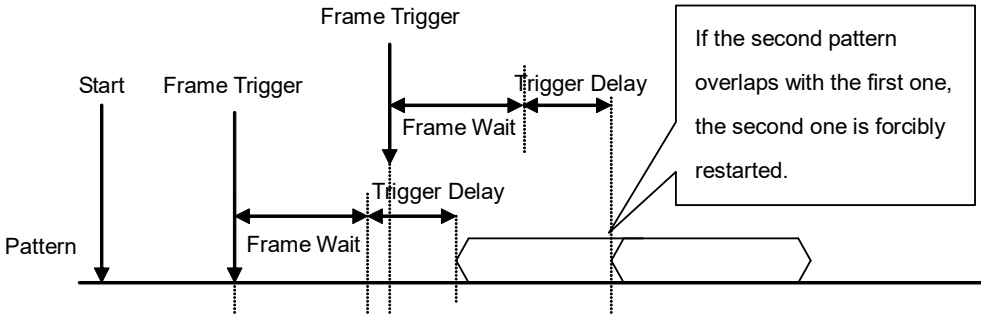


Figure 7.3.9-4 Frame Trigger Restart on Trigger

Note:

Trigger inputs on output wait in each mode above are queued, and output is judged sequentially. The queue size is 16384 (= 2^14). If the trigger is input beyond the size, the trigger is discarded. 2^14 is the size which allows all triggers of 10 ms cycle when Delay is the maximum.

7.3.10 Frame Count

Mode or **Top**>**Mode**, >(→)>**Start/Frame Trigger**>**Frame Count**

Sets the number of frames to output when Frame trigger is input during Frame trigger operation.
This is enabled when the trigger mode is set to Frame.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F7 Frame Count** on the Start/Frame Trigger function menu for setting.

Remote command

Set the number of frames to output when Frame trigger is input

Command

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:FRAMe:COUNt <integer>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:TRIGger:FRAMe:COUNt?
```

Response

```
<integer>
```

Parameter

<integer>	Output Frame Number
Range	1 to 32767
Resolution	1
Default	1
Unit	Frame
Suffix code	None

Programming Example

To set 1000 to the number of frames to output when Frame trigger is input.

```
RAD:ARB:TRIG:FRAM:COUN 1000
RAD:ARB:TRIG:FRAM:COUN?
> 1000
```

Refer to the following pages for the Frame Count operation.

When Event is No Retrigger

When Frame Trigger is received in the section where the pattern signal output for the number of frames, which is set to Frame Count, is not finished and the second pattern start position is in the section where the first pattern signal output is not finished, the second pattern output is not executed, and the trigger is discarded. The frame numbering of the second pattern is continued from the first pattern.

The following figure shows an example of when the Frame Count is set to 4.

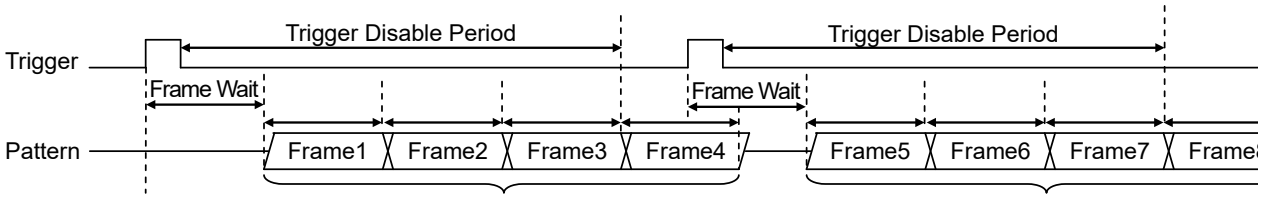


Figure 7.3.10-1 Frame Trigger No Retrigger

When Event is Buffered Trigger

When Frame Trigger is received in the section where the pattern signal output for the number of frames, which is set to Frame Count, is not finished, the second pattern start position is placed to meet the first pattern finish position for preventing pattern outputs from overlapping each other. The frame numbering of the second pattern is continued from the first pattern.

The following figure shows an example of when the Frame Count is set to 3.

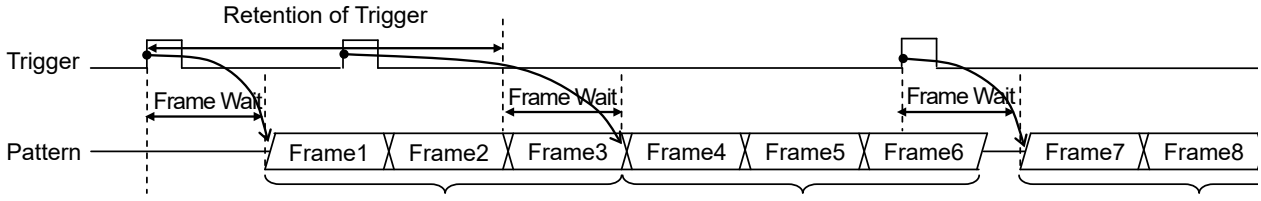


Figure 7.3.10-2 Frame Trigger Buffered Trigger

When Event is Restart on Trigger

When Frame Trigger is received in the section where the pattern signal output for the number of frames, which is set to Frame Count, is not finished, the first pattern output is stopped, and the second pattern is overwritten. The frame numbering of the second pattern begins at the sum of “Frame number at which the output starts” and “Frame Count setting”.

The following figure shows an example of when the Frame Count is set to 3.

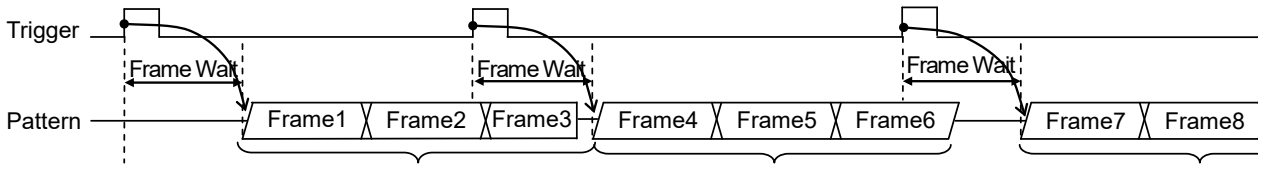


Figure 7.3.10-3 Frame Trigger Restart on Trigger

To add two waves

When combining two signals, each of pattern signals A and B is outputted at its frame length by the number of frames set to Frame Count. At this time, the Trigger Disable period (When Event is No Retrigger) or the Trigger Retention period (When Event is Buffered on Trigger) is established according to the pattern with longer frame length. If one pattern signal with shorter frame length has been output within shorter time, this function holds the final sample level and adds it to the other pattern signal in order to output a combined wave.

The following figure shows an example of when the Frame Count is set to 3.

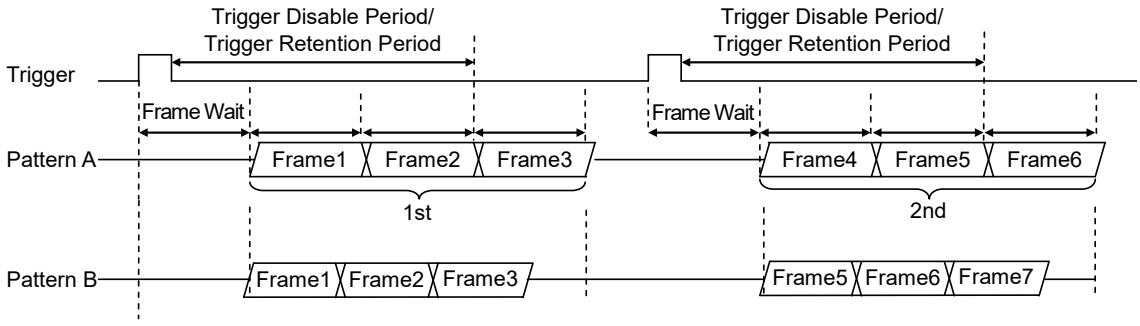


Figure 7.3.10-4 Frame Trigger to add two waves

7.3.11 Baseband Clock

Mode or **Top**>**Mode,** >→>**Baseband Clock**

Sets the settings related to Baseband Clock.
This cannot be used in MG3740A.

The Baseband Clock function menu is used when the external reference clock is input to be used for Baseband. The arbitrary Sampling Clock can be generated because the input clock is divided with the divider within the hardware.

This function is used when the 1.2288 MHz multiplication clock is to be the reference signal like the CDMA2000 base station or when the synchronized signals are to be output with the use of the same clock source like MINO.

Press **F3 Baseband Clock** on page 2 of ARB/Waveform function menu to open the Baseband Clock function menu.

Table 7.3.11-1 Baseband Clock Function Menu

Page	Key No.	Menu Display	Function
1	F1	Source Int	Selects the Baseband Reference Clock signal source.
	F2	Division 1/2	Sets the division ratio for the external input Clock for generation of Baseband Reference Clock.
	F3	Out Off On	Sets the Baseband clock reference to Off (not to be output) or On (to be output).

Clock source: Source

Mode or **Top**>**Mode,** >→>**Baseband Clock**>**Source**

Selects the Baseband Reference Clock signal source.

This cannot be used in MG3740A.

Press **F1 Source** on the Baseband Clock function menu to open the Baseband Clock Source function menu for selection of the signal source.

This is an independent parameter for each SG. It can be set in the modulation output status (when waveform selection is Mod = On).

For SG1	
Int	The internal signal source is the reference (Default).
Ext	The clock input from the rear panel BB REF Clock Input is the reference. Used for inputting DUT clock or others.
Ext(BB Ref Sync)	The clock input from the rear panel BB REF Clock Input is the reference. Used for synchronization for multiple MG3710A/MG3710Es. BB REF Clock Output of MG3710A/MG3710E must be input as the reference.
For SG2	
Int	The internal signal source is the reference (Default).
Sync with 1st SG	Baseband clock used by SG1 is the reference.

Remote command

Select the Baseband Reference Clock signal source

Command

```
[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence[:SOURce]
INTernal|EXTernal|EXTSync|SYNC
```

Query

```
[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence[:SOURce]?
```

Response

<source>	INT, EXT, EXTS, or SYNC

Parameter

<source>	Baseband signal reference clock
INTernal	Int (Default)
EXTernal	Ext
EXTSync	Ext (BB Ref Sync)
SYNC	Sync with 1st SG

Programming Example

To set the baseband signal reference clock to Ext.

```
RAD:ARB:CLOC:REF EXT
RAD:ARB:CLOC:REF?
> EXT
```

Clock division ratio: Division

Mode or **Top**>**Mode**,>(→)>**Baseband Clock**>**Division**

Sets the division ratio for the external input Clock for generation of Baseband Reference Clock.

This cannot be used in MG3740A.

Press **F2 Division** on the Baseband Clock function menu to open the Baseband Clock Division function menu for selection of the division ratio.

Range Refer to the table below.

Table 7.3.11-2 Baseband Reference Clock Division

Sampling Rate [MHz]	Baseband Reference Clock Division setting range								
	16	8	4	2	1	1/2	1/4	1/8	1/16
0.02 ≤ f ≤ 0.048828125	√	√	√	√	√				
0.048828125 < f ≤ 0.09765625	√	√	√	√	√	√			
0.09765625 < f ≤ 0.1953125	√	√	√	√	√	√	√		
0.1953125 < f ≤ 0.390625	√	√	√	√	√	√	√	√	
0.390625 < f ≤ 3.125	√	√	√	√	√	√	√	√	√
3.125 < f ≤ 6.25		√	√	√	√	√	√	√	√
6.25 < f ≤ 12.5			√	√	√	√	√	√	√
12.5 < f ≤ 25				√	√	√	√	√	√
25 < f ≤ 50					√	√	√	√	√
50 < f ≤ 100						√	√	√	√
100 < f ≤ 200							√	√	√

Default 1 or within the heavy lines in the table above

Remote command

Set the division ratio for the external input Clock

Command

```
[:SOURce[1]]:RADio:ARB:CLOCk:REFerence:DIVision
SIXTeenth|EIGHth|QUARter|HALF|X1|X2|X4|X8|X16
```

Query

```
[:SOURce[1]]:RADio:ARB:CLOCk:REFerence:DIVision?
```

Response

<clock>	SIXT, EIGH, QUAR, HALF, X1, X2, X4, X8, or X16

Parameter

<clock>	Baseband signal reference clock
SIXTeenth	Sampling Clock × 1/16
EIGHth	Sampling Clock × 1/8
QUARter	Sampling Clock × 1/4
HALF	Sampling Clock × 1/2
X1	Sampling Clock × 1
X2	Sampling Clock × 2
X4	Sampling Clock × 4
X8	Sampling Clock × 8
X16	Sampling Clock × 16

The setting range is described in Table 7.3.11-2 “Baseband Reference Clock Division”.

Programming Example

To set the baseband signal reference clock frequency to sampling clock × 2.

```
RAD:ARB:CLOC:REF:DIV X2
RAD:ARB:CLOC:REF:DIV?
> X2
```

Clock output: Out

Mode or **Top**>**Mode,** >→>**Baseband Clock**>**Out**

Enables/disables the Baseband clock reference output.

This cannot be used in MG3740A.

Press **F3 Out** on the Baseband Clock function menu for setting.

This is a shared parameter for each SG. This can be set when SG1 (when one SG is installed) or SG2 (when two SGs are installed) is in the modulation output status (when selecting a waveform and setting Mod to On).

Setting range

Off	Does not output the Baseband clock reference (Default).
On	Outputs the Baseband clock reference.

Remote command

Output the Baseband clock reference

Command

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:OUTPut <boolean>
```

Query

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:OUTPut?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Frequency relative display On/Off
`OFF|0`	Does not output the Baseband clock reference (Default).
`ON|1`	Outputs the Baseband clock reference.

Programming Example

To output the Baseband clock reference.

```
RAD:ARB:CLOC:REF:OUTP ON
RAD:ARB:CLOC:REF:OUTP?
> 1
```

Sampling Clock

Queries the Baseband signal output sampling clock.
This is a function only with a remote command.

Remote command

Query the baseband signal sampling clock

Query

```
[:SOURce]:RADio:ARB:SCLock:RATE?
```

Response

<freq>	Unit: Hz

Parameter

<freq>	Sampling clock
Range	140 MHz to 200 MHz
Resolution	0.001 Hz

Programming Example

To query the sampling clock.

```
RAD:ARB:SCL:RATE?
>140000000.000
```

7.3.12 Marker Setup

Mode or **Top**>**Mode,** >(→)>**Marker Setup**

Sets the settings related to Marker.

In MG3740A, this can be used only when option-020/120 is installed.

The Marker function is used as the trigger out function when the waveform pattern specified positions (the top of Frame, top of burst, or others) are to be used as triggers.

Press **F4 Marker Setup** on the ARB/Waveform function menu to open the **Marker Setup** dialog box and Marker Setup function menu.

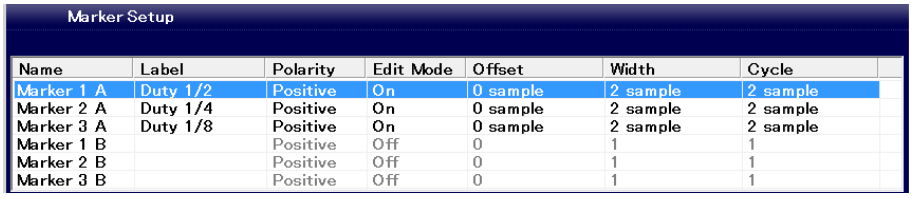


Figure 7.3.12-1 Marker Setup Dialog Box

Marker 1 to 3 indicate Marker number, and A and B indicate the waveform Pattern A and B.

Table 7.3.12-1 Marker Setup Function Menu

Page	Key No.	Menu Display	Function
1	F1	Marker 1 A	Displays Marker 1 A Setup function menu.
	F2	Marker 2 A	Displays Marker 2 A Setup function menu.
	F3	Marker 3 A	Displays Marker 3 A Setup function menu.
	F4	Marker 1 B	Displays Marker 1 B Setup function menu.
	F5	Marker 2 B	Displays Marker 2 B Setup function menu.
	F6	Marker 3 B	Displays Marker 3 B Setup function menu.

Press **F1 Marker 1 A** to **F6 Marker 3 B** on the Marker Setup function menu to open each corresponding Marker Setup function menu.

Set the selected waveform Pattern Marker output (output from the rear panel AUX connector). Marker 1 A Setup function menu is described in the table below.

Table 7.3.12-2 Marker 1 A Function Menu

Page	Key No.	Menu Display	Function
1	F1	Edit Mode Off On Sync	Enables/disables the Marker 1 edit function. When set to On/Sync, Marker bit in Pattern is disabled.
	F2	Offset 0.00	Sets Offset from the top output of Pattern to Marker 1 output timing.
	F3	Width 1.00	Sets the output width of Marker 1.
	F4	Cycle 1.00	Sets the output cycle of Marker 1.
	F8	Polarity Positive Negative	Sets the output polarity of Marker 1.

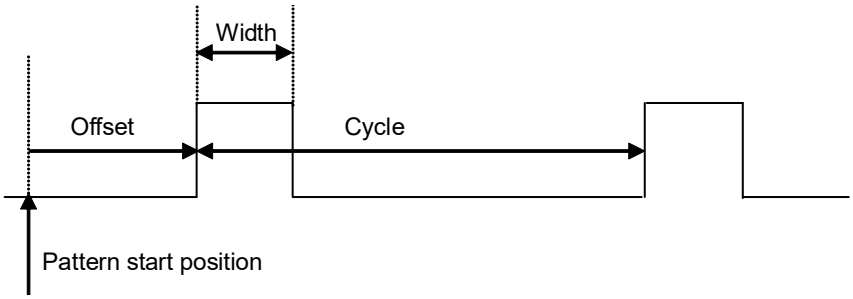


Figure 7.3.12-2 Offset, Width, Cycle

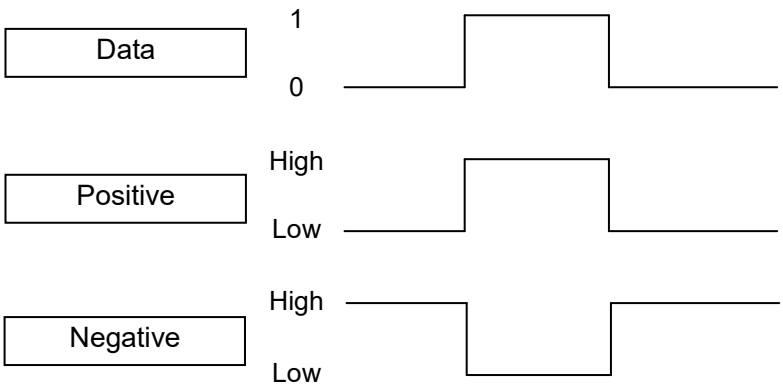


Figure 7.3.12-3 Polarity

Edit Mode

Mode or **Top**>**Mode,** >→>**Marker Setup**>**Marker 1/2/3 A(B)**>**Edit Mode**

Enables/disables the Marker 1 edit function. When set to On/Sync, Marker bit in Waveform Pattern is disabled.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Edit Mode** on the Marker 1/2/3 A(B) function menu for setting.

On	Edits the Marker position. Also Marker cycle is set by the user.
Off	Uses Marker bit in pattern. (Default).
Sync	Edits the Marker position. Marker cycle synchronizes with the Pattern cycle.

Notes:

- For the method to edit Marker bit in the pattern, refer to *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.
- OFF can be specified for Marker 1, 2, and 3 only if a waveform pattern that consists of 14-bit resolution IQ data is selected. If a 15-bit or 16-bit resolution waveform pattern is selected, the following restrictions apply:
  15-bit resolution: Markers 2 and 3 cannot be set to `OFF|0`.
  16-bit resolution: Markers 1 to 3 cannot be set to `OFF|0`.

Remote command

Enable/disable the Marker 1/2/3 edit function

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT[:STATe] <boolean>|PATSync
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT[:STATe]?
```

Response

`<mode>` `0`, `1`, or `PATS`

Parameter

<mode>	User setting mode
ON|1	Outputs the user setting marker.
OFF|0	Outputs the marker previously recorded in the waveform pattern.
PATSync	Outputs the marker at the start of the waveform pattern.

Details

OFF|0 can be specified for Marker 1, 2, and 3 only if a waveform pattern that consists of 14-bit resolution IQ data is selected. If a 15-bit or 16-bit resolution waveform pattern is selected, the following restrictions apply:

15-bit resolution: Markers 2 and 3 cannot be set to OFF|0.

16-bit resolution: Markers 1 to 3 cannot be set to OFF|0.

Programming Example

To set Marker 2 in Pattern A to user setting.

```
RAD:ARB:WMA:MARK2:EDIT ON
RAD:ARB:WMA:MARK2:EDIT?
> 1
```

Offset

Mode or **Top**>**Mode,** >→>**Marker Setup**>**Marker 1/2/3 A(B)**>**Offset**

Sets Offset from the top output of Waveform Pattern to Marker output timing.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Offset** on the Marker 1/2/3 A(B) function menu for setting.

Setting range	
Lower limit	0
Upper limit	(2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places)
Resolution	0.01 [System Unit A/B]
Default	0
OverSampling A/B	Over sampling magnification ratio of the waveform data A/B
System Unit A/B	Data unit for each system (Symbol, Bit, Chip, and others)

Remote command

Set Offset from the top output of Waveform Pattern to Marker 1/2/3 output timing

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT:OFFSet
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT:OFFSet
?
```

Response

```
<ext_numeric>
```

Parameter

`<ext_numeric>`	Starting offset value
Setting range, resolution, and default	
	Refer to the above explanation.
Unit	SystemUnit A/B
Suffix code	None

Programming Example

To set the starting offset of Marker 2 of Waveform Pattern A to 100.

```
RAD:ARB:WMA:MARK2:EDIT:OFFS 100
RAD:ARB:WMA:MARK2:EDIT:OFFS?
> 100.00
```

Output width: Width

Mode or **Top**>**Mode, >**(→)**>Marker Setup**>**Marker 1/2/3 A(B)**>**Width**

Sets the output width of Marker.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Width** on the Marker 1/2/3 A(B) function menu for setting.

Setting range

Lower limit	1 ÷ OverSampling A/B
	(Rounded off to two decimal places)

Upper limit	When Marker1/2/3 Edit ModeA/B is set to "On": (2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places) or Marker1/2/3 CycleA/B, whichever smaller When Marker1/2/3 Edit ModeA/B is set to "Sync": (2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places) or DataPointA/B ÷ OverSampling A/B, whichever smaller
Resolution	0.01 [System Unit A/B]
Default	1
OverSampling A/B	Over sampling magnification ratio of the waveform data A/B
System Unit A/B	Data unit for each system (Symbol, Bit, Chip, and others)
DataPointA/B	Waveform pattern cycle

Remote command

Set the Marker 1/2/3 output pulse width

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT:WIDTh
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT:WIDTh?
```

Response

```
<ext_numeric>
```

Parameter

<ext_numeric>	Pulse width
Setting range, resolution, and default	Refer to the above explanation.
Unit	SystemUnit A/B
Suffix code	None

Programming Example

To set the pulse width of Marker 2 of Waveform Pattern A to 50.

```
RAD:ARB:WMA:MARK2:EDIT:WIDT 50
RAD:ARB:WMA:MARK2:EDIT:WIDT?
> 50.00
```

Cycle

Mode or **Top**>**Mode,** >(→)>**Marker Setup**>**Marker 1/2/3 A/B**>**Cycle**

Sets the output cycle of Marker.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Cycle** on the Marker 1/2/3 A(B) function menu for setting.

Setting range	
Lower limit	1 ÷ OverSampling A/B (Rounded off to two decimal places)
Upper limit	(2^24 – 1) ÷ OverSampling A/B (Rounded off to two decimal places)
Resolution	0.01 [System Unit A/B]
Default	1
OverSampling A/B	Over sampling magnification ratio of the waveform data A/B
System Unit A/B	Data unit for each system (Symbol, Bit, Chip, and others)

Remote command

Set the Marker 1/2/3 output cycle

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer|2|3:EDIT:CYCLe
<ext_numeric>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer1|2|3:EDIT:CYCLe?
```

Response

```
<ext_numeric>
```

Parameter

`<ext_numeric>`	Output pulse cycle
Setting range, resolution, and default	Refer to the above explanation.
Unit	SystemUnit A/B
Suffix code	None

Programming Example

To set the output pulse cycle of Marker 2 of Waveform Pattern A to 200.

```
RAD:ARB:WMA:MARK2:EDIT:CYCL 200
RAD:ARB:WMA:MARK2:EDIT:CYCL?
> 200.00
```

Polarity

Mode or **Top**>**Mode,** >(→)>**Marker Setup**>**Marker 1/2/3 A/B**>**Polarity**

Sets the output polarity of Marker.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 Polarity** on the Marker 1/2/3 A(B) function menu for setting.

Positive	Positive polarity (Default)
Negative	Negative polarity

Remote command

Set the Marker 1/2/3 output polarity

Command

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer|2|3:POLarity
POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:RADio:ARB:WMA|WMB:MARKer|2|3:POLarity?
```

Response

<polarity>	POS or NEG

Parameter

<polarity>	Polarity
POSitive	Positive (Positive polarity)
NEGative	Negative (Negative polarity)

Programming Example

To set the polarity of Marker 2 of Waveform Pattern A to Negative.

```
RAD:ARB:WMA:MARK2:POL NEG
RAD:ARB:WMA:MARK2:POL?
> NEG
```

7.3.13 Sequence Mode

Mode or **Top>Mode, >(→)>Sequence Mode**

Sequence Mode is to play the waveform patterns in the specified sequence.

In MG3740A, this can be used only when option-020/120 is installed.

For the creation method for combination files for Sequence Mode, refer to *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

Press **F7 Sequence Mode** on page 2 of ARB/Waveform function menu to open the **Sequence Progress** dialog box and Sequence Mode function menu.

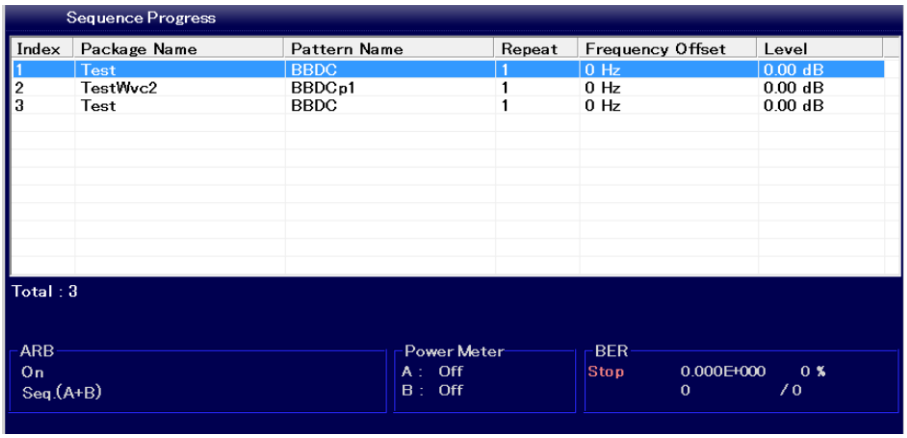


Figure 7.3.13-1 Sequence Progress Dialog Box

Index	Element (each element of Sequence Mode) number
Package Name	Package name
Pattern Name	Pattern file name
Repeat	Repetition count of the element
Frequency Offset	Frequency offset of the element based on Baseband center frequency
Level	Level ratio of each element When Add Pattern is not set, the element of the highest output level becomes the reference. When Add Pattern is set, the output level of Add Pattern becomes the reference.
Total	Displays the number of elements in Sequence Mode.

Note:

For Add Pattern, refer to 4.8.2 "Combination File Edit screen" in *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)*.

Table 7.3.13-1 Sequence Mode Function Menu

Page	Key No.	Menu Display	Function
1	F1	Next Pattern	Proceeds with the elements of the sequence mode to the next element.
	F2	Sequence Restart	Restarts the elements from the top in the sequence mode.
	F3	Play Mode Auto Manual	Selects the play mode for elements of the sequence mode.
	F4	Repeat Mode Continuous Single	Selects the operation after the last element is executed in the sequence mode.
	F5	PatternTrigger	Displays the Pattern Trigger function menu. Refer to 7.3.14 "PatternTrigger".

Next Pattern

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**Next Pattern**

The elements of the sequence mode is proceeded with to the next element.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Next Pattern** on the Sequence Mode function menu for execution.

Remote command

Proceed with the elements of the sequence mode to the next element

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:NEXT
```

Programming Example

To proceed with the elements of the sequence mode to the next element.

```
RAD:ARB:SEQ:NEXT
```

Sequence Restart

Mode or **Top**>**Mode**,>(→)>**Sequence Mode**>**Sequence Restart**

Restarts the elements from the top in the sequence mode.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Sequence Restart** on the Sequence Mode function menu for execution.

Remote command

Restart the elements from the top in the sequence mode

Command

```
:INITiate[1]|2:ARB:SEQuence[:IMMediate]
```

Related command

Use the following command to obtain the play status and to wait for completion.

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:REGister[:STATus]?
```

Programming Example

To restart SG1 output elements from the top in the sequence mode.

```
INIT:ARB:SEQ
```

Remote command

Query the playback status of the sequence mode

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:REGister[:STATus]?
```

Response

```
<status>
```

Parameter

<status>	Playback status
bit2: 2^2 = 4	(0: Paused, 1: Playback)
bit0, 1, 3 to 15	Not used

Details

"Playing" is returned during trigger waiting.

Related command

Use the following command for the pattern play status.

```
[:SOURce[1]|2]:RADio:ARB:REGister[:STATus]?
```

Programming Example

To query the SG1 output play status in the sequence mode.

```
RAD:ARB:SEQ:REG?
> 4
```

Play Mode

Mode or **Top**>**Mode**,>(→)>**Sequence Mode**>**Play Mode**

Selects the play mode for elements of the sequence mode.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Play mode** on the Sequence Mode function menu for selection.

Auto	Proceeds with elements automatically.
Manual	Proceeds with elements manually.

Remote command

Select the play mode for elements of the sequence mode

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:MODE AUTO|MANual
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:MODE?
```

Response

<mode>	AUTO, or MANual

Parameter

<mode>	Play mode for elements
AUTO	Proceeds with elements automatically.
MANual	Proceeds with elements manually.

Programming Example

To set the play mode for elements of the sequence mode to automatic.

```
RAD:ARB:SEQ:MODE AUTO
RAD:ARB:SEQ:MODE?
> AUTO
```

Repeat Mode

Mode or **Top**>**Mode**,>(→)>**Sequence Mode**>**Repeat Mode**

Selects the operation after the last element is executed in the sequence mode.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F4 Repeat mode** on the Sequence Mode function menu for selection.

Continuous	After the last element is executed, the execution of signal output is continued returning to the first element.
Single	After the last element is executed, execution is stopped.

Remote command

Select the operation after the last element is executed in the sequence mode

Command

```
INITiate[1]|2:ARB:SEQuence:CONTinuous[:ALL] <boolean>
```

Query

```
INITiate[1]|2:ARB:SEQuence:CONTinuous[:ALL]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Operation after the last element is executed
ON|1	Continuous
OFF|0	Single

Programming Example

To set the sequence mode to Single.

```
INIT:ARB:SEQ:CONT OFF
INIT:ARB:SEQ:CONT?
> 0
```

Remote command

Set the RepeatCount of each index for Sequence Mode

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:ELEMent:RCOunt
<integer>,<ext_integer>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:ELEMent:RCOunt?
<integer>
```

Response

```
<ext_integer>
```

Parameter

<integer>	Index
Range	1 to 200
Default	1
Suffix code	None
<ext_integer>	RepeatCount
Range	0 to 65535
Resolution	1
Default	0
Suffix code	None

Programming Example

To set the RepeatCount at Index = 1 to 100.

```
RAD:ARB:SEQ:ELEM:RCO 1,100
RAD:ARB:SEQ:ELEM:RCO? 1
> 100
```

7.3.14 Pattern Trigger

Mode or **Top**>**Mode**,>(→)>**Sequence Mode**>**PatternTrigger**

Uses the pattern trigger to proceed with patterns to the next pattern in the sequence mode.

In MG3740A, this can be used only when option-020/120 is installed.

Note:

In the sequence mode, the pattern trigger and pattern status are used as the trigger to be used to proceed with patterns to the next pattern. Switching of the pattern trigger and pattern status depends on the internal setting of the waveform pattern. The pattern status operation is described in the last half of this section.

Press **F5 Pattern Trigger** on the Sequence Mode function menu to open the **Pattern Trigger Info** dialog box and Pattern Trigger function menu.

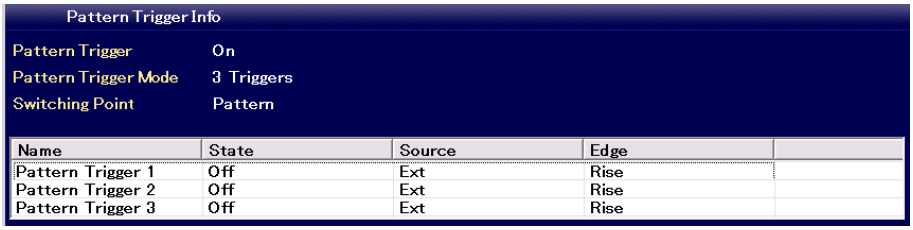


Figure 7.3.14-1 Pattern Trigger Info Dialog Box

Table 7.3.14-1 Pattern Trigger Function Menu

Page	Key No.	Menu Display	Function
1	F1	Pattern Trigger Off On	Sets whether the trigger is to be used or not to be used for Sequence Mode pattern switching.
	F2	Pattern Trigger 1	Displays the Pattern Trigger 1 function menu.
	F3	Pattern Trigger 2	Displays the Pattern Trigger 2 function menu.
	F4	Pattern Trigger 3	Displays the Pattern Trigger 3 function menu.
	F5	Switching Point Pattern Frame	Selects the switching timing to move to the next element on pattern trigger input.
	F8	Trigger Key	Generates Pattern Trigger manually. This is executable only from this menu. When Pattern Trigger Source is Trigger Key, executing this function applies the trigger.

Pattern Trigger

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger**
>**PatternTrigger**

Sets whether the trigger is to be used or not to be used for Sequence Mode pattern switching.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Pattern Trigger** on the Pattern Trigger function menu for setting.

On	Uses the trigger.
Off	Does not use the trigger (Default).

Remote command

Set whether the trigger is to be used or not to be used for Sequence Mode pattern switching

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger[:STATe]
<boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Trigger On/Off
OFF|0	Uses the trigger.
ON|1	Does not use the trigger (Default).

Programming Example

To use the trigger for Sequence Mode pattern switching.

```
RAD:ARB:SEQ:TRIG ON
RAD:ARB:SEQ:TRIG?
> 1
```

Pattern Trigger 1/2/3

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger** >**PatternTrigger 1/2/3**

Sets the pattern trigger 1/2/3.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Pattern Trigger 1** to **F4 Pattern Trigger 3** on the Pattern Trigger function menu to display the Pattern Trigger 1 to Pattern Trigger 3 function menus. Pattern Trigger 1 function menu is described in the table below.

Table 7.3.14-2 Pattern Trigger 1 Function Menu

Page	Key No.	Menu Display	Function
1	F1	Pattern Trigger 1 Off On	Enables/disables the pattern trigger 1.
	F2	Source Ext Bus Key	Sets the trigger source of the pattern trigger 1.
	F3	Edge Rise Fall	Sets the edge of the pattern trigger 1.

Pattern Trigger 1/2/3 On/Off: Pattern Trigger 1/2/3

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger** >**PatternTrigger 1/2/3**>**PatternTrigger 1/2/3**

Enables/disables the pattern trigger 1/2/3.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F1 Pattern Trigger 1/2/3** on the Pattern Trigger 1/2/3 function menu for setting.

On	Enables the pattern trigger 1/2/3.
Off	Disables the pattern trigger 1/2/3 (Default).

Remote command

Enable/disable the pattern trigger 1/2/3

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:STATe
<boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:STATe?
```

Response

`<boolean>` 0 or 1

Parameter

<boolean>	Trigger On/Off
OFF|0	Disables the pattern trigger 1/2/3 (Default).
ON|1	Enables the pattern trigger 1/2/3.

Programming Example

To enable the pattern trigger 1.

```
RAD:ARB:SEQ:TRIG1:STAT ON
RAD:ARB:SEQ:TRIG1:STAT?
> 1
```

Trigger source: Source

Mode or **Top**>**Mode, >**→**>Sequence Mode**>**PatternTrigger** >**PatternTrigger 1/2/3**>**Source**

Sets the pattern trigger 1/2/3 trigger source.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F2 Source** on the Pattern Trigger 1/2/3 function menu for setting.

Ext	Terminal set to PatternTrig1/2/3 with RouteInputConnectors (Default)
Bus	Remote command
Key	Trigger Key

Remote command

Set the pattern trigger 1/2/3 trigger source

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:SOURce
KEY|EXT|BUS
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:SOURce?
```

Response

<mode>	EXT, BUS, or KEY

Parameter

<mode>	Trigger source
EXT	Terminal set to PatternTrig1/2/3 with RouteInputConnectors (Default)
BUS	Remote command
KEY	Trigger Key

Programming Example

To set the pattern trigger 1 trigger source to Trigger Key.

```
RAD:ARB:SEQ:TRIG1:SOUR KEY
RAD:ARB:SEQ:TRIG1:SOUR?
> KEY
```

Pattern Status

The pattern status is a type of trigger to be used to proceed with patterns to the next pattern in the sequence mode.
In MG3740A, this can be used only when option-020/120 is installed.

While the pattern trigger 1/2/3 become three triggers independently, the pattern status create eight trigger statuses with three signal statuses.

To use the pattern status, the use of the pattern status must be set to the waveform pattern in advance.

The relation of Status and Status terminal is shown in the figure below.

Table 7.3.14-3 Relation of Status 0 to 7 and Status Terminal

Status	Pattern Status 1	Pattern Status 2	Pattern Status 3
0	High	High	High
1	Low	High	High
2	High	Low	High
3	Low	Low	High
4	High	High	Low
5	Low	High	Low
6	High	Low	Low
7	Low	Low	Low

Edge

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger**>**PatternTrigger 1/2/3**>**Edge**

Sets the pattern trigger 1/2/3 edge.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Edge** on the Pattern Trigger 1/2/3 function menu for setting.

Rise	Applies the trigger at the signal rising. (Default)
Fall	Applies the trigger at the signal falling.

Remote command

Set the pattern trigger 1/2/3 edge

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:SLOPe
POSitive|NEGative
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1|2|3:SLOPe?
```

Response

<mode>	POS or NEG

Parameter

<mode>	Pattern trigger edge
POSitive	Rise, the trigger is applied at the signal rising. (Default)
NEGative	Fall, the trigger is applied at the signal falling.

Programming Example

To apply the trigger to the pattern trigger 1 edge at the signal rising.

```
RAD:ARB:SEQ:TRIG1:SLOP POS
RAD:ARB:SEQ:TRIG1:SLOP?
> POS
```

Switching Point

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger** >**Switching Point**

Selects the switching timing to move to the next element on pattern trigger input.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F5 Switching Point** on the Sequence Mode function menu for selection.

Pattern	Switched to the next element with the data length of the waveform pattern of each element as the base unit (Default).
Frame	Switched to the next element with the frame length of the waveform pattern of each element as the base unit.

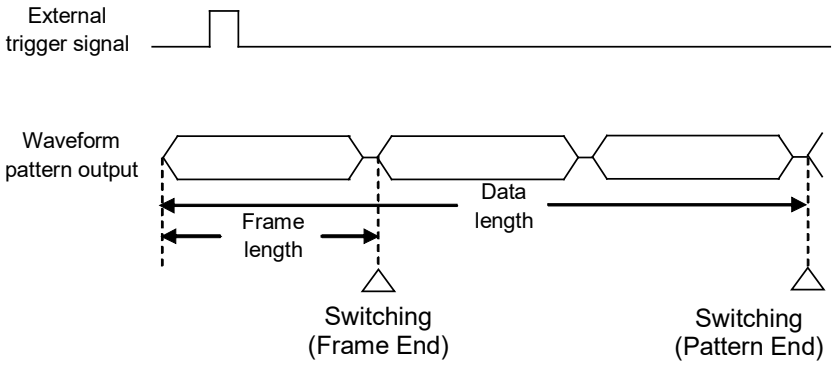


Figure 7.3.14-2 Switching Timing

Remote command

Select the switching timing to move to the next element on pattern trigger input

Command

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger:SPOint
PATTen|FRAMe
```

Query

```
[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger:SPOint?
```

Response

<mode> PATT or FRAM

Parameter

<mode>	Switching timing to move to the next element
PATTern	Switched to the next element with the data length of the waveform pattern of each element as the base unit (Default).
FRAMe	Switched to the next element with the frame length of the waveform pattern of each element as the base unit.

Programming Example

To set the switching timing base unit to move to the next element on pattern trigger input to the frame length.

```
RAD:ARB:SEQ:TRIG:SPO FRAM
RAD:ARB:SEQ:TRIG:SPO?
> FRAM
```

Trigger Key

Mode or **Top**>**Mode,** >→>**Sequence Mode**>**PatternTrigger** >**Trigger Key**

Generates Pattern Trigger manually. This is executable only from this menu. It is enabled only when Trigger Key is set with **F2 Source** on the Pattern Trigger 1/2/3 function menu.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F8 Trigger Key** on the Pattern Trigger function menu to apply the trigger.

7.3.15 Sync Multi SG

Mode or **Top**>**Mode**,>(→)>**Sync Multi SG**

Sync Multi SG function is used to output signals with synchronized timings or phases among multiple SGs.

In MG3740A, the Sync Multi SG function cannot be used.

The MG3710A/MG3710E can have the synchronization system with up to four units. Sharing each Local signal, baseband clock, and trigger signal allows output of phase coherent signals with the same signal output timings. If four units of 2nd RF option-installed MG3710A/MG3710E are used, 8x8 MIMO system configuration will be available.

This function allows easy setting necessary for the synchronization system configuration with multiple MG3710A/MG3710Es.(The Local signal input/output and baseband lock input/output require the Universal Input/Output option.)

Note:

When several MG3710A/MG3710E units are connected, sometimes the output level of the MG3710A/MG3710E LO Output is outside the LO Input it level range, depending on the set frequency. In this case, use an external LO signal source to input a LO signal with the appropriate level to the MG3710A/MG3710E LO Input connector.

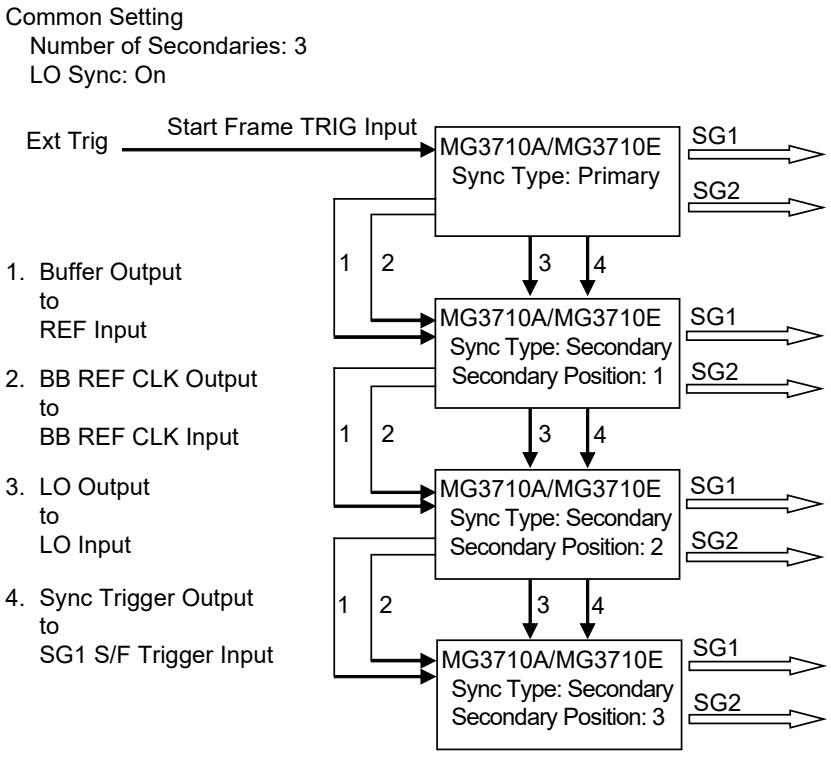


Figure 7.3.15-1 Sync Multi SG Configuration

SG1/2 synchronization procedure

The method to synchronize the phases and timings of signals output from SG1/2 with the use of the Multi SG Sync function is explained.

1. Phase synchronization

1.1 Output waveform patterns which become 0 Hz (= DC) on Baseband from both SG1 and SG2.

Waveform pattern	BBDC (Waveform pattern where I-phase is 1-fixed and Q-phase is 0-fixed)
Frequency	Same setting value (frequency to be used after synchronization)
Level	Same setting value (level to be used after synchronization)
Mod	On
RF	On
ATT Hold	On

Changing frequency/level changes the internal path length; therefore, phase/timing synchronization must be executed again.(When ATT Hold = On, changing the level does not change the path length.)

1.2 Execute the synchronization setting for SG1 and SG2.

Sync Type	SG1&2
LO Sync	On

When the option-017/117 is installed, SG1/2 Local signal and Baseband Reference Clock are connected within the unit. The synchronization can be executed without change.

1.3 Execute I/Q DC Cal for both SG1 and SG2, and minimize carrier leakage.

1.4 When synchronizing several MG3710A/MG3710E units, connect them as shown.

When synchronizing several MG3710A/MG3710E units, connect them as shown in items 1 to 4 of Figure 7.3.15-1 Sync Multi SG Composition and set Sync Type, Number of Secondaries, Secondary Position, and LO Sync at each SG.

Note:

When several MG3710A/MG3710E units are connected, sometimes the output level of the MG3710A/MG3710E LO Output is outside the LO Input level range, depending on the set frequency. In this case, use an external LO signal source to input a LO signal with the appropriate level to the MG3710A/MG3710E LO Input connector.

1.5 Input the mixed wave of SG1 and SG2 to the spectrum analyzer.

Input the mixed wave of SG1/2 to the spectrum analyzer as shown in the figure below.

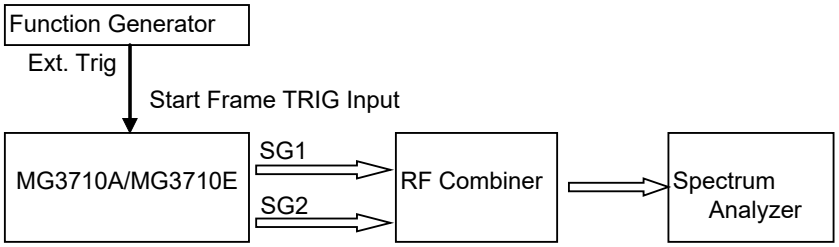


Figure 7.3.15-2 Phase Synchronization/Timing Synchronization Adjustment

1.6 Adjust the I/Q Phase of SG1 (coarse adjustment).

Estimate the phase difference between SG1/2 using the behavior where CW signals with the phase difference of 180 degrees negate each other. Adjust the SG1 I/Q Phase to the values where the mixed wave output level becomes the minimum.

1.7 Adjust the level of SG1.

Adjust the level of SG1 to reduce the level difference between SG1/2 close to zero because the level difference between SG1/2 remains as the residual level. Adjust the level of SG1 to the value where the mixed wave output level becomes the minimum.

1.8 Adjust the I/Q Phase of SG1 (fine adjustment).

Adjust the SG1 I/Q Phase to the values where the mixed wave output level becomes the minimum again.

2. Timing synchronization

Adjust the timing synchronization continuously after the phase synchronization is completed.

2.1 Output waveform patterns to be used from both SG1/2.

Waveform pattern	Same setting (arbitrary waveform pattern)
ATT Hold	On

2.2 Adjust the I/Q Delay of SG1 (coarse adjustment).

Estimate the timing difference between SG1/2 using the behavior where CW signals with the phase difference of 180 degrees negate each other. Adjust the SG1 I/Q Delay to the values where the mixed wave output level becomes the minimum.

2.3 Adjust the level of SG1.

Adjust the level of SG1 to reduce the level difference between SG1/2 close to zero because the level difference between SG1/2 remains as the residual level. Adjust the level of SG1 to the value where the mixed wave output level becomes the minimum.

2.4 Adjust the I/Q Delay of SG1 (fine adjustment).

Adjust the I/Q Delay of SG1.

2.5 Add +180 degrees to the I/Q Phase of SG1.

Add +180 degrees to the I/Q Phase value of SG1 in Step 1.8 and set the I/Q Phase again. They are changed from reversed status to in-phase status.

Display description

Press **F8 Sync Multi SG** on the ARB/Waveform function menu page 2 to display the Sync Multi SG.

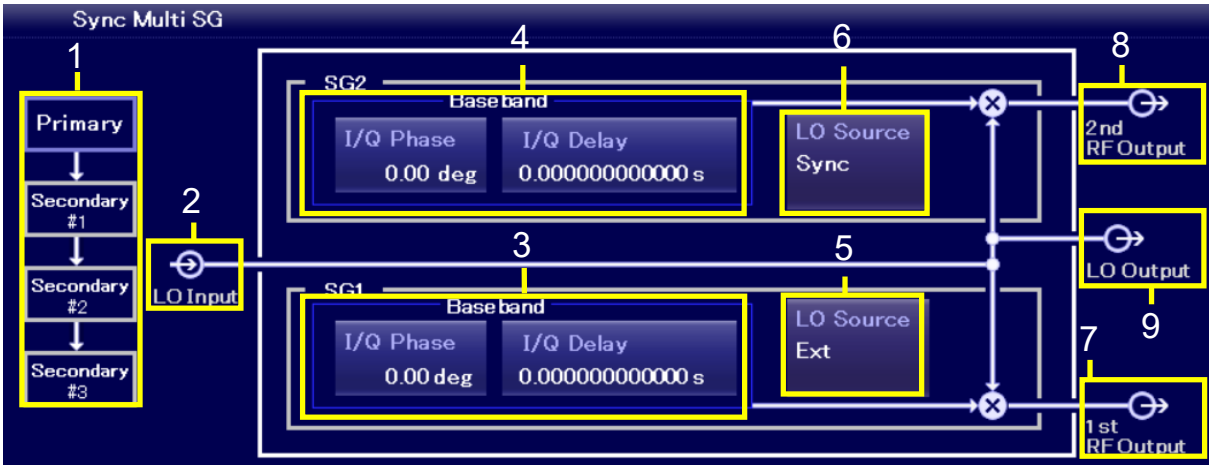
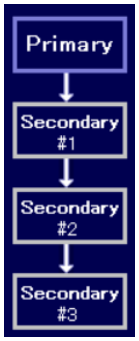


Figure 7.3.15-3 Sync Multi SG

Notes:

- The figure above is for explanation; it is different from the actual display.
- SG2-related blocks are displayed when SG2 (Option 062/162, 064/164 or 066/166) is installed.

Table 7.3.15-1 Sync Multi SG Display Contents

No.	Display Example	Display	Description
1		Primary, Secondary#1 to Secondary#3	Displays the order of connecting MG3710A/MG3710E units when using several MG3710A/MG3710E units. This is displayed when Sync Type is Primary or Secondary. The number of Secondaries displayed depends on the "Number of Secondaries" setting.
2		LO Input	Indicates the Local signal source is set to Ext (input from the rear LO Input connector).
3		SG1	---
		I/Q Phase	Displays the I/Q Phase setting for SG1.
		I/Q Delay	Displays the I/Q Delay setting for SG1.
4		SG2	---
		I/Q Phase	Displays the I/Q Phase setting for SG2.
		I/Q Delay	Displays the I/Q Delay setting for SG2.
5		LO Source (SG1)	Indicates the status of the Local signal source for SG1. The status of the Local signal source for SG1 can be switched between Int and Ext by clicking this block.
6		LO Source (SG2)	Indicates the status of the Local signal source for SG2. The status of the Local signal source for SG2 can be switched between Int and Sync by clicking this block.
7		1st RF Output	Indicates that the RF Output of SG1 is On.
8		2nd RF Output	Indicates that the RF Output of SG2 is On.
9		LO Output	Indicates the Local signal external output setting (output from the rear LO Output connector) is On.

Press **F8 Sync Multi SG** on page 2 of ARB/Waveform function menu to open the Sync Multi SG function menu. Also the Sync Multi SG control is also displayed.

Table 7.3.15-2 Sync Multi SG Function Menu

Page	Key No.	Menu Display	Function
1	F1	Sync Type Off	Sets the synchronization mode.
	F2	Number of Secondaries 1	Sets the number of connected Secondaries. This is enabled when SyncType is Primary or Secondary.
	F3	Secondary Position 1	Sets the position of MG3710A/MG3710E when SyncType is Secondary. This is enabled when SyncType is Secondary. It is used for setting judgment such as the case Lo Out is set to Off for connection termination.
	F4	LO Sync Off On	Enables/disables the Local synchronization. This is used to synchronize signal phases from SGs.
	F5	Sync	Starts synchronization for multiple SGs. This is enabled when SyncType is Primary or Secondary.
	F6	Waveform Restart	Simultaneously restarts each waveform pattern selected by SG1 and SG2 when SG2 (Option 062/162, 064/164 or 066/166) is installed.
	F7	I/Q Phase 0.00 deg	Adjusts the Baseband signal phase. This is used to adjust multiple SGs signal phases with MIMO or beam forming.
	F8	I/Q Delay 0.000000000000 s	Adjusts the Baseband signal output timings. This is used when multiple SGs are to be synchronized and timings for signals to reach to DUT are to be adjusted.

Sync Type

Mode or **Top**>**Mode**,>(→)>**Sync Multi SG**>**Sync Type**

Sets the synchronization mode.

Press **F1 Sync Type** on the Sync Multi SG function menu to open the Sync Type function menu for selection of the synchronization mode.

Off	Does not execute synchronization (Default).
Primary	Synchronizes multiple SGs. MG3710A/MG3710E is positioned as Primary. When SG2 is installed, SG1 and SG2 are synchronized.
Secondary	Synchronizes multiple SGs. MG3710A/MG3710E is positioned as Secondary. When SG2 is installed, SG1 and SG2 are synchronized.
SG1 & SG2	Synchronizes SG1 and SG2 of MG3710A/MG3710E.

Remote command

Set the synchronization mode

Command

```
[:SOURce]:RADio:ARB:MBSYnc OFF|SG12|PRIMary|SECondary
```

Query

```
[:SOURce]:RADio:ARB:MBSYnc?
```

Response

<mode>	OFF, SG12, PRIM, or SEC

Parameter

<mode>	Synchronization mode
OFF	Does not execute synchronization (Default).
PRIM	Synchronizes multiple SGs. MG3710A/MG3710E is positioned as Primary. When SG2 is installed, SG1 and SG2 are synchronized.
SEC	Synchronizes multiple SGs. MG3710A/MG3710E is positioned as Secondary. When SG2 is installed, SG1 and SG2 are synchronized.
SG12	Synchronizes SG1 and SG2 of MG3710A/MG3710E.

Programming Example

To set to the mode to synchronizes SG1 and SG2 of MG3710A/MG3710E.

```
RAD:ARB:MBSY SG12
RAD:ARB:MBSY?
> SG12
```

Number of Secondaries

Mode or **Top**>**Mode**,>(→)>**Sync Multi SG**>**Number of Secondaries**

Sets the number of connected Secondaries. This is enabled when SyncType is Primary or Secondary.

Press **F2 Number of Secondaries** on the Sync Multi SG function menu for setting.

Range	1 to 3
Resolution	1
Default	1

Remote command

Set the number of connected Secondaries

Command

```
[:SOURce]:RADio:ARB:MBSYnc:NSECondaries <ext_integer>
```

Query

```
[:SOURce]:RADio:ARB:MBSYnc:NSECondaries?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	The number of connected Secondaries
Range	1 to 3
Resolution	1
Default	1
Suffix code	None

Programming Example

To set the number of connected Secondaries to 2.

```
RAD:ARB:MBSY:NSEC 2
RAD:ARB:MBSY:NSEC?
> 2
```

Secondary Position

Mode or **Top>Mode, >(→)>Sync Multi SG>Secondary Position**

Sets the position of MG3710A/MG3710E when SyncType is Secondary. This is enabled when SyncType is Secondary. It is used for setting judgment such as the case Lo Out is set to Off for connection termination.

Press **F3 Secondary Position** on the Sync Multi SG function menu for setting.

Range	1 to 3
Resolution	1
Default	1

Remote command

Set the position of MG3710A/MG3710E when SyncType is Secondary

Command

```
[:SOURce]:RADio:ARB:MBSYnc:SREFerence <ext_integer>
```

Query

```
[:SOURce]:RADio:ARB:MBSYnc:SREFerence?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	Position of MG3710A/MG3710E
Range	1 to 3
Resolution	1
Default	1
Suffix code	None

Programming Example

To set the position of MG3710A/MG3710E when SyncType is Secondary to 2.

```
RAD:ARB:MBSY:SREF 2
RAD:ARB:MBSY:SREF?
> 2
```

Local synchronization: LO Sync

Mode or **Top**>**Mode**, >→>**Sync Multi SG**>**LO Sync**

Enables/disables the Local synchronization. This is used to synchronize signal phases from SGs.

Press **F4 LO Sync** on the Sync Multi SG function menu for setting.

Off	Does not execute Local synchronization (Default).
On	Executes Local synchronization.

Remote command

Enable/disable the Local synchronization

Command

```
[:SOURce]:RADio:ARB:MBSYnc:LOSYnc <boolean>
```

Query

```
[:SOURce]:RADio:ARB:MBSYnc:LOSYnc?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Local synchronization On/Off
OFF|0	Does not execute Local synchronization (Default).
ON|1	Executes Local synchronization.

Programming Example

To set the Local synchronization to On.

```
RAD:ARB:MBSY:LOSY ON
RAD:ARB:MBSY:LOSY?
> 1
```

Sync

Mode or **Top**>**Mode**, >→>**Sync Multi SG**>**Sync**

Synchronization for multiple SGs is started. This is enabled when SyncType is Primary or Secondary.

To start the signal output with the same trigger signal, execute Sync starting from SGs of latter part, and when all SGs are in trigger waiting status, input the trigger to Primary SG.

Press **F5 Sync** on the Sync Multi SG function menu for setting.

Remote command

Start synchronization for multiple SGs

Command

```
[:SOURce]:RADio:ARB:MBSYnc:SSECondaries
```

Programming Example

To start synchronization for multiple SGs.

```
RAD:ARB:MBSY:SSEC
```

Waveform Restart

Mode or **Top**>**Mode**, >→>**Sync Multi SG**>**Waveform Restart**

Simultaneously restarts each waveform pattern selected by SG1 and SG2 when SG2 (Option 062/162, 064/164 or 066/166) is installed. SG1 and SG2 enter the Waiting-for-Trigger state when the trigger is to be used for Baseband signal output start.

Press **F6 Waveform Restart** on the Sync Multi SG function menu for setting.

Remote command

Restarts each waveform pattern selected by SG1 and SG2

Command

```
[:SOURce]:RADio:ARB:MBSYnc:RESTart
```

Programming Example

To restart each waveform pattern selected by SG1 and SG2.

```
RAD:ARB:MBSY:REST
```

I/Q Phase

Mode or **Top**>**Mode,** >→>**Sync Multi SG**>**I/Q Phase**

Adjusts the Baseband signal IQ phase.
This is used to adjust multiple SGs signal phases with MIMO or beam forming. The setting is same as **F5 I/Q Phase** in Table 7.6.4-1 "Internal Baseband Adjust Function Menu".

Press **F7 I/Q Phase** on the Sync Multi SG function menu for adjustment.

Range	–360 deg to 360 deg
Resolution	0.01 deg
Default	0 deg

Remote command

Adjust the Baseband signal IQ phase

Command

```
[:SOURce[1]|2]:DM:IQADjustment:PHASe <phase>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:PHASe?
```

Response

<phase>	Unit: deg

Parameter

<phase>	Baseband signal phase
Range	–360 deg to 360 deg
Resolution	0.01 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To set the Baseband signal IQ phase to 5 deg.

```
DM:IQAD:PHAS 5
DM:IQAD:PHAS?
> 5.00
```

I/Q Delay

Mode or **Top**>**Mode**,>(→)>**Sync Multi SG**>**I/Q Delay**

Adjusts the Baseband signal output timings.
This is used when multiple SGs are to be synchronized and timings for signals to reach to DUT are to be adjusted. The setting is same as **F7 I/Q Delay** in Table 7.6.4-1 "Internal Baseband Adjust Function Menu".

Press **F8 I/Q Delay** on the Sync Multi SG function menu for adjustment.

Range	–400 ns to 400 ns
Resolution	1 ps
Default	0 s

Remote command

Adjust the Baseband signal IQ output timing

Command

```
[:SOURce[1]|2]:DM:IQADjustment:DELay <time>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:DELay?
```

Response

<time>	Unit: s

Parameter

<time>	Baseband signal output timings
Range	–400 ns to 400 ns
Resolution	1 ps
Default	0 s
Suffix code	S, MS, US, NS, PS, When omitted: S

Programming Example

To set the time difference between I phase and Q phase to 300 ns.

```
DM:IQAD:DEL 300NS
DM:IQAD:DEL?
> 0.000000300000
```

7.4 Route Connectors

Top>(→)>Route Connectors

Sets signals of the input and output connectors. This setting is common for the entire MG3710A/MG3710E/MG3740A.

Press **F4 Route Connectors** on page 2 of the top function menu to open the Route Connectors function menu.

Table 7.4-1 Route Connectors Function Menu

Page	Key No.	Menu Display	Function
1	F1	Route Input Connectors	Displays the Input Connectors function menu to set the input signals. Refer to 7.4.1 “Route Input Connectors”.
	F2	Route Output Connectors	Displays the Output Connectors function menu to set the output signals. Refer to 7.4.2 “Route Output Connectors”.

7.4.1 Route Input Connectors

Top>(→)>Route Connectors>Route Input Connectors

Sets signals input to input connectors displayed on the menu.

Press **F1 Route Input Connectors** on the Route Connectors function menu to display the Input Connectors function menu.

Table 7.4.1-1 Input Connectors Function Menu

Page	Key No.	Menu Display	Function
1	F1	S/F Trigger	Selects the signal input to the Start/Frame Trigger Input connector.
	F2	Pattern Trigger 1	Selects the signal input to the Pattern Trigger 1 Input connector.
	F3	Pattern Trigger 2	Selects the signal input to the Pattern Trigger 2 terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.
	F4	Pattern Trigger 3	Selects the signal input to the Pattern Trigger 3 terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.
	F5	Pattern Status 1	Selects the signal input to the Pattern Status 1 terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.
	F6	Pulse Mod	Selects the signal input to the Pulse Mod terminal of AUX connector.
	F7	Pattern Trigger Type Shared Ind	Sets the usage of PatternTrigger 1, 2, 3, and PatternStatus1. This is available in MG3740A only when option-020/120 is installed.

Setting each input connector

Top>(→)>Route Connectors>Route Input Connectors>F1 to F6

Press **F1** to **F6** on the Input Connectors function menu to display the Input Connectors function menu.

You can set signals in the table below regardless of names of input connectors.

Table 7.4.1-2 Input Connector Function Menu (MG3710A, MG3710E, MG3740A installed option-020/120)

Page	Key No.	Menu Display	Function
1	F1	SG1 S/F Trigger	Handles the input signal as S/F Trigger for SG1. Refer to 7.3.8 “Start/Frame Trigger”.
	F2	SG2 S/F Trigger	Handles the input signal as S/F Trigger for SG2. This is displayed when option-062/064/066/ 162/164/166 is installed. Refer to 7.3.8 “Start/Frame Trigger”.
	F3	Pattern Trigger 1	Handles the input signal as Pattern Trigger 1/Point Trigger. Refer to 7.3.14 “Pattern Trigger”. Refer to 6.5 “Point Trigger”.
	F4	Pattern Trigger 2	Handles the input signal as Pattern Trigger 2/Pattern Status 2. Refer to 7.3.14 “Pattern Trigger”.
	F5	Pattern Trigger 3	Handles the input signal as Pattern Trigger 3/Pattern Status 3. Refer to 7.3.14 “Pattern Trigger”.
	F6	Pattern Status 1	Handles the input signal as Pattern Status 1. Refer to 7.3.14 “Pattern Trigger”.
	F7	SG1 Pulse Mod	Handles the input signal as SG1 Pulse Mod. Menu Display is **Pulse Mod** when option-062/064/066/ 162/164/166 is not installed. Refer to 7.2.3 “Pulse”.
	F8	SG2 Pulse Mod	Handles the input signal as SG2 Pulse Mod. This is displayed when option-062/064/066/ 162/164/166 is installed. Refer to 7.2.3 “Pulse”.
2	F1	Off	Does not use the input signal.

Table 7.4.1-3 Input Connector Function Menu (MG3740A not installed option-020/120)

Page	Key No.	Menu Display	Function
1	F1	Off	Does not use the input signal.
	F3	Pattern Trigger 1	Handles the input signal as Pattern Trigger 1/Point Trigger. Refer to 7.3.14 “Pattern Trigger”. Refer to 6.5 “Point Trigger”.
	F7	SG1 Pulse Mod	Handles the input signal as SG1 Pulse Mod. Menu Display is [Pulse Mod] when option-062/064/066/162/164/166 is installed. Refer to 7.2.3 “Pulse”.
	F8	SG2 Pulse Mod	Handles the input signal as SG2 Pulse Mod. This is displayed when option-062/064/066/162/164/166 is installed. Refer to 7.2.3 “Pulse”.

S/F Trigger

Top>(→)>Route Connectors>Route Input Connectors>S/F Trigger

Selects the signal input to the S/F Trigger connector.

Press **F1 S/F Trigger** in Table 7.4.1-1 “Input Connectors Function Menu” to select the signal.

Options	Listed in Table 7.4.1-2 “Input Connector Function Menu”.	
Default	SG1 S/F Trigger	(MG3710A, MG3710E, MG3740A-020/120)
	OFF	(MG3740A, when MG3740A-020/120 is not installed)

Remote command

Select the signal input to the S/F Trigger connector

Command

```
:ROUTe[:CONNectors]:INPut:TRIGger:SFRame
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:TRIGger:SFRame?
```

Response

```
<signal>
```

Parameter

<signal>	Signal input to the S/F Trigger connector
Options	Refer to the table below.

Table 7.4.1-4 Input Connector

Parameter	Signal to be input	Remarks
SFT	SG1 S/F Trigger	Default (MG3710A, MG3710E, MG3740A-020/120) In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2SFT	SG2 S/F Trigger	In MG3740A, this cannot be selected when option-020/120 is not installed.
PT1	Pattern Trigger 1 /Point Trigger	
PT2	Pattern Trigger 2 /Pattern Status 2	In MG3740A, this cannot be selected when option-020/120 is not installed.
PT3	Pattern Trigger 3 /Pattern Status 3	In MG3740A, this cannot be selected when option-020/120 is not installed.
PS1	Pattern Status 1	In MG3740A, this cannot be selected when option-020/120 is not installed.
PM	SG1 Pulse Mod	
SG2PM	SG2 Pulse Mod	
OFF	Off	Default (MG3740A when option-020/120 not installed)

Programming Example

To set the signal input to the S/F Trigger connector to SG1 S/F Trigger.

```
ROUT:INP:TRIG:SFR SFT
ROUT:INP:TRIG:SFR?
> SFT
```

Pattern Trigger 1

Top>(→)>Route Connectors>Route Input Connectors>Pattern Trigger 1

Selects the signal input to the Pattern Trigger 1 connector.

Press **F2 Pattern Trigger 1** in Table 7.4.1-1 “Input Connectors Function Menu” to select the signal.

Options	Listed in Table 7.4.1-2 “Input Connector Function Menu”.
Default	Pattern Trigger 1 (MG3710A, MG3710E, MG3740A-020/120) OFF (MG3740A, when option-020/120 not installed)

Remote command

Select the signal input to the Pattern Trigger 1 connector

Command

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern1
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern1?
```

Response

```
<signal>
```

Parameter

<signal>	Signal input to the Pattern Trigger 1 connector	
Options	Listed in Table 7.4.1-3 “Input Connector”.	
Default	PT1	(MG3710A, MG3710E, MG3740A-020/120)
	OFF	(MG3740A, when option-020/120 not installed)

Programming Example

To set the signal input to the Pattern Trigger 1 connector to SG1 S/F Trigger.

```
ROUT:INP:TRIG:PATT1 SFT
ROUT:INP:TRIG:PATT1?
> SFT
```

Pattern Trigger 2

Top>(→)>Route Connectors>Route Input Connectors>Pattern Trigger 2

Selects the signal input to the Pattern Trigger 2 connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F3 Pattern Trigger 2** in Table 7.4.1-1 “Input Connectors Function Menu” to select the signal.

Options	Listed in Table 7.4.1-2 “Input Connector Function Menu”.
Default	Pattern Trigger 2

Remote command

Select the signal input to the Pattern Trigger 2 connector

Command

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern2
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern2?
```

Response

```
<signal>
```

Parameter

<signal>	Signal input to the Pattern Trigger 2 connector
Options	Listed in Table 7.4.1-3 “Input Connector”.
Default	PT2

Programming Example

To set the signal input to the Pattern Trigger 2 connector to SG1 S/F Trigger.

```
ROUT:INP:TRIG:PATT2 SFT
ROUT:INP:TRIG:PATT2?
> SFT
```

Pattern Trigger 3

Top>(→)>Route Connector>Route Input Connectors>Pattern Trigger 3

Selects the signal input to the Pattern Trigger 3 connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F4 Pattern Trigger 3** in Table 7.4.1-1 “Input Connectors Function Menu” to select the signal.

Options	Listed in Table 7.4.1-2 “Input Connector Function Menu”.
Default	Pattern Trigger 3

Remote command

Select the signal input to the Pattern Trigger 3 connector

Command

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern3
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern3?
```

Response

<signal>

Parameter

<signal>	Signal input to the Pattern Trigger 3 connector
Options	Listed in Table 7.4.1-3 “Input Connector”.
Default	PT3

Programming Example

To set the signal input to the Pattern Trigger 3 connector to SG1 S/F Trigger.

```
ROUT:INP:TRIG:PATT3 SFT
ROUT:INP:TRIG:PATT3?
> SFT
```

Pattern Status 1

Top>(→)>Route Connectors>Route Input Connectors>Pattern Status 1

Selects the signal input to the Pattern Status 1 connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F5 Pattern Status 1** in Table 7.4.1-1 “Input Connectors Function Menu” to select the signal.

Options	Listed in Table 7.4.1-2 “Input Connector Function Menu”.
Default	Pattern Status 1

Remote command

Select the signal input to the Pattern Status 1 connector

Command

```
:ROUTe[:CONNectors]:INPut:STATus:PATTern1
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:STATus:PATTern1?
```

Response

<signal>

Parameter

<signal>	Signal input to the Pattern Status 1 connector
Options	Listed in Table 7.4.1-3 “Input Connector”.
Default	PS1

Programming Example

To set the signal input to the Pattern Status 1 connector to SG1 S/F Trigger.

```
ROUT:INP:STAT:PATT1 SFT
ROUT:INP:STAT:PATT1?
> SFT
```

Pulse Mod

Top>(→)>Route Connectors>Route Input Connectors>Pulse Mod

Selects the signal input to the Pulse Mod connector.
Press **F6 Pulse Mod** in Table 7.4.1-1 "Input Connectors Function Menu" to select the signal.

Options	Listed in Table 7.4.1-2 "Input Connector Function Menu".
Default	SG1 Pulse Mod (When option-062/064/066/162/164/166 is installed.) Pulse Mod (When option-062/064/066/162/164/166 is not installed.)

Remote command

Select the signal input to the Pulse Mod connector

Command

```
:ROUTe[:CONNectors]:INPut:PLUM
SFT|SG2SFT|PT1|PT2|PT3|PS1|PM|SG2PM|OFF
```

Query

```
:ROUTe[:CONNectors]:INPut:PLUM?
```

Response

```
<signal>
```

Parameter

<signal>	Signal input to the Pulse Mod connector
Options	Listed in Table 7.4.1-3 "Input Connector".
Default	PM

Programming Example

To set the signal input to the Pulse Mod connector to SG1 S/F Trigger.

```
ROUT:INP:PLUM SFT
ROUT:INP:PLUM?
> SFT
```

Pattern Trigger Type

Top>(→)>Route Connectors>Route Input Connectors>Pattern Trigger Type

Selects the usage of PatternTrig1, 2, 3, and PatternStatus1.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F7 Pattern Trigger Type** on the Input Connectors function menu to select the usage.

Shared	PatternTrig1,2,3 and PatternStatus1 are handled as the same signal in SG1/2. This is used when the sequence mode is controlled with all control signals of PatterTrig1,2,3 and PatternStatus1, or when the sequence mode of SG1 and SG2 are synchronized for operation (Default).
Ind (Independent)	PatternTrig1,2 are handled as PatternTrig1,2 for SG1, and PatternTrig3 and PatternStatus1 are handled as PatternTrig1,2 for SG2. This is used when the sequence mode is operated in SG1/2 independently.

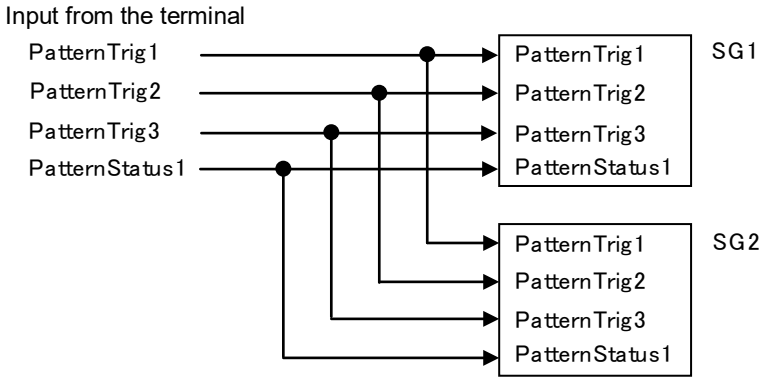


Figure 7.4.1-1 Shared Image

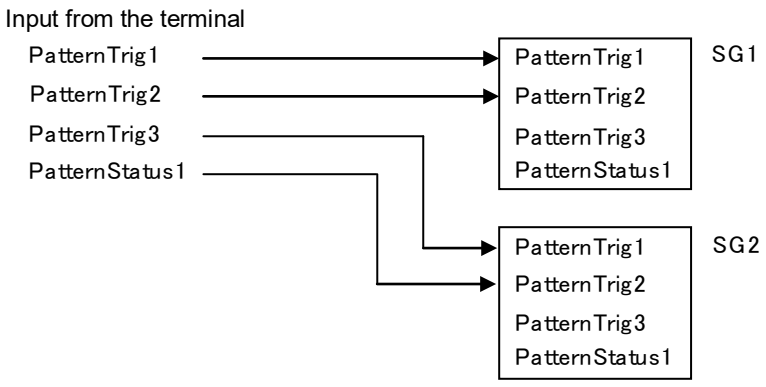


Figure 7.4.1-2 Independent Image

Remote command

Select the usage of PatternTrig1, 2, 3, and PatternStatus1

Command

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern:TYPE
SHARe|DIVide
```

Query

```
:ROUTe[:CONNectors]:INPut:TRIGger:PATTern:TYPE?
```

Response

<mode>	SHAR or DIV

Parameter

<mode>	Usage of PatternTrig 1, 2, 3, and PatternStatus1
SHARe	Shared (Default)
DIVide	Independent

Programming Example

To set the usage of PatternTrig 1, 2, 3 and PatternStatus1 to Independent.

```
ROUT:INP:TRIG:PATT:TYPE DIV
ROUT:INP:TRIG:PATT:TYPE?
> DIV
```

7.4.2 Route Output Connectors

Top>(→)>Route Connectors>Route Output Connectors

Sets signals output from output connectors displayed on the menu.

Press **F2 Route Output Connectors** on the Route Connectors function menu to display the Output Connectors function menu.

Table 7.4.2-1 Output Connectors Function Menu

Page	Key No.	Menu Display	Function
1	F1	Marker 1	Sets the signal output from the Marker 1 Output connector.
	F2	Marker 2	Sets the signal output from the Marker 2 terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.
	F3	Marker 3	Sets the signal output from the Marker 3 terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.
	F4	Pulse Video	Sets the signal output from the Pulse Video terminal of AUX connector.
	F5	Pulse Sync	Sets the signal output from the Pulse Sync terminal of AUX connector.
	F6	Sync Trig Out	Sets the signal output from the Sync Trig Out terminal of AUX connector. This is available in MG3740A only when option-020/120 is installed.

Setting each output connector

Top>(→)>Route Connectors>Route Output Connectors>F1 to F6

Press **F1** to **F6** on the Output Connectors function menu to display the Marker Connectors function menu.

You can set signals in the table below regardless of names of output connectors.

Table 7.4.2-2 Marker Connector Function Menu (MG3710A, MG3710E, MG3740A installed option-020/120)

Page	Key No.	Menu Display	Function
1	F1	SG1 Marker 1 A	Outputs SG1 Waveform Memory A side Marker 1 signal. Refer to 7.3.12 "Marker Setup".
	F2	SG1 Marker 2 A	Outputs SG1 Waveform Memory A side Marker 2 signal. Refer to 7.3.12 "Marker Setup".
	F3	SG1 Marker 3 A	Outputs SG1 Waveform Memory A side Marker 3 signal. Refer to 7.3.12 "Marker Setup".
	F4	SG1 Marker 1 B	Outputs SG1 Waveform Memory B side Marker 1 signal. This is not displayed when the option 048/148 is not installed. Refer to 7.3.12 "Marker Setup".
	F5	SG1 Marker 2 B	Outputs SG1 Waveform Memory B side Marker 2 signal. This is not displayed when the option 048/148 is not installed. Refer to 7.3.12 "Marker Setup".
	F6	SG1 Marker 3 B	Outputs SG1 Waveform Memory B side Marker 3 signal. This is not displayed when the option 048/148 is not installed. Refer to 7.3.12 "Marker Setup".
	F7	SG1 Pulse Sync	Outputs the signal synchronized with SG1 Pulse cycle. This is used when the measurement synchronized with the pulse modulation of the MG3710A/MG3710E/MG3740A is to be executed. Refer to Figure 7.4.2-3 "SG1/2 Pulse Sync" and 7.2.3 "Pulse"
	F8	SG1 Pulse Video	Outputs the signal synchronized with SG1 Pulse On interval. This is used when the measurement synchronized with the pulse modulation of the MG3710A/MG3710E/MG3740A is to be executed. Refer to Figure 7.4.2-4 "SG1/2 Pulse Video" and 7.2.3 "Pulse".

Table 7.4.2-2 Marker Connector Function Menu
(MG3710A, MG3710E, MG3740A installed option-020/120 (Cont'd)

Page	Key No.	Menu Display	Function
2	F1	SG1 Settled	Outputs the settling signal of SG1. This is used when the measurement synchronized with the signal transmission after frequency switching or others of the MG3710A/MG3710E/MG3740A is to be executed. Refer to Figure 7.4.2-5 "SG1/2 Source Settled".
	F2	Sync Trigger Out	Outputs the trigger signal for synchronization for multiple SGs. This is used for output waveforms of multiple signal generators to be synchronized with Start/Frame Trigger input to the MG3710A/MG3710E/MG3740A. Refer to Figure 7.4.2-1 "Sync Trigger Out".
	F3	Pattern Trigger 1 Out	Outputs Pattern Trigger 1 signal. This is used for output waveforms of multiple signal generators to be synchronized with Pattern Trigger 1 input to the MG3710A/MG3710E/MG3740A. Refer to 7.3.14 "Pattern Trigger".
	F4	Pattern Trigger 2 / Pattern Status 2	Outputs Pattern Trigger 2/Pattern Status 2 signal. This is used for output waveforms of multiple signal generators to be synchronized with Pattern Trigger 2/Pattern Status 2 input to the MG3710A/MG3710E/MG3740A. Refer to 7.3.14 "Pattern Trigger".
	F5	Pattern Trigger 3 / Pattern Status 3	Outputs Pattern Trigger 3/Pattern Status 3 signal. This is used for output waveforms of multiple signal generators to be synchronized with Pattern Trigger 3/Pattern Status 3 input to the MG3710A/MG3710E/MG3740A. Refer to 7.3.14 "Pattern Trigger".
	F6	Pattern Status 1	Outputs Pattern Status 1 signal. This is used for output waveforms of multiple signal generators to be synchronized with Pattern Status 1 input to the MG3710A/MG3710E/MG3740A. Refer to 7.3.14 "Pattern Trigger".
	F7	Point Trigger	Outputs Point Trigger signal. This is used for measurement synchronized with Sweep/List function. Refer to Figure 7.4.2-2 "Point Trigger Out" and 6.5 "Point Trigger".
	F8	SG2 Marker 1 A	Outputs SG2 Waveform Memory A side Marker 1 signal. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to 7.3.12 "Marker Setup".

Table 7.4.2-2 Marker Connector Function Menu
(MG3710A, MG3710E, MG3740A installed option-020/120 (Cont'd)

Page	Key No.	Menu Display	Function
3	F1	SG2 Marker 2 A	Outputs SG2 Waveform Memory A side Marker 2 signal. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to 7.3.12 "Marker Setup".
	F2	SG2 Marker 3 A	Outputs SG2 Waveform Memory A side Marker 3 signal. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to 7.3.12 "Marker Setup".
	F3	SG2 Marker 1 B	Outputs SG2 Waveform Memory B side Marker 1 signal. This is not displayed when the option 078/178 is not installed. Refer to 7.3.12 "Marker Setup".
	F4	SG2 Marker 2 B	Outputs SG2 Waveform Memory B side Marker 2 signal. This is not displayed when the option 078/178 is not installed. Refer to 7.3.12 "Marker Setup".
	F5	SG2 Marker 3 B	Outputs SG2 Waveform Memory B side Marker 3 signal. This is not displayed when the option 078/178 is not installed. Refer to 7.3.12 "Marker Setup".
	F6	SG2 Pulse Sync	Outputs the signal synchronized with SG2 Pulse cycle. This is used when the measurement synchronized with the pulse modulation of the MG3710A/MG3710E/MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-3 "SG1/2 Pulse Sync" and 7.2.3 "Pulse".
	F7	SG2 Pulse Video	Outputs the signal synchronized with SG2 Pulse On interval. This is used when the measurement synchronized with the pulse modulation of the MG3710A/MG3710E/MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-4 "SG1/2 Pulse Video" and 7.2.3 "Pulse".
	F8	SG2 Settled	Outputs the settling signal of SG2. This is used when the measurement synchronized with the signal transmission after frequency switching or others of the MG3710A/MG3710E/MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-5 "SG1/2 Source Settled".

Table 7.4.2-3 Marker Connector Function Menu (MG3740A not installed option-020/120)

Page	Key No.	Menu Display	Function
1	F1	SG1 Pulse Sync	Outputs the signal synchronized with SG1 Pulse cycle. This is used when the measurement synchronized with the pulse modulation of the MG3740A is to be executed. Refer to Figure 7.4.2-3 "SG1/2 Pulse Sync" and 7.2.3 "Pulse"
	F2	SG1 Pulse Video	Outputs the signal synchronized with SG1 Pulse On interval. This is used when the measurement synchronized with the pulse modulation of the MG3740A is to be executed. Refer to Figure 7.4.2-4 "SG1/2 Pulse Video" and 7.2.3 "Pulse".
	F3	SG1 Settled	Outputs the settling signal of SG1. This is used when the measurement synchronized with the signal transmission after frequency switching or others of the MG3740A is to be executed. Refer to Figure 7.4.2-5 "SG1/2 Source Settled".
	F4	Point Trigger	Outputs Point Trigger signal. This is used for measurement synchronized with Sweep/List function. Refer to Figure 7.4.2-2 "Point Trigger Out" and 6.5 "Point Trigger".
	F5	SG2 Pulse Sync	Outputs the signal synchronized with SG2 Pulse cycle. This is used when the measurement synchronized with the pulse modulation of the MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-3 "SG1/2 Pulse Sync" and 7.2.3 "Pulse".
	F6	SG2 Pulse Video	Outputs the signal synchronized with SG2 Pulse On interval. This is used when the measurement synchronized with the pulse modulation of the MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-4 "SG1/2 Pulse Video" and 7.2.3 "Pulse".
	F7	SG2 Settled	Outputs the settling signal of SG2. This is used when the measurement synchronized with the signal transmission after frequency switching or others of the MG3740A is to be executed. This is not displayed when the option 062/162, 064/164 or 066/166 is not installed. Refer to Figure 7.4.2-5 "SG1/2 Source Settled".

SG1/2 Marker 1A to 3A: Output level is TTL.

Outputs the waveform pattern-defined marker signal or user-defined marker signal.

SG1/2 Marker 1B to 3B: Output level is TTL.

Outputs the waveform pattern-defined marker signal or user-defined marker signal.

Sync Trigger Out: Output level is TTL.

Sends the trigger signal input as S/F Trigger to DFF circuit and outputs the signal at the timing of synchronization with Baseband Reference Clock Out falling.

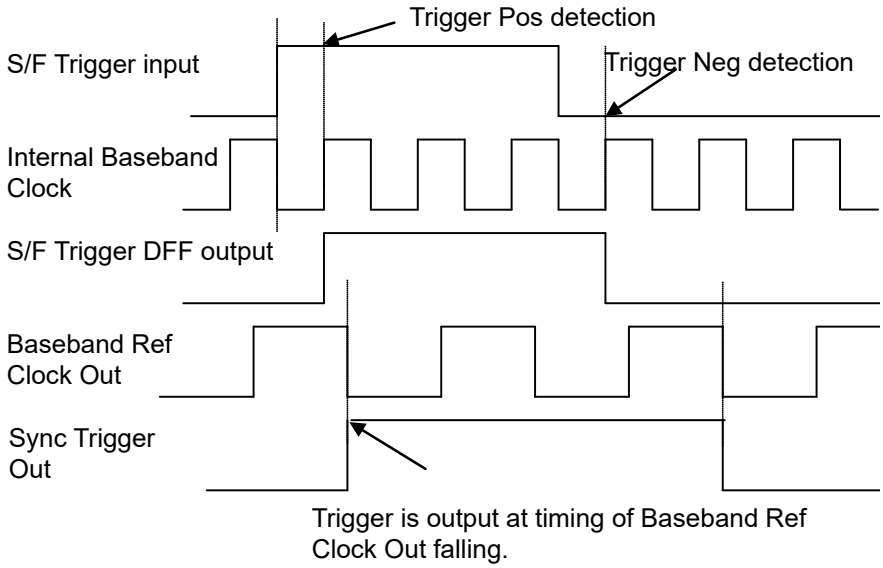


Figure 7.4.2-1 Sync Trigger Out

Pattern Trigger 1 Out, Pattern Trigger 2 / Pattern Status 2 Out, Pattern Trigger 3 / Pattern Status 3 Out: Output level is TTL.

This is same as Sync Trigger Source Out.

Point Trigger Out: Output level is TTL.

Outputs the signal at the timing of switching of Sweep/List function sweep point.

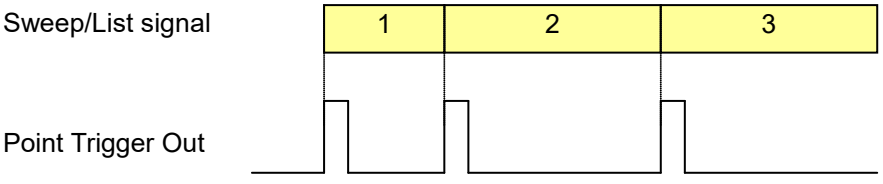


Figure 7.4.2-2 Point Trigger Out

SG1/2 Pulse Sync: Output level is TTL.

Outputs the signal synchronized with the start position of the pulse modulation cycle.

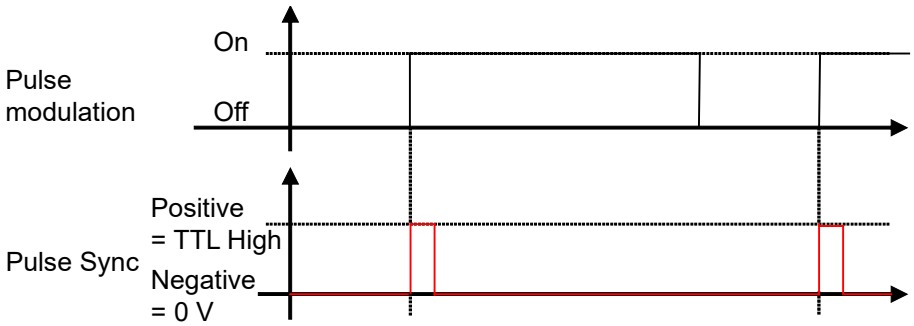


Figure 7.4.2-3 SG1/2 Pulse Sync

SG1/2 Pulse Video: Output level is TTL.

Outputs the signal synchronized with the modulated signal of the pulse modulation.

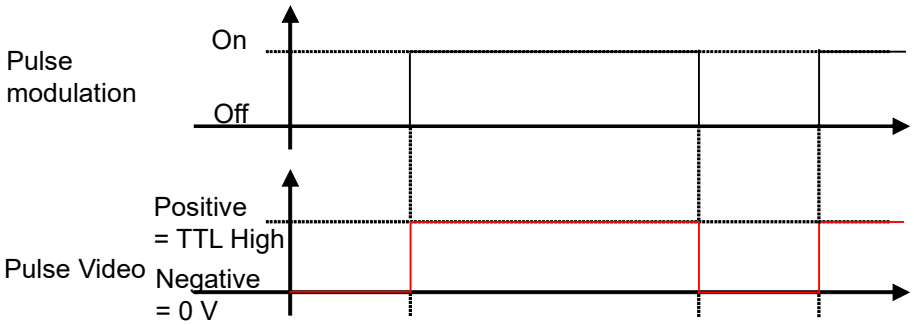


Figure 7.4.2-4 SG1/2 Pulse Video

SG1/2 Settled: Output level is TTL

Outputs the signal synchronized with the settling of SG1/2.
"Settling" indicates the status where the signal transmission is being prepared with switching of the frequency or waveform data.

Example:

- During Cal
- When signals are not being output due to digital delay

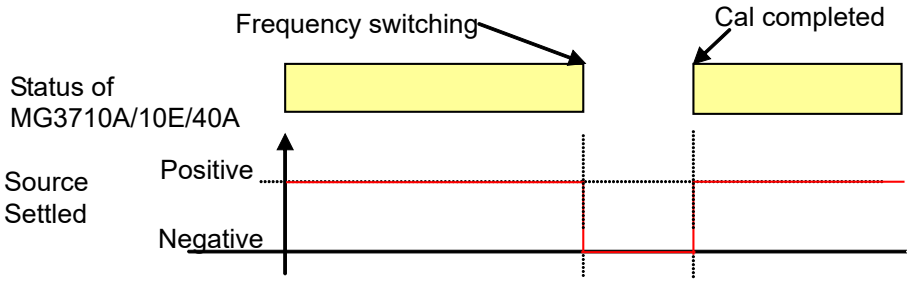


Figure 7.4.2-5 SG1/2 Source Settled

Marker 1 connector: Marker 1

Top>(→)>Route Connectors>Route Output Connectors>Marker 1

Selects the signal output from the Marker 1 connector.

Press **F1 Marker 1** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 "Marker Connector Function Menu".
Default	SG1 Marker 1 A (MG3710A, MG3710E, MG3740A-020/120) Point Trigger Out (MG3740A, when MG3740A-020/120 is not installed)

Remote command

Select the signal output from the Marker 1 connector

Command

```
:ROUTe[:CONNectors]:OUTPut:MARKer1
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:MARKer1?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Refer to the table below.

Table 7.4.2-4 Marker Connector

Parameter	Signal to be output	Remarks
M1A	SG1 Marker 1 A	Default (MG3710A, MG3710E, MG3740A-020/120) In MG3740A, this cannot be selected when option-020/120 is not installed.
M2A	SG1 Marker 2 A	In MG3740A, this cannot be selected when option-020/120 is not installed.
M3A	SG1 Marker 3 A	In MG3740A, this cannot be selected when option-020/120 is not installed.
M1B	SG1 Marker 1 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
M2B	SG1 Marker 2 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
M3B	SG1 Marker 3 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
PSY	SG1 Pulse Sync	
PVID	SG1 Pulse Video	
SET	SG1 Settled	
SYNC	Sync Trigger Out	In MG3740A, this cannot be selected when option-020/120 is not installed.
PT1	Pattern Trigger 1 Out	In MG3740A, this cannot be selected when option-020/120 is not installed.
PT2	Pattern Trigger 2 / Pattern Status 2	In MG3740A, this cannot be selected when option-020/120 is not installed.
PT3	Pattern Trigger 3 / Pattern Status 3	In MG3740A, this cannot be selected when option-020/120 is not installed.
PS1	Pattern Status 1	In MG3740A, this cannot be selected when option-020/120 is not installed.
POINT	Point Trigger	Default (MG3740A when option-020/120 is not installed)
SG2M1A	SG2 Marker 1 A	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2M2A	SG2 Marker 2 A	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2M3A	SG2 Marker 3 A	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2M1B	SG2 Marker 1 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2M2B	SG2 Marker 2 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2M3B	SG2 Marker 3 B	In MG3740A, this cannot be selected when option-020/120 is not installed.
SG2PSY	SG2 Pulse Sync	
SG2PVID	SG2 Pulse Video	
SG2SET	SG2 Settled	

Programming Example

To set the signal output from the Marker 1 connector to SG1 Marker 1 A.

```
ROUT:OUTP:MARK1 M1A
ROUT:OUTP:MARK1?
> M1A
```

Marker 2 connector: Marker 2

Top>(→)>Route Connectors>Route Output Connectors>Marker 2

Selects the signal output from the Marker 2 connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F2 Marker 2** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 “Marker Connector Function Menu”.
Default	SG1 Marker 2 A

Remote command

Select the signal output from the Marker 2 connector

Command

```
:ROUTe[:CONNectors]:OUTPut:MARKer2
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:MARKer2?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Listed in Table 7.4.2-4 “Marker Connector”.
Default	M2A

Programming Example

To set the signal output from the Marker 2 connector to SG1 Marker 1 A.

```
ROUT:OUTP:MARK2 M1A
ROUT:OUTP:MARK2?
> M1A
```

Marker 3 connector: Marker 3

Top>(→)>Route Connectors>Route Output Connectors>Marker 3

Selects the signal output from the Marker 3 connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F3 Marker 3** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 "Marker Connector Function Menu".
Default	SG1 Marker 3 A

Remote command

Select the signal output from the Marker 3 connector

Command

```
:ROUTe[:CONNectors]:OUTPut:MARKer3
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:MARKer3?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Listed in Table 7.4.2-4 "Marker Connector".
Default	M3A

Programming Example

To set the signal output from the Marker 3 connector to SG1 Marker 1 A.

```
ROUT:OUTP:MARK3 M1A
ROUT:OUTP:MARK3?
> M1A
```

Pulse Video

Top>(→)>**Route Connectors**>**Route Output Connectors**>**Pulse Video**

Selects the signal output from the Pulse Video connector.

Press **F4 Pulse Video** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 “Marker Connector Function Menu”.
Default	SG1 Pulse Video

Remote command

Select the signal output from the Pulse Video connector

Command

```
:ROUTe[:CONNectors]:OUTPut:PULSe:VIDeo
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:PULSe:VIDeo?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Listed in Table 7.4.2-4 “Marker Connector”.
Default	PVID

Programming Example

To set the signal output from the Pulse Video connector to SG1 Marker 1 A.

```
ROUT:OUTP:PULS:VID M1A
ROUT:OUTP:PULS:VID?
> M1A
```

Pulse Sync

Top>(→)>Route Connectors>Route Output Connectors>Pulse Sync

Selects the signal output from the Pulse Sync connector.

Press **F5 Pulse Sync** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 “Marker Connector Function Menu”.
Default	SG1 Pulse Sync

Remote command

Select the signal output from the Pulse Sync connector

Command

```
:ROUTe[:CONNectors]:OUTPut:PULSe:SYNC
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:PULSe:SYNC?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Listed in Table 7.4.2-4 “Marker Connector”.
Default	PSY

Programming Example

To set the signal output from the Pulse Sync connector to SG1 Marker 1 A.

```
ROUT:OUTP:PULS:SYNC M1A
ROUT:OUTP:PULS:SYNC?
> M1A
```

Sync Trig Out

Top>(→)>Route Connectors>Route Output Connectors>Sync Trig Out

Selects the signal output from the Sync Trig Out connector.
In MG3740A, this can be selected only when option-020/120 is installed.

Press **F6 Sync Trig Out** on the Output Connectors function menu to select the signal.

Options	Listed in Table 7.4.2-2 “Marker Connector Function Menu”.
Default	Sync Trigger Out

Remote command

Select the signal output from the Sync Trig Out connector

Command

```
:ROUTe[:CONNectors]:OUTPut:SYNC
M1A|M1B|M2A|M2B|M3A|M3B|SG2M1A|SG2M1B|SG2M2A|SG2M2B|SG2M
3A|SG2M3B|SYNC|PT1|PT2|PT3|PS1|POINT|PSY|SG2PSY|PVID|SG2
PVID|SET|SG2SET
```

Query

```
:ROUTe[:CONNectors]:OUTPut:SYNC?
```

Response

```
<mode>
```

Parameter

<mode>	Signal to be output
Options	Listed in Table 7.4.2-4 “Marker Connector”.
Default	SYNC

Programming Example

To set the signal output from the Sync Trig Out connector to SG1 Marker 1 A.

```
ROUT:OUTP:SYNC M1A
ROUT:OUTP:SYNC?
> M1A
```

7.5 AWGN

Top>(→)>AWGN

Executes the digital-addition of AWGN signal for the selected waveform pattern.
This can be used when AWGN option (MG3710A/MG3710E-049/079/149/179) is installed. This cannot be used in MG3740A.

Notes:

- The AWGN function cannot be used when a waveform pattern is not selected.
- If you want to use AWGN only, generate it by using IQproducer.

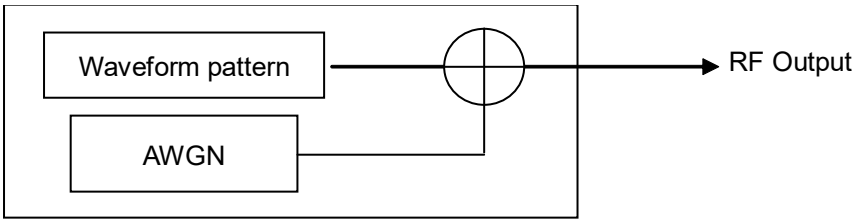


Figure 7.5-1 AWGN Addition Function

Press **F1 AWGN** on page 2 of the top function menu to open the AWGN function menu.

Table 7.5-1 AWGN Function Menu

Page	Key No.	Menu Display	Function
1	F1	AWGN Off On	Enables/disables the AWGN.
	F2	Noise Bandwidth 128.000000 MHz	Sets the bandwidth of AWGN.
	F3	Carrier Level –110.00 dBm	Sets the carrier signal output level.
	F4	Noise Level –20.00 dBm	Sets the noise level of the noise bandwidth conversion when no carrier exists, and sets the noise level of the carrier bandwidth conversion when the carrier exists.
	F5	C/N Ratio 40.00 dB	Sets the in-band Noise Power with the ratio to Carrier Power when AWGN is added.
	F6	C/N Set Signal Carrier	Sets the target for level change on CN Ratio change.(The option which is not selected is fixed.)

AWGN On/Off: AWGN

Top>(→)>AWGN>AWGN

Enables/disables the AWGN addition.

Press **F1 AWGN** on the AWGN function menu to set On/Off.

On	Outputs AWGN.
Off	Does not output AWGN (Default).

The signal with AWGN added is output when AWGN is On.

While the combination of baseband signal (A+B) is being executed, the AWGN cannot be set to On.

Remote command

Enable/disable AWGN

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe[:STATe] <boolean>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	AWGN output On/Off
ON|1	On
OFF|0	Off

Details

The signal with AWGN added is output when AWGN is On.

While the combination of baseband signal (A+B) is being executed, the AWGN cannot be set to On.

Programming Example

To add AWGN to the output signal.

```
RAD:ARB:NOIS ON
RAD:ARB:NOIS?
> 1
```

Noise Bandwidth

Top>(→)>AWGN>Noise Bandwidth

Sets the bandwidth of AWGN.

Press **F2 Noise Bandwidth** on the AWGN function menu to set with the **Noise Bandwidth** dialog box.

Range See table below.

Note:

The table below describes the setting range when it is output with single AWGN.

Table 7.5-2 AWGN Noise Bandwidth

Output waveform status	Upper limit	Lower limit
A, A+AWGN, Long, Long+Awgn	Sampling Rate A × 0.8	Sampling Rate A × 0.2
B, A+B, Awgn, CW No Signal, B+Awgn Multi	Sampling Rate B × 0.8	Sampling Rate B × 0.2
Seq.(A), Seq.(A+B) Seq.(A+Awgn)	16 kHz to 160 MHz	16 kHz to 160 MHz

Resolution 1 Hz

Default 128 MHz

This parameter indicates the bandwidth of the flat part.

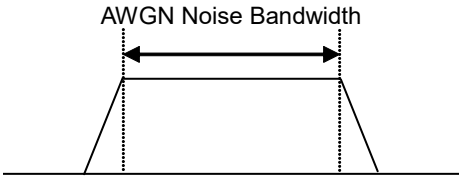


Figure 7.5-2 AWGN Noise Bandwidth

Remote command

Set the bandwidth of AWGN

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe:BANDwidth <freq>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe:BANDwidth?
```

Response

<freq> Unit: Hz

Parameter

<freq>	Frequency
Range	Refer to Table 7.5-2.
Resolution	1 Hz
Default	128 MHz
Suffix code	HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ When omitted: HZ

Programming Example

To set the bandwidth of AWGN to 10 MHz.

```
RAD:ARB:NOIS:BAND 10MHZ
RAD:ARB:NOIS:BAND?
> 10000000
```

Carrier Level

Top>(→)>AWGN>Carrier Level

Sets the carrier signal output level.

Press **F3 Carrier Level** on the AWGN function menu to set with the **Carrier Level** dialog box.

Same value with Level A. When Level A is changed, also Carrier Level is changed with the same value. And vice versa.

Range	Output level range of MG3710A/MG3710E
Resolution	0.01 dB
Default	–110.00 dBm

Remote command

Set the carrier signal output level

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CARRier <ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CARRier?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Carrier signal level when AWGN is ON
Range	Output level range of MG3710A/MG3710E
Resolution	0.01 dB
Default	–110.00 dBm
Suffix code	DBM, DM, DBUV, DBUVE When omitted: DBM

Programming Example

To set the carrier signal level when AWGN is ON to –55.00 dBm.

```
RAD:ARB:NOIS:POW:CARR -55
RAD:ARB:NOIS:POW:CARR?
> -55.00
```

Noise Level

Top>(→)>AWGN>Noise Level

Sets the noise level of AWGN.

The noise level of the noise bandwidth conversion is set when no carrier exists, and the noise level of the carrier bandwidth conversion is set when the carrier exists.

Press **F4 Noise Level** on the AWGN function menu to set with the **Noise Level** dialog box.

Resolution	0.01 dB
Default	–20 dBm

The noise level of the noise bandwidth conversion is set when no carrier exists, and the noise level of the carrier bandwidth conversion is set when the carrier exists.

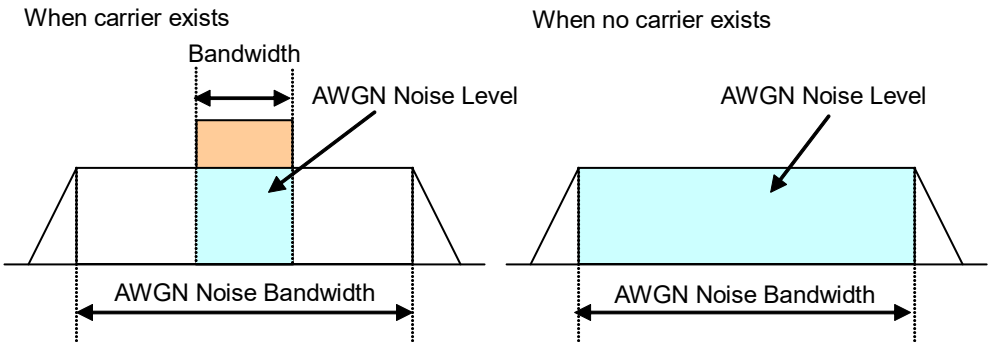


Figure 7.5-3 AWGN Noise Level

Remote command

Set the noise level of AWGN

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:NOISe <ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:NOISe?
```

Response

<ampl>	Unit: dBm

Parameter

<ampl>	Output level
Resolution	0.01 dB
Default	–20 dBm
Suffix code	DBM, DM, DBUV, DBUVE When omitted: DBM

Programming Example

To set the AWGN noise level to –30.00 dBm.

```
RAD:ARB:NOIS:POW:NOIS -30.00
RAD:ARB:NOIS:POW:NOIS?
> -30.00
```

C/N Ratio

Top>(→)>AWGN>C/N Ratio

Sets the ratio of in-band AWGN Noise Level to Carrier Level when AWGN is On.

Press **F5 C/N Ratio** on the AWGN function menu to set with the **C/N Ratio** dialog box.

Range	–40 dB to 40 dB
Resolution	0.01 dB
Default	40 dB

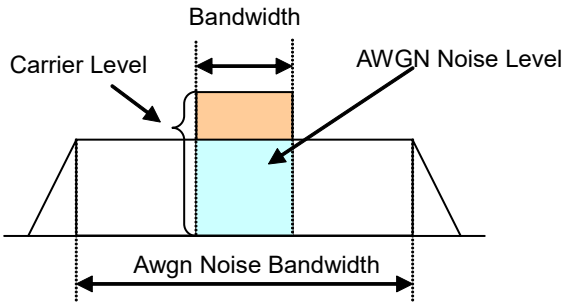


Figure 7.5-4 AWGN Noise Level

Remote command

Set the ratio of in-band AWGN Noise Level to Carrier Level when AWGN is On

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe:CN <rel_ampl>
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe:CN?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	C/N
Range	–40 dB to 40 dB
Resolution	0.01
Default	40.00
Suffix code	DB, When omitted: DB

Details

When the RF output level is near the upper limit or lower limit, the settable range may become narrow.

Programming Example

To set the C/N to 3 dB.

```
RAD:ARB:NOIS:CN 3DB
RAD:ARB:NOIS:CN?
> 3.00
```

C/N setting: C/N Set Signal

Top>(→)>AWGN>C/N Set Signal

Sets the target for level change on C/N Ratio change.(The option which is not selected is fixed.)

Press **F6 C/N Set Signal** on the AWGN function menu to set the target.

Carrier	Fixes Noise and changes Carrier.
Noise	Fixes Carrier and changes Noise.
Constant	Fixes the output level and changes Carrier and Noise (Default).

Remote command

Set the target for level change on C/N Ratio change

Command

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CONTrol[:MODE]
TOTal|CARRier|NOISe
```

Query

```
[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CONTrol[:MODE]?
```

Response

<mode>	TOT, CARR, or NOIS

Parameter

<mode>	Parameter to be changed
CARRier	Changes Carrier.
NOISe	Changes Noise.
TOTal	Fixes the output level and changes Carrier and Noise (Default).

Programming Example

To set the parameter to be changed when C/N is set to AWGN.

```
RAD:ARB:NOIS:POW:CONT NOIS
RAD:ARB:NOIS:POW:CONT?
> NOIS
```

7.6 I/Q Modulation

I/Q or **Top**>→>**I/Q**

Sets the vector modulation with the external I/Q signal and correction, adjustment, and routing for the vector modulation.

In MG3740A, this can be used only when option-020/120 is installed.

Press **I/Q** of the main function key or **F2 I/Q** on page 2 of the top function menu to open the I/Q function menu.

Table 7.6-1 IQ Function Menu

Page	Key No.	Menu Display	Function
1	F1	I/Q Source Internal	Sets the I/Q signal source. This is available in MG3710A/MG3710E only when option-018/118 is installed. This is not available in MG3740A.
	F2	I/Q Output RF	Sets the output destination for baseband signals. This is not available in MG3740A.
	F3	Internal Channel Correction Off On	Enables/disables the baseband in-band correction. This is not available in MG3740A.
	F5	I/Q Calibration	Displays the IQ Calibration function menu to set the settings related to I/Q quadrature modulator calibration. Refer to 7.6.1 “I/Q Calibration”.
	F6	Wideband Off On	Selects the switching mode for RF output bandwidth. This is not available in MG3740A.
2	F1	Analog I/Q Input Adjustments	Displays the Analog I/Q Input function menu to adjust and set the analog I/Q input. This is available in MG3710A/MG3710E only when option-018/118 is installed. This is not available in MG3740A. Refer to 7.6.2 “Analog I/Q Input Adjustments”.
	F2	Analog I/Q Output Adjustments	Displays the Analog I/Q Output function menu to adjust and set the analog I/Q output. This is available in MG3710A/MG3710E only when option-018/118 is installed. This is not available in MG3740A. Refer to 7.6.3 “Analog I/Q Output Adjustments”.
	F3	Internal Baseband Adjustments	Displays the Internal Baseband Adjustments function menu to adjust the I/Q signal generated in the internal Baseband. Refer to 7.6.4 “Internal Baseband Adjustments”.

I/Q Source

I/Q or **Top**>→>**I/Q, >I/Q Source**

Selects the I/Q signal source for the vector modulation with the external I/Q signal.

This can be used only when option-018/118 is installed in MG3710A/MG3710E.
This cannot be used in MG3740A.

Press **F1 I/Q Source** on the I/Q function menu to select from the I/Q Source function menu.

Internal	I/Q signal generated with the internal Baseband (Default).
Analog I/Q In	Signal input from Analog I/Q In connector (available only for SG1) This is displayed when the option 018/118 is installed.

Internal is selected during Sweep/List execution.

Remote command

Set the I/Q signal source

Command

```
[:SOURce[1]|2]:DM:SOURce INTernal|AEXTernal
```

Query

```
[:SOURce[1]|2]:DM:SOURce?
```

Response

<mode>	INT or AEXT

Parameter

<mode>	I/Q signal source
INTernal	Internal (Default)
AEXTernal	Analog I/Q In

Programming Example

To set the I/Q signal source to the I/Q signal generated with the internal Baseband.

```
DM:SOUR INT
DM:SOUR?
> INT
```

Operation description

The setting procedure for the vector modulation with the external I/Q signal is described below.

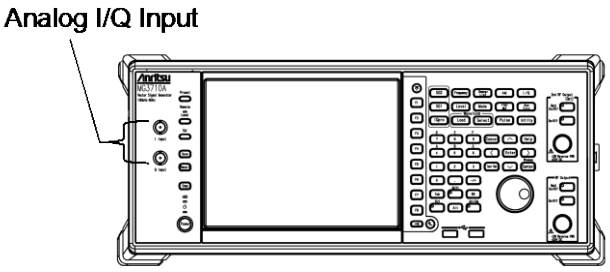


Figure 7.6-1 Analog I/Q Input Connector

The Analog I/Q Input connectors are internally terminated with 50 Ω. When the effective value voltage of $\sqrt{I^2+Q^2}$ is 0.2 V (rms) in the 50 Ω termination status, RF signal that corresponds to the output level setting is output. Input the I/Q signal with 0.2 V (rms) of the effective value voltage of $\sqrt{I^2+Q^2}$ when the vector modulation is actually executed. Also input the maximum I/Q signal within the range of ±1 V for each.

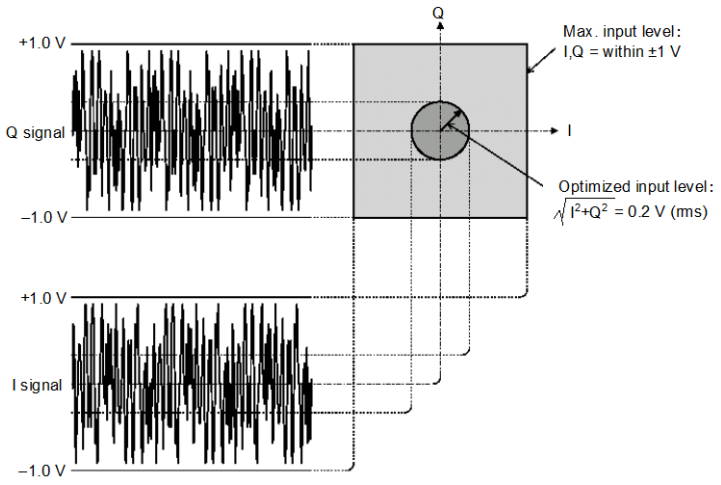


Figure 7.6-2 I/Q Signal Input Level

Example: To execute the vector modulation with the external I/Q signal.

1. Press **F1 I/Q Source** on the I/Q function menu to switch **F1 Internal** to **F2 Analog I/Q In**. The display for "Src:" is switched to "Analog I/Q In" in the I/Q block in the figure below.



Figure 7.6-3 External I/Q Signal Input Status

2. Press On/Off of RF Output to set the RF output to On. Press Mod On/Off to light the lamp (green) of the key to start the vector modulation. External input of "Analog I/Q In" is indicated between the I/Q block and the Pulse Mod block in the figure below. In addition, a line is displayed at the right side of the Pulse Mod block and it indicates that RF Output is On.

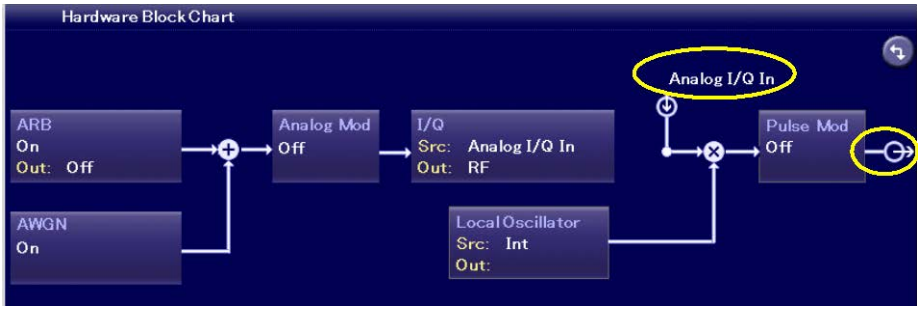


Figure 7.6-4 Modulation Status with External I/Q Signal

When the modulation is executed with the external I/Q signal and if the I/Q signal with $\sqrt{I^2+Q^2}$ = 0.5 V is input, the output level corresponds to the displayed level.

I/Q Output

I/Q or **Top**>→>**I/Q**, >**I/Q Output**

Can output the I/Q signal generated at the digital modulation unit from the I/Q signal output connector on the rear panel.

This cannot be used in MG3740A.

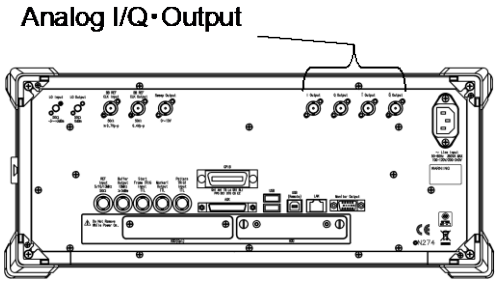


Figure 7.6-5 Analog I/Q Output Connector

Select the output destination for the Baseband signal.

Press **F2 I/Q Output** on the I/Q function menu to select from the I/Q Output function menu.

RF	RF terminal (Default)
Analog I/Q Out	Analog I/Q Out terminal (selectable only with SG1) RF terminal output is CW. This is displayed when the option 018/118 is installed.

Remote command

Set the output destination for baseband signals

Command

```
[:SOURce[1]|2]:DM:OUTPut RFOut|AEXTernal
```

Query

```
[:SOURce[1]|2]:DM:OUTPut?
```

Response

<mode>	RFO or AEXT

Parameter

<mode>	Baseband signal output destination
RFOut	RF terminal (Default)
AEXTernal	Analog I/Q Out

Programming Example

To set the output destination for baseband signals to Analog I/Q Out terminal.

```
DM:OUTP AEXT
DM:OUTP?
> AEXT
```

Operation method

Example: To output the I/Q signal from the I/Q signal output connector.

Note:

When the power is turned on while the I/Q signal output is set to On, the DC voltage of +1 V is output for tens of microseconds during the power activation. Do not turn on the MG3710A/MG3710E while a low-voltage device or others are connected to the I/Q signal output.

1. Press **F2 I/Q Output** on the I/Q function menu to switch **F1 RF** to **F2 Analog I/Q Out**.
   The display for "Out:" is switched to "Analog I/Q Out" in the I/Q block in the figure below.
2. Press Mod On/Off to light the lamp (green) of the key to start the vector modulation. External output of "Analog I/Q Out" is indicated between the I/Q block and the Pulse Mod block.

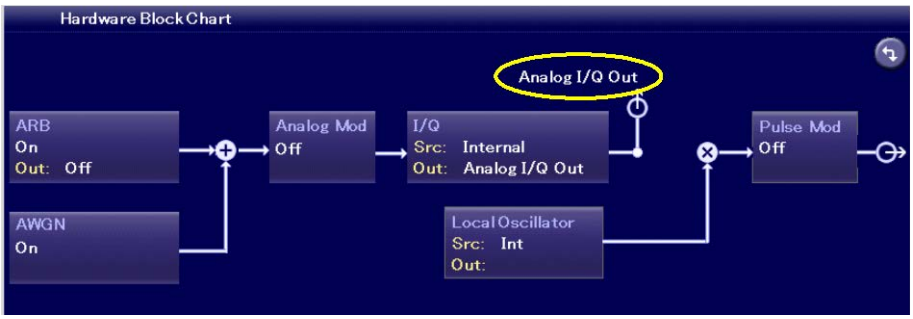


Figure 7.6-6 I/Q Signal Output Status

Baseband in-band correction: Internal Channel Correction

I/Q or **Top**>  >**I/Q**, **Internal Channel Correction,** or Cal >**Internal Channel Correction**

Enables/disables the baseband in-band correction.

This cannot be set in MG3740A.

Press **F3 Internal Channel Correction** on the I/Q function menu to set the correction.

Off	Does not execute the baseband in-band correction (Default).
On	Executes the baseband in-band correction.

When it is set to On, the in-band flatness becomes better; however, the switching time for the frequency and pattern change becomes longer because the correction filter recalculation time and filter passing time become longer. If the in-band characteristics are not important, setting this function to Off allows the high-speed operation. When CW is output, this function has no effect.

Remote command

Enable/disable the baseband in-band correction

Command

```
[:SOURce[1]|2]:DM:INTernal:CHANnel:CORRection[:STATe]
<boolean>
```

Query

```
[:SOURce[1]|2]:DM:INTernal:CHANnel:CORRection[:STATe]?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	On/Off of the baseband in-band correction
`OFF|0`	Does not execute the baseband in-band correction (Default).
`ON|1`	Executes the baseband in-band correction.

Programming Example

To execute the baseband in-band correction.

```
DM:INT:CHAN:CORR ON
DM:INT:CHAN:CORR?
> 1
```

Baseband in-band correction: Wideband

I/Q or **Top**>→>**I/Q, >Wideband**

Selects the switching mode for RF output bandwidth.

This cannot be used in MG3740A.

Press **F6 Wideband** on the I/Q function menu to select the mode.

Off	Harmonics distortion characteristic has priority (Default).
On	In-band flatness has priority. This function allows using the maximum modulation bandwidth with low frequency.(Harmonics cut filter has no effect.)

When CW is output, this function has no effect.

Remote command

Enable/disable the wideband output

Command

```
[:SOURce[1]|2]:DM:WIDeband <boolean>
```

Query

```
[:SOURce[1]|2]:DM:WIDeband?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Wideband output switching mode On/Off
OFF|0	Does not execute the wideband output (Default).
ON|1	Executes the wideband output.

Programming Example

To execute the wideband output.

```
DM:WID ON
DM:WID?
> 1
```

7.6.1 I/Q Calibration

I/Q or **Top**>→>**I/Q, >I/Q Calibration**, or Cal >**I/Q Cal**

Sets the settings related to the I/Q quadrature modulator calibration.

Press **F5 I/Q Calibration** on the I/Q function menu to open the **I/Q Calibration Info** dialog box and I/Q Calibration function menu.



Figure 7.6.1-1 I/Q Calibration Info Dialog Box

Table 7.6.1-1 I/Q Calibration Function Menu

Page	Key No.	Menu Display	Function
1	F1	Execute	Executes the calibration for the I/Q gain balance, origin offset, and I/Q quadrature angle.
	F2	Cal Type DC Full	Sets the calibration method for the I/Q calibration execution.
	F8	Restore Default	Returns the calibration value to factory setting status.

Execute Cal

I/Q or **Top**>→>**I/Q, >I/Q Calibration**>**Execute**

Executes the calibration for the I/Q gain balance, origin offset, and I/Q quadrature angle.

Press **F1 Execute Cal** on the I/Q Calibration function menu to execute the calibration.

This function cannot be executed during Sweep/List execution.

Remote command

Execute the calibration for the I/Q quadrature modulator optimal in the current instrument setting status

Command

```
:CALibration[1]|2:IQ:DC
```

Programming Example

To execute the optimal adjustment for SG1 in the current instrument setting status

```
CAL:IQ:DC
```

Remote command

Execute the calibration for the I/Q quadrature modulator with the range of all frequencies

Command

```
:CALibration[1]|2:IQ:FULL
```

Programming Example

To execute the calibration of SG1 for the range of all frequencies.

```
CAL:IQ:FULL
```

Cal Type

I/Q or **Top**>→>**I/Q,** >**I/Q Calibration**>**Cal Type**

Selects the calibration method for the I/Q calibration execution.

Press **F2 Cal Type** on the I/Q Calibration function menu to select the method.

DC	Executes the optimal adjustment with the currently specified frequency. (Default) For other frequency points, the existing correction value is used without change.
Full	Executes the calibration with the range of all frequencies.

Remote command

Select the calibration method for the I/Q calibration execution

Command

```
:CALibration[1]|2:IQ:TYPE DC|FULL
```

Query

```
:CALibration[1]|2:IQ:TYPE?
```

Response

```
<type>
```

Parameter

<type>	Calibration method for the I/Q calibration execution
DC	Executes the optimal adjustment with the currently specified frequency. (Default)
FULL	Executes the calibration with the range of all frequencies.

Programming Example

To set the calibration method for the SG1 I/Q calibration execution to the range of all frequencies.

```
CAL:IQ:TYPE FULL
CAL:IQ:TYPE?
> FULL
```

Remote command **Query the calibration method for the calibration execution**

Query

```
:CALibration[1]|2:IQ:INFomation:TYPE?
```

Response

<type>	Calibration method for the I/Q calibration execution
DC	Executes the optimal adjustment with the currently specified frequency.
FULL	Executes the calibration with the range of all frequencies.

Programming Example

To query the calibration method for the SG1 calibration execution.

```
CAL:IQ:INF:TYPE?
> FULL
```

Remote command **Query the latest date when the calibration has been executed**

Query

```
:CALibration[1]|2:IQ:INFomation:DATE?
```

Response

<date>	yyyy/mm/dd
Default	2000/01/01

Programming Example

To query the date when the calibration for SG1 has been executed.

```
CAL:IQ:INF:DATE?
> 2011/01/01
```

Remote command

Query the latest time when the calibration has been executed

Query

```
:CALibration[1]|2:IQ:INFomation:TIME?
```

Response

<time>	hh:mm:ss
Default	00:00:00

Programming Example

To query the time when the calibration for SG1 has been executed.

```
CAL:IQ:INF:TIME?
> 01:01:01
```

Restore Default

I/Q or **Top**>→>**I/Q,** >**I/Q Calibration**>**Restore Default**

Returns the calibration value to factory setting status.

Press **F8 Restore Default** on the I/Q Calibration function menu to execute the function.

This function cannot be executed during Sweep/List execution.

Remote command

Return the calibration value to factory setting status

Command

```
:CALibration[1]|2:IQ:DEFault
```

Programming Example

To return the SG1 calibration value to factory setting status.

```
CAL:IQ:DEF
```

7.6.2 Analog I/Q Input Adjustments

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Input Adjustments**

Adjusts/sets the analog I/Q input.

This is available in MG3710A/MG3710E only when option-018/118 is installed.

This is not available in MG3740A.

Press **F1 Analog I/Q Input Adjustments** on page 2 of the I/Q function menu to open the Analog I/Q Input Adjust function menu.

Table 7.6.2-1 Analog I/Q Input Adjust Function Menu

Page	Key No.	Menu Display	Function
1	F1	I Offset 0.000 V	Sets the offset for the I-phase.
	F2	Q Offset 0.000 V	Sets the offset for the Q-phase.

I Offset

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Input Adjustments**>**I Offset**

Sets the offset for the I-phase.

This is available in MG3710A/MG3710E only when option-018/118 is installed.

This is not available in MG3740A.

Press **F1 I Offset** on the Analog I/Q Input Adjust function menu to set with the **I Offset** dialog box.

Range	–100 mV to 100 mV
Resolution	1 mV
Default	0 mV

Remote command

Set the offset for the I-phase

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:IOFFset <voltage>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:IOFFset?
```

Response

<voltage>	Unit: V

Parameter

<voltage>	I-phase offset value
Range	–100 mV to 100 mV
Resolution	1 mV
Default	0 mV
Suffix code	V, MV, UV, When omitted: V

Programming Example

To set the offset for the I-phase to 50 mV.

```
DM:IQAD:EXT:IOFF 50MV
DM:IQAD:EXT:IOFF?
> 0.050
```

Q Offset

I/Q or **Top**>→>**I/Q**, >→>**Analog I/Q Input Adjustments**>**Q Offset**

Sets the offset to the Q-phase.

This is available in MG3710A/MG3710E only when option-018/118 is installed.

This is not available in MG3740A.

Press **F2 Q Offset** on the Analog I/Q Input Adjust function menu to set the offset with the **Q Offset** dialog box.

Range	–100 mV to 100 mV
Resolution	1 mV
Default	0 mV

Remote command

Set the offset for the Q-phase

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:QOFFset <voltage>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:QOFFset?
```

Response

<voltage>	Unit: V

Parameter

<voltage>	Q-phase offset value
Range	–100 mV to 100 mV
Resolution	1 mV
Default	0 mV
Suffix code	V, MV, UV, When omitted: V

Programming Example

To set the offset for the Q-phase to 50 mV.

```
DM:IQAD:EXT:QOFF 50MV
DM:IQAD:EXT:QOFF?
> 0.050
```

7.6.3 Analog I/Q Output Adjustments

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Output Adjustments**

Adjusts/sets the analog I/Q output.

This is available in MG3710A/MG3710E only when option-018/118 is installed.

This is not available in MG3740A.

Press **F2 Analog I/Q Output Adjustments** on page 2 of the I/Q function menu to open the Analog I/Q Output Adjust function menu.

Table 7.6.3-1 Analog I/Q Output Adjust Function Menu

Page	Key No.	Menu Display	Function
1	F1	I Level Trimming 100.0 %	Adjusts the I-phase output level gain.
	F2	Q Level Trimming 100.0 %	Adjusts the Q-phase output level gain.
	F3	I/Q Common Offset 0.0000 V	Adjusts the I/Q inphase output DC offset level.
	F4	I Diff Offset 0.0000 V	Adjusts the I-phase differential output DC offset level.
	F5	Q Diff Offset 0.0000 V	Adjusts the Q-phase differential output DC offset level.

Set the I/Q signal output

The I/Q signal output voltage and DC offset can be adjusted. The output voltage is set with the ratio (%) to the output voltage defined with the setting of the digital modulation unit.

These voltages are always indicated by open voltage.

Setting ranges of output voltage and DC offset

Setting range of output voltage	0.0 to 120.0 %
Minimum setting resolution	0.1 %
Setting range of inphase DC offset	–2.500 to 5.000 V
Minimum setting resolution	2 mV
Setting range of differential DC offset	–50.00 to 50.00 mV
Minimum setting resolution	0.1 mV

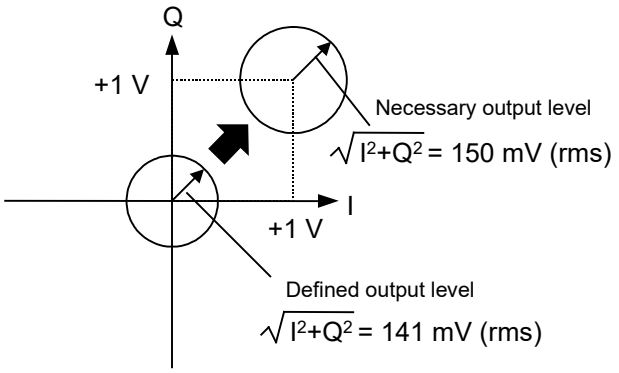


Figure 7.6.3-1 I/Q Signal Output Adjustment Image

Example: To set the I/Q signal output voltage to 150 mV (rms), inphase DC offset to +1 V, and differential DC offset to 0.5 V.
However, the output voltage defined with the waveform pattern setting is 141 mV (rms).

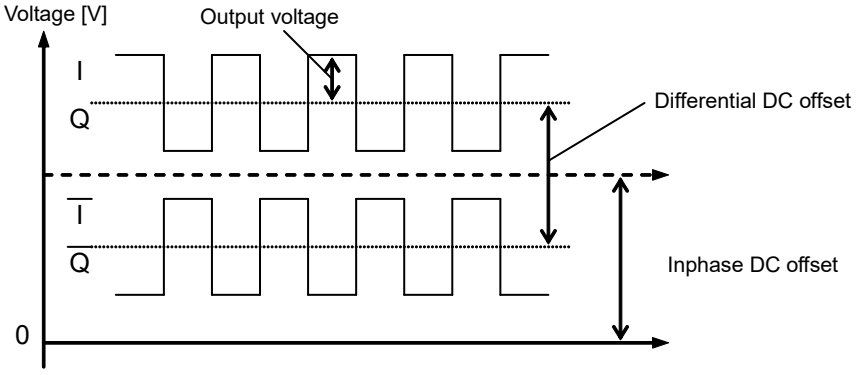


Figure 7.6.3-2 I/Q Signal Output Image

1. Press **F1 I level Trimming** to display the **I level Trimming** dialog box.
2. Set “106 %” (150/141 × 100 = 106 [%]) to the **I level Trimming** dialog box.
3. Press **F2 Q level Trimming** to display the **Q level Trimming** dialog box.
4. Set “106 %” (150/141 × 100 = 106 [%]) to the **Q level Trimming** dialog box.
5. Press **F3 I/Q Common Offset** to display the **I/Q Common Offset** dialog box.
6. Set “1 V” to the **I/Q Common Offset** dialog box.
7. Press **F4 I Diff Offset** to display the **I Diff Offset** dialog box.
8. Set “0.5 mV” to the **I Diff Offset** dialog box.
9. Press **F5 Q Diff Offset** to display the **Q Diff Offset** dialog box.
10. Set “0.5 mV” to the **Q Diff Offset** dialog box.

I Level Trimming

I/Q or **Top**>→>**I/Q**, >→>**Analog I/Q Output Adjustments**>**I Level Trimming**

Adjusts the I-phase output level gain.

This is available in MG3710A/MG3710E only when option-018/118 is installed.
This is not available in MG3740A.

Press **F1 I Level Trimming** on the Analog I/Q Output Adjust function menu to set with the **I Level Trimming** dialog box.

Range	0 % to 120 %
Resolution	0.1 %
Default	100 %

Remote command

Adjust the I-phase output level gain

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:ITRimming <percent>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:ITRimming?
```

Response

<percent>	Unit: %

Parameter

<percent>	I-phase output level gain
Range	0 % to 120 %
Resolution	0.1 %
Default	100 %
Suffix code	PCT (%), When omitted: PCT

Programming Example

To adjust the I-phase output level gain to 50 %.

```
DM:IQAD:EXT:ITR 50
DM:IQAD:EXT:ITR?
> 50.0
```

Q Level Trimming

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Output Adjustments**>**Q Level Trimming**

Adjusts the Q-phase output level gain.

This is available in MG3710A/MG3710E only when option-018/118 is installed.
This is not available in MG3740A.

Press **F2 Q Level Trimming** on the Analog I/Q Output Adjust function menu to set with the **Q Level Trimming** dialog box.

Range	0 % to 120 %
Resolution	0.1 %
Default	100 %

Remote command

Adjust the Q-phase output level gain

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:QTRimming <percent>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:QTRimming?
```

Response

<percent>	Unit: %

Parameter

<percent>	Q-phase output level gain
Range	0 % to 120 %
Resolution	0.1 %
Default	100 %
Suffix code	PCT (%), When omitted: PCT

Programming Example

To adjust the Q-phase output level gain to 50 %.

```
DM:IQAD:EXT:QTR 50
DM:IQAD:EXT:QTR?
> 50.0
```

I/Q Common Offset

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Output Adjustments**>**I/Q Common Offset**

Adjusts the I/Q inphase output DC offset level.

This is available in MG3710A/MG3710E only when option-018/118 is installed.
This is not available in MG3740A.

Press **F3 I/Q Common Offset** on the Analog I/Q Output Adjust function menu to set with the **I/Q Common Offset** dialog box.

Range	–2.5 V to 5 V
Resolution	2 mV
Default	0 V

Remote command

Adjust the I/Q inphase output DC offset level

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:COFFset <voltage>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:COFFset?
```

Response

`<voltage>`	Unit: V

Parameter

`<voltage>`	I-phase inphase output DC offset level
Range	–2.5 V to 5 V
Resolution	2 mV
Default	0 V
Suffix code	V, MV, UV, When omitted: V

Programming Example

To adjust the I-phase inphase output DC offset level to 50 mV.

```
DM:IQAD:EXT:COFF 50MV
DM:IQAD:EXT:COFF?
> 0.050
```

I Diff Offset

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Output Adjustments**>**I Diff Offset**

Adjusts the I-phase differential output DC offset level.

This is available in MG3710A/MG3710E only when option-018/118 is installed.
This is not available in MG3740A.

Press **F4 I Diff Offset** on the Analog I/Q Output Adjust function menu to set with the **I Diff Offset** dialog box.

Range	–50 mV to 50 mV
Resolution	0.1 mV
Default	0 V

Remote command

Adjust the I-phase differential output DC offset level

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:DIOFfset <voltage>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:DIOFfset?
```

Response

<voltage>	Unit: V

Parameter

<voltage>	I-phase differential output DC offset level
Range	–50 mV to 50 mV
Resolution	0.1 mV
Default	0 V
Suffix code	V, MV, UV, When omitted: V

Programming Example

To adjust the I-phase differential output DC offset level to 5 mV.

```
DM:IQAD:EXT:DIOF 5MV
DM:IQAD:EXT:DIOF?
> 0.0050
```

Q Diff Offset

I/Q or **Top**>→>**I/Q,** >→>**Analog I/Q Output Adjustments**>**Q Diff Offset**

Adjusts the Q-phase differential output DC offset level.

This is available in MG3710A/MG3710E only when option-018/118 is installed.
This is not available in MG3740A.

Press **F5 Q Diff Offset** on the Analog I/Q Output Adjust function menu to set with the **Q Diff Offset** dialog box.

Range	–50 mV to 50 mV
Resolution	0.1 mV
Default	0 V

Remote command

Adjust the Q-phase differential output DC offset level

Command

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:DQOFfset <voltage>
```

Query

```
[:SOURce[1]]:DM:IQADjustment:EXTernal:DQOFfset?
```

Response

<voltage>	Unit: V

Parameter

<voltage>	Q-phase differential output DC offset level
Range	–50 mV to 50 mV
Resolution	0.1 mV
Default	0 V
Suffix code	V, MV, UV, When omitted: V

Programming Example

To adjust the Q-phase differential output DC offset level to 5 mV.

```
DM:IQAD:EXT:DQOF 5MV
DM:IQAD:EXT:DQOF?
> 0.0050
```

7.6.4 Internal Baseband Adjustments

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**

Adjusts the I/Q signal generated in the internal Baseband.

In MG3740A, this can be used only when option-020/120 is installed.

Press **F3 Internal Baseband Adjustments** on page 2 of I/Q function menu to open the **Internal Baseband Adjustments** dialog box and Internal Baseband Adjust function menu.

Table 7.6.4-1 Internal Baseband Adjust Function Menu

Page	Key No.	Menu Display	Function
1	F1	I Offset 0.000 %	Sets the DC offset for the I-phase.
	F2	Q Offset 0.000 %	Sets the DC offset for the Q-phase.
	F3	Gain Balance 0.000 dB	Adjusts the I/Q phase gain balance.
	F4	Quad. Angle 0.00 deg	Adjusts the quadrature angle of I/Q phase.
	F5	I/Q Phase 0.00 deg	Adjusts the Baseband signal phases.
	F6	I/Q Skew 0.000000000000 s	Adjusts the I/Q phase time difference (timing).
	F7	I/Q Delay 0.000000000000 s	Adjusts the Baseband signal output timing.

I Offset

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**>**I Offset**

Sets the DC offset for the I-phase.

Press **F1 I Offset** on the Internal Baseband Adjust function menu to set with the **I Offset** dialog box.

Range	–20 % to 20 %
Resolution	0.025 %
Default	0 %

Remote command

Set the DC offset for the I-phase

Command

```
[:SOURce[1]|2]:DM:IQADjustment:IOFFset <percent>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:IOFFset?
```

Response

<percent>	PCT

Parameter

<percent>	DC offset value
Range	–20 % to 20 %
Resolution	0.025 %
Default	0 %
Suffix code	PCT (%), When omitted: PCT

Programming Example

To adjust the I-phase DC offset to 10 %.

```
DM:IQAD:IOFF 10
DM:IQAD:IOFF?
> 10.000
```

Q Offset

I/Q or **Top**>→>**I/Q**, >→>**Internal Baseband Adjustments**>**Q Offset**

Sets the DC offset for the Q-phase.

Press **F2 Q Offset** on the Internal Baseband Adjust function menu to set with the **Q Offset** dialog box.

Range	–20 % to 20 %
Resolution	0.025 %
Default	0 %

Remote command

Set the DC offset for the Q-phase

Command

```
[:SOURce[1]|2]:DM:IQADjustment:QOFFset <percent>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:QOFFset?
```

Response

<percent>	Unit: %

Parameter

<percent>	Q-phase DC offset value
Range	–20 % to 20 %
Resolution	0.025 %
Default	0 %
Suffix code	PCT (%), When omitted: PCT

Programming Example

To adjust the Q-phase DC offset to 10 %.

```
DM:IQAD:QOFF 10
DM:IQAD:QOFF?
> 10.000
```

Gain Balance

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**>**Gain Balance**

Adjusts the I/Q phase gain balance.

Press **F3 Gain Balance** on the Internal Baseband Adjust function menu to set with the **Gain Balance** dialog box.

Range	–1 dB to 1 dB
Resolution	0.001 dB
Default	0 dB

When the positive value is set, Gain of the I-phase becomes larger than the Q-phase.
The amplitude ratio of the I/Q phase is the gain balance [dB].
Even if the gain balance is changed, RMS value is not changed.

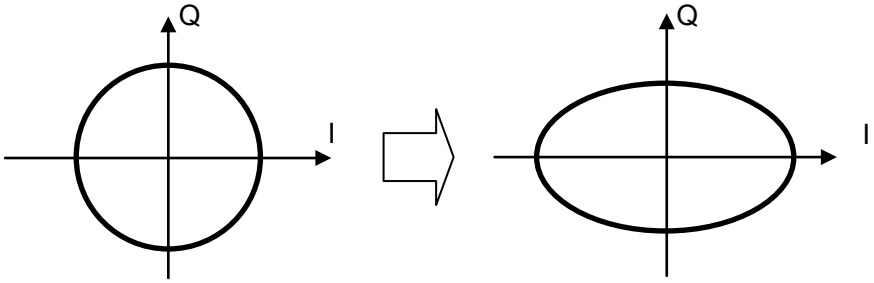


Figure 7.6.4-1 Gain Balance

Remote command

Adjust the I/Q phase gain balance

Command

```
[:SOURce[1]|2]:DM:IQADjustment:GAIN <rel_ampl>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:GAIN?
```

Response

<rel_ampl>	Unit: dB

Parameter

<rel_ampl>	Gain balance of the I/Q phase
Range	–1 dB to 1 dB
Resolution	0.001 dB
Default	0 dB
Suffix code	DB, When omitted: DB

Programming Example

To set the gain balance of I/Q phase to 1 dB.

```
DM:IQAD:GAIN 1
DM:IQAD:GAIN?
> 1.000
```

Quad. Angle

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**>**Quad. Angle**

Adjusts the quadrature angle of I/Q phase.

Press **F4 Quad. Angle** on the Internal Baseband Adjust function menu to set with the **Quad. Angle** dialog box.

Range	–10 deg to 10 deg
Resolution	0.01 deg
Default	0 deg

The positive value increases the I/Q quadrature angle from 90 degrees, and the negative value decreases the I/Q quadrature angle from 90 degrees. For zero, the I/Q quadrature angle is 90 degrees.

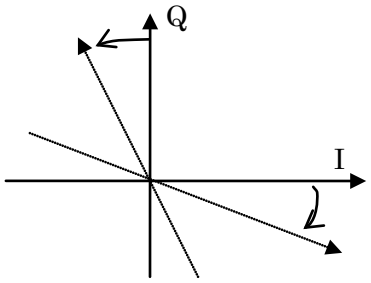


Figure 7.6.4-2 Quadrature Angle

Remote command

Adjust the I/Q phase quadrature angle

Command

```
[:SOURce[1]|2]:DM:IQADjustment:QSKew <angle>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:QSKew?
```

Response

<angle>	Unit: deg

Parameter

<angle>	Quadrature angle of the I/Q phase
Range	–10 deg to 10 deg
Resolution	0.01 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To adjust the quadrature angle of I/Q phase to 90 deg + 5 deg.

```
DM:IQAD:QSK 5
DM:IQAD:QSK?
> 5.00
```

I/Q Phase

I/Q or **Top**>→>**I/Q**, >→>**Internal Baseband Adjustments**>**I/Q Phase**

Adjusts the Baseband signal phase.

This is used to adjust multiple SGs signal phases with MIMO or beam forming. The setting is same as **F7 I/Q Phase** in Table 7.3.15-1 "Sync Multi SG Function Menu".

Press **F5 I/Q Phase** on the Internal Baseband Adjust function menu to set with the **I/Q Phase** dialog box.

Range	–360 deg to 360 deg
Resolution	0.01 deg
Default	0 deg

When the positive value is set, the phase is adjusted to be promoted.

Remote command

Adjust the Baseband signal phase

Command

```
[:SOURce[1]|2]:DM:IQADjustment:PHASe <phase>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:PHASe?
```

Response

<phase>	Unit: deg

Parameter

<phase>	Baseband signal phase
Range	–360 deg to 360 deg
Resolution	0.01 deg
Default	0 deg
Suffix code	DEG, When omitted: DEG

Programming Example

To set the Baseband signal IQ phase to 5 deg.

```
DM:IQAD:PHAS 5
DM:IQAD:PHAS?
> 5.00
```

I/Q time difference: I/Q Skew

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**>**I/Q Skew**

Adjusts the I/Q phase time difference (timing).

Press **F6 I/Q Skew** on the Internal Baseband Adjust function menu to set with the **I/Q Skew** dialog box.

Range	–800 ns to 800 ns
Resolution	1 ps
Default	0 s

When the positive value is set, the I-phase is delayed against the Q-phase.

Remote command

Adjust the time difference (timing) between I-phase and Q-phase

Command

```
[:SOURce[1]|2]:DM:IQADjustment:SKEW <time>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:SKEW?
```

Response

<time>	Unit: s

Parameter

<time>	Time difference between the I-phase and Q-phase
Range	–800 ns to 800 ns
Resolution	1 ps
Default	0 s
Suffix code	S, MS, US, NS, PS, When omitted: S

Programming Example

To set the time difference between I-phase and Q-phase to 500 ps.

```
DM:IQAD:SKEW 500PS
DM:IQAD:SKEW?
> 0.000000000500
```

I/Q Delay

I/Q or **Top**>→>**I/Q,** >→>**Internal Baseband Adjustments**>**I/Q Delay**

Adjusts the Baseband signal output timing.

This is used when multiple SGs are to be synchronized and timings for signals to reach to DUT are to be adjusted. The setting is same as **F8 I/Q Delay** in Table 7.3.15-1 "Sync Multi SG Function Menu".

Press **F7 I/Q Delay** on the Internal Baseband Adjust function menu to set with the **I/Q Delay** dialog box.

Range	–400 ns to 400 ns
Resolution	1 ps
Default	0 s

Remote command

Adjust the Baseband signal output timing

Command

```
[:SOURce[1]|2]:DM:IQADjustment:DELay <time>
```

Query

```
[:SOURce[1]|2]:DM:IQADjustment:DELay?
```

Response

<time>	Unit: s

Parameter

<time>	Baseband signal output timing
Range	–400 ns to 400 ns
Resolution	1 ps
Default	0 s
Suffix code	S, MS, US, NS, PS, When omitted: S

Programming Example

To set the time difference between I-phase and Q-phase to 300 ns.

```
DM:IQAD:DEL 300NS
DM:IQAD:DEL?
> 0.000000300000
```

Chapter 8 BER Measurement

This chapter describes the operations and screen display of the BER measurement function.

Note on remote command:
When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

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8.1 Function, Performance, and Communication

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**

When the MG3710A/MG3710E/MG3740A has the option 021/121 BER measurement function installed, it can measure Bit Error Rates (BER) of externally input signals.

To switch the MG3710A/MG3710E/MG3740A to the BER measurement mode, press **Aux Fnct** on the main function menu or press **F5 Auxiliary** on page 2 of the top function menu to display the Auxiliary function menu, and press **F2 BER**.

This chapter assumes that the MG3710A/MG3710E/MG3740A is in the BER measurement mode, unless otherwise specified.

8.1.1 Function and performance

The BER measurement function of the MG3710A/MG3710E/MG3740A has the following functions and performance:

Input signal
: Data, Clock, and Enable (Polarity inversion is enabled.)

Input level
: TTL

Input bit rate
: 100 bps to 40 Mbps

Measurable patterns
: PN9, PN11, PN15, PN20, PN23, ALL0, ALL1, Alternate (repetition of 01), PN9Fix, PN11Fix, PN15Fix, PN20Fix, PN23Fix, and user defined patterns

Number of measurable bits
: ≤4294967295 bits = (2^{32} – 1 bit)

Number of measurable error bits
: ≤4294967295 bits = (2^{32} – 1 bit)

Measurement end condition
: Selectable between the number of measurement bits and the number of measurement error bits

Operation mode
: Measure Mode: Continuous, Single, Endless
: Count Mode: Data, Error
: Auto Resync: On, Off

Synchronization establishing condition

Depends on measured patterns.

PN 9, 11, 15, 20, 23: (PN order × 2) bit continuous error free

PN_Fix pattern: Establish the synchronization with PN signal by PN order × 2 bits error free, and then establish the synchronization with PNfix signal from the start bit of PNfix signal by PN order error free.

ALL0, ALL1, repetition of 01: 10 bit continuous error free

User defined patterns: 8 to 1024 bit (variable) error free
The start bit to be used for detecting synchronization can also be selected.

Probabilities of synchronization

For PN signals on the MG3710A/MG3710E/MG3740A, the synchronization establishing condition is (PN order × 2) bit continuous error free. For PN signals including random errors, probabilities of a section in which (PN order × 2) bit continuous error free occurs are shown in the table below. The probabilities can be deemed as those of synchronizing with PN signals with a certain error rate in 1 cycle.

Table 8.1.1-1 Probabilities of Synchronizing with PN Signals (%)

PN order / PN signal error rate (%)	PN9	PN15	PN23
10	15.0	4.2	0.79
3	57.8	40.1	24.6
1	83.5	74.0	63.0
0.1	98.2	97.0	95.5

Detection of SyncLoss

When the Auto Resync setting is ON, the SyncLoss detection conditions are as follows:

x/y: y = number of measurement bit: selectable among 500, 5000 and 50000 bits
x = number of error bits among y bits: selectable in the range from 1 to y/2

(When Auto Resync is Off, SyncLoss is not detected)

Resynchronization judgment

Based on detection of SyncLoss.

Resynchronization operations

Selectable between Clear BER Count and Count Keep

Display

Status, Error Rate, Error Count, SyncLoss Count, number of measurement bits

Measurement result clearing function

This function can start the measurement from 0 by clearing the measurement values while keeping synchronization during the BER measurement.

8.1.2 External connection

BER measurement requires signals to be input externally. The signals are input via the AUX connector on the rear panel. Refer to Table 3.1.2-1 “AUX Connectors”.

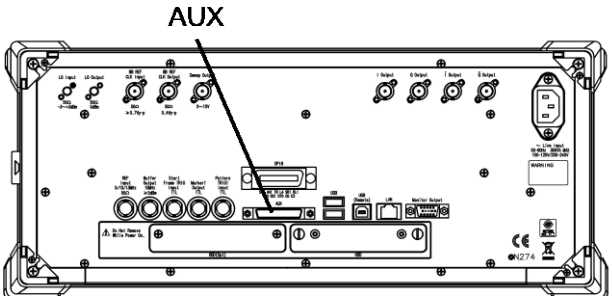


Figure 8.1.2-1 BER Measurement Input Connector

BER measurement uses three terminals of the AUX connectors:

- BER CLK terminal: Inputs clock signals for BER measurement (TTL level and DC coupling).
- BER Enable terminal: Inputs Enable signals for BER measurement of burst signals (TTL level and DC coupling).
- BER Data terminal: Inputs data signals for BER measurement (TTL level and DC coupling).

When Enables signals are not used, do not connect to the Enable terminal and set Enable Active to “Disable”. Refer to 8.3.6 “BER Interface”.

8.2 Display Description

This section describes display items of the BER measurement function.

8.2.1 BER dialog box

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**

Press **Aux Fnct** on the main function menu or **F5 Auxiliary** on page 2 of the top function menu to display the Auxiliary function menu. Press **F2 BER** to display the **BER** dialog box.

The **BER** dialog box shows a measurement result.

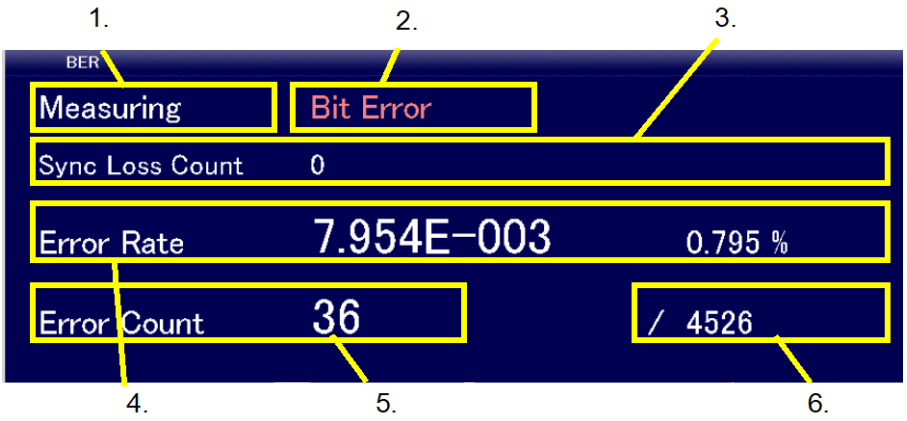


Figure 8.2.1-1 BER Dialog Box

When BER is not measured, Error Rate 0, Error Count 0, and Data Count 0 are displayed in the **BER** dialog box.

Table 8.2.1-1 Display Items of BER Dialog Box

No.	Display	Description
1	Status	Indicates the status of measurement.
2	Error	Explains an error when it occurs.
3	Sync Loss Count	Indicates a SyncLoss count and a reason why it stopped.
4	Error Rate	Indicates an error rate in index and percentage.
5	Error Count	Indicates the number of error bits.
6	Data Count	Indicates the number of measurement bits.

Status

Indicates the status of the BER measurement.

Table 8.2.1-2 Measurement Status

Display	Description
Stop	Measurement stopped.
Synchronizing	Synchronization is being established.
Measuring	Measurement is in progress.
OverflowDataCount	Measurement stopped because the number of measurement bits exceeded the maximum value ($2^{32} - 1$ bit).
OverflowSyncLoss	Measurement stopped because the SyncLoss count exceeded the maximum value (65535).

Remote command

Query the status of the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:MEASure?
```

Response

```
<status>
```

Parameter

<status>	Measurement status
0	Stop
1	Measuring
2	Synchronizing
3	Stopped because a measurement error occurs.
4	Stopped because the SyncLoss count exceeded the maximum value. OverflowSyncLoss
5	Stopped because the number of count bits exceeded the maximum value. OverflowDataCount

Details

When a measurement error occurs, `[:SENSe]:BERT[:BASeband]:ERRor?` can be used to query the details of the error.

Programming Example

To query the current operation status.

```
BERT:MEAS?
> 0
```

Error

Indicates the error information of the BER measurement.

Table 8.2.1-3 Explanation of Errors

Display	Description
Bit Error	An error bit occurred.
SyncLoss	SyncLoss occurred.
ClockError	The input clock signal was abnormal.
EnableError	The input enable signal was abnormal.

Remote command

Query the error information of the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:ERRor?
```

Response

```
<status>
```

Parameter

<status> Measurement status

Value = bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7 + bit8 + bit9 + bit10 + bit11 + bit12 + bit13 + bit14 + bit15

When a target application is BER, bits are assigned as follows:

bit0: $2^0 = 1$	Sync Loss occurred
bit1: $2^1 = 2$	Clock Error occurred
bit2 : $2^2 = 4$	Enable Error occurred
bit3: $2^3 = 8$	(Not Used)
bit4: $2^4 = 16$	(Not Used)
bit5: $2^5 = 32$	(Not Used)
bit6: $2^6 = 64$	(Not Used)
bit7: $2^7 = 128$	(Not Used)
bit8: $2^8 = 256$	(Not Used)
bit9: $2^9 = 512$	(Not Used)
bit10: $2^{10} = 1024$	(Not Used)
bit11: $2^{11} = 2048$	(Not Used)
bit12: $2^{12} = 4096$	(Not Used)
bit13: $2^{13} = 8192$	(Not Used)
bit14: $2^{14} = 16384$	(Not Used)
bit15: $2^{15} = 32768$	(Not Used)

Range 0 to 65535

Details

0 is returned if both SG and BER operate normally.

Programming Example

To query the current operation status.

```
BERT:ERR?
> 0
```

SyncLoss Count

Displays a Sync Loss count of the BER measurement.

Remote command

Query a Sync Loss count of the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:SYNLoss:COUNt?
```

Response

```
<count>
```

Parameter

<count>	Sync Loss count
Range	0 to 65535

Programming Example

To query a Sync Loss count.

```
BERT:SYNL:COUN?
> 500
```

Error Rate

Displays a bit error rate of the BER measurement function.
Error Rate is represented in two ways: in index; and in percentage. Each representation follows the rules:

In index

The rate is rounded to the digit of a ten-thousandth of the maximum digit and represented before the digit of a ten-thousandth.

Example: 0.00978495 is displayed as 9.785E-03.

In percentage

The rate is represented in percentage, rounded to four decimal places, and represented before four decimal places.

Example: 0.00978495 is displayed as 0.978 %.

Remote command

Query the bit error rate of the BER measurement function

Query

```
:FETCh:BERT:ERRor:RATE? EP|ER
```

Response

```
<rate>
```

Parameter

EP	Returns the bit error rate in percentage.
ER	Returns the bit error rate as an index.
<rate>	Value of the bit error rate
EP	0.000 to 100.000 %
ER	0.000E+00 to 1.000E + 02

Programming Example

To query the bit error rate of the BER measurement function in percentage.

```
FETC:BERT:ERR:RATE? EP
> 5.000
```

Error Count

Displays the number of error bits of the BER measurement.

Remote command

Query the number of error bits of the BER measurement

Query

```
:FETCh:BERT:ERRor:COUNt?
```

Response

```
<bit>
```

Parameter

<bit>	Number of error bits
Range	0 to $2^{32} - 1$ bit

Programming Example

To query the number of error bits.

```
FETC:BERT:ERR:COUN?
> 500
```

Number of measurement bits: Data Count

Displays the number of measurement bits of the BER measurement.

Remote command

Query the number of measurement bits of the BER measurement

Query

```
:FETCh:BERT:DATA:COUNt?
```

Response

```
<bit>
```

Parameter

<bit>	Number of measurement bits
Range	0 to $2^{32} - 1$ bit

Programming Example

To query the number of measurement bits.

```
FETC:BERT:DATA:COUN?
> 10000
```

8.3 Performing BER Measurement

AUX Fctn or **Top**>(→)>**Auxiliary,** >**BER**

Use the BER function menu to set and perform the BER measurement.

1. Following the explanation in 8.1.2 “External connection”, input signals externally.
2. Use **F4 Measure Mode** to select a mode for the BER measurement.
3. Use **F5 Count Mode** to set the measurement end conditions.
4. Use **F6 Data Type** to select data pattern for measurement.
5. Use **F1 Resync Condition** on page 2 of the function menu to set the automatic resynchronization function.
6. Use **F2 BER Interface** on page 2 of the function menu to set the interface for the BER measurement.
7. Use **F1 Start BER** and **F2 Stop BER** to start and stop the measurement, respectively.

BER function menu

AUX Fctn or **Top**>(→)>**Auxiliary,** >**BER**

Press **Aux Fnct** on the main function menu or **F5 Auxiliary** on page 2 of the top function menu to display the Auxiliary function menu. Press **F2 BER** to display the BER function menu.

Table 8.3-1 BER Function Menu

Page	Key No.	Menu Display	Function
1	F1	Start BER Test	Starts the BER measurement. Refer to 8.3.1 “Starting/stopping BER measurement”.
	F2	Stop BER Test	Stops the BER measurement. Refer to 8.3.1 “Starting/stopping BER measurement”.
	F3	Clear BER Count	Clears Data Count, ErrorCount, or SyncLossCount. Refer to 8.3.1 “Starting/stopping BER measurement”.
	F4	Measure Mode Continuous	Selects a mode for the BER measurement from Single, Continuous, or Endless. Refer to 8.3.2 “Measure Mode”.
	F5	Count Mode	Selects either the number of measurement bits or the number of error bits for the measurement end condition. Refer to 8.3.3 “Measurement end conditions: Count Mode”.
	F6	Data Type PN9	Selects data pattern for measurement. Refer to 8.3.4 “Data Type”.
	F7	PN Fix Pattern	Sets the PN Fix pattern. Refer to 8.4 “PN Fix Pattern”.
	F8	User Pattern	Queries or sets user defined patterns. Refer to 8.5 “User Defined Pattern”.

Table 8.3-1 BER Function Menu (Cont'd)

Page	Key No.	Menu Display	Function
2	F1	Resync Condition	Sets the automatic resynchronization function. Refer to 8.3.5 "Resync Condition".
	F2	BER Interface	Sets the interface for the BER measurement. Refer to 8.3.6 "BER Interface".
	F3	Show Log	Displays, saves, or deletes a log of the BER measurement result. Refer to 8.6 "BER Log".
	F4	Auto Restart Off On	Sets whether to auto-restart BER measurement when output level is changed. Refer to 8.3.1 "Starting/stopping BER measurement".
	F7	Level –144.00 dBm	Sets the output level. Refer to 5.2 "Output Level Setting Method: Level".

8.3.1 Starting/stopping BER measurement

Start BER Test

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**>**Start BER Test**

Starts the BER measurement.

Press **F1 Start BER Test** to start the BER measurement.

If this is pressed during measurement, measurement values obtained during measurement are cleared and nothing remains in the log. Measurement starts over after stopping.

Remote command

Start the BER measurement

Command

```
:INITiate:BERT[:IMMediate]
```

Programming Example

To start the BER measurement.

```
INIT:BERT
```

Stop BER Test

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**>**Stop BER Test**

Stops the BER measurement.

Pressing **F2 Stop BER Test** during BER measurement stops measurement and saves measurements while stopped to the log.

Remote command

Stop the BER measurement

Command

```
:ABORt:BERT
```

Programming Example

To stop the BER measurement.

```
ABOR:BERT
```

Operation description

Other measurement end conditions

Other measurement end conditions depend on operation modes.

Table 8.3.1-1 Measurement End Conditions of BER Measurement (Single Measurement Mode)

Auto Resync / Count Mode	On	Off
Data	• Reaches the specified number of the measurement bits. • Reaches the maximum SyncLoss count (65535).	• Reaches the specified number of the measurement bits.
Error	• Reaches the specified number of the measurement error bits. • Reaches the maximum number of measurement bits ($2^{32} - 1$ bit). • Reaches the maximum SyncLoss count (65535).	• Reaches the specified number of the measurement error bits. • Reaches the maximum number of measurement bits ($2^{32} - 1$ bit).

Setting parameters stops measurements (except for BER Interface).

In the Continuous measurement mode, if the condition in Table 8.3.1-1 is met, the measurement stops. Then, it starts again.

The BER measurement continues even if you navigate to other screens during the BER measurement.

When you turn the power off and restart the MG3710A/MG3710E/MG3740A during measurement, the BER measurement becomes the stop status.

When 40 Mbps signals are measured, the result reaches the upper limit of bit count at the longest 107.4 seconds or so, and the measurement stops.

Clear BER Count

AUX Fctn or **Top**>  >**Auxiliary,** >**BER**>**Clear BER Count**

Clears the result of the BER measurement.

Press **F3 Clear BER Count** to clear the result of the BER measurement.

This is not available when Measurement Mode is Continuous.

Remote command

Clear the result of the BER measurement

Command

```
[:SENSe]:BERT[:BASeband]:COUNt:CLEar
```

Programming Example

To clear Error Rate, ErrorCount and SyncLossCount.

```
BERT:COUN:CLE
```

Operation description

When Clear BER Count is pressed during synchronizing/measuring

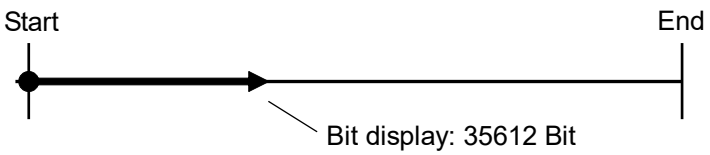
The number of measurement bits, the number of error bits, and the SyncLoss count are cleared during measurement while keeping synchronization. However, the displayed measurement status is not cleared. Therefore, if you perform Clear BER Count during measurement, and the measurement finishes, then the number of measurement bits is less than the specified number of measurement bits. Operations of the number of error bits and the SyncLoss count are similar to this.

When you press **F3 Clear BER Count**, the measurement values (Data Count, Error Count, and Sync Loss Count) are stored as offset values. Then, the displayed values are updated by subtracting the offset values from the measurement values. These offset values are reset to 0 when the measurement finishes or stops.

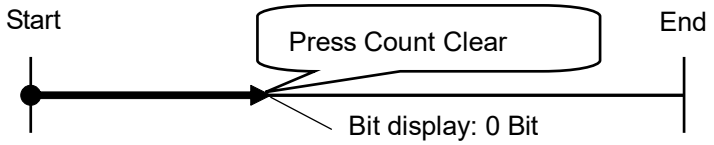
Executing Clear BER Count during measurement saves CLEAR to the log.

Example: The displayed result of measuring 100000 bits when you press Clear BER Count.

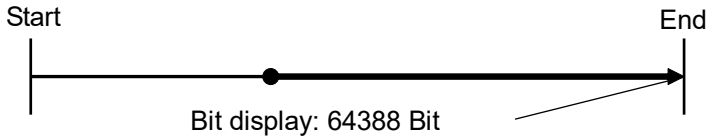
1. Start the measurement.



2. Press **F3 Clear BER Count**. When the key is pressed, the number of count bits is 35612, but the "0 bit" is displayed.



3. When the measurement finishes, the total count bit is 100000 bits, but the "64388 bit" (100000 – 35612) is displayed.



When Clear BER Count is pressed after the measurement is finished or stopped

The number of measurement bits, the number of error bits, the SyncLoss count, the error rate, and the status displayed on the screen are cleared. Executing Clear BER Count saves CLEAR to the log.

Auto Restart

AUX Fctn or **Top>**(→)**>Auxiliary, >BER>**(→)**>Auto Restart**

Enables/disables the Auto Restart.

Press (→) to display the page 2 of BER function menu. Press **F4 Auto Restart** to select the Auto Restart setting after changing output level.

On	Auto Restart enabled.
Off	Auto Restart disabled. (Default).

Remote command

Enable/disable the Auto Restart.

Command

```
[:SENSe]:BERT:[BASeband]:RSTart:AUTO <boolean>
```

Query

```
[:SENSe]:BERT:[BASeband]:RSTart:AUTO?
```

Response

`<boolean>` `0` or `1`

Parameter

`<boolean>`	Auto Restart setting
`ON|1`	Auto Restart enabled.
`OFF|0`	Auto Restart disabled (Default).

Programming Example

To enable Auto Restart.

```
BERT:RST:AUTO ON
BERT:RST:AUTO?
> 1
```

8.3.2 Measure Mode

AUX Fctn or **Top**>  >**Auxiliary,** >**BER**>**Measure Mode**

Selects a mode for the BER measurement.

Press **F4 Measure Mode** to display the Measure Mode function menu to select a measurement mode.

Single	Measures selected data patterns until a result reaches the specified number of bits or the specified number of error bits.
Continuous	Repeats Single measurements (Default).
Endless	Measures data until a result reaches the upper limit of the measurement count bit (4294967295 bits).

Remote command

Select a mode for the BER measurement

Command

```
[:SENSe]:BERT[:BASeband]:MODE SINGle|CONTinuous|ENDLess
```

Query

```
[:SENSe]:BERT[:BASeband]:MODE?
```

Response

<mode>	SING, CONT, or ENDL

Parameter

<mode>

SINGle	Measures selected data patterns until a result reaches the specified number of bits or the specified number of error bits.
CONTinuous	Repeats Single measurements (Default).
ENDLess	Measures data until a result reaches the upper limit of the measurement count bit (4294967295 bits).

Programming Example

To set the measurement mode to Continuous.

```
BERT:MODE CONT
BERT:MODE?
> CONT
```

Operation description

Display the BER measurement mode

Displayed measurement results by BER measurement modes are shown below. Refer to Figure 8.2.1-1 “BER Dialog Box” for displayed status and error rates during measurement.

When Measure Mode is Continuous:

Status, Error, and Sync Loss Count are updated as required during measurement. When measurement starts again, the measurement results are cleared to 0.

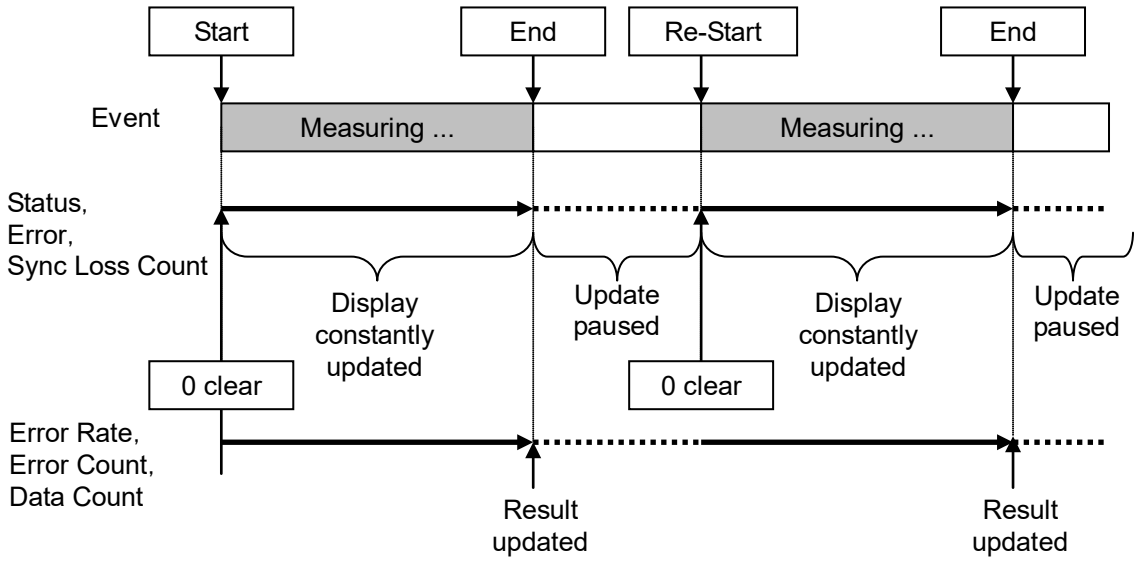


Figure 8.3.2-1 Measure Mode: Continuous

When Measure Mode is Single or Endless:

Error, Error Rate, Error Count, Data Count, and Status (only for Single) are updated as required during measurement. When the measurement finishes, updating stops.

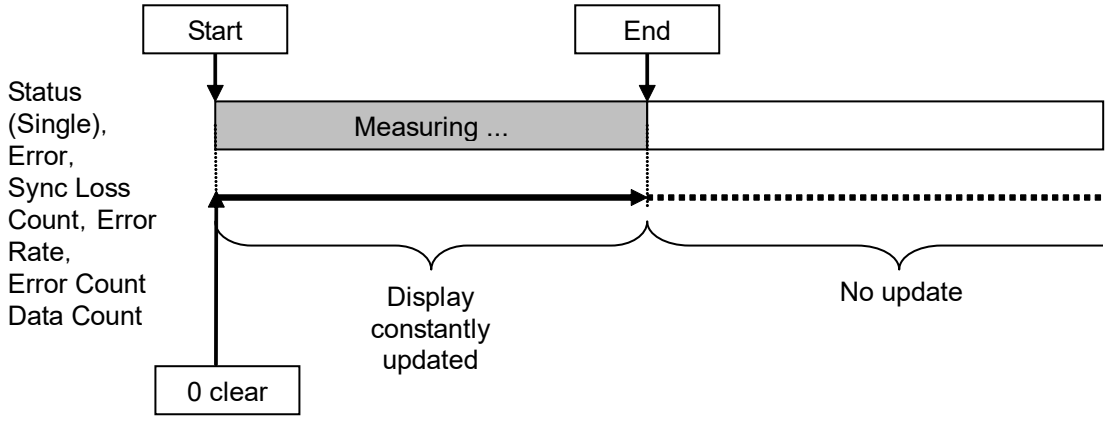


Figure 8.3.2-2 Measure Mode: Single or Endless

8.3.3 Measurement end conditions: Count Mode

AUX Fctn or **Top**>→>**Auxiliary, >BER>Count Mode**

Sets the measurement end conditions.

This function is not available when Measure Mode is set to Endless.

Press **F5 Count Mode** to display the BER Count mode function menu to set the measurement end conditions.

Table 8.3.3-1 Count Mode Function Menu

Page	Key No.	Menu Display	Function
1	F1	Count Mode Data Error	Selects a measurement end condition.
	F2	Data 1000	Sets the number of measurement bits.
	F3	Error 1	Sets the number of measurement error bits.

Selecting measurement end conditions: Count Mode

AUX Fctn or **Top**>→>**Auxiliary, >BER>Count Mode>Count Mode**

Selects a measurement end condition.

This function is not available if Measure Mode is set to Endless.

Press **F1 Count Mode** on the BER Count mode function menu to select a measurement end condition.

Data	Specifies the number of measurement bits(Default).
Error	Specifies the number of measurement error bits.

Remote command

Select a measurement end condition

Command

```
[:SENSe]:BERT[:BASeband]:STOP:CRITeria[:SELect] EBIT|NONE
```

Query

```
[:SENSe]:BERT[:BASeband]:STOP:CRITeria[:SELect]?
```

Response

```
<mode>
```

Parameter

```
<mode>
```

NONE	Specifies the condition to the number of measurement bits (Default).
EBIT	Specifies the condition to the number of measurement error bits.

Programming Example

To set the Count mode to the number of measurement bits.

```
BERT:STOP:CRIT NONE
BERT:STOP:CRIT?
> NONE
```

Setting the number of measurement bits: Data

AUX Fctn or **Top**>  **>Auxiliary, >BER>Count Mode>Data**

Sets the number of measurement bits when Count Mode is Data.
This function is not available if Measure Mode is set to Endless.
Press **F2 Data** on the Count mode function menu to specify the number of measurement bits in the **Data** dialog box. When accumulated measurement bits reach the specified number of bits, the measurement stops.

Table 8.3.3-2 Setting Range

Setting range	1000 bit to 2^{32} –1 (4294967295) bit
Resolution	1 bit
Default	1000 bit

Remote command

Set the number of measurement bits when Count Mode is Data

Command

```
[:SENSe]:BERT[:BASeband]:TBITs <ext_integer>
```

Query

```
[:SENSe]:BERT[:BASeband]:TBITs?
```

Response

```
<ext_integer>
```

Parameter

```
<ext_integer>
```

Based on Table 8.3.3-2 “Setting Range”.

Programming Example

To set the number of measurement bits to 2000 bits.

```
BERT:TBIT 2000
BERT:TBIT?
> 2000
```

Setting the number of measurement error bits: Error

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**>**Count Mode**>**Error**

Sets the number of measurement error bits when Count Mode is Error. This function is not available if Measure Mode is set to Endless.

Press **F3 Error** on the Count mode function menu to specify the number of measurement error bits in the **Error** dialog box. When accumulated measurement error bits reach the specified number of bits, the measurement stops.

Table 8.3.3-3 Setting Range

Setting range	1 bit to $2^{32} - 1$ (4294967295) bit
Resolution	1 bit
Default	1 bit

Remote command

Set the number of measurement error bits when Count Mode is Error

Command

```
[:SENSe]:BERT[:BASeband]:STOP:CRITeria:EBIT <ext_integer>
```

Query

```
[:SENSe]:BERT[:BASeband]:STOP:CRITeria:EBIT?
```

Response

```
<ext_integer>
```

Parameter

```
<ext_integer>
```

Based on Table 8.3.3-3 “Setting Range”.

Programming Example

To set the number of measurement error bits to 2000 bits.

```
BERT:STOP:CRIT:EBIT 2000
BERT:STOP:CRIT:EBIT?
> 2000
```

8.3.4 Data Type

AUX Fctn or **Top**>→>**Auxiliary,** >**BER**>**Data Type**

Select a data type.

Press **F6 Data Type** to display the Data type function menu to select a data pattern for the measurement. Use → to display page 2.

Options PN9, PN11, PN15, PN20, PN23,
PN9Fix, PN11Fix, PN15Fix, PN20Fix, PN23Fix,
ALL0 (all 0s), ALL1 (all 1s), Alternate (0, 1, 0, 1),
User Defined (user defined patterns)

Note:

The PN_Fix pattern is a pattern consisting of repeated parts of PN patterns and PN patterns with length shorter than 1 cycle.
Refer to 8.4 “PN Fix Pattern” and 8.5 “User Defined Pattern” for details of PN_Fix and UserDefined.

Remote command

Select a data type

Command

```
[:SENSe]:BERT[:BASeband]:PRBS[:DATA]
PN9|PN11|PN15|PN20|PN23|ALL0|ALL1|ALT|FPN9|FPN11|FPN15|F
PN20|FPN23|USER
```

Query

```
[:SENSe]:BERT[:BASeband]:PRBS[:DATA]?
```

Response

```
<pattern>
```

Parameter

`<pattern>`	Type of data patterns
`PN9`	PN9 (Default)
`PN11`	PN11
`PN15`	PN15
`PN20`	PN20
`PN23`	PN23
`FPN9`	PN9Fix
`FPN11`	PN11Fix
`FPN15`	PN15Fix
`FPN20`	PN20Fix
`FPN23`	PN23Fix
`ALL0`	All 0s (00...0)
`ALL1`	All 1s (11...1)
`ALT`	Repetitions of 0, 1 (0, 1, 0, 1, ...)
`USER`	User defined patterns

Programming Example

To set the data pattern for measurement to PN23.

```
BERT:PRBS PN23
BERT:PRBS?
> PN23
```

8.3.5 Resync Condition

AUX Fctn or **Top>(→)>Auxiliary, >BER>(→)>Resync Condition**

Sets the automatic resynchronization function.

Press (→) to display page 2 of the BER function menu. Press **F1 Resync Condition** to display the Resync Condition function menu and set the automatic resynchronization function for the BER measurement.

Table 8.3.5-1 Resync Condition Function Menu

Page	Key No.	Menu Display	Function
1	F1	Auto Resync Off On	Specifies whether or not to automatically perform resynchronization when a Sync Loss occurs.
	F2	Threshold X 200	Specifies the number of bits to determine if Sync Loss occurs (numerator).
	F3	Threshold Y 500 bits	Specifies the number of bits to determine if Sync Loss occurs (denominator).
	F4	at SyncLoss Clear Keep	Specifies whether or not to clear the measurement results when a Sync Loss is detected.

Details of Auto Resync

There are differences between Auto Resync On and Off.

Auto Resync On:

After establishing synchronization, if errors are more than the specified threshold values, then it is determined that SyncLoss occurred. The measurement stops, and resynchronization is performed. If thresholds are set to 200/500 (Default), and error bits are less than 200 of 500 bits, then it is not determined that SyncLoss occurred and the measurement continues.

To measure signals with high error rate, you can avoid SyncLoss in a condition where a block error occurs due to fading by specifying the thresholds to high values such as 200/500.

To measure signals with low error rate, you can immediately detect SyncLoss and perform resynchronization when an error occurs by specifying the thresholds to low values such as 50/500.

Auto Resync Off:

SyncLoss is not detected during measurement. Signals with high error rate can be measured without interruption. However, when clock is not reproduced at the DUT-side, the clock and data may not be synchronized. In this case, use AutoReEsync On for measurement.

Measured error rates and the corresponding recommended settings are as follows:

Table 8.3.5-2 Measured Error Rates and Recommended Settings

Value / Measured error rate	AutoResync On		AutoResync Off
	Threshold Value 50/500	Threshold Value 200/500	
Less than 0.3 %	Optimal setting	Measurable	Measurable
0.3 % or more	√	Optimal setting	Measurable

√ SyncLoss may occur frequently.

Reference:

The default threshold values of the MG3700A: 200/500
The specified threshold values of the MP1201C: 200/512
The default threshold values of the MD6420A: 200/512
The specified threshold values of the MT8820A (WCDMA) BER function: 23/64

There are differences between Auto Resync on the MG3710A/MG3710E/MG3740A and Auto Sync on the MP1201C or MD6420A.

Details of Auto Resync on the MG3710A/MG3710E/MG3740A

Auto Resync on the MG3710A/MG3710E/MG3740A behaves as follows:

Auto Resync On

The MG3710A/MG3710E/MG3740A performs synchronization when it starts measurement. It starts measurement after the synchronization is established. After the measurement starts, the MG3710A/MG3710E/MG3740A automatically performs resynchronization when it detects SyncLoss.

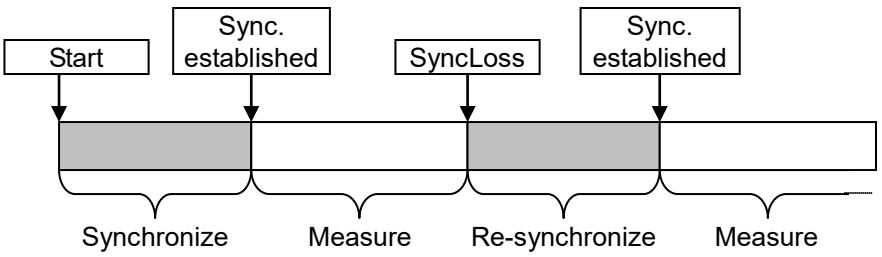


Figure 8.3.5-1 Auto Resync On

Auto Resync Off

The MG3710A/MG3710E/MG3740A performs synchronization when it starts measurement. It starts measurement after the synchronization is established. SyncLoss is not detected during measurement.

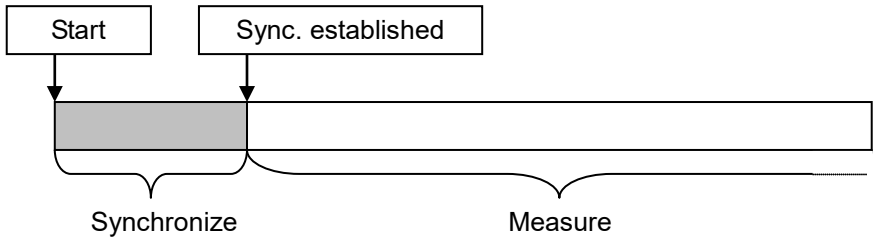


Figure 8.3.5-2 Auto Resync Off

Details of Auto Sync on the MP1201C or MD6420A

Auto Sync on the MP1201C or MD6420A behaves as follows:

Auto Sync On

The MP1201C or MD6420A performs synchronization when it starts measurement. It starts measurement after the synchronization is established. After the measurement starts, the MP1201C or MD6420A automatically performs resynchronization when it detects SyncLoss.

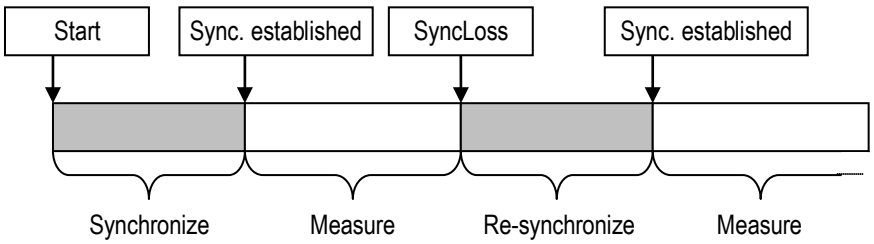


Figure 8.3.5-3 Auto Sync On

Auto Sync Off

The MP1201C or MD6420A assumes synchronization is established when it starts measurement. SyncLoss is not detected during measurement.

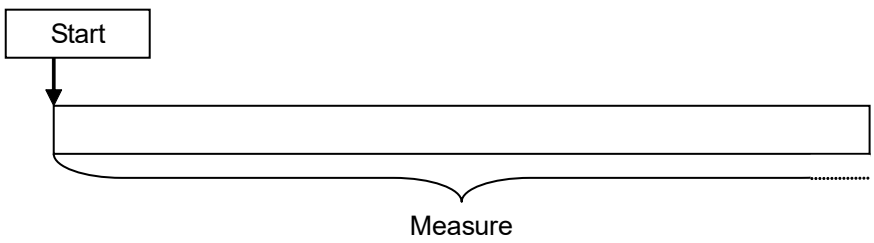


Figure 8.3.5-4 Auto Sync Off

Note:

To get BER curve, set Auto Sync to On and establish synchronization in good S/N condition, and then change Auto Sync to Off and perform measurement with varying S/N.

Auto Resync

AUX Fctn or **Top**>→>**Auxiliary, >BER**>→>**Resync Condition**>**Auto Resync**

Enables/disables the automatic resynchronization.

Press **F1 Auto Resync** on the Resync Condition function menu to select operations of resynchronization when Sync Loss occurs.

On	Automatically performs resynchronization(Default).
Off	Does not automatically perform resynchronization.

Remote command

Enable/disable the automatic resynchronization

Command

```
[:SENSe]:BERT[:BASeband]:RSYNc[:STATe] <boolean>
```

Query

```
[:SENSe]:BERT[:BASeband]:RSYNc[:STATe]?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Set the automatic resynchronization
ON|1	Automatically performs resynchronization (Default).
OFF|0	Does not automatically perform resynchronization.

Programming Example

To set automatic resynchronization to On.

```
BERT:RSYN ON
BERT:RSYN?
> 1
```

Conditions for detecting Sync Loss: Threshold X, Threshold Y

Threshold X

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**>**Threshold X**

Sets conditions for detecting Sync Loss of the BER measurement.
Set values of X and Y so that when X bits in Y bits become error, it is determined that SyncLoss occurred.
Press **F2 Threshold X** on the Resync Condition function menu to set a value of X in the **Threshold X** dialog box.
This function is available when Auto Resync is **On**.

Table 8.3.5-3 Setting Range

Setting range	1 bit to (Y/2) bits
Resolution	1 bit
Default	200 bits

Threshold Y

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**>**Threshold Y**

Press **F3 Threshold Y** on the Resync Condition function menu to select a value of Y on the Threshold function menu.
This function is available when Auto Resync is On.

Options 500 bits (Default), 5000 bits, 50000 bits

Remote command

Set conditions for detecting Sync Loss of the BER measurement

Command

```
[:SENSe]:BERT[:BASeband]:RSYNc:THReshold
<ext_integer>,500|5000|50000
```

Query

```
[:SENSe]:BERT[:BASeband]:RSYNc:THReshold?
```

Response

```
<ext_integer>, <Y>
```

Parameter

`<ext_integer>` Numerator of the threshold
Based on Table 8.3.5-3 “Setting Range”.
`<Y>` Denominator of the threshold
500 500 bits (Default)
5000 5000 bits
50000 50000 bits

Programming Example

To set conditions for determining Sync Loss to 123/500 bits.

```
BERT:RSYN:THR 123,500
BERT:RSYN:THR?
> 123,500
```

Operations when detecting Sync Loss: at SyncLoss

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**>**at SyncLoss**

Specifies to clear or hold the measurement results when a SyncLoss is detected.

Press **F4 at SyncLoss** on the Resync Condition function menu to select a parameter. This function is available when Auto Resync is On.

Clear	Clears the measurement results(Default).
Keep	Holds the measurement results.

Remote command

Specify to clear or hold the measurement results when a SyncLoss is detected

Command

```
[:SENSe]:BERT[:BASeband]:RSYNc:COUNt:ACTion CLEar|KEEP
```

Query

```
[:SENSe]:BERT[:BASeband]:RSYNc:COUNt:ACTion?
```

Response

<mode>	CLE or KEEP

Parameter

<mode>	Operation mode
CLEar	Clears the measurement results (Default).
KEEP	Holds the measurement results.

Details

This function is available when Auto Resync is On.

Programming Example

To clear the count value when a Sync Loss occurs.

```
BERT:RSYN:COUN:ACT CLE
BERT:RSYN:COUN:ACT?
> CLE
```

8.3.6 BER Interface

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**BER Interface**

Sets input signals for the BER measurement.

Press → to display page 2 of the BER function menu. Press **F2 BER Interface** to display the BER Interface function menu to set an input interface for the BER measurement. You can set the input interface during measurement.

Table 8.3.6-1 BER Interface Function Menu

Page	Key No.	Menu Display	Function
1	F1	Clock Edge Fall Rise	Specifies an enabled edge for Clock.
	F2	Data Polarity Negative Positive	Specifies a polarity of the Data connector.
	F3	Enable Active Disable	Specifies a polarity of the Enable connector and whether or not to use it.

Clock Edge

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**> **BER Interface**>**Clock Edge**

Sets a detection edge for Clock signals.

Press **F1 Clock Edge** on the BER Interface function menu to select a parameter.

Rise	Detects Data at the rising edge of Clock signals(Default).
Fall	Detects Data at the falling edge of Clock signals.

Remote command

Set a detection edge for Clock signals

Command

```
:INPut:BERT[:BASeband]:CLOCk:POLarity POSitive|NEGative
```

Query

```
:INPut:BERT[:BASeband]:CLOCk:POLarity?
```

Response

<mode> POS or NEG

Parameter

<mode>	Detection edge of Clock signals
POSitive	Detects Data at the rising edge of Clock signals (Default).
NEGative	Detects Data at the falling edge of Clock signals.

Programming Example

To specify to detect Data at the rising edge of Clock signals.

```
INP:BERT:CLOC:POL POS
INP:BERT:CLOC:POL?
> POS
```

Data Polarity

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**> **BER Interface**>**Data Polarity**

Sets the logic for Data signals.

Press **F2 Data Polarity** on the BER Interface function menu to select a parameter.

Positive	Sets the logic for Data signals to positive logic (Default).
Negative	Sets the logic for Data signals to negative logic.

Remote command

Set the logic for Data signals

Command

```
:INPut:BERT[:BASeband]:DATA:POLarity POSitive|NEGative
```

Query

```
:INPut:BERT[:BASeband]:DATA:POLarity?
```

Response

<mode>	POS or NEG

Parameter

<mode>	Logic for Data signals
POSitive	Positive logic (Default)
NEGative	Negative logic

Programming Example

To set the polarity for Data signals to positive logic.

```
INP:BERT:DATA:POL POS
INP:BERT:DATA:POL?
> POS
```

Enable Active

AUX Fctn or **Top**>→>**Auxiliary**, >**BER**>→>**Resync Condition**> **BER Interface**>**Enable Active**

Sets the logic for Enable signals of the BER measurement.
Press **F3 Enable Active** on the BER Interface function menu to select a value on the Enable Active function menu.

Disable	Does not use Enable signals(Default).
High	Measures the signals when High input.
Low	Measures the signals when Low input.

Remote command

Set the logic for Enable signals of the BER measurement

Command

```
:INPut:BERT[:BASeband]:CGATe:POLarity
POSitive|NEGative|DISable
```

Query

```
:INPut:BERT[:BASeband]:CGATe:POLarity?
```

Response

<mode>	POS, NEG, or DIS

Parameter

<mode>	Logic for Enable signals
DISable	Does not use Enable signals (Default).
POSitive	Measures the signals when High input.
NEGative	Measures the signals when Low input.

Programming Example

To perform measurement when Enable signals are High input.

```
INP:BERT:CGAT:POL POS
INP:BERT:CGAT:POL?
> POS
```

8.4 PN Fix Pattern

For the BER measurement, you can use special PN patterns known as PN_Fix patterns.

The PN_Fix pattern is a pattern consisting of repeated parts of PN patterns and PN patterns with length shorter than 1 cycle.

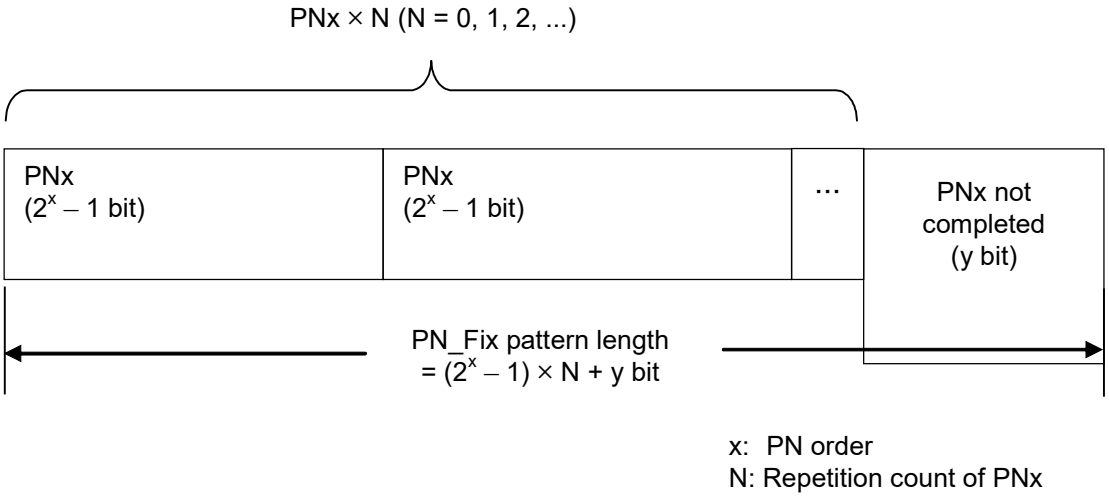


Figure 8.4-1 PN_Fix Pattern

8.4.1 Setting PN_Fix Pattern: PN Fix Pattern

AUX Fctn **or Top>(→)>Auxiliary**, **>BER>PN Fix Pattern**

Sets a PN_Fix pattern.

A PN_Fix pattern can be set when PN9Fix, PN11Fix, PN15Fix, PN20Fix, or PN23Fix is selected for Data Type.

Press **F7 PN Fix Pattern** on the BER function menu to display the PN Fix Pattern function menu and set a PN Fix pattern.

Table 8.4.1-1 PN Fix Pattern Function Menu

Page	Key No.	Menu Display	Function
1	F1	Initial 1FF	Specifies an initial value of PN Pattern for PN Fix.
	F2	Length 96 Bits	Specifies a length of 1 cycle in bit unit for PN Fix.

Initial Pattern

AUX Fctn **or Top>(→)>Auxiliary**, **>BER>PN Fix Pattern>Initial Pattern**

Sets an initial pattern of PN_Fix patterns.

Press **F1 Initial Pattern** on the PN Fix Pattern function menu to set an initial pattern of PN_Fix patterns in the **Initial Pattern** dialog box.

Table 8.4.1-2 Initial Pattern Setting Value

Data Type	Initial Pattern Setting Range		Resolution	Default
	Binary	Hex		
PN9Fix	000000000 to 111111111 (9 bits)	000 to 1FF	1	1FF
PN11FIx	00000000000 to 11111111111 (11 bits)	000 to 7FF	1	7FF
PN15Fix	000000000000000 to 111111111111111 (15 bits)	0000 to 7FFF	1	7FFF
PN20Fix	00000000000000000000 to 11111111111111111111 (20 bits)	00000 to FFFFF	1	FFFFF
PN23Fix	0000000000000000000000 to 11111111111111111111111 (23 bits)	000000 to 7FFFFF	1	7FFFFF

<Cautions for setting PN_Fix>

When you set all initial values of PN_Fix pattern to 0, the following signals are output:

PN9Fix, PN11Fix, or PN20Fix: ALL0 signals

PN15Fix or PN23Fix: ALL1 signals

Remote command

Set an initial pattern of PN_Fix patterns

Command

```
[:SENSe]:BERT[:BASeband]:PRBS:PNFix:INITial <binary>
```

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:PNFix:INITial?
```

Response

```
<binary>
```

Parameter

```
<binary>
```

Based on Table 8.4.1-2 “Initial Pattern Setting Value”.

Details

You can set patterns using this function only when PN Fix pattern is selected for Data Type.
Add the character string “#B”, which indicates binary, before the parameter.

Programming Example

To set an initial value of PN9 Fix to “101010101”.

```
BERT:PRBS:PNF:INIT #B101010101
BERT:PRBS:PNF:INIT?
> 101010101
```

Pattern length: Length

AUX Fctn **or Top>(→)>Auxiliary**, >**BER**>**PN Fix Pattern**>**Length**

Sets a length of PN_Fix patterns.
Press **F2 Length** on the PN Fix Pattern function menu to set a length of PN_Fix patterns in the **Length** dialog box.

Table 8.4.1-3 Setting Range

Setting range	96 bits to 134217728 bits (0x8000000)
Resolution	1 bit
Default	96 bit

Remote command

Set a length of PN_Fix patterns

Command

```
[:SENSe]:BERT[:BASeband]:PRBS:PNFix:LENGth <ext_integer>
```

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:PNFix:LENGth?
```

Response

```
<ext_integer>
```

Parameter

```
<ext_integer>
```

Based on Table 8.4.1-3 “Setting Range”.

Details

You can set patterns using this function only when PN Fix pattern is selected for Data Type.

Programming Example

To set a bit length of PN Fix patterns to 1024 bits.

```
BERT:PRBS:PNF:LENG 1024
BERT:PRBS:PNF:LENG?
> 1024
```

8.4.2 Synchronization establishing conditions of PN_Fix patterns

This section describes synchronization establishing conditions of PN_Fix patterns.

Assumptions:
x: PN order(If PN9, x = 9)

Synchronization is established in 3 phases:

1. Establish synchronization with PN patterns by detecting (x × 2) bit error free.
2. Detect the last bit of PNxFix pattern from the initial bit pattern length of the specified PN pattern.
3. Establish synchronization with PN_Fix pattern overall by detecting x bit error free from the start PN_Fix pattern.

For example, synchronization establishing of PN9Fix pattern is as follows:

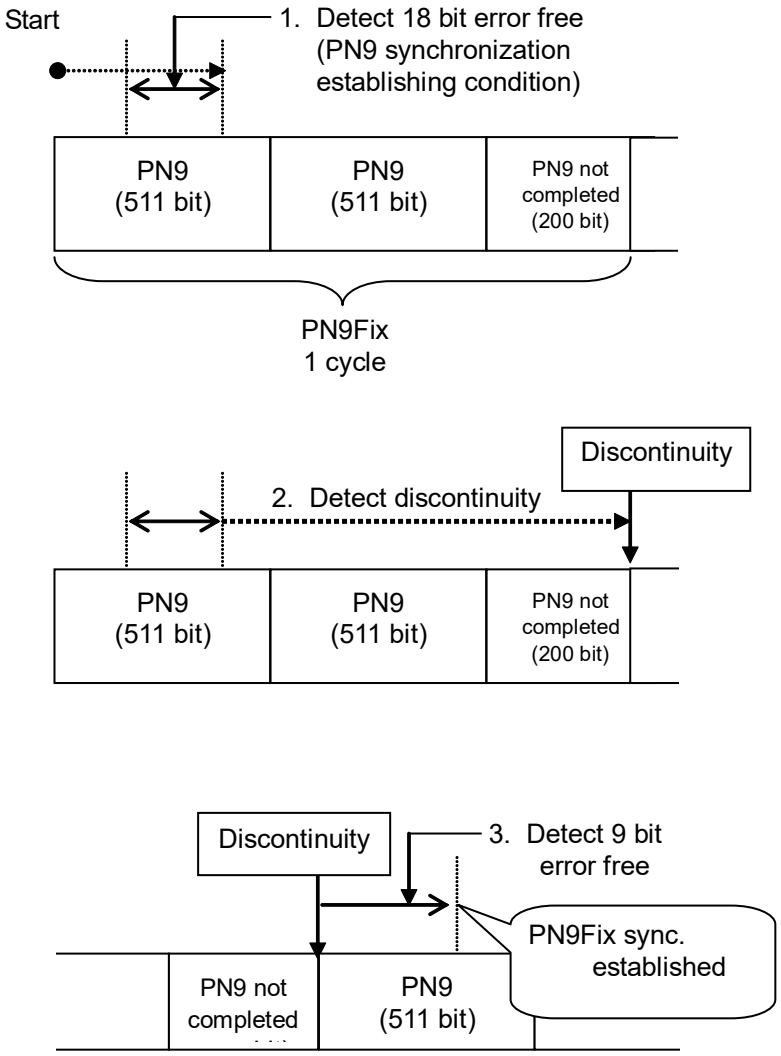


Figure 8.4.2-1 Example: Synchronization Establishing of PN9Fix Pattern

8.4.3 Examples of using PN_Fix patterns

This section describes examples of how to use PN_Fix patterns.

Imagine that a communication system has a frame format shown in Figure 8.4.3-1, in which the fixed bit A is 10 bits and the communication channel B is 1000 bits.
When the communication channel uses PN9, the number of bits per frame (1000 bits) does not match with the cycle of PN9 (511 bits). Therefore, the cycle must be 511 frames to keep continuity of PN 9 signals of the communication channel.
However, on a signal generator using a waveform generator like the MG3710A/MG3710E/MG3740A, increasing frames and samples of waveform patterns may decrease patterns stored in the waveform memory, or may cause over capacity of waveform memory.

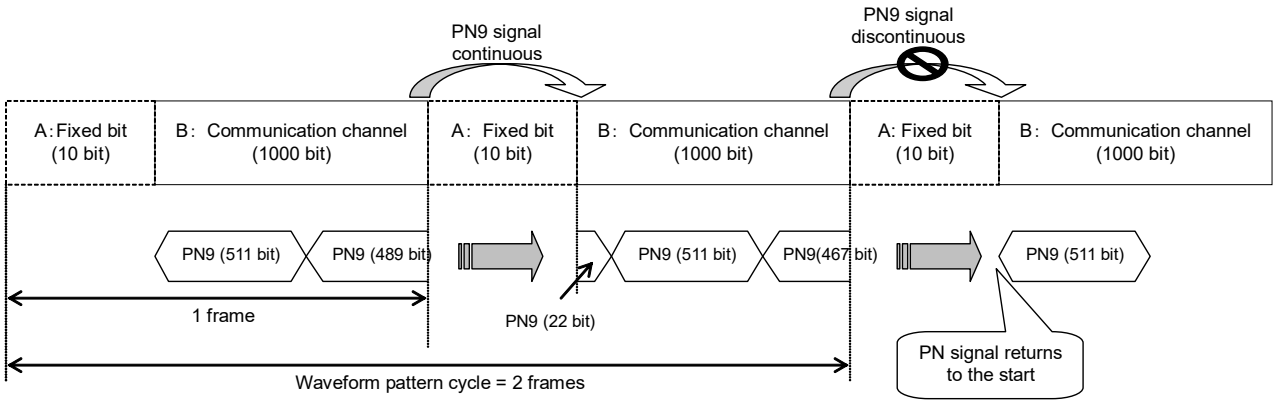


Figure 8.4.3-1 Example: PN9Fix Patterns

In such a case, to perform the BER measurement for PN9 signals that discontinues in the frame shown in Figure 8.4.3-1, use short-cycle signals, for example, 2-frame cycles generated by IQproducer™ shown in Figure 8.4.3-2, and select PN Fix pattern for Data Type.
Refer to an operation manual of each IQproducer™ for how to set PN_Fix signals on IQproducer™.

When PN_Fix signals are used for measurement, pseudorandom signals lose some of their randomness.

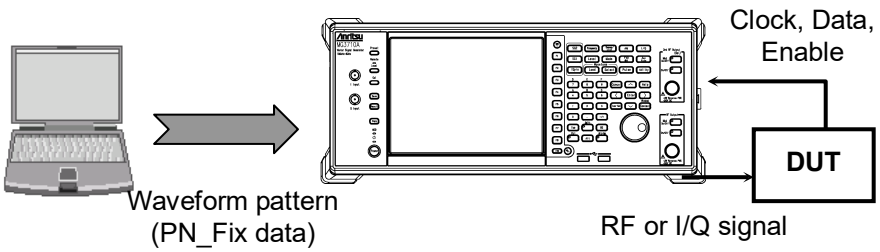


Figure 8.4.3-2 BER Measurement with PN_Fix Data

8.5 User Defined Pattern

The BER measurement can use a pattern created by a user, which is called a user defined pattern.

A user defined pattern is an arbitrary binary string that is 8 to 1024 bit length and that consists of a data bit string to determine if synchronization is established and a data bit string used as measurement data. Refer to 8.5.2 “Setting user defined patterns: User Pattern” for how to specify bits to determine if synchronization is established.

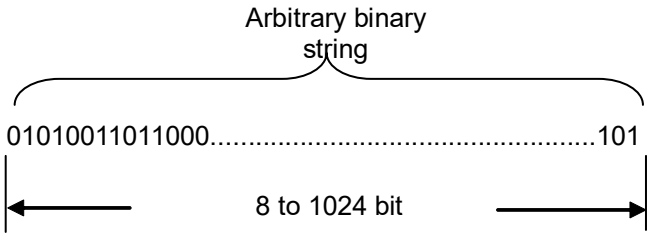


Figure 8.5-1 User Defined Pattern

You can create user defined patterns in text file formats using PCs. Load the file from USB memories or internal hard disks/SSDs of the MG3710A/MG3710E/MG3740A. Following the explanation below, create a file and specify “*.bpn” as an extension.

Table 8.5-1 lists items that can be included in user defined patterns.

Table 8.5-1 Items to Be Included in User Defined Patterns

Character		Description
0, 1	Single-byte number	Loaded as bit data. Characters, including numbers, spaces, and CR/LF must be continuous.
Space	Single-byte space	Used for improving readability when editing bit data.
New line	CR/LF	Used for improving readability when editing bit data.
#	Single-byte #	Indicates comments.

For example, a file can have following content:

Example 1:

#20070216 Marked by Anritsu Co.
0010 0111 0110 0011 0000 1111 0101

Example 2:

#UserPattern Start
0000 0000 1111 1111
#mark001
0101 0101
#mark002
1111 1111 0000 0000

8.5.1 Displaying user defined patterns

AUX Fctn **or Top>(→)>Auxiliary**, >**BER**>**User Pattern**

To use user defined patterns, press **F6 Data Type** on the BERTEST function menu and select **F6 User Defined** on page 2 of the BERDataType function menu.

When you press **F8 User Pattern**, loaded parameters of user defined patterns are displayed in the **BERT User Defined Pattern** dialog box on the main screen. When no user defined pattern is loaded, "- -" is displayed.

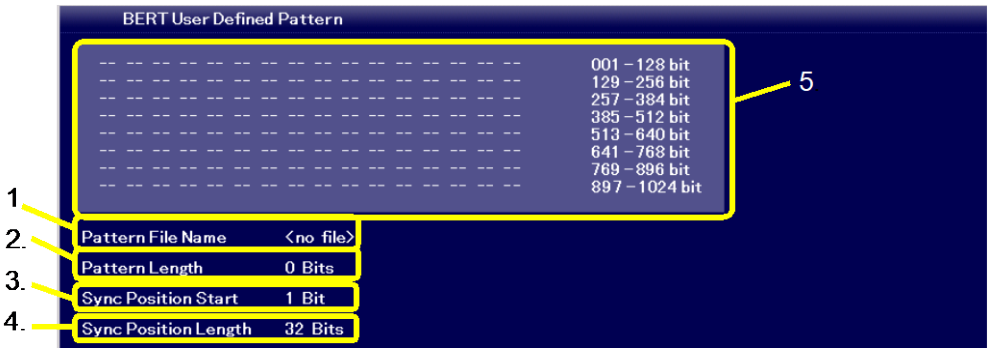


Figure 8.5.1-1 BERT User Defined Pattern Dialog Box

1. Pattern File Name
   Indicates a loaded User Pattern name.
2. Pattern Length
   Indicates a loaded User Pattern length (number of bits).
3. Sync Position Start
   Indicates a bit at which synchronizing User Patterns starts.
   Refer to 8.5.2 "Setting user defined patterns: User Pattern".
4. Sync Position Length
   Indicates a length (number of bits) at which matching is performed for synchronizing User Pattern.
   Refer to 8.5.2 "Setting user defined patterns: User Pattern".
5. User Defined Pattern
   Displays content of loaded User Pattern in hexadecimal formats.

Pattern File Name

Displays a loaded user defined pattern name of the BER measurement.

Remote command

Query a loaded user defined pattern name of the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:PATTern?
```

Response

```
<pattern>,<drive>
```

Details

If there is no user defined pattern file, the command returns ***.

Parameter

<pattern>	User defined pattern file name Character string within 100 characters, excluding an extension (bpn)
<drive>	Drive name where the user defined pattern file is loaded

Programming Example

To query a user defined pattern name.

```
BERT:PRBS:USER:PATT?
> TEST1,D
```

Response when a corresponding pattern does not exist:

```
> ***
```

Pattern Length

Displays a pattern length of a user defined pattern for the BER measurement.

Remote command

Query a pattern length of a user defined pattern for the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:LENGth?
```

Response

```
<integer>
```

Parameter

<integer>	Pattern length of the user defined pattern
Range	8 to 1024 bits

Programming Example

To query the pattern length of the user defined pattern.

```
BERT:PRBS:USER:LENG?
> 1024
```

Bit string of user defined pattern: User Defined Pattern

Displays a bit string of a user defined pattern for the BER measurement.

Remote command

Query a bit string of a user defined pattern for the BER measurement

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:BIT?
```

Response

```
<binary>
```

Parameter

`<binary>`	Bit string of the user defined pattern
`Range`	Pattern from 8 to 1024 bits

Details

If the language mode is MS269xA, the “#B” is not added at the start.

If there is no user defined pattern, the command returns #B***.

Note:

1024 "0"s are inserted at ***.

Programming Example

To query the bit string of the user defined pattern.

```
BERT:PRBS:USER:BIT?
> #B001011101000101
```

8.5.2 Setting user defined patterns: User Pattern

AUX Fctn **or Top>(→)>Auxiliary**, >**BER**>**User Pattern**

Loads and sets user defined patterns.

Select **User Defined** on the Data Type function menu, and then press **F8 User Pattern**. The User Pattern function menu is displayed and you can set user defined patterns.

Table 8.5.2-1 User Pattern Function Menu

Page	Key No.	Menu Display	Function
1	F1	Sync Start 1	Specifies the start bit to determine if synchronization of user defined patterns is established.
	F2	Sync Length 32	Specifies a length to determine if synchronization of user defined patterns is established.
	F7	Open	Loads user defined patterns. Refer to 8.5.3 “Loading user defined patterns: Open”.

Setting synchronization establishing conditions of user defined patterns

Sets a synchronization establishing condition after loading a user defined pattern file.

Specify a start bit and a bit length to determine if synchronization is established. When error free is detected at the locations specified here, it is determined that synchronization is established.

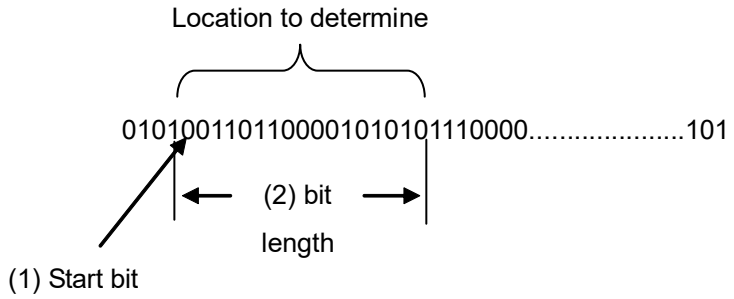


Figure 8.5.2-1 Specifying the Location to Determine if Synchronization Is Established

Setting the start bit: Sync Start

AUX Fctn **or Top>(→)>Auxiliary**, >**BER**>**User Pattern**>**Sync Start**

Sets the start bit of the part for judging the synchronization establishment.

Press **F1 Sync Start** on the User Pattern function menu to set a length to set the start bit of the part for judging the synchronization establishment in the **Sync Start** dialog box.

Table 8.5.2-2 Setting Range

Setting range	1 bit to (Pattern Length) bit
Resolution	1 bit
Default	1 bit

Remote command

Set the start bit to determine if synchronization is established

Command

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:STARt
<ext_integer>
```

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:STARt?
```

Response

```
<ext_integer>
```

Parameter

```
<ext_integer>
```

Based on Table 8.5.2-2 “Setting Range”.

Details

You can set the start bit using this function only when User Defined is selected for Data Type.

Programming Example

To set the 31st bit from the start of the user defined pattern as the start of the bit string to determine if synchronization is established.

```
BERT:PRBS:USER:SYNC:STAR 31
BERT:PRBS:USER:SYNC:STAR?
> 31
```

Sync Length

AUX Fctn **or Top>(→)>Auxiliary**, >**BER**>**User Pattern**>**Sync Length**

Sets a length to determine if synchronization is established.

Press **F2 Sync Length** on the User Pattern function menu to set a length to determine if synchronization is established in the **Sync Length** dialog box.

Table 8.5.2-3 Setting Range

Setting range	8 bits to 1024 bits
Resolution	1 bit
Default	32 bit

Remote command

Set a length to determine if synchronization is established

Command

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:LENGth
<ext_integer>
```

Query

```
[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:LENGth?
```

Response

```
<ext_integer>
```

Parameter

```
<ext_integer>
```

Based on Table 8.5.2-3 “Setting Range”.

Details

You can set the length using this function only when **User Defined** is selected for Data Type.

Programming Example

To specify 65 bit as a length of the user bit string to determine if synchronization is established.

```
BERT:PRBS:USER:SYNC:LENG 65
BERT:PRBS:USER:SYNC:LENG?
> 65
```

8.5.3 Loading user defined patterns: Open

AUX Fctn or Top>→>**Auxiliary**, >**BER**>**User Pattern**>**Open**

Loads user defined patterns for the BER measurement.

Place user defined pattern files directly below the specified USB memories or Hard Disk (internal hard disk/SSD) (Root) or [Device]:\Anritsu\MG3710A\User Data\BERT BitPattern\.

Remote command

Load a user defined pattern

Command

```
:MMEMory:LOAD:BERT:PATTern <string>[,<device>]
```

Parameter

<string>	File name excluding extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Details

Only a file with the extension ".bpn" can be loaded.
If a corresponding user defined pattern file does not exist, the command returns an error.

Programming Example

To load the user defined pattern file "USERPATTERN.bpn" from D drive.

```
MMEM:LOAD:BERT:PATT "USERPATTERN",D
```

Remote command

Load a list of user defined pattern files

Query

```
:MMEMory:LIST:BERT:PATTern? [<device>]
```

Response

```
<s1>,<s2>,<s3>.....,<s999>,<s1000>
```

Parameter

<device>	Number of the drive
Options	A to Z, currently selected drive when omitted
<s1>,.....,<s1000>	Existing user defined pattern file names (up to 1000) Within 100 characters

Details

If there is no user defined pattern file, the command returns ***.
Files are listed alphabetically in a response message.

Programming Example

To load a list of user pattern files in C drive for the BER measurement.

```
MMEM:LIST:BERT:PATT?
> TEST1,TEST2,TEST3
```

Operation method

Load a user defined pattern.

1. Press **F7 Open** on the User Pattern function menu to display the User Pattern Open function menu, File List, and the **User Pattern Open** dialog box.

Table 8.5.3-1 User Pattern Open Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies a drive of the device containing user patterns to select.
	F7	Open	Loads user defined pattern files.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Device** to select a device containing the user defined pattern files to load.
3. Select user defined pattern files to load from File List and press **F7 Open**.

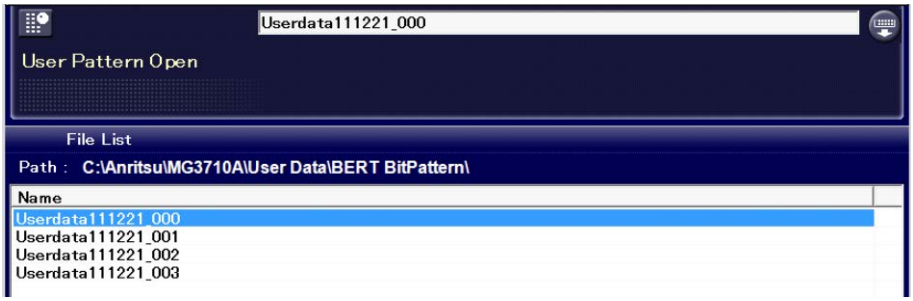


Figure 8.5.3-1 User Pattern Open Dialog Box and File List

When selecting files, only files with the extension “bpn” are displayed.

Place user defined pattern files in:
[Device]:\Anritsu\MG3710A\User Data\BERT BitPattern\
File names are listed in alphanumeric order.
If no user defined pattern file exists, “File not found” is displayed.

If no user defined pattern file exists, the “No file to read” is displayed.
If the length of user defined patterns are out of available range, the following errors are displayed:

Less than 8 bits:	“Bit pattern is too short.”
More than 1024 bits:	“Bit pattern is too long.”

If user defined pattern files include characters other than “0”, “1”, or CR/LF, or comments starting with #, then “Illegal character exists.” is displayed.

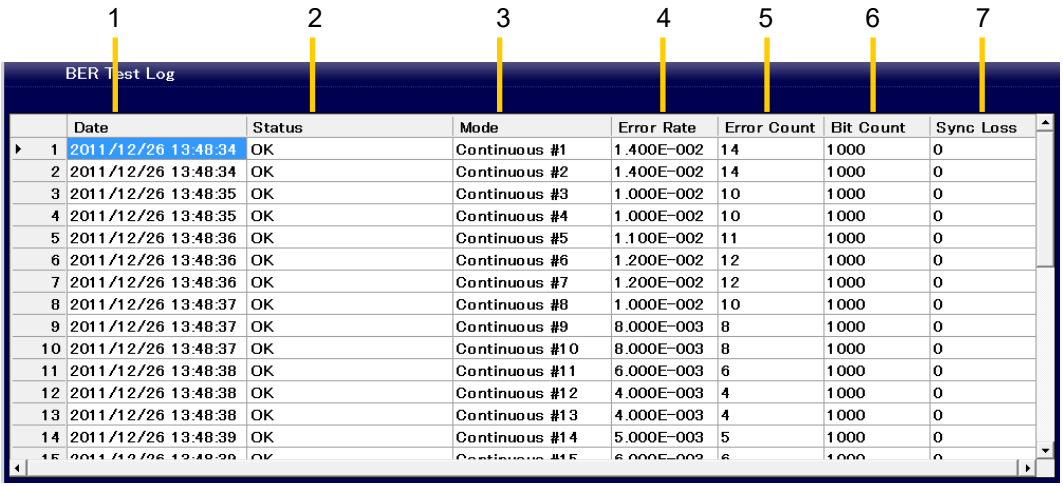
8.6 BER Log

AUX Fctn **or Top>** → **>Auxiliary**, **>BER>** → **>Show Log**

Displays the past results of the BER measurement and saves them as files.

Press → to display page 2 of the BER function menu and press **F3 Show Log** to display BER Test Log. You can display up to 1000 logs. The BER Log function menu is displayed, too.

Logs are displayed in the following format:



	Date	Status	Mode	Error Rate	Error Count	Bit Count	Sync Loss
1	2011/12/26 13:48:34	OK	Continuous #1	1.400E-002	14	1000	0
2	2011/12/26 13:48:34	OK	Continuous #2	1.400E-002	14	1000	0
3	2011/12/26 13:48:35	OK	Continuous #3	1.000E-002	10	1000	0
4	2011/12/26 13:48:35	OK	Continuous #4	1.000E-002	10	1000	0
5	2011/12/26 13:48:36	OK	Continuous #5	1.100E-002	11	1000	0
6	2011/12/26 13:48:36	OK	Continuous #6	1.200E-002	12	1000	0
7	2011/12/26 13:48:36	OK	Continuous #7	1.200E-002	12	1000	0
8	2011/12/26 13:48:37	OK	Continuous #8	1.000E-002	10	1000	0
9	2011/12/26 13:48:37	OK	Continuous #9	8.000E-003	8	1000	0
10	2011/12/26 13:48:37	OK	Continuous #10	8.000E-003	8	1000	0
11	2011/12/26 13:48:38	OK	Continuous #11	6.000E-003	6	1000	0
12	2011/12/26 13:48:38	OK	Continuous #12	4.000E-003	4	1000	0
13	2011/12/26 13:48:38	OK	Continuous #13	4.000E-003	4	1000	0
14	2011/12/26 13:48:39	OK	Continuous #14	5.000E-003	5	1000	0

Figure 8.6-1 BER Test Log

Table 8.6-1 Display Items of BER Test Log

No.	Item	Description
1	Date	Indicates the time when the measurement ended.
2	Status	Indicates the reason why the measurement ended.
3	Mode	Indicates the mode when the measurement was performed (Continuous, Single, or Endless).
4	Error Rate	Indicates an error rate in index.
5	Error Count	Indicates the number of error bits.
6	Bit Count	Indicates the number of measurement bits.
7	Sync Loss	Indicates a SyncLoss count (only for Auto Resync On).

Table 8.6-2 End Reasons

Display	Description
OK	Indicates that the specified bits or error bits were exceeded and the test completed successfully.
STOP	Indicates that you pressed **F2 Stop BER Test** to stop the measurement or specified parameters and the measurement stopped.
OVERFLOW_ DATACOUNT	Indicates that the measurement bits exceeded the maximum value and the measurement stopped.
OVERFLOW_ SYNCLOSS	Indicates that the SyncLoss count exceeded the maximum value and the measurement stopped.
ABNORMAL_ COUNT	Indicates that a malfunction of the BER measurement circuit resulted in the measurement stop.
CLEAR	Indicates that you pressed **F3 Clear BER Count** to clear the measurement value. This does not mean the measurement stopped.

Remote commands for items in BER Test Log are as follows:

BER Test Log

Queries logs of the BER measurement results.

Remote command

Query logs of the BER measurement results

Query

```
[:SENSe]:BERT[:BASeband]:LOG? <ext_integer>
```

Response

```
<string>
```

Parameter

<ext_integer>	Log No.
Range	1 to log count
<string>	The Log Date, Time, Status, Measure mode, Error Rate, Error Count, Bit Count, and Sync Loss for the specified number are output according to Figure 8.6-1 BER Test Log.

Programming Example

To query log #11 of the BER measurement.

```
BERT:LOG? 11
> 2011/09/01 10:35:42,OK,Continuous,1.800E-002,18,1000,0
```

BER Test Log Count

Queries a count of logs for the BER measurement results.

Remote command

Query a count of logs for the BER measurement results

Query

```
[:SENSe]:BERT[:BASeband]:LOG:COUNt?
```

Response

```
<integer>
```

Parameter

<integer>	Count of logs for the measurement results
Range	0 to 1000

Details

This function is available only for remote commands.

Programming Example

To query a count of logs for the BER measurement results.

```
BERT:LOG:COUN?
> 1000
```

Table 8.6-3 BER Log Function Menu

Page	Key No.	Menu Display	Function
1	F1	Clear	Deletes logs stored in the memory. Turning the power of the MG3710A/MG3710E/MG3740A off also deletes logs. Refer to 8.6.1 “Deleting BER logs: Clear”.
	F8	Save	Saves BER Test Log as a file in the text format. Refer to 8.6.2 “Saving BER logs: Save”.

8.6.1 Deleting BER logs: Clear

AUX Fctn **or Top>**(→)**>Auxiliary**, **>BER>**(→)**>Show Log>Clear**

Deletes logs of the BER measurement.

Press **F1 Clear** on the BER Log function menu to delete logs stored in the memory. Turning the power of the MG3710A/MG3710E/MG3740A off also deletes logs.

Remote command

Delete logs of the BER measurement

Command

```
[:SENSe]:BERT[:BASeband]:LOG:CLEar
```

Programming Example

To delete logs stored in the memory.

```
BERT:LOG:CLE
```

8.6.2 Saving BER logs: Save

AUX Fctn **or Top>→>Auxiliary**, **>BER>→>Show Log>Save**

Saves logs of the BER measurement as a text file.
The latest 1000 logs are kept. Logs are not stored in HDD/SSD unless SaveLog is performed. Therefore, turning the power off deletes the data.

Remote command

Save logs of the BER measurement as a text file

Command

```
:MMEMory:STORe:BERT:LOG [<string>[,<device>]]
```

Parameter

<string>	File name excluding extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " ″ ` ′ < > | Automatically named as "Bert_[Date]_[Additional number].log" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
A destination path to save the file is the following directory in the specified drive.

Anritsu\MG3710A\User Data\BERT Log\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To name a BER Log file as "BER123" and saves it in D drive.

```
MMEM:STOR:BERT:LOG "BER123",D
```

Operation method

Example: To name a log file of the measurement results as "ABC" and save it

1. Press **F8 Save** on the BER Log function menu to display the BER log Save function menu, File List in the function information frame, and the **BER Log Save** dialog box in the active function frame.

Table 8.6.2-1 BER Log Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Specifies a drive of the device to save BER Test Log.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F5	Delete	Deletes BER Test Log files.
	F7	Save	Saves BER Test Log as a file.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select a destination drive for the file.
3. In the **BER Log Save** dialog box, enter "ABC" as a name of BER Log file and press **F7 Save** to save the log.

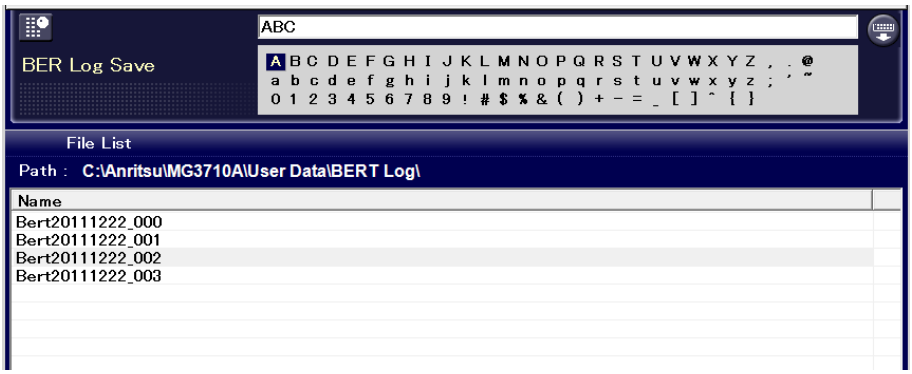


Figure 8.6.2-1 BER Log Save Dialog Box and File List

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path: Anritsu\MG3710A\UserData\BERT Log\
- Default destination name:
  Bert_[Date]_[Additional number].csv
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character pallet.

- The following characters cannot be used:
  \ / : * ? " ″ ` ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Deleting BER log files: Delete

AUX Fctn **or Top>(→)>Auxiliary**, **>BER>(→)>Show Log>Save>Delete**

Deletes BER Log files.

Remote command

Delete BER Log files

Command

```
:MMEMory:DELete:BERT:LOG <string>[,<device>]
```

Parameter

<string>	File name excluding extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Number of the drive
Options	A to Z, drive C when omitted

Programming Example

To delete the BER Log file "BER123" from D drive.

```
MMEM:DEL:BERT:LOG "BER123",D
```

Operation method

Example: To select and delete BER Log files

1. Press **F8 Save** on the BER Log function menu to display the BER log Save function menu, File List in the function information frame, and the **BER Log Save** dialog box in the active function frame.
2. Press **F1 Drive** to select a destination drive for the file.
3. Select the BER Log files to delete from File List. When you press **F5 Delete**, the Confirmation function menu is displayed for your confirmation.

Table 8.6.2-2 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Deletion	Deletes files.
	F8	Cancel	Returns to the previous menu.

4. Press **F7 Confirm Deletion** to delete files.

8.7 About BER Measurement Operations

This section describes the BER measurement operations from synchronization to finishing.

Auto Resync Off:

Overview of the measurement operations when Auto Resync is set to Off is as follows: In this mode, an error rate is checked immediately after synchronization to determine if the synchronization failed. If the error rate immediately after the synchronization is 30 % or more, it is determined that the synchronization failed. Resynchronization is performed.

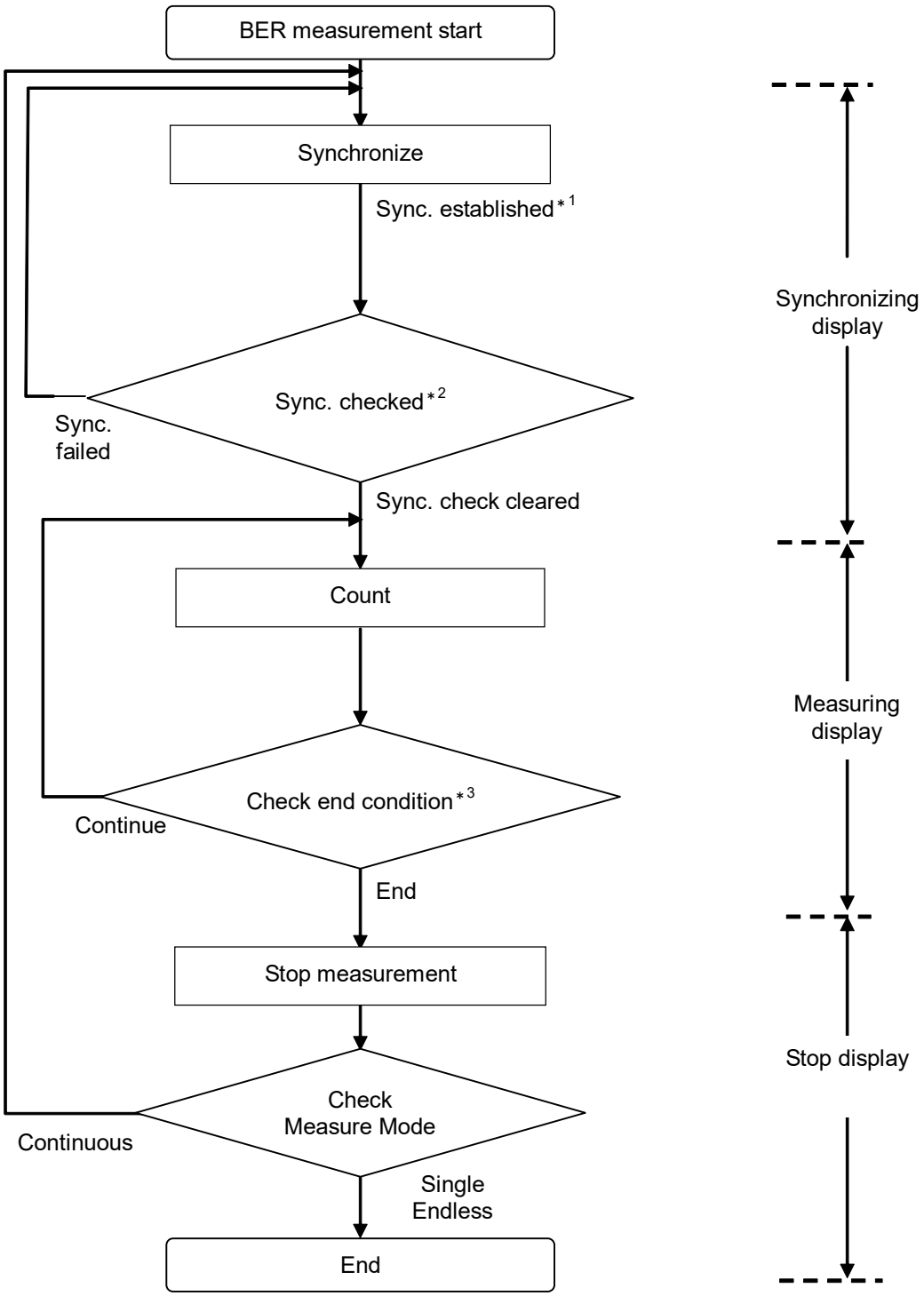


Figure 8.7-1 Auto Resync Off

*1: If the number of measurement bits is less than 1000 bits and the measurement finishes, an error rate is not checked. The measurement result, therefore, may not be correct.

*2: If the error rate is 30 % or more and the number of measurement bits is 1000 or more, it is determined that synchronization failed.

*3: The measurement finishes when one of the following conditions is met:

- The number of measurement bits or measurement error bits reaches the specified number of bits.
- The number of measurement bits exceeds the maximum value.
- The SyncLoss count exceeds the maximum value.

Auto Resync On:

Overview of the measurement operations when Auto Resync is set to On is as follows: In this mode, when a SyncLoss occurs, resynchronization is automatically performed.

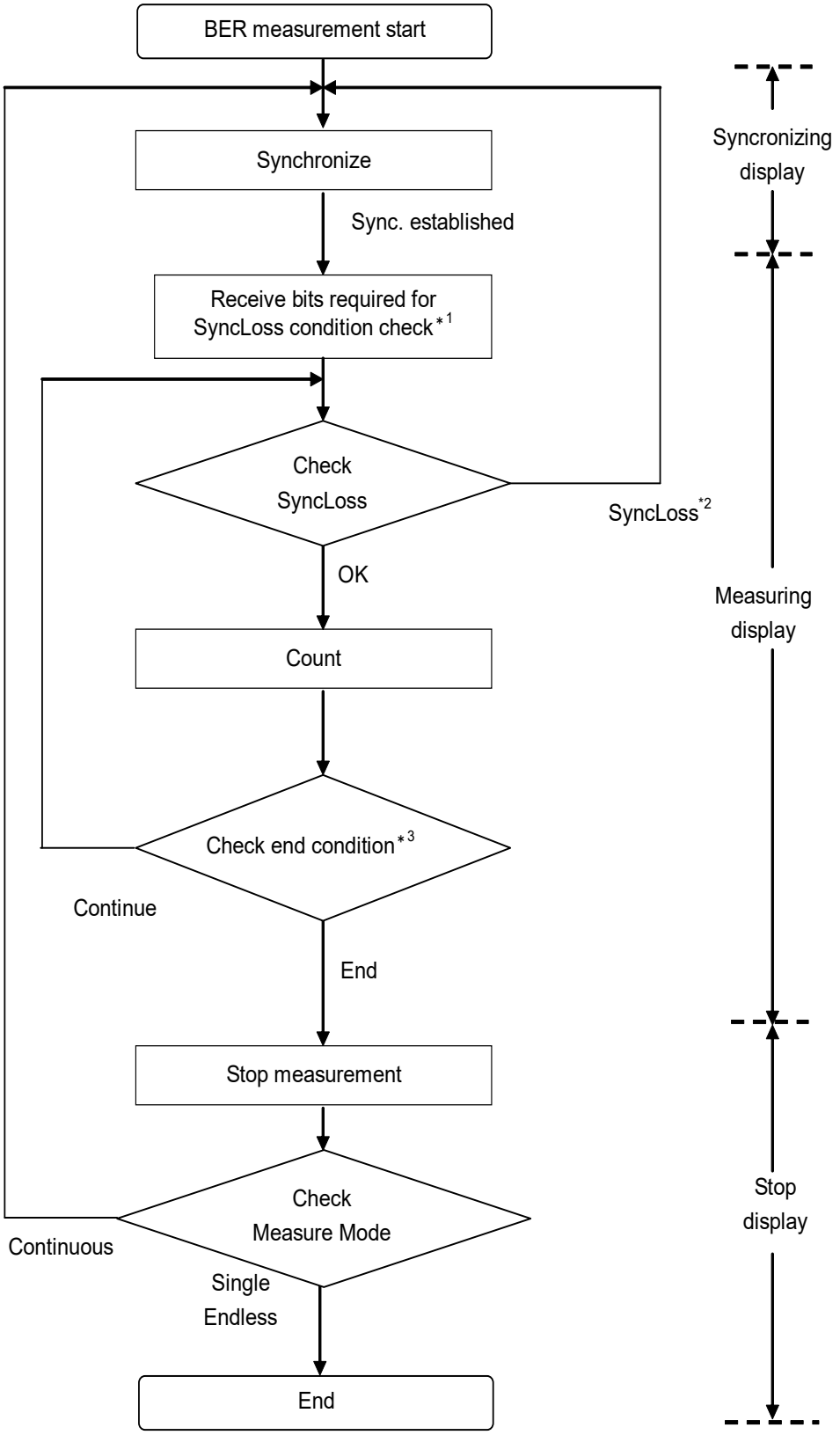


Figure 8.7-2 Auto Resync On

*1: To check SyncLoss conditions, bits specified with the denominator of SyncLoss Threshold must be received. Therefore, it may take time to start counting after synchronization is established.

*2: When a SyncLoss occurs, the operation specified with at SyncLoss is performed.

*3: The measurement finishes when one of the following conditions is met:

- The number of measurement bits or measurement error bits reaches the specified number of bits.
- The number of measurement bits exceeds the maximum value.
- The SyncLoss count exceeds the maximum value.

Chapter 9 Other Functions

This chapter describes the Auxiliary and Utility functions, panel keys, touch panel, and how to configure Windows system settings.

Note on remote command:

When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions. Refer to Appendix E.7.6 “Selecting SG1/2” for details.

The MG3710A/MG3710E/MG3740A uses one of the following Microsoft Windows (hereinafter, referred to as “Windows”) as the operating system (hereinafter, “OS”).

- Windows Embedded Standard 2009 (hereinafter, “WES 2009”)
- Windows Professional 7 32 bit ver. (hereinafter, “Win 7”)
- Windows Embedded Standard 7 64 bit ver. (hereinafter, “WES 7”)
- Windows 10 IoT 64 bit ver. (hereinafter, “Win 10”)

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9.1 Auxiliary Function

AUX Fctn or **Top**>(→)>**Auxiliary**

Press **Aux Fctn** on the main function key or **F5 Auxiliary** on page 2 of the top function menu to display the Auxiliary function menu. On this menu, you can set Power Meter, the BER measurement, and Alarm History.

This section describes the Auxiliary function menu.

Table 9.1-1 Auxiliary Function Menu

Page	Key No.	Menu Display	Function
1	F1	Power Meter	Sets Power Meter. Refer to 9.2 “Power Meter”
	F2	BER	Performs the BER measurement. Refer to Chapter 8 “BER Measurement”.
	F4	Alarm History	Saves Alarm History. Refer to 9.3 “Alarm History”.

9.2 Power Meter

AUX Fctn or **Top>**(→)**>Auxiliary, >Power Meter**

You can connect two USB power sensors to the MG3710A/MG3710E/MG3740A, simultaneously control them, and show their measurement values individually.

The two power sensor measurements are displayed at Ch. A and Ch. B of the power meter.

Press **F1 Power Meter** on the Auxiliary function menu to display the **Power Meter Measurements** dialog box and the Power Meter function menu.

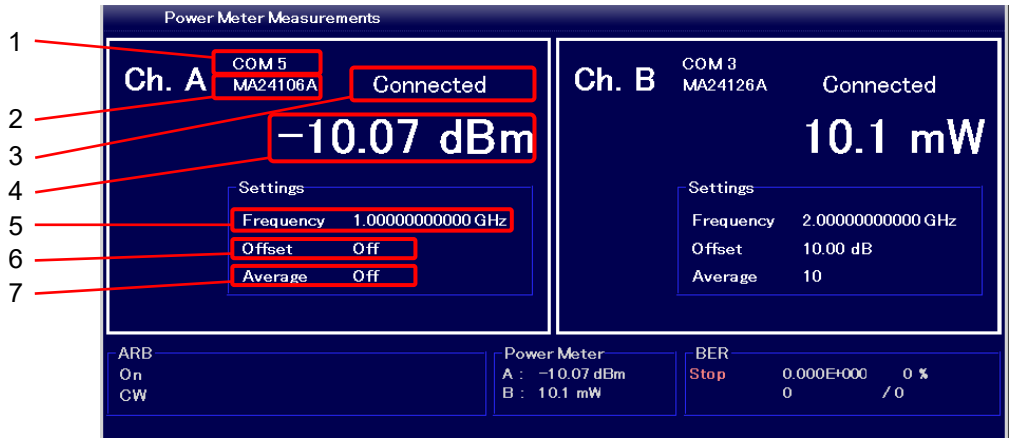


Figure 9.2-1 Power Meter Measurements Dialog Box

Table 9.2-1 Power Meter Measurements Dialog Box

No	Display	Description
1	COM	COM Port number
2	Model	Model name of power sensor
3	Connection	Connection status of the power sensor Off: The power sensor is Off. Connected: The power sensor is On and measurement is in progress. Disconnected: The power sensor is On and measurement is not in progress.(Not connected)
4	Measurement value	Indicates a measurement result in dBm or W
5	Frequency	Measurement frequency of the power sensor
6	Offset	Offset level value to be added to the power sensor reading
7	Average	Averaging count for the measurement values with the power sensor

Measurement value

Indicates a measurement value of a power sensor. When a power sensor is on, this value is updated constantly. It includes a level offset.

Remote command

Query the power sensor measurement display value

Query

```
:SYSTem:PMETer[1]|2:MEASuer?
```

Response

<power> "-999.0" is returned when there is no value.

Parameter

<power>	Level
Resolution	0.01 dB when dBm, 1 nW when W

Details

As for node :PMETer[1]|2, select Ch. A or B of power meter. Set as follows:

Ch. A: :PMETer1 or :PMETer
Ch. B: :PMETer2

Programming Example

To measure using the Ch. A power sensor and read the result.

```
SYST:PMET:MEAS?
> -10.00
```

Connection

Displays the connection status of power sensor.

`Off`	Power sensor is turned off. (Default)
`Connected`	Power sensor is turned on and measuring
`Disconnected`	Power sensor is turned on but not measuring. (Disconnected)

Remote command

Querying the power sensor connection status

Query

```
:SYSTem:PMETer[1]|2:CONNection?
```

Response

```
<connect>
```

Parameter

`<connect>`	Connection
`CONN`	Connected
`DISC`	Disconnected, or OFF

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To query the connection status of the Ch. A power sensor.

```
SYST:PMET:CONN?
> CONN
```

Information about the connection and measurement results are displayed in the resident frame below the function display frame.

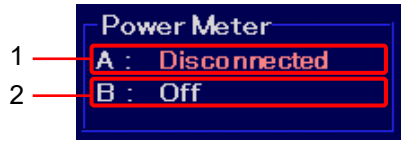


Figure 9.2-2 Power Meter in Resident Frame

Table 9.2-2 Power Meter in Resident Frame

No	Display	Description
1	A:	Connection status or a measurement value of Ch. A
2	B:	Connection status or a measurement value of Ch. B

Table 9.2-3 Power Meter Function Menu

Page	Key No.	Menu Display	Function
1	F1	Channel A Off On	Enables/disables measurement performed by the Ch. A power sensor.
	F2	Channel A Setup	Channel Setup Refer to 9.2.1 “Power Meter setting: Channel A/B Setup”.
	F3	Channel B Off On	Enables/disables measurement performed by the Ch. B power sensor.
	F4	Channel B Setup	Channel Setup Refer to 9.2.1 “Power Meter setting: Channel A/B Setup”.

Ch A/B power sensor On/Off: Channel A/B

AUX Fctn or **Top**>→>**Auxiliary,** >**Power Meter**>**Channel A** or **Channel B**

Enables/disables measurement performed by Ch. A or Ch. B power sensor.

Press **F1 Channel A** or **F3 Channel B** to set On/Off.

On	Measures.
Off	Does not measure (Default).

Remote command

Enable/disable measurement performed by Channel A or Channel B power sensor

Command

`:SYSTem:PMETer[1]|2[:STATe] <boolean>`

Query

`:SYSTem:PMETer[1]|2[:STATe]?`

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Measurement On/Off
`ON|1`	Measures.
`OFF|0`	Does not measure (Default).

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To enable measurement performed by Channel B.

```
SYST:PMET2 ON
SYST:PMET2?
> 1
```

9.2.1 Power Meter setting:Channel A/B Setup

AUX Fctn or **Top**>→>**Auxiliary,** >**Power Meter**>**Channel A Setup** or **Channel B Setup**

Press **F2 Channel A Set up** or **F4 Channel B Setup** on the Power Meter function menu to display the Ch A/B Setup function menu. Ch. A and Ch. B can be set individually.

Table 9.2.1-1 Ch A/B Setup Function Menu

Page	Key No.	Menu Display	Function
1	F1	Connection Settings	Displays the PMC Connection function menu where you can set connection of power meters. Refer to 9.2.2 “Setting connection to power meters : Connection Settings”.
	F2	Channel Settings	Displays the Channel Settings function menu where you can set measurement. Refer to 9.2.3 “Power Meter setting: Channel Settings”.
	F4	Zero Sensor	Zeros the levels of power sensors.

Zero adjustment: Zero Sensor

AUX Fctn or **Top**>→>**Auxiliary,** >**Power Meter**>**Channel A Setup** or **Channel B Setup,** >**Zero Sensor**

Execute the zero adjustment for the power sensor.

Press **F4 Zero Sensor** on the Ch A/B Setup function menu to execute the zero adjustment for the power sensor. Channel A Zero Sensor can be executed when Channel A is **On**, and Channel B Zero Sensor can be executed when Channel B is **On**.

“Executing **%” is displayed during the adjustment, and keys other than the power key are disabled.

Remote command

Execute the zero adjustment

Command

```
:SYSTem:PMETer[1]|2:ZERoset
```

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To execute the zero adjustment for the Ch. A power sensor.

```
SYST:PMET:ZER
```

Operation method

Example: To execute the zero adjustment for the power sensor.

1. Connect the USB terminal of the power sensor to the USB terminal of the MG3710A/MG3710E/MG3740A.
2. Enter the information of the connected power sensor with Com Port number and Model to the MG3710A/MG3710E/MG3740A.
3. Turn “On” Channel A or Channel B to be used.
4. Connect the RF Input terminal of the power sensor to the RF output connector of the MG3710A/MG3710E/MG3740A.

⚠ CAUTION

The power sensor may be damaged depending on the output level of the MG3710A/MG3710E/MG3740A. Beware not to apply excessive input when the terminal is connected.

5. Perform ZeroSensor.
   While the Zero adjustment is in progress, the RF Output of the MG3710A/MG3710E/MG3740A is automatically set to Off.

9.2.2 Setting connection to power meters: Connection Settings

AUX Fctn or **Top**>(→)>**Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Connection Settings**

Sets the connection to power meters.

Press **F1 Connection Settings** on the Ch A/B Setup function menu to display the Ch A/B Connection function menu.

Table 9.2.2-1 Ch A/B Connection Function Menu

Page	Key No.	Menu Display	Function
1	F1	Com Port 2	Sets the COM Port number allocated to the power sensor.
	F2	Model MA24106A	Displays the Model function menu for selection of the model name of the power sensor to be used.
	F3	Open Device Manager	Displays Windows Device Manager. This is used for checking the COM port number of connected power sensor.

COM Port setting: COM Port

AUX Fctn or **Top**>(→)>**Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Connection Settings>COM Port**

Sets the COM Port number of the power sensor.

Press **F1 COM Port** to display the **COM Port** dialog box in the active function frame. Enter numbers and press **F1 Enter** to set the COM Port number.

Setting range	2 to 8
Resolution	1
Default	2



Figure 9.2.2-1 COM Port Dialog Box

Remote command

Set the COM Port number

Command

```
:SYSTem:PMETer[1]|2:COMMunicate:USB:PORT <ext_integer>
```

Query

```
:SYSTem:PMETer[1]|2:COMMunicate:USB:PORT?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	COM Port number
Setting range	2 to 8
Resolution	1
Default	2

Details

As for node :PMETer[1]|2, select Ch. A or B of power meter. Set as follows:

Ch. A: :PMETer1 or :PMETer
Ch. B: :PMETer2

Programming Example

To set the COM Port number of Ch. A to 8.

```
SYST:PMET:COMM:USB:PORT 8
SYST:PMET:COMM:USB:PORT?
> 8
```

Model setting: Model

AUX Fctn or **Top**>→>**Auxiliary,** >**Power Meter**>**Channel A Setup** or **Channel B Setup,** >**Connection Settings**>**Model**

Selects the model name of the power sensor.

Press **F2 Model** to display the Model function menu, and press the function key of the power sensor to be used to set the model.

Table 9.2.2-2 Sensor Model Function Menu

Page	Key No.	Menu Display	Function
1	F1	MA24104A	600 MHz to 4 GHz
	F2	MA24105A	350 MHz to 4 GHz
	F3	MA24106A	50 MHz to 6 GHz (Default)
	F4	MA24108A	10 MHz to 8 GHz
	F5	MA24118A	10 MHz to 18 GHz
	F6	MA24126A	10 MHz to 26 GHz

Notes:

If Windows Device Manager does not display the available USB power sensor, the older version of PowerXpert software may be the cause.

Download and install the latest PowerXpert software from Anritsu website.

Use PowerXpert Ver. 2.11 or later for MA24105A, use PowerXpert Ver. 2.00 or later for other power sensor.

Remote command

Select the model name for the power sensor

Command

```
:SYSTem:PMETer[1]|2:SENSe:MODel
MA24104A|MA24105A|MA24106A|MA24108A|MA24118A|MA24126A
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:MODel?
```

Response

```
<model>
```

Parameter

`<model>`	Model name of power sensor
Options	MA24104A, MA24105A, MA24106A (Default), MA24108A, MA24118A, MA24126A

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To select the MA24118A for the power sensor.

```
SYST:PMET:SENS:MOD MA24118A
SYST:PMET:SENS:MOD?
> MA24118A
```

9.2.3 Power Meter setting: Channel Settings

AUX Fctn or **Top**>(→)>**Auxiliary,** >**Power Meter**>**Channel A Setup** or **Channel B Setup,** >**Channel Settings**

Performs the measurement-related settings.

Press **F2 Channel Settings** on the Ch A/B Setup function menu to display the Ch A/B Settings function menu.

Table 9.2.3-1 Ch A/B Setup Function Menu

Page	Key No.	Menu Display	Function
1	F1	Channel Freq 1.000000000 GHz	Sets a measurement frequency for the power sensor.
	F2	Channel Offset Off On	Enables/disables adding level offset to the value measured by the power sensor.
	F3	Channel Offset Value 0.00 dB	Sets the offset level value to be added to the power sensor reading.
	F4	Averaging Off On	Enables/disables the averaging for the measurement value with the power sensor.
	F5	Averaging Count Value 1024	Sets the averaging count for the measurement values with the power sensor.
	F6	Measurement Units dBm W	Sets a unit to be used for displaying the value measured by the power sensor.

Channel Freq

AUX Fctn or **Top**>→>**Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Channel Settings>Channel Freq**

Sets a measurement frequency for the power sensor.

Press **F1 Channel Freq** on the Ch A/B Settings function menu to display the **Channel Freq** dialog box. Enter the numbers and press the unit key of the Unit function menu to set the offset level value.

Table 9.2.3-2 Power Sensor Setting Range

Power Sensor	Minimum Value	Maximum Value	Resolution	Default
MA24104A	600 MHz	4 GHz	1 kHz	1 GHz
MA24105A	350 MHz	4 GHz	100 kHz	1 GHz
MA24106A	50 MHz	6 GHz	1 kHz	1 GHz
MA24108A	10 MHz	8 GHz	100 kHz	1 GHz
MA24118A	10 MHz	18 GHz	100 kHz	1 GHz
MA24126A	10 MHz	26 GHz	100 kHz	1 GHz

Remote command

Set a measurement frequency for the power sensor

Command

```
:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed] <freq>
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed]?
```

Response

<freq> Unit: Hz

Parameter

<freq> Frequency

Range Refer to Table 9.2.3-2 Power Sensor Setting Range

Resolution

MA24104A, MA24106A	1 kHz
MA24105A	100 kHz
MA24108A, MA24118, MA24126	100 kHz

Default 1 GHz

Suffix code HZ, KHZ, KZ, MHZ, MZ, GHZ, GZ

When omitted Hz

Details

As for node :PMETer[1]|2, select Ch. A or B of power meter. Set as follows:

Ch. A: :PMETer1 or :PMETer
Ch. B: :PMETer2

Programming Example

To set a measurement frequency of Ch. B to 800 MHz.

```
SYST:PMET2:SENS:FREQ 800000000
SYST:PMET2:SENS:FREQ?
> 800 000 000
```

Level Offset: Channel Offset

AUX Fctn or **Top**>→>**Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Channel Settings>Channel Offset**

Enables/disables adding level offset to the value measured by the power sensor.

Press **F2 Channel Offset** on the Ch A/B Settings function menu to set it.

Off	Does not add level offset (Default).
On	Adds level offset.

Remote command

Enable/disable the level offset for the power sensor

Command

```
:SYSTem:PMETer[1]|2:SENSe:CORRection:GAIN2:STATe
<boolean>
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:CORRection:GAIN2:STATe?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Level offset On/Off
OFF|0	Off (Default)
ON|1	On

Details

As for node :PMETer[1]|2, select Ch. A or B of power meter. Set as follows:

Ch. A: :PMETer1 or :PMETer
Ch. B: :PMETer2

Programming Example

To set a level offset for the Ch. B power sensor to ON.

```
SYST:PMET2:SENS:CORR:GAIN2:STAT ON
SYST:PMET2:SENS:CORR:GAIN2:STAT?
> 1
```

Channel Offset Value

AUX Fctn or **Top**>  **>Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Channel Settings>Channel Offset Value**

Sets the offset level value to be added to the power sensor reading.

Press **F3 Channel Offset Value** on the Ch A/B Settings function menu to display the **Channel Offset Value** dialog box. Enter the numbers and press the unit key of the Unit function menu to set the offset level value.

Setting range	–100 dB to 100 dB
Resolution	0.01 dB
Default	0.00 dB

Remote command

Set an offset level for the power sensor

Command

```
:SYSTem:PMETer[1]|2:SENSe:CORRection:GAIN2[:INPut][:MAGN
itude] <rel_ampl>
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:CORRection:GAIN2[:INPut][:MAGN
itude]?
```

Response

`<rel_ampl>`	Unit: dB

Parameter

`<rel_ampl>`	Offset level
Setting range	–100 to +100 dB
Resolution	0.01 dB
Default	0.00 dB
Suffix code	DB, when omitted: DB

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To set an offset level for the Ch. B power sensor to –15.00 dB.

```
SYST:PMET2:SENS:CORR:GAIN2 -15.00
SYST:PMET2:SENS:CORR:GAIN2?
> -15.00
```

Averaging

AUX Fctn or **Top**>→>**Auxiliary, >Power Meter**>**Channel A Setup** or **Channel B Setup, >Channel Settings**>**Averaging**

Enables/disables the averaging for the measurement value with the power sensor.

Press **F4 Averaging** on the Ch A/B Settings function menu to set it.

Off	Does not perform averaging. (Default)
On	Performs averaging.

Remote command

Enable/disable averaging

Command

```
:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe] <boolean>
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe]?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Averaging On/Off
`OFF|0`	Off (Default)
`ON|1`	On

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

Ch. A: `:PMETer1` or `:PMETer`
Ch. B: `:PMETer2`

Programming Example

To set Ch. B power meter averaging to ON.

```
SYST:PMET2:SENS:AVER ON
SYST:PMET2:SENS:AVER?
> 1
```

Averaging Count Value

AUX Fctn or **Top**>(→)>**Auxiliary,** >**Power Meter**>**Channel A Setup** or **Channel B Setup,** >**Channel Settings**>**Averaging Count Value**

Sets the averaging count for the measurement values with the power sensor.

Press **F5 Averaging Count Value** on the Ch A/B Settings function menu to display the **Averaging Count Value** dialog box. Enter the numbers and press **F1 Enter** to set the averaging count.

Setting range	1 to 2048
Resolution	1
Default	1024

Remote command

Set the averaging count

Command

```
:SYSTem:PMETer[1]|2:SENSe:AVERage:COUNt <ext_integer>
```

Query

```
:SYSTem:PMETer[1]|2:SENSe:AVERage:COUNt?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	The number of measurement points
Setting range	1 to 2048
Resolution	1
Default	1024

Details

As for node :PMETer[1]|2, select Ch. A or B of power meter. Set as follows:

Ch. A: :PMETer1 or :PMETer

Ch. B: :PMETer2

Programming Example

To set Ch. B power meter averaging to 1024 times.

```
SYST:PMET2:SENS:AVER:COUN 1024
SYST:PMET2:SENS:AVER:COUN?
> 1024
```

Measurement Units

AUX Fctn or **Top**>→>**Auxiliary, >Power Meter>Channel A Setup** or **Channel B Setup, >Channel Settings>Measurements Units**

Sets a unit to be used for displaying the value measured by the power sensor.

Press **F6 Measurement Units** on the Ch A/B Settings function menu to set it.

dBm	Displays in dBm (Default).
W	Displays in W.

Remote command

Set the output level unit

Command

```
:SYSTem:PMETer[1]|2:UNIT:POWer DBM|W
```

Query

```
:SYSTem:PMETer[1]|2:UNIT:POWer?
```

Response

```
<unit>
```

Parameter

`<unit>`	Output level unit
`DBM`	dBm
`W`	W

Details

As for node `:PMETer[1]|2`, select Ch. A or B of power meter. Set as follows:

For Ch. A: `:PMETer1` or `:PMETer`
For Ch. B: `:PMETer2`

Programming Example

To set a unit to be used for displaying the output level of the Ch. B power meter to dBm.

```
SYST:PMET2:UNIT:POW DBM
SYST:PMET2:UNIT:POW?
> DBM
```

9.3 Alarm History

AUX Fctn or **Top**>  >**Auxiliary, >Alarm History**

The MG3710A/MG3710E/MG3740A can store occurred alarm histories up to 100 in files.

Press **F4 Alarm History** on the Auxiliary function menu to display the **Alarm History** dialog box and the Alarm History function menu.

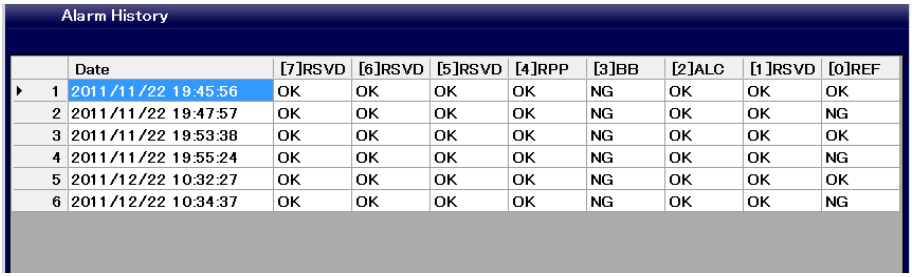


Figure 9.3-1 Alarm History Dialog Box

Table 9.3-1 Alarm History Display

Display	Description
Date	Alarm occurrence date, time
[7]RSVD	Not used
[6]RSVD	Not used
[5]RSVD	Not used
[4]RPP	RPP Alarm
[3]BB	Baseband Reference Clock PLL Alarm
[2]ALC	ALC Alarm
[1]RSVD	Not used
[0]REF	Reference Oscillator PLL Alarm
OK	Normal
NG	Alarm occurred.

For measures for Alarm, refer to 11.6 “Troubleshooting”.

Table 9.3-2 Alarm History Function Menu

Page	Key No.	Menu Display	Function
1	F8	Save	Displays the Save Alarm History function menu where you can set alarm histories to save. Refer to 9.3.1 “Saving Alarm History: Save”.

9.3.1 Saving Alarm History: Save

AUX Fctn or **Top**>→>**Auxiliary,** >**Alarm History**>**Save**:

When an error occurs during operation of the MG3710A/MG3710E/MG3740A, an alarm is displayed, describing details. The alarm is kept as Alarm History. Using this function, you can save histories of alarms.

Remote command

Save Alarm History in an alarm file

Command

```
:MMEMory[1]|2:STORe:ALARm:LOG [<string>[,<device>]]
```

Parameter

<string>	File name excluding extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " < > | Automatically named as "Alarm_[Date]_[Additional number].log" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.

A destination path to save the file is the following directory in the specified drive.

Anritsu\MG3710A\User Data\Alarm History\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To name an alarm file as "TEST" and saves it in D drive.

```
MMEM:STOR:ALAR:LOG "TEST",D
```

Operation method

Example: To name the currently displayed file as "Alarm20110624_000" and save it.

1. Press **F8 Save** on the Alarm History function menu to display the **Alarm Save** dialog box on the active function menu, the **File List** dialog box in the function display frame, and the Alarm Save function menu in the function menu frame.

Table 9.3.1-1 Alarm Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu and sets the destination Drive.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F7	Save	Saves the file to the Drive selected with **F1 Drive**.
	F8	Cancel	Returns to the previous menu.

2. Press **F1 Drive** to select the destination Drive.

   Options All connected Drives
   Default C

3. The **File List** dialog box of the device selected in Step 2 is displayed, and the files are displayed.



Figure 9.3.1-1 Alarm Save Dialog Box

4. Enter the file name to the text box in the active function frame. By default, the “Alarm[Date]_Additional number” is displayed in the text box.
5. Enter “Alarm20110624_0000” in the text box and press **F7 Save**. The file with the entered file name is saved, and the **Alarm Save** dialog box closes.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path:
  Anritsu\MG3710A\User Data¥Alarm History\
- Default destination name:
  Alarm[Date]_[Additional number].log
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character pallet.
- The following characters cannot be used:
  \ / : * ? " ″ ` ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

9.4 Utility Function

Utility or **Top**>→>**Utility**

When you press the **Utility** of the main function key, the MG3710A/MG3710E/MG3740A becomes the utility setting mode and displays the Utility function menu. On this menu, you can save or call parameters or set networks and other functions.

This section assumes that the MG3710A/MG3710E/MG3740A is in the utility setting mode, unless otherwise explained.

Table 9.4-1 Utility Function Menu

Page	Key No.	Menu Display	Function
1	F1	Interface Settings	Sets the interface for remote control. Refer to 9.4.1 “Interface Settings”.
	F2	System Settings	Performs common settings in the system. Refer to 9.4.2 “System Setting”.
	F3	Instrument Info	Displays the status and factory shipment defaults of the MG3710A/MG3710E/MG3740A. Refer to 9.4.3. “Instrument Info”.
	F4	Install	Adds or deletes firmware, waveform licenses, and options. Refer to 9.4.4 “Install”.
	F5	Error Info	Displays the error information. Refer to 9.4.5 “Displaying Error Information: Error Info”.

9.4.1 Interface Settings

Utility or **Top**>→>**Utility, >Interface Settings**

The MG3710A/MG3710E/MG3740A allows the remote control with GPIB, Ethernet, and USB. Press **F1 Interface Settings** on the Utility function menu to display the Interface Settings function menu. Set the interface for remote control.

For details, refer to Appendix E "Remote Control".

Table 9.4.1-1 Interface Setting Function Menu

Page	Key No.	Menu Display	Function
1	F1	GPIB 3	Sets GPIB Address.
	F2	Terminator CR LF EOI	Sets a terminator (end code) for a response message of controller sending, which is sent by a measuring instrument via remote control.
	F3	Language SCPI	Selects a language mode during remote control.
	F4	Raw Socket Port Number 49158	Specifies a TCP/IP port number for transmitting the waveform data from IQproducer, which locates on an external PC, to the MG3710A/MG3710E/MG3740A.

GPIB address: GPIB

Utility or **Top**>→>**Utility, >Interface Settings>GPIB**

Sets GPIB Address.

Press **F1 GPIB** on the Interface Settings function menu to display the **GPIB** dialog box on the active function frame. Enter numbers and press **Enter** to set it.

Setting range	1 to 30
Default	3
Resolution	1

Remote command

Set GPIB Address

Command

```
:SYSTem:COMMunicate:GPIB:ADDRess <ext_integer>
```

Query

```
:SYSTem:COMMunicate:GPIB:ADDRess?
```

Response

```
<ext_integer>
```

Parameter

<ext_integer>	GPIB address
Setting range	1 to 30
Default	3
Resolution	1

Programming Example

To set GPIB Address to 2.

```
SYST:COMM:GPIB:ADDR 2
SYST:COMM:GPIB:ADDR?
> 2
```

Terminator

Utility or **Top**>  **>Utility, >Interface Settings>Terminator**

Sets a terminator (end code) for a response message of controller sending, which is sent by a measuring instrument via remote control.

Press **F2 Terminator** on the Interface Settings function menu to select a terminator.

CR	Adds CR+LF to transmit EOI (Default).
LF	Adds LF to transmit EOI.
EOI	Transmits EOI without adding any characters.

Remote command

Set a terminator (end code)

Command

```
:SYSTem:COMMunicate:GPIB:TERMinator LF|CRLF|EOI
```

Query

```
:SYSTem:COMMunicate:GPIB:TERMinator?
```

Response

```
<terminator>
```

Parameter

<terminator>	Terminator
CRLF	Adds CR+LF to transmit EOI (Default).
LF	Adds LF to transmit EOI.
EOI	Transmits EOI without adding any characters.

Programming Example

To set a terminator to CRLF.

```
SYST:COMM:GPIB:TERM CRLF
SYST:COMM:GPIB:TERM?
> CRLF
```

Selecting control language: Language

Utility or **Top**>  >**Utility,** >**Interface Settings**>**Language**

Selects a language mode during remote control.

Press **F3 Language** on the Interface Settings function menu to select an assignment from options displayed on the function menu.

SCPI	Sets a language mode to SCPI mode (Default).
MG3700A	Sets a language mode to the MG3700 mode.
MS269xA	Sets a language mode to the MS269x mode.
MS2830A	Sets a language mode to the MS2830 mode.
MG364x	Sets a language mode to the MG364x mode.

Remote command

Set a language mode

Command

```
:SYSTem:LANGuage SCPI|MG3700|MS269X|MS2830|MG364X
```

Query

```
:SYSTem:LANGuage?
```

Response

```
<language>
```

Parameter

`<language>`	Language mode
`SCPI`	Sets to the SCPI mode (Default).
`MG3700`	Sets to the MG3700 mode (Native).
`MS269X`	Sets to the MS269x mode (Native).
`MS2830`	Sets to the MS2830 mode (Native).
`MG364X`	Sets to the MG364x mode (Native).

Programming Example

To set a language mode to the MS2830 mode.

```
SYST:LANG MS2830A
SYST:LANG?
> MS2830A
```

TCP/IP port number: Raw Socket Port Number

Utility or **Top**>→>**Utility,** >**Interface Settings**>**Raw Socket Port Number**

Specifies a TCP/IP port number for transmitting the waveform data from IQproducer, which locates on an external PC, to the MG3710A/MG3710E/MG3740A.

Press **F4 Raw Socket Port Number** on the Interface Settings function menu to display the **Raw Socket Port Number** dialog box in the active function frame. Enter numbers and press **Enter** to set it.

Setting range	49152 to 65535
Default	49158
Resolution	1

9.4.2 System Settings

Utility or **Top**>→>**Utility, >System Settings**

Press **F2 System Settings** on the Utility function menu to display the System Setting function menu. Set common items in the system.

Table 9.4.2-1 System Settings Function Menu

Page	Key No.	Menu Display	Function
1	F1	Beep Sound Off On	Specifies On to make a beep or Off not to make it when displaying an error message.
	F3	Power On Preset Last	Specifies status of parameters when the power is on.

Beep

Utility or **Top**>→>**Utility, >System Settings>Beep Sound**

Enables/disables a beep when displaying an error message.

Press **F1 Beep Sound** on the System Setting function menu to enable/disable a beep.

On	Enables a beep (Default).
Off	Disables a beep.

Remote command

Enable/disable a beep

Command

```
:SYSTem:BEEPer <boolean>
```

Query

```
:SYSTem:BEEPer?
```

Response

<boolean>	0 or 1

Parameter

<boolean>	Beep
ON|1	Enables a beep (Default).
Off|0	Disables a beep.

Programming Example

To disable a beep.

```
SYST:BEEP OFF
SYST:BEEP?
> 0
```

Parameters at power-on: Power On

Utility or **Top**>  **>Utility, >System Setting>Power On**

Specifies status of parameters when the power is on.

Press **F3 Power On** of the System Setting function menu to set the status.

Last	Keeps the status when the power is on and recovers them if the power goes on (Default).
Preset	Does not keep the status when the power is on and uses default values if the power goes on. Pressing **Preset**  performs the same operation as initializing by pressing **F1 Preset**.

Remote command

Specify status of parameters when the power is on

Command

```
:SYSTem:PON:TYPE PRESet|LAST
```

Query

```
:SYSTem:PON:TYPE?
```

Response

<type>	PRES or LAST

Parameter

<type>	Status of parameters
LAST	Keeps the status when the power is off and recovers them if the power goes on (Default).
PRESet	Does not keep the status when the power is off and uses default values if the power goes on. Pressing **Preset**  performs the same operation as initializing by pressing **F1 Preset**.

Programming Example

To set status of parameters when the power is on to the default values.

```
SYST:PON:TYPE PRES
SYST:PON:TYPE?
> PRES
```

9.4.3 Instrument Info

Utility or **Top**>→>**Utility, >Instrument Info**

Press **F3 Instrument Info** on the Utility function menu to display the Instrument Info function menu. This function displays the status and factory shipment defaults of the system.

Table 9.4.3-1 Instrument Info Function Menu

Page	Key No.	Menu Display	Function
1	F1	Product Info	Displays the **Product Information** dialog box where you can see the product information.
	F2	Instrument Options	Displays the **Instrument Options** dialog box where you can see the option information.
	F3	Board Info	Displays the **Board Information** dialog box where you can see the revision number of the board.
	F4	FPGA Info	Displays the **FPGA Info** dialog box where you can see the FPGA version.
	F5	Waveform Licenses	Displays the **Waveform Licenses** dialog box where you can see the license number of the waveform data.

Product Info

Utility or **Top**>→>**Utility, >Instrument Info>Product Info**Displays the product information.

Press **F1 Product Info** on the Instrument Info function menu to display the **Product Information** dialog box.

Product Name	Product name
Product Model	Product model name
Serial Number	Serial number of the system (hardware)
Firmware Version	Version of this application
USB Product ID	Product ID of the USB port for remote control
USB Vendor ID	Vendor ID of the USB port for remote control
USB Serial Number	Serial number of the USB port for remote control
Power On (Hours:Minutes:Seconds)	Elapsed time since the power is turned to on
SG1 Frequency Setting Range	SG1 Frequency Setting Range
SG1 Level Setting Range	SG1 Level Setting Range
SG1 ARB Memory Size	SG1 Waveform Memory Size (MSamples)
SG1 AWGN	SG AWGN function On/Off

SG1 RPP Count	Number of circuit breaker trips by SG1 RPP
SG2 Frequency Setting Range	SG2 Frequency Setting Range
SG2 Level Setting Range	SG2 Level Setting Range
SG2 ARB Memory Size	SG2 Waveform Memory Size (MSamples)
SG2 AWGN	SG2 AWGN function On/Off
SG2 RPP Count	Number of circuit breaker trips by SG2 RPP

Note:

RPP Count is displayed when the reverse input power protection option (Opt–043/143/073/173) is installed.

Remote commands for displaying the product information are as follows:

Remote command

Device information

Query Product Type (product model name), Serial Number (serial number), Firmware Version (version of this application), or the information common to IEEE488.2

Query

```
*IDN?
```

Response

```
company,model,serialnumber,firmware
```

Parameter

`company`	Manufacturer (ANRITSU)
`model`	Product model name (7 alphanumeric characters)
`serialnumber`	Serial number specific to the product (10-digit numbers)
`firmware`	Version number of this application

Programming Example

To query the device information.

```
*IDN?
> ANRITSU,MG3710A,6100000000,1.00.00.
```

Remote command **Query the Product Type (product model name)**

Query

```
:SYSTem:INFormation:MODel?
```

Response

```
<model>
```

Parameter

`<model>`	Product model name

Programming Example

To query the product model name.

```
SYST:INF:MOD?
> MG3710A
```

Remote command **Query Product Name (product name)**

Query

```
:SYSTem:INFormation:TYPE?
```

Response

```
<type>
```

Parameter

`<type>`	Product name

Programming Example

To query the product name.

```
SYST:INF:TYPE?
> SIGNAL GENERATOR
```

Remote command **Query Serial Number (serial number)**

Query

```
:SYSTem:INFormation:SERial?
```

Response

```
<serial>
```

Parameter

`<serial>`	Serial number

Programming Example

To query the serial number.

```
SYST:INF:SER?
> 6100000000
```

Remote command

Query Running Time (available time)

Query

```
:SYSTem:INFormation:RTIMe?
```

Response

```
<time>
```

Parameter

<time>	Running time
Suffix code	None, Unit: m (minutes)

Programming Example

To query the running time.

```
SYST:INF:RTIM?
> 100
```

Remote command

Query Firmware Version (the version of this application)

Refer to the explanation of "*IDN?".

Instrument Options

Utility or **Top**>  **>Utility, >Instrument Info>Instrument Options**Displays the option information of the system.

Press **F2 Instrument Options** on the Instrument Info function menu to display the **Instrument Options** dialog box in the function display frame.

Number	Number of the installed hardware option
Name	Name of the hardware option
State	Status of On/Off switch

Remote command

Query the option information

Query

```
:SYSTem:HARDware:OPTion:CATalog?
```

Response

```
<total>,<number1>,<switch1>,<name1>,<number2>,<switch2>,
<name2>...
```

Parameter

<total>	Total number of selectable options
<number>	Number of the option
<switch>	Status of the option (On or Off) ON, OFF
<name>	Name of the option

Programming Example

To query the option information.

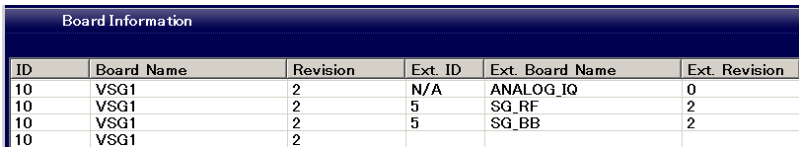
```
SYST:HARD:OPT:CAT?
> 1,001,ON,Rubidium Reference Oscillator
```

Board Info

Utility or **Top**>  **>Utility, >Instrument Info>Board Info**

Displays Revision of the system board.

Press **F3 Board Info** on the Instrument Info function menu to display the **Board Information** dialog box in the function display frame.



Board Information

ID	Board Name	Revision	Ext. ID	Ext. Board Name	Ext. Revision
10	VSG1	2	N/A	ANALOG_IQ	0
10	VSG1	2	5	SG_RF	2
10	VSG1	2	5	SG_BB	2
10	VSG1	2			

Figure 9.4.3-1 Board Information (VSG1 Revision = 2)

ID	ID number of the board
Board Name	Name of the board
Revision	Revisions
Ext.ID	ID number of the expansion board
Ext. Board Name	Name of the expansion board
Ext. Revision	Revisions of the expansion board

Remote command

Query the revision number of the specified hardware

Query

```
:SYSTem:HARDware:REVision? <hardware>
```

Response

```
<revision>
```

Parameter

<hardware>	Hardware type
MAIN	Main Board (With BER option)
MAIN_NO_BER	Main Board (Without BER option)
VSG1	1st VSG Board
VSG2	2nd VSG Board
MAIN_IB	Interface Board (With BER option)
MAIN_NO_BER_IB	Interface Board (Without BER option)
VSG1_ANALOG_IQ	1st VSG Analog I/Q Board
VSG1_SG_BB	1st VSG Baseband Board
VSG1_SG_RF	1st VSG RF Board
VSG2_ANALOG_IQ	2nd VSG Analog I/Q Board
VSG2_SG_BB	2nd VSG Baseband Board
VSG2_SG_RF	2nd VSG RF Board

<revision>	Revision number

Details

This command queries the revision number of the specified hardware.
"-" is returned when reading a version number of hardware not installed.
To query in batch all hardware names and revision numbers, use:
:SYSTem:HARDware:REVision:CATalog?

Programming Example

To query the revision number of Main Board.

```
SYST:HARD:REV? MAIN
> 2
```

Remote command

Query revision numbers of all the hardware

Query

```
:SYSTem:HARDware:REVision:CATalog?
```

Response

<hardware1>,<revision1>,<hardware2>,<revision2>,...

Parameter

<hardware>	Hardware type
MAIN	Main Board (With BER option)
MAIN_NO_BER	Main Board (Without BER option)
VSG1	1st VSG Board
VSG2	2nd VSG Board
MAIN_IB	Interface Board (With BER option)
MAIN_NO_BER_IB	Interface Board (Without BER option)
VSG1_ANALOG_IQ	1st VSG Analog I/Q Board
VSG1_SG_BB	1st VSG Baseband Board
VSG1_SG_RF	1st VSG RF Board
VSG2_ANALOG_IQ	2nd VSG Analog I/Q Board
VSG2_SG_BB	2nd VSG Baseband Board
VSG2_SG_RF	2nd VSG RF Board
<revision>	Revision number

Details

This command queries revision numbers of all the hardware.
No response is returned when the hardware does not exist.

Programming Example

To query all revision numbers.

```
SYST:HARD:REV:CAT?
> MAIN,2,VSG1,4,VSG_SG_RF,0,VSG1_SG BB,1
```

FPGA Info

Utility or **Top**>→>**Utility, >Instrument Info**>**FPGA Info**

Displays FPGA Version of the system.

Press **F4 FPGA Info** on the Instrument Info function menu to display the **FPGA Info** dialog box in the function display frame.

Name	FPGA name
Board	Installed FPGA board name
Version	Versions

Remote command

Query the version number of FPGA

Query

```
:SYSTem:FPGA:VERSion? <hardware>
```

Response

```
<version>
```

Parameter

<hardware>	FPGA type
CNTR_KEY	ControlPldAndPanel
HWC	HardwareControlFpga
MEAS_COM	MeasureComDsp
MEAS_CORE	MeasureCoreFpga
MEAS_PCI	MeasurePciFpga
SGBB	SgBbHardwareControlFpga
SGCTRL	SgControlFpga
SGRF	SgRfFpga
<version>	Version number of FPGA

Details

This command queries the version number of the specified FPGA.
"-" is returned when reading a version number of hardware not installed.
To acquire in batch the version numbers of all the FPGAs, use:

```
:SYSTem:FPGA:VERSion:CATalog?
```

Programming Example

To query the version number of HWC FPGA.

```
SYST:FPGA:VERS? CNTR_KEY
> 5
```

Remote command

Query the version numbers of all FPGAs

Query

```
:SYSTem:FPGA:VERSion:CATalog?
```

Response

```
<hardware1>,<version1>,<hardware2>,<version2>...
```

Parameter

<hardware>	FPGA type
ControlPldAndPanel	ControlPldAndPanel
HardwareControlFpga	HardwareControlFpga
MeasureComDsp	MeasureComDsp
MeasureCoreFpga	MeasureCoreFpga
MeasurePciFpga	MeasurePciFpga
SgBbHardwareControlFpga	SgBbHardwareControlFpga
SgControlFpga	SgControlFpga
SgRfFpga	SgRfFpga
<version>	Version number of FPGA

Details

This command queries the version number of all FPGAs.
No response is returned when the hardware does not exist.

Programming Example

To query the version number of all FPGAs.

```
SYST:FPGA:VERS:CAT?
> HardwareControlFpga,6,MeasurePciFpga,15,
  MeasureComDsp,46,MeasureCoreFpga,21,SgBbHardwareContro
  lFpga,3,SgRfFpga,5,SgControlFpga,7,ControlPldAndPanel,
  5
```

Waveform Licenses

Utility or **Top**>→>**Utility, >Instrument Info**>**Waveform Licenses**Displays waveform licenses.
Press **F5 Waveform Licenses** on the Instrument Info function menu to display the **Waveform Licenses** dialog box and the Waveform Licenses function menu.

License Name	Names of waveform licenses
Serial Number	Serial number
Version Limit	Versions are limited. Only the files with the displayed version number or earlier can be worked with.
Note	Remarks

Table 9.4.3-2 Waveform Licenses Function Menu

Page	Key No.	Menu Display	Function
1	F1	Install	Displays the Waveform Licenses function menu and the **Waveform License Install** dialog box.
	F2	Uninstall	Selects a waveform license in the **Waveform Licenses** dialog box and deletes it.

Remote commands for Waveform license information are as follows:

Remote command **Query the total number of waveform licenses**

Query

```
:SYSTem:WAVeform:LICense:COUNt?
```

Response

`<integer>` Total number of waveform licenses

Programming Example

To query the total number of waveform licenses.

```
SYST:WAV:LIC:COUN?
> 3
```

Remote command **Query a license name of waveform license specified with a number**

Query

```
:SYSTem:WAVeform:LICense:NAME? <integer>
```

Response

```
<string>
```

Parameter

<integer>	Number
Setting range	0 to (license count – 1)
Resolution	1
<string>	License name of the waveform license Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)

Programming Example

To query the license name of waveform license with #5.

```
SYST:WAV:LIC:NAME? 5
> "W-CDMA Waveform"
```

Remote command **Query a version number of waveform license specified with a number**

Query

```
:SYSTem:WAVeform:LICense:VERSion? <integer>
```

Response

```
<numeric>
```

Parameter

<integer>	No.
Setting range	0 to (license count – 1)
Resolution	1
<numeric>	Version number

Programming Example

To query a version number of waveform license with #5.

```
SYST:WAV:LIC:VERS? 5
> 1.23
```

Remote command **Delete the waveform license specified with a name**

Command

```
:SYSTem:WAVeform:LICense:DELete <string>
```

Parameter

<string>	Name of waveform license Character string within 100 characters enclosed by double quotes (“ ”) or single quotes (‘ ’) (excluding file extension)

Programming Example

To delete the "W-CDMA License" waveform license.

```
SYST:WAV:LIC:DEL "W-CDMA License"
```

Remote command

Install a waveform license by specifying a license file

Command

```
:SYSTem:WAVeform:LICense:INSTall <string>[,<device>]
```

Parameter

`<string>`	Name of a license file Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
`<device>`	Drive number: A to Z, currently selected drive when omitted

Programming Example

To install the license file "LicenseFile" in D drive.

```
SYST:WAV:LIC:INST "LicenseFile",D
```

Operation method

Install or uninstall waveform licenses

Example: To install a waveform license.

1. Press **F1 Install** on the Waveform Licenses function menu to display the **Waveform License Install** dialog box and the Waveform License function menu.

File Name	File name
License Name	Name of waveform license
State	Not used
Serial Number	Serial number
Version Limit	Versions are limited. Only the files with the displayed version number or earlier can be worked with.

Table 9.4.3-3 Waveform License Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu where you can select a drive containing waveform licenses.
	F7	Install	Installs selected waveform license files.

2. Press **F1 Drive** to select a drive for containing waveform licenses.

   Options All connected drives
   Default C

3. The **File List** dialog box for the device selected in Step 2 appears and shows files.

4. Select a waveform license to be installed in the **Waveform License Install** dialog box, press **F7 Install**, and the Confirmation function menu is displayed.

Table 9.4.3-4 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm installation	Performs installation.
	F8	Cancel	Returns to the menu before this menu is opened.

5. Press **F7 Confirm installation.**

Example: Uninstalling Waveform License

1. Select the waveform license to be uninstalled at the **Waveform License** dialog box.

License Name	Names of waveform licenses
Serial Number	Serial number
Version Limit	Versions are limited. Only the files with the displayed version number or earlier can be worked with.
Note	Remarks

2. Press **F2 Uninstall** at the Waveform Licenses function menu to display the **Waveform License** dialog box and Confirmation function menu.

Table 9.4.3-5 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Uninstallation	Performs Uninstallation.
	F8	Cancel	Returns to the menu before this menu is opened.

3. Press **F7 Confirm installation.**

9.4.4 Install

Utility or **Top**>→>**Utility, >Install**

Updates the firmware and adds or deletes waveform licenses.

Press **F4 Install** on the Utility function menu to display the Install function menu.

Table 9.4.4-1 Install Function Menu

Page	Key No.	Menu Display	Function
1	F1	Firmware	Updates the firmware.
	F2	Waveform Licenses	Displays the Waveform Licenses dialog box where you can add or delete waveform licenses.
	F3	Options	Adds options.
	F8	Factory Preset	Initializes parameters to the level at which past status does not affect operations at all.

Updating firmware: Firmware

Utility or **Top**>→>**Utility, >Install>Firmware**

Updates the firmware.

Note:

Upon firmware installation, "LastParameterSetting.xml", the parameter file automatically saved at the last power-off, will be deleted. Therefore, the settings return to default when restarting the MG3710A/MG3710E/MG3740A.
For default settings, refer to Appendix C, "Default Value List".

Example: To install a firmware file.

1. Copy the installer file "Setup.msi" and "update.bat" to a root folder on any drives or to the following folder:
   [Drive] \Anritsu\MG3710A\User Data\Install
2. Press **F1 Firmware** on the Install function menu to display the Firmware Install function menu and the **Installer List** dialog box.

Table 9.4.4-2 Firmware Install Function Menu

Page	Key No.	Menu Display	Function
1	F7	Install	Displays the Confirmation function menu.

3. Make sure the **Installer List** dialog box shows the information about the installer file "Setup.msi".
4. Select a file to install and press **F7 Install** to display the Confirmation function menu.

Table 9.4.4-3 Confirmation Function Menu

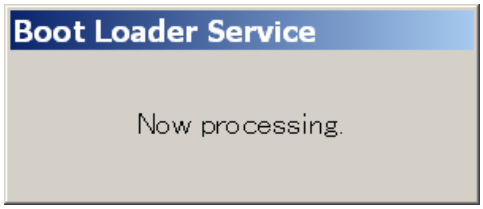
Page	Key No.	Menu Display	Function
1	F7	Confirm installation	Performs installation.
	F8	Cancel	Returns to the previous menu.

5. Press **F7 Confirm installation**.

6. Install is performed after quitting the application and uninstalling. Then a restart is performed; this all occurs automatically.

Note:

When installing the firmware, "Now Processing" displays.



Adding/deleting waveform licenses: Waveform Licenses

Utility or **Top**>→>**Utility,** >**Install**>**Waveform Licenses**

Adds or deletes waveform licenses.

Press **F2 Waveform Licenses** on the Install function menu to display the Waveform Licenses function menu and the **Waveform Licenses** dialog box.

Refer to Table 9.4.3-2 "Waveform Licenses Function Menu" for how to add or delete waveform licenses.

Adding options: Options

Utility or **Top**>→>**Utility,** >**Install**>**Options**

Adds options.

Press **F3 Options** on the Install function menu to display the **Option Install** dialog box and the Option Install function menu.

Number	Number of the option
Name	Name of the option
State	Indicates On/Off of the option.

Table 9.4.4-4 Option Install Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu where you can select a drive containing options.
	F7	Install	Displays the Confirmation function menu.

Example: To install an option.

1. Press **F1 Drive** on the Option Install function menu to select a drive containing options.

   Options All connected drives
   Default C
2. Select options to install in the **Option Install** dialog box and press **F7 Install**. The Confirmation function menu is displayed.

Table 9.4.4-5 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm installation	Performs installation.
	F8	Cancel	Returns to the previous menu.

3. Press **F7 Confirm installation** to perform installation.

Factory Preset

Utility or **Top**>→>**Utility,** >**Install**>**Factory Preset**

Factory Preset is initialization with the largest target range available with normal panel operations and remote control commands. It initializes parameters to the level at which past status before the initialization does not affect operations at all.

Any folders excluding Waveform in the UserData folder created by the MG3710A/MG3710E/MG3740A are deleted, and a reboot is executed after the following processings are executed.

- I/Q Calibration Restore Default Setting
- Preset Reference Clock, Correction Table Clear
- Channel Table Clear
- List Table Clear
- The following folders are deleted:

Anritsu\MG3710A\User Data\Corrections\
Anritsu\MG3710A\User Data\Copy Files\
Anritsu\MG3710A\User Data\Parameter Setting\
Anritsu\MG3710A\User Data\ChannelTable\
Anritsu\MG3710A\User Data\ListTable\
Anritsu\MG3710A\User Data\Alarm History\
Anritsu\MG3710A\User Data\BERT BitPattern\
Anritsu\MG3710A\User Data\BERT Log\

Press **F8 Factory Preset** to display the Factory Preset function menu and **Factory Preset** message.

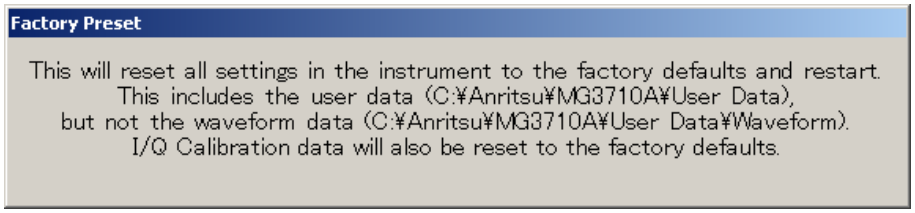


Figure 9.4.4-1 Factory Preset Message

Table 9.4.4-6 Factory Preset Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Reset To Factory Default	Performs System Preset and initialize parameters to the level at which past status does not affect operations at all.
	F8	Cancel	Returns the menu before this menu is opened.

Confirm Reset To Factory Default

Utility or **Top**>  >**Utility, >Install>Factory Preset>Confirm Reset To Factory Default**

Performs Factory Preset and initialize parameters to the level at which past status does not affect operations at all.

Remote command

Initialize parameters to the level at which past status does not affect operations at all

Command Factory

```
:SYSTem:FPReset
```

Programming Example

To perform the factory-level initialization.

```
SYST:FPR
```

9.4.5 Displaying Error Information: Error Info

Utility or **Top**>→>**Utility, >Error Info**

Displays the error information.

Refer to Appendix B “Error Messages”.

Note:

The **Error Queue** dialog box displays the most recent 30 screen operation errors.

Press **F5 Error Info** on the Utility function menu to display the Error Info function menu and **Error Queue** dialog box.

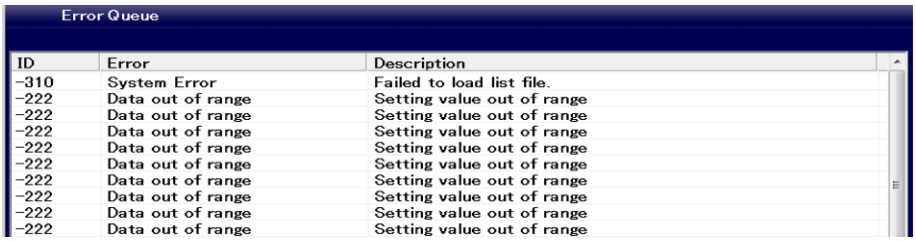


Figure 9.4.5-1 Error Queue Dialog Box

ID	Shows error code.
Error	Displays error message.
Description	Describes error content

Note:

Error information caused by remote control can be read using the following remote commands. The most recent 30 errors are saved.

Remote commands related to remote operation errors are shown below.

Remote command

To read remote control error code and error message

Query

```
:SYSTem:ERRor[:NEXT]?
```

Response

<code>	Error code number 0, “No Error” returns where there is no error.

Programming Example

```
SYST:ERR?
> 0,"No error"
```

Remote command **To read remote control error code**

Query

```
:SYSTem:ERRor:CODE[:NEXT]?
```

Response

<code>	Error code number "0" returns where there is no error.

Programming Example

```
SYST:ERR:CODE?
> 0
```

Remote command **Select the mode to display error messages when an error occurs during remote control**

Command

```
:DISPlay:ERRor:MODE NORMal|REMain|LAST
```

Query

```
:DISPlay:ERRor:MODE?
```

Response

<mode>	NORM, REM, or LAST

Parameter

<mode>	Display mode for error messages
NORMal	Clears the error message when the next command is received (Default).
REMain	Keeps the first error message displayed.
LAST	Keeps the last error message displayed.

Details

This is a function only with a remote command.
The setting of the mode to display error messages is not included in the initialization by 9.5.1 "Preset". The setting with this command can be initialized with Factory Preset in 9.4.4 "Install".

Programming Example

To keep the first error message displayed.

```
DISP:ERR:MODE REM
DISP:ERR:MODE?
> REM
```

Table 9.4.5-1 Error Info Function Menu

Page	Key No.	Menu Display	Function
1	F7	Clear	Deletes error information.

Deleting Error Information: Clear

Utility or **Top**>  **>Utility, >Error Info>Clear**

Deletes the error information.

9.4.6 Changing Boot Loader Service

The Boot Loader Service program runs immediately after the MG3710A/MG3710E/MG3740A is powered-up to read and boot from the MG3710A/MG3710E/MG3740A firmware. This section explains the procedure for changing the Boot Loader Service program.

The procedure is performed in the following sequence:
Disabling Boot Loader Service Start (Boot)

Installing Boot Loader Service

Disabling Boot Loader Service Start (Boot)

1. Power-up the MG3710A/MG3710E/MG3740A.
2. Click the Windows **Start** button and select **All Programs** > **Startup** > **Shortcut to Boot Loader Service,** and then right-click to display the context menu.
3. Select **Delete** so that Boot Loader Service does not run automatically immediately after Windows starts.
4. Power-down the MG3710A/MG3710E/MG3740A.
5. Power-up the MG3710A/MG3710E/MG3740A.

Note:

Subsequently, neither the Boot loader Service program nor the MG3710A/MG3710E/MG3740A applications will start when Windows starts.

Installing Boot Loader Service

1. Disable the Boot Loader Service program as described above.
2. **WES 2009**
   Click the Windows **Start** button and select **Control Panel** > **Add or Remove Programs**.
   Win 7, WES 7
   Click the Windows **Start** button and select **Control Panel** > **Uninstall a program**.
   Win 10
   In the Start menu, scroll the app list to the W section, and select **Windows System** > **Control Panel** > **Programs and Features**.
3. Select “Anritsu Boot Loader Service for MG3710A” and delete it.
4. Connect a USB flash drive to the external PC and copy the installer file for the Boot Loader Service to be updated to the root folder of the USB flash drive.

5. Dismount the USB flash drive from the external PC and connect it to the MG3710A/MG3710E/MG3740A.
6. Run the Boot Loader Service installer file and follow the install wizard instructions.
7. The updated Boot Loader Service is enabled automatically at the next restart.

9.5 Panel Keys

This section describes functions available only from keys on the front panel.

9.5.1 Preset



Press **Preset** of the panel key to display the Preset function menu.

Table 9.5.1-1 Preset Function Menu

Page	Key No.	Menu Display	Function
1	F1	Preset	Performs Preset and resets all parameters managed by this application to default values, excluding those of the Utility function.
	F3	Preset All	Resets parameters managed by this application to default values, including those of the Utility function. The user correction data is not reset to default values.
	F7	Restart	Turns the power OFF and executes restart.
	F8	Cancel	Returns to the previous menu.

Preset



>Preset

Performs Preset and resets all parameters managed by this application to default values, excluding those of the Utility function.

The power meter COM Port number and model name are not initialized. Initialize with **Preset All**.

Press **F1 Preset** for execution.

Remote command

Initialize a device. A command common to IEEE488.2

Command

```
*RST
```

Details

This command initializes the settings and status of the currently loaded all applications.

Programming Example

To initialize a device.

```
*RST
*OPC?                  // When 1 is returned, the initialization
                          is complete.
```

Remote command

Initialize the settings and status of the currently selected application

Command

```
:SYSTem:PRESet
```

Programming Example

To initialize the settings and status of the currently selected application.

```
SYST:PRES
*OPC?                // When 1 is returned, the initialization
                        is complete.
```

Preset All



>Preset All

Resets parameters managed by this application to default values, including those of the Utility function. In addition, List Table, Channel Table, and the waveform memory (with loaded waveform file) are initialized. However, the user correction data is not initialized. Press **F3 Preset All** for execution.

Remote command

Reset parameters managed by this application to default values, including those of the Utility function

Command System All

```
:SYSTem:PRESet:ALL
```

Programming Example

To reset parameters including those of the Utility function.

```
SYST:PRES:ALL
*OPC?                // When 1 is returned, the initialization
                        is complete.
```

Restart

Preset >Restart

Turns the power OFF and executes restart. It resets Remote/Local to Local, Display On/Off to On, SignalGenerator function menu to the default values, and IEEE488.2 event status processing to the power on-equivalent.

Remote command

Restart

Command

```
:SYSTem:REBoot
```

Details

This function turns the power OFF and executes restart. It resets Remote/Local to Local, Display On/Off to On, SignalGenerator function menu to the default values, and IEEE488.2 event status processing to the power on-equivalent.

Programming Example

To restart.

```
SYST:REB
```

9.5.2 Switching Remote/Local: Local



When you press **Local** of the panel key, the remote-control state is changed to the local-control state. Then, the lit Remote LED (Remote) goes off (Local).

Remote command

Switch the remote-control state to the local-control state

Command

```
:SYSTem:COMMunicate:GTLocal
```

Programming Example

To switch the state to the local-control state.

```
SYST:COMM:GTL
```

9.5.3 Saving parameter file: Save

The MG3710A/MG3710E/MG3740A can restore the settings by saving and loading settings of frequencies, output levels, or modulation parameters. This section describes how to save the settings.

Save

Press **Save** of the panel key to display the **Parameter Save** dialog box, the **File List** dialog box, and the Parameter Save function menu.

Table 9.5.3-1 Parameter Save Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu where you can set a destination drive for saving files.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F5	Delete	Deletes the specified parameter file.
	F7	Save	Saves the settings and the status of the application in a parameter file.
	F8	Cancel	Returns to the previous menu.

Saving Parameter File: Save

Save>**Save**

Saves the settings and the status of the application in a parameter file.

Remote command

Save the settings and the status of the application in a parameter file

Command

```
:MMEMory:STORe:STATe [<string>[,<device>]]
```

Parameter

<string>	File name excluding extension Character string enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " ″ ` ′ < > | Automatically named as "Param[Date]_[Additional number].xml" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
A destination path to save the file is the following directory in the specified drive.

Anritsu\MG3710A\User Data\Parameter Setting\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To name a parameter file as "TEST" and saves it in D drive.

```
MMEM:STOR:STAT "TEST",D
```

Deleting Parameter File: Delete

Save >**Delete**

Deletes the specified parameter file.

When the parameter file to be deleted is selected and **F5 Delete** is pressed, the **Confirmation** function menu is displayed.

Table 9.5.3-2 Confirmation Function Menu

Page	Key No.	Menu Display	Function
1	F7	Confirm Deletion	Executes delete.
	F8	Cancel	Returns to the menu before this menu is opened.

Press **F7 Confirm Deletion** to delete files.

Remote command

Delete the specified parameter file

Command

```
:MMEMory:DELete:STATe <filename>[,<device>]
```

Parameter

<filename>	File name excluding extension
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Programming Example

To delete the parameter file "TEST" stored in D drive.

```
MMEM:DEL:STAT "TEST",D
```

Operation method

The procedure of saving parameters is as follows:

Example: To save the currently displayed parameters in “ABC”.



Figure 9.5.3-1 File Name Input Window

1. Press **Save** of the panel key to display the Parameter Save function menu, the **Parameter Save** dialog box, and the **File List** dialog box.
2. Press **F1 Drive** to specify a destination drive.

   Options A to Z
   Default C
3. Enter "ABC" for a file name in the text box in the **Parameter Save** dialog box.

   By default, the “Param[Date]_[Additional number].xml” is displayed in the text box.
4. Press **F7 Save** to save a parameter file with the entered file name.

Notes:

- Do not turn the power off while saving parameter files because they may be damaged.
- When you input a file name, an extension is automatically added. You cannot specify an extension.
- Destination path:
  Anritsu\MG3710A\User Data\Parameter Setting\
- Default destination name:
  Param[Date]_[Additional number].xml
  The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
- Characters available for file names are displayed on the character pallet.
- The following characters cannot be used:
  \ / : * ? " " ' ' < > |

- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Description of Function This function allows you to save the following items:

*: Setting item common to SG1 and SG2. Other items are saved for SG1 or SG2.

Table 9.5.3-3 Items Saved in a Parameter File

System	Items
Frequency setting function	Frequency Frequency Relative Display On/Off Frequency Relative Value Frequency Offset On/Off Frequency Offset Frequency Offset Multiplier On/Off Frequency Offset Multiplier Frequency/Channel Display Frequency Display On/Off Channel Group Channel Selection Channel Table * Frequency Synchronization On/Off * Frequency Synchronization Mode * Phase Noise Optimization RF Spectrum Reference Frequency Source * Reference Frequency * Local Signal Source Local Signal Output * Local Signal Phase
Output level function	RF Output On/Off Output Level Display Unit Output Level Relative Display On/Off Output Level Relative Value Output Level Offset On/Off Output Level Offset Limit Level On/Off Limit Level Output Level Synchronization On/Off * User Correction On/Off User Correction Table * S/N Optimization On/Off
User correction	Com Port Model Start Freq Stop Freq Level Offset On/Off Level Offset value Correction Points Averaging On/Off Averaging Count

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
Sweep/List function	Sweep/List Freq On/Off Sweep/List Freq On/Off Sweep/List Type * Sweep Repeat * Sweep Direction * Manual Mode On/Off * Manual Point * Sweep Out Setting * Sweep Start Frequency Sweep Stop Frequency Sweep Center Frequency Sweep Span Frequency Sweep Start Level Sweep Stop Level Sweep Point Sweep Dwell Time Sweep Type List Frequency Setting List Level Setting List Table *

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
Modulation function	Modulation On/Off AM Modulation On/Off AM Depth Scale AM Depth (Lin) AM Depth (Log) AM Modulation Frequency FM Modulation On/Off FM Frequency Deviation FM Modulation Frequency ϕM Modulation On/Off ϕM Deviation Angle ϕM Modulation Frequency Pulse Modulation On/Off Pulse Modulation Source Pulse Modulation Frequency Pulse Modulation Period Pulse Modulation Delay Pulse Modulation Width Pulse 2 Delay Pulse 2 Width Pulse Sync/Pulse Video Output Signal Polarity Pulse Mod input signal polarity ARB On/Off RMS Adjustment Pattern Generation Mode Pattern A On/Off Pattern B On/Off Pattern A Output Level Pattern B Output Level Object of Level Change Level Ratio Setting Sampling Rate A Sampling Rate B Frequency Offset Frequency Offset A Frequency Offset B Reference Frequency Start Offset Spectrum Reverse A Spectrum Reverse B Waveform Load List Focus * Load Waveform Package Name * Load Waveform Pattern Name * Sub Item * Waveform Load Target Memory Waveform Selection List Focus * Waveform Selection Target Memory

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
Modulation function	Selected Waveform Package Name * Selected Waveform Pattern Name * Waveform Copy List Focus * RF Gate On/Off RF Gate Edit On/Off RF Gate Line RF Gate Offset 1 RF Gate Width 1 RF Gate Offset 2 RF Gate Width 2 RF Gate Frequency Start/Frame Trigger On/Off Start/Frame Trigger Mode Start/Frame Trigger Source Start/Frame Trigger Delay Start/Frame Trigger Edge Start/Frame Trigger Event Baseband Reference Clock Source Baseband Reference Clock Division * Baseband Reference Clock Out * Marker1 Edit Mode A On/Off Marker1 Offset A Marker1 Width A Marker1 Cycle A Marker1 Polarity A Marker1 Edit Mode B On/Off Marker1 Offset B Marker1 Width B Marker1 Cycle B Marker1 Polarity B Marker2 Edit Mode A On/Off Marker2 Offset A Marker2 Width A Marker2 Cycle A Marker2 Polarity A Marker2 Edit Mode B On/Off Marker2 Offset B Marker2 Width B Marker2 Cycle B Marker2 Polarity B Marker3 Edit Mode A On/Off Marker3 Offset A Marker3 Width A Marker3 Cycle A Marker3 Polarity A Marker3 Edit Mode B On/Off Marker3 Offset B

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
Modulation function	Marker3 Width B Marker3 Cycle B Marker1 Polarity B Sequence Play Mode Sequence Repeat Mode Pattern Trigger On/Off Pattern Trigger 1 On/Off Pattern Trigger 1 Source Pattern Trigger 1 Edge Pattern Trigger 2 On/Off Pattern Trigger 2 Source Pattern Trigger 2 Edge Pattern Trigger 3 On/Off Pattern Trigger 3 Source Pattern Trigger 3 Edge Pattern Trigger Switching Point Sync Type * Number of Secondaries * Secondary Position * LO Sync * I/Q Phase I/Q Delay
Route Connectors	S/F Trigger * Pattern Trigger 1 * Pattern Trigger 2 * Pattern Trigger 3 * Pattern Status 1 * Pulse Mod * Pattern Trigger Type * Marker1 * Marker2 * Marker3 * Pulse Video * Pulse Sync * Sync Trig Out *
AWGN	AWGN On/Off Noise Bandwidth Carrier Level Noise Level C/N Ratio C/N Set Signal

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
I/Q modulation	I/Q Source I/Q Output Internal Channel Correction Cal Type Wideband Analog I/Q Input I Offset * Analog I/Q Input Q Offset * Analog I/Q Output I Level Trimming * Analog I/Q Output Q Level Trimming * Analog I/Q Output I/Q Common Offset* Analog I/Q Output I Diff Offset * Analog I/Q Output Q Diff Offset * Internal Baseband I Offset Internal Baseband Q Offset Internal Baseband Gain Balance Internal Baseband Quad. Angle Internal Baseband I/Q Phase Internal Baseband I/Q Skew Internal Baseband I/Q Delay
BER measurement	Measure Mode * Data Type * Count Mode Data * Error * Auto Resync * Threshold X * Threshold Y * at SyncLoss * BER Interface Clock Edge * BER Interface Data Polarity * BER Interface Enable Active * PN Fix Pattern Length * User Defined Pattern Pattern Length * User Defined Pattern Sync Start * User Defined Pattern Sync Length * PN Fix9 Pattern Initial PN Fix11 Pattern Initial PN Fix15 Pattern Initial PN Fix20 Pattern Initial PN Fix23 Pattern Initial Pattern Length Sync Start Sync Length

Table 9.5.3-3 Items Saved in a Parameter File (Cont'd)

System	Items
Power Meter	Channel A On/Off * Channel A Com Port * Channel A Model * Channel A Freq * Channel A Offset On/Off * Channel A Offset value* Channel A Averaging On/Off * Channel A Averaging Count value * Channel A Measurement Units * Channel B On/Off * Channel B Com Port * Channel B Model * Channel B Freq * Channel B Offset On/Off * Channel B Offset value * Channel B Averaging On/Off * Channel B Averaging Count value * Channel B Measurement Units *
Utility	GPIB Address * Terminator * Raw Socket Port Number * Beep Sound * Power On *
Others	File Type * Color *

The following items are not saved:

- Remote-control state (Remote or Local)
- The type of the displayed function menu. The MG3710A/MG3710E /MG3740A always displays the top-level function menu after loading the setting.
- Status of entered/displayed dialog boxes
- Display On/Off. Display is always recalled as On.
- Regenerating points of output signals. After loading settings, regeneration restarts based on the current conditions.

The following items are stored in settings.

- The system information (model name, product name)
- File version. It is an integer in decimal number, starting 0.
- Parameter information (ID, type, name, value, min/max value for each parameter)

A parameter file is in the xml format. It can be transmitted from an external PC to multiple MG3710As/MG3710Es/MG3740As. Refer to *MG3700A/MG3710A/MG3710E Vector Signal Generator MG3740A Analog Signal Generator Operation Manual (IQproducer™)* for how to transmit it.

9.5.4 Recalling Parameter File: Recall

Recall

Press the **Recall** of the panel key to display the Parameter Recall function menu, the **Parameter Recall** dialog box, and the **File List** dialog box.

Note:

Do not turn the power off when loading a parameter file. When you turn the power off during loading, the MG3710A/MG3710E/MG3740A may start with undefined parameters.

Table 9.5.4-1 Parameter Recall Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu where you can set a source drive for loading files.
	F3	Allow different option composition file Off On	Sets whether to allow the MG3710A/MG3710E/MG3740A to load parameter files with different option configurations. To allow file loading, select **On**.
	F7	Open	Performs loading settings.
	F8	Cancel	Returns to the previous menu.

Allow different option composition file

Recall>**Allow different option composition file**

Sets whether to allow the MG3710A/MG3710E/MG3740A to load parameter files with different option configurations. To allow file loading, select **On**.

When a parameter file for a different option configuration is loaded, MG3710A/MG3710E/MG3740A may behave as follows:

- Settings related to a different option configuration are not recalled.
- If a frequency or output level is out of the setting range, you will be asked to confirm to round it to its upper limit or lower limit. To cancel the file loading, select **Cancel**.
- If the waveform memory runs out of free space while loading a waveform pattern, the remaining waveform pattern will be skipped (not loaded).
- Without Combination of Baseband Signal option (Option 048/148, 078/178) installed, only the memory A related settings are recalled.

Note:

This function is available when the firmware version (the version of this application) is 8.01.00 or later. If the firmware version is earlier than 8.01.00, the set parameter settings file cannot be

recalled with a different option configuration.

Remote command

Set whether to allow the MG3710A/MG3710E/MG3740A to load parameter files with different option configurations

Command

```
:MMEMory:LOAD:MODE:DOPTion <boolean>
```

Query

```
:MMEMory:LOAD:MODE:DOPTion?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Permission of files with different option configurations On/Off
`OFF|0`	Off (Default))
`ON|1`	On

Programming Example

To allow loading parameter files with different option configurations.

```
MMEM:LOAD:MODE:DOPT ON
MMEM:LOAD:MODE:DOPT?
> 1
```

Open

Recall>**Open**

Loads the parameter file specified in the **File List** dialog box.
Press **F7 Open** to load a setting file.

Remote command

Recall the application settings and status into a parameter file

Command

```
:MMEMory:LOAD:STATe <string>[,<device>]
```

Parameter

<string>	File name excluding extension Character string enclosed by double quotes (" ") or single quotes (' ') (excluding extension)
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Programming Example

To recall settings of all applications based on the parameter file "TEST", which is saved in D drive.

```
MMEM:LOAD:STAT "TEST",D
```

Displaying a parameter file list

Reads out a list of all parameter files in the specified device.

Remote command

Query a list of all parameter files in the specified device

Query

```
:MMEMory:CATalog:STATe? <device>
```

Response

```
<number>,<filename_1>,<filename_2>…
```

Parameter

<device>	Number of the drive
Options	A to Z, currently selected drive when omitted
<number>	Number of files: 0 to 1000
<filename_n>	File name When files more than 1000 exist, the command sorts them by file name and returns the top 1000 files.

Programming Example

To query a list of parameter files saved in D drive.

```
MMEM:CAT:STAT? D
> 3,Param_00,Param_01,Param_02
```

Operation method

The procedure of loading parameters is as follows:

Example: To load a parameter file.



Figure 9.5.4-1 Parameter Recall Dialog Box

1. Press **Recall** of the panel key to display the Parameter Recall function menu, the **Parameter Recall** dialog box, and the **File List** dialog box.
2. Press **F1 Drive** to select a device containing parameters to load.

   Options All connected drives
   Default C
3. Parameter files in the default folder of currently specified drive are listed. To select, place the cursor on files to load.
4. Press **F7 Open** to load target files and the **Parameter Recall** dialog box closes.

Notes:

- File names are listed in alphanumeric order.
- If no parameter file exists, the “File not found” is displayed.
- Parameter files created with one MG3710A/MG3710E/MG3740A can be loaded by another MG3710A/MG3710E/MG3740A, but check firmware versions installed on each MG3710A/MG3710E/MG3740A. When the firmware version of the MG3710A/MG3710E/MG3740A that loads parameter files is older than the one that saves files, files cannot be loaded successfully.

9.5.5 Screen copy: Copy

Copy

Copies the screen displayed on the MG3710A/MG3710E/MG3740A and saves it in the specified folder.

Press **Copy** of the panel key to display the **Screen Copy** dialog box, the **File List** dialog box, and the Screen Copy function menu.

Table 9.5.5-1 Screen Copy Function Menu

Page	Key No.	Menu Display	Function
1	F1	Drive C:	Displays the Drive function menu where you can set a destination drive for saving the screen copy.
	F2	File Type BMP PNG	Sets the file format of the screen copy.
	F3	Color Normal	Sets the color of the screen copy.
	F4	Change Focus	Moves the cursor between dialog box and file list.
	F7	Save	Copies the screen.
	F8	Cancel	Returns to the previous menu.

Setting a destination drive for screen copies: Drive

Copy>**Drive**

Displays the Drive function menu where you can set a destination drive for saving the screen copy.

Press **F1 Drive** on the Screen Copy function menu to display the Drive function menu and set copy.

Options	All connected drives
Default	C

Setting a file format for screen copies: File Type

Copy>**File Type**

Sets the file format of the screen copy.

Press **F2 File Type** on the Screen Copy function menu to set the copy.

BMP	Saves a copy in the BMP file format.
PNG	Saves a copy in the PNG file format (Default).

Remote command

Set the file format of the screen copy

Command

```
:MMEMory:STORe:SCReen:MODE BMP|PNG
```

Query

```
:MMEMory:STORe:SCReen:MODE?
```

Response

```
<mode>
```

Parameter

<mode>	File format
BMP	BMP format
PNG	PNG format (Default)

Programming Example

To save a hardcopy in the PNG format.

```
MMEM:STOR:SCR:MODE PNG
MMEM:STOR:SCR:MODE?
> PNG
```

Setting a color scheme for screen copies: Color

Copy >**Color**

Sets the color of the screen copy.

Press **F3 Color** on the Screen Copy function menu to display the Copy Color function menu and set copy.

Normal	Color, the same as the displayed screen (Default)
Reverse	Color, reversed
Monochrome	Monochrome
Reversed Monochrome	Monochrome, reversed

Remote command

Set the color of the screen hardcopy

Command

```
:MMEMory:STORe:SCReen:THEMe
NORMal|REVerse|MONochrome|MREVerse
```

Query

```
:MMEMory:STORe:SCReen:THEMe?
```

Response

<mode>	NORM, REV, MONO, or MREV

Parameter

<mode>	Settings of colors
NORMal	Color, the same as the displayed screen (Default)
REVerse	Color, reversed
MONochrome	Monochrome
MREVerse	Monochrome, reversed

Programming Example

To set the screen hardcopy to reverse color.

```
MMEM:STOR:SCR:THEM REV
MMEM:STOR:SCR:THEM?
> REV
```

Copying screens: Save

Copy >**Save**

Copies the screen.

Press **F7 Save** on the Screen Copy function menu to copy the screen.

Remote command

Specify file and drive names and save the screen copy

Command

```
:MMEMory:STORe:SCReen [<string>[,<device>]]
```

Parameter

<string>	File name excluding extension Character string within 100 characters enclosed by double quotes (" ") or single quotes (' ') (excluding extension) The following characters cannot be used: \ / : * ? " < > | Automatically named as "Copy_[Date]_[Additional number].bmp" or "Copy_[Date]_[Additional number].png" when omitted. The additional number will be the minimum three-digit numerical number within 000 to 999 which does not exist.
<device>	Number of the drive
Options	A to Z, currently selected drive when omitted

Details

A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
A destination path to save the file is the following directory in the specified drive.

Anritsu\MG3710A\User Data\Copy Files\

Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

Programming Example

To name the screen copy as "TEST" and save it in D drive.

```
MMEM:STOR:SCR "TEST",D
```

Operation method

Example: To name the currently displayed screen as "ABC" and save it in monochrome.

1. Press **Copy** of the panel key to display the **Screen Copy** dialog box, the **File List** dialog box, and the Screen Copy function menu.
2. Press **F1 Drive** to select a destination drive.

   Options All connected drives
   Default C
3. Press **F2 File Type** to set a file format of the screen copy to "BMP".
4. Press **F3 Color** to set colors of the screen copy to "Monochrome".
5. Enter "ABC" for a file name in the text box in the **Screen Copy** dialog box. By default, the "Copy [Date]_Additional number" is displayed in the text box.
6. Press **F7 Save**. The file with the entered file name is saved, and the **Screen Copy** dialog box closes. To return to the previous screen without saving the Copy file, press **F8 Cancel**.

Notes:

- When you input a file name, an extension is automatically added. You cannot specify an extension.
- The maximum 100 characters are allowed for a file name.
- Destination path:
  Anritsu\MG3710A\User Data\Copy Files\
- Default destination name:
  Copy[Date]_[Additional number].bmp
  or Copy[Date]_[Additional number].png
  The additional number will be the minimum three-digit

numerical number within 000 to 999 which does not exist.

- Characters available for file names are displayed on the character pallet.
- The following characters cannot be used:
  \ / : * ? " ″ ` ′ < > |
- A space or dot "." at the beginning or the end of a file name causes a file name error, and the file cannot be saved.
- Up to 1000 files can be saved in a single folder. Saving more than 1000 files in a folder cause an error, and the file cannot be saved.

9.5.6 Functions specific to remote commands

This section describes the functions available only for remote commands.

Screen display On/Off function

Turns the LCD backlight and the display ON/OFF. Turning Off the display quickens operations because drawing is omitted.

Remote command

Turn the display On/Off

Command

```
:DISPlay:ENABle <boolean>
```

Query

```
:DISPlay:ENABle?
```

Response

`<boolean>`	`0` or `1`

Parameter

`<boolean>`	Screen display On/Off
`OFF|0`	Does not display.
`ON|1`	Displays (Default)

Details

When you press the **Local**, the LCD backlight automatically turns ON.

Programming Example

To disable displaying screens.

```
DISP:ENAB OFF
DISP:ENAB?
> 0
```

Screen power On/Off function

Turns the screen power and display On/Off. Turning the screen power Off with this command can reduce the radiated interference from the monitor. However, operating a mouse, key board, panel key, and touch panel turns the power on again with the control of Windows.

Remote command

Turn On the screen power

Command

```
:DISPlay:POWer:ON
```

Turn Off the screen power

Command

```
:DISPlay:POWer:OFF
```

Programming Example

To turn Off the screen power.

```
DISP:POW:OFF
```

9.5.7 Calibration



Press **Cal** of the panel key to display the Calibration function menu.

Table 9.5.7-1 Calibration Function Menu

Page	Key No.	Menu Display	Function
1	F1	Calibrate Level	Performs the level calibration. Refer to 5.3.6 “Calibrate Level”.
	F2	I/Q Cal	Displays the IQ Calibration function menu to set the settings related to I/Q quadrature modulator calibration. Refer to 7.6.1 “I/Q Calibration”.
	F3	Internal Channel Correction Off On	Enables/disables the baseband in-band correction. Refer to 7.6 “IQ Modulation”.
	F8	Cancel	Returns to the menu before this menu is opened.

Notes:

- Execute Calibrate Level while the device to be tested is connected to the RF connector of the MG3710A/MG3710E/MG3740A.
- Executing Calibrate Level with the RF connector opened may degrade the level accuracy of output signals because of reflection.

9.6 Touch Panel

The MG3710A/MG3710E/MG3740A has the touch panel function. Aged deterioration of touch panels may cause constellations to be less accurate than at the time of deployment. In such a case, we recommend you to calibrate them again. This section describes how to calibrate them.

To calibrate the touch panel:

When the OS is other than Win 10

1. Press Windows Context on the front panel or right click, and click the **Show the Desktop** on the displayed menu.
2. Select **Start** > **All Program** > **DMC** > **DMC Touch Panel Configuration** to start the property.

   When the property starts, the **User Account Control** may be displayed. Then, click **Yes**.
3. In the setting tool, click the **Calibration** button on the upper left. Set calibration screen points (Calibration points) and calibration timeout (Timeout(s)) in second.

Note:

Do not change other settings.

4. In the setting tool, click the **Calibration** button on the upper right. The calibration screen is displayed.
5. Touch calibration points, which are intersection points in the calibration screen and displayed sequentially. When you touch one calibration point, the next one is displayed.
6. After touching all calibration points, the **OK** button is displayed. When you touch all points successfully, press the **OK** button.

Note:

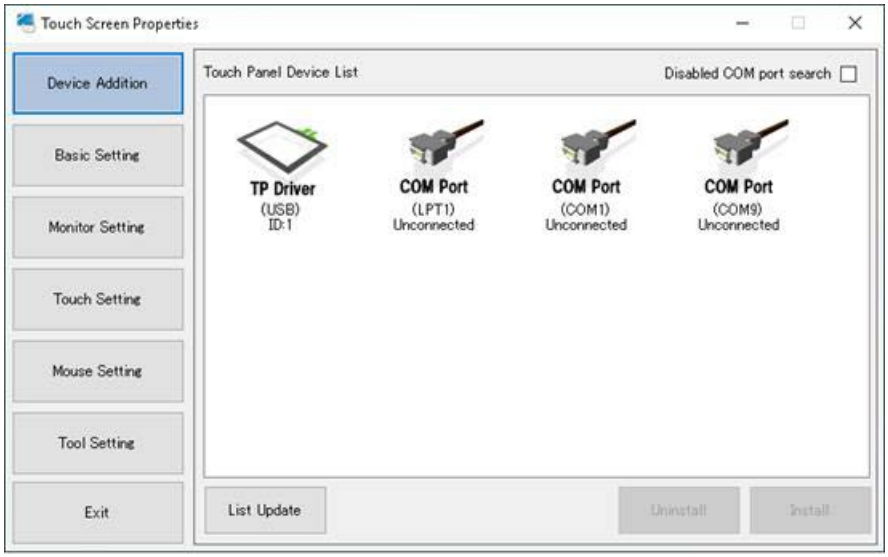
When you touch items other than calibration points by mistake, press the **Esc** or just wait for 15 seconds* with doing nothing. The **Timed out** dialog box is displayed after 15 s. Click the **OK** button to discard the executed calibration without saving it and return to the status for performing calibration again. Clicking **Cancel** returns to step 4 in the procedure.

*: 15 seconds is the default timeout value. It can be changed at Timeout(s).

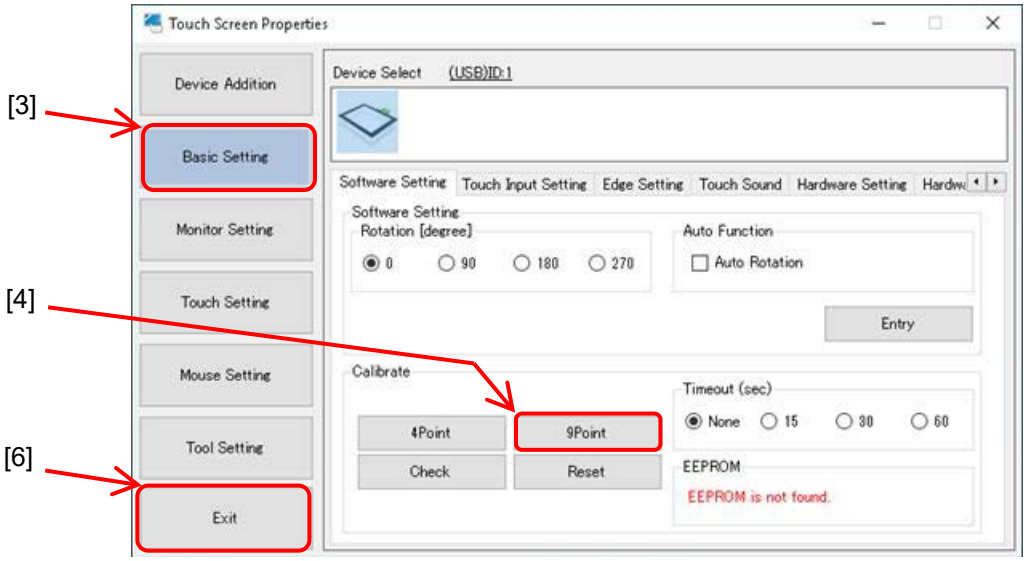
For details, refer to the *TSC-DD User's Guide* for the DMC touch panel application included in the attached DVD-ROM.

When the OS is Win 10

1. Press Windows Context on the front panel or right click, and click the **Show the Desktop** on the displayed menu.
2. Select **Start** > **DMC** > **DMC DD** to display the **Touch Screen Properties** window.



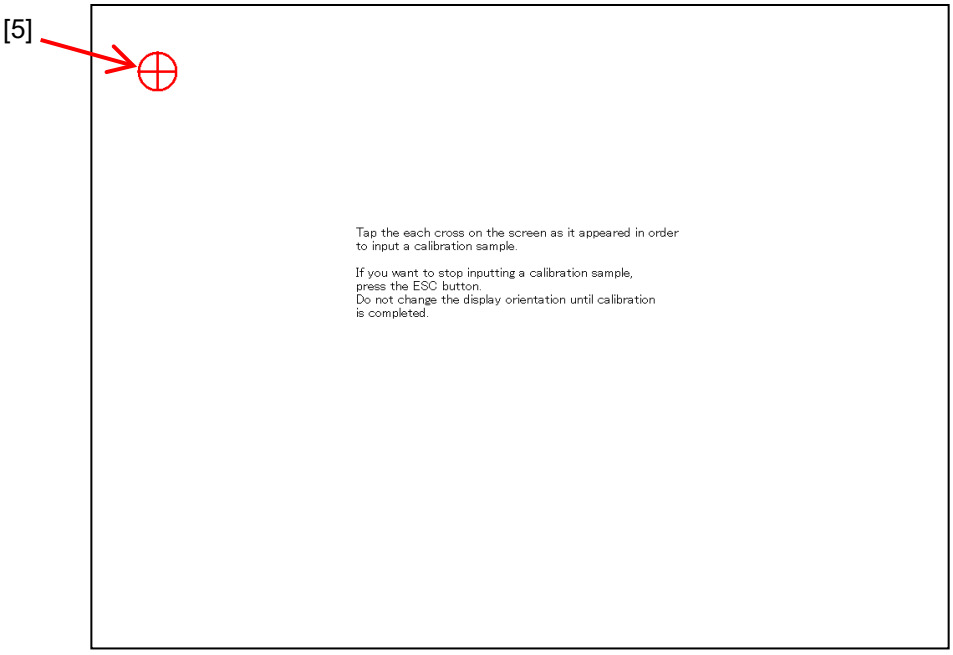
3. Select **Basic Setting.**
4. In the Software Setting tab, click the **9Point** button in the Calibrate area to start the calibration.



5. Tap 9 red sun crosses that appear on the screen in the order of appearance.

Note:

Press the **Esc** to abort the calibration.



6. After tapping the 9 calibration points, the **Calibrate** dialog box is displayed. Press the **OK** button.
   When the window of Step 4 is displayed, press the **Exit** button to finish.

For details, refer to the *DMT-DD User's Guide* for the DMC touch panel application included in the attached DVD-ROM.

9.7 Setting Windows

The MG3710A/MG3710E/MG3740A uses Windows as an OS.

Settings for Windows and the system can be operated by connecting a mouse and a keyboard.

This section describes how to perform operations on Windows installed to the MG3710A/MG3710E/MG3740A and general notes.

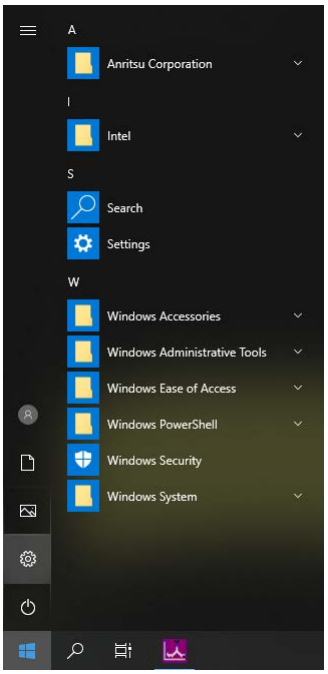
Note:

The setting method varies depending on the CPU and operating system you are running. Check your CPU and operating system as below before starting the Windows setting.

How to check your CPU and operating system

Connect the mouse to MG3710A/MG3710E/MG3740A and perform the steps below.

1. Click the **Start** menu on the Windows taskbar.
   When the Start menu is displayed as below, go to Step 4 and 5.
   Otherwise, go to Step 2 and 3.



2. Right-click on **My Computer** or **Computer** to display the menu and select **Properties**.
3. Find out the operating system from the window design and the Processor and System types displayed.

   Figure 9.7-1 Windows Embedded Standard 2009 (WES 2009)
   Figure 9.7-2 Windows 7 Professional (Win 7)
   Figure 9.7-3 Windows Embedded Standard 7 (WES 7)

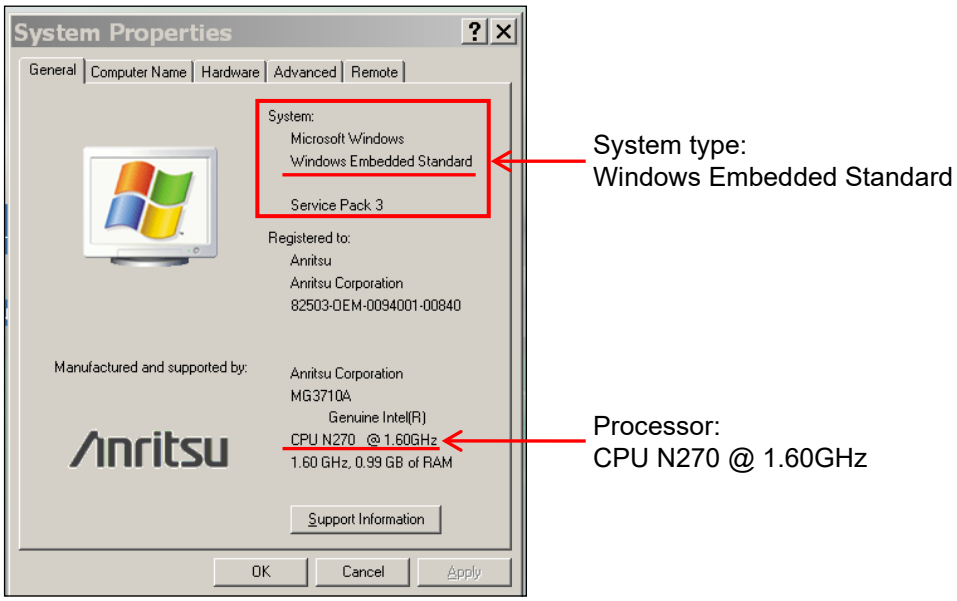


Figure 9.7-1 Windows Embedded Standard 2009 (WES 2009)

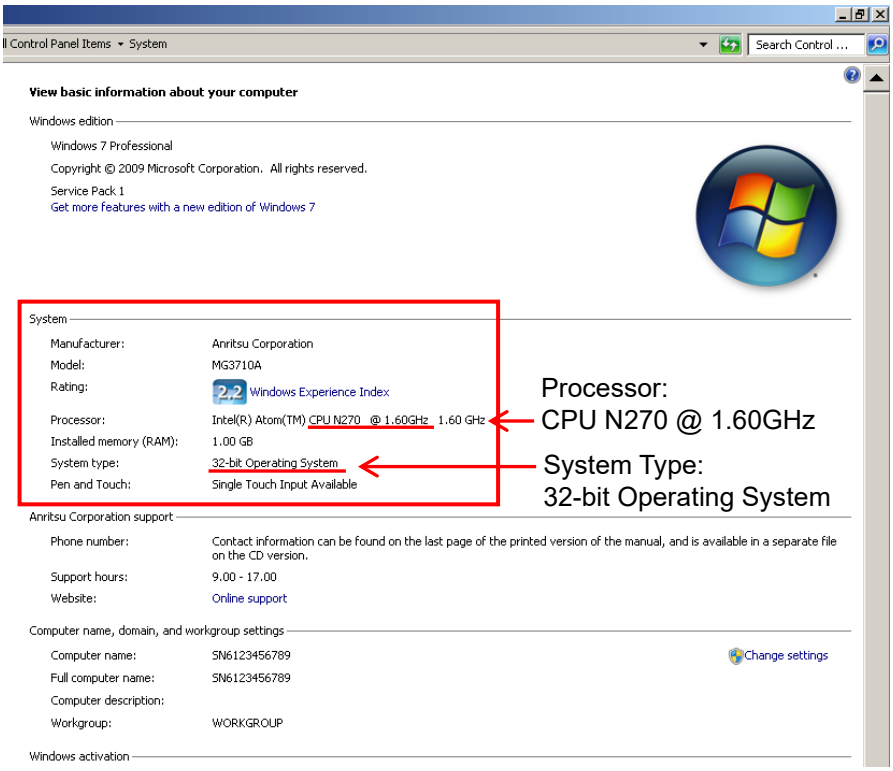


Figure 9.7-2 Windows 7 Professional (Win 7)

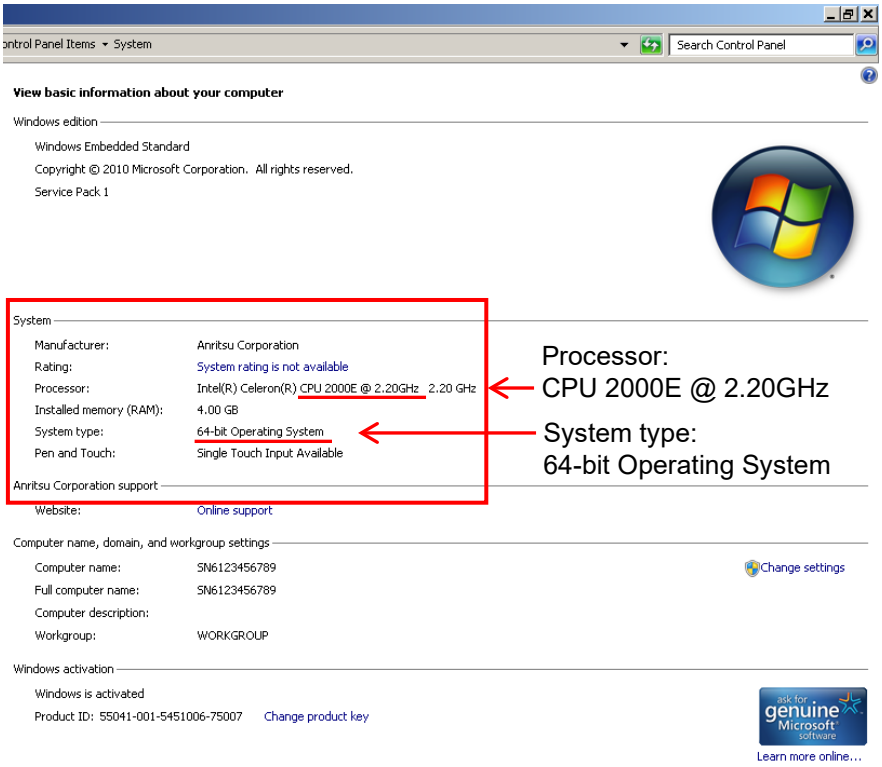


Figure 9.7-3 Windows Embedded Standard 7 (WES 7)

4. Click **Settings** .
5. Click **About** to display the system information and check **Processor** and **Edition**.

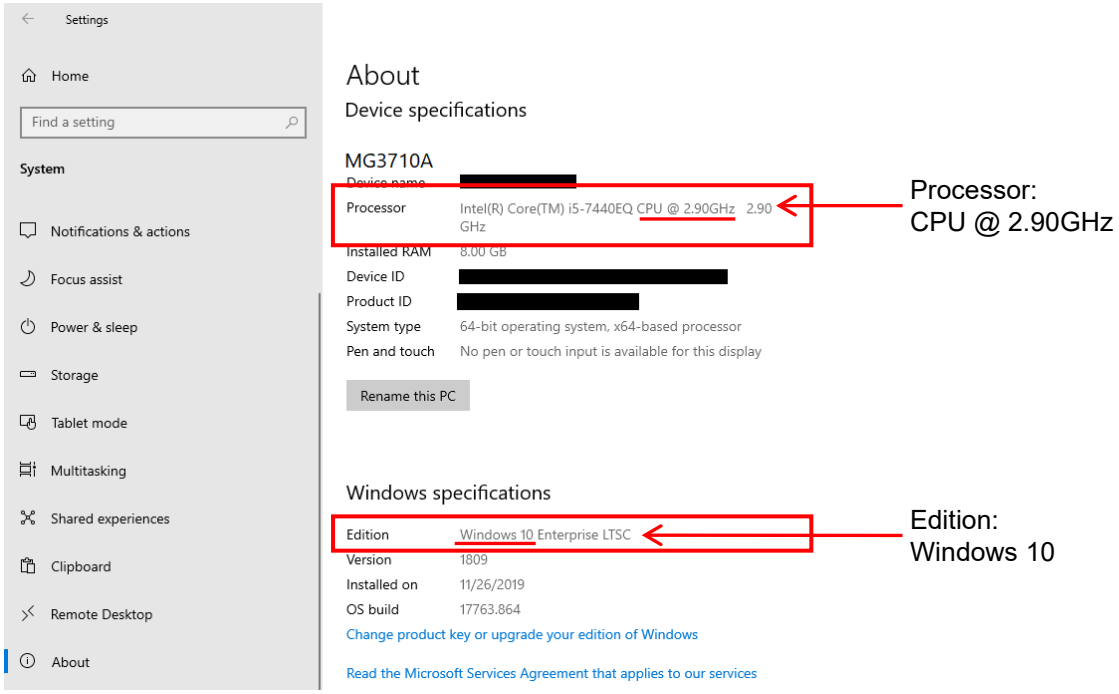


Figure 9.7-4 Windows 10 IoT (Win 10)

Setting Windows

The MG3710A/MG3710E/MG3740A is set to default settings at factory shipment so as to perform optimal measurements. Changing the Windows settings without instructions is outside the scope of operation warranty. In addition, performance may drop or functions may not operate correctly when Windows settings are changed. Carefully read the general notes of this section when changes to Windows settings are required.

When the system fails to operate correctly due to Windows operation, execute system recovery functions to restore the MG3710A/MG3710E/MG3740A to its status at factory shipment. Refer to 9.7.6 “System Recovery Functions” for details.

⚠ WARNING

MG3710A/MG3710E/MG3740A operations are not guaranteed when Windows settings are changed from their default shipment status without instructions, or when a program not guaranteed by Anritsu Corporation is installed.

Installing a program not recommended or admitted by Anritsu Corporation is prohibited by the license with Microsoft. However, it is the customer's responsibility to purchase, install, and operate antivirus software.

⚠ WARNING

Performing system recovery will cause software installation (including updates) after factory shipment of the MG3710A/MG3710E/MG3740A and application settings to be lost. In addition, data (measurements, parameters, etc.) recorded by the customer may be deleted depending on the method to perform system recovery.

9.7.1 Displaying Windows desktop

To operate Windows, connect the USB Mouse and the Keyboard (USB) available as applicable parts to the MG3710A/MG3710E/MG3740A.

The following are methods to display the Windows desktop. To display applications of the MG3710A/MG3710E/MG3740A again, press SG1 or SG2, or select an application in the Windows Taskbar.

Show Windows desktop

Mouse

- Right-click anywhere on the screen, and click the **Show the Desktop** on the displayed list to display the Windows desktop.
- Click the "Minimize" button located in the upper right corner of the application window of the MG3710A/MG3710E/MG3740A. Minimizing all applications displays the Windows desktop.
- Press Windows Context on the front panel, and click the **Show the Desktop** on the displayed list to display the Windows desktop.

Keyboard

- Pressing the **Windows logo key** + **D** minimizes all windows and displays the Windows desktop.

Show Start button

When the OS is WES 2009

- The **Start** button appears on the left side of the Windows taskbar at the bottom of the Windows desktop.
- On the application window, move the mouse pointer to the bottom of the screen to display the Windows taskbar. The **Start** button appears on the left side of the Windows taskbar.

When the OS is Win 7, WES 7, or Win 10

- On the Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar. The **Start** button or **Start** icon appears on the left side of the Windows taskbar.

Show Start menu

Mouse

- Click the **Start** button or **Start** icon to display the start menu.

Keyboard

- Press the **Windows logo key** to display the start menu.

Show Control Panel

When the OS is other than Win 10

- Click the **Control Panel** in the start menu.

When the OS is Win 10

- Click **Windows System > Control Panel** in the **W** column of the app list displayed.

9.7.2 Setting control panel

Various Windows settings can be configured using the Control Panel. The following describes general notes on each setting. Although each setting can be set without using the Control Panel, use within the scope of the following restrictions.

The MG3710A/MG3710E/MG3740A may not operate normally when any other Windows settings are changed from the factory defaults.

Program and Hardware

- Do not delete the installed devices or update/delete the drivers.
- The MG3710A/MG3710E/MG3740A may not operate normally due to conflicts with device drivers when new hardware is added.
- Do not update or remove programs installed at the factory.
- Anritsu does not warrant operations of the MG3710A/MG3710E/MG3740A when programs not guaranteed are installed.

Windows Update

- Automatic updating of Windows is turned off at the factory.
  Refer to 9.7.7 “Windows Security Measures” for details.

Network Connection

- TCP/IP settings may change when the MG3710A/MG3710E/MG3740A is remote-controlled through Ethernet. Refer to E.3.2 “Ethernet interface settings”.
- The IP address is set to use DHCP before shipment from the factory. Ensure that the network administrator settings are appropriate when connecting the MG3710A/MG3710E/MG3740A to a network.

User Account

- Automatic login with the following settings is enabled at the factory. Do not change the User Account settings shown below.

Account Name	“ANRITSU”	
Password	“anritsu”	(Other than Win 10)
	“ANRITSU”	(Win 10)
Account Type	Computer Administrator	

- New user accounts can be created. Specify “Computer Administrator” for the account type of the user account to be created. Applications will not start up normally with user accounts created using Limited (Power User).

Security

- Windows Firewall setting depends on the factory shipping date as show below.
  - Shipped in or before September 2018 Off
  - Shipped in or after October 2018 On

  Refer to 9.7.7 "Windows Security Measures" for details.

  When the setting is changed from Off to On, Windows Firewall displays a dialog box asking if you want to block the applications of the MG3710A/MG3710E/MG3740A at the next startup time. Be sure to click **Unblock**.
- Antivirus software is not installed at the factory. Anritsu strongly recommends installing antivirus software when connecting the MG3710A/MG3710E/MG3740A to a network. However, the MG3710A/MG3710E/MG3740A may not be remote-controlled through Ethernet if the function blocking external communications works.
- Security warnings are not displayed by factory default.

Date & Time

- You can change the date, time and time zone.
- Internet Time is set to Off by factory default. Operations may be affected; therefore, do not change this setting.

Display

- This setting must be changed when using an external monitor with connected to the VGA connector of the MG3710A/MG3710E/MG3740A. Refer to Section 9.7.3 "Using external display" for details.
- Operations may be affected by changing screen resolution, refresh rate or monitor power management or turning on the screen saver.

System

- The Computer Name can be changed. The factory default name is "SN" + "Serial Number".
- Do not change Hardware or Advanced settings.
- Do not enable the System Restore. Otherwise, the MG3710A/MG3710E/MG3740A may not operate normally.

Power Options

- The settings for the Auto Power Off function (Turn off Monitor) of the display can be changed.
- The Power Off function of the hard disk/SSD (Turn off Hard Disks) is disabled (Never). Do not change this setting.
- Do not change the Power options settings other than those described above. The MG3710A/MG3710E/MG3740A will not operate normally after recovering from hibernation.

Fonts

- Fonts required for applications of the MG3710A/MG3710E/MG3740A are installed at factory shipment; therefore, do not delete these fonts.

Printer and Faxes

- Printers and fax machines can be set. However, operations are not guaranteed in the event print drivers or relevant applications affect the MG3710A/MG3710E/MG3740A.

Regional and Language Options

- Do not change this setting. Applications may not operate normally.

9.7.3 Using external display

An external display can be connected to the VGA connector on the rear side of the MG3710A/MG3710E/MG3740A, to display screens of the MG3710A/MG3710E/MG3740A and show multiple displays. The following describes the operation procedure for this function.

When the OS is other than Win 10

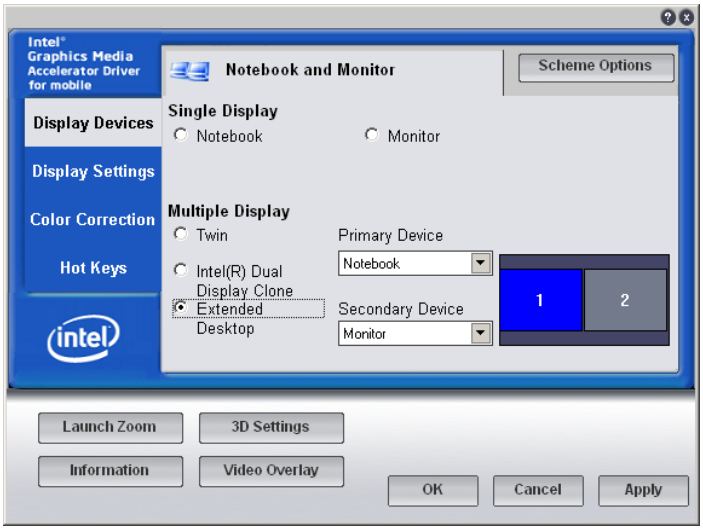


Figure 9.7.3-1 Intel® GMA Driver

<Procedure>

1. Connect the display to the VGA connector on the rear side of the MG3710A/MG3710E/MG3740A.
   When using Win 7 or WES 7, the connected external display and the main unit display are set automatically to the same display (mirroring).
2. Display the Intel® GMA Driver Settings screen using any of the following methods.
   - Execute "Intel® GMA Driver for Mobile" from the Windows Control Panel. For the Control Panel display method, refer to sections 9.7.1 "Displaying Windows Desktop" and 9.7.2 "Setting Control Panel".
   - Press **Ctrl** + **Alt** + **F12** on the keyboard. (Only WES 2009)

3. Click the **Display Devices**, and change the settings as shown below:

   When not using an external display

   - Single Display Notebook

   When using only an external display

   - Single Display Monitor

   When displaying the MG3710A/MG3710E/MG3740A display to an external display

   - Multiple Display Twin or Intel® Dual Display Clone
   - Primary Device Notebook (MG3710A/MG3710E/MG3740A display)
   - Secondary Device Monitor

   When displaying with the MG3710A/MG3710E/MG3740A and external display connected

   - Multiple Display Extended Desktop
   - Primary Device Notebook (MG3710A/MG3710E/MG3740A display)
   - Secondary Device Monitor

4. Press either the **OK** or **Apply** button.

When the OS is Win 10



Figure 9.7.3-2 Intel® HD Graphics Control Panel

<Procedure>

1. Connect the display to the VGA connector on the rear of MG3710A/MG3710E/MG3740A.
2. Open the Intel® HD Graphics Control Panel by the following method:
   - Display the Windows desktop, right-click an empty area on the screen, and click the **Intel® Graphics Settings** on the displayed list.

3. Click **Display** > **Multiple Displays**, and then change the settings.

When not using an external display

- Select Display Mode Single Display
- Select One or More Active Displays
  Built-in Display
  (MG3710A/MG3710E/MG3740A display)

When using only an external display

- Select Display Mode Single Display
- Select One or More Active Displays
  (Connected external display)

When displaying the same content on each of MG3710A/MG3710E/MG3740A display and external display

- Select Display Mode Clone Displays
- Select One or More Active Displays
  Built-in Display
  (MG3710A/MG3710E/MG3740A display)
  (Connected external display)

When displaying with MG3710A/MG3710E/MG3740A and external display connected

- Select Display Mode Extended Desktop
- Select One or More Active Displays
  1. Primary Display Built-in Display
     (MG3710A/MG3710E/MG3740A display)
  2. (Connected external display)

⚠ CAUTION

Turning the MG3710A/MG3710E/MG3740A power On when an external display is not connected to the VGA connector initializes to mainframe display only. When continuously using an external display, it is recommended to keep the external monitor connected for use.

⚠ CAUTION

Do not change the resolution, refresh rate or power management settings of the mainframe monitor.

9.7.4 General notes

The MG3710A/MG3710E/MG3740A operations are guaranteed provided it is in factory default settings. The following situations may affect the MG3710A/MG3710E/MG3740A operations.

- Install software that is not factory-installed and operate it on the MG3710A/MG3710E/MG3740A.
  e.g.) Install antivirus software and execute virus scan.
- Enable or operate a Windows program service that is disabled or stopped at factory.
  e.g.) Transfer files by FTP while the MG3710A/MG3710E/MG3740A is running.

In addition to the above, note the below.

- Note that the MG3710A/MG3710E/MG3740A may not operate normally when registries are changed.

9.7.5 Storage device configuration

The MG3710A/MG3710E/MG3740A has a built-in hard disk/SSD for storing the OS, application software, user data, and the like.

The hard disk/SSD of the MG3710A/MG3710E/MG3740A consists of the following partitions.

Volume C: System Disk

Windows, application software and files required for operation of the MG3710A/MG3710E/MG3740A are stored. Also, it is used as the destination for file input or output for application software of the MG3710A/MG3710E/MG3740A. The MG3710A/MG3710E/MG3740A may not operate normally when data necessary for operations of the MG3710A/MG3710E/MG3740A is changed or deleted.

Volume D: 2nd Hard Disk (when the 2ndary HDD option is installed)

This volume is used mainly for inputting files to and as the output destination for the application software of the MG3710A/MG3710E/MG3740A. Adding data to this volume or deleting data on it will not affect MG3710A/MG3710E/MG3740A operations.

A USB flash drive, used for installing application software and inputting or outputting data, is included as standard equipment with the MG3710A/MG3710E/MG3740A.

Volume D: USB flash drive (when the 2ndary HDD option is not installed)

Volume E: USB flash drive (when the 2ndary HDD option is installed)

Note the following items when operating MG3710A/MG3710E/MG3740A:

- Do not change the partition configuration. Doing so may affect system operation.
- Do not format the hard disk/SSD of the MG3710A/MG3710E/MG3740A. Besides the above, data for system recovery is stored within this hard disk/SSD. Recovery may become inoperable when the hard disk/SSD is formatted.
- The volumes and folders described above are not set to be shared at factory shipment. Although sharing is an effective means for transferring data to and from an external PC, be mindful of security when connecting to a network.

9.7.6 System Recovery Functions

The MG3710A/MG3710E/MG3740A has system recovery functions to restore data on the hard disk/SSD to the factory shipment status. These functions can be used in the event of system instability.

The backup can be obtained by copying the User Data folder in the path: C:\Anritsu\MG3710A.
For Win 7, WES 7, or Win 10, copy the User Data folder in the path: D:\Anritsu\MG3710A as well, because some data may be stored there.

When the OS is other than Win 10

The MG3710A/MG3710E/MG3740A comes with factory-installed recovery software, Phoenix Recover Pro or Paragon Drive Backup. To confirm the installed recovery software, start the MG3710A/MG3710E/MG3740A, and press the **F4** on the BIOS screen to start the recovery software.

<Procedure>

1. Disconnect the MG3710A/MG3710E/MG3740A from the network if connected.
2. Connect the keyboard and mouse to the mainframe, and then turn the MG3710A/MG3710E/MG3740A power On. The BIOS screen will appear in a few seconds after.
3. Press the **F4** (not F4 on the front panel of the mainframe) while the screen in Step 2 is displayed.
4. Only when the screen displays the message “Press F4 to start recovery from Backup Capsule”, press the **F4** again.
5. According to the software instructions on the screen, perform a system recovery.

   Phoenix Always

   Refer to 9.7.6.1 “Phoenix Recover Pro”.

   Paragon Drive Backup

   Refer to 9.7.6.2 “Paragon Drive Backup”.

⚠ CAUTION

To execute these functions, understand the following items for their use.

- **All applications and updates added after factory shipment will be lost. Additionally, all data recorded to C Drive will be restored to the factory shipment status. Backup important data before executing these functions.**
- **For Win 7 or WES 7, the area of D Drive can be restored to the factory shipment status depending on the function to be selected. So as not to lose important user data due to incorrect operations, it is recommended to backup data in D Drive before executing these functions.**
- **Data deleted by these functions cannot be restored.**
- **When the Paragon Drive Backup software is installed, the backup data is saved to an unknown partition on the Disk 0. If the unknown partition is accidentally deleted, the backup data required for system recovery is deleted as well.**

When the OS is Win 10

The MG3710A/MG3710E/MG3740A has the standard Windows system recovery functions. See 9.7.6.3 “Windows Backup” for the system recovery procedure.

⚠ CAUTION

To execute these functions, understand the following items for their use.

- **All applications and updates added after factory shipment will be lost. Additionally, all data recorded to Volume C and D will be restored to the factory default. Backup important data before executing these functions.**
- **Unlike WES 2009 and WES 7, the Win 10 system recovery functions cannot restore only Volume C to the factory default. Data stored on both Volume C and D will be restored to the factory default.**
- **Data deleted by these functions cannot be restored.**

9.7.6.1 Phoenix Recover Pro

This subsection describes how to perform a system recovery with factory-installed recovery software “Phoenix Recover Pro”.

Restore System drive (partition) only

This function restores only C Drive, in which Windows, application software, and files required for operations of the MG3710A/MG3710E/MG3740A are stored, to the factory shipment status.

Restore entire hard disk

This function restores C Drive to the factory shipment status. For Win 7 or WES 7, it restores D Drive to the factory shipment status as well, deleting all data.

<Procedure>

1. After the screen displaying “Phoenix Always” appears, the following alternatives are displayed on the screen:

   Restore System drive (partition) only

   Recovers only C Drive.

   Restore entire hard disk

   Recovers C Drive (including D Drive for Win 7 or WES 7).

   Select one of the two alternatives, and then click [NEXT]. To cancel, press and hold the [Power] button of the mainframe to power off.

2. After clicking [NEXT], the confirmation screen appears. Click [OK] to start a system recovery. Although the required time for recovery varies depending on the conditions, it normally takes between 10 and 30 minutes. The progress of recovery is shown during recovery. Although the progress indicator may close during recovery, this is a normal operation.

   The MG3710A/MG3710E/MG3740A will restart automatically then normal startup will be executed.

9.7.6.2 Paragon Drive Backup

This subsection describes how to perform a system recovery with factory-installed recovery software “Paragon Drive Backup”.

Type: Partition

This function restores only C Drive, in which Windows, application software, and files required for operations of the MG3710A/MG3710E/MG3740A are stored, to the factory shipment status.

Type: Disk

This function restores C Drive to the factory shipment status. For Win 7 or WES 7, it restores D Drive to the factory shipment status as well, deleting all data.

<Procedure>

1. After the screen displaying “Drive Backup” appears, the following alternatives are displayed on the screen:

   Normal Mode, Safe Mode

   Select **Normal Mode** with the arrow keys, and then press the **Enter**.
2. When the menu screen appears in about a minute, double-click **Simple Restore Wizard**.
3. The **Paragon Simple Restore Wizard** appears, so click **Next**.
4. The following alternatives are displayed on the screen:

   Type: Partition

   Recovers only C Drive.

   Type: Disk

   Recovers C Drive (including D Drive for Win 7 or WES 7).

   Double-click either of them, and then click **Next**.
5. When the confirmation screen appears, click **Yes** to start a system recovery. Then, the **Progress information** screen appears, and the recovery process starts.

   Do not click **Cancel** when a system recovery is in progress.

   Although the required time for recovery varies depending on the conditions, it normally takes between 10 and 30 minutes. The progress of recovery is shown during recovery. Although the progress indicator may close during recovery, this is a normal operation.
6. Upon completion of the recovery process, click **Close**. (**Close** appears after the recovery process is completed.)
7. When the completion screen appears, click **Finish** to return to the menu screen described in Step 5. Click **Reboot the computer** to reboot the MG3710A/MG3710E/MG3740A, or click **Power off** to turn the power Off.

9.7.6.3 Windows Backup

This subsection describes how to perform a system recovery when the installed OS is Win 10.

<Procedure>

1. Disconnect the MG3710A/MG3710E/MG3740AA from the network if connected.
2. Connect the keyboard and mouse to the mainframe, and then turn the MG3710A/MG3710E/MG3740A power On.
3. While the Anritsu logo is displayed, press **F8** on the keyboard.
4. The boot options menu is launched. Select **Repair Your computer**, and then press the **Enter**.
5. The **Choose an option** appears, select **Troubleshoot**, and press **Enter**.
6. The **Troubleshoot** appears, select **Advanced options**, and press **Enter**.
7. The **Advanced options** appears, select **System Image Recovery**, and press **Enter**.
8. The **System Image Recover** appears, select **ANRITSU**, and press **Enter**.
9. When you are prompted to enter a password, enter “ANRITSU”, and then click **Continue**.

   Note:

   If you have changed the password for your user account, use the new password.

10. The **Select a system image backup** appears, select **Use the latest available system image (recommended)**, and click **Next**.
11. The **Choose additional restore options** appears, and click **Next** without any changes.
12. When “Your computer will be restored from the following system image:” appears, click **Finish**.
13. When the confirmation screen appears, click **Yes** to start a system recovery.
    The Progress bar appears, and the recovery process starts.
    Do not click **Stop restore** when a system recovery is in progress.
    Although the required time for recovery varies depending on the conditions, it normally takes between 20 and 30 minutes.
14. After the system recovery is completed, the MG3710A/MG3710E/MG3740A restarts automatically, and Windows starts.

9.7.7 Windows Security Measures

To apply security measures described in this section, the MG3710A /MG3710E/MG3740A must run WES 7 or Win 10.

The following options upgrade the CPU and operating system.

MG3710A /MG3710E/MG3740A-182: Upgrades to Win 10.

In terms of security measures and antivirus, we do not recommend connecting the MG3710A/MG3710E/MG3740A running WES 2009 or Win 7 to a network.

The "C1" label is affixed on the rear panel of the MG3710A/MG3710E/MG3740A that runs on WES 7.
The "C2" label is affixed on the rear panel of the MG3710A/MG3710E/MG3740A that runs on Win 10.

When connecting the MG3710A/MG3710E/MG3740A with WES 7 or Win 10 to a network, in addition to connecting to secure and virus-protected networks, the following procedures are recommended in order to add protection against malware (malicious software) and viruses.

- Activating firewall
- Installing Windows important update programs
- Using antivirus software

When the OS is WES 7

The security measure settings condition of this equipment can be confirmed from the Control Panel of Windows.

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows taskbar. Click **Start** > **Control Panel**.
3. Set "View by: Category" at the upper right of the Control Panel, click **System and Security** > **Action Center**.
4. Click **Security**, and confirm security measures settings condition.

When the OS is Win 10

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows task bar. Click the **Start**  icon to open the Start menu, and then click **Windows System** > **Control Panel** in the **W** column of the app list displayed.
3. Set "View by: Category" at the upper right of the Control Panel, click **System and Security** > **Security and Maintenance**.
4. Click **Security**, and confirm security measures settings condition.

Note:

Security warnings are not displayed by factory default.

⚠ CAUTION

When connecting this equipment to the Internet or to an external network, there is a possibility an unpredictable problem or damage may occur. Anritsu Corporation does not recompense for any damage caused by connecting this equipment to a network.

⚠ CAUTION

Adding any options or repair may restore the Windows settings to factory default settings. In this case, reinstall Windows updates, turn the firewall on again, and reinstall antivirus software.

9.7.7.1 Activating Firewall

It is recommended to turn On the Windows firewall on this equipment.

When the OS is WES 7

Windows firewall On/Off setting (WES 7):

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows task bar. Click **Start** > **Control Panel**.
3. Set "View by: Category" at the upper right of the Control Panel, click **System and Security** > **Windows Firewall** to show Windows Firewall window.

Note:

Windows firewall might be turned off by default on the equipment released in or before September 2018.

4. Click **Turn Windows Firewall on or off** found in left side of Windows Firewall window.

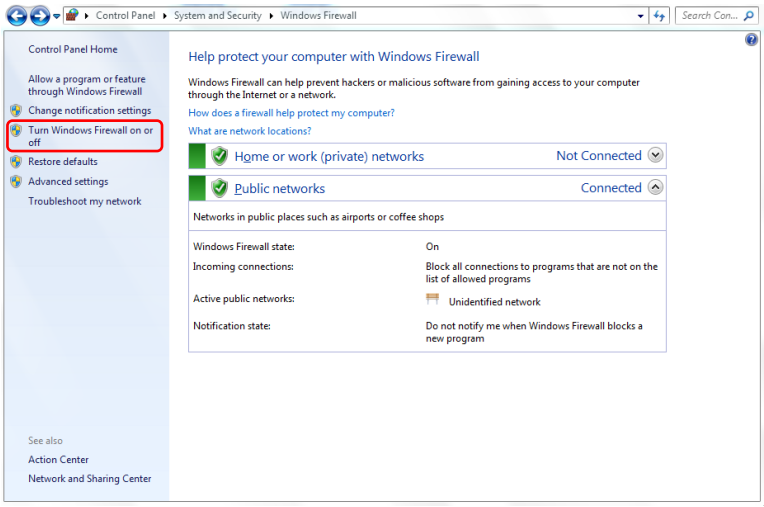


Figure 9.7.7.1-1 Windows Firewall Window

5. Customize Settings window will be shown where Windows firewall On/Off settings can be changed.

   Use this equipment with the following checkboxes Off (unchecked).

   - **Block all incoming connections, including those in the list of allowed programs**
   - **Notify me when Windows Firewall blocks a new program**

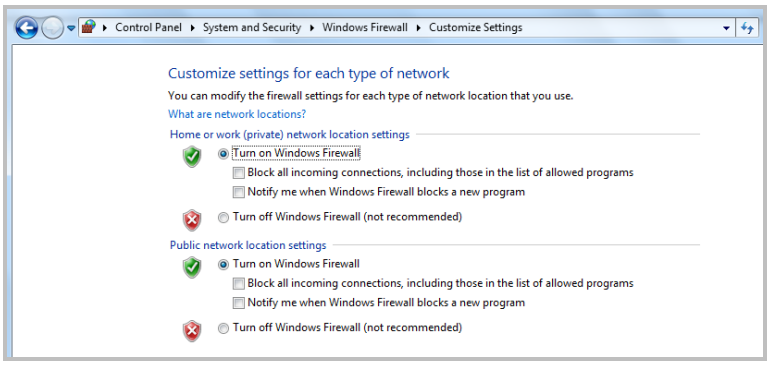


Figure 9.7.7.1-2 Customize Settings Window

Confirmation and setting of allowed programs through Windows firewall (WES 7):

Even if Windows firewall is On, in order for this equipment to operate properly, it is necessary to set as allowed programs those that enable external communication from this equipment.

Note:

The factory default setting for allowed programs might not be set properly on the equipment released in or before September 2018.

1. Use the mouse to click **Allow a program or feature through Windows Firewall** found in left side of Windows Firewall window.

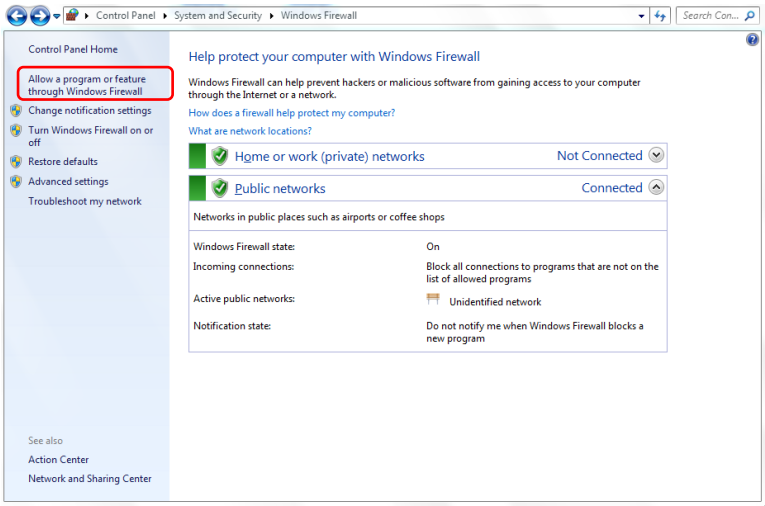


Figure 9.7.7.1-3 Windows Firewall Window

2. Allowed Programs window will be shown where programs allowed through Windows firewall can be confirmed.
   Confirm that **FTP Server** (used to transfer the waveform data from IQproducer on an external PC to this equipment) is found and is set to On (checked) under **Allowed programs and features**.
   If **FTP Server** is set to Off (not checked), set it to On (checked) and click **OK**.

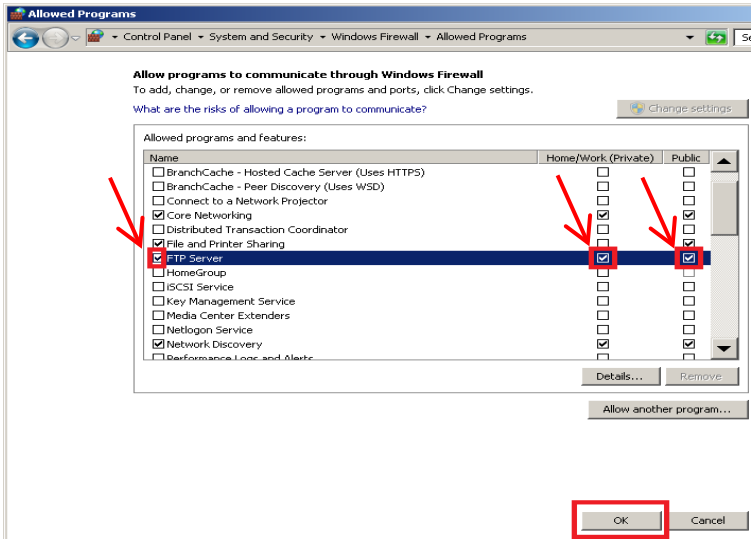


Figure 9.7.7.1-4 Allowed Programs Window

Confirm that **SignalGenerator** (used to control this equipment by a control PC) is found and is set to On (checked) under **Allowed programs and features**.
When no such information is displayed, it is necessary to add **SignalGenerator**.

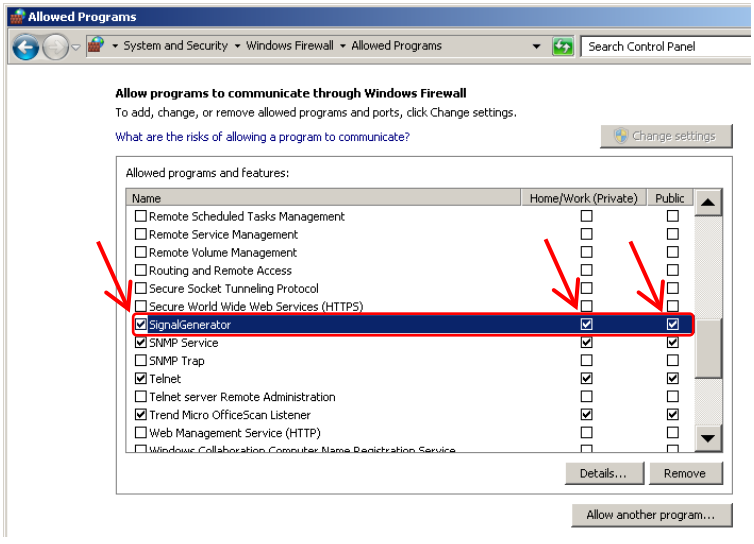


Figure 9.7.7.1-5 Allowed Programs Window

Procedure to add SignalGenerator when it is not registered (WES 7):

1. Use the mouse to click **Allow another program...** found in Allowed Programs display.

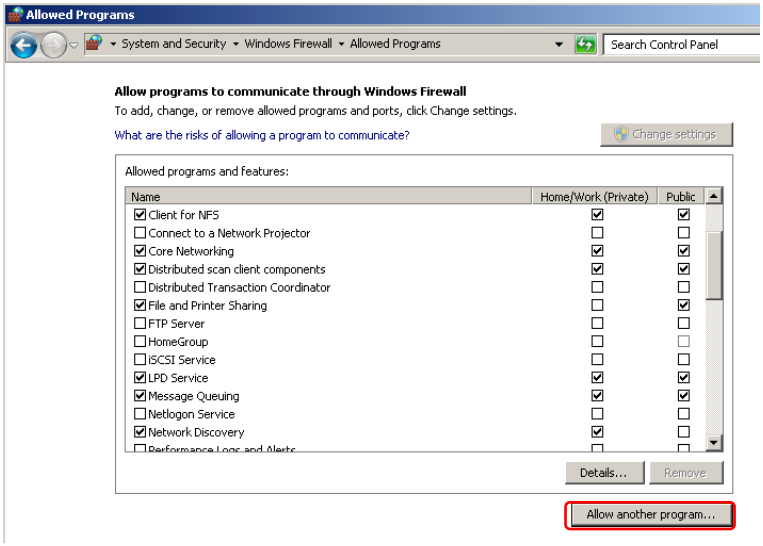


Figure 9.7.7.1-6 Allowed Programs Window

2. Click **Browse...** to show Browse window of Add a Program.

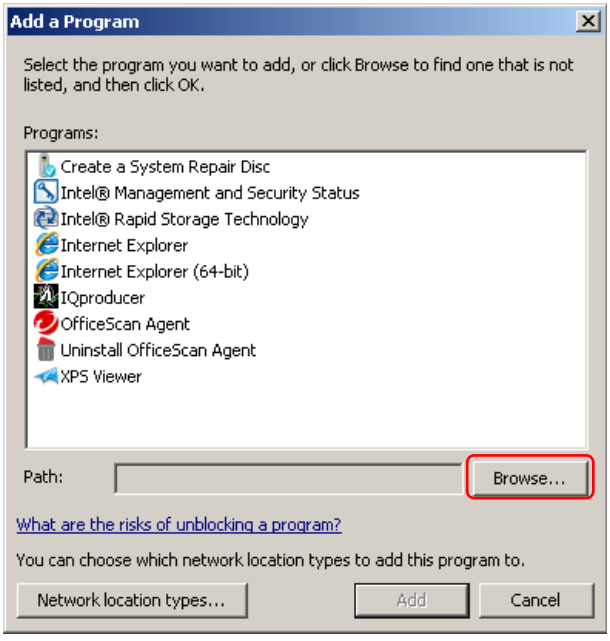


Figure 9.7.7.1-7 Add a Program Window

3. Browse window of Add a Program is shown.

   Select C:\Anritsu\MG3710A\Program Files\SignalGenerator.exe, and click **Open**.

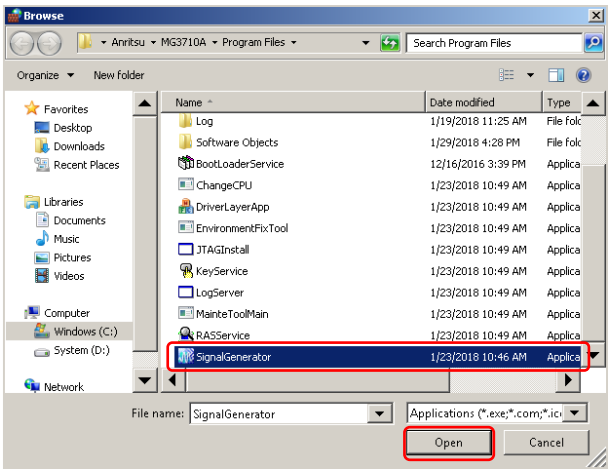


Figure 9.7.7.1-8 Browse Window of Add a Program

4. In Add a Program window, select **SignalGenerator**, and click **Add**.

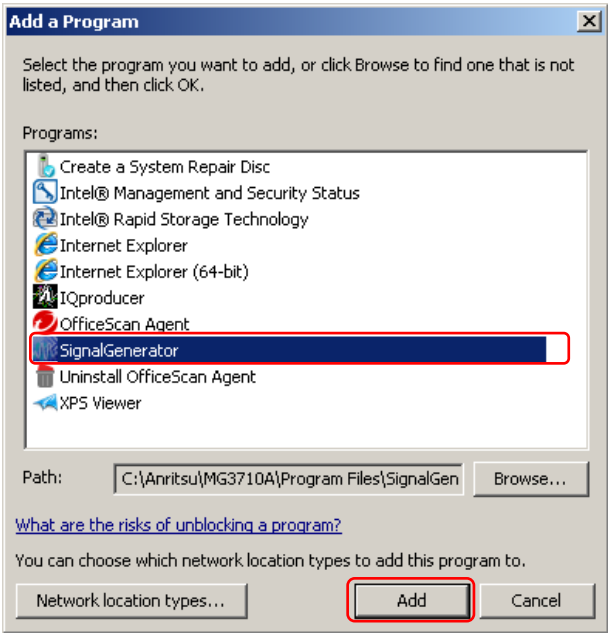


Figure 9.7.7.1-9 Add a Program Window

5. **SignalGenerator** is added to **Allowed programs and features**. Confirm if **SignalGenerator** is found and set to On (checked).

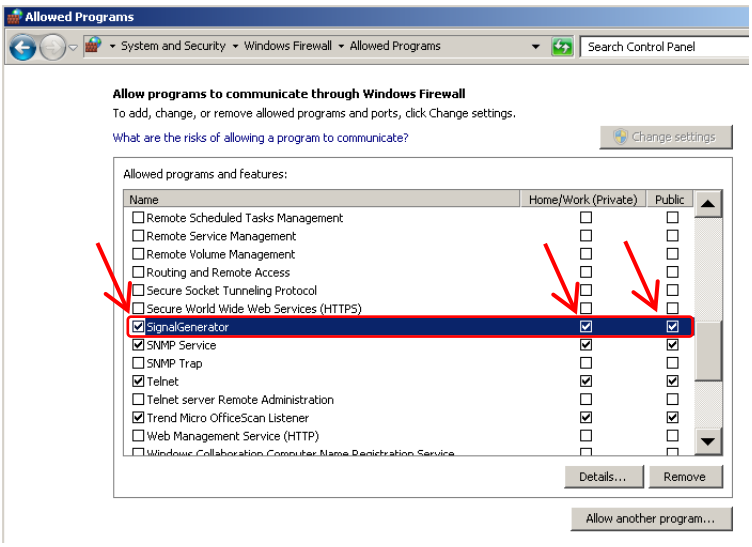


Figure 9.7.7.1-10 Allowed Programs Window

When the OS is Win 10

Windows firewall On/Off setting (Win 10)

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows task bar. Click the **Start** icon to open the Start menu, and then click **Windows System** > **Control Panel** in the **W** column of the app list displayed.
3. Set "View by: Category" at the upper right of the Control Panel, click **System and Security** > **Windows Defender Firewall** to show Windows Defender Firewall window.

   Note:

   Windows firewall is on by factory default.

4. Click **Turn Windows Defender Firewall on or off** found in the left side of Windows Defender Firewall window.

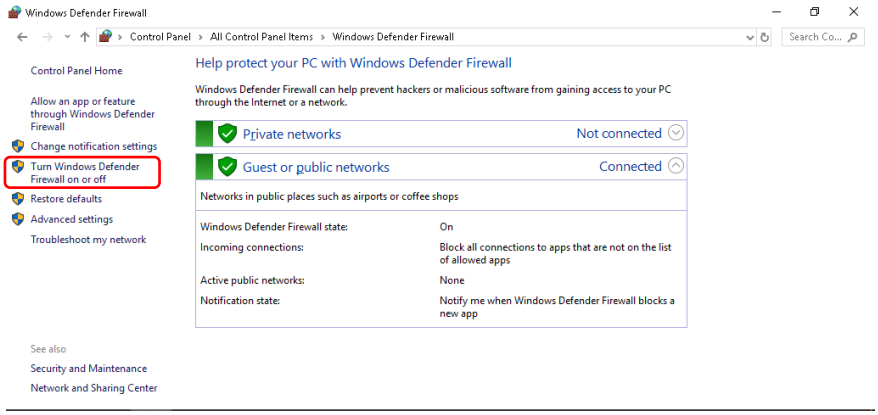


Figure 9.7.7.1-11 Windows Defender Firewall Window

5. Customize Settings window will be shown where Windows firewall On/Off settings can be changed.

   Use the MG3710A/MG3710E/MG3740A with the following checkboxes Off (unchecked).

   - **Block all incoming connections, including those in the list of allowed apps**
   - **Notify me when Windows Firewall blocks a new app**

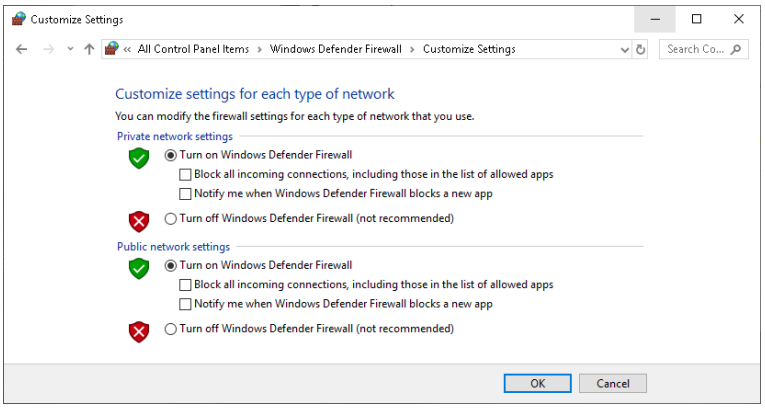


Figure 9.7.7.1-12 Customize Settings Window

Confirmation and setting of allowed programs through Windows firewall (Win 10)

Even if Windows firewall is On, in order for the MG3710A/MG3710E/MG3740A to operate properly, it is necessary to set as allowed programs those that enable external communication from the MG3710A/MG3710E/MG3740A.

1. Use the mouse to click **Allow an app or feature through Windows Defender Firewall** found in left side of **Windows Defender Firewall** window.

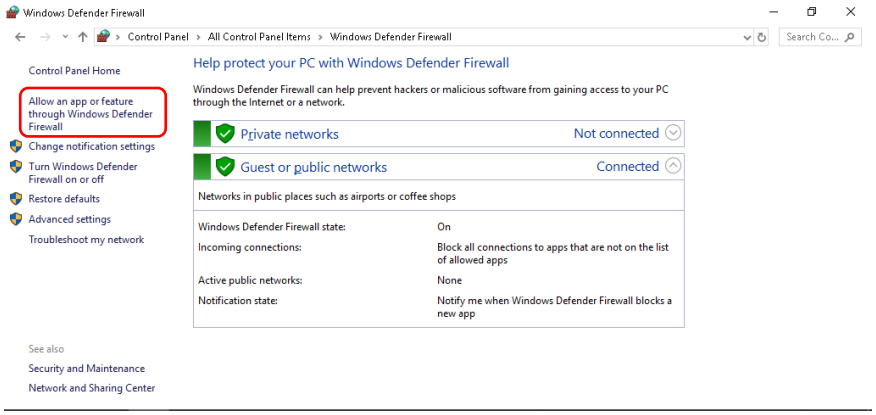


Figure 9.7.7.1-13 Windows Defender Firewall Window

2. Allowed apps window will be shown where programs allowed through Windows firewall can be confirmed.
   Confirm if **MS269xA AppMgr** is found and set to On (checked) under **Allowed apps and features**.

   When no such information is displayed, it is necessary to add **MS269xA AppMgr**.

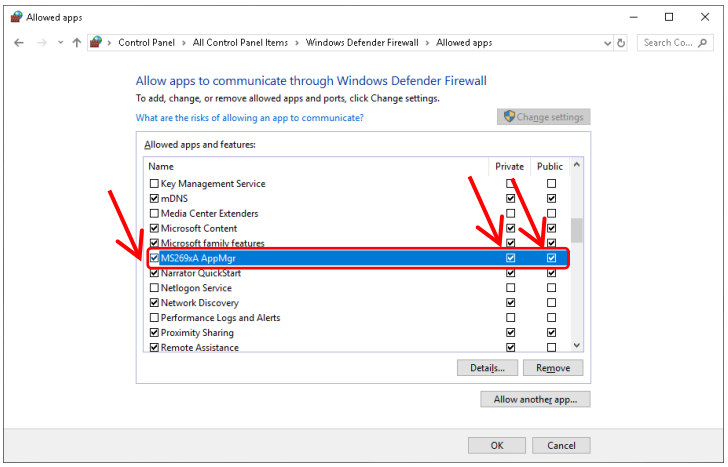


Figure 9.7.7.1-14 Allowed apps Window

Procedure to add **MS269xA AppMgr** when it is not registered (Win 10)

1. Use the mouse to click **Allow another app…** found in Allowed apps window.

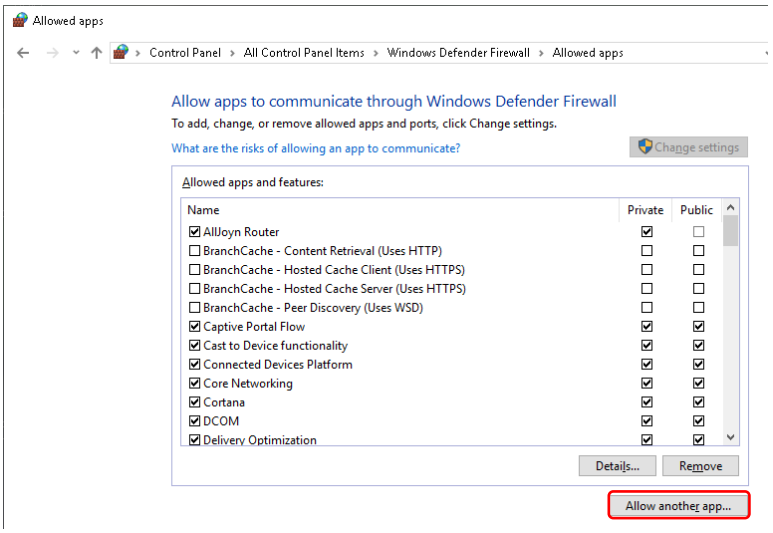


Figure 9.7.7.1-15 Allowed apps Window

2. Add an app window is shown. Click **Browse….**

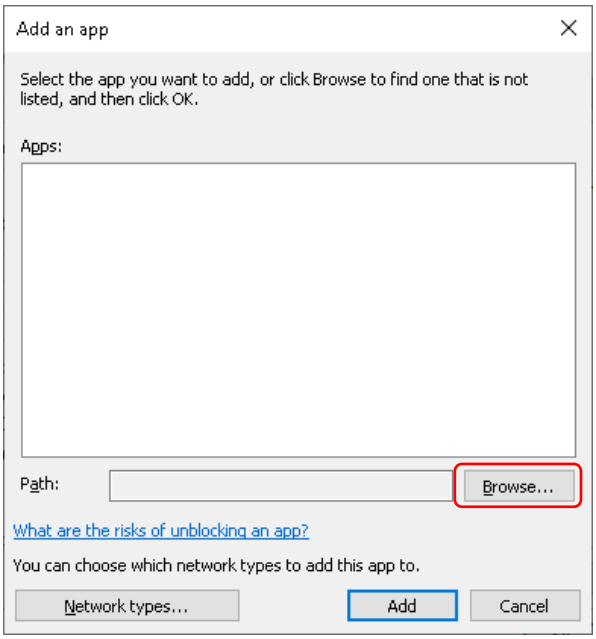


Figure 9.7.7.1-16 Add an app Window

3. Browse window of Add an app is shown.
   Select C:\Anritsu\Signal Analyzer\Applications\AppMgr.exe, and click **Open**.

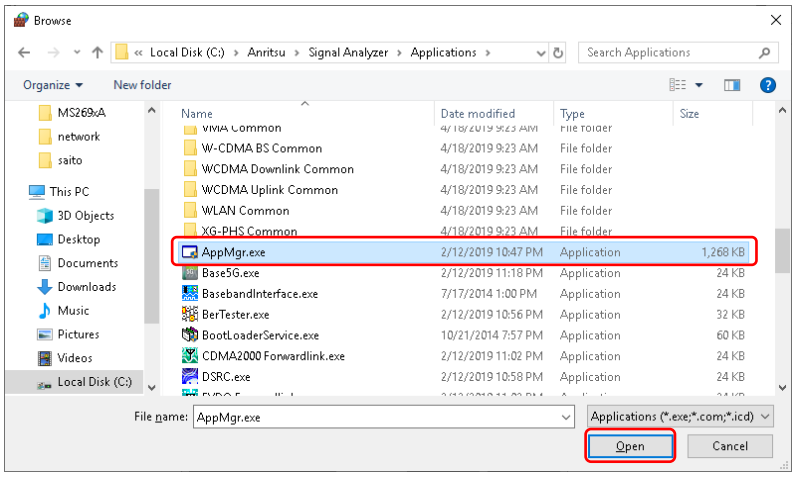


Figure 9.7.7.1-17 Browse Window of Add an app

4. In Add an app window select **MS269xA AppMgr**, and click **Add**.

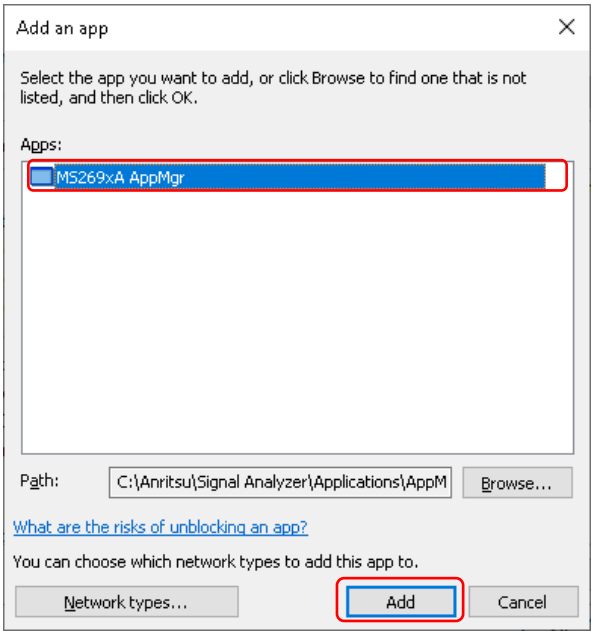


Figure 9.7.7.1-18 Add an app Window

5. **MS269xA AppMgr** is added to **Allowed apps and features**.
   Confirm if **MS269xA AppMgr** is found and set to On (checked).

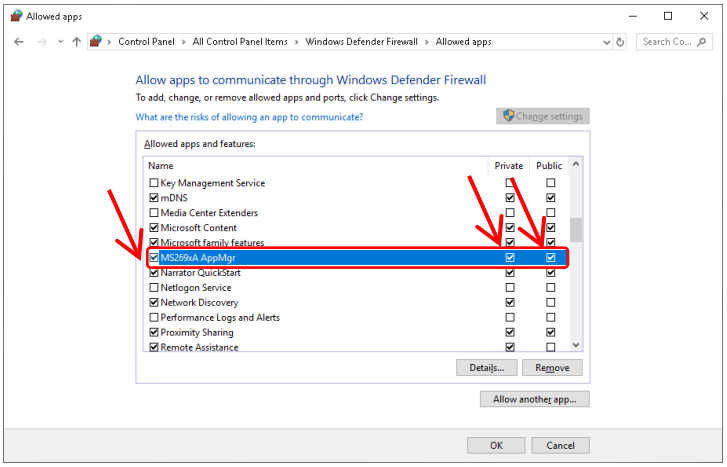


Figure 9.7.7.1-19 Allowed apps Window

9.7.7.2 Installing Windows Important Update Programs (Windows Update)

It is necessary to regularly check for important Windows update programs and keep them up-to-date. However, since executing update program downloads and installations will decrease the performance of this equipment, deactivate automatic updates for Windows Update. Instead, it is recommended to check for new updates, execute downloads and installations periodically when this equipment is not in use for measurement.

When the OS is WES 7

Windows Update setting and execution (WES 7):

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows task bar. Click **Start** > **Control Panel**.
3. Set "View by: Category" at the upper right of the Control Panel, click **System and Security** > **Windows Update** to show Windows Update window.
4. To deactivate automatic updates, click **Change settings** found in left side of Windows Update window.



Figure 9.7.7.2-1 Windows Update Window

5. Select **Never check for updates (not recommended)** in Important updates, then click **OK**.

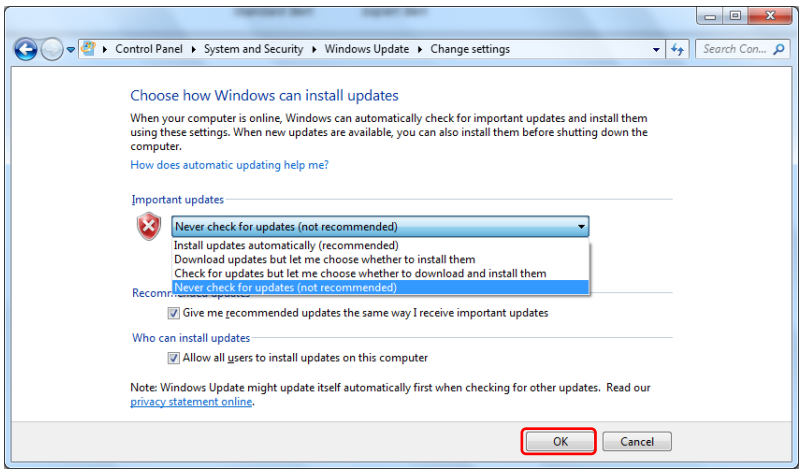


Figure 9.7.7.2-2 Change settings Window

6. To check for newly available update programs (manual update), click **Check for updates** in Windows Update window.

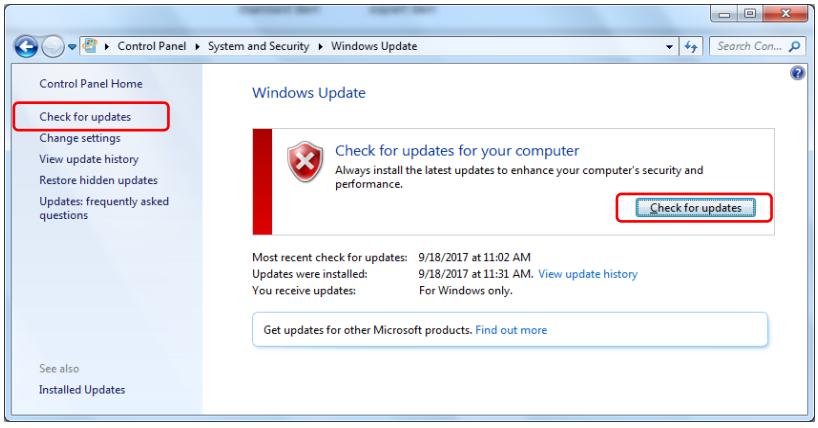


Figure 9.7.7.2-3 Windows Update Window (manual update)

7. When a new update program is found, download and install following the displayed instructions.

8. After Windows Update, if you are prompted to restart, shut down the MG3710A/MG3710E/MG3740A by pressing the Power button* and power it on by pressing the Power button again. “Restart” in the message does not mean “Restart Windows”.

   *: Do not hold down the Power button when shutting down.

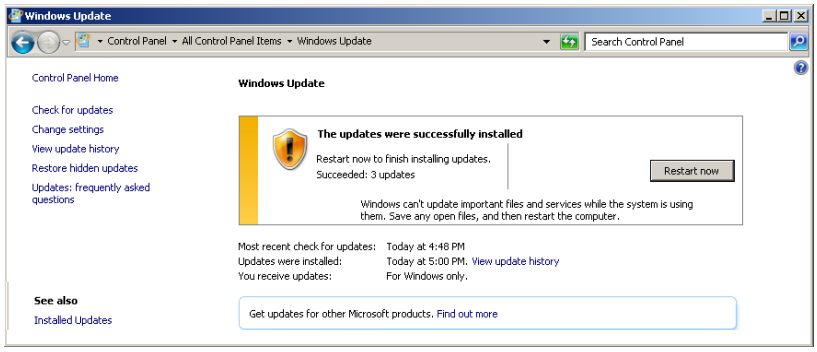


Figure 9.7.7.2-4 Windows Update display (Restart now)

When the OS is Win 10

Windows Update setting and execution (Win 10)

1. Use the mouse to right-click anywhere on the screen, and click **Show the desktop** to reveal the Windows desktop.
2. Move the mouse pointer to the bottom of the screen to display the Windows task bar. Click the **Start** icon to open the Start menu, and then click **Settings** icon.
3. Click **Update and Security** to show Windows Update window.
4. To turn off automatic updates, select **Windows Update** found in left side of Windows Update window, and then click **Advanced options**.

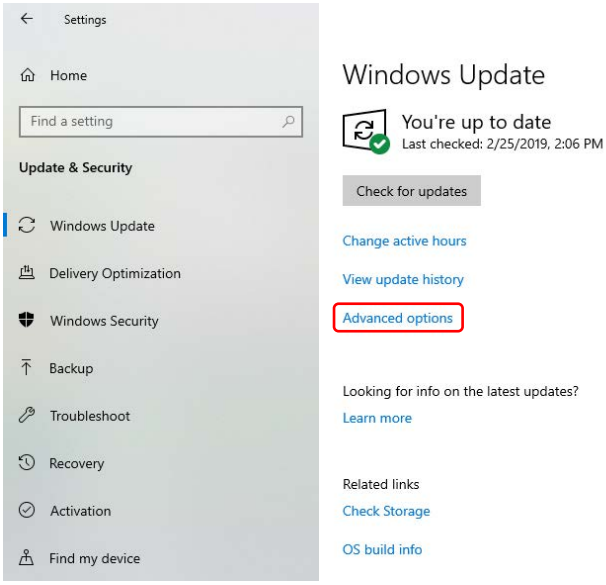


Figure 9.7.7.2-5 Windows Update Window

5. Advanced options window will be shown.
   Confirm if **Automatically download updates, even over metered data connections (charges may apply)** is set to Off.

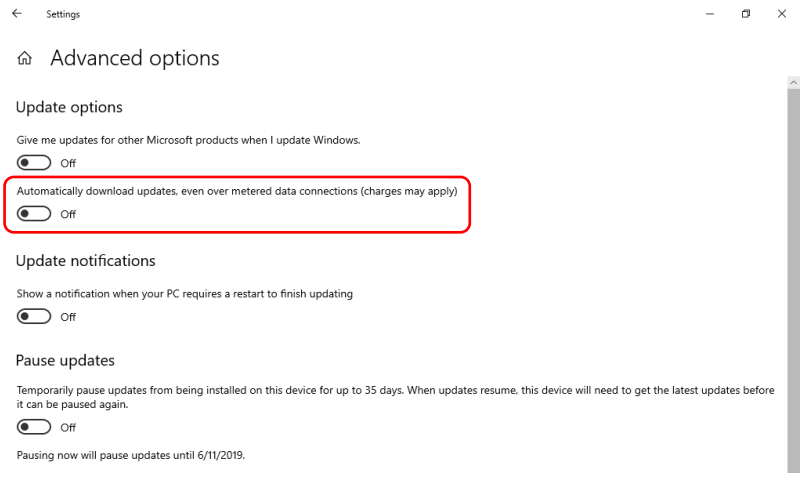


Figure 9.7.7.2-6 Advanced options Window

6. To check for newly available update programs (manual update), click **Check for updates** in Windows Update window.

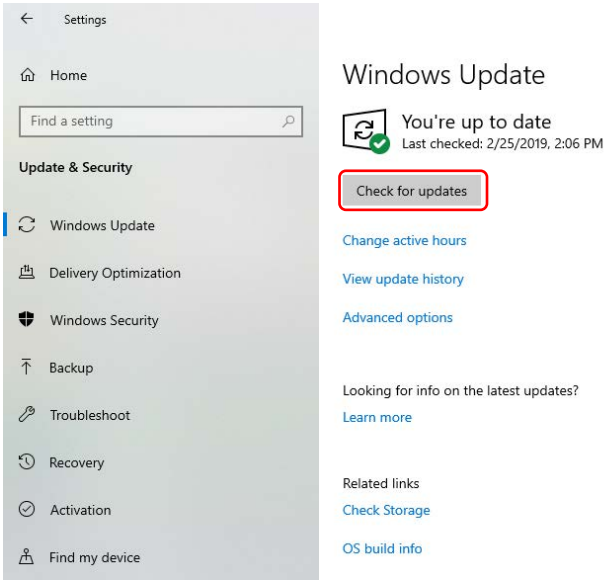


Figure 9.7.7.2-7 Windows Update Window (manual update)

7. When a new update program is found, download and install following the displayed instructions.

8. After Windows Update, if you are prompted to restart, shut down the MG3710A/MG3710E/MG3740A by pressing the Power button* and power it on by pressing the Power button again. “Restart” in the message does not mean “Restart Windows”.

*: Do not hold down the Power button when shutting down.

9.7.7.3 Using Antivirus Software

It is recommended to install antivirus software on this equipment. However, since the automatic updates for virus data library and the full scans run in the background by the antivirus software will decrease the performance of this equipment, do not execute them. Instead, it is recommended to run them periodically when this equipment is not in use for measurement.
The antivirus software that checked operation in this equipment is shown below.

- Trend Micro OfficeScan XG

Note:

Refer to the antivirus software operation manual for its installation and operation procedures. It is confirmed that no negative effects in the general usage of this equipment are caused by using the software mentioned above, however, we do not guarantee the behavior of all functions of this antivirus software and other software containing similar functions.

Chapter 10 Performance Test

This chapter describes measurement devices, setup methods, configuration procedures, and performance test procedures required for performing performance tests as preventive maintenance.

10.1 Overview of Performance Test 10-2
10.1.1 Performance test 10-2
10.1.2 MG3710A/MG3710E/MG3740A performance test items and instruments used 10-3
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10.3 Output Level Performance Test 10-7
10.3.1 Output level frequency characteristics 10-7
10.4 Vector Modulation Performance Test 10-11
10.4.1 Vector accuracy 10-11

10.1 Overview of Performance Test

10.1.1 Performance test

Performance tests are performed as preventive maintenance in order to prevent degradation of the performance. Perform the tests when required for acceptance inspection, routine inspection, and performance verification after repairs.

If the tests results do not meet the specifications, failures are considered. Contact an Anritsu Service and Sales office.

⚠ CAUTION

When the performance tests are performed, warm up the MG3710A/MG3710E/MG3740A and devices to be used with the tests for 30 minutes or more to stabilize them sufficiently. Also maximum measurement accuracy requires conducting performance tests under ambient temperatures and with little AC power supply voltage fluctuations (100 to 120 VAC, 200 to 240 VAC), as well as the absence of noise, vibrations, dust, humidity, and other problems.

10.1.2 MG3710A/MG3710E/MG3740A performance test items and instruments used

The MG3710A/MG3710E/MG3740A performance test items and instruments to be used for each item are described in Table 10.1.2-1.

Table 10.1.2-1 Performance Test Items and Instruments Used

Item		Summary	Main Instrument (Anritsu Model Name)
Frequency	Frequency	The frequency is set and the output frequency is measured.	Counter (MF2412C)
Output level	Output level frequency characteristics	The absolute accuracy (frequency characteristics) is measured by using a power meter.	Power Meter (ML2437A) Power Sensor (MA24002A)
Vector modulation	Vector accuracy	A modulated pattern signal is generated through internal modulation and the vector accuracy is measured by using a Signal Analyzer.	Signal Analyzer (MS2690A/91A/92A) W-CDMA/HSPA Downlink Measurement Software (MX269011A) GSM/EDGE Measurement Software (MX269013A) LTE Downlink Measurement Software (MX269020A)

For items judged as important, perform the performance tests regularly as the preventive maintenance. It is recommended that those tests are performed around once or twice a year.

10.2 Frequency Performance Test

10.2.1 Frequency

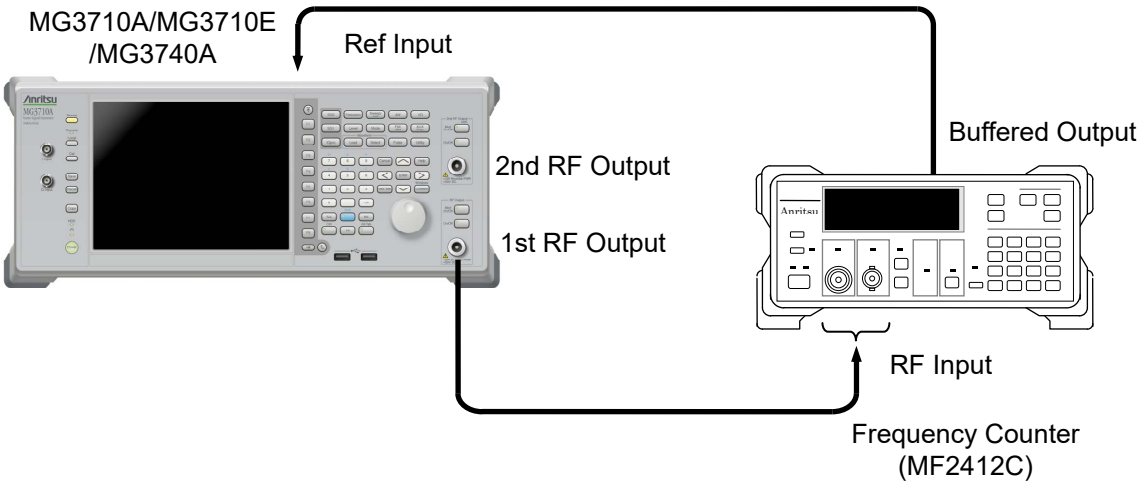
Set the frequency of the MG3710A/MG3710E/MG3740A within 9 kHz to upper limit frequency and measure the frequency with the frequency counter (MF2412C) to confirm the set frequency is correctly output.

Test standards

Frequency range

9 kHz to 2700 MHz
(when MG3710A/MG3710E/MG3740A-032/062/162 is installed)
9 kHz to 4000 MHz
(when MG3710A/MG3710E/MG3740A-034/064/164 is installed)
9 kHz to 6000 MHz
(when MG3710A/MG3710E/MG3740A-036/066/166 is installed)

Resolution 0.01 Hz



Test procedure

Set the frequency within 9 kHz to upper limit frequency of the MG3710A/MG3710E/MG3740A.

1. Connect the reference signal output (10 MHz) of the frequency counter to the external reference input (REF Input) of the MG3710A/MG3710E/MG3740A for frequency synchronization.
2. Press Preset to preset the MG3710A/MG3710E/MG3740A.

3. Set the output level of the MG3710A/MG3710E/MG3740A to 0 dBm and turn On the 1st RF Output.
4. Set the output frequency of the MG3710A/MG3710E/MG3740A to the value [FR (x)] in Table 10.2.1-1.

4.1 When x = 1

Connect RF Output of this equipment to Input2 of the frequency counter.

Select **Input2** at **Input** > **F1 Input CH**.

Select **1 MΩ** at **Input** > **F2 Impd2**.

Set the measurement resolution of the frequency counter to 100 Hz.

4.2 When x = 2, 3, 4

Connect RF Output of this equipment to Input2 of the frequency counter.

Select **Input2** at **Input** > **F1 Input CH**.

Select **50 Ω** at **Input** > **F2 Impd2**.

Set the measurement resolution of the frequency counter to 1 MHz.

4.3 When x = 5 to 16

Connect RF Output of this equipment to Input1 of the frequency counter.

Select **Input1** at **Input** > **F1 Input CH**.

Set the measurement resolution of the frequency counter to 1 MHz.

5. Check whether the frequency set to the MG3710A/MG3710E/MG3740A is equal to the frequency displayed on the frequency counter.
6. Change the frequency [FR (x)] according to Table 10.2.1-1 to repeat the measurement.
7. If the 2nd RF is installed, change the connection to the 2nd RF Output to perform Step 3 to 6.

Table 10.2.1-1 Frequency Setting Table

x	FR (x) (MHz)
1	0.009
2	100
3	300
4	600
5	1000
6	1500
7	2000
8	2500
9	2700
10	3000
11	3500
12	4000
13	4500
14	5000
15	5500
16	6000

X ≥ 10 are available only when the Upper limit frequency 4 GHz and 6 GHz options are installed.
X ≥ 13 are available only when the Upper limit frequency 6 GHz option is installed.

10.3 Output Level Performance Test

10.3.1 Output level frequency characteristics

Measure the level of each frequency of the MG3710A/MG3710E/MG3740A for the reference level with the power meter (Anritsu ML2437A) and power sensor (MA24002A).

Test standards

Absolute accuracy (18 to 28 °C in CW mode)

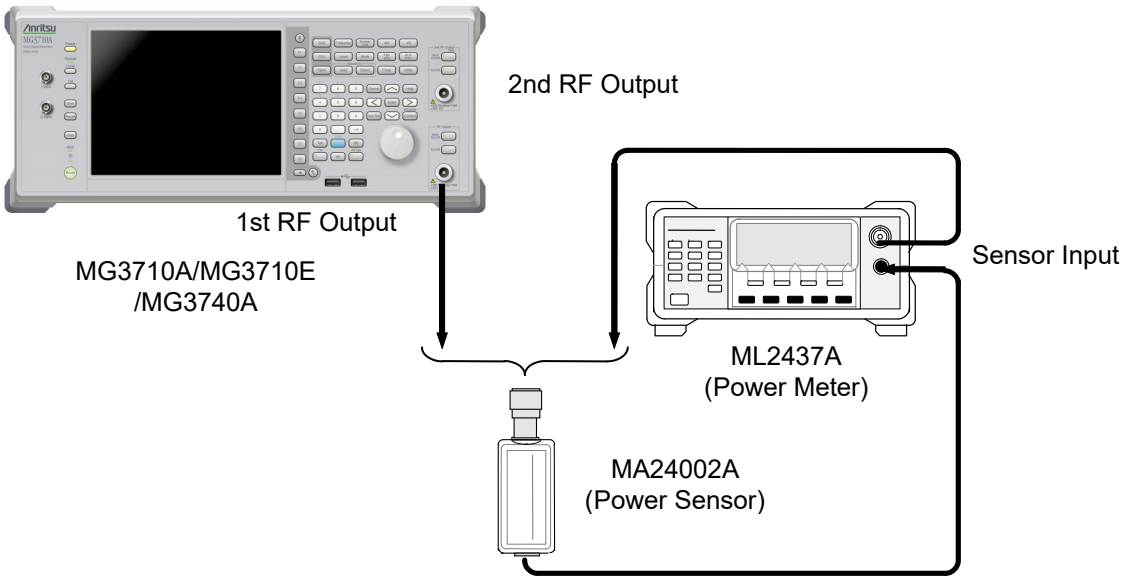
Table 10.3.1-1 Test Standards

Composition	Output Level	Frequency				
		50 MHz ≤ , < 400 MHz	400 MHz ≤ , ≤ 3 GHz	3 GHz < , ≤ 4 GHz	4 GHz < , ≤ 5 GHz	5 GHz < , ≤ 6 GHz
1st RF	–40 dBm <, < +2 dBm	±0.5 dB	±0.5 dB	±0.7 dB	±0.8 dB	±0.8 dB
2nd RF	–40 dBm <, < +2 dBm	±0.5 dB	±0.5 dB	±0.7 dB	±0.8 dB	±0.8 dB

For the 1st RF, when Option-043/143 is not installed.
For the 2nd RF, when Option-073/173 is not installed.

Composition	Output Level	Frequency				
		50 MHz ≤ , < 400 MHz	400 MHz ≤ , ≤ 3 GHz	3 GHz < , ≤ 4 GHz	4 GHz < , ≤ 5 GHz	5 GHz < , ≤ 6 GHz
1st RF	–40 dBm <, < –1 dBm	±0.5 dB	±0.5 dB	±0.7 dB	±0.8 dB	±0.8 dB
2nd RF	–40 dBm <, < –1 dBm	±0.5 dB	±0.5 dB	±0.7 dB	±0.8 dB	±0.8 dB

For the 1st RF, when Option-043/143 is installed.
For the 2nd RF, when Option-073/173 is installed.



Measure the level according to Table 10.3.1-2 or Table 10.3.1-3.

Test procedure

1. Press Preset on the MG3710A/MG3710E/MG3740A and ML2437A to preset them.
2. Connect the MA24002A to the Cal Output connector of the ML2437A.
3. Calibrate the ML2437A.
4. Set Average Mode of the ML2437A to “Moving”.
5. Set Average Count of the ML2437A to “10”.
6. Connect the MA24002A to the RF Output connector of the MG3710A/MG3710E/MG3740A.
7. Perform the sensor calibration (zero point and sensitivity) for the ML2437A.
8. Turn On the 1st RF Output of the MG3710A/MG3710E/MG3740A.
9. Set the output level of the MG3710A/MG3710E/MG3740A to the value [LEV (1)] in Table 10.3.1-2 or Table 10.3.1-3.
10. Set frequencies of the MG3710A/MG3710E/MG3740A and ML2437A to the value [FR (1)] in Table 10.3.1-2 or Table 10.3.1-3.
11. Measure the level with the ML2437A.
12. Change the output level [LEV (x)] and frequency [FR (x)] according to Table 10.3.1-2 or Table 10.3.1-3 to repeat Step 9 to 11 to obtain measured values.
13. If the 2nd RF is installed, change the connection of the MA24002A to the 2nd RF Output to perform Step 7 to 12.

Table 10.3.1-2 Absolute Accuracy Measurement Frequency Setting

Table 1

x	FR (x) (MHz)	LEV (x) (dBm)
1	50	–5
2	97	–5
3	98	–7
4	100	–7
5	399	–7
6	400	–7
7	500	–7
8	1000	–7
9	1500	–7
10	2000	–7
11	2500	–7
12	2700	–7
13	3000	–7
14	3001	–7
15	3500	–7
16	4000	–7
17	4001	–7
18	4500	–7
19	5000	–7
20	5001	–7
21	5500	–7
22	6000	–7

X ≥ 13 are available only when the Upper limit frequency 4 GHz and 6 GHz options are installed.
X ≥ 17 are available only when the Upper limit frequency 6 GHz option is installed.
For the 1st RF, when Option-043/143 is not installed.
For the 2nd RF, when Option-073/173 is not installed.

Table 10.3.1-3 Absolute Accuracy Measurement Frequency Setting Table 2

x	FR (x) (MHz)	LEV (x) (dBm)
1	50	–5
2	97	–5
3	98	–10
4	100	–10
5	399	–10
6	400	–10
7	500	–10
8	1000	–10
9	1500	–10
10	2000	–10
11	2500	–10
12	2700	–10
13	3000	–10
14	3001	–10
15	3500	–10
16	4000	–10
17	4001	–10
18	4500	–10
19	5000	–10
20	5001	–10
21	5500	–10
22	6000	–10

X ≥ 13 are available only when the Upper limit frequency 4 GHz and 6 GHz options are installed.
X ≥ 17 are available only when the Upper limit frequency 6 GHz option is installed.
For the 1st RF, when Option-043/143 is installed.
For the 2nd RF, when Option-073/173 is installed.

10.4 Vector Modulation Performance Test

10.4.1 Vector accuracy

The baseband signal is generated with the internal waveform pattern, and the vector modulation is performed with the MG3710A/MG3710E (hereafter referred to as "MG3710A/10E"). The vector error in the modulated RF signal is measured by using a signal analyzer (MS2690A/91A/92A) in which signal analysis software has been installed.

The vector modulation performance test is unnecessary because waveform patterns are not stored in the MG3740A.

Test standards

When MG3710A/10E-043/143/073/173 is not installed

W-CDMA (Test Model 4)

Output level ≤ +7 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +13 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 2200 MHz,
After CAL execution at 18 to 28 °C
≤ 0.62 % (rms) (0.6 % (rms) typ.)

GSM

Output level ≤ +7 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +13 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 1900 MHz,
After CAL execution at 18 to 28 °C
≤ 0.84° (rms) (0.8° (rms) typ.)

EDGE

Output level ≤ +7 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +13 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 1900 MHz,
After CAL execution at 18 to 28 °C
≤ 0.84 % (rms) (0.8 % (rms) typ.)

LTE (20 MHz Test Model 3.1)

Output level ≤ +7 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +13 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency 600 to 2700 MHz,
After CAL execution at 18 to 28 °C
≤ 0.82 % (rms) (0.8 % (rms) typ.)
Output level ≤ +4 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +10 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency 3400 to 3800 MHz,
After CAL execution at 18 to 28 °C
≤ 0.82 % (rms) (0.8 % (rms) typ.)

When MG3710A/10E-043/143/073/173 is installed

W-CDMA (Test Model 4)

Output level ≤ +4 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +10 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 2200 MHz,
After CAL execution at 18 to 28 °C
≤ 0.62 % (rms) (0.6 % (rms) typ.)

GSM

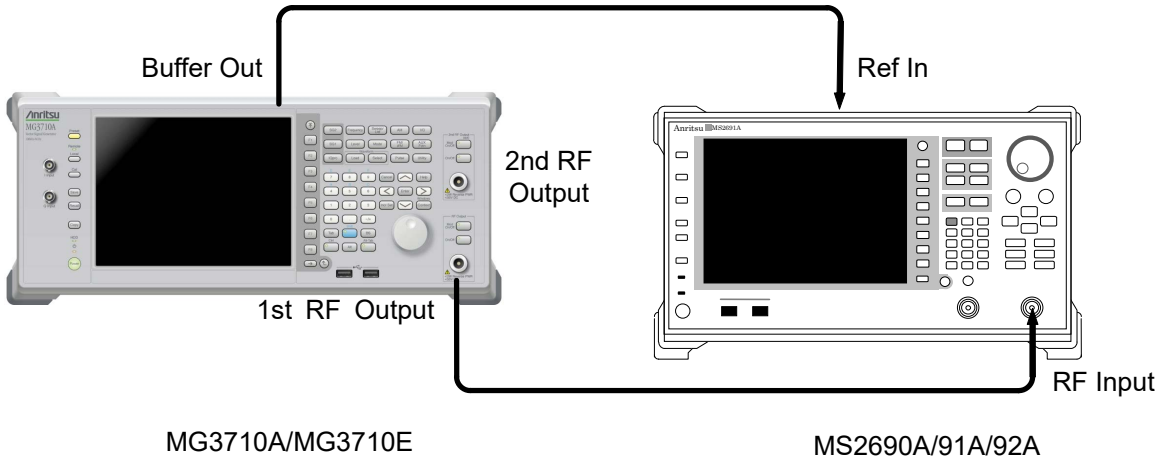
Output level ≤ +4 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +10 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 1900 MHz,
After CAL execution at 18 to 28 °C
≤ 0.84° (rms) (0.8° (rms) typ.)

EDGE

Output level ≤ +4 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +10 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency: 800 to 900 MHz, 1800 to 1900 MHz,
After CAL execution at 18 to 28 °C
≤ 0.84 % (rms) (0.8 % (rms) typ.)

LTE (20 MHz Test Model 3.1)

Output level ≤ +4 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +10 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency 600 to 2700 MHz,
After CAL execution at 18 to 28 °C
≤ 0.82 % (rms) (0.8 % (rms) typ.)
Output level ≤ +1 dBm (When MG3710A/10E-041/141/071/171 is not installed),
Output level ≤ +7 dBm (When MG3710A/10E-041/141/071/171 is installed),
Output frequency 3400 to 3800 MHz,
After CAL execution at 18 to 28 °C
≤ 0.82 % (rms) (0.8 % (rms) typ.)



Test procedure W-CDMA (Test Model 4)

1. Press Preset of the MG3710A/MG3710E and MS2690A/91A/92A to preset them.
2. Load the W-CDMA/HSPA Downlink Measurement Software (MX269011A) to the MS2690A/91A/92A.
3. Perform Band Cal. for the MS2690A/91A/92A.
4. Set the MS2690A/91A/92A as follows:
   - Chanel Detection: Test Model 4
   - Origin Ofst.: Incl.
   - ScramblingCode Synchronization: User Defined
   - Storage Mode: Average & Max

- Average count: 10

5. Turn On the RF Output of the MG3710A/MG3710E.
6. Turn On the vector modulation of the MG3710A/MG3710E to apply modulation with the TestModel_4 of standard waveform pattern.
7. Set the output level of the MG3710A/MG3710E and the input level of the MS2690A/91A/92A to the values in Table 10.4.1-1.
8. Set frequencies of the MG3710A/MG3710E and MS2690A/91A/92A to the value [FR (1)] in Table 10.4.1-2.
9. Set the Cal Type of IQ Cal. of the MG3710A/MG3710E to DC to perform Cal.
10. Measure EVM (rms) (the maximum value for Storage Count) with the MS2690A/91A/92A.
11. Change the output level and frequency [FR (x)] according to Table 10.4.1-1 and 10.4.1-2 to repeat Step 7 to 10 to obtain measured values.
12. If the 2nd RF is installed, change the connection of the MS2690A/91A/92A to the 2nd RF Output to perform Step 5 to 11.

Test procedure GSM

1. Press 

of the MG3710A/MG3710E and MS2690A/91A/92A to preset them.
2. Load the GSM/EDGE Measurement Software (MX269013A) to the MS2690A/91A/92A.
3. Perform Band Cal. for the MS2690A/91A/92A.
4. Set the MS2690A/91A/92A as follows:
   - RF Signal: Normal Burst
   - Modulation: GMSK.
   - Storage Mode: Average & Max
   - Average count: 10
5. Turn On the RF Output of the MG3710A/MG3710E.
6. Turn On the vector modulation of the MG3710A/MG3710E to apply modulation with the NB_GMSK of standard waveform pattern.
7. Set the output level of the MG3710A/MG3710E and the input level of the MS2690A/91A/92A to the values in Table 10.4.1-1.
8. Set frequencies of the MG3710A/MG3710E and MS2690A/91A/92A to the value [FR (1)] in Table 10.4.1-3.
9. Set the Cal Type of IQ Cal. of the MG3710A/MG3710E to DC to perform Cal.
10. Measure Phase Error (rms) (the maximum value for Storage Count) with the MS2690A/91A/92A.
11. Change the output level and frequency [FR (x)] according to Table 10.4.1-1 and 10.4.1-3 to repeat Step 7 to 10 to obtain measured values.
12. If the 2nd RF is installed, change the connection of the MS2690A/91A/92A to the 2nd RF Output to perform Step 5 to 11.

Test procedure (EGDE)

1. Press Preset of the MG3710A/MG3710E and MS2690A/91A/92A to preset them.
2. Load the GSM/EDGE Measurement Software (MX269013A) to the MS2690A/91A/92A.
3. Perform Band Cal. for the MS2690A/91A/92A.
4. Set the MS2690A/91A/92A as follows:
   - RF Signal: Normal Burst
   - Modulation: 8PSK
   - Storage Mode: Average & Max
   - Average count: 10
5. Turn On the RF Output of the MG3710A/MG3710E.
6. Turn On the vector modulation of the MG3710A/MG3710E to apply modulation with the NB_8PSK of standard waveform pattern.
7. Set the output level of the MG3710A/MG3710E and the input level of the MS2690A/91A/92A to the values in Table 10.4.1-1.
8. Set frequencies of the MG3710A/MG3710E and MS2690A/91A/92A to the value [FR (1)] in Table 10.4.1-4.
9. Set the Cal Type of IQ Cal. of the MG3710A/MG3710E to DC to perform Cal.
10. Measure EVM (rms) (the maximum value for Storage Count) with the MS2690A/91A/92A.
11. Change the output level and frequency [FR (x)] according to Table 10.4.1-1 and 10.4.1-4 to repeat Step 7 to 10 to obtain measured values.
12. If the 2nd RF is installed, change the connection of the MS2690A/91A/92A to the 2nd RF Output to perform Step 5 to 11.

Test procedure LTE (20 MHz Test Model 3.1)

1. Press Preset of the MG3710A/MG3710E and MS2690A/91A/92A to preset them.
2. Load the LTE Downlink Measurement Software (MX269020A) to the MS2690A/91A/92A.
3. Perform Band Cal. for the MS2690A/91A/92A.
4. Set the MS2690A/91A/92A as follows:
   - Channel Bandwidth: 20 MHz
   - Test Model: E-TM3.1
   - Analysis Time: 10 Subframe
   - Storage Mode: Average & Max
   - EVM Window Length: W, 136
   - Average count: 10
5. Turn On the RF Output of the MG3710A/MG3710E.
6. Turn On the vector modulation of the MG3710A/MG3710E to apply modulation with the E-TM_3-1_20M of standard waveform pattern.
7. Set the output level of the MG3710A/MG3710E and the input level of the MS2690A/91A/92A to the values in Table 10.4.1-1.

8. Set frequencies of the MG3710A/MG3710E and MS2690A/91A/92A to the value [FR (1)] in Table 10.4.1-5.
9. Set the Cal Type of IQ Cal. of the MG3710A/MG3710E to DC to perform Cal.
10. Measure EVM (rms) (the maximum value for Storage Count) with the MS2690A/91A/92A.
11. Change the output level and frequency [FR (x)] according to Table 10.4.1-1 and 10.4.1-5 to repeat Step 7 to 10 to obtain measured values.
12. If the 2nd RF is installed, change the connection of the MS2690A/91A/92A to the 2nd RF Output to perform Step 5 to 11.

Table 10.4.1-1 Modulation Accuracy Measurement Level

Composition	For the 1st RF, when Option-043/143 is not installed For the 2nd RF, when Option-073/173 is not installed	For the 1st RF, when Option-043/143 is installed For the 2nd RF, when Option-073/173 is installed
For the 1st RF, when Option-041/141 is not installed For the 2nd RF, when Option-071/171 is not installed	W-CDMA: +7 dBm GSM: +7 dBm EDGE: +7 dBm LTE: +7 dBm (600 to 2700 MHz) LTE: +4 dBm (3400 to 3800 MHz)	W-CDMA: +4 dBm GSM: +4 dBm EDGE: +4 dBm LTE: +4 dBm (600 to 2700 MHz) LTE: +1 dBm (3400 to 3800 MHz)
For the 1st RF, when Option-041/141 is installed For the 2nd RF, when Option-071/171 is installed	W-CDMA: +13 dBm GSM: +13 dBm EDGE: +13 dBm LTE: +13 dBm (600 to 2700 MHz) LTE: +10 dBm (3400 to 3800 MHz)	W-CDMA: +10 dBm GSM: +10 dBm EDGE: +10 dBm LTE: +10 dBm (600 to 2700 MHz) LTE: +7 dBm (3400 to 3800 MHz)

Table 10.4.1-2 W-CDMA Test Model 4 Modulation Accuracy Measurement Frequency Table

x	FR (x) (MHz)
1	800
2	900
3	1800
4	2000
5	2200

Table 10.4.1-3 GSM Modulation Accuracy Measurement Frequency Table

x	FR (x) (MHz)
1	800
2	900
3	1800
4	1900

Table 10.4.1-4 EDGE Modulation Accuracy Measurement Frequency Table

x	FR (x) (MHz)
1	800
2	900
3	1800
4	1900

Table 10.4.1-5 LTE (20 MHz Test Model 3.1) Modulation Accuracy Measurement Frequency Table

x	FR (x) (MHz)
1	600
2	800
3	1500
4	2000
5	2400
6	2700
7	3400
8	3500
9	3600
10	3700
11	3800

Chapter 11 Maintenance

This chapter describes cautions related to daily maintenance, storage, and shipping of the MG3710A/MG3710E/MG3740A, as well as the calibration procedure to be used as preventive maintenance.

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11.1 Daily Maintenance and Storage

11.1.1 Daily maintenance

Before maintenance, be sure to turn the power off and unplug it from the AC outlet.

Panel surface dirt

When the panel surface dirt is noticeable, or when the MG3710A/MG3710E/MG3740A has been used in a dusty place, or before long-term storage, wipe the MG3710A/MG3710E/MG3740A with a cloth soaked in soapy water and wrung dry.

Screen surface dirt

If the screen surface is dirty, first wipe it dry with a soft cloth. When the dirt is terrible, wipe it lightly with a cloth soaked in soapy water and wrung dry.

Loose screws

Use a Phillips screwdriver to tighten screws.

11.1.2 Precautions for long-term storage

Wipe off dust, fingerprint marks, stains, spots, etc. from the surface of the MG3710A/MG3710E/MG3740A before storing it. Put the power cable, DVD-ROM and other accessories in the accessory box and store with the MG3710A/MG3710E/MG3740A. Also, avoid storing the MG3710A/MG3710E/MG3740A in the following places:

- In direct sunlight for extended periods
- Outdoors
- In excessively dusty locations
- Where condensation may occur
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen oxide, or hydrogen chloride etc.) are present
- Where toppling over may occur
- In the presence of lubricating oil mists
- At low atmospheric pressure
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes
- Where temperature range and relative humidity exceed –20 to 60°C and 90%, respectively

Recommended storage conditions

For long-term storage, it is recommended that the MG3710A/MG3710E/MG3740A is stored within the ranges of the environmental conditions below along with that the conditions for cautions before storage above are met.

- Temperature 0 to 45°C
- Humidity 40 to 80%
- A place with small change of temperature and humidity during a day

11.1.3 Storing USB flash drive

Store a USB flash drive in a place at a temperature of 4 to 53°C and relative humidity of 8 to 90% (no condensation). Also, do not store it in places that are:

- Dusty and damp
- Close to magnetized items
- Exposed to direct sunlight
- Close to heat sources

11.1.4 Storing Removable HDD

For long-term storage of a Removable HDD, it is recommended that it be packed as it was purchased and be stored in a place that meets the following environment conditions.

- Temperature The range of 5 to 45°C
- Humidity The range of 8 to 90% (No condensation)
- A place with small change of temperature and humidity during a day

Also, do not store it in places that are:

- Exposed to frequent vibrations or shocks
- Close to magnetized items
- Exposed to direct sunlight

11.2 Repacking and Transportation upon Return

Cautions needed on transportation of the MG3710A/MG3710E/MG3740A are explained.

11.2.1 Repacking

Repacking

Repack the MG3710A/MG3710E/MG3740A using the packing material (box) in which the MG3710A/MG3710E/MG3740A had been packed first. If the packing material has been discarded or damaged, repack the MG3710A/MG3710E/MG3740A with the method below:

1. Pack the MG3710A/MG3710E/MG3740A with vinyl or others.
2. Prepare a cardboard box, wooden box, or aluminum box which is large enough for the MG3710A/MG3710E/MG3740A and buffer material to surround the MG3710A/MG3710E/MG3740A to be put in the box.
3. Put the MG3710A/MG3710E/MG3740A in the box. Place the buffer material around the MG3710A/MG3710E/MG3740A not to move in the box.
4. Tie up the box with packing rope, adhesive tape, band, or others.

11.2.2 Transportation

It is recommended to transport the MG3710A/MG3710E/MG3740A after the recommended storage conditions are satisfied and avoiding vibration as much as possible.

11.3 Disposal

When the MG3710A/MG3710E/MG3740A is to be discarded, comply with regulations of each country and local government.
Before discarding the MG3710A/MG3710E/MG3740A, dismantle or physically destroy any memory media it contains to ensure that any data saved in memory cannot be recovered by third parties.

11.4 Calibration

11.4.1 Recommended calibration

Calibration is performed as preventive maintenance in order to prevent degradation of the performance. It should be performed regularly to maintain the performance of the MG3710A/MG3710E/MG3740A even if it operates normally.

It is desired that calibration is performed around once or twice a year. If the calibration result does not meet the specification, a failure is considered. Contact an Anritsu Service and Sales office.

⚠ CAUTION

When the calibration is performed, warm up the MG3710A/MG3710E/MG3740A and the device to be used with the calibration for 30 minutes or more to stabilize them sufficiently. Also maximum measurement accuracy requires conducting the calibration under the temperature of 23±5°C and with little AC power supply voltage fluctuations (100 to 120 VAC, 200 to 240 VAC), as well as the absence of noise, vibrations, dust, humidity, and other problems.

11.4.2 Device to be used for calibration

Devices to be used for the calibration of the MG3710A/MG3710E/MG3740A are described in the table below.

Table 11.4.2-1 Measuring Instrument for Calibration List

Recommended Device	Required Performance	Calibration Item
Oscilloscope	1 GHz measurement available External trigger input supported	Reference oscillator frequency accuracy
Signal generator	1 GHz signal output available (Resolution: 0.01 Hz or more)	Reference oscillator frequency accuracy
Frequency standard device	Standard electrical wave receiver or device with equivalent function (Accuracy: 1×10^{-11} order or more)	Reference oscillator frequency accuracy

11.4.3 Calibrating frequency with oscilloscope

Calibrate the reference oscillator frequency using an oscilloscope. Use a frequency standard device (signal synchronized with a standard electric wave and rubidium atomic standard device) with accuracy sufficiently better than the reference oscillator.

Table 11.4.3-1 Calibration Standard

Reference Oscillator	Aging Rate	Temperature Stability
Internal reference oscillator	$\pm 1 \times 10^{-6}$/year	$\pm 2.5 \times 10^{-6}$ (5 to 45°C)
High stability reference oscillator (Option 002/102 installed)	$\pm 1 \times 10^{-7}$/year	$\pm 2 \times 10^{-8}$ (5 to 45°C)
Rubidium reference oscillator (Option 001/101 installed)	$\pm 1 \times 10^{-10}$/month	$\pm 2 \times 10^{-9}$ (5 to 45°C)

Calibration procedure

The frequency calibration procedure with an oscilloscope is described.

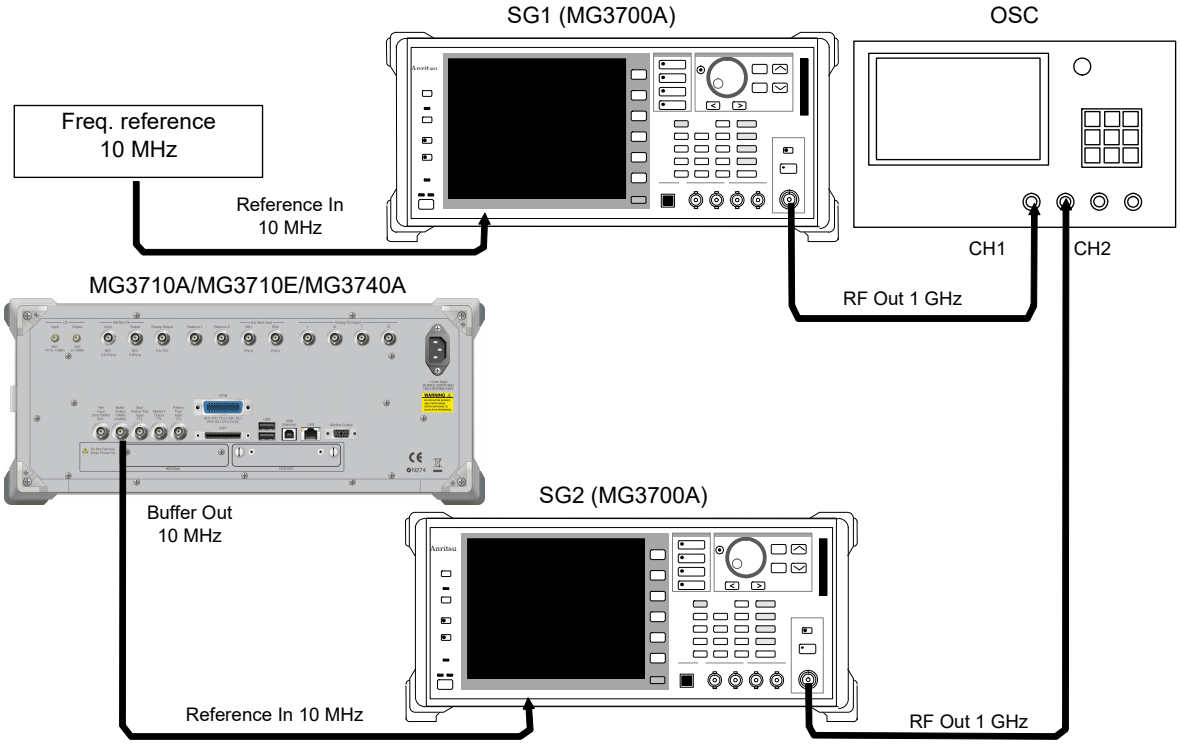


Figure 11.4.3-1 Frequency Calibration Connection with Oscilloscope

1. Connect the signal of 10 MHz output from the frequency standard device to the reference signal input connector (Reference In) of the signal generator 1.
2. Connect the reference signal output (Buffer Out) on the rear side of the MG3710A/MG3710E/MG3740A to the reference signal input connector (Reference In) of the signal generator 2.
3. Connect the RF output connector of the signal generator 1 to CH1 of the input connector of the oscilloscope and the RF output connector of the signal generator 2 to CH2 of the input connector of the oscilloscope.
4. Set the frequency of the signal generator 1 and 2 to 1 GHz and output the signal.
5. Adjust the oscilloscope to enable observation of the input waveform of each signal generator.

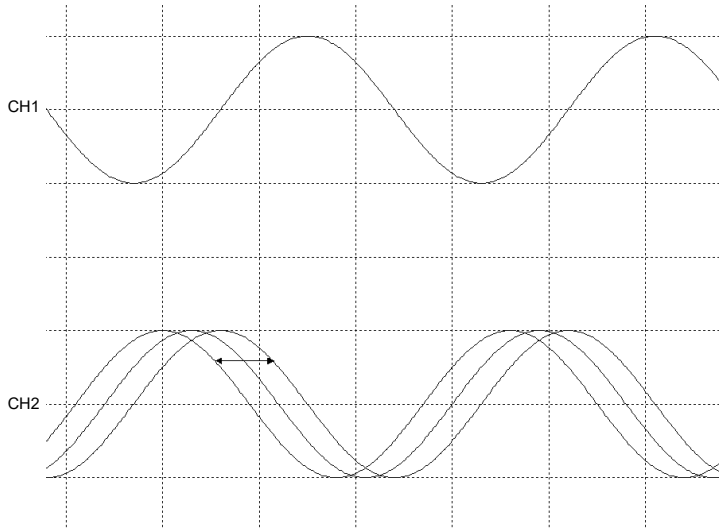


Figure 11.4.3-2 Oscilloscope Waveform Display

From the figure above, set the trigger to the signal waveform of CH1 which outputs the reference signal.

The stationary displayed waveforms of the signal generator 1 and 2 (CH1 and CH2) input to the oscilloscope indicate that the frequency of the reference oscillator of the MG3710A/MG3710E/MG3740A is synchronized with the standard frequency and has a normal value.

However, if the displayed waveforms move to the right or left without synchronization, the reference oscillator of the MG3710A/MG3710E/MG3740A must be adjusted.

6. For synchronization, adjust the value of Reference Clock.
   For the adjustment method for Reference Clock, Refer to 4.6.6 “Ref Clock Adjustment”.
7. When it is adjusted and the output frequency of the MG3710A/MG3710E/MG3740A meets the standard frequency, the displayed waveform of the oscilloscope rests.

Note:

In actuality, the complete correspondence between waveforms of the output frequency and the standard frequency is not possible. Make the adjustment for the phase fluctuation to be the minimum.

11.5 Replacing Hard Disk/SSD

Follow the procedure below to replace the MG3710A/MG3710E/MG3740A's internal hard disk/SSD (Main HDD/SSD) with the Removable HDD (MG3710A/MG3740A-313) or the Removable HDD, Win10 (MG3710E/MG3740A-014/114). The reference waveforms have been written to the Removable HDD already at factory shipment. Waveform patterns saved by the customer after purchasing this equipment should be rewritten to the Removable HDD after replacing the Main HDD/SSD. (Be sure to backup important waveform patterns.)

A backup can be obtained by copying the User Data folder in the path C:\Anritsu\MG3710A.

If either or both of internal HDD/SSD (Main HDD/SSD) and secondary HDD are faulty, contact an Anritsu Sales and Office for factory repair.

Notes:

- Turn off the power of the MG3710A/MG3710E/MG3740A and disconnect the power cable from the power outlet before replacement. Also, put the MG3710A/MG3710E/MG3740A on a flat horizontal bench top when working on it.

- Take care not to allow foreign matter to get in the HDD/SSD, nor to let the HDD/SSD get charged electrostatically or drop, when removing or installing. If the HDD/SSD is suspected of malfunctioning or being deformed, do not forcibly install it. Ignoring this may damage it.

<Replacement Procedure>

1. Before replacing the internal HDD/SSD, create backups of saved waveform pattern and calibration files, and save them to the USB flash drive.

   User data folder: C:\Anritsu\MG3710A\User Data

   Calibration data folder: C:\Anritsu\MG3710A\CalBackup

2. On the rear panel, loosen two screws on the HDD ASSY with a flat head screwdriver.
3. Pull out the old HDD ASSY.
4. Insert the new HDD ASSY.
5. On the rear panel, tighten up the two screws on the HDD ASSY with a flat head screwdriver.

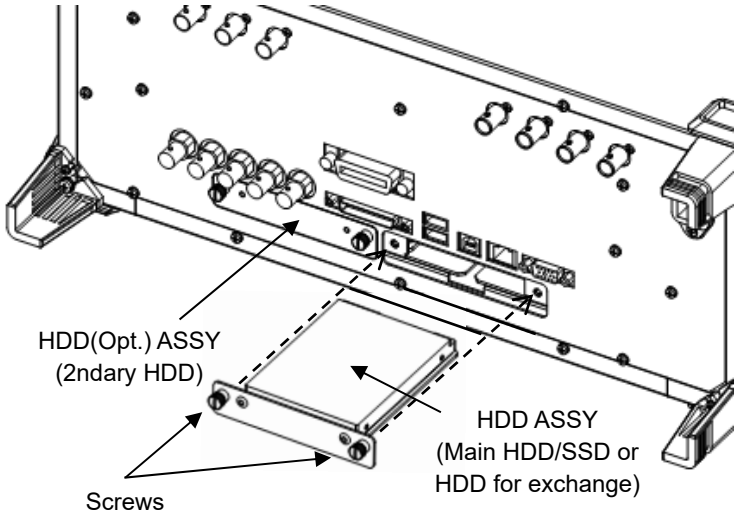


Figure 11.5-1 HDD ASSY Replacement

Note:

If the Hard Disk/SSD lamp on the front panel remains illuminated after HDD ASSY replacement, the HDD ASSY may not be inserted correctly. If so, turn off the power, disconnect the power cable from the power outlet, remove the HDD ASSY once, and insert it again.

<Migrating backup data when returned from repair and calibration>

The Removable HDD, Win10 (MG3710E/MG3740A-014/114) returned stores calibration files used for repair and calibration. Using the USB flash drive, copy the calibration files from the folder below to the standard HDD/SSD.

C:\Anritsu\MG3710A\CalBackup

11.6 Troubleshooting

This section explains possible causes and measures for them when the MG3710A/MG3710E/MG3740A does not operate correctly.
If any troubles are not described in this section or taking measures below does not improve the symptoms, contact an Anritsu Service and Sales office.

Table 11.6-1 Troubleshooting

Problem	Possible Cause	Measure
Cannot be powered on.	The power cord is disconnected. The plug is not securely connected to the inlet.	Connect the power cord correctly.
	The power switch is not pressed securely.	Hold down the power switch for three seconds or more.
The initialization screen is not finished even when ten minutes or more have passed after the power on.		Turn off the power once, and turn on it again. If you have the same state after that, immediately turn off the power, and contact an Anritsu Service and Sales office.
Nothing is displayed on the screen.	The command to set the screen display to Off has been sent with the remote control.	Send the command to set the screen display to On.
Parameters cannot be set.	Knob Hold has been set.	Press  on the screen to cancel Knob Hold.
	The remote control mode has been enabled.	Press  to switch to the local control mode.
	The parameter stands out of the specified range.	Set the parameter with the value within the specified range.
	The setting condition is not met.	Check the parameter setting condition.
The function menu cannot be found.	It is displayed on another menu page.	Press  to switch the page.
	The displayed mode is different.	Switch to the mode which displays the menu to be set.
When the parameter is to be set, “Out of Range” is displayed.	The parameter stands out of the specified range.	Set the parameter with the value within the specified range.

Table 11.6-1 Troubleshooting (Cont'd)

Problem	Possible Cause	Measure
The remote control mode is not enabled with GPIB.	Remote control has been executed with Ethernet.	Disconnect Ethernet, press Local to switch to the local control mode, and then execute the connection with GPIB again.
	GPIB address is wrong.	Set the same GPIB address to the interface setup screen and the controller side.
	The GPIB cable is not connected correctly.	Connect the cable correctly based on the GPIB network condition.
	The GPIB board setup on the PC is not correct.	Refer to the GPIB board operation manual you use.
The remote control mode is not enabled with Ethernet.	Remote control has been executed with GPIB.	Disconnect GIPB, press Local to switch to the local control mode, and then execute the connection with Ethernet again.
	The port number is wrong.	Set the same port number to the interface setup screen and the PC.
	The LAN cable type you use is wrong.	Select the cable correctly according to the connection method. Refer to "E.2.2 Connection by Ethernet".
	The LAN cable is not connected correctly.	Connect the cable correctly based on the Ethernet network condition.
	The LAN board setup on the PC is not correct.	Refer to the LAN board operation manual you use.
The connection to IQproducer™ by LAN is unavailable.	IP address is wrong.	Set the same IP address to the interface setup screen and the IQproducer™ side.
	The User ID or password is wrong.	Set the same user ID/password to the interface setup screen and the IQproducer™ side.
A waveform pattern is not displayed on the Waveform List to Play list in Baseband Mode.	The waveform pattern has not been loaded to the memory.	Load the waveform pattern to the memory. Refer to 7.3.4 "Loading waveform pattern: Load".
A waveform pattern cannot be loaded to the memory.	The license key has not been installed.	Install the license key which corresponds to each pattern. Refer to 9.4.4 "Install".
A signal is not output from the RF output.	The RF output is Off.	Press On/Off to switch the RF output to On.
A modulated signal is not output from the RF output.	The modulation is Off.	Press Mod On/Off to switch the RF output modulation to On.

Table 11.6-1 Troubleshooting (Cont'd)

Problem	Possible Cause	Measure
A modulated signal is not output from the I/Q output.	I/Q output is Off.	Press I/Q to enable the I/Q setting mode and switch the I/Q Output to "Analog I/Q Out". Refer to 7.6 "IQ Modulation".
The BER measurement does not operate normally.	The connected connector is wrong.	Connect to the correct connector according to the type of the signal to be input.
UNLOCK is displayed.	When Ref Source is Auto	Check if the reference signal input externally is correct.
	When Baseband Clock Source is Ext	Check if the Baseband Clock signal input externally is correct.
	Cases other than the above	The MG3710A/MG3710E/MG3740A may be broken. Contact an Anritsu Service and Sales office.
NG is displayed to [0] REF with Alarm History.	Failure in circuit	The MG3710A/MG3710E/MG3740A may be broken. Contact an Anritsu Service and Sales office.
ALC is displayed. NG is displayed to [2] ALC with Alarm History.	When using the MG3710A/MG3710E/MG3740A beyond the range of the product specification (output level accuracy)	The output level may not have reached the specified value. Change the setting so that the specified output level accuracy can be obtained.
	When using the MG3710A/MG3710E/MG3740A within the range of the product specification (output level accuracy)	The MG3710A/MG3710E/MG3740A may be broken. Contact an Anritsu Service and Sales office.
NG is displayed to [3] BB with Alarm History.	Failure in circuit	The MG3710A/MG3710E/MG3740A may be broken. Contact an Anritsu Service and Sales office.
NG is displayed to [4] RPP with Alarm History.	High-level RF signal has been input to the RF Output terminal externally.	Check for the output level of connected devices, cable disconnection, short, and impedance inconsistency. Refer to 3.3.10 "RPP".
BBDAC is displayed.	Clipping by over flow has occurred with Baseband DAC or digital block.	Lower the RMS Value Tuning setting.
EXTMOD is displayed.	The level of signal input to the External Modulation Input connector is greater than 2.03 Vp-p.	Decrease the level of signal input to the External Modulation Input connector to 2 Vp-p or less.
	The level of signal input to the External Modulation Input connector is not greater than 2.03 Vp-p.	The MG3710A/MG3710E/MG3740A may be broken. Contact an Anritsu Service and Sales office.

A.1 Electrical Characteristics

Typ. value is not the guaranteed performance with this specification; it is for reference.
Nominal values are not guaranteed.

It is a common specification for MG3710A, MG3710E and MG3740A (hereafter "MG3710A/10E/40A"), if not specified.

<Conditions>

Unless otherwise noted, function and performance are specified in the following conditions.	
Common to CW mode and modulation mode	Measurement at a constant ambient temperature, after a warm up of 30 minutes Pulse modulation: Off ATT Hold: Off Optimize S/N Mode: Off In the frequency range over 2.7 GHz, this condition is applied only when MG3710A/10E/40A-034/036 (or 064/066/164/166 for 2nd SG) is installed. At frequencies over 4 GHz, this condition applies only when the MG3710A/10E/40A-036 (2nd SG is 066/166) is installed.
Only in modulation mode	Assuming that the RMS value of the waveform pattern is RMSw [linear value], the following must be met: –3.00 dB ≤ RMSnom ≤ +3.00 dB Exceptions: RMSnom = 20・log (RMSw/4628) (when specified in 16 bit data) RMSnom = 20・log (RMSw/2314) (when specified in 15 bit data) RMSnom = 20・log (RMSw/1157) (when specified in 14 bit data) After CAL execution All the above are also applied to 2nd SG (MG3710A/10E/40A-062/064/066/162/164/166).

<Frequency>

Items	Specifications
Range	
1st SG	9 kHz to 2.7 GHz (MG3710A/10E/40A-032) 9 kHz to 4 GHz (MG3710A/10E/40A-034) 9 kHz to 6 GHz (MG3710A/10E/40A-036)
2nd SG	9 kHz to 2.7 GHz (MG3710A/10E/40A-062/162) 9 kHz to 4 GHz (MG3710A/10E/40A-064/164) 9 kHz to 6 GHz (MG3710A/10E/40A-066/166)
Resolution	0.01 Hz
Phase adjustment	
Setting range	–180.00 deg to 180.00 deg
Resolution	0.01 deg
Frequency switching time	Under the condition of frequency > 187.5 MHz, Phase Noise Optimize: Offset < 200 kHz, this is defined as the period from the detection of a List function execution trigger to the time when the frequency falls within ±0.1 ppm or 100 Hz tolerance of the final target value. When MG3710A/10E/40A-041/141 or MG3710A/10E/40A-071/171 not installed and output level ≤ +7 dBm: ≤ 600 μs
Internal reference oscillator	
	When MG3710A/10E/40A-001/101/002/102 is not installed:
Aging rate	$\pm 1 \times 10^{-6}$/year
Temperature stability	$\pm 2.5 \times 10^{-6}$ (5 to 45 °C)
	When MG3710A/10E/40A-001/101 is installed:
Aging rate	$\pm 1 \times 10^{-10}$/month
Temperature stability	$\pm 2 \times 10^{-9}$ (5 to 45 °C)
Activation characteristics	Based on frequency 24 hours after power application, at 23 °C $\pm 1 \times 10^{-9}$ (7.5 minutes after power application)
	When MG3710A/10E/40A-002/102 is installed:
Aging rate	$\pm 1 \times 10^{-7}$/year
Temperature stability	$\pm 2 \times 10^{-8}$ (5 to 45 °C)
Activation characteristics	Based on frequency 24 hours after power application, at 23 °C $\pm 5 \times 10^{-7}$ (2 minutes after power application) $\pm 5 \times 10^{-8}$ (5 minutes after power application)

<Output level>

Items	Specifications
Setting range	1st SG: MG3710A/10E/40A-043/143 not installed, 2nd SG: MG3710A/10E/40A-073/173 not installed 1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 not installed, 2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 not installed –110 dBm to +17 dBm 1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed, 2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed –110 dBm to +30 dBm 1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed, 2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed –144 dBm to +17 dBm 1st SG: MG3710A/10E/40A-041/141 installed, 042/142 installed, 2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 installed –144 dBm to +30 dBm 1st SG: MG3710A/10E/40A-043/143 installed, 2nd SG: MG3710A/10E/40A-073/173 installed 1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 not installed, 2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 not installed –110 dBm to +17 dBm 1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed, 2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed –110 dBm to +25 dBm 1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed, 2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed –144 dBm to +17 dBm 1st SG: MG3710A/10E/40A-041/141 installed, 042/142 installed, 2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 installed –144 dBm to +25 dBm
Resolution	0.01 dB
Unit Unit of electrical power Unit of voltage	 dBm dBμV (terminal voltage display) and dBμVemf (open voltage display)
Level switching time	Under the condition of frequency > 187.5 MHz, within the specification range of output level accuracy. However, output level ≤ +7 dBm when MG3710A/10E/40A-041/141 or MG3710A/10E/40A-071/171 not installed: This is defined as the period from the detection of a List function execution trigger to the time when the frequency falls within ±0.2 dB tolerance of the final target value. ≤ 600 μs

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Accuracy</td><td>CW, at 18 to 28 °C
1st SG: MG3710A/10E/40A-043/143 not installed,
2nd SG: MG3710A/10E/40A-073/173 not installed
1st SG: MG3710A/10E/40A-041/141/042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 not installed
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th></th><th>100 kHz ≤, < 1 MHz</th></tr>
<tr><td>–100 dBm <, ≤ +5 dBm</td><td></td><td>±0.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>1 MHz ≤, < 10 MHz</th><th>10 MHz ≤, < 50 MHz</th></tr>
<tr><td>+5 dBm <, ≤ +10 dBm</td><td></td><td>±0.7 dB typ.</td></tr>
<tr><td>–110 dBm <, ≤ +5 dBm</td><td>±0.5 dB typ.</td><td>±0.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>+1 dBm ≤, ≤ +13 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–110 dBm <, ≤ –40 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 5 GHz</th></tr>
<tr><td>+11 dBm <, ≤ +13 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>+1 dBm ≤, ≤ +11 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>5 GHz<, ≤6 GHz</th><th></th></tr>
<tr><td>+1 dBm ≤, ≤ +11 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td></td></tr>
</table>
</td></tr>
</table>

<Output level> Cont'd

Items	Specifications
Accuracy	1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed, 2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed

Level	Frequency	
		100 kHz ≤, < 1 MHz
–100 dBm <, ≤ +5 dBm		±0.5 dB typ.

Level	Frequency	
	1 MHz ≤, < 10 MHz	10 MHz ≤, < 50 MHz
+5 dBm <, ≤ +10 dBm		±0.7 dB typ.
–110 dBm <, ≤ +5 dBm	±0.5 dB typ.	±0.5 dB typ.

Level	Frequency	
	50 MHz ≤, < 400 MHz	400 MHz ≤, ≤ 3 GHz
+20 dBm <, ≤ +23 dBm		±0.6 dB
+13 dBm <, ≤ +20 dBm	±0.6 dB	±0.6 dB
+1 dBm ≤, ≤ +13 dBm	±0.5 dB	±0.5 dB
–40 dBm <, < +1 dBm	±0.5 dB	±0.5 dB
–110 dBm <, ≤ –40 dBm	±0.5 dB	±0.5 dB

Level	Frequency	
	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 5 GHz
+13 dBm <, ≤ +20 dBm	±0.7 dB	
+11 dBm <, ≤ +13 dBm	±0.7 dB	±0.8 dB
+1 dBm ≤, ≤ +11 dBm	±0.7 dB	±0.8 dB
–40 dBm <, < +1 dBm	±0.7 dB	±0.8 dB
–100 dBm <, ≤ –40 dBm	±0.7 dB	±0.8 dB
–110 dBm <, ≤ –100 dBm	±0.7 dB	±0.8 dB

Level	Frequency	
	5 GHz <, ≤ 6 GHz	
+1 dBm ≤, ≤ +11 dBm	±0.8 dB	
–40 dBm <, < +1 dBm	±0.8 dB	
–100 dBm <, ≤ –40 dBm	±0.8 dB	
–110 dBm <, ≤ –100 dBm	±0.8 dB	

<Output level> Cont'd

Items	Specifications
Accuracy	1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed, 2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed

Level	Frequency	
		100 kHz ≤, < 1 MHz
–100 dBm <, ≤ +5 dBm		±0.5 dB typ.

Level	Frequency	
	1 MHz ≤, < 10 MHz	10 MHz ≤, < 50 MHz
+5 dBm <, ≤ +10 dBm		±0.7 dB typ.
–120 dBm <, ≤ +5 dBm	±0.5 dB typ.	±0.5 dB typ.

Level	Frequency	
	50 MHz ≤, < 400 MHz	400 MHz ≤, ≤ 3 GHz
+1 dBm ≤, ≤ +13 dBm	±0.5 dB	±0.5 dB
–40 dBm <, < +1 dBm	±0.5 dB	±0.5 dB
–110 dBm <, ≤ –40 dBm	±0.5 dB	±0.5 dB
–120 dBm <, ≤ –110 dBm	±0.5 dB	±0.5 dB
–127 dBm <, ≤ –120 dBm	±0.7 dB	±0.7 dB
–136 dBm <, ≤ –127 dBm	±1.5 dB typ.	±1.5 dB typ.

Level	Frequency	
	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 5 GHz
+11 dBm <, ≤ +13 dBm	±0.7 dB	±0.8 dB
+1 dBm ≤, ≤ +11 dBm	±0.7 dB	±0.8 dB
–40 dBm <, < +1 dBm	±0.7 dB	±0.8 dB
–100 dBm <, ≤ –40 dBm	±0.7 dB	±0.8 dB
–110 dBm <, ≤ –100 dBm	±0.7 dB	±0.8 dB
–120 dBm <, ≤ –110 dBm	±0.7 dB	±1.0 dB
–127 dBm <, ≤ –120 dBm	±2.5 dB typ.	±2.5 dB typ.

Level	Frequency	
	5 GHz <, ≤ 6 GHz	
+1 dBm ≤, ≤ +11 dBm	±0.8 dB	
–40 dBm <, < +1 dBm	±0.8 dB	
–100 dBm <, ≤ –40 dBm	±0.8 dB	
–110 dBm <, ≤ –100 dBm	±0.8 dB	
–120 dBm <, ≤ –110 dBm	±1.0 dB	
–127 dBm <, ≤ –120 dBm	±2.5 dB typ.	

<Output level> Cont'd

Items	Specifications
Accuracy	1st SG: MG3710A/10E/40A-041/141/042/142 installed, 2nd SG: MG3710A/10E/40A-071/171/072/172 installed

Level	Frequency	
		100 kHz ≤, < 1 MHz
–100 dBm <, ≤ +5 dBm		±0.5 dB typ.

Level	Frequency	
	1 MHz ≤, < 10 MHz	10 MHz ≤, < 50 MHz
+5 dBm <, ≤ +10 dBm		±0.7 dB typ.
–120 dBm <, ≤ +5 dBm	±0.5 dB typ.	±0.5 dB typ.

Level	Frequency	
	50 MHz ≤, < 400 MHz	400 MHz ≤, ≤ 3 GHz
+20 dBm <, ≤+23 dBm		±0.6 dB
+13 dBm <, ≤ +20 dBm	±0.6 dB	±0.6 dB
+1 dBm ≤, ≤ +13 dBm	±0.5 dB	±0.5 dB
–40 dBm <, < +1 dBm	±0.5 dB	±0.5 dB
–110 dBm <, ≤ –40 dBm	±0.5 dB	±0.5 dB
–120 dBm <, ≤ –110 dBm	±0.5 dB	±0.5 dB
–127 dBm <, ≤ –120 dBm	±0.7 dB	±0.7 dB
–136 dBm <, ≤ –127 dBm	±1.5 dB typ.	±1.5 dB typ.

Level	Frequency	
	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 5 GHz
+13 dBm <, ≤ +20 dBm	±0.7 dB	
+11 dBm <, ≤ +13 dBm	±0.7 dB	±0.8 dB
+1 dBm ≤, ≤ +11 dBm	±0.7 dB	±0.8 dB
–40 dBm <, < +1 dBm	±0.7 dB	±0.8 dB
–100 dBm <, ≤ –40 dBm	±0.7 dB	±0.8 dB
–110 dBm <, ≤ –100 dBm	±0.7 dB	±0.8 dB
–120 dBm <, ≤ –110 dBm	±0.7 dB	±1.0 dB
–127 dBm <, ≤ –120 dBm	±2.5 dB typ.	±2.5 dB typ.

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Accuracy</td><td>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>5 GHz <, ≤ 6 GHz</th><th></th></tr>
<tr><td>+1 dBm ≤, ≤ +11 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–120 dBm <, ≤ –110 dBm</td><td>±1.0 dB</td><td></td></tr>
<tr><td>–127 dBm <, ≤ –120 dBm</td><td>±2.5 dB typ.</td><td></td></tr>
</table>
1st SG: MG3710A/10E/40A-043/143 installed,
2nd SG: MG3710A/10E/40A-073/173 installed

1st SG: MG3710A/10E/40A-041/141/042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 not installed
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th></th><th>100 kHz ≤, < 1 MHz</th></tr>
<tr><td>–100 dBm <, ≤ +2 dBm</td><td></td><td>±0.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>1 MHz ≤, < 10 MHz</th><th>10 MHz ≤, < 50 MHz</th></tr>
<tr><td>+2 dBm <, ≤ +7 dBm</td><td></td><td>±0.7 dB typ.</td></tr>
<tr><td>–110 dBm <, ≤ +2 dBm</td><td>±0.5 dB typ.</td><td>±0.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>–2 dBm ≤, ≤ +10 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–110 dBm <, ≤ –40 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 5 GHz</th></tr>
<tr><td>+8 dBm <, ≤ +10 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–2 dBm ≤, ≤ +8 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td>±0.8 dB</td></tr>
</table>
</td></tr>
</table>

<Output level> Cont'd

Items	Specifications
Accuracy	

Level	Frequency	
	5 GHz <, ≤ 6 GHz	
–2 dBm ≤, ≤ +8 dBm	±0.8 dB	
–40 dBm<, < –2 dBm	±0.8 dB	
–100 dBm<, ≤ –40 dBm	±0.8 dB	
–110 dBm<, ≤ –100 dBm	±0.8 dB	

1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed

Level	Frequency	
		100 kHz ≤, < 1 MHz
–100 dBm <, ≤ +2 dBm		±0.5 dB typ.

Level	Frequency	
	1 MHz ≤, < 10 MHz	10 MHz ≤, < 50 MHz
+2 dBm <, ≤ +7 dBm		±0.7 dB typ.
–110 dBm <, ≤ +2 dBm	±0.5 dB typ.	±0.5 dB typ.

Level	Frequency	
	50 MHz ≤, < 400 MHz	400 MHz ≤, ≤ 3 GHz
+17 dBm <, ≤ +20 dBm		±0.6 dB
+10 dBm <, ≤ +17 dBm	±0.6 dB	±0.6 dB
–2 dBm ≤, ≤ +10 dBm	±0.6 dB	±0.5 dB
–40 dBm <, < – 2 dBm	±0.5 dB	±0.5 dB
–110 dBm <, ≤ –40 dBm	±0.5 dB	±0.5 dB

Level	Frequency	
	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 5 GHz
+10 dBm <, ≤ +17 dBm	±0.7 dB	
+8 dBm <, ≤ +10 dBm	±0.7 dB	±0.8 dB
–2 dBm ≤, ≤ +8 dBm	±0.7 dB	±0.8 dB
–40 dBm <, < –2 dBm	±0.7 dB	±0.8 dB
–100 dBm <, ≤ –40 dBm	±0.7 dB	±0.8 dB
–110 dBm <, ≤ –100 dBm	±0.7 dB	±0.8 dB

<Output level> Cont'd

Items: Accuracy

Specifications

Level	Frequency	
	5 GHz <, ≤ 6 GHz	
–2 dBm ≤, ≤ +8 dBm	±0.8 dB	
–40 dBm <, < –2 dBm	±0.8 dB	
–100 dBm <, ≤ –40 dBm	±0.8 dB	
–110 dBm <, ≤ –100 dBm	±0.8 dB	

1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed,
2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed

Level	Frequency	
		100 kHz ≤, < 1 MHz
–100 dBm <, ≤ +2 dBm		±0.5 dB typ.

Level	Frequency	
	1 MHz ≤, < 10 MHz	10 MHz ≤, < 50 MHz
+2 dBm <, ≤ +7 dBm		±0.7 dB typ.
–120 dBm <, ≤ +2 dBm	±0.5 dB typ.	±0.5 dB typ.

Level	Frequency	
	50 MHz ≤, < 400 MHz	400 MHz ≤, ≤ 3 GHz
–2 dBm ≤, ≤ +10 dBm	±0.5 dB	±0.5 dB
–40 dBm <, < –2 dBm	±0.5 dB	±0.5 dB
–110 dBm <, ≤ –40 dBm	±0.5 dB	±0.5 dB
–120 dBm <, ≤ –110 dBm	±0.5 dB	±0.7 dB
–127 dBm <, ≤ –120 dBm	±0.7 dB	±1.0 dB
–136 dBm <, ≤ –127 dBm	±1.5 dB typ.	±1.5 dB typ.

Level	Frequency	
	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 5 GHz
+8 dBm <, ≤ +10 dBm	±0.7 dB	±0.8 dB
–2 dBm ≤, ≤ +8 dBm	±0.7 dB	±0.8 dB
–40 dBm <, < –2 dBm	±0.7 dB	±0.8 dB
–100 dBm <, ≤ –40 dBm	±0.7 dB	±0.8 dB
–110 dBm <, ≤– 100 dBm	±0.8 dB	±0.8 dB
–120 dBm <, ≤– 110 dBm	±1.0 dB	±1.0 dB
–127 dBm <, ≤ –120 dBm	±2.5 dB typ.	±2.5 dB typ.

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Accuracy</td><td>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>5 GHz <, ≤ 6 GHz</th><th></th></tr>
<tr><td>–2 dBm ≤, ≤ +8 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–120 dBm <, ≤ –110 dBm</td><td>±1.0 dB</td><td></td></tr>
<tr><td>–127 dBm <, ≤ –120 dBm</td><td>±2.5 dB typ.</td><td></td></tr>
</table>
1st SG: MG3710A/10E/40A-041/141/042/142 installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 installed
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th></th><th>100 kHz≤, <1 MHz</th></tr>
<tr><td>–100 dBm <, ≤ +2 dBm</td><td></td><td>±0.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>1 MHz ≤, < 10 MHz</th><th>10 MHz ≤, < 50 MHz</th></tr>
<tr><td>+2 dBm <, ≤ +7 dBm</td><td></td><td>±0.7 dB typ.</td></tr>
<tr><td>–120 dBm <, ≤ +2 dBm</td><td>±0.5 dB typ.</td><td>±0.5 dB typ.</td></tr>
</table>
</td></tr>
</table>

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Accuracy</td><td>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>+17 dBm <, ≤ +20 dBm</td><td></td><td>±0.6 dB</td></tr>
<tr><td>+10 dBm <, ≤ +17 dBm</td><td>±0.6 dB</td><td>±0.6 dB</td></tr>
<tr><td>–2 dBm ≤, ≤ +10 dBm</td><td>±0.6 dB</td><td>±0.5 dB</td></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–110 dBm <, ≤ –40 dBm</td><td>±0.5 dB</td><td>±0.5 dB</td></tr>
<tr><td>–120 dBm <, ≤ –110 dBm</td><td>±0.5 dB</td><td>±0.7 dB</td></tr>
<tr><td>–127 dBm <, ≤ –120 dBm</td><td>±0.7 dB</td><td>±1.0 dB</td></tr>
<tr><td>–136 dBm <, ≤ –127 dBm</td><td>±1.5 dB typ.</td><td>±1.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 5 GHz</th></tr>
<tr><td>+10 dBm <, ≤ +17 dBm</td><td>±0.7 dB</td><td></td></tr>
<tr><td>+8 dBm <, ≤ +10 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–2 dBm ≤, ≤ +8 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.7 dB</td><td>±0.8 dB</td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td>±0.8 dB</td></tr>
<tr><td>–120 dBm <, ≤ –110 dBm</td><td>±1.0 dB</td><td>±1.0 dB</td></tr>
<tr><td>–127 dBm <, ≤ –120 dBm</td><td>±2.5 dB typ.</td><td>±2.5 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>5 GHz <, ≤ 6 GHz</th><th></th></tr>
<tr><td>–2 dBm <, ≤ +8 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–40 dBm <, ≤ –2 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.8 dB</td><td></td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.8 dB</td><td></td></tr>
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</table>
</td></tr>
</table>

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Linearity</td><td>
CW, at 18 to 28°C

1st SG: MG3710A/10E/40A-043/143 not installed,
2nd SG: MG3710A/10E/40A-073/173 not installed

1st SG: MG3710A/10E/40A-041/141/042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 not installed
Reference: –7 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.2 dB typ.</td><td>±0.2 dB typ.</td></tr>
<tr><td>–110 dBm <, ≤ –40 dBm</td><td>±0.2 dB typ.</td><td>±0.2 dB typ.</td></tr>
</table>
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 6 GHz</th></tr>
<tr><td>–40 dBm <, < +1 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
</table>

1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed
Reference: –7 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
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</table>

<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Linearity</td><td>
1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed,
2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed
Reference: –7 dBm
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1st SG: MG3710A/10E/40A-041/141/042/142 installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 installed
Reference: –7 dBm
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<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
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<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Linearity</td><td>
1st SG: MG3710A/10E/40A-043/143 installed,
2nd SG: MG3710A/10E/40A-073/173 installed

1st SG: MG3710A/10E/40A-041/141/042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 not installed
Reference: –10 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.2 dB typ.</td><td>±0.2 dB typ.</td></tr>
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<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 6 GHz</th></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
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<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.4 dB typ.</td><td>±0.4 dB typ.</td></tr>
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1st SG: MG3710A/10E/40A-041/141 installed, 042/142 not installed,
2nd SG: MG3710A/10E/40A-071/171 installed, 072/172 not installed
Reference: –10 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.2 dB typ.</td><td>±0.2 dB typ.</td></tr>
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<tr><td>–40 dBm <, < –2 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
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<Output level> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Linearity</td><td>
1st SG: MG3710A/10E/40A-041/141 not installed, 042/142 installed,
2nd SG: MG3710A/10E/40A-071/171 not installed, 072/172 installed
Reference: –10 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
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<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 6 GHz</th></tr>
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<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.4 dB typ.</td><td>±0.4 dB typ.</td></tr>
</table>
1st SG: MG3710A/10E/40A-041/141/042/142 installed,
2nd SG: MG3710A/10E/40A-071/171/072/172 installed
Reference: –10 dBm
<table>
<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>50 MHz ≤, < 400 MHz</th><th>400 MHz ≤, ≤ 3 GHz</th></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.2 dB typ.</td><td>±0.2 dB typ.</td></tr>
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<tr><th rowspan="2">Level</th><th colspan="2">Frequency</th></tr>
<tr><th>3 GHz <, ≤ 4 GHz</th><th>4 GHz <, ≤ 6 GHz</th></tr>
<tr><td>–40 dBm <, < –2 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
<tr><td>–100 dBm <, ≤ –40 dBm</td><td>±0.3 dB typ.</td><td>±0.3 dB typ.</td></tr>
<tr><td>–110 dBm <, ≤ –100 dBm</td><td>±0.4 dB typ.</td><td>±0.4 dB typ.</td></tr>
</table>
</td></tr>
</table>

<ATT Hold>

Items	Specifications
ATT Hold function	When ATT Hold is turned on, level adjustment of continuous signal generation is available. Setting Range: –10 dB to +10 dB. (However, each upper and lower limit of the adjustment range is restricted by the signal output range.) Resolution: 0.01 dB

<Output connector>

Items	Specifications
Connector	Front panel, RF Output, 2nd RF Output (Opt), N-J connector, 50 Ω
VSWR	1st SG: MG3710A/10E/40A-043/143 not installed, 2nd SG: MG3710A/10E/40A-073/173 not installed

Level	Frequency		
	50 MHz ≤, ≤ 3 GHz	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 6 GHz
≤ –7 dBm	≤ 1.45	≤ 1.65	≤ 1.9

1st SG: MG3710A/10E/40A-043/143 installed,
2nd SG: MG3710A/10E/40A-073/173 installed

Level	Frequency		
	50 MHz ≤, ≤ 3 GHz	3 GHz <, ≤ 4 GHz	4 GHz <, ≤ 6 GHz
≤ –10 dBm	≤ 1.45	≤ 1.65	≤ 1.9

<Maximum reverse input>

Items	Specifications
Maximum reverse input	
Maximum reverse input voltage	±50 V DC Max Common to 1st and 2nd SG
Maximum reverse input power	1st SG: MG3710A/10E/40A-043/143 not installed, 2nd SG: MG3710A/10E/40A-073/173 not installed 2 W (Nominal) 1st SG: MG3710A/10E/40A-043/143 installed, 2nd SG: MG3710A/10E/40A-073/173 installed 20 W (Nominal) (1 MHz < Reverse input power frequency ≤ 1 GHz) 20 W (Nominal) (1 GHz < Reverse input power frequency ≤ 2 GHz) 10 W (Nominal) (2 GHz < Reverse input power frequency ≤ 6 GHz)

<Signal purity>

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Harmonic spurious</td><td>
At CW, Optimize S/N = Off
1st SG: MG3710A/10E/40A-043/143 not installed,
2nd SG: MG3710A/10E/40A-073/173 not installed
1st SG: MG3710A/10E/40A-041/141 not installed,
2nd SG: MG3710A/10E/40A-071/171 not installed
<table>
<tr><th rowspan="2">Level</th><th colspan="3">Frequency</th></tr>
<tr><th>10 MHz ≤, ≤ 3 GHz</th><th>3 GHz <</th><th></th></tr>
<tr><td>≤ +4 dBm</td><td>≤ –30 dBc</td><td>≤ –30 dBc</td><td></td></tr>
</table>
1st SG: MG3710A/10E/40A-041/141 installed,
2nd SG: MG3710A/10E/40A-071/171 installed
<table>
<tr><th rowspan="2">Level</th><th colspan="3">Frequency</th></tr>
<tr><th>10 MHz ≤, < 50 MHz</th><th>50 MHz ≤, ≤ 3 GHz</th><th>3 GHz <</th></tr>
<tr><td>≤ +4 dBm</td><td>≤ –30 dBc</td><td></td><td></td></tr>
<tr><td>≤ +12 dBm</td><td></td><td>≤ –30 dBc</td><td></td></tr>
<tr><td>≤ +4 dBm</td><td></td><td></td><td>≤ –30 dBc</td></tr>
</table>
</td></tr>
<tr><td></td><td>
CW, Optimize S/N = Off
1st SG: MG3710A/10E/40A-043/143 installed,
2nd SG: MG3710A/10E/40A-073/173 installed
1st SG: MG3710A/10E/40A-041/141 not installed,
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<tr><th rowspan="2">Level</th><th colspan="3">Frequency</th></tr>
<tr><th>10 MHz ≤, ≤ 3 GHz</th><th>3 GHz <</th><th></th></tr>
<tr><td>≤ +1 dBm</td><td>≤ –30 dBc</td><td>≤ –30 dBc</td><td></td></tr>
</table>
1st SG: MG3710A/10E/40A-041/141 installed,
2nd SG: MG3710A/10E/40A-071/171 installed
<table>
<tr><th rowspan="2">Level</th><th colspan="3">Frequency</th></tr>
<tr><th>10 MHz ≤, < 50 MHz</th><th>50 MHz ≤, ≤ 3 GHz</th><th>3 GHz <</th></tr>
<tr><td>≤ +1 dBm</td><td>≤ –30 dBc</td><td></td><td></td></tr>
<tr><td>≤ +9 dBm</td><td></td><td>≤ –30 dBc</td><td></td></tr>
<tr><td>≤ +1 dBm</td><td></td><td></td><td>≤ –30 dBc</td></tr>
</table>
</td></tr>
</table>

<Signal purity> Cont'd

Items	Specifications
Non-harmonic spurious	Under the conditions of –30 dBm ≤ output level ≤ +5 dBm, CW generation, 10 kHz or more frequency offset from the output frequency. < –62 dBc (–70 dBc typ.) (100 kHz ≤ frequency ≤ 187.5 MHz) < –68 dBc (–76 dBc typ.) (187.5 MHz < frequency ≤ 750 MHz) < –62 dBc (–76 dBc typ.) (750 MHz < frequency ≤ 1.5 GHz) < –56 dBc (–70 dBc typ.) (1.5 GHz < frequency ≤ 3 GHz) < –50 dBc (–64 dBc typ.) (3 GHz < frequency ≤ 6 GHz)
SSB phase noise	At Phase Noise Opt.: < 200 kHz, CW, 20 kHz offset: < –140 dBc/Hz (Nominal) (100 MHz) < –131 dBc/Hz typ. (1 GHz) < –125 dBc/Hz typ. (2 GHz)

<Analog modulation/Pulse modulation>

Items	Specifications
Optimize Function	• Spurious mode Mode to control spurious problem. Controls spurious generated by the modulator. • Distortion mode Mode to control distortion problem. Optimizes the setting automatically to avoid distortions. This mode can be used when the output frequency is 7 MHz or higher .
Amplitude Modulation	Available only for internal modulation. Specified only for the modulation onto CW. In MG3740A, Optimize Function is set to Distortion.
AM Depth Type	• Lin Displays the AM depth type in linear. • Exp Displays the AM depth type into the log format.
AM Depth	Range: 0 % to 100.0 %, Resolution: 0.1 %
AM Depth Error (MG3710A/10E)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m ≤ 90 %. < (3 % of the set value + 2 %) (Nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m ≤ 90 %. < (2 % of the set value + 1 %) (Nominal)
AM Depth Error (MG3740A)	Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m < 20 %. < (2 % of the set value + 1 %) (Nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and 20 % ≤ modulation ratio m ≤ 90 %. < (2 % of the set value + 1 %)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Amplitude Modulation (Cont'd)	
Distortion (MG3710A/10E)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 30 %. < 2 % (Nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 90 %. < 2.5 % (Nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 30 %. < 0.5 % (Nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 90 %. < 0.5 % (Nominal)
Distortion (MG3740A)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 7 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 30 %. < 2 % (Nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 7 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 90 %. < 2.5 % (Nominal) Under the conditions: peak level ≤ 4 dBm, 7 MHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 30 %. < 2 % Under the conditions: peak level ≤ 4 dBm, 7 MHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 90 %. < 2.5 % Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 30 %. < 1 %

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Amplitude Modulation (Cont'd)	
Distortion (MG3740A)	Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, after CAL execution, modulation rate = 1 kHz, AM Source = Sine, and modulation ratio m = 90 %. < 1 %
Modulation Frequency Response (MG3710A/10E)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1.5 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1.5 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Amplitude Modulation (Cont'd) Modulation Frequency Response (MG3740A)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1.5 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1.5 dB. 0.1 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1 dB. 0.1 Hz ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1 dB. 0.1 Hz ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Frequency Modulation	Available only for internal modulation. Specified only for the modulation onto CW. In MG3740A, Optimize Function is set to Distortion.
FM Deviation	Range: A value between 0 Hz and 40 MHz or the value of 50 MHz minus modulation rate, whichever is smaller. Resolution: 0.1 Hz
Deviation Accuracy (MG3710A/10E)	Under the conditions: output level≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and 20 Hz ≤ deviation ≤ 40 kHz. < (2 % of the set value + 20 Hz) (Nominal)
Deviation Accuracy (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and 20 Hz ≤ deviation ≤ 200 Hz. < (2 % of the set value + 20 Hz) (Nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Frequency Modulation (Cont'd)	
Deviation Accuracy (MG3740A)	Under the conditions: output level≤ 4 dBm, 250 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and 200 Hz ≤ deviation ≤ 40 kHz. (Deviation ÷ modulation rate) > 0.2: < (3 % of the set value + 20 Hz) < (1.26 % of the set value + 20 Hz) (typ.) (Deviation ÷ modulation rate) > 1.2: < (3 % of the set value + 20 Hz) < (1.84 % of the set value + 20 Hz) (typ.)
Distortion (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 22.5 kHz. < 0.5 % (Nominal) Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 3.5 kHz. < 1 % (Nominal)
Distortion (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency < 1 MHz + 2 × (modulation rate + 2 × deviation), after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 22.5 kHz. < 0.5 % (Nominal) Under the conditions: output level ≤ 4 dBm, 1 MHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 22.5 kHz. < 0.4 % Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency < 1 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 3.5 kHz. < 1 % (Nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Frequency Modulation (Cont'd)	
Distortion (MG3740A)	Under the conditions: output level ≤ 4 dBm, 1 MHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, FM Source = Sine, and deviation = 3.5 kHz. < 0.5 %
Modulation Frequency Response (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)
Modulation Frequency Response (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency < 10 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: Output level ≤ 4 dBm, 10 MHz ≤ frequency ≤ 2700 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Phase Modulation	Available only for internal modulation. Specified only for the modulation onto CW. In MG3740A, Optimize Function is set to Distortion.
PM Deviation	Range: A value between 0 rad and 160 rad or the value of 40 MHz divided by the modulation rate, whichever is smaller. Resolution: 0.001 rad
Deviation Accuracy (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, ϕM Source = Sine, and deviation ≤ 20 rad. < (2 % of the set value + 0.02 rad) (Nominal)
Deviation Accuracy (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, ϕM Source = Sine, and 0 < deviation ≤ 0.7 rad. < (2 % of the set value + 0.02 rad) (Nominal) Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, ϕM Source = Sine, and 0.7 < deviation ≤ 20 rad. < (3 % of the set value + 0.02 rad) < (1.84 % of the set value + 0.02 rad) (typ.)
Distortion	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, after CAL execution, modulation rate = 1 kHz, ϕM Source = Sine, and deviation = 20 rad. MG3710A/10E: < 0.2 % (Nominal) MG3740A: < 0.2 % (typ.)
Modulation Frequency Response (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, deviation = 2 rad, after CAL execution, and bandwidth within ±1 dB. 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)
Modulation Frequency Response (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, deviation = 2 rad, after CAL execution, and bandwidth within ±1 dB. 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
Pulse Modulation	
On/Off ratio	>70 dB (50 MHz ≤ Output frequency ≤ 3 GHz >60 dB (3 GHz < Output frequency ≤ 6 GHz
Minimum pulse width	1 μs (Nominal)
Rising/Falling time	≤ 50 ns (10 to 90 %) (Nominal)
Pulse repetition frequency	DC to 1 MHz (Duty 50 %)
External pulse modulation signal input	Rear panel AUX connector, TTL H = signal output/L = signal off
Internal modulation signal	
Waveform	Sine wave, Triangular wave, Square wave, Ramp wave (Positive or Negative)
Modulation rate	Sine wave: 0.01 Hz to 40 MHz or (50 MHz – FMDeviation) Triangular wave, Square wave, Ramp wave: 0.01 Hz to 4 MHz or (5 MHz - FMDeviation)
Frequency resolution	0.1 Hz
Phase	–180 deg to 180 deg
Phase resolution	0.1 deg
External modulation signal	When MG3710A/10E/40A-050/150/080/180 is installed and for 1st SG and 2nd SG respectively Specified only for the modulation onto CW. In MG3740A, Optimize Function is set to Distortion.
Modulation type	AM, FM, ϕM
Input Impedance	50 Ω/600 Ω/Hi-Z (100 kΩ/70 pF) (nominal)
Coupling	DC or AC is alternatively selectable.
Input level	For set value, 2 Vp-p (nominal)
Input Frequency	DC coupling: DC to 1 MHz (nominal) AC coupling: 20 Hz (typ.) to 1 MHz (nominal)
Simultaneous modulation	AM + FM AM + ϕM Internal 1 + Internal 2 Internal + External FM and ϕM cannot enabled simultaneously.

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
External modulation signal (Cont'd) Amplitude Modulation Frequency Response (MG3710A/10E)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1.5 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1.5 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate < 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate < 20 kHz (nominal)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
External modulation signal (Cont'd) Amplitude Modulation Frequency Response (MG3740A)	Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1.5 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 100 kHz ≤ frequency range < 98 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1.5 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 30 %, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.) AC coupling: 20 Hz ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.) Under the conditions: peak level ≤ 4 dBm, 98 MHz ≤ frequency range ≤ 2700 MHz, AM Depth Type = Lin, modulation ratio m = 90 %, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.) AC coupling: 20 Hz ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 100 kHz (typ.)

<Analog modulation/Pulse modulation> Cont'd

Items	Specifications
External modulation signal (Cont'd)	
Frequency Modulation Frequency Response (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency ≤ 2700 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)
Frequency Modulation Frequency Response (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation) ≤ frequency < 10 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal) Under the conditions: output level ≤ 4 dBm, 10 MHz ≤ frequency ≤ 2700 MHz, deviation = 40 kHz, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 200 kHz (typ.) AC coupling: 20 Hz ≤ modulation rate < 50 Hz (nominal) 50 Hz ≤ modulation rate ≤ 200 kHz (typ.)
Phase Modulation Frequency Response (MG3710A/10E)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, deviation = 2 rad, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate ≤ 20 kHz (nominal) AC coupling: 20 Hz ≤ modulation rate ≤ 20 kHz (nominal)
Phase Modulation Frequency Response (MG3740A)	Under the conditions: output level ≤ 4 dBm, 100 kHz + 2 × (modulation rate + 2 × deviation × modulation rate) ≤ frequency ≤ 2700 MHz, deviation = 2 rad, after CAL execution, and bandwidth within ±1 dB. DC coupling: DC ≤ modulation rate < 200 Hz (nominal) 200 Hz ≤ modulation rate ≤ 20 kHz (typ.) AC coupling: 20 Hz ≤ modulation rate < 200 Hz (nominal) 200 Hz ≤ modulation rate ≤ 20 kHz (typ.)

<Vector modulation>

Items	Specifications
Modulation Frequency Response 1st SG (MG3710A/10E)	At 18 to 28°C When MG3710A/10E-043/143 is not installed: Internal Channel Correction = On, Random signal of Bandwidth 160 MHz, Crest Factor 11 dB. Output level = –7 dBm At output frequency: 850 MHz/1.8 GHz/1.9 GHz/2.2 GHz, ±0.6 dB (At Center Frequency ±10 MHz) ±1.3 dB (At Center Frequency ±50 MHz) At output frequency: 3.5 GHz/5.8 GHz, ±0.6 dB (At Center Frequency ±10 MHz) ±1.9 dB (At Center Frequency ±50 MHz) When MG3710A/10E-043/143 is installed: Internal Channel Correction = On, Random signal of Bandwidth 160 MHz, Crest Factor 11 dB. Output level = –10 dBm At output frequency: 850 MHz/1.8 GHz/1.9 GHz/2.2 GHz, ±0.6 dB (At Center Frequency ±10 MHz) ±1.8 dB (At Center Frequency ±50 MHz) At output frequency: 3.5 GHz/5.8 GHz, ±0.6 dB (At Center Frequency ±10 MHz) ±2.4 dB (At Center Frequency ±50 MHz)
Modulation Frequency Response 2nd SG (MG3710A/10E)	Same as 1st SG (MG3710A/10E)

<Vector modulation> Cont'd

Items	Specifications
Vector accuracy 1st SG (MG3710A/10E)	At 18 to 28°C After CAL execution When MG3710A/10E-043/143 is not installed: When W-CDMA (Test Model 4) is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 2200 MHz, Output level ≤ +7 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.62 % (rms) (0.6 % (rms) typ.) When GSM is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +7 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.84° (rms) (0.8° (rms) typ.) When EDGE is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +7 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.84 % (rms) (0.8 % (rms) typ.) When LTE (20MHz Test Model 3.1) is modulated: Output frequency: 600 MHz to 2700 MHz, Output level ≤ +7 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.) Output frequency: 3400 MHz to 3800 MHz, Output level ≤ +4 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.) When MG3710A/10E-043/143 is installed: When W-CDMA (Test Model 4) is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 2200 MHz, Output level ≤ +4 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.62 % (rms) (0.6 % (rms) typ.) When GSM is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +4 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.84° (rms) (0.8° (rms) typ.)

<Vector modulation> Cont'd

Items	Specifications
Vector accuracy 1st SG (MG3710A/10E)	When EDGE is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 2200 MHz, Output level ≤ +4 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.84 % (rms) (0.8 % (rms) typ.) When LTE (20MHz Test Model 3.1) is modulated: Output frequency: 600 MHz to 2700 MHz, Output level ≤ +4 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.) Output frequency: 3400 MHz to 3800 MHz, Output level ≤ +1 dBm (When MG3710A/10E-041/141 is not installed), Output level ≤ +7 dBm (When MG3710A/10E-041/141 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.)
Vector accuracy 2nd SG (MG3710A/10E)	When MG3710A/10E-073/173 is not installed: When W-CDMA (Test Model 4) is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 2200 MHz, Output level ≤ +7 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.62 % (rms) (0.6 % (rms) typ.) When GSM is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +7 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.84° (rms) (0.8° (rms) typ.) When EDGE is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +7 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.84 % (rms) (0.8 % (rms) typ.) When LTE (20MHz Test Model 3.1) is modulated: Output frequency: 600 MHz to 2700 MHz, Output level ≤ +7 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +13 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.) Output frequency: 3400 MHz to 3800 MHz, Output level ≤ +4 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.)

<Vector modulation> Cont'd

Items	Specifications
Vector accuracy 2nd SG (MG3710A/10E)	When MG3710A/10E-073/173 is installed: When W-CDMA (Test Model 4) is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 2200 MHz, Output level ≤ +4 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.62 % (rms) (0.6 % (rms) typ.) When GSM is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +4 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.84° (rms) (0.8° (rms) typ.) When EDGE is modulated: Output frequency: 800 MHz to 900 MHz, 1800 MHz to 1900 MHz, Output level ≤ +4 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.84 % (rms) (0.8 % (rms) typ.) When LTE (20MHz Test Model 3.1) is modulated: Output frequency: 600 MHz to 2700 MHz, Output level ≤ +4 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +10 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.) Output frequency: 3400 MHz to 3800 MHz, Output level ≤ +1 dBm (When MG3710A/10E-071/171 is not installed), Output level ≤ +7 dBm (When MG3710A/10E-071/171 is installed), ≤ 0.82 % (rms) (0.8 % (rms) typ.)
Carrier leak	MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed Under the conditions of the temperature range between 18 °C and 28 °C, RMS Value = 0 dB, and after CAL execution. ≤ –55 dBc (100 MHz ≤ frequency < 4 GHz) ≤ –45 dBc (4 GHz ≤ frequency)
Image rejection	In MG3710A, MG3710E under the conditions of the temperature range between 18 °C and 28 °C, RMS Value = 0 dB, after CAL execution, and complex CW at 10MHz or less. ≤ –50 dBc (200 MHz ≤ frequency < 4 GHz) ≤ –43 dBc (4 GHz ≤ frequency) MG3740A with MG3740A-020/120 installed Under the conditions of the temperature range between 18 °C and 28 °C, RMS Value = 0 dB, after CAL execution, and complex CW at 1 MHz or less. ≤ –50 dBc (200 MHz ≤ frequency < 4 GHz) ≤ –43 dBc (4 GHz ≤ frequency)

<Vector modulation> Cont'd

Note:

When "E" label is put on the rear panel of MG3710A, the VSG revision number of the corresponding RF is 6 or later, and the performance of MG3710A is equal to that of MG3710E.
For how to confirm the revision numbers for VSG1 and VSG2, refer to Board Info in 9.4.3 "Instrument Info".

Items	Specifications
ACLR 1st SG (MG3710A) [When VSG1 Revision = 5 or earlier]	Under the conditions of the temperature between 18 °C and 28 °C and W-CDMA (Test Model 1 64DPCH) signal generation. When MG3710A-043/143 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –67 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 1st SG (MG3710A) [When VSG1 Revision = 6 or later]	When MG3710A-043/143 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710A-041/141 is not installed), Output level ≤ +5 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 1st SG (MG3710A) [When VSG1 Revision = 5 or earlier]	When MG3710A-043/143 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –67 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 1st SG (MG3710A) [When VSG1 Revision = 6 or later]	When MG3710A-043/143 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710A-041/141 is not installed), Output level ≤ +2 dBm (When MG3710A-041/041 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710A) [When VSG2 Revision = 5 or earlier]	When MG3710A-073/173 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –67 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710A) [When VSG2 Revision = 6 or later]	When MG3710A-073/173 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710A-071/171 is not installed), Output level ≤ +5 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710A) [When VSG2 Revision = 5 or earlier]	When MG3710A-073/173 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –71 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –67 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710A) [When VSG2 Revision = 6 or later]	When MG3710A-073/173 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710A-071/171 is not installed), Output level ≤ +2 dBm (When MG3710A-071/071 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 1st SG (MG3710E)	Under the conditions of the temperature between 18°C and 28°C and W-CDMA (Test Model 1 64DPCH) signal generation. When MG3710E-043/143 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710E-041/141 is not installed), Output level ≤ +5 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710E-041/141 is not installed), Output level ≤ +5 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710E-041/141 is not installed), Output level ≤ +5 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 1st SG (MG3710E)	When MG3710E-043/143 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency<2.2 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710E-041/141 is not installed), Output level ≤ +2 dBm (When MG3710E-041/041 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710E)	When MG3710E-073/173 is not installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –2 dBm (When MG3710E-071/171 is not installed), Output level ≤ +5 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –2 dBm (When MG3710E-071/171 is not installed), Output level ≤ +5 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –2 dBm (When MG3710E-071/171 is not installed), Output level ≤ +5 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz, Output level ≤ –2 dBm (When MG3710E-071/171 is not installed), Output level ≤ +5 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –2 dBm (When MG3710E-071/171 is not installed), Output level ≤ +5 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –2 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
ACLR 2nd SG (MG3710E)	When MG3710E-073/173 is installed: 300 MHz ≤ Output frequency < 800 MHz, Output level ≤ –5 dBm (When MG3710E-071/171 is not installed), Output level ≤ +2 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –70 dBc/3.84 MHz 800 MHz ≤ Output frequency < 1 GHz, Output level ≤ –5 dBm (When MG3710E-071/171 is not installed), Output level ≤ +2 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –70 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1 GHz ≤ Output frequency < 1.8 GHz, Output level ≤ –5 dBm (When MG3710E-071/171 is not installed), Output level ≤ +2 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –69 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 1.8 GHz ≤ Output frequency < 2.2 GHz Output level ≤ –5 dBm (When MG3710E-071/171 is not installed), Output level ≤ +2 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –68 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 2.2 GHz ≤ Output frequency ≤ 3.0 GHz, Output level ≤ –5 dBm (When MG3710E-071/171 is not installed), Output level ≤ +2 dBm (When MG3710E-071/071 is installed), 5 MHz offset: ≤ –65 dBc/3.84 MHz 10 MHz offset: ≤ –71 dBc/3.84 MHz 3.0 GHz < Output frequency ≤ 3.8 GHz, Output level ≤ –5 dBm 5 MHz offset: ≤ –63 dBc/3.84 MHz 10 MHz offset: ≤ –67 dBc/3.84 MHz

<Vector modulation> Cont'd

Items	Specifications
Level error from CW during vector modulation	Under the conditions of the temperature between 18°C and 28°C and AWGN signal of bandwidth = 5 MHz.
1st SG (MG3710A/10E)	When MG3710A/10E -043/143 is not installed: Output level < –5 dBm: ±0.3 dB (50 MHz ≤ Output frequency < 98 MHz) Output level < +1 dBm: ±0.2 dB (98 MHz ≤ Output frequency ≤ 3 GHz) ±0.2 dB (3 GHz < Output frequency ≤ 6 GHz) When MG3710A/10E -043/143 is installed: Output level < –5 dBm: ±0.3 dB (50 MHz ≤ Output frequency < 98 MHz) Output level < –2 dBm ±0.2 dB (98 MHz ≤ Output frequency ≤ 3 GHz) ±0.2 dB (3 GHz < Output frequency ≤ 6 GHz)
2nd SG (MG3710A/10E)	When MG3710A/10E -073/173 is not installed: Output level < –5 dBm: ±0.3 dB (50 MHz ≤ Output frequency < 98 MHz) Output level < +1 dBm: ±0.2 dB (98 MHz ≤ Output frequency ≤ 3 GHz) ±0.2 dB (3 GHz < Output frequency ≤ 6 GHz) When MG3710A/10E -073/173 is installed: Output level < –5 dBm: ±0.3 dB (50 MHz ≤ Output frequency < 98 MHz) Output level < –2 dBm ±0.2 dB (98 MHz ≤ Output frequency ≤ 3 GHz) ±0.2 dB (3 GHz < Output frequency ≤ 6 GHz)

<Vector modulation> Cont'd

Items	Specifications
IQ input/output	
Base band IQ adjustment	MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed
DC offset function	Range: –20.000 % to +20.000 % Resolution: 0.025 %
Gain balancing function	Range: –1.000 dB to +1.000 dB Resolution: 0.001 dB
IQ adjustment function	Range: –10.00 deg to +10.00 deg Resolution: 0.01 deg
IQ Phase adjustment function	Range: –360.00 deg to +360.00 deg Resolution: 0.01 deg
IQ Skew adjustment function	Range: –800.000 ns to +800.000 ns Resolution: 1 ps
IQ Delay adjustment function	Range: –400.000 ns to +400.000 ns Resolution: 1 ps
IQ input	When MG3710A/10E-018/118 is installed:
Modulation bandwidth	Base band 80 MHz (Nominal) RF 160 MHz (Nominal)
Input level	$\sqrt{I^2+Q^2}$ = 85 mV (rms) (optimum value of level accuracy)
DC offset function	Range: –100 mV to 100 mV Resolution: 1 mV
Input connector	Connector: Front panel, BNC-J connector (I Input, Q Input) Maximum input level: –1 V (peak) ≤ I, Q ≤ +1 V (peak) Impedance: 50 Ω (Nominal)

<Vector modulation> Cont'd

Items	Specifications
IQ output	When MG3710A/10E-018/118 is installed:
Output voltage range	Under open circuit output conditions, with output voltage amplitude +DC offset: –2.5 V to +5 V
DC offset function	Under an open circuited output conditions Inphase DC offset Range: –2.5 V to 5 V Resolution: 2 mV Differential DC offset Range: –50 mV to 50 mV Resolution: 0.1 mV
IQ adjustment function	Uses Baseband IQ adjustment function
Output connector	Connector: Rear panel, BNC-J connector (I Output/$\overline{I}$ Output, Q Output/$\overline{Q}$ Output) Impedance: 50 Ω (Nominal)

<Arbitrary waveform generator>

Items	Specifications
Waveform resolution	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed I/Q is 14, 15, or 16 bits
Modulation bandwidth	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed MG3710A/10E: 160 MHz Bandwidth MG3740A: 2 MHz Bandwidth (Over sampling rate = 4, the maximum number of Sampling rate = 8 MHz)
Reconstruction filter	In MG3710A, MG3710E or MG3740A with MG3740A-020/120 installed 80 MHz
Base band level adjustment	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed Input level adjustment capability of the quadrature modulator. (RMS Value Tuning) Decreasing a level leads to less distortion. Increasing a level leads to less floor noise. Adjustable range ±8 dB Resolution 0.01 dB
Marker output	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed In case of 14 bit resolution Three signals among waveform patterns or three signals generated in real-time. In case of 15 bit resolution One signal among waveform patterns or three signals generated in real-time. In case of 16 bit resolution Three signals generated in real-time. Toggling between positive logic pulse output and negative logic pulse output is available.

<Arbitrary waveform generator> Cont'd

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Internal Baseband Reference clock signal
Range
Resolution</td><td>In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed

20 kHz to 200 MHz
0.001 Hz</td></tr>
<tr><td>External Baseband Reference clock signal
Range
Divisional and multiplication function
Input connector
Input level
Others</td><td>When MG3710A/10E-017/117 is installed:

20 kHz to 50 MHz
A clock that is generated internally by multiplying the input frequency by 1, 2, 4, 8, 16, 1/2, 1/4, 1/8, and 1/16 can be used as the DAC sampling clock.
Rear panel, BNC-J connector (BB REF CLK Input)
≥ 0.2 Vp-p/50 Ω (AC coupling) (Nominal)
Function of External Input or MIMO connection (BB Ref Sync) is selectable.</td></tr>
<tr><td>Waveform memory

Memory capacity: 1st SG

Memory capacity: 2nd SG

Number of loadable files

Memory synthesizing function
1st SG

2nd SG</td><td>When the Memory synthesizing function is installed, both 1 ch and 2 ch must have the same capacity. A combination of different capacities is not available.
<table>
<tr><th>MG3710A/10E/40A -045/145</th><th>MG3710A/10E -046/146</th><th>Memory capacity</th></tr>
<tr><td>Not installed</td><td>Not installed</td><td>64 Msamples</td></tr>
<tr><td>Installed</td><td>Not installed</td><td>256 Msamples</td></tr>
<tr><td>Not installed</td><td>Installed</td><td>1024 Msamples</td></tr>
</table>
<table>
<tr><th>MG3710A/10E/40A -075/175</th><th>MG3710A/10E -076/176</th><th>Memory capacity</th></tr>
<tr><td>Not installed</td><td>Not installed</td><td>64 Msamples</td></tr>
<tr><td>Installed</td><td>Not installed</td><td>256 Msamples</td></tr>
<tr><td>Not installed</td><td>Installed</td><td>1024 Msamples</td></tr>
</table>
The following numbers of waveform patterns are available per wave memory:
4096 packages/wave memory
4096 patterns/package
The maximum number of patterns in total: 4096/wave memory
The minimum number of samples per pattern: 128

When MG3710A/10E/40A-048/148 is installed, this function synthesizes the contents of two channel memories to generate a baseband waveform.
When MG3710A/10E/40A-078/178 is installed, this function synthesizes the contents of two channel memories to generate a baseband waveform.</td></tr>
</table>

<Arbitrary waveform generator> Cont'd

Items	Specifications
Frequency offset	In MG3710A, MG3710E: ± (200 MHz × 0.8 – Wave form data bandwidth)/2 at the maximum When MG3740A-020/120 is installed: ± (8 MHz × 0.8 – Wave form data bandwidth)/2 at the maximum
Sequence function	In MG3710A, MG3710E or MG3740A with MG3740A-020/120 installed The following functions can be executed by selecting combination files. • Selecting a pattern switching method (manual or auto) • Selecting a pattern switching position (the termination of a frame or the termination of a pattern) • When the switching method is set to manual, the pattern can be switched upon the receipt of an external trigger signal. • Sequence restart function. • Maximum number of elements: 200 • Minimum number of points per pattern: 1000 Level ratio setting range level difference between two signals < 80 dB or OFF Level setting resolution 0.01 dB Frequency offset Frequency setting resolution 1 Hz
Pattern trigger	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed When the pattern for the functional sequence mode is used, the pattern can be switched upon receipt of an external trigger.
Input connector	Connector: Either of BNC-J connector (Start Frame TRIG Input, Pattern TRIG1 Input) or AUX connector on the rear panel can be used. Input level: TTL Logic: The polarity of rising or falling edge can be selected.
Trigger Input	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed Starts outputting waveform pattern in sync with trigger signal. Start trigger or frame trigger is alternatively selectable.
Start trigger	Used to start a waveform generation.
Frame trigger	In the burst waveform generation mode, this function is used to determine the timing of burst signal generation.
Trigger event	The following trigger events can be detected. No Retrigger/Buffered Trigger/Restart on Trigger
Input connector	Function switching: Start trigger or frame trigger can be selected at the connector. Connector: Either of BNC-J connector (Start Frame TRIG Input, Pattern TRIG1 Input) or AUX connector can be used. Input level: TTL Logic: The polarity of rising or falling edge can be selected.

<AWGN generating function>

Items	Specifications
AWGN generating function	
1st SG	When MG3710A/10E-049/149 is installed: Absolute value of CN ratio: ≤ 40 dB
2nd SG	When MG3710A/10E-079/179 is installed: Absolute value of CN ratio ≤ 40 dB
Band restriction filter	When MG3710A/10E-049/079/149/179 is installed: The band restriction of AWGN can be set in the following range. From 20 % to 80 % of waveform sampling rate

<Sweep/List function>

Items	Specifications
Sweep function	Frequency and level sweep can be set at 1000-point resolution.
List function	Sweeping points of both frequency and level can be set individually to 500 points.

<BER measurement function>

Items	Specifications
	When MG3710A/10E/40A-021/121 is installed:
Connector	Connector: Rear panel, AUX Connector Input level: TTL
Input signal	Data, Clock, Enable
Input bit rate	100 bps to 40 Mbps
Measurable patterns	PN,9, PN,1, PN,5, PN,0, PN,3, AL,0, AL,1, Repeat of "01" PN9fix, PN11fix, PN15fix, PN20fix, PN23fix, User Define
Synchronization establishing condition	
PN signal	PN order × 2 bits error free
PNfix signal	Establish the synchronization with PN signal by PN order × 2 bits error free, and then establish the synchronization with PNfix signal from the start bit of PNfix signal by PN order error free.
ALL0, ALL1, repetition of 01	10 bit error free
UserDefine	8 to 1024 bit (variable) error free A start bit to be used for detection of synchronization can also be selected.
Re-synchronization judgment	x/y: y = number of measurement bit: selectable among 500, 5000 and 50000 x = number of error bits among y bits: selectable in the range from 1 to y/2
Measurable bit	$\leq 2^{32}-1$ bit
Number of measurable error bits	$\leq 2^{32}-1$ bit
Measurement end condition	Number of measurement bits, number of measurement error bits
Automatic re-synchronization function	Can be toggled on and off.
Operation of re-synchronization	Can be selected Count Clear or Count Keep.
Measurement mode	Single, Endless, Continuous
Display	Status, Error, Error Rate, Error Count, SyncLoss Count, number of measurement bits
Alternating polarity function	Polarity of Data, Clock and/or Enable can be alternatively switched.
Measurement result clearing function	This function can start the measurement from 0 by clearing the measurement values while keeping synchronization during the BER measurement.

<Connector>

Items	Specifications
Output connector (RF Output)	Refer to <Output connector> for details.
Output connector (2nd RF Output)	When MG3710A/10E/40A- 062/064/066/162/164/166 is installed: Refer to <Output connector> for details.
Analog IQ input (I Input) (Q Input)	When MG3710A/10E-018/118 is installed: Refer to <Vector modulation>, IQ input for details.
Analog IQ output (I Input/I Input) (Q Input/Q Input)	When MG3710A/10E-062/064/066/162/164/166 is installed: Refer to <Vector modulation>, IQ output for details.
External reference input (REF Input)	
Connector	Rear panel, BNC-J, 50 Ω (Nominal)
Frequency	5 MHz/10 MHz/13 MHz
Operating range	±1 ppm
Input level	–15 dBm ≤ level ≤ +20 dBm, (AC coupling)
Reference signal output (Buffer Output)	
Connector	Rear panel, BNC-J, 50 Ω (Nominal)
Frequency	10 MHz
Output level	≥ 0 dBm (AC coupling)
Start Frame TRIG Input	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed
Connector	Rear panel, BNC-J connector
Output level	TTL
Marker1 Output	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed
Connector	Rear panel, BNC-J connector
Output level	TTL
Pattern TRIG1 Input	In MG3710A, MG3710E, or MG3740A with MG3740A-020/120 installed
Connector	Rear panel, BNC-J connector
Input level	TTL
BB REF CLK Input	When MG3710A/10E-017/117 is installed:
Connector	Rear panel, BNC-J, 50 Ω (Nominal)
Frequency	20 kHz to 50 MHz (for External Baseband Reference clock) 560 MHz to 800 MHz (for BB Ref Sync)
Input level	≥ 0.2 Vp-p, (Nominal) (AC coupling)
BB REF CLK Output	When MG3710A/10E-017/117 is installed:
Connector	Rear panel, BNC-J, 50 Ω (Nominal)
Frequency	560 MHz to 800 MHz
Output level	0.8 Vp-p, (Nominal) (AC coupling)

<Connector> Cont'd

Items	Specifications
Sweep Output	When MG3710A/10E/40A-017/117 is installed:
Connector	BNC-J at < 1 Ω (driving capability of up to 2 kΩ) on the rear panel
Output level	0 to 10 V (while 10V level sweep is being executed), 0/5 V (when Sweep Status is selected)
LO Input	When MG3710A/10E-017/117 is installed:
Connector	Rear panel, SMA-J, 50 Ω (Nominal)
Frequency	98 MHz to 6 GHz
Input level	–10 dBm ≤ level ≤ +1 dBm (Nominal) (AC coupling)
LO Output	When MG3710A/10E-017/117 is installed
Connector	Rear panel, SMA-J, 50 Ω (Nominal)
Frequency	98 MHz to 6 GHz
Output level	≤ +1 dBm (Nominal) (AC coupling) (Internal Lo output)
Additional Analog Modulation Input	When MG3710A/10E/40A-050/080/150/180 is installed:
Connector	Rear panel, BNC-J
Input impedance	50 Ω, 600 Ω, or Hi-Z (100 kΩ/70 pF) (Nominal)
Input level	For set value, 2 Vp-p (Nominal) Absolute maximum ratings: ±5 V
Remote control	Remote control functions from an external controller (excluding the power supply)
LAN	Ethernet (10/100/1000 Base-T)
Connector	Rear panel, RJ-45
GPIB	Compatible with IEEE488.2
Connector	IEEE488 bus connector on the rear panel
Interface function	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2
USB (B)	Compatible with USB2.0
Connector	Rear panel. USB-B Connector
USB	Compatible with USB2.0 Waveform hardcopy and parameter saving of this equipment onto USB compatible external devices are available.
Connector	Two ports of USB-A Connector on each of front panel and rear panel.
Monitor Output	
Connector	VGA compatible mini D-SUB 15 pin on the rear panel
AUX	Used for input/output of an auxiliary device when MG3710A/10E/40A-017/117/021/121 is installed.
Connector	Rear panel, 50 pins (DX10A-50S equivalent part) An AUX-BNC conversion cable is attached when MG3710A/10E/40A-017/117/021/121 is installed.
Input/Output level	TTL

<Display>

Items	Specifications
Display	XGA color LCD (resolution 1024 × 768) 8.4 inches (213 mm)

<General specification>

Items	Specifications
Dimensions and mass	
Dimensions	177 mm (h) × 426 mm (w) × 390 mm (d) (excluding protrusions)
Mass	≤ 13.7 kg (with MS3710A/10E/40A-032,034 or 036 installed; excludes all other options) ≤ 17 kg (with all options installed; MG3710A/10E-001, -002, -011, -017, -018, -021, -036, -041, -042, -043, -046, -048, -049, -050, -066, -071, -072, -073, -076, -078, -079, or MG3740A-001, -002, -011, -017, -020, -021, -036, -041, -042, -043, -045, -048, -050, -066, -071, -072, -073, -075, -078, -080)
Power supply	
Rated power voltage	AC 100 V to 120 V or 200 V to 240 V *
Rated frequency	50 to 60 Hz
Power consumption	≤ 350 VA (Including all options) 180VA (Nominal) (Including the following options but excluding other options: MG3710A/10E/40A-032, 034 or 036, and 041) 260VA (Nominal) (Including the following options but excluding other options: MG3710A/10E/40A-032, 034 or 036, 041, and 042; and MG3710A/10E/40A-062, 064 or 066, 071, and 072) 280VA (Nominal) (Including the following options but excluding other options: MG3710A/10E/40A-032, 034 or 036, 041, and 042; MG3710A/10E/40A-062, 064 or 066, 071, and 072; and 001, 021)
Temperature	
Operating temperature	5 to 45°C
Storage temperature	–20 to 60°C

*: Operating voltage: within the range of +10 % to –15 % from the rated voltage

<Environment performance>

Items	Specifications
Conducted interference	Conforms to EN 61326-1
Radiated interference	Conforms to EN 61326-1
Harmonic current emission	Conforms to EN 61000-3-2
Electrostatic Discharge	Conforms to EN 61326-1
Electromagnetic immunity	Conforms to EN 61326-1
First transient/burst	Conforms to EN 61326-1
Surge	Conforms to EN 61326-1
RF Conductive Immunity	Conforms to EN 61326-1
Power Frequency Magnetic Field Immunity	Conforms to EN 61326-1
Voltage drop / power supply interruption	Conforms to EN 61326-1

A.2 Options

<Option 001 Rubidium Reference Oscillator / Option 101 Rubidium Reference Oscillator Retrofit>

Items	Specifications
Model, Name	MG3710A-001, MG3710E-001, MG3740A-001 Rubidium Reference Oscillator MG3710A-101, MG3710E-101, MG3740A-101 Rubidium Reference Oscillator Retrofit
Intended Use	This option generates 10 MHz reference signal to enhance frequency stability. Refer to <Frequency>, Internal Rubidium Reference Oscillator for details.

<Option 002 High Stability Reference Oscillator / Option 102 High Stability Reference Oscillator Retrofit>

Items	Specifications
Model, Name	MG3710A-002, MG3710E-002, MG3740A-002 High Stability Reference Oscillator MG3710A-102, MG3710E-102, MG3740A-102 High Stability Reference Oscillator Retrofit
Intended Use	This option generates 10 MHz reference signal to enhance frequency stability. Refer to <Frequency>, Internal Rubidium Reference Oscillator for details.

<Option 011 2ndary HDD / Option 111 2ndary HDD Retrofit>

Items	Specifications
Model, Name	MG3710A-011, MG3710E-011, MG3740A-011 2ndary HDD MG3710A-111, MG3710E-111, MG3740A-111 2ndary HDD Retrofit
Intended Use	Adds a removable HDD for storage of user data.

<Option 014 Removable HDD, Win10 / Option 114 Removable HDD, Win10 Retrofit >

Items	Specifications
Model, Name	MG3710E-014, MG3740A-014 Removable HDD, Win10 MG3710E-114, MG3740A-114 Removable HDD, Win10 Retrofit
Intended Use	Removable HDD for storing user data of Windows 10 based products User-installable and removable HDD Used with inserted into the HDD/SSD slot on the rear panel

<Option 017 Universal Input/Output / Option 117 Universal Input/Output Retrofit>

Items	Specifications
Model, Name	MG3710A-017, MG3710E-017, MG3740A-017 Universal Input/Output MG3710A-117, MG3710E-117, MG3740A-117 Universal Input/Output Retrofit
Intended Use	Supplies the following interfaces. MG3710A, MG3710E: The interface for local signal synchronization to realize MIMO function Sweep Out signal AUX-BNC conversion cable. MG3740A: Sweep Out signal AUX-BNC conversion cable.

<Option 018 Analog IQ Input/Output / Option 118 Analog IQ Input/Output Retrofit>

Note:

This option cannot be installed in MG3740A.

Items	Specifications
Model, Name	MG3710A-018, MG3710E-018 Analog IQ Input/Output MG3710A-118, MG3710E-118 Analog IQ Input/Output Retrofit
Intended Use	Adds the analog I/Q input/output function. Refer to <IQ Input/Output>, IQ input, IQ output for details.

<Option 020 Digital Modulation / Option 120 Digital Modulation Retrofit>

Note:

This option cannot be installed in MG3710A, MG3710E.

Items	Specifications
Model, Name	MG3740A-020 Digital Modulation MG3740A-120 Digital Modulation Retrofit
Intended Use	Adds the digital modulation function to the analog signal generator. Refer to <Vector modulation> for details.

<Option 021 BER Test Function / Option 121 BER Test Function Retrofit>

Items	Specifications
Model, Name	MG3710A-021, MG3710E-021, MG3740A-021 BER Test Function MG3710A-121, MG3710E-121, MG3740A-121 BER Test Function Retrofit
Intended Use	Adds the BER measurement function. Refer to <BER measurement function> for details.

<Option 029 OS Upgrade to Windows 7>

Items	Specifications
Model, Name	MG3710A-029, MG3740A-029 OS Upgrade to Windows 7
Intended Use	Upgrades OS to Windows 7 Professional. According to the license restriction, this product is available only as a factory option.

<Option 032 1st RF 100 kHz to 2.7 GHz>

Items	Specifications
Model, Name	MG3710A-032, MG3710E-032, MG3740A-032 1st RF 100kHz to 2.7GHz This option cannot be retrofitted.
Intended Use	Supplies a specific 1st RF frequency range. Refer to <Frequency> for details.

<Option 034 1st RF 100 kHz to 4 GHz>

Items	Specifications
Model, Name	MG3710A-034, MG3710E-034, MG3740A-034 1st RF 100kHz to 4GHz This option cannot be retrofitted.
Intended Use	Supplies a specific 1st RF frequency range. Refer to <Frequency> for details.

<Option 036 1st RF 100 kHz to 6 GHz>

Items	Specifications
Model, Name	MG3710A-036, MG3710E-036, MG3740A-036 1st RF 100kHz to 6GHz This option cannot be retrofitted.
Intended Use	Supplies a specific 1st RF frequency range. Refer to <Frequency> for details.

<Option 041 High Power Extension for 1st RF /
Option 141 High Power Extension for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-041, MG3710E-041, MG3740A-041 High Power Extension for 1st RF MG3710A-141, MG3710E-141, MG3740A-141 High Power Extension for 1st RF Retrofit
Intended Use	Extends the maximum 1st RF output level. Refer to <Output level> for details.

<Option 042 Low Power Extension for 1st RF /
Option 142 Low Power Extension for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-042, MG3710E-042, MG3740A-042 Low Power Extension for 1st RF MG3710A-142, MG3710E-142, MG3740A-142 Low Power Extension for 1st RF Retrofit
Intended Use	Extends the minimum 1st RF output level. Refer to <Output level> for details.

<Option 043 Reverse Power Protection for 1st RF /
Option 143 Reverse Power Protection for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-043, MG3710E-043, MG3740A-043 Reverse Power Protection for 1st RF MG3710A-143, MG3710E-143, MG3740A-143 Reverse Power Protection for 1st RF Retrofit
Intended Use	Protects 1st RF from damage due to reverse power input. Refer to <Maximum reverse input> for details.

<Option 045 ARB Memory Upgrade 256 Msample for 1st RF /
Option 145 ARB Memory Upgrade 256 Msample for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-045, MG3710E-045, MG3740A-045 ARB Memory Upgrade 256 Msample for 1st RF MG3710A-145, MG3710E-145, MG3740A-145 ARB Memory Upgrade 256 Msample for 1st RF Retrofit
Intended Use	Expands the ARB memory capacity of 1st RF to 256 M. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 046 ARB Memory Upgrade 1024 Msample for 1st RF / Option 146 ARB Memory Upgrade 1024 Msample for 1st RF Retrofit>

Note:

This option cannot be installed in MG3740A.

Items	Specifications
Model, Name	MG3710A-046, MG3710E-046 ARB Memory Upgrade 1024 Msample for 1st RF MG3710A-146, MG3710E-146, ARB Memory Upgrade 1024 Msample for 1st RF Retrofit
Intended Use	Expands the ARB memory capacity of 1st RF to 1024 M. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 048 Combination of Baseband Signal for 1st RF / Option 148 Combination of Baseband Signal for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-048, MG3710E-048, MG3740A-048 Combination of Baseband Signal for 1st RF MG3710A-148, MG3710E-148, MG3740A-148 Combination of Baseband Signal for 1st RF Retrofit
Intended Use	Adds the memory synthesizing function for synthesizing signals in the 1st RF baseband. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 049 AWGN for 1st RF / Option 149 AWGN for 1st RF Retrofit>

Note:

This option cannot be installed in MG3740A.

Items	Specifications
Model, Name	MG3710A-049, MG3710E-049 AWGN for 1st RF MG3710A-149, MG3710E-149 AWGN for 1st RF Retrofit
Intended Use	Adds the AWGN function to the 1st RF. Refer to <AWGN generating function> for details.

<Option 050 Additional Analog Modulation Input for 1st RF / Option 150 Additional Analog Modulation Input for 1st RF Retrofit>

Items	Specifications
Model, Name	MG3710A-050, MG3710E-050, MG3740A-050 Additional Analog Modulation Input for 1st RF MG3710A-150, MG3710E-150, MG3740A-150 Additional Analog Modulation Input for 1st RF Retrofit
Intended Use	Adds the additional analog modulation function for 1st RF. Refer to <Analog modulation>, External modulation signal for details.

<Option 062 2nd RF 100kHz to 2.7GHz / Option 162 2nd RF 100kHz to 2.7GHz Retrofit>

Items	Specifications
Model, Name	MG3710A-062, MG3710E-062, MG3740A-062 2nd RF 100kHz to 2.7GHz MG3710A-162, MG3710E-162, MG3740A-162 2nd RF 100kHz to 2.7GHz Retrofit This option can be retrofitted only when 2nd RF is not installed.
Intended Use	Supplies a specific 2nd RF frequency range. Refer to <Frequency> for details.

<Option 064 2nd RF 100kHz to 4GHz / Option 164 2nd RF 100kHz to 4GHz Retrofit>

Items	Specifications
Model, Name	MG3710A-064, MG3710E-064, MG3740A-064 2nd RF 100kHz to 4GHz MG3710A-164, MG3710E-164, MG3740A-164 2nd RF 100kHz to 4GHz Retrofit This option can be retrofitted only when 2nd RF is not installed.
Intended Use	Supplies a specific 2nd RF frequency range. Refer to <Frequency> for details.

<Option 066 2nd RF 100kHz to 6GHz / Option 166 2nd RF 100kHz to 6GHz Retrofit>

Items	Specifications
Model, Name	MG3710A-066, MG3710E-066, MG3740A-066 2nd RF 100kHz to 6GHz MG3710A-166, MG3710E-166, MG3740A-166 2nd RF 100kHz to 6GHz Retrofit This option can be retrofitted only when 2nd RF is not installed.
Intended Use	Supplies a specific 2nd RF frequency range. Refer to <Frequency> for details.

<Option 071 High Power Extension for 2nd RF / Option 171 High Power Extension for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-071, MG3710E-071, MG3740A-071 High Power Extension for 2nd RF MG3710A-171, MG3710E-171, MG3740A-171 High Power Extension for 2nd RF Retrofit
Intended Use	Extends the maximum 2nd RF output level. Refer to <Output level> for details.

<Option 072 Low Power Extension for 2nd RF / Option 172 Low Power Extension for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-072, MG3710E-072, MG3740A-072 Low Power Extension for 2nd RF MG3710A-172, MG3710E-172, MG3740A-172 Low Power Extension for 2nd RF Retrofit
Intended Use	Extends the minimum 2nd RF output level. Refer to <Output level> for details.

<Option 073 Reverse Power Protection for 2nd RF / Option 173 Reverse Power Protection for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-073, MG3710E-073, MG3740A-073 Reverse Power Protection for 2nd RF MG3710A-173, MG3710E-173, MG3740A-173 Reverse Power Protection for 2nd RF Retrofit
Intended Use	Protects 2nd RF from damage due to reverse power input. Refer to <Maximum reverse input> for details.

<Option 075 ARB Memory Upgrade 256 Msample for 2nd RF / Option 175 ARB Memory Upgrade 256 Msample for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-075, MG3710E-075, MG3740A-075 ARB Memory Upgrade 256 Msample for 2nd RF MG3710A-175, MG3710E-175, MG3740A-175 ARB Memory Upgrade 256 Msample for 2nd RF Retrofit
Intended Use	Expands the ARB memory capacity of 2nd RF to 256 M. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 076 ARB Memory Upgrade 1024 Msample for 2nd RF / Option 176 ARB Memory Upgrade 1024 Msample for 2nd RF Retrofit>

Note:

This option cannot be installed in MG3740A.

Items	Specifications
Model, Name	MG3710A-076, MG3710E-076 ARB Memory Upgrade 1024 Msample for 2nd RF MG3710A-176, MG3710E-176 ARB Memory Upgrade 1024 Msample for 2nd RF Retrofit
Intended Use	Expands the ARB memory capacity of 2nd RF to 1024 M. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 078 Combination of Baseband Signal for 2nd RF / Option 178 Combination of Baseband Signal for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-078, MG3710E-078, MG3740A-078 Combination of Baseband Signal for 2nd RF MG3710A-178, MG3710E-178, MG3740A-178 Combination of Baseband Signal for 2nd RF Retrofit
Intended Use	Adds the memory synthesizing function for synthesizing signals in the 2nd RF baseband. Refer to <Arbitrary waveform generator>, Waveform memory for details.

<Option 079 AWGN for 2nd RF / Option 179 AWGN for 2nd RF Retrofit>

Note:

This option cannot be installed in MG3740A.

Items	Specifications
Model, Name	MG3710A-079, MG3710E-079 AWGN for 2nd RF MG3710A-179, MG3710E-179 AWGN for 2nd RF Retrofit
Intended Use	Adds the AWGN function to the 2nd RF. Refer to <AWGN generating function> for details.

<Option 080 Additional Analog Modulation Input for 2nd RF / Option 180 Additional Analog Modulation Input for 2nd RF Retrofit>

Items	Specifications
Model, Name	MG3710A-080, MG3710E-080, MG3740A-080 Additional Analog Modulation Input for 2nd RF MG3710A-180, MG3710E-180, MG3740A-180 Additional Analog Modulation Input for 2nd RF Retrofit
Intended Use	Adds the additional analog modulation function for 2nd RF. Refer to <Analog modulation>, External modulation signal for details.

<Option 181 CPU/Windows7 Upgrade Retrofit>

Items	Specifications
Model, Name	MG3710A-181, MG3740A-181 CPU/Windows7 Upgrade Retrofit
Intended Use	Upgrades the COM-Express module and changes the OS to Windows Embedded Standard 7 (64-bit) (WES 7).

<Option 182 CPU/Windows10 Upgrade Retrofit>

Items	Specifications
Model, Name	MG3710A-182, MG3710E-182, MG3740A-182 CPU/Windows10 Upgrade Retrofit
Intended Use	Upgrades the COM-Express module and changes the OS to Windows 10 IoT (Win 10).

<Option 313 Removable HDD>

Items	Specifications
Model, Name	MG3710A-313, MG3740A-313 Removable HDD
Intended Use	A HDD as an additional main storage medium (including OS) Users should attach or detach their HDD by themselves.

Appendix B Error Messages

B.1 Error Messages List B-2

B.1 Error Messages List

ID	Message	Description
-1	Operation is canceled	—
-100	Command error	Failed to analyze command syntax.
-108	Parameter not allowed	Received more-than-required number of parameters for header.
-109	Missing parameter	Received less-than-required number of parameters for header.
-113	Undefined header	Undefined program header.
-120	Numeric data error	Failed to analyze numeric data syntax.
-120	Character data error	Failed to analyze character data syntax.
-130	Suffix error	Failed to analyze suffix syntax.
-150	String data error	Failed to analyze string data syntax.
-160	Block data error	Failed to analyze block data syntax.
-200	Execution error	Aborted execution due to file access failure.
-200	Execution error	Failed to save. Number of files to be saved reached upper limit.
-200	Execution error	No selectable waveform pattern in waveform memory.
-200	Execution error	License error
-200	Execution error	License Version error
-200	Execution error	Waveform Pattern File not found.
-200	Execution error	Operation disabled because Long pattern is included.
-200	Execution error	Long pattern cannot be used for the current option configuration.
-200	Execution error	Operation disabled when Pattern Combination is Edit.
-200	Execution error	I/Q Calibration failed.
-200	Execution error	Cannot load waveform.
-200	Execution error	Only supported when Sweep or List function is being executed.
-200	Execution error	The number of waveform on memory A reached upper limit.
-200	Execution error	The number of waveform on memory B reached upper limit.
-200	Execution error	The number of Long pattern on memory reached upper limit.
-200	Execution error	There is insufficient space on memory A.
-200	Execution error	There is insufficient space on memory B.

ID	Message	Description
-200	Execution error	There is insufficient space on memory to load Long pattern.
-200	Execution error	The waveform already exists on memory A.
-200	Execution error	The waveform already exists on memory B.
-200	Execution error	The same Long pattern already exists on memory.
-200	Execution error	Cannot load with current condition.
-200	Execution error	Operation forbidden as long as the current function is being executed.
-200	Execution error	Option composition of parameter file is not the same.*
-221	Settings conflict	Setting not supported for 1st SG.
-221	Settings conflict	Setting not supported for 2nd SG.
-221	Settings conflict	Operation disabled when SG type is Analog.
-221	Settings conflict	Operation disabled when I/Q Output is Analog I/Q Out.
-221	Settings conflict	Operation disabled when I/Q Source is Digital I/Q In.
-221	Settings conflict	Operation disabled when Modulation Source is Ext.
-221	Settings conflict	Operation disabled when Modulation Source is Int.
-221	Settings conflict	Operation disabled when Output Frequency is under 7MHz.
-221	Settings conflict	Operation disabled when Sequence Mode is being executed.
-221	Settings conflict	Operation disabled when Sweep/List is being executed.
-221	Settings conflict	Operation disabled when High S/N is On.
-221	Settings conflict	Operation disabled with current level setting. Increase level to turn on this function.
-221	Settings conflict	Operation disabled when Channel A is Off.
-221	Settings conflict	Operation disabled when Channel B is Off.
-221	Settings conflict	Operation disabled when SyncWithSG is Off.
-221	Settings conflict	Operation disabled when no channel group is loaded to channel table.
-221	Settings conflict	Operation disabled when Frequency Type differs between SG1 and SG2.
-221	Settings conflict	Operation disabled when FreqType is Channel.
-221	Settings conflict	Operation disabled when AttHold is On.
-221	Settings conflict	Operation disabled when SyncWithSG is On.
-221	Settings conflict	Operation disabled when LO Source is not Internal.
-221	Settings conflict	Operation disabled when SG2 LO Source is Sync.

*: For how to avoid this error, refer to 9.5.4 “Recalling Parameter File: Recall”.

ID	Message	Description
-221	Settings conflict	Operation restricted by Multi SG Sync.
-221	Settings conflict	Operation disabled when Pattern Combination is Edit.
-221	Settings conflict	Operation disabled when Digital Modulation (Opt-020) not installed.
-221	Settings conflict	Parameter out of range or invalid: [Comment]Line
-221	Settings conflict	Parameter out of range or invalid: [Header]Product Name
-221	Settings conflict	Parameter out of range or invalid: [Header]Soft Type
-221	Settings conflict	Parameter out of range or invalid: [Wave Info]Data Width
-221	Settings conflict	Operation disabled when Combination Pattern File or Alias Pattern File not selected.
-221	Settings conflict	Operation disabled when Pattern B is not selected.
-221	Settings conflict	Operation disabled when Pattern A is not selected.
-221	Settings conflict	Operation disabled when both Pattern A and B is not selected.
-221	Settings conflict	Operation disabled when Off not set for Sync Type.
-221	Settings conflict	Operation disabled when Sync Type is Secondary.
-221	Settings conflict	Operation disabled when External not set for Baseband Reference Clock Source.
-221	Settings conflict	Operation disabled when Marker1 Edit Mode A is Off.
-221	Settings conflict	Operation disabled when Marker2 Edit Mode A is Off.
-221	Settings conflict	Operation disabled when Marker3 Edit Mode A is Off.
-221	Settings conflict	Operation disabled when On not set for Marker1 Edit Mode A.
-221	Settings conflict	Operation disabled when On not set for Marker2 Edit Mode A.
-221	Settings conflict	Operation disabled when On not set for Marker3 Edit Mode A.
-221	Settings conflict	Operation disabled when RF Gate Edit Mode is Off.
-221	Settings conflict	Operation disabled when On not set for RF Gate Edit Mode.
-221	Settings conflict	Operation disabled when Play Mode is Auto for Sequence Mode.
-221	Settings conflict	Operation disabled when Sequence Mode is not being executed.
-221	Settings conflict	Operation disabled because Primary or Secondary not set for Sync Type.
-221	Settings conflict	Operation disabled when Secondary not set for Sync Type.
-221	Settings conflict	Operation disabled when Sync Type is Off.
-221	Settings conflict	Operation disabled when Waveform Pattern is not included in output signal.

ID	Message	Description
-221	Settings conflict	Operation disabled when Sequence Pattern File is selected.
-221	Settings conflict	Operation disabled when Carrier is not included in output signal.
-221	Settings conflict	Operation disabled when Carrier is included in output signal.
-221	Settings conflict	Operation disabled when Marker1 Edit Mode B is Off.
-221	Settings conflict	Operation disabled when Marker2 Edit Mode B is Off.
-221	Settings conflict	Operation disabled when Marker3 Edit Mode B is Off.
-221	Settings conflict	Operation disabled when On not set for Marker1 Edit Mode B.
-221	Settings conflict	Operation disabled when On not set for Marker2 Edit Mode B.
-221	Settings conflict	Operation disabled when On not set for Marker3 Edit Mode B.
-221	Settings conflict	Operation disabled when Pattern A and B is not included in output signal.
-221	Settings conflict	Operation disabled with currently selected Waveform Pattern File.
-221	Settings conflict	Operation disabled when Combination Pattern File or Alias Pattern File not selected.
-221	Settings conflict	Operation disabled when Waveform of List function is On when List function in use.
-221	Settings conflict	Operation disabled when Rate Matching is used.
-221	Settings conflict	Operation disabled when RfGateType is Single.
-221	Settings conflict	Operation disabled when Start/Frame Trigger is Off.
-221	Settings conflict	Operation disabled when Start/Frame Trigger Mode is Start.
-221	Settings conflict	Operation disabled when 3Trigger not set for Pattern Trigger Mode.
-221	Settings conflict	Operation disabled when Pattern Trigger Mode is 3Status.
-221	Settings conflict	Operation disabled when outputting Pattern A and B addition signal or Multiplex signal.
-221	Settings conflict	Operation disabled when Center Signal is Baseband DC.
-221	Settings conflict	Operation disabled when Baseband DC not set for Center Signal.
-221	Settings conflict	Operation disabled when Long pattern is loaded.
-221	Settings conflict	Operation disabled when Mod is On.
-221	Settings conflict	Operation disabled when SG1 output signal is CW.
-221	Settings conflict	Operation disabled when SG2 output signal is CW.
-221	Settings conflict	Invalid waveform type
-221	Settings conflict	Invalid waveform file information
-221	Settings conflict	Same combination file has been loaded.

ID	Message	Description
-221	Settings conflict	Cannot find waveform A specified with combination.
-221	Settings conflict	Cannot find waveform B specified with combination.
-221	Settings conflict	Invalid waveform A file information
-221	Settings conflict	Invalid waveform B file information
-221	Settings conflict	The number of combination file reached upper limit.
-221	Settings conflict	Cannot load new waveform when Long waveform is already loaded.
-221	Settings conflict	Cannot load new Long waveform when more than one waveform is already loaded.
-221	Settings conflict	Operation disabled when AM Type is Exp.
-221	Settings conflict	Operation disabled when AM Type is Lin.
-221	Settings conflict	Operation disabled when Square not set for Pulse Source.
-221	Settings conflict	Operation disabled when Freerun or Gated not set for Pulse Source.
-221	Settings conflict	Operation disabled when Pulse Source is Square or Ext Pulse.
-221	Settings conflict	Operation disabled when Pulse Source is Square, Freerun, Gated, or Ext Pulse.
-221	Settings conflict	Operation disabled when Adjustable Doublet not set for Pulse Source.
-221	Settings conflict	Operation disabled when I/Q Source is Analog I/Q In.
-221	Settings conflict	Operation disabled when SG output signals are not modulated.
-221	Settings conflict	Operation disabled when Sequence Pattern File is selected.
-221	Settings conflict	Operation disabled in Manual Mode.
-221	Settings conflict	Operation disabled when using 2nd SG and in Sweep mode.
-221	Settings conflict	Specified function not supported at current state.

ID	Message	Description
-222	Data out of range	Setting value out of range
-222	Data out of range	Frequency and/or level setting value out of range.
-240	Hardware error	Failed to communicate with Power Sensor.
-241	Hardware missing	Operation disabled when both Option 018 and Option 019 not installed.
-241	Hardware missing	Operation disabled when Digital BB I/Q Unit (Opt-019) not installed.
-241	Hardware missing	Operation disabled when 2nd SG (Opt-062, 064, 066) not installed.
-241	Hardware missing	Operation disabled when Reverse Power Protection for 1st RF (Opt-043) not installed.
-241	Hardware missing	Operation disabled when Reverse Power Protection for 2nd RF (Opt-073) not installed.
-241	Hardware missing	Operation disabled when Option 048 not installed.
-241	Hardware missing	Operation disabled when Option 078 not installed.
-241	Hardware missing	Operation disabled when Universal Input/Output (Opt-017) not installed.
-241	Hardware missing	Operation disabled when AWGN (Opt-049) not installed.
-241	Hardware missing	Operation disabled when AWGN (Opt-079) not installed.
-241	Hardware missing	Operation disabled when 2nd HDD (Opt-011) not installed.
-241	Hardware missing	Operation disabled when Analog I/Q Input/Output (Opt-018) not installed.
-241	Hardware missing	Operation disabled when 1st SG (Opt-050) not installed.
-241	Hardware missing	Operation disabled when 2nd SG (Opt-080) not installed.
-256	File name not found	Unable to execute; specified file name not found in media.
-257	File name error	An invalid filename was encountered.
-350	Queue overflow	Remote control error queue overflowed.

Appendix C Default Value List

The default values are common to SG Port 1 and 2, if not specified.

<System>

Item	Default
SG Port	SG1

<Frequency Functions>

Item	Default
Frequency setting	
Frequency	1 GHz
Frequency relative display On/Off	Off
Frequency relative display	0 Hz
Frequency offset On/Off	Off
Frequency offset	0 Hz
Frequency offset multiplier On/Off	Off
Frequency offset multiplier	1
Frequency step	100.00000 kHz
Channel setting	
Frequency/Channel display	Freq
Frequency display On/Off	Off
Channel group	No Group
Channel selection	0
Function	
Frequency synchronization On/Off	Off
Frequency synchronization mode	Parallel
Phase noise optimization	Offset < 200 kHz
RF spectrum	Normal
Signal source	
Reference frequency source	Auto
Reference frequency	10 MHz
Local signal source	Int
Local signal output	Off
Local signal phase	0.00 deg

<Output Level Main Function>

Item	Default
Output	
RF output On/Off	Off
Output level	–144.00 dBm
Display unit	dBm
Output level relative display On/Off	Off
Output level relative value	0 dB
Output level offset On/Off	Off
Output level offset	0.00 dB
Output level step	0.10 dB
Limit level On/Off	Off
Limit level	Maximum level of installed options
Function	
ATT Hold On/Off	Off
Output level synchronization On/Off	Off
User correction On/Off	Off
S/N optimization On/Off	Off
User correction setting	
Com Port	2
Model	MA24106A
Start Freq	1.00000000000 GHz
Stop Freq	1.00000000000 GHz
Level Offset On/Off	Off
Level Offset	0.00 dB
Correction Points	2
Averaging On/Off	Off
Averaging Count	10

<Sweep/List Function>

Item	Default
Sweep	
Sweep/List Freq On/Off	Off
Sweep/List Level On/Off	Off
Sweep/List Type	Sweep
Sweep repeat	Continuous
Sweep Direction	Up
Manual Mode On/Off	Off
Manual Point	1
Output setting	
Sweep Out setting	Sweep Status
Trigger Out Polarity	Positive
Sweep function setting	
Sweep start frequency	1.00000000000 GHz
Sweep stop frequency	1.00000000000 GHz
Sweep center frequency	1 GHz
Sweep span frequency	0 Hz
Sweep start level	–144.00 dBm
Sweep stop level	–144.00 dBm
Sweep point	101
Sweep dwell time	2.000 ms
Sweep type	Saw Tooth
List function setting	
List SG setting	SG1
List frequency setting	1 GHz
List level setting	–144.00 dBm
Dwell time selection	List
Point trigger	
Point trigger On/Off	Off
Point trigger mode	Start
Point trigger source	External
Point trigger delay	0.00000000 s
Point trigger edge	Rise
Point trigger timer	1.000 ms

<Modulation Function>

Item	Default
Modulation	
Modulation On/Off	Off
Analog/Pulse modulation	
AM Modulation On/Off	Off
AM Depth scale	Linear
AM Depth (Lin)	0.1 %
AM Depth (Log)	3.00 dB
AM modulation frequency	400.0 Hz
Switching AM Source	Int
AM Waveform	Sine
AM Phase Adjust	0 deg
FM Modulation On/Off	Off
FM frequency deviation	1.0000 kHz (SG1) 0 Hz (SG2)
FM modulation frequency	400.0 Hz
Switching FM Source	Int
FM Waveform	Sine
FM Phase Adjust	0 deg
ϕM Modulation On/Off	Off
ϕM deviation angle	0.000 rad
ϕM modulation frequency	400.0 Hz
Switching ϕM Source	Int
ϕM Waveform	Sine
ϕM Phase Adjust	0 deg
Pulse Modulation On/Off	Off
Pulse modulation source	Freerun
Pulse modulation frequency	400.0 Hz
Pulse modulation period	4.00 µs
Pulse modulation delay	0.00000000 s
Pulse modulation width	2.00 µs
Pulse 2 delay	0.00000000 s
Pulse 2 width	2.00 µs
Pulse Sync/Pulse Video output signal polarity	Positive
Pulse Mod input signal polarity	Positive
External Modulation Signal	
Coupling	DC
Impedance	600 Ω

Item	Default
Optimize function for the analog modulation	
Optimize	Spurious (MG3710A/MG3710E) Distortion (MG3740A)
Digital modulation	
ARB On/Off	On
RMS adjustment	0.00 dB
Pattern generation mode	Defined
ARB Setup	
Pattern A On/Off	On
Pattern B On/Off	Off
Pattern A output level	–144.00 dBm
Pattern B output level	–144.00 dBm
Object of level change	A&B
Level ratio setting	0.00 dB
Sampling rate A	20.000000 kHz
Sampling rate B	20.000000 kHz
Frequency offset	0 Hz
Frequency offset A	0 Hz
Frequency offset B	0 Hz
Reference frequency	Baseband DC
Start offset	0
Spectrum reverse A	Normal
Spectrum reverse B	Normal
Waveform load	
Waveform load list focus	Package
Sub item	Status
Waveform load target memory	A
Waveform selection	
Waveform selection list focus	Package
Waveform selection target memory	A
Waveform copy	
Waveform copy list focus	Package
Waveform copy target drive	C:

Item	Default
RF Gate	
RF Gate On/Off	On
RF Gate edit On/Off	Off
RF Gate line	Single
RF Gate offset 1	0.00
RF Gate width 1	1.00
RF Gate offset 2	0.00
RF Gate width 2	1.00
RF Gate frequency	1.00
Start/Frame Trigger	
Start/Frame Trigger On/Off	Off
Start/Frame Trigger Mode	Start
Start/Frame Trigger Source	Ext
Start/Frame Trigger Delay	0.00
Start/Frame Trigger Edge	Rise
Start/Frame Trigger Event	No Retrigger
Baseband Clock	
Baseband Reference Clock Source	Int
Baseband Reference Clock Division	1/4
Baseband Reference Clock Out	Off
Maker Setup	
Marker1 Edit Mode A On/Off	Off
Marker1 Offset A	0.00
Marker1 Width A	1.00
Marker1 Cycle A	1.00
Marker1 Polarity A	Positive
Marker1 Edit Mode B On/Off	Off
Marker1 Offset B	0.00
Marker1 Width B	1.00
Marker1 Cycle B	1.00
Marker1 Polarity B	Positive
Marker2 Edit Mode A On/Off	Off
Marker2 Offset A	0.00
Marker2 Width A	1.00
Marker2 Cycle A	1.00
Marker2 Polarity A	Positive
Marker2 Edit Mode B On/Off	Off
Marker2 Offset B	0.00
Marker2 Width B	1.00
Marker2 Cycle B	1.00

Item	Default
Marker2 Polarity B	Positive
Marker3 Edit Mode A On/Off	Off
Marker3 Offset A	0.00
Marker3 Width A	1.00
Marker3 Cycle A	1.00
Marker3 Polarity A	Positive
Marker3 Edit Mode B On/Off	Off
Marker3 Offset B	0.00
Marker3 Width B	1.00
Marker3 Cycle B	1.00
Marker3 Polarity B	Positive
Sequence Mode	
Sequence Play Mode	Auto
Sequence Repeat Mode	Continuous
Sequence Element Repeat Count	1
Sequence Element Number	1
Pattern Trigger On/Off	Off
Pattern Trigger 1 On/Off	Off
Pattern Trigger 1 Source	Ext
Pattern Trigger 1 Edge	Rise
Pattern Trigger 2 On/Off	Off
Pattern Trigger 2 Source	Ext
Pattern Trigger 2 Edge	Rise
Pattern Trigger 3 On/Off	Off
Pattern Trigger 3 Source	Ext
Pattern Trigger 3 Edge	Rise
Pattern Trigger Switching Point	Pattern
Sync Multi SG	
Sync Type	Off
Number of Secondaries	1
Secondary Position	1
LO Sync	Off
I/Q Phase	0.00 deg
I/Q Delay	0.000000000000 s

<Route Connectors>

Item	Default
Route Input Connectors	
S/F Trigger	SG1 S/F Trigger (MG3710A, MG3710E, MG3740A-020/120) OFF (When MG3740A-020/120 is not installed)
Pattern Trigger 1	Pattern Trigger 1 (MG3710A, MG3710E, MG3740A-020/120) OFF (When MG3740A-020/120 is not installed)
Pattern Trigger 2	Pattern Trigger 2
Pattern Trigger 3	Pattern Trigger 3
Pattern Status 1	Pattern Status 1
Pulse Mod	SG1 Pulse Mod
Pattern Trigger Type	Shared
Route Output Connectors	
Marker1	SG1 Marker1 A (MG3710A, MG3710E, MG3740A-020/120) Point Trigger Out (When MG3740A-020/120 is not installed)
Marker2	SG1 Marker2 A
Marker3	SG1 Marker3 A
Pulse Video	SG1 Pulse Video
Pulse Sync	SG1 Pulse Sync
Sync Trig Out	Sync Trigger Out

<AWGN>

Item	Default
AWGN	
AWGN On/Off	Off
Noise Bandwidth	16.000 kHz
Carrier Level	–110.00 dBm
Noise Level	–20.00 dBm
C/N Ratio	40.00 dB
C/N Set Signal	Constant

<I/Q Modulation>

Item	Default
I/Q	
I/Q Source	Internal
I/Q Output	RF
Internal Channel Correction	Off
I/Q Calibration	
Cal Type	DC
Wideband	Off
Analog I/Q Input Adjustments	
I Offset	0.000 V
Q Offset	0.000 V
Analog I/Q Output Adjustments	
I Level Trimming	100.0 %
Q Level Trimming	100.0 %
I/Q Common Offset	0.0000 V
I Diff Offset	0.0000 V
Q Diff Offset	0.0000 V
Internal Baseband Adjust	
I Offset	0.000 %
Q Offset	0.000 %
Gain Balance	0.000 dB
Quad. Angle	0.00 deg
I/Q Phase	0.00 deg
I/Q Skew	0.000000000000 s
I/Q Delay	0.000000000000 s

<BER Measurement Functions>

Item	Default
BER	
Measure Mode	Continuous
Data Type	PN9
Count Mode	
Count Mode	Data
Data	1000
Error	1
Resync Condition	
Auto Resync	On
Threshold X	200
Threshold Y	500 bits
at SyncLoss	Clear
BER Interface	
Clock Edge	Rise
Data Polarity	Positive
Enable Active	Disable
PN Fix Pattern	
PN Fix9 Pattern Initial	1FF
PN Fix11 Pattern Initial	7FF
PN Fix15 Pattern Initial	7FFF
PN Fix20 Pattern Initial	FFFFF
PN Fix23 Pattern Initial	7FFFFF
PN Fix Pattern Length	96
User Defined Pattern	
Pattern Length	1024
Sync Start	1
Sync Length	32
Auto Restart	
Auto Restart	Off

<Power Meter>

Item	Default
Channel A On/Off	Off
Channel B On/Off	Off
Connection Settings	
Channel A Com Port	2
Channel A Model	MA24106A
Channel B Com Port	2
Channel B Model	MA24106A
Channel Settings	
Channel A Freq	1.00000000000 GHz
Channel A Offset On/Off	Off
Channel A Offset	0.00 dB
Channel A Averaging On/Off	Off
Channel A Averaging Count	1024
Channel A Measurement Units	dBm
Channel B Freq	1.00000000000 GHz
Channel B Offset On/Off	Off
Channel B Offset	0.00 dB
Channel B Averaging On/Off	Off
Channel B Averaging Count	1024
Channel B Measurement Units	dBm

<Utility>

Item	Default
Interface Settings	
GPIB Address	3
Terminator	CR
Language	SCPI
Raw Socket Port Number	49158
System Settings	
Beep Sound	On
Power On	Last
Parameter Recall	
Allow different option composition file	Off

<Other Functions>

Item	Default
Copy	
File Type	PNG
Color	Normal
Others	
Screen display On/Off	On
Knob hold On/Off	Off

<Save/Read Function>

Item	Default
Saving/reading media	C

Performance Test Result Form

Test Location		Report No.	
		Date	
		Test person in charge	

Equipment Name:MG3710A, MG3710E Vector Signal Generator/MG3740A Analog Signal Generator

Serial No.		Ambient temperature	ºC
Power frequency		Relative humidity	%

Remarks:

Output Frequency (Section 10.2.1)

1st RF

Setting	Results	
0.009 MHz	☐ OK	☐ NG
100 MHz	☐ OK	☐ NG
300 MHz	☐ OK	☐ NG
600 MHz	☐ OK	☐ NG
1000 MHz	☐ OK	☐ NG
1500 MHz	☐ OK	☐ NG
2000 MHz	☐ OK	☐ NG
2500 MHz	☐ OK	☐ NG
2700 MHz	☐ OK	☐ NG
3000 MHz	☐ OK	☐ NG
3500 MHz	☐ OK	☐ NG
4000 MHz	☐ OK	☐ NG
4500 MHz	☐ OK	☐ NG
5000 MHz	☐ OK	☐ NG
5500 MHz	☐ OK	☐ NG
6000 MHz	☐ OK	☐ NG

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

2nd RF

Setting	Results	
0.009 MHz	☐ OK	☐ NG
100 MHz	☐ OK	☐ NG
300 MHz	☐ OK	☐ NG
600 MHz	☐ OK	☐ NG
1000 MHz	☐ OK	☐ NG
1500 MHz	☐ OK	☐ NG
2000 MHz	☐ OK	☐ NG
2500 MHz	☐ OK	☐ NG
2700 MHz	☐ OK	☐ NG
3000 MHz	☐ OK	☐ NG
3500 MHz	☐ OK	☐ NG
4000 MHz	☐ OK	☐ NG
4500 MHz	☐ OK	☐ NG
5000 MHz	☐ OK	☐ NG
5500 MHz	☐ OK	☐ NG
6000 MHz	☐ OK	☐ NG

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

Output Level Frequency Characteristics (Section 10.3.1)

1st RF, without Option 043/143

Setting		Minimum Rating	Results	Maximum Rating	Uncertainty
Frequency	Output level				
50 MHz 97 MHz	–5 dBm	–5.5 dBm	_____ _____	–4.5 dBm	±0.27 dB
98 MHz 100 MHz 399 MHz 400 MHz	–7 dBm	–7.5 dBm	_____ _____ _____ _____	–6.5 dBm	±0.27 dB
500 MHz 1000 MHz 1500 MHz 2000 MHz 2500 MHz 2700 MHz 3000 MHz		–7.5 dBm	_____ _____ _____ _____ _____ _____ _____	–6.5 dBm	±0.25 dB
3001 MHz 3500 MHz 4000 MHz		–7.7 dBm	_____ _____ _____	–6.3 dBm	±0.34 dB
4500 MHz 5000 MHz		–7.8 dBm	_____ _____	–6.2 dBm	±0.34 dB
5500 MHz 6000 MHz		–7.8 dBm	_____ _____	–6.2 dBm	±0.34 dB

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

2nd RF, without Option 073/173

Setting		Minimum Rating	Results	Maximum Rating	Uncertainty
Frequency	Output level				
50 MHz 97 MHz	–5 dBm	–5.5 dBm	_____ _____	–4.5 dBm	±0.27 dB
98 MHz 100 MHz 399 MHz 400 MHz	–7 dBm	–7.5 dBm	_____ _____ _____ _____	–6.5 dBm	±0.27 dB
500 MHz 1000 MHz 1500 MHz 2000 MHz 2500 MHz 2700 MHz 3000 MHz		–7.5 dBm	_____ _____ _____ _____ _____ _____ _____	–6.5 dBm	±0.25 dB
3001 MHz 3500 MHz 4000 MHz		–7.7 dBm	_____ _____ _____	–6.3 dBm	±0.34 dB
4500 MHz 5000 MHz		–7.8 dBm	_____ _____	–6.2 dBm	±0.34 dB
5500 MHz 6000 MHz		–7.8 dBm	_____ _____	–6.2 dBm	±0.34 dB

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

1st RF, with Option 043/143

Setting		Minimum Rating	Results	Maximum Rating	Uncertainty
Frequency	Output level				
50 MHz 97 MHz	–8 dBm	–8.5 dBm	_____ _____	–7.5 dBm	±0.27 dB
98 MHz 100 MHz 399 MHz 400 MHz	–10 dBm	–10.5 dBm	_____ _____ _____ _____	–9.5 dBm	±0.27 dB
500 MHz 1000 MHz 1500 MHz 2000 MHz 2500 MHz 2700 MHz 3000 MHz		–10.5 dBm	_____ _____ _____ _____ _____ _____ _____	–9.5 dBm	±0.25 dB
3001 MHz 3500 MHz 4000 MHz		–10.7 dBm	_____ _____ _____	–9.3 dBm	±0.34 dB
4500 MHz 5000 MHz		–10.8 dBm	_____ _____	–9.2 dBm	±0.34 dB
5500 MHz 6000 MHz		–10.8 dBm	_____ _____	–9.2 dBm	±0.34 dB

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

2nd RF, with Option 073/173

Setting		Minimum Rating	Results	Maximum Rating	Uncertainty
Frequency	**Output level**				
50 MHz 97 MHz	–8 dBm	–8.5 dBm	_____ _____	–7.5 dBm	±0.27 dB
98 MHz 100 MHz 399 MHz 400 MHz	–10 dBm	–10.5 dBm	_____ _____ _____ _____	–9.5 dBm	±0.27 dB
500 MHz 1000 MHz 1500 MHz 2000 MHz 2500 MHz 2700 MHz 3000 MHz		–10.5 dBm	_____ _____ _____ _____ _____ _____ _____	–9.5 dBm	±0.25 dB
3001 MHz 3500 MHz 4000 MHz		–10.7 dBm	_____ _____ _____	–9.3 dBm	±0.34 dB
4500 MHz 5000 MHz		–10.8 dBm	_____ _____	–9.2 dBm	±0.34 dB
5500 MHz 6000 MHz		–10.8 dBm	_____ _____	–9.2 dBm	±0.34 dB

*: 3000 to 4000 MHz are available only when the Upper frequency limit 4 GHz, 6 GHz option is installed.
4500 to 6000 MHz are available only when the Upper frequency limit 6 GHz option is installed.

Vector Accuracy (Section 10.4.1)

Note:

Waveform patterns are not included in the MG3740A; therefore the vector modulation performance test is not required.

1st RF

Setting			Results	Maximum Rating	Uncertainty
System	Frequency	Output level			
W-CDMA (Test Model 4)	800 MHz 900 MHz 1800 MHz 1900 MHz	☐ (1) +7 dBm ☐ (2) +13 dBm ☐ (3) +4 dBm ☐ (4) +10 dBm		0.62 % (rms)	0.02 % (rms)
GSM	800 MHz 900 MHz 1800 MHz 1900 MHz			0.84° (rms)	0.04° (rms)
EDGE	800 MHz 900 MHz 1800 MHz 1900 MHz			0.84 % (rms)	0.04 % (rms)
LTE (20 MHz TestModel 3.1)	600 MHz 800 MHZ 1500 MHz 2000 MHz 2400 MHz 2700 MHz			0.82 % (rms)	0.02 % (rms)
LTE (20 MHz TestModel 3.1)	3400 MHz 3500 MHz 3600 MHz 3700 MHz 3800 MHz	☐ (1) +4 dBm ☐ (2) +10 dBm ☐ (3) +1 dBm ☐ (4) +7 dBm		0.82 % (rms)	0.02 % (rms)

*: Refer to the table below for output level.

Output level	1st RF: 043/143 2nd RF: 073/173	1st RF: 041/141 2nd RF: 071/171
(1)	Not installed	Not installed
(2)	Not installed	Installed
(3)	Installed	Not installed
(4)	Installed	Installed

2nd RF

Setting			Results	Maximum Rating	Uncertainty
System	Frequency	Output level			
W-CDMA (Test Model 4)	800 MHz 900 MHz 1800 MHz 1900 MHz	☐ (1) +7 dBm ☐ (2) +13 dBm ☐ (3) +4 dBm ☐ (4) +10 dBm		0.62 % (rms)	0.02 % (rms)
GSM	800 MHz 900 MHz 1800 MHz 1900 MHz			0.84° (rms)	0.04° (rms)
EDGE	800 MHz 900 MHz 1800 MHz 1900 MHz			0.84 % (rms)	0.04 % (rms)
LTE (20 MHz TestModel 3.1)	600 MHz 800 MHZ 1500 MHz 2000 MHz 2400 MHz 2700 MHz			0.82 % (rms)	0.02 % (rms)
LTE (20 MHz TestModel 3.1)	3400 MHz 3500 MHz 3600 MHz 3700 MHz 3800 MHz	☐ (1) +4 dBm ☐ (2) +10 dBm ☐ (3) +1 dBm ☐ (4) +7 dBm		0.82 % (rms)	0.02 % (rms)

*: Refer to the table below for output level.

Output level	1st RF: 043/143 2nd RF: 073/173	1st RF: 041/141 2nd RF: 071/171
(1)	Not installed	Not installed
(2)	Not installed	Installed
(3)	Installed	Not installed
(4)	Installed	Installed

Appendix E Remote Control

This chapter provides an overview of the remote control operation of the MG3710A/MG3710E/MG3740A.

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E.1 Overview

Automatic measurement can be performed in combination with an external controller (PC). The MG3710A/MG3710E/MG3740A is equipped with GPIB, Ethernet and USB interfaces as standard. The following functions are supported via these interfaces:

- Control of all functions, except for the power switch
- Reading of all the status and settings
- Interrupts and serial polls

An overview of each interface is shown below:

(1) GPIB

The GPIB interface of the MG3710A/MG3710E/MG3740A conforms to the IEEE488.1/IEEE488.2 standard. The interface functions shown below are supported:

- SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0, E2

(2) Ethernet (1000BASE-T)

For the network connection, refer to 9.7.7 “Windows Security Measures”.

The Ethernet interface of the MG3710A/MG3710E/MG3740A can be used as a remote control interface conforming to the VXI-11 protocol using TCP/IP. Control programs can be described using VISA software supporting the VXI-11 protocol. The interface functions shown below are supported:

- SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0

In addition, the Ethernet interface can be controlled by a Raw Socket connection using TCP/IP. Control programs can be described by using the VISA software or a Telnet client supporting Raw Socket connections. Interrupt functions and serial port operation are not supported at Raw Socket connection.

(3) USB

The USB interface of the MG3710A/MG3710E/MG3740A can be used as a remote control interface conforming to the USBTMC-USB488 protocol. Control programs can be described using VISA software supporting the USBTMC-USB488 protocol. The interface functions shown below are supported:

- SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0

E.2 Connection

Connect the MG3710A/MG3710E/MG3740A and an external controller (PC) to be used for remote control using the dedicated connector for the applicable interface on the rear panel. Connection cables are provided as additional parts with the MG3710A/MG3710E/MG3740A.

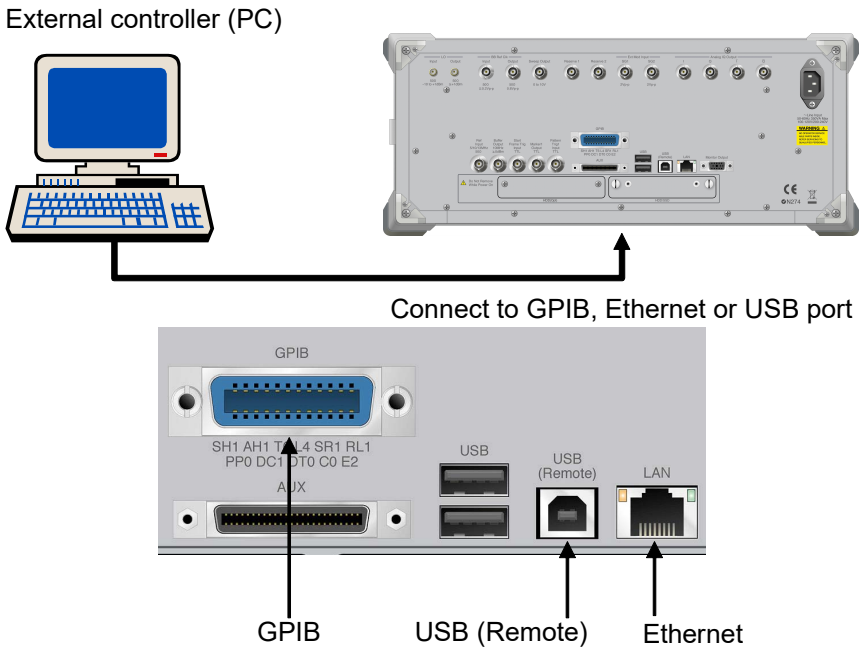


Figure E.2-1 Connection port connecting to external controller (PC)

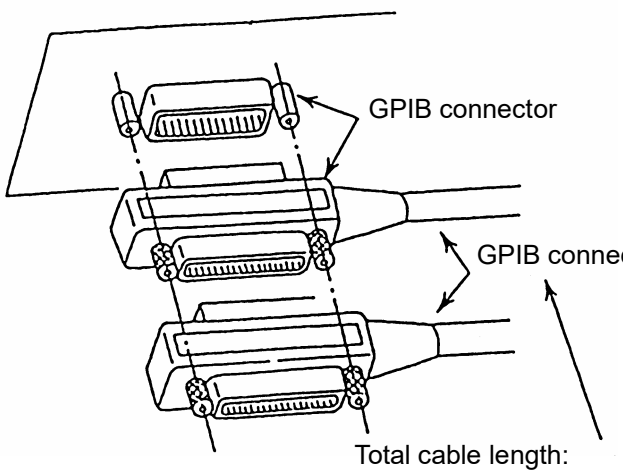
E.2.1 GPIB connection

Connect the GPIB connector on the rear panel of the MG3710A/MG3710E/MG3740A and an external device using a GPIB cable.

Note:

Be sure to connect the GPIB cable before turning power on to the MG3710A/MG3710E/MG3740A. Connecting it while the power is on may damage internal circuits.

Up to 15 devices, including the external controller (PC), can be connected into one MG3710A/MG3710E/MG3740A. Be sure to abide by the conditions shown below when connecting devices.



Total cable length:	Up to 20 m
Cable length between devices:	Up to 4 m
Number of devices that can be connected:	Up to 15

Figure E.2.1-1 GPIB cable connection

E.2.2 Ethernet connection

Connect the Ethernet connector on the rear panel and external devices using LAN cables.

Note:

Check the network settings before LAN connection. The destination LAN may be affected depending on settings.

Use a LAN crossover cable to connect the MG3710A/MG3710E/MG3740A and an external device. Use a network hub when connecting to multiple external devices.

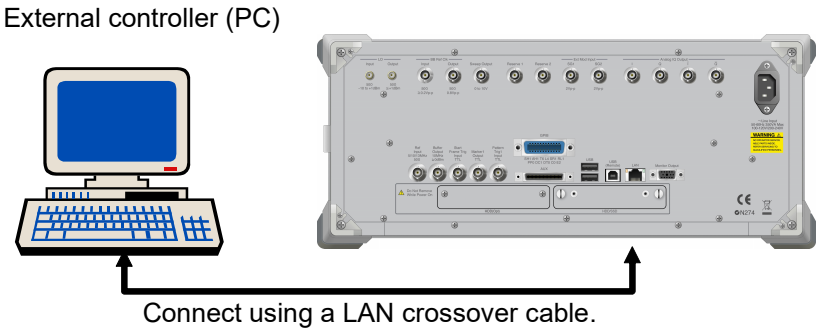


Figure E.2.2-1 Sample connection with one external device

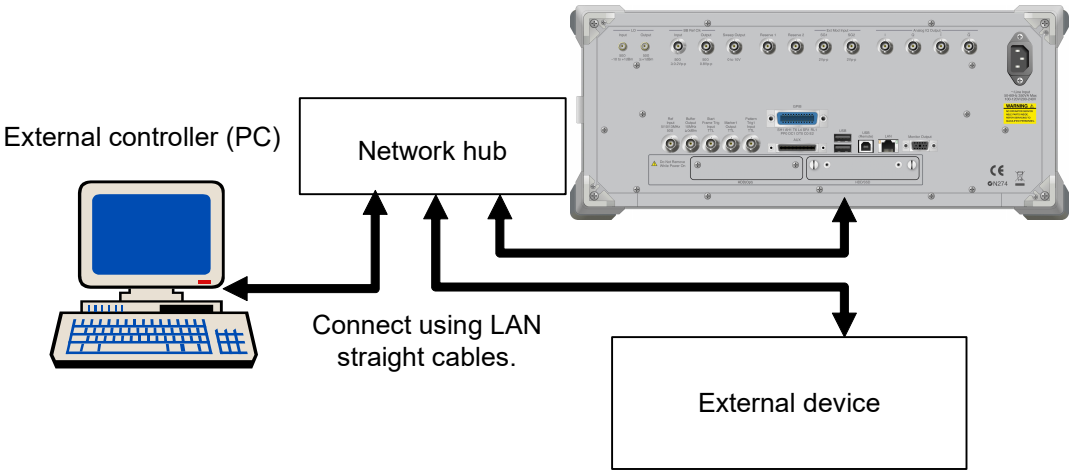


Figure E.2.2-2 Sample connection with multiple external devices

Note:

External devices may experience difficulty in communicating with the MG3710A/MG3710E/MG3740A, depending on the status of communications between them. A LAN crossover-cable connection is recommended to ensure communication stability.

E.2.3 USB connection

Connect the USB (Remote) connector on the rear panel and external devices using USB cables. The external controller (PC) can be connected to multiple devices via a USB hub, etc.

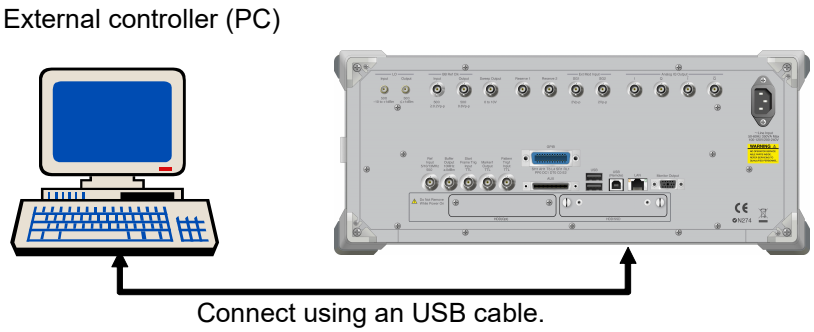


Figure E.2.3-1 Sample connection with one external device

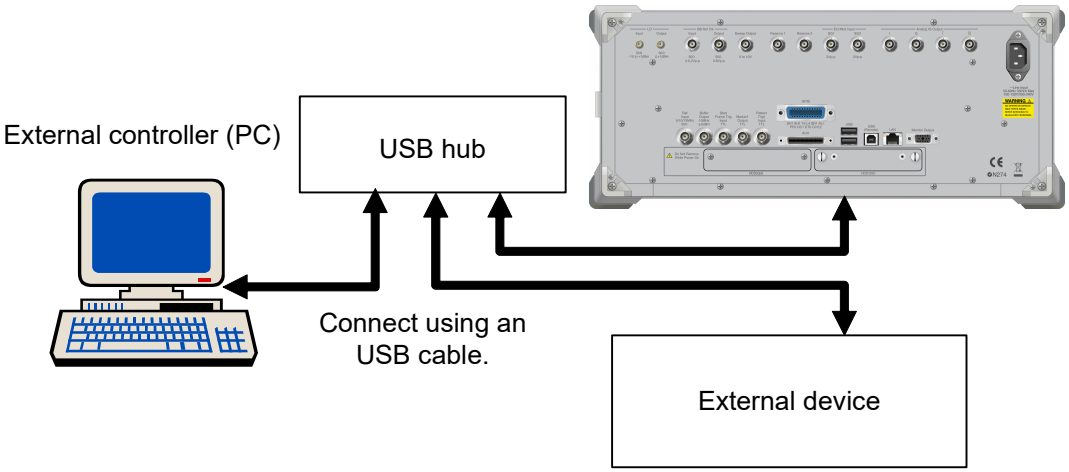


Figure E.2.3-2 Sample connection with multiple external devices

E.3 Interface Settings

This section describes setting methods for the MG3710A/MG3710E/MG3740A and the external controller (PC) for remote control. Connecting a mouse or keyboard may be required to perform settings.

E.3.1 GPIB interface settings

1. Sets the GPIB Address
   Refer to 9.4.1 “Interface Setting” for the setting procedure.
   The Resource Name used during control program description by VISA is as shown below:
   When the GPIB primary address is 1:
   `GPIB0::1::INSTR`
2. Sets the terminator (a terminator code).
   Refer to 9.4.1 “Interface Setting” for how to set it.

E.3.2 Ethernet interface settings

1. Sets the terminator (a terminator code).
   Refer to 9.4.1 “Interface Setting” for how to set it.
2. Sets the Raw Socket Port Number.

   Refer to 9.4.1 “Interface Setting” for how to set it.
3. Confirms and configures the network settings of the MG3710A/MG3710E/MG3740A.

   Confirm the IP address, subnet mask, and host name of the Ethernet settings by referring to <How to confirm and set IP address and subnet mask on Windows.> described on the next page.

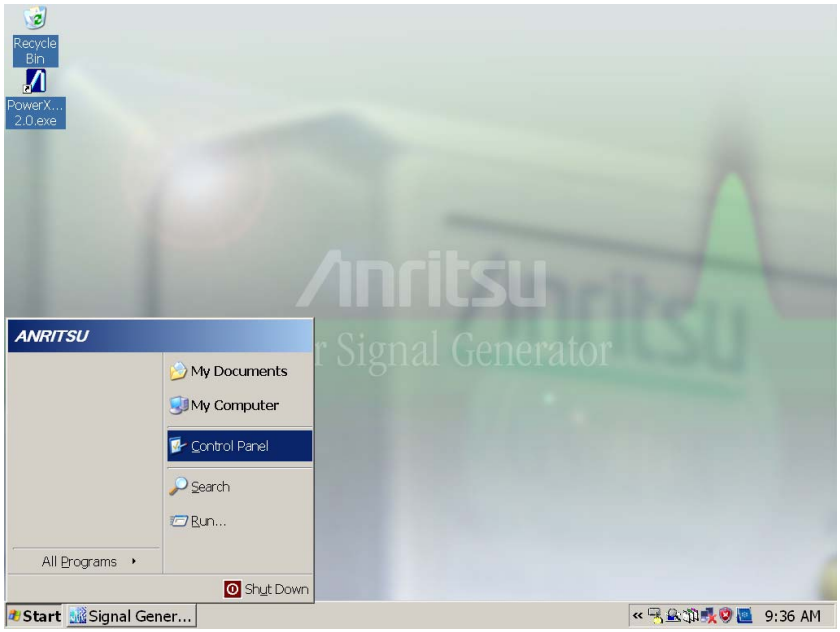
   In case of using Windows VISTA to remotely control MG3710A/MG3710E/MG3740A, the resource name should be described as follows;

   When IP Address = 172.168.0.1:
   `TCPIP::172.168.0.1::INSTR`

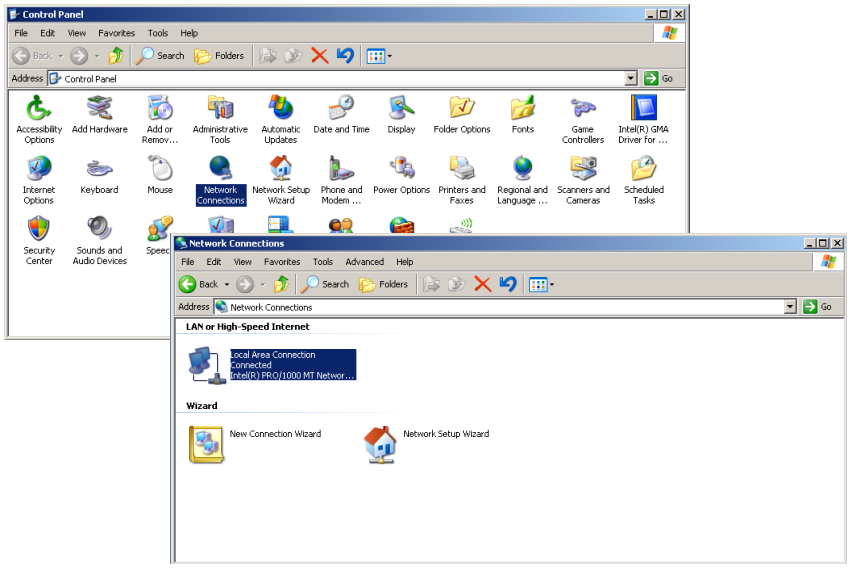
<How to confirm and set IP address and subnet mask>

When the OS is Windows Embedded Standard 2009

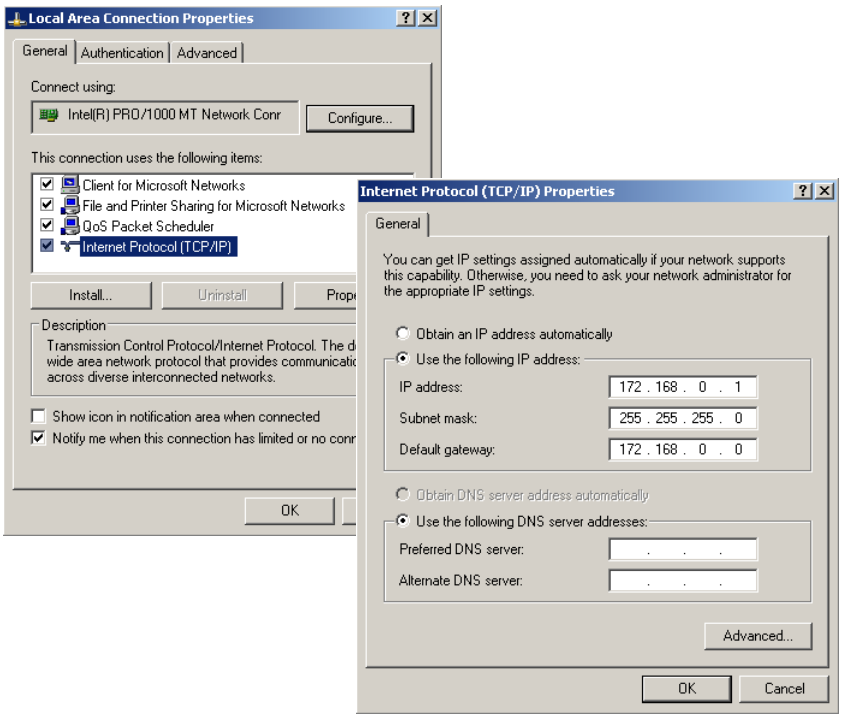
1. Connect a keyboard. Press the Windows key to open the Start menu and then click **Control Panel**. (Or connect a mouse and move the pointer to the bottom of the screen by using it to open the Start menu.) The **Control Panel** window is displayed.



2. On the **Control Panel** window, click **Network Connections** to display the **Network Connections** window. Then click **Local Area Connection** on the **Network Connections** window to display the **Local Area Connection Properties** window.

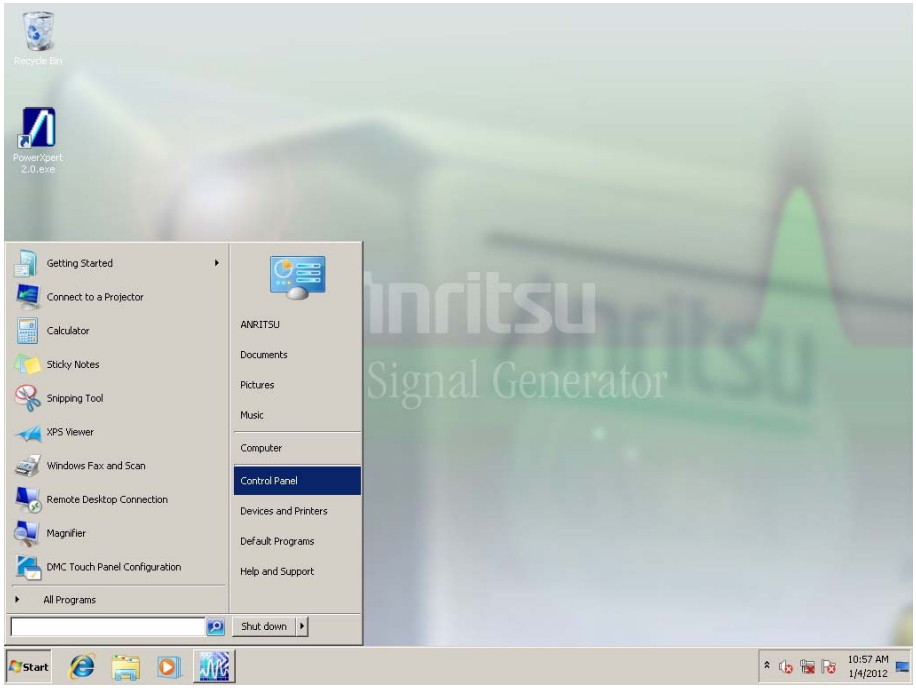


3. On the **Local Area Connection Properties** window, click **Internet Protocol (TCP/IP)** to display the **Internet Protocol (TCP/IP)** Properties window.
   Change the settings according to the connection conditions.

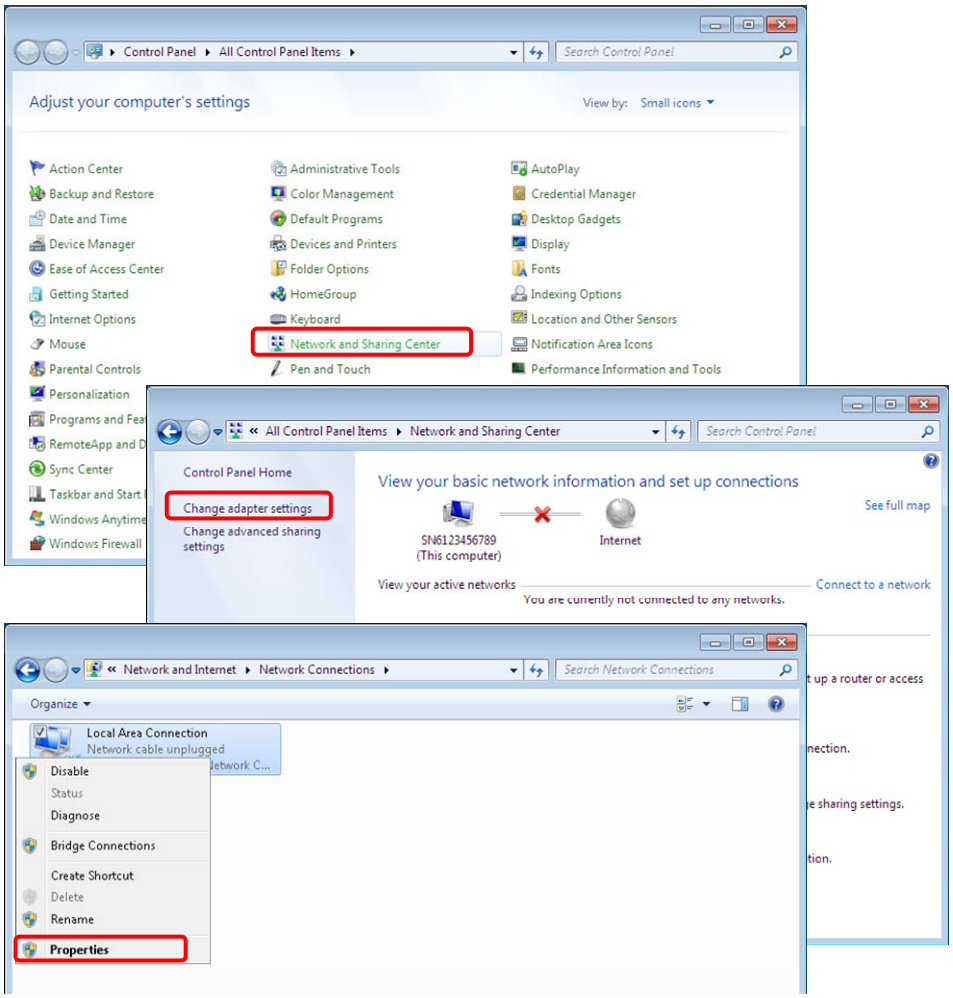


When the OS is Windows 7 Professional or Windows Embedded Standard 7

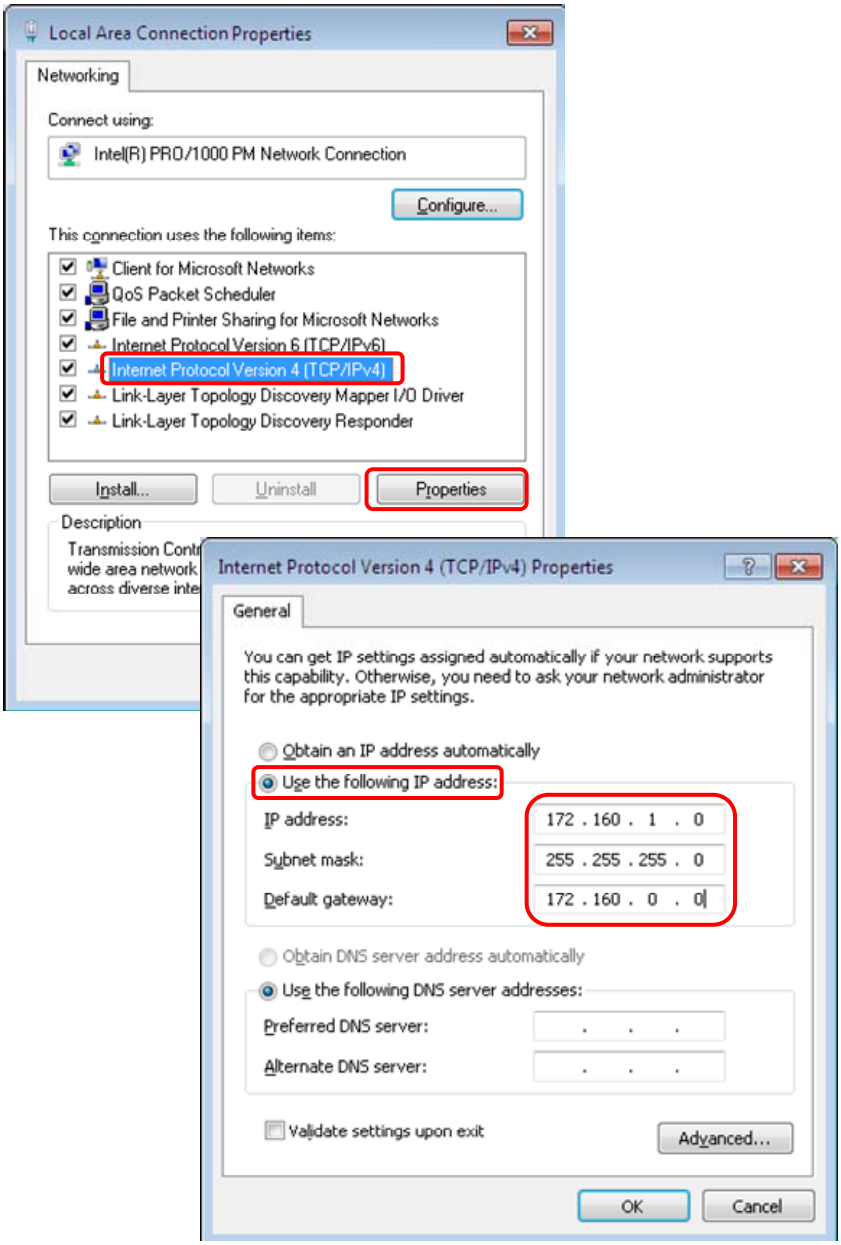
1. Press the Windows key on the connected keyboard, and click the **Control Panel** from the Start menu. The Start menu is also displayed by moving the pointer of the connected mouse to the bottom of the screen. The **Control Panel** window is displayed.



2. Click **Network and Sharing Center** in the **Control Panel** window to display the **Network and Sharing Center** window. Click **Change adapter settings** on the upper left to display the **Network Connections** window.
   Right-click the **Local Area Connection** icon and click **Properties** to display the **Local Area Connection Properties** window.

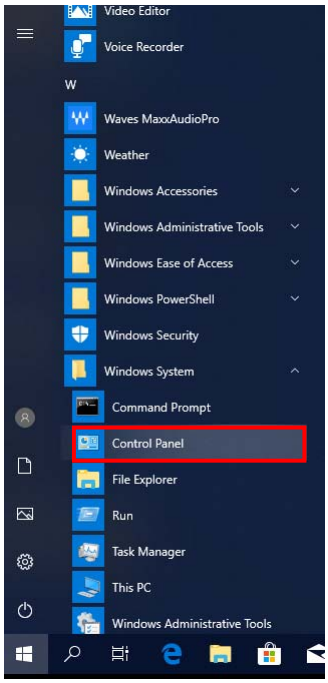


3. Select the **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties** to display the **Internet Protocol Version 4 (TCP/IPv4) Properties** window. Change the setting to meet the conditions of connection.

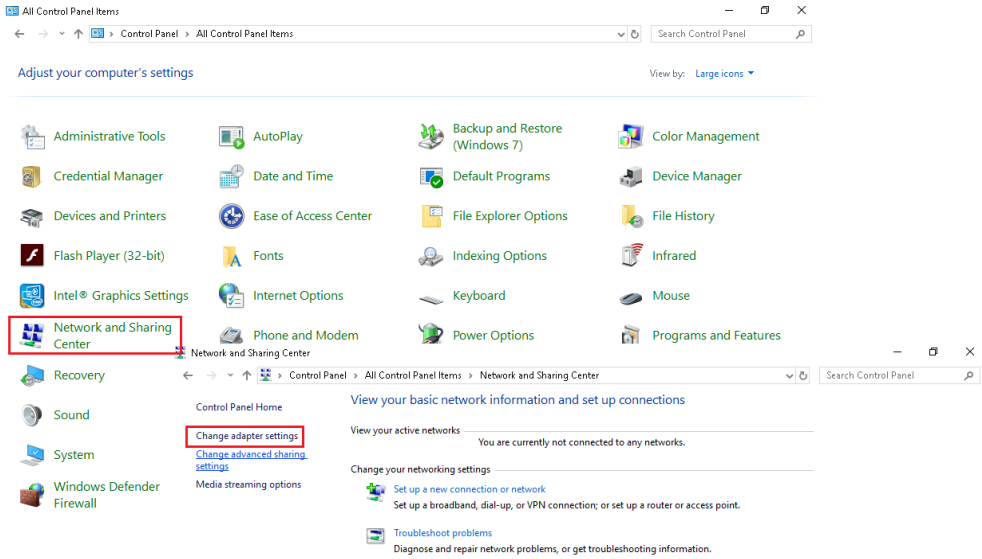


When the OS is Windows 10

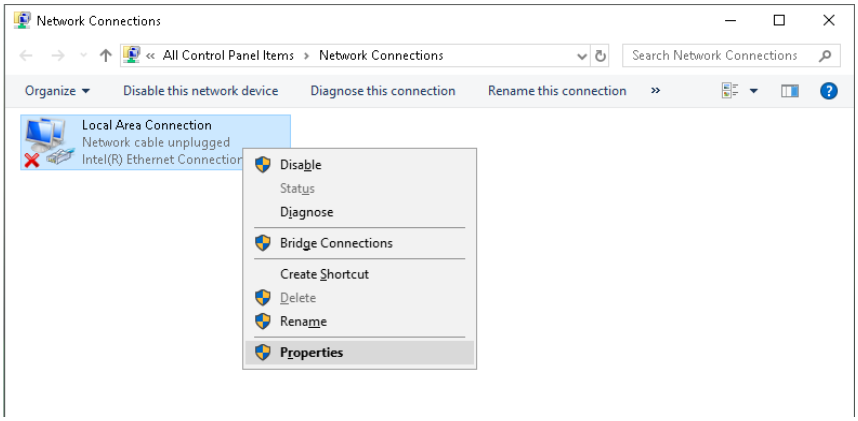
1. On the keyboard, press the **Windows logo key** to open the Start menu, and then click **Windows System > Control Panel** in the **W** column of the app list displayed. The Control Panel window is displayed.



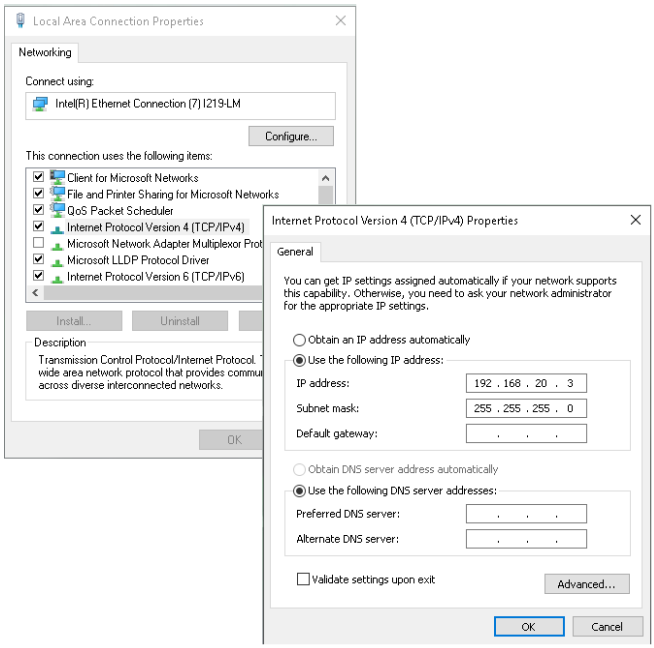
2. In Control Panel, click **Network and Sharing Center**, and then click **Change adapter settings**.



3. Right-click **Local Area Connection**, and then click **Properties.**



4. In the **Local Area Connection Properties** dialog box, click **Internet Protocol Version 4 (TCP/IP)**, and then click **Properties**. In the **Internet Protocol Version 4 (TCP/IP) Properties** dialog box, change the settings according to the connection conditions.



5. In the Configuration screen, check that the settings have changed.

E.3.3 USB interface settings

Utility or **Top**>→>**Utility**

1. Sets the terminator (a terminator code).
   Refer to 9.4.1 “Interface Setting” for how to set it.
2. Check Vendor ID, Product ID, and Serial Number displayed in the USB(B) Settings field.

   Refer to 9.4.3 “Instrument Info” for the setting confirmation procedure.
   The Resource Name used during control program description by VISA is as shown below:

   When Vendor ID = 0x0B5B, Product ID = 0x0006, Serial Number = 123456789:
   `USB0::0x0B5B::0x0006::123456789::INSTR`

E.4 Interface Selection/Changing

The MG3710A/MG3710E/MG3740A supports GPIB, Ethernet and USB as remote control interfaces. Only one of these can be used at once.

The interface to be used is determined automatically according to the communication start command received from the external controller (PC) while in Local status. It enters Remote status when the interface is determined. Remote on the front panel goes off in Local status and lights up in Remote status.

To change the interface, the MG3710A/MG3710E/MG3740A must enter Local status again. Press Local on the front panel to enter Local status, then send a command via the desired interface.

E.5 Initialization

Initialization types and targets for the MG3710A/MG3710E/MG3740A are shown in the table below.

Table E.5-1 Initialization level

Item	IFC	DCL/SDC	Power On	*RST	*CLS
Interface bus initialization	√	–	√	–	–
Message exchange initialization • Input buffer and output queue • Message processing and status	–	√	√	–	–
OPC status initialization	–	√	√	√	√
Event status initialization	–	–	–	–	√
Protected settings initialization (Calibration values, Correction values, OS settings, application load/execution status, etc.)	–	–	–	–	–
Initialization of settings saved at power-off	–	–	*	√	–
Initialization of settings not saved at power-off (window status, measurement results, etc.)	–	–	√	√	–

*: Restores the settings from the last power-off.

(1) IFC (Interface Clear)
- Reception of control command IFC from external controller (PC) (GPIB)
- create_link request from external controller (PC) (Ethernet)
- Establishment of USB2.0 link (USB)
- Pressing of [Local] key

(2) DCL (Device Clear)/SDC (Selectable Device Clear)
- Reception of control command, DCL or SDC, from external controller (PC) (GPIB)
- device_clear request from external controller (PC) (Ethernet)
- Reception of INITIATE_CLEAR from external controller (PC) (USB)

(3) Power On
- Power-on of the MG3710A/MG3710E/MG3740A

(4) *RST
- Reception of *RST command (GPIB/Ethernet/USB)

(5) *CLS
- Reception of *CLS command (GPIB/Ethernet/USB)

E.6 Language Mode

As a command to remotely control the MG3710A/MG3710E/MG3740A, you can select SCPI mode, which is a command format defined by the SCPI Consortium, or compatible modes, in which you can use commands for Anritsu's measuring instruments MG3700A, MG364x, MS269xA, and MS2830A.

- SCPI Mode
  This is a command format defined by the SCPI Consortium and enables control of instruments offered by various manufacturers following a common rule.
- MS269xA Mode
  The commands for the MS269xA Signal Generator application can be used for controlling.
- MS2830A Mode
  The commands for the MS2830A Signal Generator application can be used for controlling.
- MG3700A Mode
  The commands for the MG3700A Vector Signal Generator can be used for controlling.
- MG364x Mode
  The commands for the MG364xA Synthesized Signal Generator can be used for controlling.

Refer to the following descriptions corresponding to your language mode:

SCPI, MS269xA, and MS2830A Modes:
E.7 “SCPI Device Message Details”

MG3700A, MG364x Modes:
E.8 “Native Device Message Details”

Follow the procedure shown below to initialize the language mode to the SCPI mode.

- Preset All
  Refer to 9.5.1 “Preset”.
- Factory Preset
  Refer to 9.4.4 “Install”.
- System Recovery Functions
  Refer to 9.7.6 “System Recovery Functions”.

E.6.1 Language mode switching

Utility or **Top>**→**>Utility**

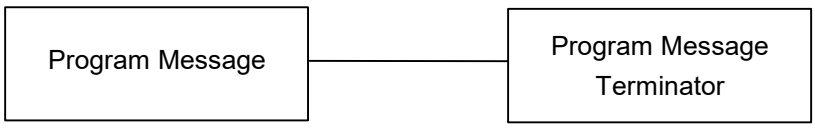
Refer to 9.4.1 “Interface Setting” for language switch.

E.7 SCPI Device Message Details

E.7.1 SCPI Program message formats

Among all device messages, those that are transmitted from the external controller (PC) to the MG3710A/MG3710E/MG3740A are called “program messages”. Program messages fall into two groups: program commands, which set or specify instrument parameters, and program queries, which request parameters and measurement results.

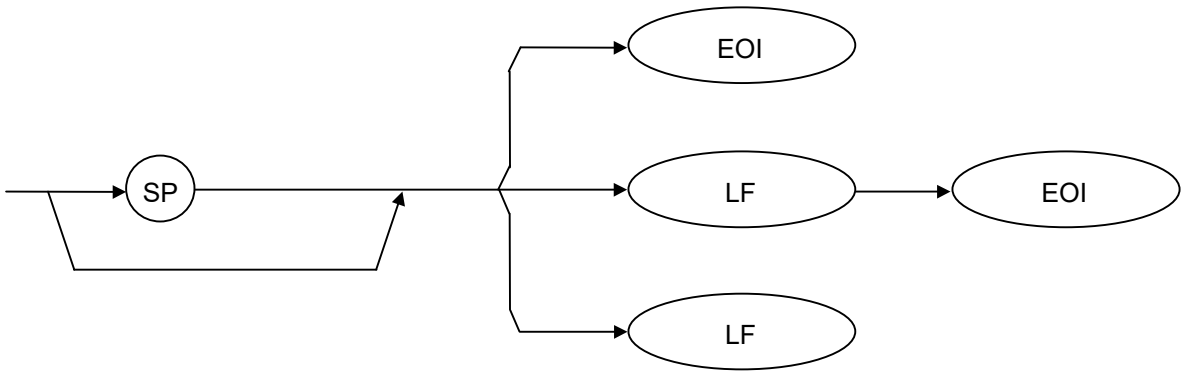
An example of transmitting a program message from the external controller (PC) program to the MG3710A/MG3710E/MG3740A with a PRINT or any other statement is shown below.



PRINT @1;“MEAS:ACP?”
Program message

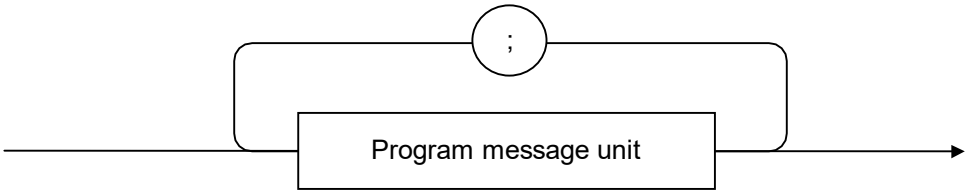
A program message, when transmitted from the external controller (PC) to this unit, is terminated by a specified terminator.

Program Message Terminator



CR (Carriage Return) is ignored without being processed as a terminator.

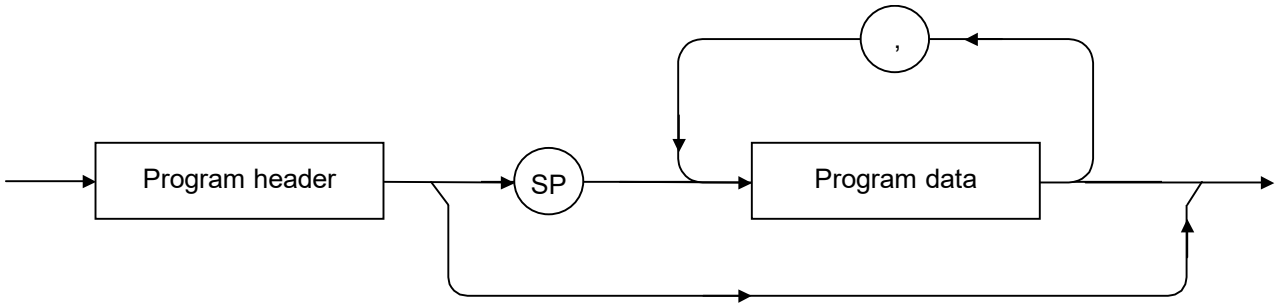
Program message



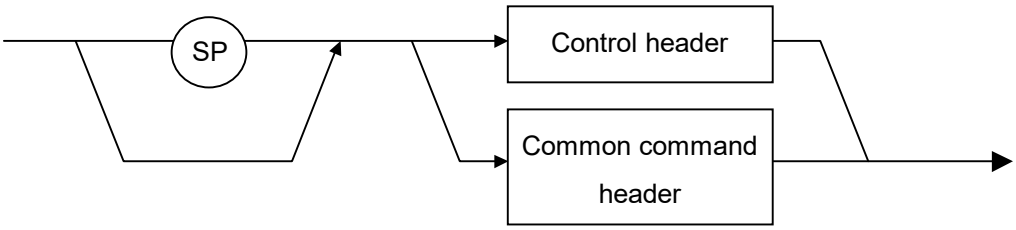
<Example>
PRINT @1; "CONF:ACP;READ:ACP?"

Multiple commands can be transmitted separately by separating them with semicolons (";").

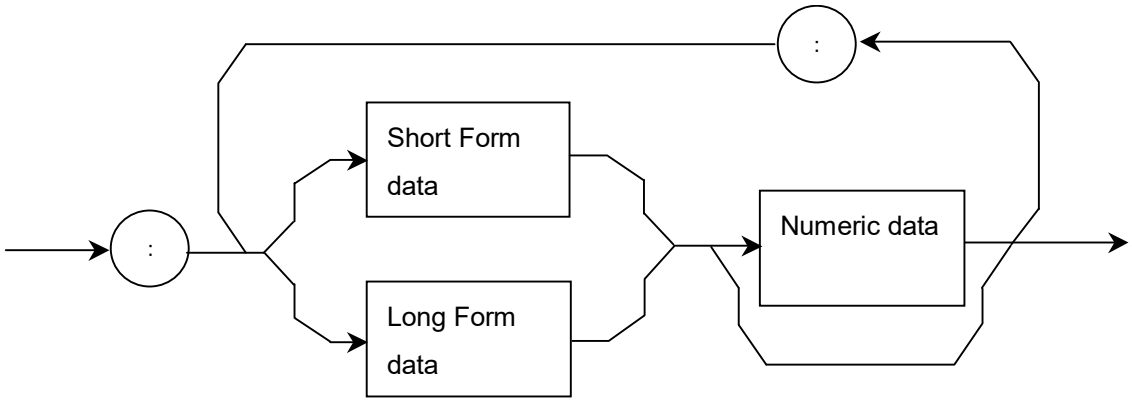
Program message unit



Program header

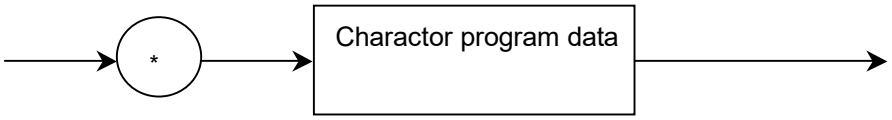


Control header



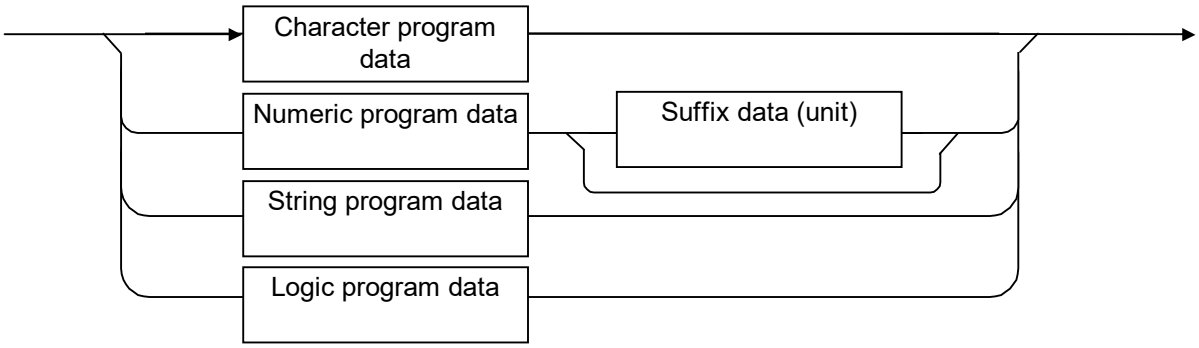
Short Form data corresponds to the short form of SCPI. Long Form data corresponds to the long form of SCPI. Refer to the character program data for each specification. The numeric data is specified as a single ASCII code byte indicating any value within the range of numeric data, from 0 to 9.0.

Common command header



The common command header is denoted by an asterisk (*) before the character program data.

Program data



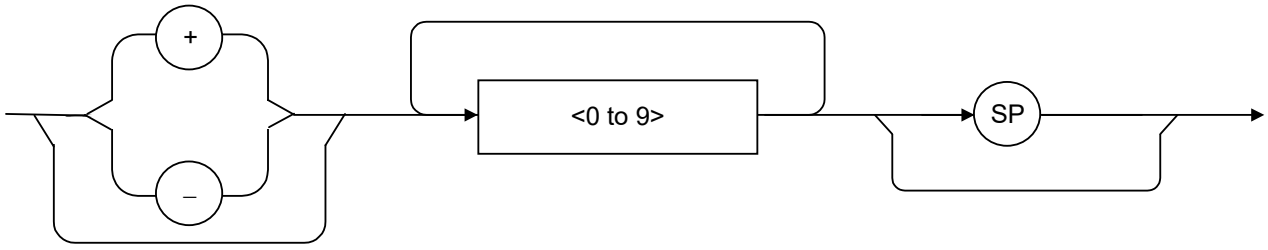
Character program data

Defined strings of data are composed of any of the lowercase and uppercase alphanumeric characters A to Z and 0 to 9, and the underscore ("_").

Numeric program data

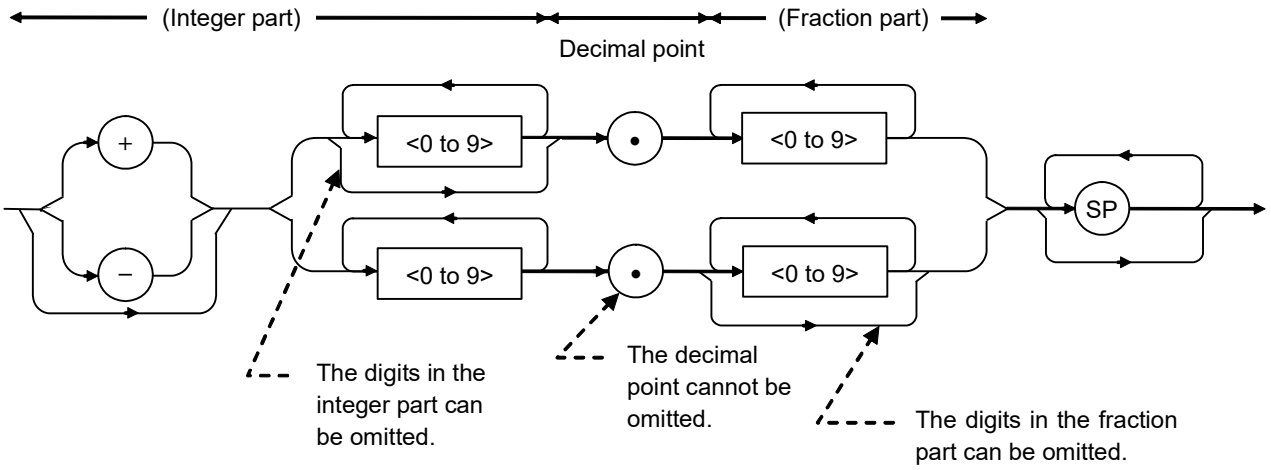
Numeric program data is grouped into four types: integral (NR1), fixed-point decimal (NR2), floating-point decimal (NR3), and hexadecimal formats.

Integral (NR1)



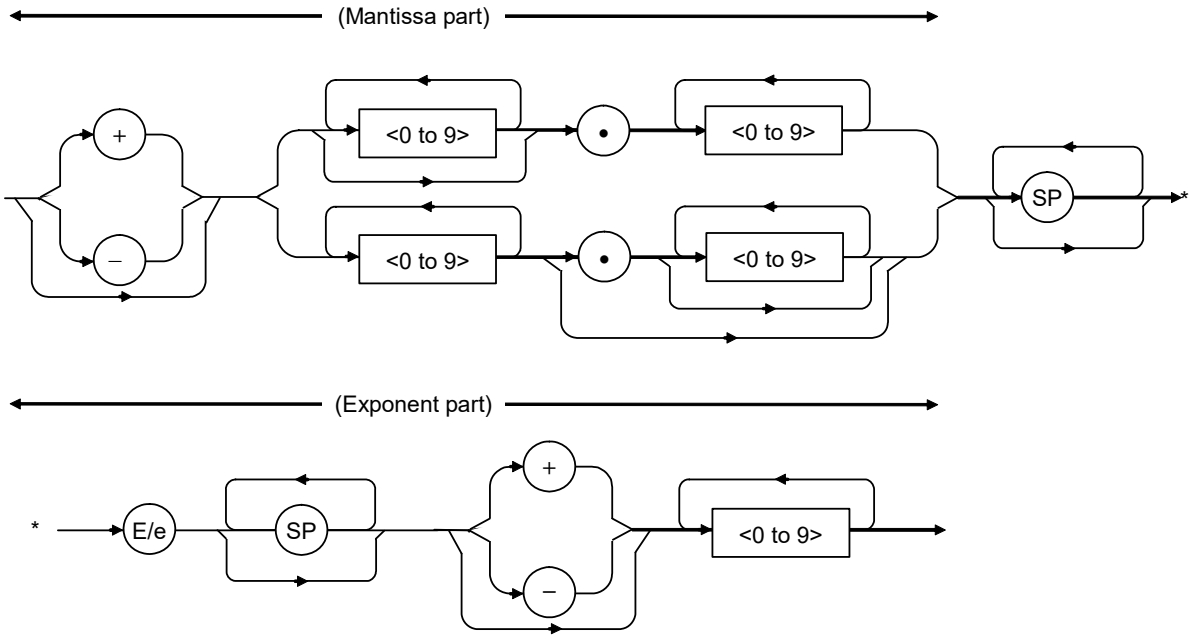
- Integral data can have leading zeros (e.g., 005, +005).
- No space is allowed between a sign (+ or –) and the numeric value that follows it.
- The plus ("+") sign can be omitted (e.g., 005, +005).

Fixed-point decimal (NR2)



- An integer is represented in the integral part.
- No space is allowed between a digit and the decimal point that follows it.
- The plus ("+") sign can be omitted.
- The digit 0 in the integral part may be omitted.
- Any number of zeros, including none, may precede the numeric value in the integral part (e.g., –0.5, +00204, –5).

Floating-point decimal (NR3)



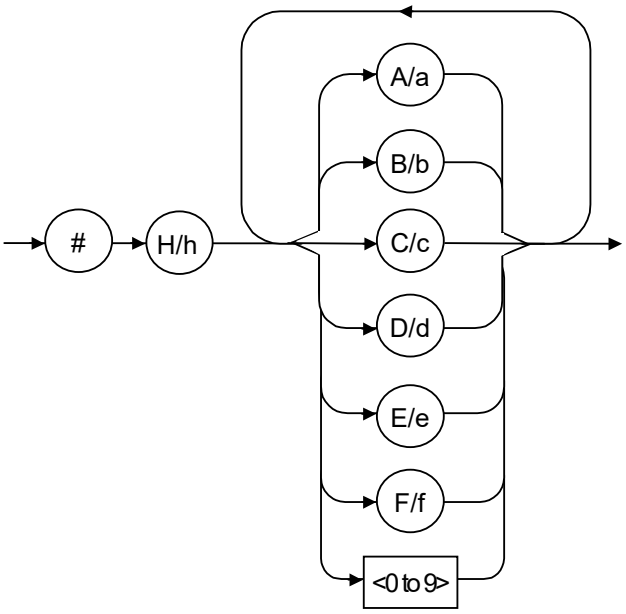
- E denotes the power of 10, or the exponent.
- Spaces are allowed both before and after, only before or only after E/e.
- A numeric value is required in the mantissa.
- Alternatively selectable numeric values (ex. 1|2) and character strings are unavailable.
- The plus ("+") sign can be omitted (from both the mantissa and the exponent).

  <Examples>

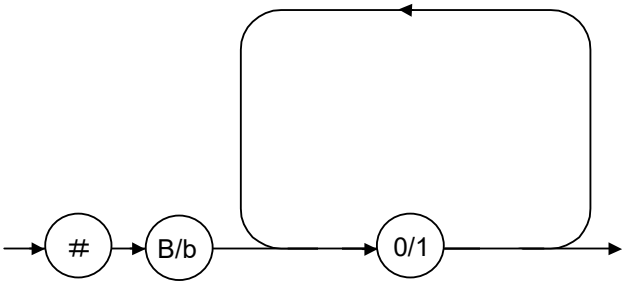
  $-22.34E+6 \rightarrow -22.34 \times 10^{6}$ (= –22,340,000)

  $5.3e-4 \rightarrow 5.3 \times 10^{-4}$ (= 0.00053)

Hexadecimal data



Binary data



Suffix data

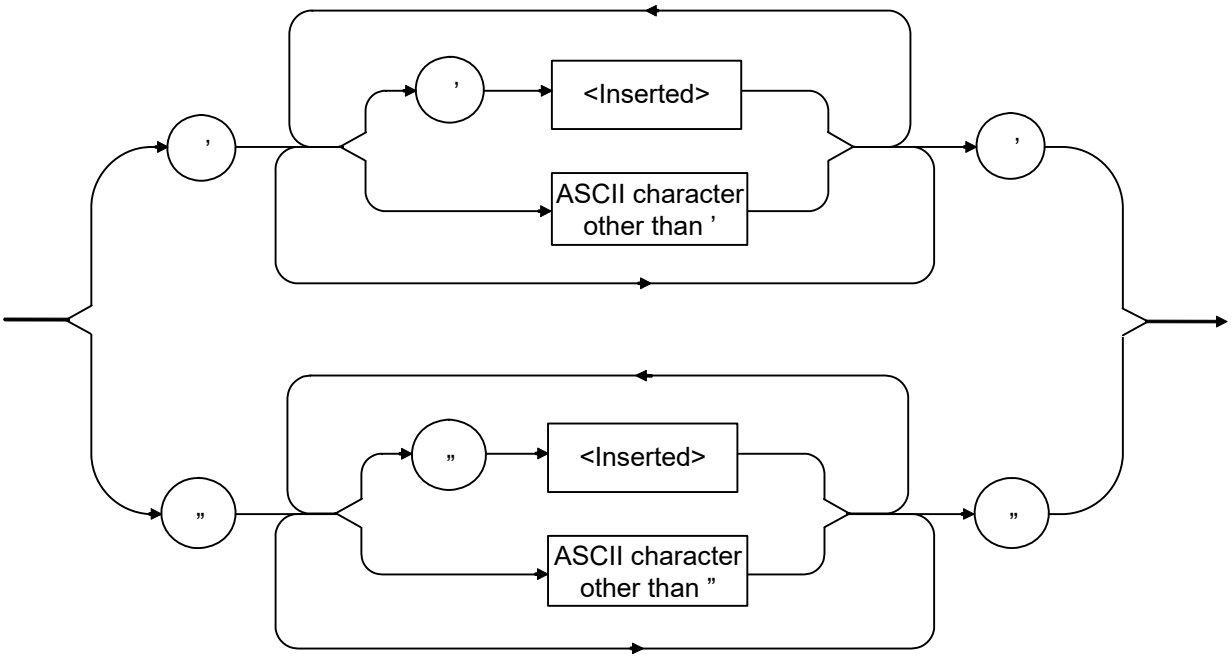
The table below lists the suffix data that is used in the MG3710A/MG3710E/MG3740A.
The suffix codes available vary depending on the function.

Table E.7.1-1 Suffix codes

Category	Suffix Code	Unit
Frequency	GHZ or GZ	GHz
	MHZ or MZ	MHz
	KHZ or KZ	kHz
	HZ	Hz
Level	DB	dB
	DBM or DM	dBm
	DBUV	dBμV
	DBUVE	dBμV (emf)
	V	V
	MV	mV
	UV	μV
Time	S	s
	MS	ms
	US	μs
	NS	ns
	PS	ps
Angle	DEG	degree
Percent	PCT	%

String program data

An arbitrary character string is enclosed by one pair of double quotation marks (“ ”) or single quotation marks (‘ ’). The characters that can be used vary depending on their function.

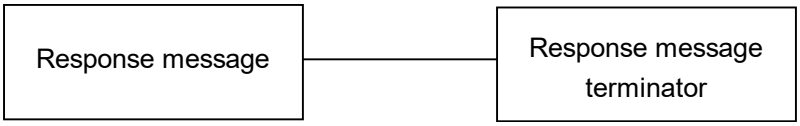


Logic program data

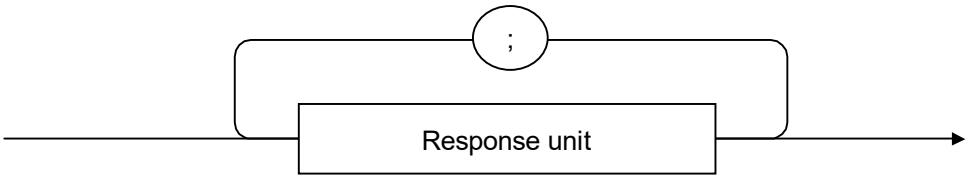
Logical program data indicates a logical value by the program data specified in SCPI. On/off of character program data and 1/0 of numeric program data are defined as values corresponding to true/false.

E.7.2 SCPI Response message formats

The formats in which the external controller (PC) transmits response messages from the MG3710A/MG3710E/MG3740A by way of INPUT and other statements are described below.

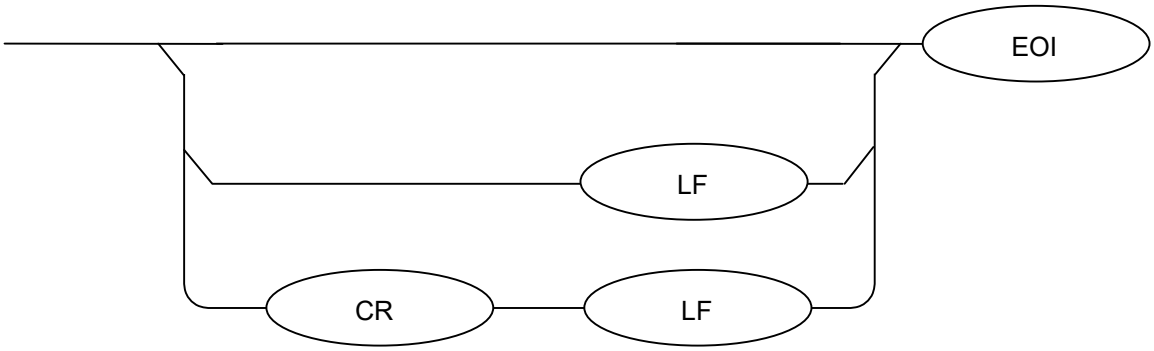


Response message



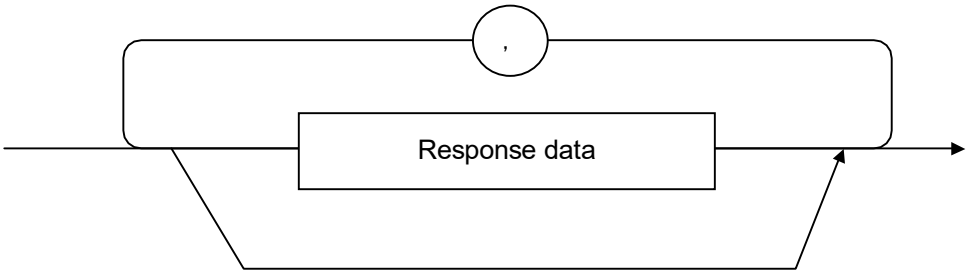
A response message is composed of one or more response message units to one or more program queries issued with one PRINT statement.

Response Message Terminator



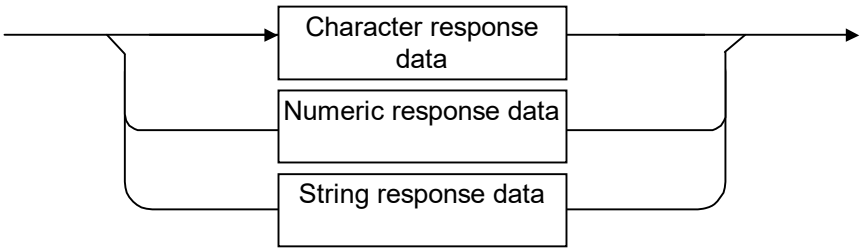
Use a
‘:SYSTem:COMMunicate:GPIB[1][:SELF]:DELimiter’
command to specify the terminator format.

Response Unit



Response unit has no header and only returns the data of the measurement data.

Response data

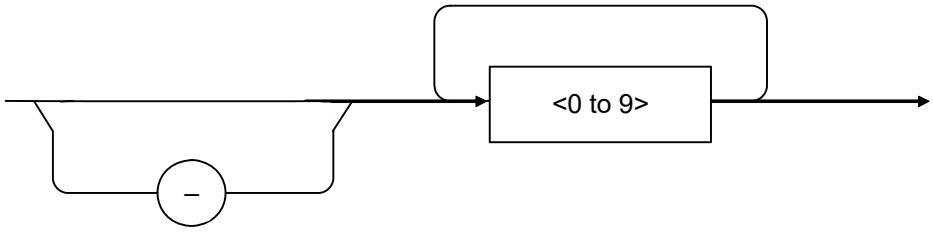


Character response data

Defined strings of data are composed of any of the lowercase and uppercase alphanumeric characters A to Z and the digits 0 to 9, and the underscore ("_").

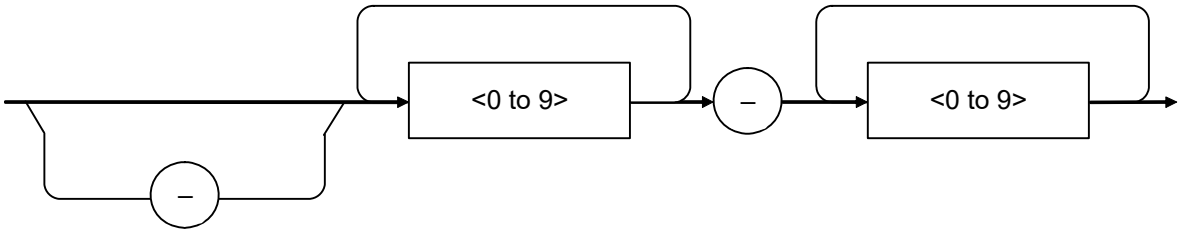
Numeric response data

Integer (NR1)



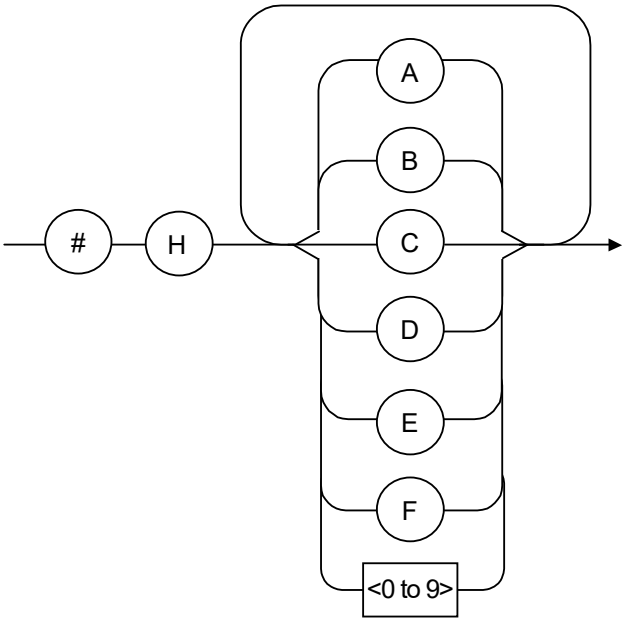
- The leading digit must be non-zero.
  <Examples>
  123, –1234

Fixed-point decimal (NR2)

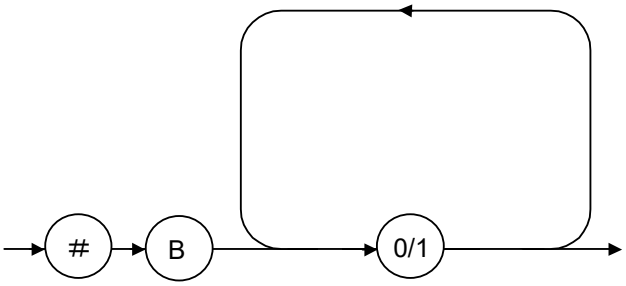


- The leading digit must be non-zero.
- A fixed-point decimal number having a value of 0 in its decimal place is output as an integer.
  <Examples>
  12.34, –12.345

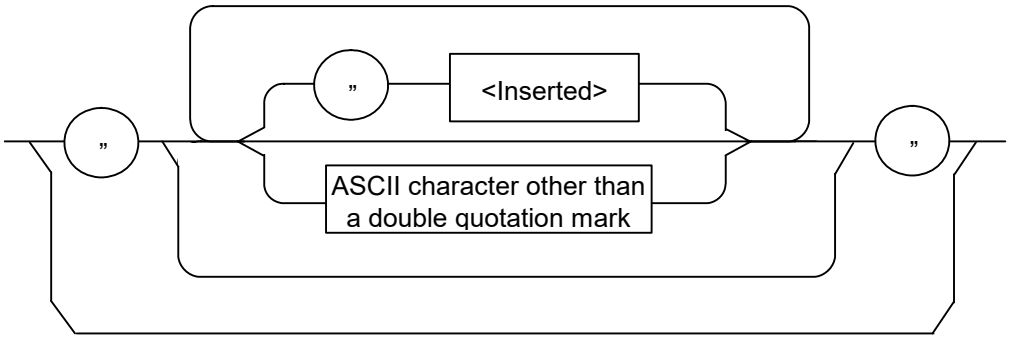
Hexadecimal data



Binary data

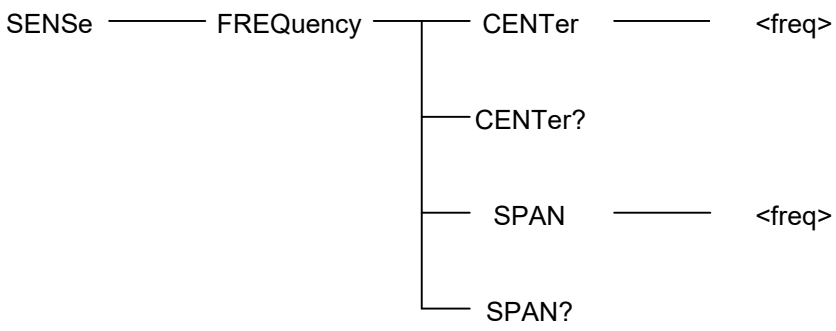


String response data



E.7.3 Structure of SCPI command

The SCPI commands are based on a layered structure. The commands are grouped according to their related functions, and each of them has a layer structure called a “sub-system”.



Example of SCPI command tree

Although the same header may be in the commands, it corresponds to each function, according to the position of the header. Therefore, the commands need to be described with all the headers available on the full path.

E.7.4 Command definition method

:SENSe:FREQuency:CENTer <freq>
:SENSe:FREQuency:CENTer?
:SENSe:FREQuency:SPAN <freq>
:SENSe:FREQuency:SPAN?

Example of SCPI command

The command tree in the previous page comprises the SCPI commands listed above. Overviews of the SCPI command definitions are shown below.

<Command Format>
The command starts with a colon (":"), and the commands are configured by consolidating a header with a header by a colon (":").

<Omission format of header>
The headers have both a short and a long form, the short form being an abbreviated version of the long form. The commands are interpreted as being the same, regardless of whether the short or long form is used (both can be used at the same time). Uppercase and lower case alphabetic characters are used in this manual to distinguish between the short and long forms. (Uppercase letters denote the short form.) It should be noted that the headers are not case sensitive.

Example:

long form	`> :SENSe:FREQuency:CENTer 1000000`
short form	`> :SENS:FREQ:CENT 1000000`
long + short form	`> :SENSe:FREQ:CENTer 1000000`

<Option Node>
[ ] indicates an Option Node.
A header enclosed by square brackets ("[ ]") may be omitted, and is treated as the same command whether omitted or not.

Example:
:STATus:OPERation:[EVENt]?

When the header is not omitted	`> :STATus:OPERation:EVENt?`
When the header is omitted	`> :STATus:OPERation?`

<Header Separator>
There must be at least one space between a command and a parameter. Furthermore, if there is more than one parameter, they need to be separated by commas.

E.7.5 Composition of commands

As in the following examples, commands can be combined by a semi-colon (";"). The second command is referred to as the same level as the bottom layer of the first command. Thus, the second command can be described as in Example 1, or can be described without the upper header over FREQuency, as in Example 2.

Example 1:
```
>:SENSe:FREQuency:CENTer 1000000
:SENSe:FREQuency:SPAN 500000
```
Example 2:
```
>:SENSe:FREQuency:CENTer 1000000;SPAN
500000
```

E.7.6 Selecting SG1/2

Two SGs can be installed on the MG3710A/MG3710E/MG3740A. When the language mode is SCPI, the target SG can be selected with the beginning node of commands for controlling individual functions.

To specify the target SG:
Specify the beginning node of command
`":SOURce[1]|2",":MMEMory[1]|2",":OUTPut[1]|2,"`
`":UNIT[1]|2",":INITiate[1]|2",":CALibration[1]|2"`
as shown below.

To select SG1:
`":SOURce1",":MMEMory1",":OUTPut1",":INITiate1",":UNIT1",`
`":CALibration1" or`
`":SOURce",":MMEMory",":OUTPut",":INITiate",":UNIT",":CAL`
`ibration"`
To select SG2:
`:SOURce2, :MMEMory2, :OUTPut2, :INITiate2, :UNIT2, :CALibratio`
`n2`
To control active SG:
Omit (if possible)

To activate SG, use the following command:
`[:SOURce]:PORT 1|2`

The commands for specifying frequencies are provided examples.

```
[:SOURce[1]|2]:FREQuency[:CW|:FIXed] <freq>
```

Example 1: To select 1 GHz for the frequency of SG1

```
SOUR1:FREQ:CW 1GHZ, or SOUR:FREQ:CW 1GHZ
```

Example 2: To select 2 GHz for the frequency of SG2

```
SOUR2:FREQ:CW 2GHZ
```

Example 3: To activate SG2 and select 3 GHz for the frequency of SG2

```
PORT 2
FREQ:CW 3GHZ
```

E.8 Native Device Message Details

E.8.1 Native Program message formats

Among all device messages, those that are transmitted from the external controller (PC) to the MG3710A/MG3710E/MG3740A are called “program messages”. Program messages fall into two groups: program commands, which set or specify instrument parameters, and program queries, which request parameters and measurement results.

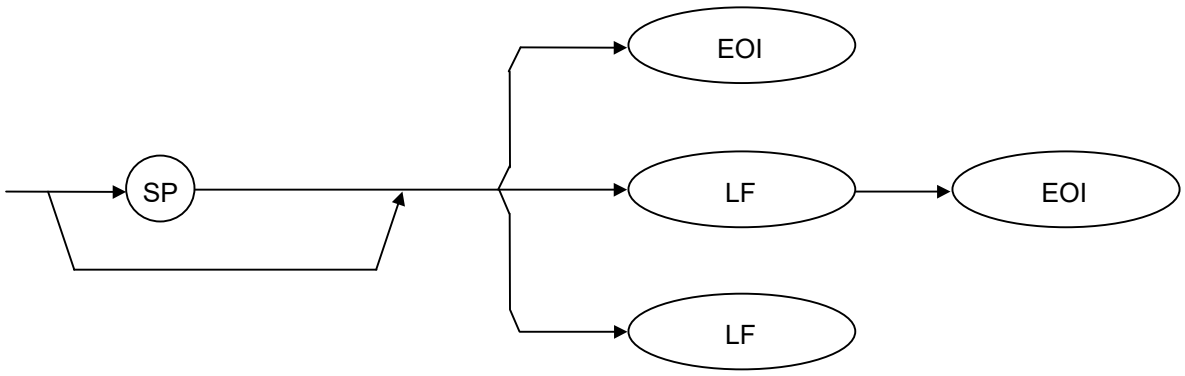
An example of transmitting a program message from the external controller (PC) program to the MG3710A/MG3710E/MG3740A with a PRINT or any other statement is shown below.



PRINT @1;”CNF 1GHZ”
Program message

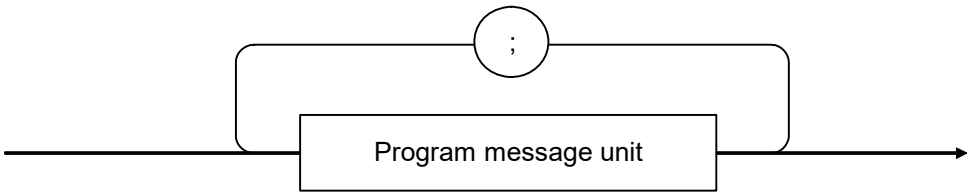
A program message, when transmitted from the external controller (PC) to this unit, is terminated by a specified terminator.

Program message terminator



CR (Carriage Return) is ignored without being processed as a terminator.

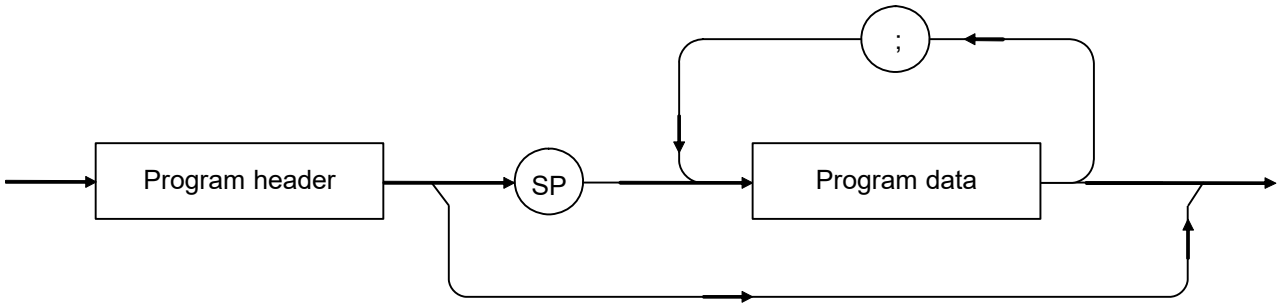
Program message



<Example>
PRINT @1;"CNF 1GHZ;RLV 0DBM"

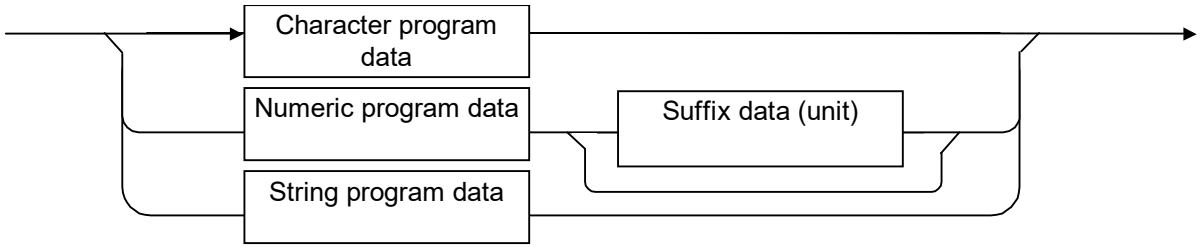
Multiple commands can be transmitted separately by separating them with semicolons (;).

Program message unit



The program header of each IEEE488.2 common command begins with an asterisk (*). The program header of each program query (query) generally ends with a question mark (?).

Program data



Character program data

Defined strings of data are composed of any of the alphabetical lower-case and upper-case characters A to Z, the digits 0 through 9, and the underscore (_).

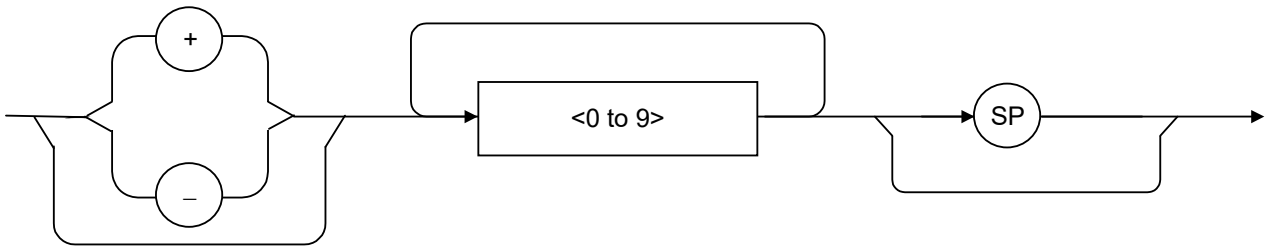
<Examples>

`LOAD SIGANA`	Loads the Signal Analyzer.
`SOUND OFF`	Sets sound to Off.

Numeric program data

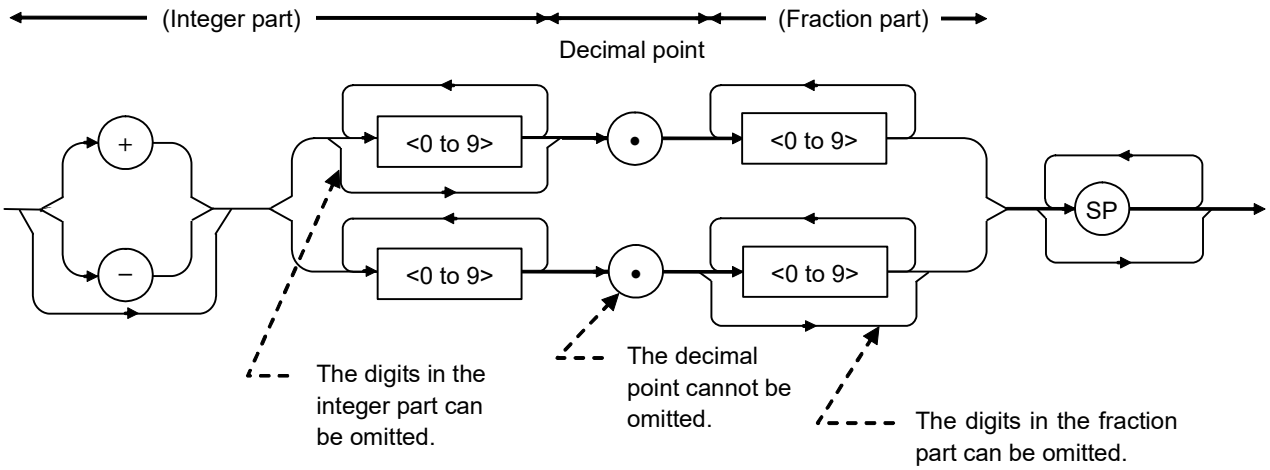
Numeric program data is grouped into four types: integral (NR1), fixed-point decimal (NR2), floating-point decimal (NR3), and hexadecimal.

Integral (NR1)



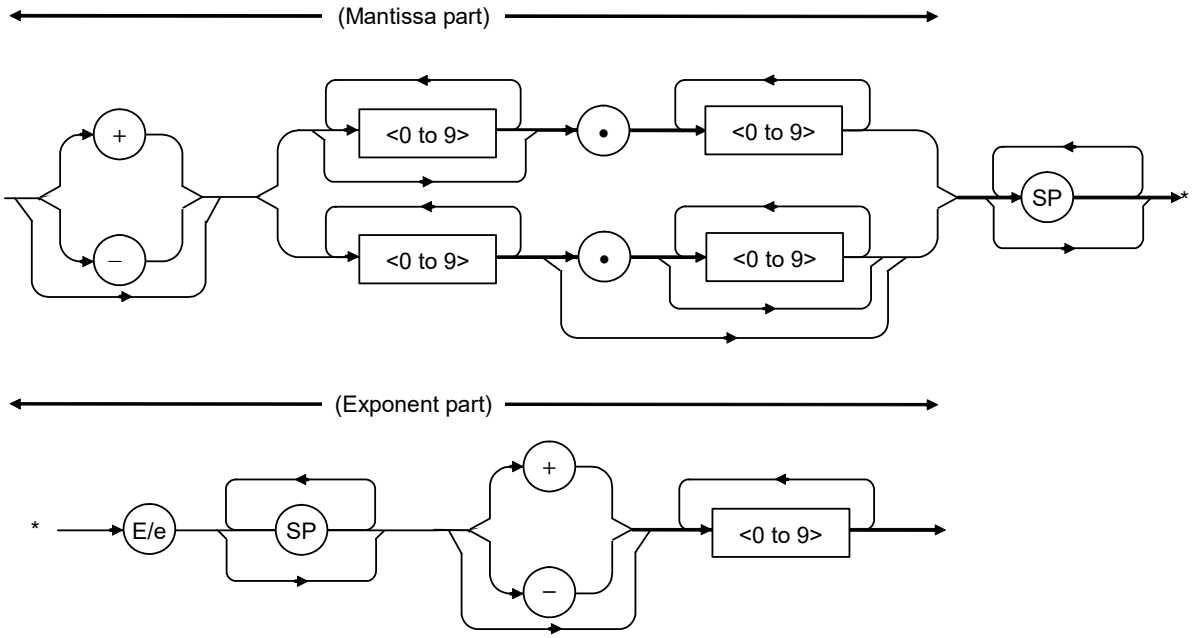
- Integral data can have leading zeros (e.g., 005, +005).
- No space is allowed between a sign (+ or –) and the numeric value that follows it.
- The "+" sign can be omitted (e.g., 005, +005).

Fixed-point decimal (NR2)



- An integer is represented in the integral part.
- No space is allowed between a digit and the decimal point that follows it.
- The "+" sign can be omitted.
- The digit 0 in the integral part may be omitted.
- Any number of zeros may precede the numeric value in the integral part (e.g., –0.5, +00204, –5).

Floating-point decimal (NR3)



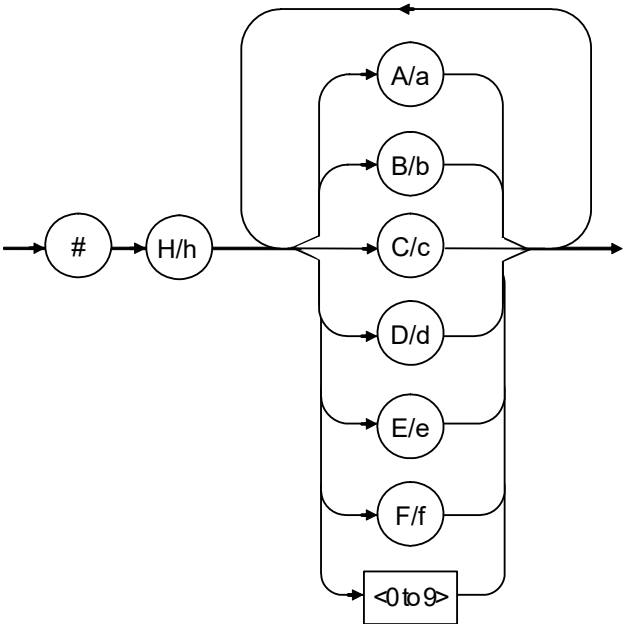
- E denotes the power of 10, or the exponent.
- Spaces are allowed both before and after, only before or only after E/e.
- A numeric value is required in the mantissa.
- Alternatively selectable numeric values (ex. 1|2) and character strings are unavailable.
- The "+" sign can be omitted (from both the mantissa and exponent).

  <Examples>

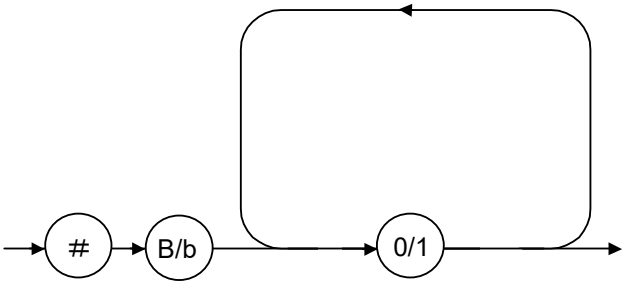
  $-22.34E+6 \rightarrow -22.34 \times 10^{6}$ (= –22,340,000)

  $5.3e-4 \rightarrow 5.3 \times 10^{-4}$ (= 0.00053)

Hexadecimal data



Binary data



Suffix data

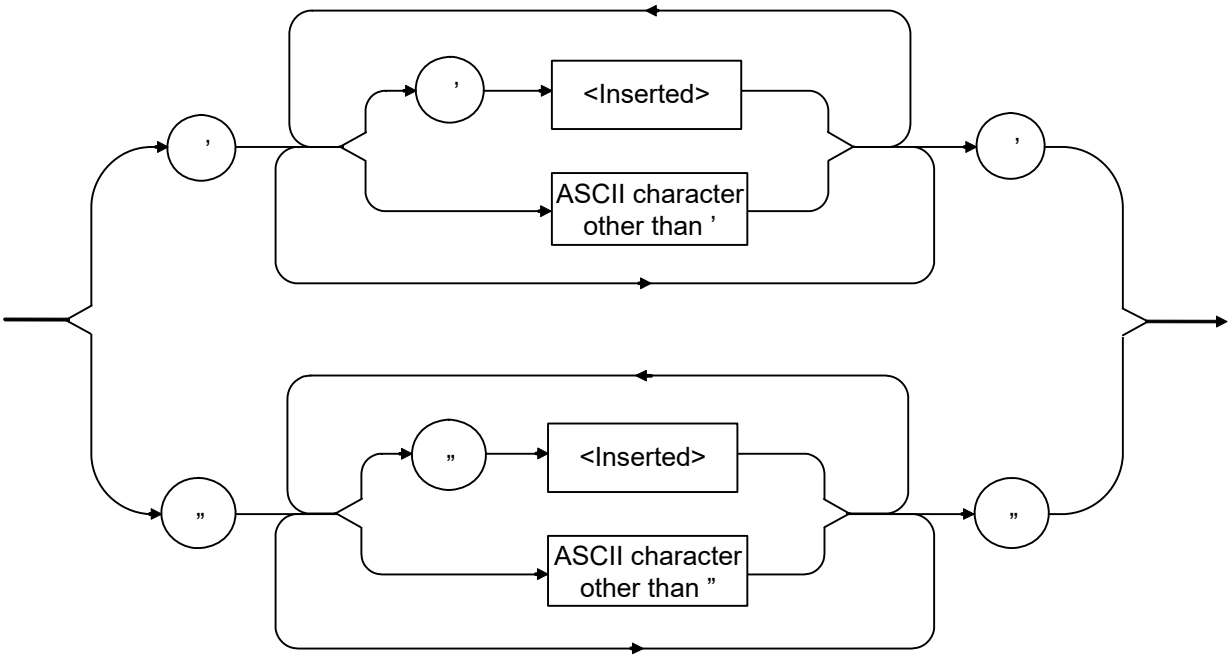
The table below lists the suffix data that is used.
The suffix codes available vary depending on the function.

Table E.8.1-1 Suffix codes

Category	Suffix Code	Unit
Frequency	GHZ or GZ MHZ or MZ KHZ or KZ HZ	GHz MHz kHz Hz
Level	DB	dB
	DBM or DM	dBm
	DBUV	dBμV
	DBUVEMF	dBμV (emf)
	V MV UV	V mV μV
	DBUV	dBμV
	DBUVE	dBμV (emf)
	V MV UV	V mV μV
Time	S MS US NS	s ms μs ns
Angle	DEG	degree
Percent	PCT	%

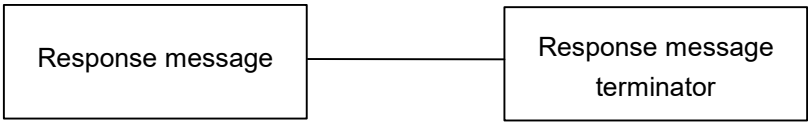
String program data

Arbitrary character string enclosed by one pair of “ ” (double quotation marks) or ‘ ’ (single quotation marks). The characters that can be used vary depending on the function.

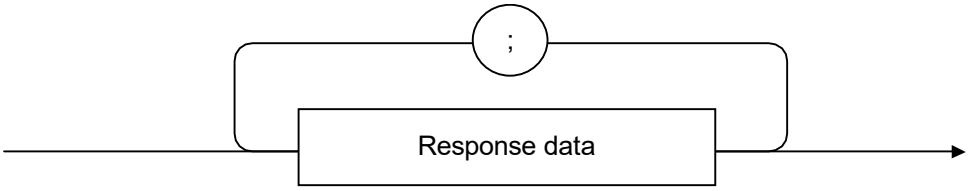


E.8.2 Native Response message formats

The formats in which the external controller (PC) transmits response messages from the MG3710A/MG3710E/MG3740A by way of INPUT and other statements are described below.

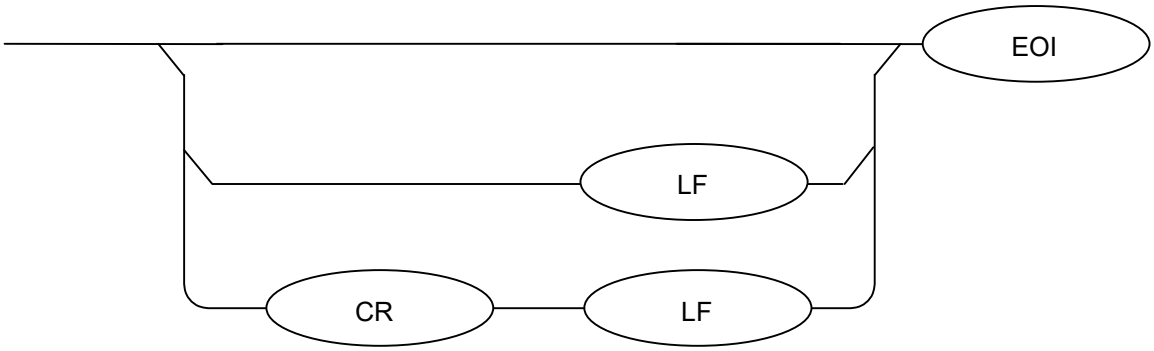


Response message



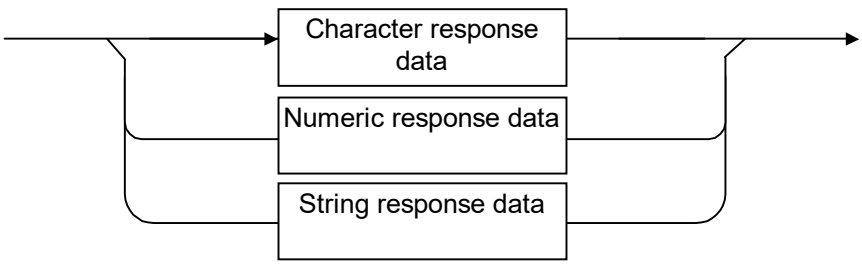
A response message is composed of one or more response message units to one or more program queries issued with one PRINT statement.

Response message terminator



Use a TRM command to specify the terminator format.

Response data

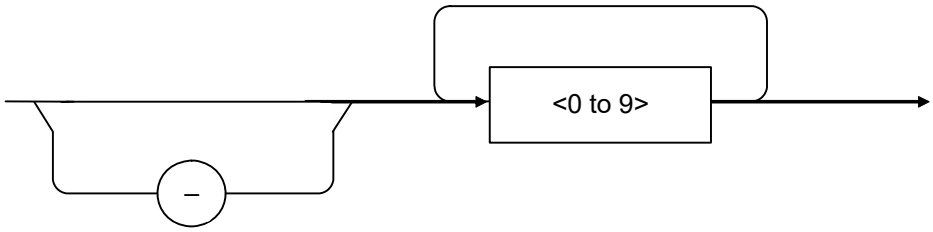


Character response data

Defined strings of data are composed of any of the alphabetical lower case and upper case characters A to Z, the digits 0 through 9, and the underscore (_).

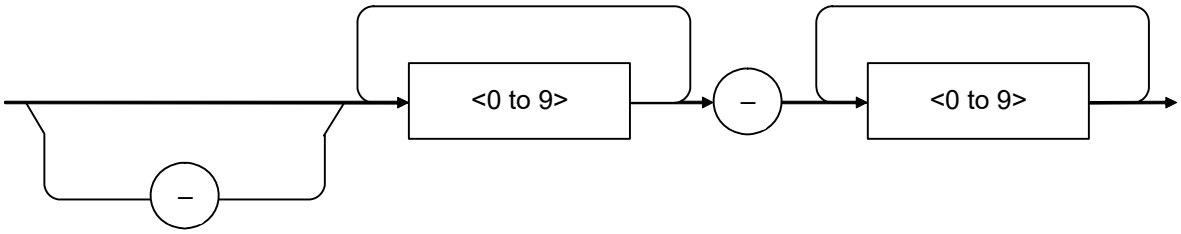
Numeric response data

Integer (NR1)



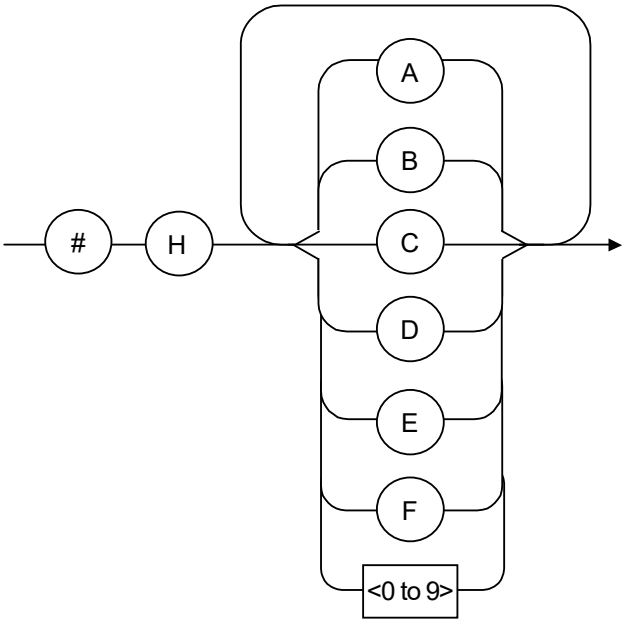
- The leading digit must be non-zero.
  <Examples>
  123, –1234

Fixed-point decimal (NR2)

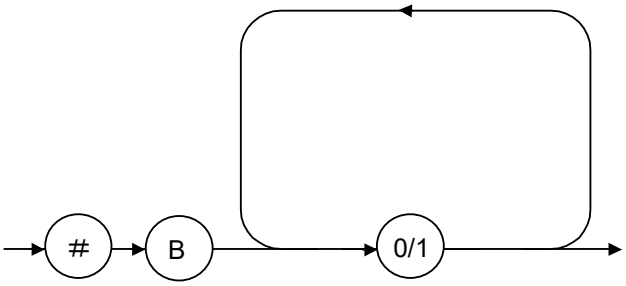


- The leading digit must be non-zero.
- A fixed-point decimal number having a value of 0 in its decimal place is output as an integer.
  <Examples>
  12.34, –12.345

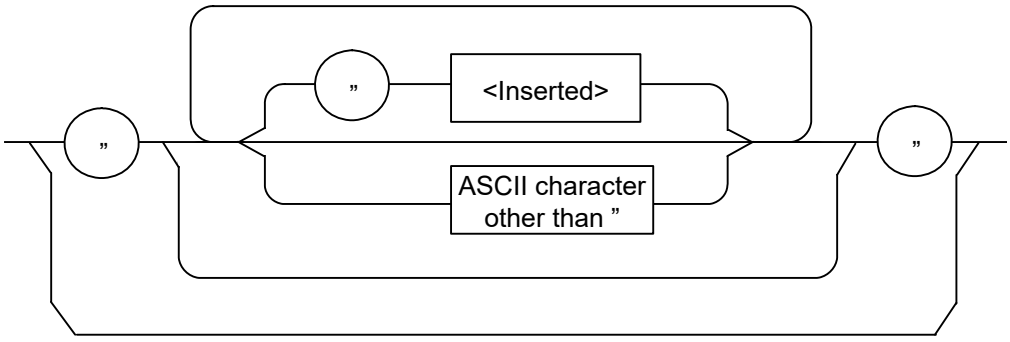
Hexadecimal data



Binary data



String response data



E.8.3 Selecting SG1/2

Two SGs can be installed on the MG3710A/MG3710E/MG3740A. When the language mode is Native, individual functions of active SG are controlled.

To activate SG, use the following command:

```
SELECTSG 1|2
```

Refer to Appendix F.1.1 “Functions Device Messages Common to Measurement Equipment”.

Example: To select 1 GHz for the frequency of SG1

```
SELECTSG 1
FREQ 1GHZ
```

E.9 Status Structure

The Status Byte (STB) that is transmitted to the external controller (PC) complies with the IEEE488.1 standard. Its bit string, called a "status summary message," provides summary information about the current data placed in a register or queue.

E.9.1 IEEE488.2 standard status model

The standard model of the status structure defined by IEEE488.2 is shown below.

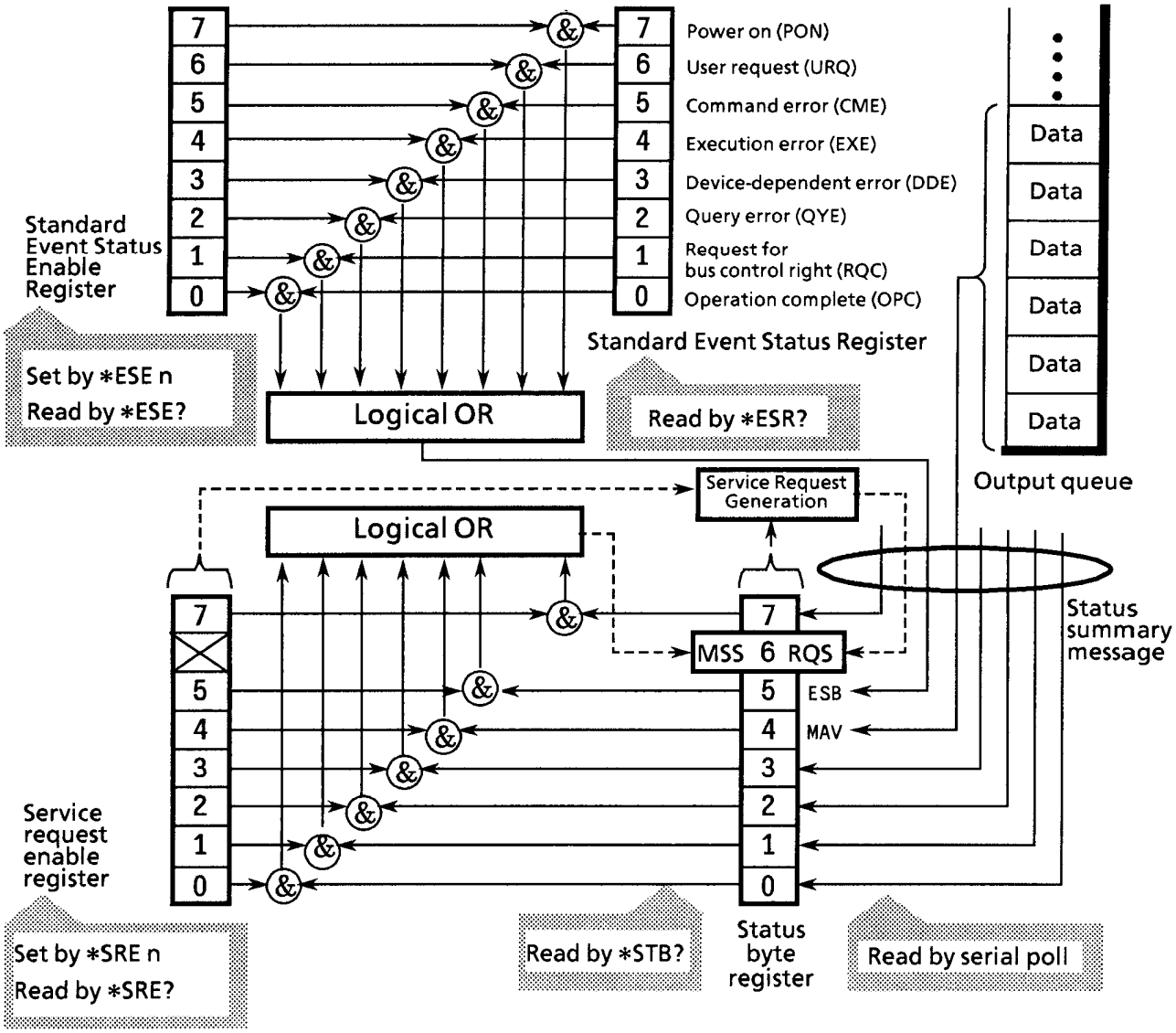


Figure E.9.1-1 IEEE488.2 standard status model

In the status model, an IEEE488.1 status byte is used as the lowest-level status, which consists of seven summary message bits that are supplied from an upper status structure. The status data structure is organized into a register model and a queue model to generate these summary message bits.

Table E.9.1-1 Register model and queue model

Register model	Queue model
A set of registers used to keep a record of the events and conditions that have been encountered in the device. Its structure is built of an Event Status register and an Event Status Enable register. If their AND operation results in non-zero, the corresponding bit of the status byte is set to 1; otherwise, it is set to 0. If their OR operation results in 1, the corresponding summary bit is set to 1; otherwise, it is set to 0.	A queue used to keep a sequential record of status or information. In the queue structure, a bit is set to 1 only if data exists at the corresponding position in the queue; otherwise, a bit is 0.

On the basis of the register model and the queue model thus described, the standard model in the IEEE488.2 status data structure is assembled of two kinds of register models and one queue model.

<1> Standard Event Status register and Event Status Enable register

<2> Status Byte register and Standard Event Enable register

<3> Output queue

Table E.9.1-2 Register models and queue model of IEEE488.2 standard status

Standard Event Status Register	Status Byte Register	Output Queue
The Standard Event Status register is structured in the register model described above. Among all the events that the device may encounter, this register holds bits that represent eight kinds of standard events: <1> power-on, <2> user request, <3> command error, <4> execution error, <5> device-dependent error, <6> query error, <7> bus control request, and <8> operation complete. Bit6 (DIO6) of the Status Byte Register works as an OR output bit to report an Event Summary Bit (ESB) summary message.	The Status Byte register holds an RQS bit seven summary message bits from the status data structure. Bit6 (DIO7) of the Service Request Enable register is system-reserved as an RQS bit to report a service request to the external controller. The mechanism of this SRQ conforms to the specifications of IEEE488.1.	The Output Queue is structured in the queue model described above. Bit4 (DIO5) of the Status Byte Register works as a Message Available (MAV) summary message to report the availability of data in the output buffer.

E.9.2 Status Byte (STB) register

The STB register consists of an STB device and an RQS (or MSS) message.

(1) ESB and MAV summary messages

The ESB and MAV summary messages are described below.

ESB summary message

The ESB (Event Summary Bit) summary message is a message defined by IEEE488.2. It is reported by STB register bit5. The ESB summary message is set to 1 when any one of the bits registered in the Standard Event Status register is set to 1 where event occurrence is enabled. The ESB summary bit is, in turn, set to 0 when none of the events registered in the Status Event Status register occur where event occurrence is enabled.

MAV summary message

The MAV (Message Available) summary message is a message defined by IEEE488.2. It is reported by STB register bit4. This bit indicates whether the output queue is empty. It is used by the device to synchronize message exchanges with the external controller (PC). For example, the external controller (PC) might transmit a query command to the device and wait for MAV to be set to 1. If reading from the output queue is begun without first checking MAV, all system bus actions are deferred until the device responds.

E.9.3 SCPI Device-dependent summary messages

The structure of the status byte register is as shown below when the SCPI mode is selected.

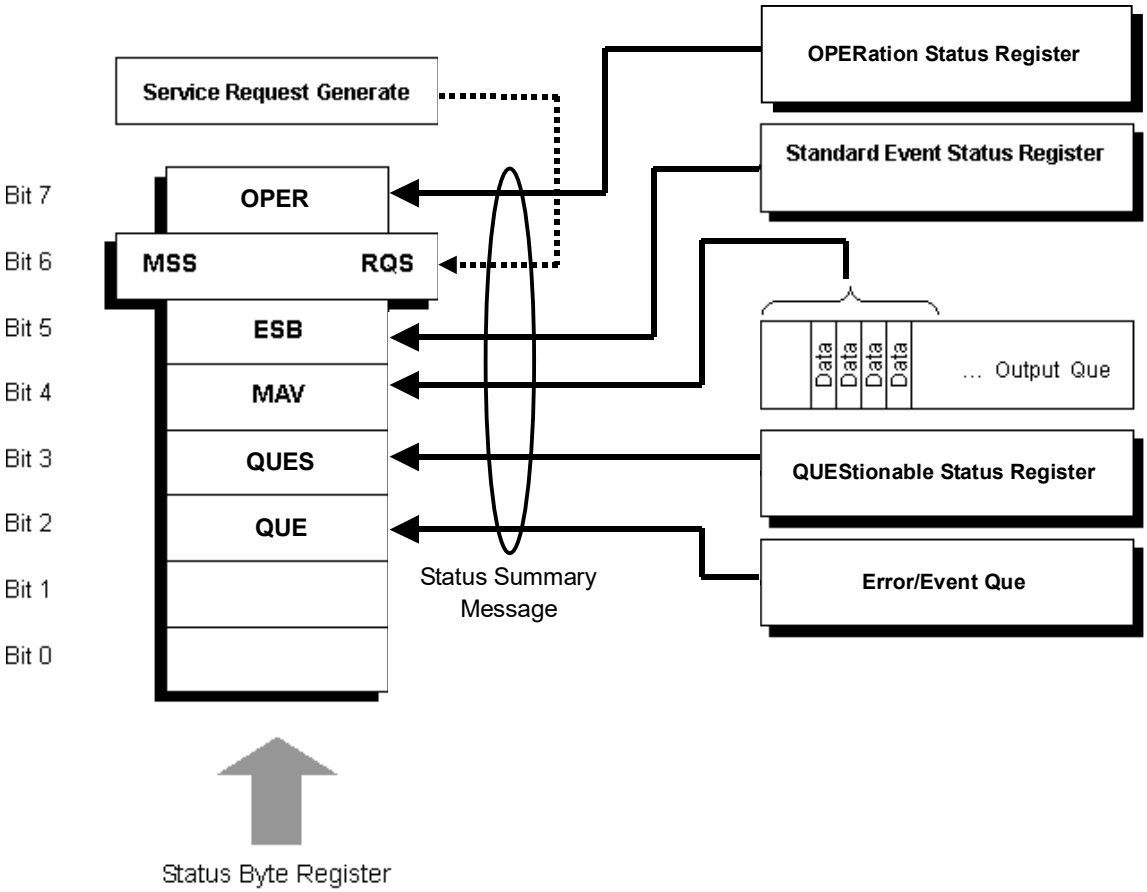


Figure E.9.3-1 Status byte register in SCPI mode

E.9.4 Native Device-dependent summary messages

When language mode is Native, in addition to the Status Bite Register defined by IEEE488.2, Extended Event Status Bits (EESB) are defined individually. EESB 0 to 3 are used as summary bits for application-specific Extended Event Status registers.

Both LEESB3 and EESB2 correspond to the event status expansion of main application (SG1) of the MG3710A/MG3710E/MG3740A, and also both EESB1 and EESB0 correspond to that of the sub-application (SG2) of the MG3710A/MG3710E/MG3740A.

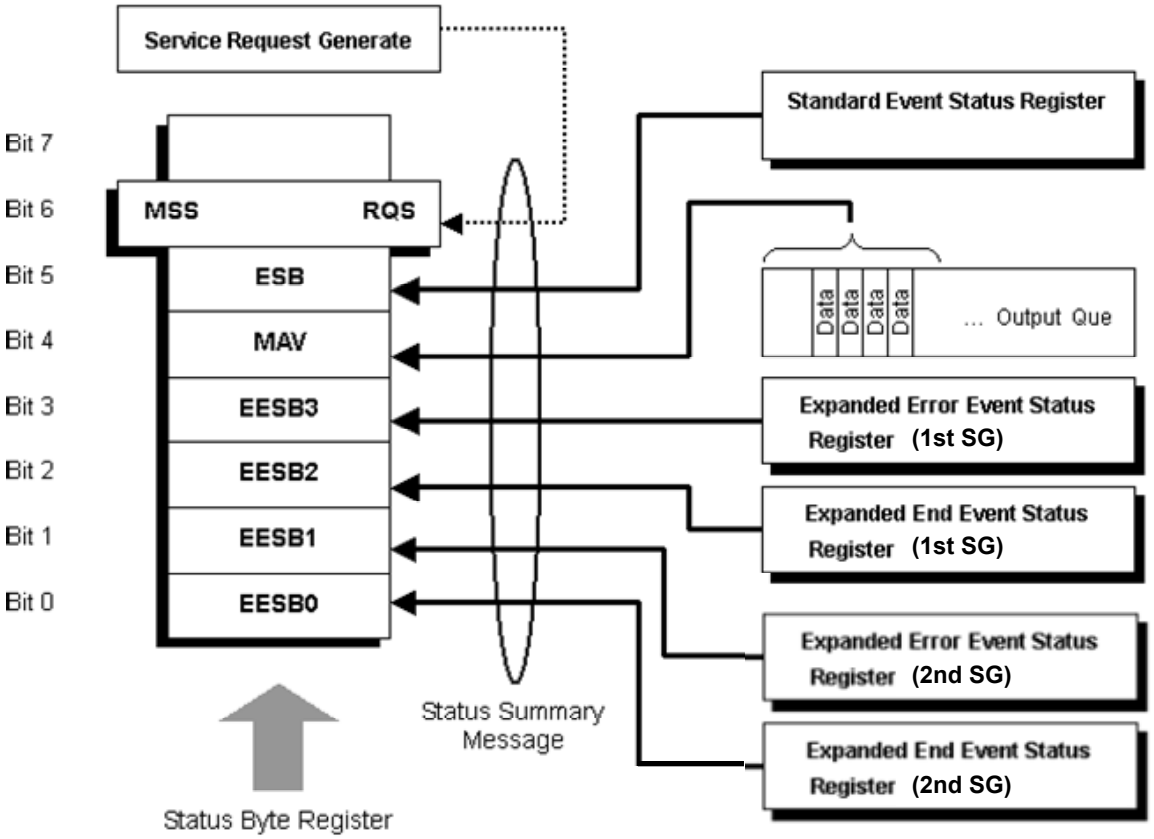


Figure E.9.4-1 Status byte register in Native mode

E.9.5 Reading and clearing STB register

The STB register is read by serial polling or by using an ∗STB? query. Either way, an STB message as defined by IEEE488.1 is read, but the value that is transmitted to bit6 (position) varies with each method used. The STB register can be cleared using the ∗CLS command.

Use Serial Polling to read STB register

If serial polling is implemented under IEEE488.1, a 7-bit status byte and an RQS message bit based on IEEE488.1 are returned. Serial polling does not alter the value of the status byte. The device will set the RQS message bit to 0 immediately on polling.

Use an *STB Common Query to read STB register

Issuing an ∗STB common query causes the device to transmit a response message, in the integer format, comprising the MSS (Master Summary Status) message in the STB register. Hence, a response to ∗STB? matches one to serial polling, except that an MSS summary message appears at the bit6 position, instead of an RQS message.

Define *MSS (Master Summary Status)

The MSS message indicates that the device has at least one service request condition. The MSS message appears at the bit6 position as a device response to an ∗STB query, but not as a response to serial polling. It must not be viewed as part of the IEEE488.1 status byte. MSS consists of total OR which is the combination of the bits of the STB register and the SRQ Enable (SRE) register with one another.

Use the *CLS Common Command to clear STB register

The *CLS common command clears the entire status structure and also summary messages responding to it. The execution of ∗CLS does not affect the settings of the enable registers.

E.9.6 Service Request (SRQ) enable operation

Bits 0 to 7 of the Service Request Enable (SRE) register control whether the corresponding bits of the STB register will generate an SRQ. The SRB register bits are associated with the STB register bits. If the STB register bit associated with a SRE register bit that is 1 is set to 1, the device sets the RQS bit to 1, issuing a service request to the external controller (PC).

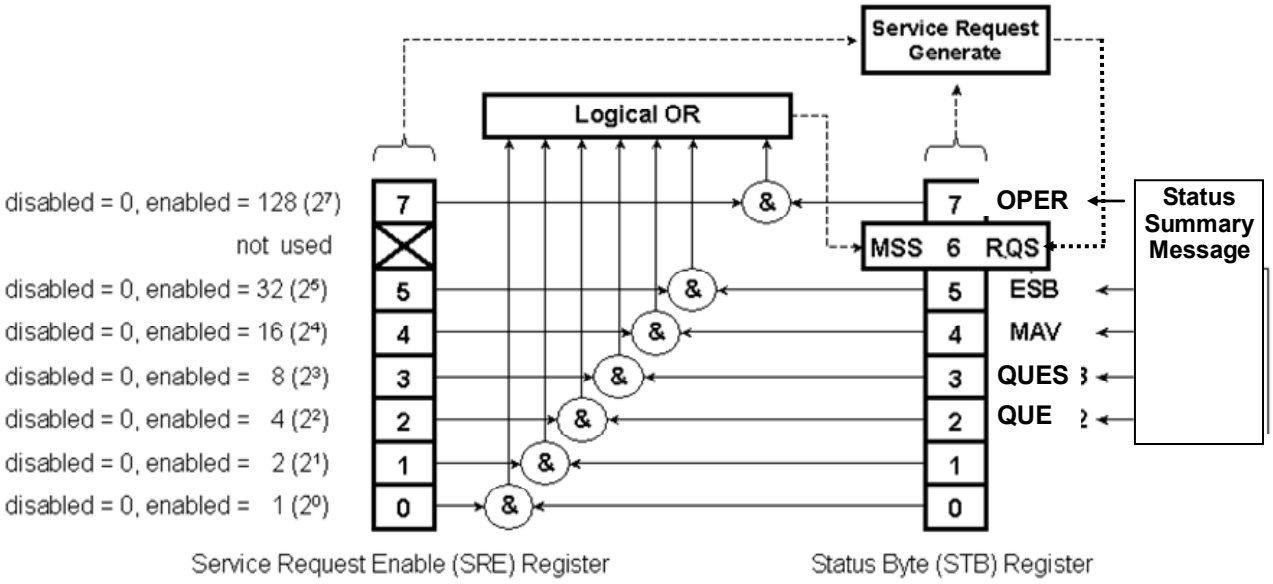


Table E.9.6-1 Service Request (SRQ) Enable Operation (SCPI Mode)

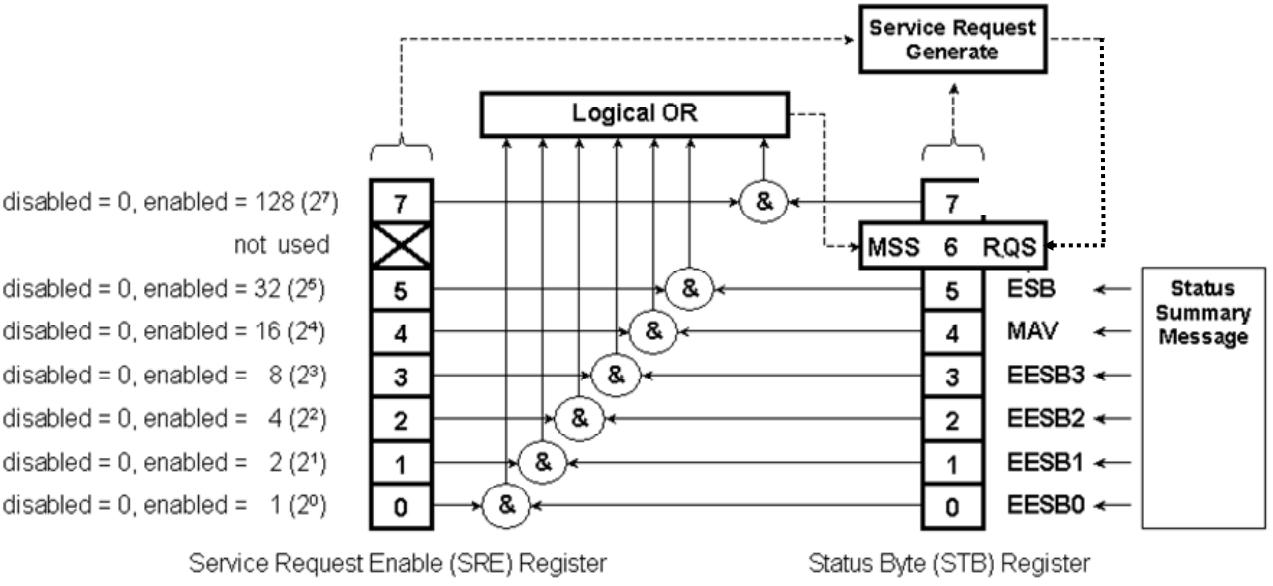


Table E.9.6-2 Service Request (SRQ) Enable Operation (Native Mode)

Read from SRE register

The SRE register is read using an *SRE? common query. A response message to this query is given as an integer between 0 and 255, equaling the sum of the values of the SRE register bits.

Update SRE register

The SRE register is written to using an *SRE common command with an integer between 0 and 255 as a parameter and with the SRE register bits being set to 0 or 1. The value of bit6 is ignored.

E.9.7 Standard Event Status register model

Bit definitions of Standard Event Status register

The operations of the Standard Event Status register are shown below.

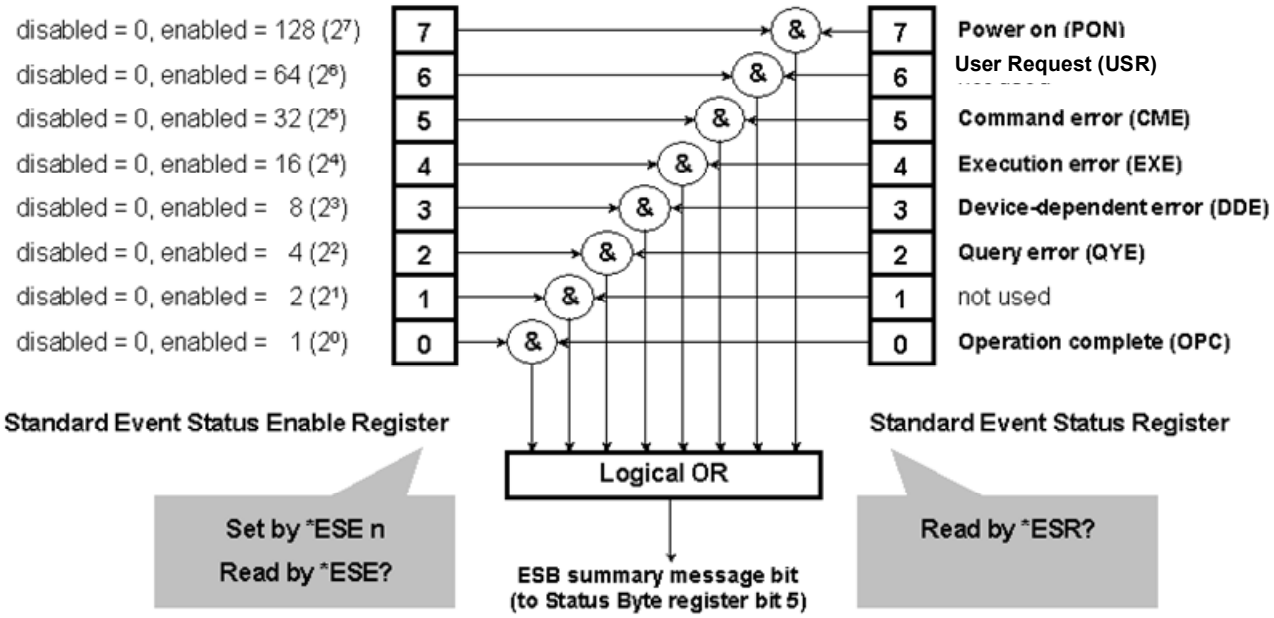


Figure E.9.7-1 Standard event status register

The Standard Event Status Enable (ESE) register specifies which bit of the Event Status register will cause a summary message to become true when it is set.

Table E.9.7-1 Bit events

bit	Event name	Description
7	Power on (PON)	Power transition from Off to On
6	User Request	Transition from Remote to Local
5	Command error (CME)	Device message with illegal header received
4	Execution error (EXE)	Device message with illegal parameter received or the executed function has not completed normally
3	Device-dependent error (DDE)	Error caused by a condition other than CME, EXE, and QYE
2	Query error (QYE)	Attempt to read data from the output queue when it is empty or queued data lost before it is read
1	Not used	—
0	Operation complete (OPC)	Set to 1 when the MG3710A/MG3710E/MG3740A has processed the *OPC command.

E.9.8 Standard Event Status register operation

The operation methods for the Standard Event Status registers and Standard Event Status Enable registers are shown in the table below.

Table E.9.8-1 Standard Event Status register operation

Register	Operation	
Standard Event Status register	Read	This register is read using an *ESR? common query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: <1> The *CLS command is received. <2> The power is turned on (bit7 is turned on, with all other bits being cleared to 0). <3> An event is read in response to an *ESR? query command.
Standard Event Status Enable register	Read	This register is read using an *ESE? common query.
	Write	This register is written to using an *ESE common command.
	Clear	This register is cleared when: <1> An *ESE command with a data value of 0 is received. <2> The power is turned on.

E.9.9 SCPI Specification Status register

The following registers are available, in addition to the status register specified in IEEE488.2 by the specification of SCPI in the SCPI mode.

Table E.9.9-1 SCPI Specification Status registers

Register-Filter	Operation
QUEStionable Status register	Reports the status of signals such as measurement results. It is used to require service to external controller when an error occurs. It is not used in MG3710A/MG3710E/MG3740A.
OPERation Status register	Reports some of the statuses of MG3710A/MG3710E/MG3740A.

The SCPI specification status register has the following configuration.

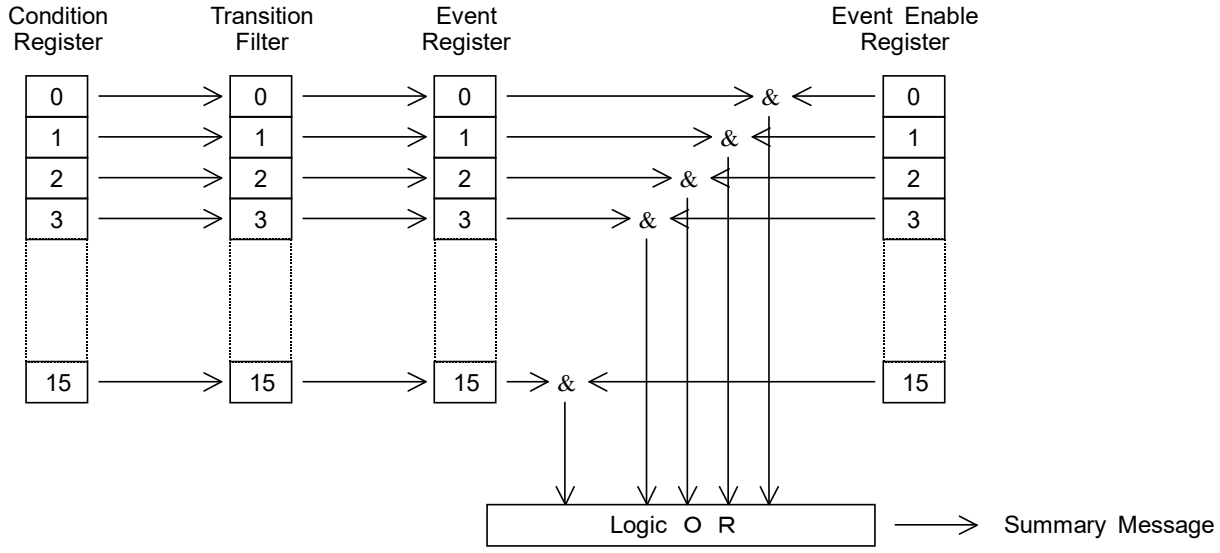


Figure E.9.9-1 Configuration of SCPI Specification Status Register

Table E.9.9-2 SCPI Specification Status register configurations

Register-Filter	Operation
Condition Register	Monitors device status and changes depending on the device status. Therefore, this register does not store the status.
Transition Filter	Sets the contents of the condition register to the event register. The transition filter has the three types shown below, according to what change of the condition register is measured. (1) Positive direction change The event becomes true only when the corresponding condition changes false into true. (2) Negative direction change The event becomes true only when the corresponding condition changes from true into false. (3) Both direction change The event becomes true when a change in either the positive or negative direction is present.
Event Register	Stores the output of transition filter.
Event Enable Register	Selects which bit of the corresponding event register is used to set the summary message to true when set to 1.

E.9.10 SCPI specification status register operation

How to operate the SCPI specification status register and error/event queue is shown below.

Table E.9.10-1 SCPI Status register operation

Register	Operation	
SCPI event register (Main Application)	Read	`:STATus:...:EVENt?` This register is read using a query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: (1) `*CLS` command is received. (2) The power is On. (3) An event is read in response to `:STATus:...:EVENt?` Query command. (4) A language mode is switched.
SCPI enable register (Main Application)	Read	`:STATus:...:ENABle?` This register is read by using an query.
	Write	`:STATus:...:ENABle` This register is written by using a command.
	Clear	This register is cleared when: (1) `:STATus:PRESet` command is received. (2) The power is On. (3) `:STATus:...:ENABle 0` command is received. (4) A language mode is switched.

Table E.9.10-1 SCPI Status register operation (Cont'd)

Register	Operation	

SCPI Transition Filter (Main Application)	Read	`:STATus:...:PTRansition?`
		`:STATus:...:NTRansition?`
		This register is read using a query.

	Write	`:STATus:...:PTRansition`
		`:STATus:...:NTRansition`
		This register is written using a command.

	Clear	This register is cleared when. (1) `:STATus:PRESet` command is received. (2) The power is on. (3) `:STATus:...:PTRansition 0` command is received. (4) A language mode is switched.
Error/Event Queue (Main Application)	Read	`:SYSTem:ERRor?` This register is read using a query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: (1) `*CLS` command is received. (2) The power is on. (3) An event is read in response to `:SYSTem:ERRor?` Query command. (4) A language mode is switched.

The values after the register and filter influenced by `:STATus:PRESet` have been reset are shown in the following table.

Table E.9.10-2 Values after the register and filter influenced by :STATus:PRESet have been reset.

Register	Enable Filter	Reset Value
OPERational Status Register	Enable Register	All 0
QUEStionable Status Register	PTRansition Filter	All 1
	NTRansition Filter	All 0

E.9.11 Extended Event Status register

When the language mode is Native, the application running on the MG3710A/MG3710E/MG3740A has a specific extended event status register and an enable register.

The extended event status register transmits a summary message to EESB0 to EESB3 bits of the status byte register. This allows you to detect events of two applications running on the MG3710A/MG3710E/MG3740A using service requests.

In general, the applications are categorized into Main Application (1st SG) and Sub Application (2nd SG).

Summary messages of the extended event status register of Main Application are transmitted to EESB3 and EESB2 of the status byte register.

Summary messages of the extended event status register of Sub Application are transmitted to EESB1 and EESB0 of the status byte register.

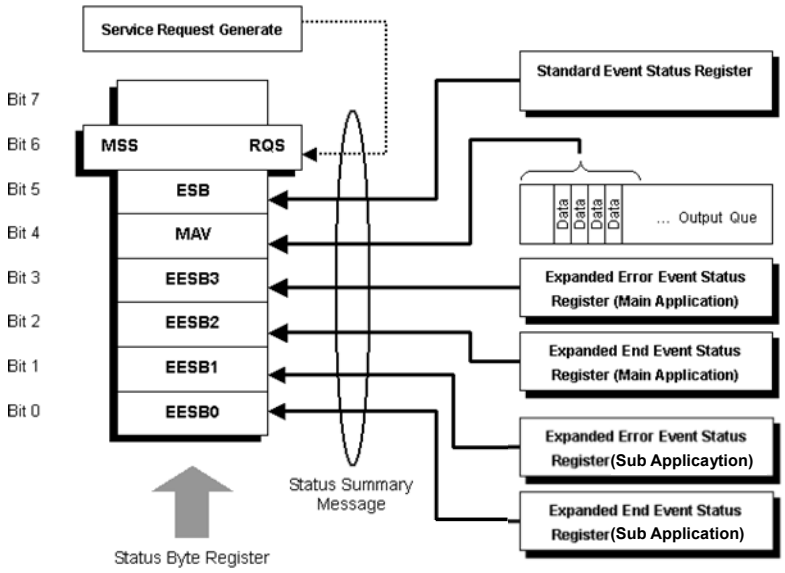


Figure E.9.11-1 Extended event status register model

E.9.12 Extended Error Event Status register (Main Application)

The operation model of the Extended Error Event Status registers for the Main Applications is shown below.

Main Application indicates 1st SG. The target of the status register and the enable register is 1st SG.

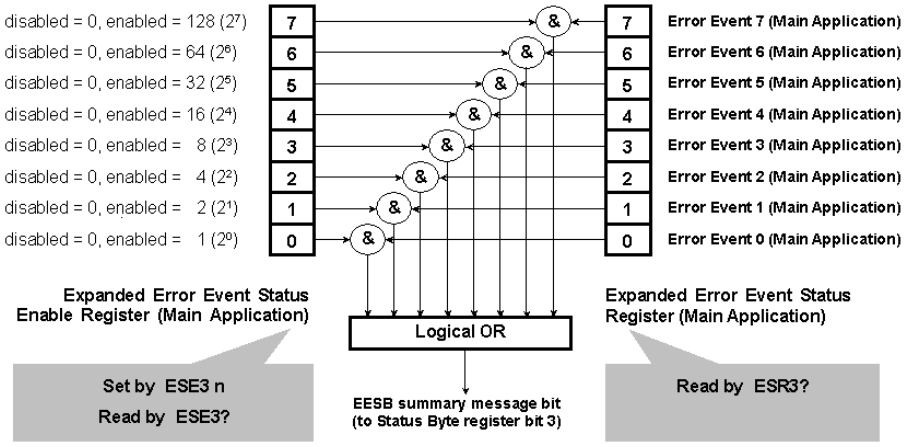


Figure E.9.12-1 Extended Error Event Status register (Main Application)

The Extended Error Event Status Enable register (on the left of the figure above) specifies which bit of the Event Status register will cause a summary message to become true when it is set.

For specifications of the event status register on the right side of the above figure, refer to Appendix F.1 “Native Device Messages”.

The summary message of this register is transmitted to EESB 3 of the Status Byte register.

<Program example>
To generate a service request when the error event 0 of 1st SG occurs

```
*SRE 8          ; Enables bit3 of the Service Request
                  Enable register.
ESE3 1          ; Enables bit0 of the Extended Error Event
                  Status Enable register of the main
                  application.
```

E.9.13 Extended End Event Status register (Main Application)

The operation model of the Extended End Event Status registers of Main Applications is shown below.

Main Application indicates 1st SG. The target of the status register and the enable register is 1st SG.

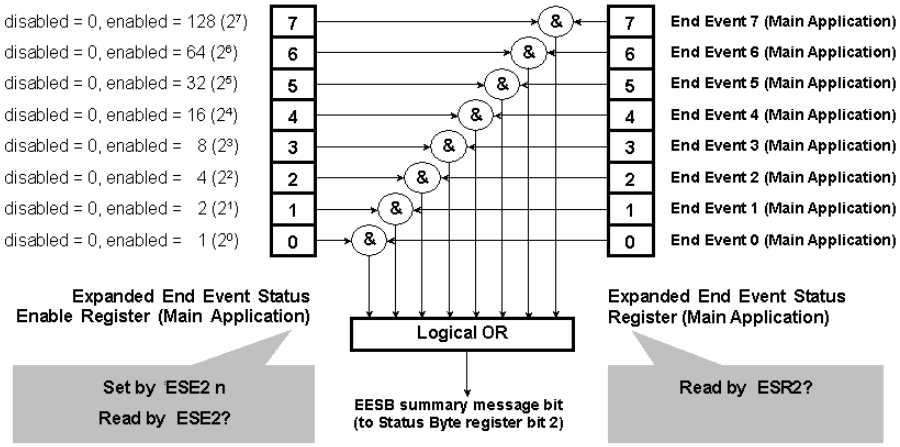


Figure E.9.13-1 Extended End Event Status register (Main Application)

The Extended End Event Status Enable register (on the left of the figure above) specifies which bit of the Event Status register will cause a summary message to become true when it is set.

For specifications of the event status register on the right side of the above figure, refer to Appendix F.1 “Native Device Messages”.

The summary message of this register is transmitted to EESB 2 of the Status Byte register.

<Program example>
To generate a service request when the end event 0 of 1st SG occurs

```
*SRE 4          ; Enables bit2 of the Service Request
                  Enable register.
ESE2 1          ; Enables bit0 of the Extended End Event
                  Status Enable register of the main
                  application.
```

E.9.14 Extended Error Event Status register (Sub Application)

The operation model of the Extended Error Event Status registers for Sub Applications (an example with Application a) is shown below.

Sub Application indicates 2nd SG. The target of the status register and the enable register is 2nd SG.

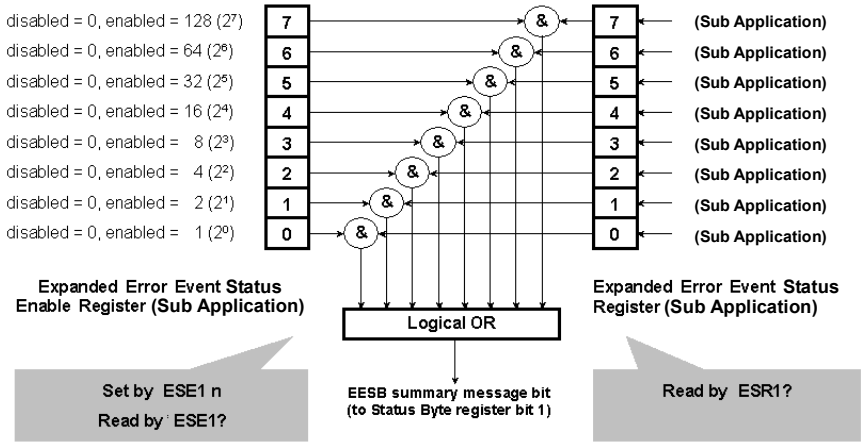


Figure E.9.14-1 Extended Error Event Status Register (Sub Application)

The Extended Error Event Status Enable register (on the left of the figure above) specifies which bit of the Event Status register will cause a summary message to become true when it is set.

For specifications of the event status register on the right side of the above figure, refer to Appendix F.1 “Native Device Messages”.

The summary message of this register is transmitted to EESB 1 of the Status Byte register.

<Program example>
To generate a service request when the error event 0 of 2nd SG occurs

```
*SRE 2          ; Enables bit1 of the Service Request
                  Enable register.
ESE1 1          ; Enables bit0 of the extended error event
                  status enable register of Sub Application.
```

E.9.15 Extended End Event Status register (Sub Application)

The operation model of the Extended End Event Status registers of Sub Applications (an example with Application a) is shown below.

Sub Application indicates 2nd SG. The target of the status register and the enable register is 2nd SG.

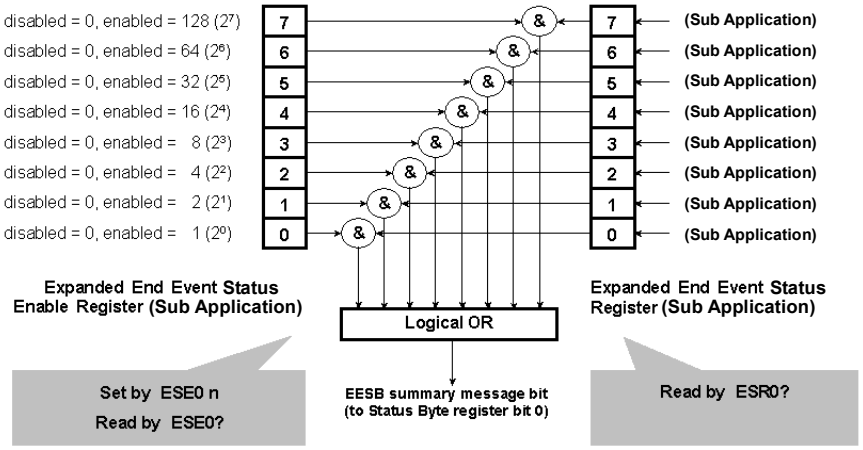


Figure E.9.15-1 Extended End Event Status Register (Sub Application)

The Extended End Event Status Enable register (on the left of the figure above) specifies which bit of the Event Status register will cause a summary message to become true when it is set.

For specifications of the event status register on the right side of the above figure, refer to Appendix F.1 “Native Device Messages”.

The summary message of this register is transmitted to EESB 0 of the Status Byte register.

<Program example>
To generate a service request when the end event 0 of 2nd SG occurs

```
*SRE 1          ; Enables bit0 of the Service Request
                  Enable register.
ESE0 1          ; Enables bit0 of the extended end event
                  status enable register of Sub Application.
```

E.9.16 Extended Event Status register operation

The operation methods for the Extended Event Status registers and Extended Event Status Enable registers are shown in the table below.

Table E.9.16-1 Extended Event Status Register Operation

Register	Operation	
Extended Error Event Status Register (Main Application)	Read	This register is read using an ESR3? query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: <1> The *CLS command is received. <2> The power is turned on. <3> An event is read in response to an ESR3? query command. <4> When the language mode has been switched.
Extended Error Event Status Enable Register (Main Application)	Read	This register is read using an ESE3? query.
	Write	This register is written to using an ESE3 command.
	Clear	This register is cleared when: <1> An ESE3 command with a data value of 0 (i.e., `ESE3 0`) is received. <2> The power is turned on. <3> When the language mode has been switched.
Extended End Event Status Register (Main Application)	Read	This register is read using an ESR2? query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: <1> The *CLS command is received. <2> The power is turned on. <3> An event is read in response to an ESR2? query command. <4> When the language mode has been switched.
Extended End Event Status Enable Register (Main Application)	Read	This register is read using an ESE2? query.
	Write	This register is written to using an ESE2 command.
	Clear	This register is cleared when: <1> An ESE2 command with a data value of 0 (i.e., `ESE2 0`) is received. <2> The power is turned on. <3> When the language mode has been switched.

Table E.9.16-1 Extended Event Status Register Operation (Cont'd)

Register	Operation	
Extended Error Event Status Register (Sub Application)	Read	This register is read using an ESR1? query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: <1> The *CLS command is received. <2> The power is turned on. <3> An event is read in response to an ESR1? query command. <4> When the language mode has been switched.
Extended Error Event Status Enable Register (Sub Application)	Read	This register is read using an ESE1? query.
	Write	This register is written to using an ESE1 command.
	Clear	This register is cleared when: <1> An ESE1 command with a data value of 0 (i.e., `ESE1 0`) is received. <2> The power is turned on. <3> When the language mode has been switched.
Extended End Event Status Register (Sub Application)	Read	This register is read using an ESR0? query.
	Write	This register cannot be written externally.
	Clear	This register is cleared when: <1> The *CLS command is received. <2> The power is turned on. <3> An event is read in response to an ESR0? query command. <4> When the language mode has been switched.
Extended End Event Status Enable Register (Sub Application)	Read	This register is read using an ESE0? query.
	Write	This register is written to using an ESE0 command.
	Clear	This register is cleared when: <1> An ESE0 command with a data value of 0 (i.e., `ESE0 0`) is received. <2> The power is turned on. <3> When the language mode has been switched.

E.10 Synchronization

This section describes synchronized control of the MG3710A/MG3710E/MG3740A (completing processing of a command message before proceeding to the next one).

The following methods can be used for controlling synchronization:

(1) Using the `*WAI` command

(2) Using the `*OPC` command

(3) Using the `*OPC?` query

(1) Using the `*WAI` command

The `*WAI` (Wait to Continue) command prevents from starting the subsequent operations before the transmitted commands completes their operations. This is an effective method when an overlap command is used.

<Program example>

To select a waveform pattern after loading of a waveform pattern completes

This example uses the following overlap command:

```
:MMEMory[1]|2:LOAD:WAVeform:WMA|WMB|LONG|COMBination
<string1>,<string2>[,<device>]
```

```
MMEM:LOAD:WAV:WMA "PackageName","PatternName"   ; Loads a waveform pattern.
*WAI                                            ; Waits until loading completes.
RAD:ARB:WMA:WAV "PackageName","PatternName"     ; Selects a waveform pattern.
```

(2) Using the *OPC

This method transmits *OPC (Operation Complete), which is the IEEE488.2 common command, to wait until bit0 (OPC) of the standard event status register is enabled, indicating the operation completes. To wait an event, query a standard event status register directly or use a service request.

<Program example>

To select a waveform pattern after loading of a waveform pattern completes

This example uses the following overlap command:

```
:MMEMory[1]|2:LOAD:WAVeform:WMA|WMB|LONG|COMBination
<string1>,<string2>[,<device>]
```

```
*CLS                                ; Clears the OPC status.
MMEM:LOAD:WAV:WMA                   ; Loads a waveform
"PackageName","PatternName"           pattern.
*OPC                                ; Switches to the
                                      operation completion
                                      waiting status.
*ESR?                               ; Queries the standard
                                      event status register
                                      directly.
>0                                  ; No event occurred.
*ESR?                               ; Queries the standard
                                      event status register
                                      directly.
>1                                  ; An event occurred.
RAD:ARB:WMA:WAV                     ; Selects a waveform
"PackageName","PatternName"           pattern.
```

(3) Using the *OPC?

This method queries a response of *OPC? (Operation Complete Query), which is the IEEE488.2 common command.

<Program example>

To select a waveform pattern after loading of a waveform pattern completes

This example uses the following overlap command:

```
:MMEMory[1]|2:LOAD:WAVeform:WMA|WMB|LONG|COMBination
<string1>,<string2>[,<device>]
```

```
MMEM:LOAD:WAV:WMA "PackageName","PatternName"   ; Loads a waveform pattern.
*OPC?                                           ; Switches to the operation completion waiting status.
>1                                              ; Returns 1 if lading completes.
RAD:ARB:WMA:WAV "PackageName","PatternName"     ; Selects a waveform pattern.
```

E.11 IEEE488.2 Common Device Messages

Described below are the IEEE488.2 Common Device Messages intended to execute the functions of the MG3710A/MG3710E/MG3740A.

E.11.1 IEEE488.2 Common Device Messages List

Table E.11-1 IEEE488.2 Common Device Messages

Function	Command	Query	Response	Remarks
Identification Query	---	*IDN?	company,model,serialnumber,firmware	model: Main unit model name serial: Main unit serial number version: Software package version
Self Test Query	---	*TST?	n	n = bit7: ALC Alarm bit6: Internal Baseband Reference Clock Unlock bit5: Not used bit4: Internal Reference Frequency Unlock bit3: RPP generation bit2: Not used bit1: Not used bit0: Not used
Operation Complete	*OPC	*OPC?	1	
Preset All	*RST	---	---	
Wait to Continue Command	*WAI	---	---	
Clear Status Command	*CLS	---	---	
Standard Event Status Enable Register Command/Query	*ESE n	*ESE?	n	n = bit7: Power On bit6: User request bit5: Command error bit4: Execution error bit3: Device error bit2: Query error bit1: Not used bit0: Operation complete
Standard Event Status Register Query	---	*ESR?	n	

Table E.11-1 IEEE488.2 Common Device Messages (Cont'd)

Function	Command	Query	Response	Remarks
Service Request Enable Register Command/Query	*SRE n	*SRE?	n	n = SCPI mode bit7: OPER bit6: MSS/RQS bit5: ESB bit4: MAV bit3: QUES bit2: QUE bit1: Not used bit0: Not used Native mode bit7: Not used bit6: MSS/RQS bit5: ESB bit4: MAV bit3: EESB3 bit2: EESB2 bit1: EESB1 bit0: EESB0
Read Status Byte Query	---	*STB?	n	n = SCPI mode bit7: OPER bit6: MSS/RQS bit5: ESB bit4: MAV bit3: QUES bit2: QUE bit1: Not used bit0: Not used Native mode bit7: Not used bit6: MSS/RQS bit5: ESB bit4: MAV bit3: EESB3 bit2: EESB2 bit1: EESB1 bit0: EESB0
Trigger Control	*TRG	---	---	

E.11.2 IEEE488.2 Common Device Messages Details

This section describes detailed specifications on IEEE488.2 common device message remote control commands for executing MG3710A/MG3710E/MG3740A functions in alphabetical order.

*CLS

Clear Status Command

Function

Clears the status byte resister, standard event status register, extended event status register and output queue data, and disables the wait for operation completion set by `*OPC`/`*OPC?` This is a common IEEE488.2 command.

Command

```
*CLS
```

Example of Use

To clear status

*ESE/*ESE?

Standard Event Status Enable Command/Query

Function

Sets the standard event status enable register. The standard event status enable register value is returned for the query. This is a common IEEE488.2 command/query.

Command

```
*ESE n
```

Query

```
*ESE?
```

Response

```
n
```

Parameter

n	Standard event status enable register	
Value	= bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Operation completion
	bit1: 2^1 = 2	Request control (not used)
	bit2: 2^2 = 4	Query error
	bit3: 2^3 = 8	Device error
	bit4: 2^4 = 16	Execution error
	bit5: 2^5 = 32	Command error
	bit6: 2^6 = 64	User request
	bit7: 2^7 = 128	Power ON
Range	0 to 255	
Default	0	

Details

This is not initialized by the System Reset (Preset) command.
This is initialized by Power On.

Example of Use

To enable execution error and command error

```
*ESE 48
*ESE?
>48
```

*ESR?

Standard Event Status Register Query

Function

Returns the standard event status register value. If this is queried, the standard event status register is cleared. This is a common IEEE488.2 query.

Query

```
*ESR?
```

Response

```
n
```

Parameter

n	Standard event status register	
Value	= bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Operation completion
	bit1: 2^1 = 2	Request control (not used)
	bit2: 2^2 = 4	Query error
	bit3: 2^3 = 8	Device error
	bit4: 2^4 = 16	Execution error
	bit5: 2^5 = 32	Command error
	bit6: 2^6 = 64	User request
	bit7: 2^7 = 128	Power ON
Range	0 to 255	

Example of Use

To query the standard event status register value (when an execution error and command error have occurred)

```
*ESR?
>48
```

*IDN?

Identification Query

Function

This command queries the device information. This is a common IEEE488.2 query.

Query

```
*IDN?
```

Response

```
company,model,serialnumber,firmware
```

Parameter

`company`	Manufacturer (ANRITSU)
`model`	Product model (7-character alphanumeric)
`serialnumber`	Serial number (10-digit number)
`firmware`	Version number of this application

Example of Use

To query the device information:

```
*IDN?
>ANRITSU,MG3710A,6100000000,1.0.0.0
```

*OPC/*OPC?

Operation Complete Command/Query

Function

*OPC/*OPC? is a command/query to synchronize between the device and the external controller (PC). This is a common IEEE488.2 command/query.

If a *OPC command is received, the operation completion bit (bit 0) is set to 1 once all active processes are complete.

If a *OPC? query is received, 1 is returned once all active processes are complete.

Command

```
*OPC
```

Query

```
*OPC?
```

Response

```
1
```

Details

The wait for operation completion set by *OPC/*OPC? is disabled after the following events:

- Power ON
- Reception of DCL or SCL on the IEEE488.1 interface
- Reception of the *CLS command
- Reception of *RST command
- Completion of all active processing

Example of Use

To wait for completion of measurement with *OPC

```
*CLS                    Clears the event status.
*SRE 32                 Enables the ESB service request.
*ESE 1                  Enables the operation completion bit.
MMEM:LOAD:WAV:WMA "PackageName","PatternName"
                        Loads a waveform pattern.
*OPC?                   Switches to the operation completion waiting
                        status.
>1                      Returns 1 if lading completes.
RAD:ARB:WMA:WAV "PackageName","PatternName"
                        Selects a waveform pattern.
```

*RST

Reset Command

Function

Initializes the device. This is a common IEEE488.2 command.

Command

```
*RST
```

Details

Initializes the settings and status of all loaded applications.

Example of Use

To initialize the device

```
*RST
```

*SRE/*SRE?

Service Request Enable Command/Query

Function

Sets the service request enable register. The service request enable register value is returned for the query. This is a common IEEE488.2 command/query.

Command

```
*SRE n
```

Query

```
*SRE?
```

Response

```
n
```

Parameter

`n` Service request enable register

Value = bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7

SCPI mode

bit0: $2^0 = 1$	Not used
bit1: $2^1 = 2$	Not used
bit2: $2^2 = 4$	QUE
bit3: $2^3 = 8$	QUES
bit4: $2^4 = 16$	MAV
bit5: $2^5 = 32$	ESB
bit6: $2^6 = 64$	MSS/RQS
bit7: $2^7 = 128$	OPER

Native mode

bit0: $2^0 = 1$	Extended event status 2nd SG (EESB0)
bit1: $2^1 = 2$	Extended event status 2nd SG (EESB1)
bit2: $2^2 = 4$	Extended event status 1st SG (EESB2)
bit3: $2^3 = 8$	Extended event status 1st SG (EESB3)
bit4: $2^4 = 16$	MAV
bit5: $2^5 = 32$	ESB
bit6: $2^6 = 64$	MSS/RQS
bit7: $2^7 = 128$	Not used

Range 0 to 255

Default 0

Details

This is not initialized by the System Reset (Preset) command.
This is initialized by Power On.

Example of Use

Enables the ESB service request.

```
*SRE 32
*SRE?
>32
```

*STB?

Status Byte Register Query

Function

Returns the status byte register value. This is a common IEEE488.2 query.

Query

```
*STB?
```

Response

```
n
```

Parameter

n Status byte register

Value = bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7

SCPI mode

bit0: $2^0 = 1$	Not used
bit1: $2^1 = 2$	Not used
bit2: $2^2 = 4$	QUE
bit3: $2^3 = 8$	QUES
bit4: $2^4 = 16$	MAV
bit5: $2^5 = 32$	ESB
bit6: $2^6 = 64$	MSS/RQS
bit7: $2^7 = 128$	OPER

Native mode

bit0: $2^0 = 1$	Extended event status 2nd SG (EESB0)
bit1: $2^1 = 2$	Extended event status 2nd SG (EESB1)
bit2: $2^2 = 4$	Extended event status 1st SG (EESB2)
bit3: $2^3 = 8$	Extended event status 1st SG (EESB3)
bit4: $2^4 = 16$	MAV
bit5: $2^5 = 32$	ESB
bit6: $2^6 = 64$	MSS/RQS
bit7: $2^7 = 128$	Not used

Range 0 to 255

Example of Use

To query the status byte register value (when the ESB bit is 1)

```
*STB?
>32
```

*TRG

Trigger Control

Function

This command requests the trigger execution.

Command message

```
*TRG
```

Explanation

This command executes processing related to trigger input.

Example of Use

To execute trigger.

`*TRG` Controller → MG3710A/MG3710E/MG3740A

*TST?

Self-Test Query

Function

Returns the result of the self test. This is a common IEEE488.2 query.

Query

```
*TST?
```

Response

```
n
```

Parameter

n	Status byte register	
Value	= bit0 + bit1 + bit2 + bit3 + bit4 + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Not used
	bit1: 2^1 = 2	Not used
	bit2: 2^2 = 4	Not used
	bit3: 2^3 = 8	RPP generation
	bit4: 2^4 = 16	Internal Reference Frequency Unlock
	bit5: 2^5 = 32	Not used
	bit6: 2^6 = 64	Internal Baseband Reference Clock Unlock
	bit7: 2^7 = 128	ALC Alarm
Range	0 to 255	

Example of Use

To query the self test result

```
*TST?
>0
```

*WAI

Wait-to-Continue Command

Function

Waits until all active processes are complete before executing the next command. This is a common IEEE488.2 command.

Command

```
*WAI
```

Example of Use

To wait for completion of measurement with `*WAI`

```
MMEM:LOAD:WAV:WMA "PackageName","PatternName"
```
Loads a waveform pattern.

```
*WAI
```
Waits until loading completes.

```
RAD:ARB:WMA:WAV "PackageName","PatternName"
```
Selects a waveform pattern.

E.12 SCPI Device Message

This section describes SCPI device messages for status registers.

E.12.1 OPERation status register

The following table and figure show the layer structure of the OPERation Status Register.

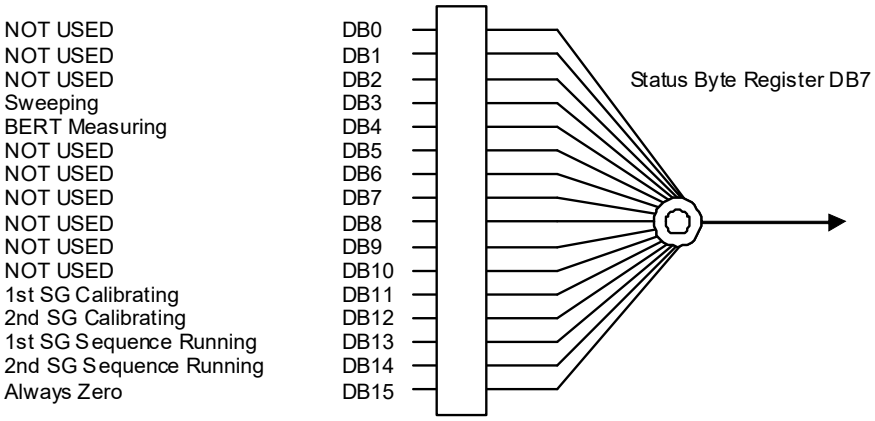


Figure E.12-1 OPERation Status Register

Table E.12-1 OPERation Status Register

Bit Definition of OPERation Status Register	
DB3	Executing Sweep
DB4	BERT measurement in progress
DB11	Calibrating 1st SG
DB12	Calibrating 2nd SG
DB13	Executing 1st SG sequence mode
DB14	Executing 2nd SG sequence mode
DB15	Fix to 0.

Table E.12-2 lists device messages for the OPERation Status Register.

Table E.12-2 Device Messages Related to OPERation Status Register

Function	Device Message
Operation Status Register Event	:STATus:OPERation[:EVENt]?
Operation Status Register Condition	:STATus:OPERation:CONDition?
Operation Status Register Enable	:STATus:OPERation:ENABle <integer>
	:STATus:OPERation:ENABle?
Operation Status Register Negative Transition	:STATus:OPERation:NTRansition <integer>
	:STATus:OPERation:NTRansition?
Operation Status Register Positive Transition	:STATus:OPERation:PTRansition <integer>
	:STATus:OPERation:PTRansition?
Status Preset	:STATus:PRESet

E.12.2 SCPI device message details

This section describes SCPI device messages for the OPERation status register.

:STATus:OPERation[:EVENt]?

Operation Status Register Event

Function

This command queries the event register of the OPERation Status Register.

Query

```
:STATus:OPERation[:EVENt]?
```

Response

```
<integer>
```

Parameter

`<integer>`	Bit sum of event register
Resolution	1
Range	0 to 65535

Details

This command is available only in SCPI mode.

Example of Use

To query the event register contents of the OPERation Status Register.

```
STAT:OPER?
> 0
```

:STATus:OPERation:CONDition?

Operation Status Register Condition

Function

This command queries the content of the condition register of the OPERation status register.

Query

```
:STATus:OPERation:CONDition?
```

Response

```
<integer>
```

Parameter

<integer>	Bit sum of condition register
Resolution	1
Range	0 to 65535

Details

This command is available only in SCPI mode.

Example of Use

To query the content of the condition register of the OPERation status register.

```
STAT:OPER:COND?
> 0
```

:STATus:OPERation:ENABle <integer>

Operation Status Register Enable

Function

This command sets the event enable register of the OPERation Status Register.

Command

```
:STATus:OPERation:ENABle <integer>
```

Parameter

<integer>	Bit sum of event enable register
Resolution	1
Range	0 to 65535

Details

This command is available only in SCPI mode.

Example of Use

To set the event enable register of the OPERation status register to 16.

```
STAT:OPER:ENAB 16
```

:STATus:OPERation:ENABle?

Operation Status Register Enable Query

Function

This command queries the event enable register of the OPERation Status Register.

Query

```
:STATus:OPERation:ENABle?
```

Response

```
<integer>
```

Parameter

<integer>	Bit sum of event enable register
Resolution	1
Range	0 to 65535

Example of Use

To query the event enable register of the OPERation Status Register.

```
STAT:OPER:ENAB?
> 16
```

:STATus:OPERation:NTRansition <integer>

Operation Status Register Negative Transition

Function

This command sets the transition filter (negative transition) of the OPERation status register.

Command

```
:STATus:OPERation:NTRansition <integer>
```

Parameter

<integer>	Bit sum of transition filter (negative transition)
Resolution	1
Range	0 to 65535

Details

This command is available only in SCPI mode.

Example of Use

To set the transition filter (negative transition) of the OPERation status register to 16.

```
STAT:OPER:NTR 16
```

:STATus:OPERation:NTRansition?

Operation Status Register Negative Transition Query

Function

This command queries the transition filter (negative transition) of the OPERation status register.

Query

```
:STATus:OPERation:NTRansition?
```

Response

```
<integer>
```

Parameter

<integer>	Bit sum of transition filter (negative transition)
Resolution	1
Range	0 to 65535

Example of Use

To query the transition filter (negative transition) of the OPERation status register.

```
STAT:OPER:NTR?
> 16
```

:STATus:OPERation:PTRansition <integer>

Operation Status Register Positive Transition

Function

This command sets the transition filter (positive transition) of the OPERation status register.

Command

```
:STATus:OPERation:PTRansition <integer>
```

Parameter

<integer>	Bit sum of transition filter (positive transition)
Resolution	1
Range	0 to 65535

Details

This command is available only in SCPI mode.

Example of Use

To set the transition filter (positive transition) of the OPERation status register to 16.

```
STAT:OPER:PTR 16
```

:STATus:OPERation:PTRansition?

Operation Status Register Positive Transition Query

Function

This command queries the transition filter (positive transition) of the OPERation status register.

Query

```
:STATus:OPERation:PTRansition?
```

Response

```
<integer>
```

Parameter

<integer>	Bit sum of transition filter (positive transition)
Resolution	1
Range	0 to 65535

Example of Use

To query the transition filter (positive transition) of the OPERation status register.

```
STAT:OPER:PTR?
> 16
```

:STATus:PRESet

Status Preset

Function

This command presets all of the transition filters, enable registers, errors and event queue enable registers.

Command

```
:STATus:PRESet
```

Parameter

None

Details

This command is available only in SCPI mode.

Example of Use

To preset all of the transition filters, enable registers, errors and event queue enable registers.

```
STAT:PRES
```

Appendix F Native Device Message Details

This chapter describes the compatible commands for controlling the MG3710A/MG3710E/MG3740A (hereafter "MG3710A/10E/40A") with the remote-control commands of the MG3700A. For the detailed specifications of each command, refer to MG3700A Vector Signal Generator Operational Manual (Mainframe) and "F.1 Native Device Message" of this manual.

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F.1 Native Device Messages

Described below are the commands that do not exist on the MG3700A when controlling the MG3710A/MG3710E/MG3740A using the MG3700 mode.

Table F.1-1 MG3710A-MG3710E-MG3740A-MG3700A Common Device Messages

Function	Command	Query	Response	Remarks
Extended End Event Status Enable Register	ESE0 n	ESE0?	n	n = bit7: Memory optimization check complete bit6: Memory optimization complete bit5: Not used bit4: Waveform pattern loaded bit3: Measurement complete bit2: Level setting complete bit1: Not used bit0: Frequency setting complete
Extended End Event Status Register	---	ESR0?	n	
Extended Error Event Status Enable Register	ESE1 n	ESE1?	n	n = bit7: Memory optimization check error bit6: Memory optimization error bit5: Not used bit4: Waveform pattern load error bit3: Measurement error bit2: Level setting error bit1: Not used bit0: Frequency setting error
Extended Error Event Status Register	---	ESR1?	n	
Extended End Event Status Enable Register	ESE2 n	ESE2?	n	n = bit7: Memory optimization check complete bit6: Memory optimization complete bit5: Not used bit4: Waveform pattern loaded bit3: Measurement complete bit2: Level setting complete bit1: Not used bit0: Frequency setting complete
Extended End Event Status Register	---	ESR2?	n	

Table F.1-1 MG3710A-MG3710E-MG3740A-MG3700A Common Device Messages (Cont'd)

Function	Command	Query	Response	Remarks
Extended Error Event Status Enable Register	ESE3 n	ESE3?	n	n = bit7: Memory optimization check error bit6: Memory optimization error bit5: Not used bit4: Waveform pattern load error bit3: Measurement error bit2: Level setting error bit1: Not used bit0: Frequency setting error
Extended Error Event Status Register	---	ESR3?	n	
Select SG	SELECTSG 1|2	SELECTSG?	n	n = SG No. 1 = SG1 2 = SG2

F.1.1 Functions Device Messages Common to Measurement Equipment

ESE0/ESE0?

Extended End Event Status Enable Register

Function

This command sets the extended end event status enable register of SG2. When an end event occurs, the end summary bit (ESB) value of the corresponding status byte register is set to 1 (true). The end event status enable register value of SG2 is returned for the query.
This command does not exist on the MG3700A.

Command

```
ESE0 n
```

Query

```
ESE0?
```

Response

```
n
```

Parameter

n	Extended end event status enable register (2nd SG)	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 20 = 1	Frequency setting complete
	bit1: 21 = 2	(Not used)
	bit2: 22 = 4	Level setting complete
	bit3: 23 = 8	Measurement complete
	bit4: 24 = 16	Waveform pattern loaded
	bit5: 25 = 32	(Not used)
	bit6: 26 = 64	Memory optimization complete
	bit7: 27 = 128	Memory optimization check complete
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To enable the waveform pattern loaded and the level setting complete of 2nd SG.

```
ESE0 20
ESE0?
> 20
```

Related Command

`ESR0?` Queries the extended end event status register of 2nd SG.

ESE1/ESE1?

Extended Error Event Status Enable Register

Function

This command sets the extended error event status enable register of 2nd SG. When an error event occurs, the error summary bit (ESB) value of the corresponding status byte register is set to 1 (true). The error event status enable register value of 2nd SG is returned for the query.
This command does not exist on the MG3700A.

Command

```
ESE1 n
```

Query

```
ESE1?
```

Response

```
n
```

Parameter

`n`	Extended error event status enable register (2nd SG)	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 20 = 1	Frequency setting error
	bit1: 21 = 2	(Not used)
	bit2: 22 = 4	Level setting error
	bit3: 23 = 8	Measurement error
	bit4: 24 = 16	Waveform pattern load error
	bit5: 25 = 32	(Not used)
	bit6: 26 = 64	Memory optimization error
	bit7: 27 = 128	Memory optimization check error
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To enable the waveform pattern load error and the level setting error of 2nd SG.

```
ESE1 20
ESE1?
> 20
```

Related Command

`ESR1?`	Queries the extended error event status register of 2nd SG.

ESE2/ESE2?

Extended End Event Status Enable Register

Function

This command sets the extended end event status enable register of 1st SG. When an end event occurs at 1st SG, the end summary bit (ESB) value of the corresponding status byte register is set to 1 (true). The end event status enable register value of 1st SG is returned for the query.

Command

```
ESE2 n
```

Query

```
ESE2?
```

Response

```
n
```

Parameter

n	Extended end event status enable register of 1st SG	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: $2^0 = 1$	Frequency setting complete
	bit1: $2^1 = 2$	Not used
	bit2: $2^2 = 4$	Level setting complete
	bit3: $2^3 = 8$	End of measurement
	bit4: $2^4 = 16$	Waveform pattern loaded
	bit5: $2^5 = 32$	Not used
	bit6: $2^6 = 64$	Memory optimization complete
	bit7: $2^7 = 128$	Memory optimization check complete
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To enable the waveform pattern loaded and the level setting complete of 1st SG.

```
ESE2 20
ESE2?
> 20
```

Related Command

ESR2?	Queries the extended end event status register of 1st SG.

ESE3/ESE3?

Extended Error Event Status Enable Register

Function

This command sets the extended error event status enable register of 1st SG. When an error event occurs at 1st SG, the error summary bit (ESB) value of the corresponding status byte register is set to 1 (true). The error event status enable register value of 1st SG is returned for the query.

Command

```
ESE3 n
```

Query

```
ESE3?
```

Response

```
n
```

Parameter

n	Extended error event status enable register of 1st SG.	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Frequency setting error
	bit1: 2^1 = 2	Not used
	bit2: 2^2 = 4	Level setting error
	bit3: 2^3 = 8	Measurement error
	bit4: 2^4 = 16	Waveform pattern load error
	bit5: 2^5 = 32	Not used
	bit6: 2^6 = 64	Memory optimization error
	bit7: 2^7 = 128	Memory optimization check error
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To enable the waveform pattern load error and the level setting error of 1st SG.

```
ESE3 20
ESE3?
> 20
```

Related Command

ESR3?	Queries the extended error event status register of 1st SG.

ESR0?

Extended End Event Status Register Query

Function

This command queries the extended end event status register of 2nd SG. After the query, this register is reset to 0. This command does not exist on the MG3700A.

Query

```
ESR0?
```

Response

```
n
```

Parameter

n	Extended end event status register of 2nd SG	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Frequency setting complete
	bit1: 2^1 = 2	Not used
	bit2: 2^2 = 4	Level setting complete
	bit3: 2^3 = 8	End of measurement
	bit4: 2^4 = 16	Waveform pattern loaded
	bit5: 2^5 = 32	Not used
	bit6: 2^6 = 64	Memory optimization complete
	bit7: 2^7 = 128	Memory optimization check complete
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To query the extended end event status register of 2nd SG.

```
ESR0?
>1                    Frequency setting complete
```

Related Command

`ESE0?`	Queries the extended end event status enable register of 2nd SG.

ESR1?

Extended Error Event Status Register Query

Function

This command queries the extended error event status register of 2nd SG. After the query, this register is reset to 0. This command does not exist on the MG3700A.

Query

```
ESR1?
```

Response

```
n
```

Parameter

n	Extended error event status register of 2nd SG	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Frequency setting error
	bit1: 2^1 = 2	Not used
	bit2: 2^2 = 4	Level setting error
	bit3: 2^3 = 8	Measurement error
	bit4: 2^4 = 16	Waveform pattern load error
	bit5: 2^5 = 32	Not used
	bit6: 2^6 = 64	Memory optimization error
	bit7: 2^7 = 128	Memory optimization check error
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To query the extended error event status register of 2nd SG.

```
ESR1?
>1          Frequency setting error
```

Related Command

ESE1?	Queries the extended error event status enable register of 2nd SG.

ESR2?

Extended End Event Status Register Query

Function

This command queries the extended end event status register of 1st SG. After the query, this register is reset to 0.

Query

```
ESR2?
```

Response

```
n
```

Parameter

`n`	Extended end event status register of 1st SG	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: 2^0 = 1	Frequency setting complete
	bit1: 2^1 = 2	Not used
	bit2: 2^2 = 4	Level setting complete
	bit3: 2^3 = 8	End of measurement
	bit4: 2^4 = 16	Waveform pattern loaded
	bit5: 2^5 = 32	Not used
	bit6: 2^6 = 64	Memory optimization complete
	bit7: 2^7 = 128	Memory optimization check complete
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To query the extended end event status register of 1st SG.

```
ESR2?
>1                    Frequency setting complete
```

Related Command

`ESE2?`	Queries the extended end event status enable register of 1st SG.

ESR3?

Extended Error Event Status Register Query

Function

This command queries the extended error event status register of 1st SG. After the query, this register is reset to 0.

Query

```
ESR3?
```

Response

```
n
```

Parameter

n	Extended error event status register of 1st SG	
Value	= bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7	
	bit0: $2^0 = 1$	Frequency setting error
	bit1: $2^1 = 2$	Not used
	bit2: $2^2 = 4$	Level setting error
	bit3: $2^3 = 8$	Measurement error
	bit4: $2^4 = 16$	Waveform pattern load error
	bit5: $2^5 = 32$	Not used
	bit6: $2^6 = 64$	Memory optimization error
	bit7: $2^7 = 128$	Memory optimization check error
Range	0 to 255	
Default	0	

Details

This command is available only in native mode.

Example of Use

To query the extended error event status register of 1st SG.

```
ESR3?
>1          Frequency setting error
```

Related Command

ESE3?	Queries the extended error event status enable register of 1st SG.

SELECTSG/SELECTSG?

Select SG

Function

This command selects the corresponding SG to be operated with the remote command.

This command does not exist on the MG3700A. It is used to select SG of the MG3710A/MG3710E/MG3740A.

Setting a numeric value other than “1” and “2” causes an error. (Out of range)

Command

```
SELECTSG 1|2
```

Query

```
SELECTSG?
```

Response

```
n
```

Parameter

n	No. of SG
1	SG1
2	SG2
Default	1

Details

This command is available only in native mode.

Example of Use

To select SG2 to be controlled

```
SELECTSG 2
SELECTSG?
> 2
```

F.2 MG3710A-MG3710E-MG3740A-MG3700A Common Functions

Note:

Column SG1/2 of the compatible list shows whether the behavior changes according to the SELECTSG command.

√: The SELECTSG command 1 is for SG1, and 2 is for SG2.
N/A: Command not related to SG1/2.

F.2.1 MG3710A-MG3710E-MG3740A-MG3700A Common Functions

Given below is the compatible list of the functions device common to messages measurement equipment.

Table F.2.1-1 Compatible List of Device Messages Common to Applications

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
DSPL ON|OFF	√	DSPL ON|OFF	N/A	Turns the display On/Off	:DisplayENABle ON|OFF|1|0
DSPL?	√	DSPL?	N/A	Turns the display On/Off	:DISPlay:ENABle?
–	√	ESE0 <integer>	N/A	Sets the extended status enable register For notification of the end of SG2; Not existing on the MG3700A.	–
–	√	ESE0?	N/A	Reads the extended status enable register For notification of the end of SG2; Not existing on the MG3700A.	–
–	√	ESE1 <integer>	N/A	Sets the extended status enable register For notification of the error of SG2; Not existing on the MG3700A.	–

Table F.2.1-1 Compatible List of Device Messages Common to Applications (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
–	√	ESE1?	N/A	Reads the extended status enable register For notification of the error of SG2; Not existing on the MG3700A.	–
ESE2 n	√	ESE2 <integer>	N/A	Sets the extended status enable register For notification of the end of SG1	–
ESE2?	√	ESE2?	N/A	Reads the extended status enable register For notification of the end of SG1.	–
ESE3 n	√	ESE3 <integer>	N/A	Sets the extended status enable register For notification of SG1 errors	–
ESE3?	√	ESE3?	N/A	Reads the extended status enable register For notification of SG1 errors	–
–	√	ESR0?	N/A	Sets the extended status register For notification of the end of SG2; Not existing on the MG3700A.	–
–	√	ESR1?	N/A	Sets the extended status register For notification of the error of SG2; Not existing on the MG3700A.	–
ESR2?	√	ESR2?	N/A	Sets the extended status register For notification of the end of SG1.	–
ESR3?	√	ESR3?	N/A	Sets the extended status register For notification of SG1 errors	–

Table F.2.1-1 Compatible List of Device Messages Common to Applications (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
HEAD ON|OFF	√	HEAD ON|OFF	N/A	Header of the response message When the Language Mode is MG3700A and this function is turned on, inserts in capital letters all character strings of the header section of the query input by the user. Adds no header section to the response of the IEEE488.2 common commands such as *IDN? even if the HEAD is on.	–
HEAD?	√	HEAD?	N/A	Header of the response message	–
KNOBHOLD ON|OFF	√	KNOBHOLD ON|OFF	N/A	Holds the rotary knob.	:SYSTem:KNOB:HOLD <boolean>
KNOBHOLD?	√	KNOBHOLD?	N/A	Holds the rotary knob	:SYSTem:KNOB:HOLD?
PRE	√	PRE	N/A	System Preset	:SYSTem:PRESet
SCOPY	√	SCOPY [<string>,[<device>]]	N/A	Copies the screen Device specified with SCRCPYMEDIA when <device> is omitted The formats to be used are those currently set with the following: :MMEMory:STORe:SCReen:MODE BMP|PNG	:MMEMory:STORe:SCReen [<filename>[,<device>]]
ERRMSG?	√	ERRMSG?	N/A	Obtains error messages Obtains only the error occurred immediately before	:SYSTem:ERRor[:NEXT]?

Table F.2.1-1 Compatible List of Device Messages Common to Applications (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN?	√	SCREEN?	N/A	Current screen Returns the options set immediately before with the SCREEN command The default is FREQ_TOP.	–
–	√	SELECTSG 1|2	N/A	Selects the corresponding SG to be operated with the remote command. A command that does not exist on the MG3700A. Used to select SG of the MG3710A/10E/40A. Setting a numeric value other than "1" and "2" causes an error. (Out of range)	[:SOURce]:PORT 1|2
–	√	SELECTSG?	N/A	Queries the corresponding SG to be operated with the remote command. Command that does not exist on the MG3700A Queries the selected status of SG of the MG3710A/10E/40A	[:SOURce]:PORT?

F.3 Frequency & Channel Function

F.3.1 Frequency & Channel function

Given below is the compatible list of the frequency & channel functions device messages.

Table F.3.1-1 Compatible List of Frequency & Channel Functions Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN FREQ_TOP	√	SCREEN FREQ_TOP	N/A	Moves to the frequency screen This command is accepted but the screen is not moved.	–
FREQ f	√	FREQ <freq>	√	Sets frequency	[:SOURce[1]|2]:FREQuency[:CW|:FIXed] <freq>
FREQ?	√	FREQ?	√	Sets frequency	[:SOURce[1]|2]:FREQuency[:CW|:FIXed]?
BPADISP FREQ|CH	√	BPADISP FREQ|CH	√	Switches between frequency and channel	[:SOURce[1]|2]:FREQuency:TYPE FREQuency|CHANnel
BPADISP?	√	BPADISP?	√	Switches between frequency and channel	[:SOURce[1]|2]:FREQuency:TYPE?
FRS UP|DN|DOWN	√	FRS UP|DN|DOWN	√	Steps up/down the frequency	[:SOURce[1]|2]:FREQuency[:CW|:FIXed] UP|DOWN
FIS f	√	FIS <freq>	√	Increments the step of the frequency	[:SOURce[1]|2]:FREQuency:STEP[:INCRement] <freq>

Table F.3.1-1 Compatible List of Frequency & Channel Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
FIS?	√	FIS?	√	Increments the step of the frequency	[:SOURce[1]|2]:FREQuency:STEP[:INCRement]?
FREQSWSPEED NORMAL|FAST	N/A		N/A	Frequency switching speed	
FREQSWSPEED?	N/A		N/A	Frequency switching speed	
SPREV ON|REV|INV|OFF|NORMAL	√	SPREV ON|REV|INV|OFF|NORMAL	√	RF spectrum	[:SOURce[1]|2]:DM:POLarity[:ALL] NORMal|INVert
SPREV?	√	SPREV?	√	RF spectrum	[:SOURce[1]|2]:DM:POLarity[:ALL]?
REF?	√	REF?	N/A	Queries the frequency reference Response: INT, EXT	–
PLLCOND?	√	PLLCOND?	N/A	Queries the PLL Condition Response: NORMAL, OVENCOND, ALARM, CHKEXT	–
SCREEN FREQ_PHASE	√	SCREEN FREQ_PHASE	N/A	Moves to the RF output phase adjustment screen. This command is accepted but the screen is not moved	–
RFPHASE d	√	RFPHASE <phase>	√	RF output phase	[:SOURce[1]|2]:PHASe[:ADJust] <ext_numeric>
RFPHASE?	√	RFPHASE?	√	RF output phase	[:SOURce[1]|2]:PHASe[:ADJust]?
SCREEN CHAN_TOP	√	SCREEN CHAN_TOP	N/A	Moves to the channel screen This command is accepted but the screen is not moved.	–

Table F.3.1-1 Compatible List of Frequency & Channel Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN CHAN_EDIT	√	SCREEN CHAN_EDIT	N/A	Moves to the channel edit screen This command is accepted but the screen is not moved.	–
CH n	√	CH <ext_integer>	√	Sets the channel number.	[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer <ext_integer>
CH?	√	CH?	√	Sets the channel number.	[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer?
CHS UP|DN|DOWN	√	CHS UP|DN|DOWN	√	Up/Down of the step of the channel Increases by 1 or decreases by 1	
CHFDISP ON|OFF	√	CHFDISP ON|OFF	√	Frequency display	[:SOURce[1]|2]:FREQuency:CHANnels:DISPlay <boolean>
CHFDISP?	√	CHFDISP?	√	Frequency display	[:SOURce[1]|2]:FREQuency:CHANnels:DISPlay?
CHGRPSEL n	√	CHGRPSEL <ext_integer>	√	Sets the channel group Setting this when no channel group exists causes an error	[:SOURce[1]|2]:FREQuency:CHANnels:GROup <ext_integer>
CHGRPSEL?	√	CHGRPSEL?	√	Sets the channel group Querying when no group is selected causes an error	[:SOURce[1]|2]:FREQuency:CHANnels:GROup?

Table F.3.1-1 Compatible List of Frequency & Channel Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
CHTBLALLCLR	√	CHTBLALLCLR	√	Entirely clears the channel table	[:SOURce[1]|2]:FREQuency:CHANnels:DELete:ALL
CHTBL n1,s,n2,n3,f1,f2	√	CHTBL <ext_integer1>,<string>,<ext_integer2>,<ext_integer3>,<freq1>,<freq2>	√	Edits the channel table	[:SOURce[1]|2]:FREQuency:CHANnels:EDIT <ext_integer1>,<string>,<ext_integer2>,<ext_integer3>,<freq1>,<freq2>
CHTBL? n1	√	CHTBL? <ext_integer>	√	Edits the channel table	[:SOURce[1]|2]:FREQuency:CHANnels:EDIT?
CHTBLDEL n	√	CHTBLDEL <ext_integer>	√	Clears the channel table	[:SOURce[1]|2]:FREQuency:CHANnels:DELete <integer>
CHFILESAVE s	√	CHFILESAVE <string>[,<device>]	√	Stores the channel table Device specified by CHMEDIA when the device is omitted	:MMEMory<1|2>:STORe:FREQuency:CHANnels <string>[,<Device>]
CHFILERECALL s	√	CHFILERECALL <string>[,<device>]	√	Reads the channel table Device specified by CHMEDIA when the device is omitted	:MMEMory<1|2>:LOAD:FREQuency:CHANnels <string>[,<Device>]

Table F.3.1-1 Compatible List of Frequency & Channel Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
CHCURFILE?	√	CHCURFILE?	√	Obtains the name of the channel table file Returns the name of the current channel table file When the channel table file is saved/recalled, changes the name accordingly. Default: ChTable (tentative name)	–
CHMEDIA HDD|CF	√	CHMEDIA HDD|SHDD|CF	√	Selects the media in which the channel table is to be stored/read C drive when HDD is selected D drive when SHDD is selected (enabled only when the 2nd HDD option is installed; otherwise causes an error). Devices other than HDD/SSD whose drive letter is the youngest when CF is selected Default: HDD	–
CHMEDIA?	√	CHMEDIA?	√	Selects the media to store/read the channel table Returns CF for drives other than C and 2nd HDD	–

F.4 Level Function

F.4.1 Level function

Given below is the compatible list of the level function device messages.

Table F.4.1-1 Compatible List of Level Function Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN LVL_TOP	√	SCREEN LVL_TOP	N/A	Moves to the level screen This command is accepted but the screen is not moved	–
LVL ON|OFF	√	LVL ON|OFF	√	Turns the RF output On/Off	:OUTPut[1]|2[:STATe] <boolean>
LVL?	√	LVL?	√	Turns the RF output On/Off	:OUTPut[1]|2[:STATe]?
OLVL l	√	OLVL <ampl>	√	RF output level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl>
OLVL? [DBM|DBU]	√	OLVL? [DBM|DBU]	√	RF output level Reads by specifying the unit Uses the unit specified by VDSPL, when DBU is selected	–
OLS UP|DN|DOWN	√	OLS UP|DN|DOWN	√	Increases/Decreases the step of the RF output level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude] UP|DOWN

Table F.4.1-1 Compatible List of Level Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
OLU DBM|DBU	√	OLU DBM|DBU	√	Switches the unit of the level Uses the unit specified by VDSPL, when DBU is selected Default: DBM	:UNIT[1]|2:POWer DBM|DBUV|DBUVEMF
OLU?	√	OLU?	√	Switches the unit of the level	:UNIT[1]|2:POWer?
VDSPL EMF|TERM	√	VDSPL EMF|TERM	√	Sets the voltage display Switches the unit of display to the one specified by VDSPL, where OLU is DBU Makes no switching but leaves the display as dBm, where OLU is DBM Default EMF	:UNIT[1]|2:POWer DBM|DBUV|DBUVEMF
VDSPL?	√	VDSPL?	√	Sets the voltage display	:UNIT[1]|2:POWer?
OOS 1	√	OOS <rel_ampl>	√	Sets the offset output level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl>
OOS?	√	OOS?	√	Sets the offset output level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet?
OOF ON|OFF	√	OOF ON|OFF	√	Turns the offset on/off	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet:STATe <boolean>

Table F.4.1-1 Compatible List of Level Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
OOF?	√	OOF?	√	Turns the offset on/off	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet:STATe?
ORL ON|OFF	√	ORL ON|OFF	√	Turns the relative level on/off	[:SOURce[1]|2]:POWer:REFerence:STATe <boolean>
ORL?	√	ORL?	√	Turns the relative level on/off	[:SOURce[1]|2]:POWer:REFerence:STATe?
OCNT ON|OFF	√	OCNT ON|OFF	√	Continuous mode (ATT Hold)	[:SOURce[1]|2]:POWer:ATTenuation:AUTO <boolean>
OCNT?	√	OCNT?	√	Continuous mode (ATT Hold)	[:SOURce[1]|2]:POWer:ATTenuation:AUTO?
OIS l	√	OIS <rel_ampl>	√	Increments the step level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:STEP[:INCRement] <rel_ampl>
OIS?	√	OIS?	√	Increments the step level	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:STEP[:INCRement]?
CAL	√	CAL	√	Executes the level calibration	[:SOURce[1]|2]:POWer:ALC:SEARch [ONCE]

Table F.4.1-1 Compatible List of Level Functions Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
ORLR?	√	ORLR?	√	Relative reference level	[:SOURce[1]|2]:POWer:REFerence?
ORLV l	√	ORLV <rel_ampl>	√	Relative output level	[:SOURce[1]|2]:POWer:REFerence:AMPLitude <rel_ampl>
ORLV?	√	ORLV?	√	Relative output level	[:SOURce[1]|2]:POWer:REFerence:AMPLitude?
EXTALC ON|OFF	N/A	—	-	Switches the external ALC mode Supported by the 2nd step and after	—
EXTALC?	N/A	—	-	Switches the external ALC mode Supported by the 2nd step and after	—
ALCSTT?	√	ALCSTT?	√	Obtains the ALC status	[:SOURce[1]|2]:POWer:ALC:ERRor?
LVLACCSTT?	√	LVLACCSTT?	√	Obtains the level accuracy status Regards as unleveled, when the [:SOURce[1]|2]:POWer:UNLeveled:ERRor? is other than NORM.	[:SOURce]:UNLeveled:ERRor?
ATTCHKSTT?	√	ATTCHKSTT?	√	Obtains the attenuator wearing status	—
LVLSTTLST?	√	LVLSTTLST?	√	Level output status	—

F.5 Modulation Functions

F.5.1 Common to modulation functions

Given below is the compatible list of device messages common to modulation functions

Table F.5.1-1 Compatible List of Device Messages Common to Modulation Functions

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_TOP	√	SCREEN BB_TOP	N/A	Moves to the modulation function screen This command is accepted but the screen is not moved	–
BBREFCOND?	√	BBREFCOND?	√	BB Reference Clock Condition NORMAL :Int lock or Ext lock UNLOCK :Int unlock CHKEXT :Ext unlock	[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence:ERRor?

F.5.2 Modulation

Given below is the compatible list of the modulation device messages.

Table F.5.2-1 Compatible List of Modulation Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_ADVANCE	√	SCREEN BB_ADVANCE	N/A	Moves to the Advanced Menu screen This command is accepted but the screen is not moved.	–
DLRES	√	DLRES	√	Waveform Restart	[:SOURce[1]|2]:RADio:ARB:WAVeform:RESTart
LOADEDFILESEL WMA,s1,s2	√	LOADEDFILESEL WMA,<string1>,<string2>	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:WMA:WAVeform <string1>,<string2>
LOADEDFILESEL? WMA	√	LOADEDFILESEL? WMA	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:WMA:WAVeform?
LOADEDFILESEL WMB,s1,s2	√	LOADEDFILESEL WMB,<string1>,<string2>	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:WMB:WAVeform <string1>,<string2>
LOADEDFILESEL? WMB	√	LOADEDFILESEL? WMB	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:WMB:WAVeform?

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
LOADEDFILESEL LONG,s1,s2	√	LOADEDFILESEL LONG,<string1>,<string2>	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:LONG:WAVeform <string1>,<string2>
LOADEDFILESEL? LONG	√	LOADEDFILESEL? LONG	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:LONG:WAVeform?
LOADEDFILESEL CONB,s1,s2	√	LOADEDFILESEL COMB,<string1>,<string2>	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:COMBination:WAVeform <string1>,<string2>
LOADEDFILESEL? COMB	√	LOADEDFILESEL? COMB	√	Selects waveform files	[:SOURce[1]|2]:RADio:ARB:COMBination:WAVeform?
PAT a,s1,s2	√	PAT WMA|WMB|LONG|COMB,<string1>,<string2>	√	Selects waveform files Operates similarly as the LOADEDFILESEL.....command	[:SOURce[1]|2]:RADio:ARB:WMA|WMB:WAVeform <string1>,<string2> [:SOURce[1]|2]:RADio:ARB:WAVeform <string1>,<string2>

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PAT? a	√	PAT? WMA|WMB|LONG|COMB	√	Selects waveform files Operates similarly as the LOADEDFILESEL.....command	[:SOURce[1]|2]:RADio:ARB:WMA|WMB:WAVeform? [:SOURce[1]|2]:RADio:ARB:WAVeform?
PATCOMBMODE EDIT|DEFINED	√	PATCOMBMODE EDIT|DEFINED	√	Pattern Addition	[:SOURce[1]|2]:RADio:ARB:PCOMbination EDIT|DEFined
PATCOMBMODE?	√	PATCOMBMODE?	√	Pattern Addition	[:SOURce[1]|2]:RADio:ARB:PCOMbination?
PATSOF n	√	PATSOF <ext_integer>	√	Start Offset	[:SOURce[1]|2]:RADio:ARB:TIME:SOFFset <ext_integer>
PATSOF?	√	PATSOF?	√	Start Offset	[:SOURce[1]|2]:RADio:ARB:TIME:SOFFset?
PATWMALVL l	√	PATWMALVL <ampl>	√	Pattern (WM(A)) Level	[:SOURce[1]|2]:RADio:ARB:WMA:POWer <ampl>
PATWMALVL?	√	PATWMALVL? [DBM|DBU|DBUT]	√	Pattern (WM(A)) Level Reads by specifying the unit DBM: dBm, DBU: dBμV(EMF), DBUT: dBμV(TERM)	[:SOURce[1]|2]:RADio:ARB:WMA:POWer?

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PATWMBLVL l	√	PATWMBLVL <ampl>	√	Pattern (WM(B)) Level Does not depend on the AWGN converted value.	[:SOURce[1]|2]:RADio:ARB:WMB:POWer <ampl>
PATWMBLVL?	√	PATWMBLVL? [DBM|DBU|DBUT]	√	Pattern (WM(B)) Level Reads by specifying the unit DBM: dBm, DBU: dBμV (EMF), DBUT: dBμV (TERM)	[:SOURce[1]|2]:RADio:ARB:WMB:POWer?
PATWMBDLVL l	√	PATWMBDLVL <ampl>	√	Pattern (WM(B')) Level Does not depend on the AWGN converted value.	[:SOURce[1]|2]:RADio:ARB:WMB:POWer <ampl>
PATWMBDLVL?	√	PATWMBDLVL? [DBM|DBU|DBUT]	√	Pattern (WM(B')) Level Reads by specifying the unit DBM: dBm, DBU: dBμV (EMF), DBUT: dBμV (TERM)	[:SOURce[1]|2]:RADio:ARB:WMB:POWer?
PATWMOUT WMA|WMB|WMAB	√	PATWMOUT WMA|WMB|WMAB|OFF	√	Output WMA, WMB	[:SOURce[1]|2]:RADio:ARB:WMA|WMB:OUTPut <boolean>
PATWMOUT?	√	PATWMOUT?	√	Output WMA, WMB	[:SOURce[1]|2]:RADio:ARB:WMA|WMB:OUTPut?
POWRATIOTARGET WMA|WMB|CONSTANT	√	POWRATIOTARGET WMA|WMB|CONSTANT	√	For setting the A/B output ratio	[:SOURce]:ARB:POWer:RATio:TARGet A|B|AB
POWRATIOTARGET?	√	POWRATIOTARGET?	√	For setting the A/B output ratio	[:SOURce[1]|2]:RADio:ARB:POWer:RATio:TARGet?

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PATWMPOWRATIO l	√	PATWMPOWRATIO <rel_ampl>	√	A/B output ratio	[:SOURce[1]|2]:RADio:ARB:POWer:RATio <rel_ampl>
PATWMPOWRATIO?	√	PATWMPOWRATIO?	√	A/B output ratio	[:SOURce[1]|2]:RADio:ARB:POWer:RATio?
PATWMFOF f	√	PATWMFOF <freq>	√	Frequency Offset Changes the frequency offset of side A	[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet <freq>
PATWMFOF?	√	PATWMFOF?	√	Frequency Offset Changes the frequency offset of side A	[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet?
PATWMAFOF f	√	PATWMAFOF <freq>	√	Frequency Offset Changes the frequency offset of side A	[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet <freq>
PATWMAFOF?	√	PATWMAFOF?	√	Frequency Offset Changes the frequency offset of side A	[:SOURce[1]|2]:RADio:ARB:FREQuency:OFFSet?
PATRUNSTT?	√	PATRUNSTT?	√	Pattern regeneration status	[:SOURce[1]|2]:RADio:ARB:REGister[:STATus]?
SAMPLINGCLK f	√	SAMPLINGCLK <freq>	√	Sampling Clock Changes the sampling rate of side A	[:SOURce[1]|2]:RADio:ARB:WMA:SCLock:RATE <freq>
SAMPLINGCLK?	√	SAMPLINGCLK?	√	Sampling Clock Changes the sampling rate of side A	[:SOURce[1]|2]:RADio:ARB:WMA:SCLock:RATE?

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
LPF a	√	LPF AUTO|THROUGH|100KHZ|300KHZ|1MHZ|3MHZ|10MHZ|30MHZ|70MHZ	√	Low Pass Filter Setting is accepted, but no operational effect occurs Default: AUTO	–
LPF?	√	LPF?	√	Low Pass Filter Setting is accepted, but no operational effect occurs.	–
RMSVAL l	√	RMSVAL <rel_ampl>	√	RMS Value Tuning	[:SOURce[1]|2]:RADio:ARB:RMSTuning <rel_ampl>
RMSVAL?	√	RMSVAL?	√	RMS Value Tuning	[:SOURce[1]|2]:RADio:ARB:RMSTuning?
CENTERSIG WMA|WMB	√	CENTERSIG WMA|WMB|BDC	√	Center Signal	[:SOURce[1]|2]:RADio:ARB:CSIGnal A|B|BDC
CENTERSIG?	√	CENTERSIG?	√	Center Signal	[:SOURce[1]|2]:RADio:ARB:CSIGnal?
DMOD ON|OFF	√	DMOD ON|OFF	√	Modulation On/Off	:OUTPut[1]|2:MODulation[:STATe] <boolean>
DMOD?	√	DMOD?	√	Modulation On/Off	:OUTPut[1]|2:MODulation[:STATe]?
IQSRC INT|EXT	√	IQSRC INT|EXT	√	IQ Source INT :Internal, EXT :Analog I/Q In	[:SOURce[1]|2]:DM:SOURce INTernal|AEXTernal

Table F.5.2-1 Compatible List of Modulation Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
IQSRC?	√	IQSRC?	√	IQ Source	[:SOURce[1]|2]:DM:SOURce?
MODE INT|EXT	√	MODE INT|EXT	√	IQ Source	[:SOURce[1]|2]:DM:SOURce INTernal|AEXTernal
MODE?	√	MODE?	√	IQ Source	[:SOURce[1]|2]:DM:SOURce?
IQOUT ON|OFF	√	IQOUT ON|OFF	√	IQ output ON: Analog I/Q Out, OFF: RF	[:SOURce[1]|2]:DM:OUTPut RFOut|AEXTernalRFA|RFD
IQOUT?	√	IQOUT?	√	IQ output ON: Analog I/Q Out, OFF: RF	[:SOURce[1]|2]:DM:OUTPut?
SMPLCLKMATCH?	√	SMPLCLKMATCH?	√	Sampling Clock Warning of mismatch	[:SOURce[1]|2]:RADio:ARB:RMATching:ERRor?

F.5.3 Load pattern

Given below is the compatible list of Load Pattern device messages.

Table F.5.3-1 Compatible List of Load Pattern Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_LOADPT	√	SCREEN BB_LOADPT	N/A	Moves to the Load Pattern to Memory screen This command is accepted but the screen is not moved.	–
LDFILE WMA,s1,s2	√	LDFILE WMA, <string1>,<string2>[,<device>]	√	Loads waveform files Asynchronous command C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:WMA <string1>,<string2>[,<device>]
LDFILE? WMA	√	LDFILE? WMA, <string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:WMA? <string1>,<string2>[,<device>]
LDFILE WMB,s1,s2	√	LDFILE WMB, <string1>,<string2>[,<device>]	√	Loads waveform files Asynchronous command C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:WMB <string1>,<string2>[,<device>]
LDFILE? WMB	√	LDFILE? WMB, <string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:WMB? <string1>,<string2>[,<device>]
LDFILE LONG,s1,s2	√	LDFILE LONG, <string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:LONG <string1>,<string2>[,<device>]

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
LDFILE? LONG	√	LDFILE? LONG, <string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:LONG? <string1>,<string2>[,<device>]
LDFILE COMB,s1,s2	√	LDFILE CONB, <string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:COMBination <string1>,<string2>[,<device>]
LDFILE? COMB	√	LDFILE? CONB,<string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted	:MMEMory[1]|2:LOAD:WAVeform:COMBination? <string1>,<string2>[,<device>]
LDPAT a,s1,s2	√	LDPAT WMA|WMB|LONG|COMB,<string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted Operates similarly as LOADEDFILESEL … command	:MMEMory[1]|2:LOAD:WAVeform:WMA <string1>,<string2>[,<device>] :MMEMory[1]|2:LOAD:WAVeform:WMB <string1>,<string2>[,<device>] :MMEMory[1]|2:LOAD:WAVeform <string1>,<string2>[,<device>]

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
LDPAT?	√	LDPAT? WMA|WMB|LONG|COMB,<string1>,<string2>[,<device>]	√	Loads waveform files C, when <device> is omitted Operates similarly as LOADEDFILESEL … command	:MMEMory[1]|2:LOAD:WAVeform:WMA? <string1>,<string2>[,<device>] :MMEMory[1]|2:LOAD:WAVeform:WMB? <string1>,<string2>[,<device>] :MMEMory[1]|2:LOAD:WAVeform? <string1>,<string2>[,<device>]
SEQFILELDCHK s1, s2	√	SEQFILELDCHK <string1>,<string2>[,<device>]	√	Confirms whether or not loading of combination files for the sequence mode is enabled Synchronous command C, when <device> is omitted	–
SEQFILELDCHK?	√	SEQFILELDCHK?	√	Confirms whether or not loading of combination files for the sequence mode is enabled.	–
LDCANCEL	√	LDCANCEL	√	Cancels loading of the waveform file to the memory	:MMEMory[1]|2:LOAD:WAVeform:ABORt

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
LOADEDFILENAME? WMA|WMB|LONG|COMB, n	√	LOADEDFILENAME? WMA|WMB|LONG|COMB, <ext_integer>	√	Queries the name of the loaded waveform file	:MEMory[1]|2:WAVeform:WMA:NAME? <ext_integer> :MEMory[1]|2:WAVeform:WMB:NAME? <ext_integer> :MEMory[1]|2:WAVeform:NAME? <ext_integer>
PATNAME? WMA|WMB|LONG|COMB, n	√	PATNAME? WMA|WMB|LONG|COMB, <ext_integer>	√	Queries the name of the loaded waveform file	:MEMory[1]|2:WAVeform:WMA:NAME? <ext_integer> :MEMory[1]|2:WAVeform:WMB:NAME? <ext_integer> :MEMory[1]|2:WAVeform:NAME? <ext_integer>
LOADEDFILENUM? WMA|WMB|LONG|COMB	√	LOADEDFILENUM? WMA|WMB|LONG|COMB	√	Obtains the number of loaded files.	:MEMory[1]|2:WAVeform:WMA:COUNt? :MEMory[1]|2:WAVeform:WMB:COUNt? :MEMory[1]|2:WAVeform:COUNt?

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PATNUM? WMA|WMB|LONG|COMB	√	PATNUM? WMA|WMB|LONG|COMB	√	Obtains the number of loaded files	:MEMory[1]|2:WAVeform:WMA:COUNt? :MEMory[1]|2:WAVeform:WMB:COUNt? :MEMory[1]|2:WAVeform:COUNt?
CFTOHDD s1,s2	√	CFTOHDD <string1>|CFROOT,<string2>[,<device1>[,<device2>]]	N/A	Copies the waveform file from the external media to the hard disk/SSD string1: Name of the copy source package string2: Name of the copy source file device1: When the copy source device is omitted, opt011 = Off: Device with the youngest drive letter connected via the one other than C. opt011 = On: Device with the youngest drive letter connected via the one other than C and D device2: C when the copy destination device is omitted.	:MMEMory:COPY:WAVeform <device1>[,<string>|"ROOT",<string1>,<string2>[,<device2>]]

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
DELFILEWM WMA|WMB|LONG|COMB,s1,s2	√	DELFILEWM WMA|WMB|LONG|COMB,s1,s2	√	Deletes the waveform files on the selected memory	:MEMory[1]|2:DELete :WAVeform[:NAME] <string1>,<string2> :MEMory[1]|2:DELete :WAVeform:WMA[:NAME] <string1>,<string2> :MEMory[1]|2:DELete :WAVeform:WMB[:NAME] <string1>,<string2>
DELFILEWM ALL	√	DELFILEWM ALL	√	Deletes the waveform files on all memories	:MEMory[1]|2:DELete :WAVeform:ALL
DELPATWM WMA|WMB|LONG|COMB,s1,s2	√	DELPATWM WMA|WMB|LONG|COMB,s1,s2	√	Deletes the waveform files on the selected memory	:MEMory[1]|2:DELete :WAVeform[:NAME] <string1>,<string2> :MEMory[1]|2:DELete :WAVeform:WMA[:NAME] <string1>,<string2> :MEMory[1]|2:DELete :WAVeform:WMB[:NAME] <string1>,<string2>
DELPATWM ALL	√	DELPATWM ALL	√	Deletes the waveform files on all memories	:MEMory[1]|2:DELete :WAVeform:ALL

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
WMSPC? WMA|WMB	√	WMSPC? WMA|WMB	√	Obtains the free space of the memory	:MEMory[1]|2:WAVeform:WMA:FREE? :MEMory[1]|2:WAVeform:WMB:FREE?
WMOPTIMIZE WMA|WMB	√	WMOPTIMIZE WMA|WMB	√	Optimizes the memory Command F is accepted but does not affect the MG3710A/10E/40A	–
WMOPTCHK WMA|WMB	√	WMOPTCHK WMA|WMB	√	Checks the optimization of the memory The command is accepted but does not affect the MG3710A/10E/40A	–
WMOPTCHK? WMA|WMB	√	WMOPTCHK? WMA|WMB	√	Checks the optimization of the memory The command is accepted but does not affect the MG3710A/10E/40A Response: Always NO_NEED_OPTIMIZE	–
WMOPTCANCEL	√	WMOPTCANCEL	√	Stops the optimization of the memory The command is accepted but does not affect the MG3710A/10E/40A	–
HDDSPC?	√	HDDSPC? [<device>]	N/A	Obtains the space information of the hard disk/SSD C, when <device> is omitted	:MMEMory:FREE[:ALL]? [<device>]
COMBPAT? s1,s2,WMA|WMB	√	COMBPAT? <string1>,<string2>,WMA|WMB[,<device>]	N/A	Queries the pattern file name existing on HDD/SSD. C, when <device> is omitted Returns "NONE","NONE" when querying non existing files and sequence files	–

Table F.5.3-1 Compatible List of Load Pattern Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
COMBTOTALSIZE? s1,s2	√	COMBTOTALSIZE? <string1>,<string2>,[<device>]	N/A	Queries the total size of the pattern files used by the combination file C, when <device> is omitted Returns in Byte the total size of wvd of each WaveMemory In the case of a Sequence file, returns the total of the wvd files of the element as the size of WaveMemoryA (excluding the overlapped ones) Returns wvd of the AddMode as the size of WaveMemoryB	–
SEQELMNUM? s1,s2	√	SEQELMNUM? <string1>,<string2>[,<device>]	N/A	Queries the number of elements that belong to the combination file for the sequence mode existing on HDD/SSD C, when <device> is omitted	–
SEQELMNAME? s1,s2,n	√	SEQELMNAME? <string1>,<string2>,<ext_integer>[,<device>]	N/A	Queries the number of elements that belong to the combination file for the sequence mode existing on HDD/SSD C, when <device> is omitted	–
SEQCURRENTELM?	√	SEQCURRENTELM?	√	Obtains the element number of the pattern regenerated in the sequence	–
FILEVER? s1,s2	√	FILEVER? <string1>,<string2>[,<device>]	N/A	Queries the version number of the pattern file existing on HDD/SSD C, when <device> is omitted	–

F.5.4 Ext I/O Setup

Given below is the compatible list of the Ext I/O Setup device messages:

Table F.5.4-1 Compatible List of Ext I/O Setup Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN B_IOSETUP	√	SCREEN B_IOSETUP	N/A	Moves to the Ext I/O Setup screen This command is accepted but the screen is not moved	–
SFTRG ON|OFF	√	SFTRG ON|OFF	√	Start/Frame Trigger	[:SOURce[1]|2]:RADio:ARB:TRIGger[:STATe] <boolean>
SFTRG?	√	SFTRG?	√	Start/Frame Trigger	[:SOURce[1]|2]:RADio:ARB:TRIGger[:STATe]?
SFTRGMODE START|FRAME	√	SFTRGMODE START|FRAME	√	Start/Frame Trigger Mode	[:SOURce[1]|2]:RADio:ARB:TRIGger:TYPE STARt|FRAMe
SFTRGMODE?	√	SFTRGMODE?	√	Start/Frame Trigger Mode	[:SOURce[1]|2]:RADio:ARB:TRIGger:TYPE?
STGS INT|EXTSTA|EXT|EXTFRM	√	STGS INT|EXTSTA|EXT|EXTFRM	√	Start/Frame Trigger Source	–
STGS?	√	STGS?	√	Start/Frame Trigger Source Returns EXTSTA when Start Trigger is set	–

Table F.5.4-1 Compatible List of Ext I/O Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
STDLY n	√	STDLY <ext_numeric>	√	Start/Frame Trigger Delay Setting unit: In sample point, Resolution: 0.01 The setting of STDLY is as same as that of STDLYSYM (a/OverSampling)	–
STDLY?	√	STDLY?	√	Start/Frame Trigger Delay	–
STDLYSYM n	√	STDLYSYM <ext_numeric>	√	Start/Frame Trigger Delay (to be specified in conversion unit) Resolution: 0.01	[:SOURce]:ARB:TRIGger:DELay <ext_numeric>
STDLYSYM?	√	STDLYSYM?	√	Start/Frame Trigger Delay (to be specified in conversion unit)	[:SOURce[1]|2]:RADio:ARB:TRIGger:DELay?
EIST RISE|FALL	√	EIST RISE|FALL	√	Start/Frame Trigger Edge	[:SOURce[1]|2]:RADio:ARB:TRIGger:SLOPe POSitive|NEGative
EIST?	√	EIST?	√	Start/Frame Trigger Edge	[:SOURce[1]|2]:RADio:ARB:TRIGger:SLOPe?
REFCLKSRC INT|EXT	√	REFCLKSRC INT|EXT|EXTS|SYNC	√	BB Reference Clock Source INT: Internal, EXT:External EXTS: External (BB Ref Sync) SYNC: Sync with 1st SG	[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence[:SOURce] INTernal|EXTernal|EXTSync
REFCLKSRC?	√	REFCLKSRC?	√	BB Reference Clock Source	[:SOURce[1]|2]:RADio:ARB:CLOCk:REFerence[:SOURce]?

Table F.5.4-1 Compatible List of Ext I/O Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PATTRG ON|OFF	√	PATTRG ON|OFF	√	Pattern Trigger On/Off	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger[:STATe] <boolean>
PATTRG?	√	PATTRG?	√	Pattern Trigger On/Off	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger[:STATe]?
PATTRGEDGE RISE|FALL	√	PATTRGEDGE RISE|FALL	√	Pattern Trigger Edge Valid only for Pattern Trigger 1	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1:SLOPe POSitive|NEGative
PATTRGEDGE?	√	PATTRGEDGE?	√	Pattern Trigger Edge Valid only for Pattern Trigger 1	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger1:SLOPe?
REFCLKVAL SIXTEENTH|EIGHTH|QUARTER|HALF|1|2|4|8|16	√	[:SOURce[1]]:REFCLKVAL SIXTEENTH|EIGHTH|QUARTER|HALF|X1|X2|X4|X8|X16	N/A	BB Reference Clock	[:SOURce[1]]:RADio:ARB:CLOCk:REFerence:DIVision SIXTeenth|EIGHth|QUARter|HALF|X1|X2|X4|X8|X16
REFCLKVAL?	√	[:SOURce[1]]:REFCLKVAL?	N/A	BB Reference Clock	[:SOURce[1]]:RADio:ARB:CLOCk:REFerence:DIVision?
MARKERPOL n,a	√	MARKERPOL <ext_integer>, POS|NEG	√	Marker Polarity Valid only for WMA	[:SOURce[1]|2]:RADio:ARB:WMA:MARKer1|2|3:POLarity POSitive|NEGative

Table F.5.4-1 Compatible List of Ext I/O Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
MARKERPOL? n	√	MARKERPOL? <ext_integer>	√	Marker Polarity Valid only for WMA	[:SOURce[1]|2]:RADio:ARB:WMA:MARKer1|2|3:POLarity?
PMO INT|EXT|OFF	√	PMO INT|EXT|OFF	√	Pulse Modulation Source When setting INT: PulseModulatino = Off, RFGate = On When setting EXT: PulseModulation = On, PulseSource = Ext Pulse, RFGate = Off When setting OFF: PulseModulatino = Off, RFGate = On	–
PMO?	√	PMO?	√	Pulse Modulation Source When setting INT: When RFGate = On EXT: When PulseModulation = On, PulseSource = Ext Pulse, and RFGate = Off OFF: Other than the above:	–

F.5.5 I/Q tuning

Given below is the compatible list of the I/Q Tuning device messages:

Table F.5.5-1 Compatible List of I/Q Tuning Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_IQTUNING	√	SCREEN BB_IQTUNING	N/A	Moves to the I/Q Tuning screen This command is accepted but the screen is not moved	–
IOLTR p	√	IOLTR <percent>	N/A	I Output Level Trimming	[:SOURce[1]]:DM:IQADjustment:EXTernal:ITRimming <percent>
IOLTR?	√	IOLTR?	N/A	I Output Level Trimming	[:SOURce[1]]:DM:IQADjustment:EXTernal:ITRimming?
QOLTR p	√	QOLTR <percent>	N/A	Q Output Level Trimming	[:SOURce[1]]:DM:IQADjustment:EXTernal:QTRimming <percent>
QOLTR?	√	QOLTR?	N/A	Q Output Level Trimming	[:SOURce[1]]:DM:IQADjustment:EXTernal:QTRimming?

Table F.5.5-1 Compatible List of I/Q Tuning Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
ICOMOS l	√	ICOMOS <voltage>	N/A	I Common Offset While I-phase and Q-phase can be set and read separately on MG3700A, setting and reading either I-phase or Q-phase on the MG3710A/10E/40A refers to IQ Common Offset. (For example, if Q-phase is set after I-phase is set, the value of IQ Common Offset is the setting for Q-phase.)	[:source :IQADjustment:EXTernal:COFFset <voltage>
ICOMOS?	√	ICOMOS?	N/A	I Common Offset While I-phase and Q-phase can be set and read separately on MG3700A, setting and reading either I-phase or Q-phase on the MG3710A/10E/40A refers to IQ Common Offset. (For example, if Q-phase is set after I-phase is set, the value of IQ Common Offset is the setting for Q-phase.)	[:SOURce[1]]:DM:IQADjustment:EXTernal:COFFset?
QCOMOS l	√	QCOMOS <voltage>	N/A	Q Common Offset While I-phase and Q-phase can be set and read separately on MG3700A, setting and reading either I-phase or Q-phase on the MG3710A/10E/40A refers to IQ Common Offset. (For example, if Q-phase is set after I-phase is set, the value of IQ Common Offset is the setting for Q-phase.)	[:source :IQADjustment:EXTernal:COFFset <voltage>

Table F.5.5-1 Compatible List of I/Q Tuning Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
QCOMOS?	√	QCOMOS?	N/A	Q Common Offset While I-phase and Q-phase can be set and read separately on MG3700A, setting and reading either I-phase or Q-phase on the MG3710A/10E/40A refers to IQ, Common, Offset. (For example, if Q-phase is set after I-phase is set, the value of IQ, Common, Offset is the setting for Q-phase.)	[:SOURce[1]]:DM:IQADjustment:EXTernal:COFFset?
IDIFFOS 1	√	IDIFFOS <voltage>	N/A	I Differential Offset	[:SOURce[1]]:DM:IQADjustment:EXTernal:DIOFfset <voltage>
IDIFFOS?	√	IDIFFOS?	N/A	I Differential Offset	[:SOURce[1]]:DM:IQADjustment:EXTernal:DIOFfset?
QDIFFOS 1	√	QDIFFOS <voltage>	N/A	Q Differential Offset	[:SOURce[1]]:DM:IQADjustment:EXTernal:DQOFfset <voltage>
QDIFFOS?	√	QDIFFOS?	N/A	Q Differential Offset	[:SOURce[1]]:DM:IQADjustment:EXTernal:DQOFfset?

F.5.6 Edit HDD

Given below is the compatible list of Edit HDD device messages.

Table F.5.6-1 Compatible List of Edit HDD Device Messages

MG3700A Commands	Compatibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_EDITHDD	√	SCREEN BB_EDITHDD	N/A	Moves to the Edit HDD screen This command is accepted but the screen is not moved	–
DELFILEHDD s1,s2	√	DELFILEHDD <string1>,<srting2>[,<device>]	N/A	Deletes waveform files on the hard disk/SSD C, when <device> is omitted wvc is given preference where both wvc and wvi exist	:MMEMory:DELete:WAVeform[:NAME] <string1>,<string2>,[<device>] :MMEMory:DELete:WAVeform:SINGle[:NAME] <string1>,<string2>,[<device>]
DELPATHDD s1,s2	√	DELPATHDD <string1>,<srting2>[,<device>]	N/A	Deletes waveform files on the hard disk/SSD C, when <device> is omitted. wvc is given preference where both wvc and wvi exist	:MMEMory:DELete:WAVeform[:NAME] <string1>,<string2>,[<device>] :MMEMory:DELete:WAVeform:SINGle[:NAME] <string1>,<string2>,[<device>]

F.5.7 Sequence Progress

Given below is the compatible list of Sequence Progress device messages.

Table F.5.7-1 Compatible List of Sequence Progress Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN BB_PROGRESS	√	SCREEN BB_PROGRESS	N/A	Moves to the Sequence Progress screen This command is accepted but the screen is not moved.	–
SEQNEXTPAT	√	SEQNEXTPAT	√	Sequence Next Pattern	[:SOURce[1]|2]:RADio:ARB:SEQuence:NEXT
SEQRESTART	√	SEQRESTART	√	Sequence Restart	INITiate[1]|2:ARB:SEQuence[:IMMediate]
SEQPLAYMODE AUTO|MANUAL	√	SEQPLAYMODE AUTO|MANUAL	√	Sequence Play Mode	[:SOURce[1]|2]:RADio:ARB:SEQuence:MODE AUTO|MANual
SEQPLAYMODE?	√	SEQPLAYMODE?	√	Sequence Play Mode	[:SOURce[1]|2]:RADio:ARB:SEQuence:MODE?
SEQSWPOINT PAT_END|FRAME_END	√	SEQSWPOINT PAT_END|FRAME_END	√	Sequence Switching Point	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger:SPOint PATTen|FRAMe
SEQSWPOINT?	√	PSEQSWPOINT?	√	Sequence Switching Point	[:SOURce[1]|2]:RADio:ARB:SEQuence:TRIGger:SPOint?

F.6 Utility Function

F.6.1 Common to utility functions

Given below is the compatible list of device messages common to utility functions.

Table F.6.1-1 Compatible List of Device Messages Common To Utility Functions

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_TOP	√	SCREEN UTIL_TOP	N/A	Moves to the utility function top screen This command is accepted but the screen is not moved.	–

F.6.2 Save/Recall

Given below is the comp able list of Save/Recall device messages.

Table F.6.2-1 Compatible List of Save/Recall Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_PARAMSR	√	SCREEN UTIL_PARAMSR	N/A	Moves to the Parameter Save/Recall screen This command is accepted but the screen is not moved.	–
PRMSAV s	√	PRMSAV <string>[,<device>]	N/A	Parameter Save The device specified by PRMMEDIA when <device> is omitted.	:MMEMory:STORe:STATe [<filename>[,<device>]]
PRMREC s	√	PRMREC <string>[,<device>]	N/A	Parameter Recall The device specified by PRMMEDIA when <device> is omitted.	:MMEMory:LOAD:STATe <filename>[,<device>]
PRMDEL s	√	PRMDEL <string>[,<device>]	N/A	Parameter File Delete The device specified by PRMMEDIA when <device> is omitted.	:MMEMory:DELete:STATe <filename>,<device>
PRMLST?	√	PRMLST? [<device>]	N/A	Parameter File List The device specified by PRMMEDIA when <device> is omitted.	:MMEMory:CATalog:STATe? <device>

Table F.6.2-1 Compatible List of Save/Recall Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
PRMMEDIA HDD|CF	√	PRMMEDIA HDD|CF	N/A	Selects media for Save/Recall C drive when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	–
PRMMEDIA?	√	PRMMEDIA?	N/A	Selects media for Save/Recall	–

F.6.3 BER Measurement

Given below is the compatible list of the BER measurement device messages.

Table F.6.3-1 Compatible List of BER Measurement Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_BERT	√	SCREEN UTIL_BERT	N/A	Moves to the BER measurement screen This command is accepted but the screen is not moved.	–
SCREEN UTIL_BER_IO	√	SCREEN UTIL_BER_IO	N/A	Moves to the BER measurement Interface Setup screen This command is accepted but the screen is not moved.	–
SCREEN UTIL_BER_RESYNC	√	SCREEN UTIL_BER_RESYNC	N/A	Moves to the BER measurement Resync Condition Setup screen This command is accepted but the screen is not moved.	–
BERSTART	√	BERSTART	N/A	Executes the BER measurement	:INITiate:BERT[:IMMediate]
BERSTOP	√	BERSTOP	N/A	Stops the BER measurement	:ABORt:BERT
BERCOUNTCLR	√	BERCOUNTCLR	N/A	Clears the BER measurement bit	[:SENSe]:BERT[:BASeband]:COUNt:CLEar
BERDATA POS|NEG	√	BERDATA POS|NEG	N/A	Sets the Data polarity	:INPut:BERT[:BASeband]:DATA:POLarity POSitive|NEGative

Table F.6.3-1 Compatible List of BER Measurement Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERDATA?	√	BERDATA?	N/A	Sets the Data polarity	:INPut:BERT[:BASeband]:DATA:POLarity?
BERCLK RISE|FALL	√	BERCLK RISE|FALL	N/A	Sets the Clock polarity	:INPut:BERT[:BASeband]:CLOCk:POLarity POSitive|NEGative
BERCLK?	√	BERCLK?	N/A	Sets the Clock polarity	:INPut:BERT[:BASeband]:CLOCk:POLarity?
BERENBL POS|NEG|DISABLE	√	BERENBL POS|NEG|DISABLE	N/A	Sets the Enable polarity	:INPut:BERT[:BASeband]:CGATe:POLarity POSitive|NEGative|DISable
BERENBL?	√	BERENBL?	N/A	Sets the Enable polarity	:INPut:BERT[:BASeband]:CGATe:POLarity?
BERDATATHLD 1	N/A	—	-	Data signal threshold level	—
BERDATATHLD?	N/A	—	-	Data signal threshold level	—
BERCLKTHLD 1	N/A	—	-	Clock signal threshold level	—
BERCLKTHLD?	N/A	—	-	Clock signal threshold level	—
BERENBLTHLD 1	N/A	—	-	Enable level threshold level	—

Table F.6.3-1 Compatible List of BER Measurement Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERENBLTHLD?	N/A	–	-	Enable level threshold level	–
BERDATADELAY n	N/A	–	-	Sets Data Delay	–
BERDATADELAY?	N/A	–	-	Sets Data Delay	–
BERENBLDELAY n	N/A	–	-	Sets Enable Delay	–
BERENBLDELAY?	N/A	–	-	Sets Enable Delay	–
BERINZ HIZ|50	N/A	–	-	Input impedance	–
BERINZ?	N/A	–	-	Input impedance	–
BERMEDIA HDD|CF	√	BERMEDIA HDD|CF	N/A	Selects media for the BER measurement log C drive when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	–
BERMEDIA?	√	BERMEDIA?	N/A	Selects media for the BER measurement log	–
BERAUTORESYNC ON|OFF	√	BERAUTORESYNC ON|OFF	N/A	Sets the automatic resynchronization	[:SENSe]:BERT[:BASeband]:RSYNc[:STATe] <boolean>
BERAUTORESYNC?	√	BERAUTORESYNC?	N/A	Sets the automatic resynchronization	[:SENSe]:BERT[:BASeband]:RSYNc[:STATe]?
BERMODE SINGLE|CONTINUOUS|ENDLESS	√	BERMODE SINGLE|CONTINUOUS|ENDLESS	N/A	Sets the measurement mode	[:SENSe]:BERT[:BASeband]:MODE SINGle|CONTinuous|ENDLess

Table F.6.3-1 Compatible List of BER Measurement Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERMODE?	√	BERMODE?	N/A	Sets the measurement mode	[:SENSe]:BERT[:BASeband]:MODE?
BERCOUNTMODE TIME|DATABIT|ERRORBIT	√	BERCOUNTMODE DATABIT|ERRORBIT	N/A	Measurement end condition TIME specification is not supported	[:SENSe]:BERT[:BASeband]:STOP:CRITeria[:SELect] EBIT|NONE
BERCOUNTMODE?	√	BERCOUNTMODE?	N/A	Measurement end condition	[:SENSe]:BERT[:BASeband]:STOP:CRITeria[:SELect]?
BERTIME n	N/A	—	-	Measurement time	—
BERTIME?	N/A	—	-	Measurement time	—
BERBIT b	√	BERBIT <ext_integer>	N/A	Measurement bit count	[:SENSe]:BERT[:BASeband]:TBITs <ext_integer>
BERBIT?	√	BERBIT?	N/A	Measurement bit count	[:SENSe]:BERT[:BASeband]:TBITs?
BERERRORBIT b	√	BERERRORBIT <ext_integer>	N/A	Measurement error bit count	[:SENSe]:BERT[:BASeband]:STOP:CRITeria:EBIT <ext_integer>
BERERRORBIT?	√	BERERRORBIT?	N/A	Measurement error bit count	[:SENSe]:BERT[:BASeband]:STOP:CRITeria:EBIT?

Table F.6.3-1 Compatible List of BER Measurement Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERLOG s	√	BERLOG <string>[,<device>]	N/A	Log output Device specified by BERMEDIA when <device> is omitted	:MMEMory:STORe:BERT:LOG <string>[,<device>]
BERLOGCLEAR	√	BERLOGCLEAR	N/A	Clears logs	[:SENSe]:BERT[:BASeband]:LOG:CLEar
BERLOGFILEDEL s	√	BERLOGFILEDEL <string>[,<device>]	N/A	Deletes Log files Device specified by BERMEDIA when <device> is omitted	:MMEMory:DELete:BERT:LOG <string>[,<device>]
BERTYPE PN9|PN11|PN15|PN20|PN23|ALL0|ALL1|ALT|PN9FIX|PN11FIX|PN15FIX|PN20FIX|PN23FIX|USERPATTERN	√	BERTYPE PN9|PN11|PN15|PN20|PN23|ALL0|ALL1|ALT|PN9FIX|PN11FIX|PN15FIX|PN20FIX|PN23FIX|USERPATTERN	N/A	PN Type	[:SENSe]:BERT[:BASeband]:PRBS[:DATA] PN9|PN11|PN15|PN20|PN23|ALL0|ALL1|ALT|FPN9|FPN11|FPN15|FPN20|FPN23|USER
BERTYPE?	√	BERTYPE?	N/A	PN Type	[:SENSe]:BERT[:BASeband]:PRBS[:DATA]?
RCVBIT?	√	RCVBIT?	N/A	Receive Bit	FETCh:BERT:DATA:COUNt?
BITERR?	√	BITERR?	N/A	Bit Error Count	FETCh:BERT:ERRor:COUNt?

Table F.6.3-1 Compatible List of BER Measurement Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BER? EP|ER	√	BER? EP|ER	N/A	Bit Error Rate	FETCh:BERT:ERRor:RATE?
BERSYNCLOSS?	√	BERSYNCLOSS?	N/A	Number of occurrences of Sync Loss.	[:SENSe]:BERT[:BASeband]:SYNLoss:COUNt?
BERSYNCLOSSTHLD n, a	√	BERSYNCLOSSTHLD <ext_integer>,500|5000|50000	N/A	Threshold for detecting Sync Loss.	[:SENSe]:BERT[:BASeband]:RSYNc:THReshold <ext_integer>,500|5000|50000
BERSYNCLOSSTHLD?	√	BERSYNCLOSSTHLD?	N/A	Threshold for detecting Sync Loss	[:SENSe]:BERT[:BASeband]:RSYNc:THReshold?
BERSYNCLOSSACT COUNT_CLEAR|COUNT_KEEP	√	BERSYNCLOSSACT COUNT_CLEAR|COUNT_KEEP	N/A	Count operation when Sync Loss is detected	[:SENSe]:BERT[:BASeband]:RSYNc:COUNt:ACTion CLEar|KEEP
BERSYNCLOSSACT?	√	BERSYNCLOSSACT?	N/A	Count operation when Sync Loss is detected	[:SENSe]:BERT[:BASeband]:RSYNc:COUNt:ACTion?
BERSTATUS?	√	BERSTATUS?	N/A	Obtain the measurement status	—
BERERROR?	√	BERERROR?	N/A	Obtain the measurement error status	[:SENSe]:BERT[:BASeband]:ERRor?
BERSTOPSTATUS?	√	BERSTOPSTATUS?	N/A	Obtain the measurement stop status	—
BERRESULT? EP|ER|EP_WSYNCLOSS|ER_WSYNCLOSS	√	BERRESULT? EP|ER|EP_WSYNCLOSS|ER_WSYNCLOSS	N/A	Obtain the result and status of measurement	—

F.6.4 BER Measurement (Data Type Detail Setup)

Given below is the compatible list of BER measurement (Data Type Detail Setup) device messages.

Table F.6.4-1 Compatible List of BER Measurement (Data Type Detail Setup) Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_BER_DETAIL	√	SCREEN UTIL_BER_DETAIL	N/A	Moves to the BER measurement Data Type Detail screen This command is accepted but the screen is not moved.	–
BERPNINITIAL n	√	BERPNINITIAL <binary>	N/A	The default value of the PN pattern to be used for PN Fix. Attaches #B at the head of the argument.	[:SENSe]:BERT[:BASeband]:PRBS:PNFix:INITial <binary>
BERPNINITIAL?	√	BERPNINITIAL?	N/A	The default value of the PN pattern to be used for PN Fix When the language mode is MS269xA, #B is not attached to the return value	[:SENSe]:BERT[:BASeband]:PRBS:PNFix:INITial?
BERPNFIXLENG n	√	BERPNFIXLENG <ext_integer>	N/A	The length of one cycle of the pattern to be used for PN Fix	[:SENSe]:BERT[:BASeband]:PRBS:PNFix:LENGth <ext_integer>
BERPNFIXLENG?	√	BERPNFIXLENG?	N/A	The length of one cycle of the pattern to be used for PN Fix	[:SENSe]:BERT[:BASeband]:PRBS:PNFix:LENGth?
BERSYNCSTARTPOS n	√	BERSYNCSTARTPOS <ext_integer>	N/A	Specifies the position of the top bit of the portion in the user defined pattern to be used for synchronization judgment	[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:STARt <ext_integer>

Table F.6.4-1 Compatible List of BER Measurement (Data Type Detail Setup) Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERSYNCSTARTPOS?	√	BERSYNCSTARTPOS?	N/A	Specifies the position of the top bit of the portion in the user pattern to be used for synchronization judgment	[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:STARt?
BERSYNCLENG n	√	BERSYNCLENG <ext_integer>	N/A	Length of the portion in the user defined pattern to be used for synchronization judgment	[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:LENGth <ext_integer>
BERSYNCLENG?	√	BERSYNCLENG?	N/A	Length of the portion in the user defined pattern to be used for synchronization judgment	[:SENSe]:BERT[:BASeband]:PRBS:USER:SYNC:LENGth?
BERLOADMEDIA a	√	BERLOADMEDIA HDD|CF	N/A	Loading source media of the user defined pattern C drive when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	–
BERLOADMEDIA?	√	BERLOADMEDIA?	N/A	User defined pattern loading source media	–
BERUSERPATLST?	√	BERUSERPATLST? [<device>]	N/A	List of the user defined pattern files Device specified by BERLOADMEDIA when <device> is omitted	:MMEMory:LIST:BERT:PATTern? [<device>]
BERLOADUSERPAT s	√	BERLOADUSERPAT <string>[,<device>]	N/A	Loads the user defined patterns Device specified by BERLOADMEDIA when <device> is omitted	:MMEMory:LOAD:BERT:PATTern <string>[,<device>]

Table F.6.4-1 Compatible List of BER Measurement (Data Type Detail Setup) Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BERUSERPAT?	√	BERUSERPAT?	N/A	Current user defined pattern file	[:SENSe]:BERT[:BASeband]:PRBS:USER:PATTern?
BERUSERPATLENG?	√	BERUSERPATLENG?	N/A	Current user defined pattern bit length	[:SENSe]:BERT[:BASeband]:PRBS:USER:LENGth?

F.6.5 Alarm Monitor

Given below is the compatible list of Alarm Monitor device messages.

Table F.6.5-1 Compatible List of Alarm Monitor Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_ALARMMON	√	SCREEN UTIL_ALARMMON	N/A	Moves to the Alarm Monitor screen This command is accepted but the screen is not moved.	–
ALMMONITOR?	√	ALMMONITOR?	√	Alarm Monitor Response = bit0 + bit1 + bit2 + bit3 + bit + bit5 + bit6 + bit7 bit7: Unused (fixed to 0) bit6: Unused (fixed to 0) bit5: Unused (fixed to 0) bit4: RppStatus On bit3: Unlock BB Int Clock bit2: ALC Alarm bit1: Unused (fixed to 0) bit0: Int.Unlock	–
ALMLOG s	√	ALMLOG <string>[,<device>]	√	Alarm History output Device specified by ALMMEDIA when <device> is omitted	:MMEMory:STORe:ALARm:LOG <string>[,<device>]

Table F.6.5-1 Compatible List of Alarm Monitor Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
ALMMEDIA HDD|CF	√	ALMMEDIA HDD|CF	√	Selects media for Alarm History output C drive when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	–
ALMMEDIA?	√	ALMMEDIA?	√	Selects media for Alarm History output	–

F.6.6 Interface Setup

Given below is the compatible list of the Interface Setup device messages.

Table F.6.6-1 Compatible List of Interface Setup Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_IFSET	√	SCREEN UTIL_IFSET	N/A	Moves to the Interface Setup Interface Setup screen This command is accepted but the screen is not moved.	–
TRM 0|1|LF|CRLF	√	TRM 0|1|LF|CRLF|EOI	N/A	GPIB Terminator	:SYSTem:COMMunicate :GPIB:TERMinator LF|CRLF|EOI
TRM?	√	TRM?	N/A	GPIB Terminator Response: LF, CRLF, EOI	:SYSTem:COMMunicate :GPIB:TERMinator?

F.6.7 Network Setup

Given below is the compatible list of the Network Setup device messages:

Table F.6.7-1 Compatible List of Network Setup Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_NETSET	√	SCREEN UTIL_NETSET	N/A	Moves to the Network Setup Interface Setup screen This command is accepted but the screen is not moved.	–
HOSTNAME s	N/A	–	-	Host Name To be set on Windows	–
HOSTNAME?	N/A	–	-	Host Name To be set on Windows	–
DOMAINNAME s	N/A	–	-	Host Name To be set on Windows	–
DOMAINNAME?	N/A	–	-	Host Name To be set on Windows	–
DHCP ON|OFF	N/A	–	-	DHCP To be set on Windows	–
DHCP?	N/A	–	-	DHCP To be set on Windows	–
IPAD n1,n2,n3,n4	N/A	–	-	IP Address To be set on Windows	–
IPAD?	N/A	–	-	IP Address To be set on Windows	–
SUBNET n1,n2,n3,n4	N/A	–	-	Subnet mask To be set on Windows	–

Table F.6.7-1 Compatible List of Network Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SUBNET?	N/A	–	-	Subnet mask To be set on Windows	–
DNSAUTO ON|OFF	N/A	–	-	DNS To be set on Windows	–
DNSAUTO?	N/A	–	-	DNS To be set on Windows	–
DNS1AD n1,n2,n3,n4	N/A	–	-	DNS Primary Address To be set on Windows	–
DNS1AD?	N/A	–	-	DNS Primary Address To be set on Windows	–
DNS2AD n1,n2,n3,n4	N/A	–	-	DNS Secondary Address To be set on Windows	–
DNS2AD?	N/A	–	-	DNS Secondary Address To be set on Windows	–
GATEWAY n1,n2,n3,n4	N/A	–	-	Default Gateway To be set on Windows	–
GATEWAY?	N/A	–	-	Default Gateway To be set on Windows	–
IQPROID s	N/A	–	-	IQproducer User ID To be set on Windows	–
IQPROID?	N/A	–	-	IQproducer User ID To be set on Windows	–
IQPROPASWD s	N/A	–	-	IQproducer Password To be set on Windows	–
IPRENEW	N/A	–	-	IP Address Renew To be set on Windows	–

Table F.6.7-1 Compatible List of Network Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
IPRELEASE	N/A	–	-	IP Address Release To be set on Windows	–
MACAD?	N/A	–	-	MAC Address To be set on Windows	–

F.6.8 Common Setup

Given below is the compatible list of the Common Setup device messages:

Table F.6.8-1 Compatible List of Common Setup Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_COMSET	√	SCREEN UTIL_COMSET	N/A	Moves to the Common Setup screen This command is accepted but the screen is not moved.	–
BUZ ON|OFF	√	BUZ ON|OFF	N/A	Buzzer	:SYSTem:BEEPer ON|OFF|0|1
BUZ?	√	BUZ?	N/A	Buzzer	:SYSTem:BEEPer?
REMDISP NORMAL|REMA	√	REMDISP NORMAL|REMAIN|REMA|REMAIN_LAST	N/A	Remote Error Message Mode NORMAL: Clears the error message when the next command is received REMAINKeeps the first error message displayed REMA:Same as REMAIN REMAIN_LAST: Keeps the last error message displayed.	:DisplayERRor:MODE NORMal|REMain|LAST
REMDISP?	√	REMDISP?	N/A	Remote Error Message Mode	:DISPlay:ERRor:MODE?
SCRCPYMEDIA HDD|CF	√	SCRCPYMEDIA HDD|CF	N/A	Screen Copy Media C drive when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	–
SCRCPYMEDIA?	√	SCRCPYMEDIA?	N/A	Screen Copy Media	–

Table F.6.8-1 Compatible List of Common Setup Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
BITMAPS COLOR|GRAY	√	BITMAPS COLOR|GRAY|REV|MREV	N/A	Bitmap Setup COLOR:Color, GRAY:Monochrome, REV:Reverse MREV:Monochrome&Reverse	:MMEMory:STORe:SCReen:THEMe NORMal|REVerse|MONOchrome|MREVerse
BITMAPS?	√	BITMAPS?	N/A	Bitmap Setup	:MMEMory:STORe:SCReen:THEMe?
TIMESET n1,n2,n3,n4,n5,n6	N/A	—	-	Time Set To be set on Windows	—
TIMESET?	N/A	—	-	Time Set To be set on Windows	—
ATTCHKDISP ON|OFF	√	ATTCHKDISP ON|OFF	N/A	Attenuator check Display Setting is acceptable but no display is made since no ATT error exists. Default: ON	—
ATTCHKDISP?	√	ATTCHKDISP?	N/A	Attenuator check Display	—

F.6.9 Maintenance Check

Given below is the compatible list of Maintenance Check device messages:

Table F.6.9-1 Compatible List of Maintenance Check Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_MNTCHK	√	SCREEN UTIL_MNTCHK	N/A	Moves to the Maintenance Check screen This command is accepted but the screen is not moved.	–
ATTT?	√	ATTT?	N/A	Attenuator Count Always returns 0	–
RUNT?	√	RUNT?	N/A	Running Time Unit: Time (H)	:SystemINFormation: RTIMe?

F.6.10 Hardware Check

Given below is the compatible list of Hardware Check device messages.

Table F.6.10-1 Compatible List of Hardware Check Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_HDCHK	√	SCREEN UTIL_HDCHK	N/A	Moves to the Hardware Check screen This command is accepted but the screen is not moved.	–
SCREEN UTIL_HDCHK_OPT	√	SCREEN UTIL_HDCHK_OPT	N/A	Moves to the Option Hardware Check screen This command is accepted but the screen is not moved.	–
HWC?	N/A	–	-	Hardware Check result This function is not supported, since the HW structure is different.	–
HWCBER?	N/A	–	-	High-speed BER Hardware Check result This function is not supported, since the HW structure is different.	–

Table F.6.10-1 Compatible List of Hardware Check Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SERNUMCPU?	N/A	Not supported due to the different HW structure. To obtain the information about the hardware version, use the following: :SYSTem:FPGA:VERSion? <hardware> :SYSTem:FPGA:VERSion:CATalog? :SYSTem:HARDware:REVision? <hardware> :SYSTem:HARDware:REVision:CATalog?	-	CPU port serial number	–
BOARDCPUVER?	N/A		-	CPU port version number	–
FPGACPUVER?	N/A		-	CPU FPGA version number	–
IPLVER?	N/A		-	IPL version number	–
SOFTCPUVER?	N/A		-	CPU Software version number	–
SERNUMIF?	N/A		-	IF port serial number	–
BOARDIFVER?	N/A		-	IF port version number	–
FPGADIGVER?	N/A		-	Baseband FPGA (Digital) version number	–
FPGAANAVER?	N/A		-	Baseband FPGA (Analog) version number	–
SERNUMRF?	N/A		-	RF port serial number	–
BOARDRFVER?	N/A		-	RF port version number	–
FPGARFVER?	N/A		-	RF FPGA version number	–
KEYENCVER?	N/A		-	Key Encoder version number	–
SERNUMBER?	N/A		-	High-speed BER serial number	–
BOARDBERVER?	N/A		-	High-speed BER port version number	–
FPGABERVER?	N/A		-	High-speed BER FPGA version number	–

Table F.6.10-1 Compatible List of Hardware Check Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_PRDINF	√	SCREEN UTIL_PRDINF	N/A	Moves to the Product Information screen This command is accepted but the screen is not moved.	–
PTYPE?	√	PTYPE?	N/A	Product Type	:SYSTem:INFormation :TYPE?
PMODEL?	√	PMODEL?	N/A	Model Number	:SYSTem:INFormation :MODel?
SERNUM?	√	SERNUM?	N/A	Serial Number	:SYSTem:INFormation :SERial?
OPT? N	√	OPT? <integer>	N/A	Confirms whether or not any Option exists Unavailable as it is as a compatible command, since the option structure differs from that of the MG3700A	–

F.6.11 Install

Given below is the compatible list of Install device messages.

Table F.6.11-1 Compatible List of Install Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
SCREEN UTIL_INSTTOP	√	SCREEN UTIL_INSTTOP	N/A	Moves to the Install screen This command is accepted but the screen is not moved.	SCREEN UTIL_INSTTOP
SCREEN UTIL_INSTFRM	√	SCREEN UTIL_INSTFRM	N/A	Moves to the Firmware Install screen This command is accepted but the screen is not moved.	SCREEN UTIL_INSTFRM
SCREEN UTIL_INSTWV	√	SCREEN UTIL_INSTWV	N/A	Moves to the Waveform Data License Install screen This command is accepted but the screen is not moved.	SCREEN UTIL_INSTWV
FIRMINST s	N/A	–	N/A	Firmware Install	–
INSTMEDIA HDD|CF	N/A	–	N/A	Install Source Media	–
INSTMEDIA?	N/A	–	N/A	Install Source Media	–
WVKEYNUM?	√	WVKEYNUM?	N/A	Waveform Data License Number	WVKEYNUM?
WVKEYNAME? n	√	WVKEYNAME? <integer>	N/A	Waveform Data License Name	WVKEYNAME? <integer>
WVKEYVER? s	√	WVKEYVER? <string>	N/A	Waveform Data License Version	WVKEYVER? <string>
WVINSTMEDIA HDD|CF	√	WVINSTMEDIA HDD|CF	N/A	Waveform Data license Install Source Media C drive, when HDD is selected Devices other than HDD/SSD whose drive letter is the youngest, when CF is selected Default: HDD	WVINSTMEDIA HDD|CF
WVINSTMEDIA?	√	WVINSTMEDIA?	N/A	Waveform Data license Install Source Media	WVINSTMEDIA?

F.7 IEEE488.2 Common Commands

F.7.1 Common to IEEE488.2

Given below is the IEEE488.2 common command device messages available on the MG3710A/10E/40A .

Table F.7.1-1 IEEE488.2 Common Device Messages

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
*CLS	√	*CLS	N/A	Clear Status Command	Same as the compatible command
*ESE	√	*ESE	N/A	Standard Event Status Enable Command	Same as the compatible command
*ESE?	√	*ESE?	N/A	Standard Event Status Enable Query	Same as the compatible command
*ESR?	√	*ESR?	N/A	Standard Event Status Register Query	Same as the compatible command
*IDN?	√	*IDN?	N/A	Identification Query	Same as the compatible command
*OPC	√	*OPC	N/A	Operation Complete Command	Same as the compatible command
*OPC?	√	*OPC?	N/A	Operation Complete Query	Same as the compatible command
*RST	√	*RST	N/A	Reset Command	Same as the compatible command
*SRE	√	*SRE	N/A	Service Request Enable Command	Same as the compatible command
*SRE?	√	*SRE?	N/A	Service Request Enable Query	Same as the compatible command

Table F.7.1-1 IEEE488.2 Common Device Messages (Cont'd)

MG3700A Commands	Com-patibility	MG3710A/10E/40A Commands (MG3700 mode)	SG 1/2	Remarks	MG3710A/10E/40A Commands (SCPI mode)
*STB	√	*STB	N/A	Read Status Byte Query	Same as the compatible command
*TRG	√	*TRG	N/A	Trigger Command	Same as the compatible command
*TST?	√	*TST?	N/A	Self Test Query	Same as the compatible command
*WAI	√	*WAI	N/A	Wait to Continue Command	Same as the compatible command

Appendix G SCPI Compatible Command

This appendix describes SCPI commands for signal generators supported by the MG3710A/MG3710E/MG3740A (hereafter "MG3710A/10E/40A").

Supported signal generators

Agilent N5162A/N5182A

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G.1 Basic Function Commands

G.1.1 Correction Subsystem

Correction Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.1-1.

Table G.1.1-1 Correction Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:CORRection:FLATness:FREQuency? <point>	√	[:SOURce[1]|2]:CORRection:FLATness:FREQuency? <ext_integer>	
[:SOURce]:CORRection:FLATness:INITialize:FSTep	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:LOAD "<file name>"	√	[:SOURce[1]|2]:CORRection:FLATness:LOAD <string>[,<device>]	
[:SOURce]:CORRection:FLATness:PAIR <freq.>[<freq suffix>],<corr.>[<corr suffix>]	√	[:SOURce[1]|2]:CORRection:FLATness:PAIR <freq>,<rel_ampl>	
[:SOURce]:CORRection:FLATness:POINts?	√	[:SOURce[1]|2]:CORRection:FLATness:POINts?	
[:SOURce]:CORRection:FLATness:PRESet	√	[:SOURce[1]|2]:CORRection:FLATness:PRESet	
[:SOURce]:CORRection:FLATness:STEP:POINts <points> |MAXimum|MINimum|DEFault|	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:STEP:POINts?[MAXimum|MINimum]	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:STEP:STARt <freq><unit> |MAXimum|MINimum|DEFault|	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:STEP:STARt? [MAXimum|MINimum]	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:STEP:STOP <freq><unit> |MAXimum|MINimum|DEFault|	N/A	Not supported.	

Table G.1.1-1 Correction Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:CORRection:FLATness:STEP:STOP? [MAXimum|MINimum]	N/A	Not supported.	
[:SOURce]:CORRection:FLATness:STORe "<file name>"	√	[:SOURce[1]|2]:CORRection:FLATness:STORe <string>[,<device>]	Folder fixed. Cannot use msus.
[:SOURce]:CORRection:PMETer:CHANnel A|B	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:CHANnel?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:DEVice <deviceName>	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:DEVice?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:IP <ipAddress>	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:IP?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:PORT <portNumber>	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:LAN:PORT?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:TYPE SOCKets|SOCKETS|VXI11|USB	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:TYPE?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:USB:DEVice <device>	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:USB:DEVice?	N/A	Not supported.	
[:SOURce]:CORRection:PMETer:COMMunicate:USB:LIST?	N/A	Not supported.	
[:SOURce]:CORRection[:STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:CORRection[:STATe] <boolean>	
[:SOURce]:CORRection[:STATe]?	√	[:SOURce[1]|2]:CORRection[:STATe]?	

G.1.2 Digital Modulation Subsystem

Digital Modulation Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.2-1.

Table G.1.2-1 Digital Modulation Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:BURSt:STATe ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:BURSt:STATe?	N/A	Not supported.	
[:SOURce]:DM:CORRection:OPTimization RFOut|EXTernal	N/A	Not supported.	
[:SOURce]:DM:CORRection:OPTimization?	N/A	Not supported.	
[:SOURce]:DM:EXTernal:POLarity NORMal|INVert|INVerted	√	[:SOURce[1]|2]:DM:EXTernal:POLarity NORMal|INVert|INVerted	
[:SOURce]:DM:EXTernal:POLarity?	√	[:SOURce[1]|2]:DM:EXTernal:POLarity?	
[:SOURce]:DM:INTernal:CHANnel:CORRection[:STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:DM:INTernal:CHANnel:CORRection[:STATe] <boolean>	
[:SOURce]:DM:INTernal:CHANnel:CORRection[:STATe]?	√	[:SOURce[1]|2]:DM:INTernal:CHANnel:CORRection[:STATe]?	
[:SOURce]:DM:INTernal:CHANnel:OPTimization EVM|ACP	N/A	Not supported.	

Table G.1.2-1 Digital Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:DM:INTernal:CHANnel:OPTimization?	N/A	Not supported.	
[:SOURce]:DM:INTernal:EQUalization:FILTer:SELect "Filter"	N/A	Not supported.	
[:SOURce]:DM:INTernal:EQUalization:FILTer:SELect?	N/A	Not supported.	
[:SOURce]:DM:INTernal:EQUalization:FILTer:STATe ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:DM:INTernal:EQUalization:FILTer:STATe?	N/A	Not supported.	
[:SOURce]:DM:IQADjustment:DELay <value><unit>	√	[:SOURce[1]|2]:DM:IQADjustment:DELay <time>	
[:SOURce]:DM:IQADjustment:DELay?	√	[:SOURce[1]|2]:DM:IQADjustment:DELay?	
[:SOURce]:DM:IQADjustment:EXTernal:CMRange COARse|FINE	N/A	Not supported.	

Table G.1.2-1 Digital Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:DM:IQADjustment:EXTernal :CMRange?	N/A	Not supported.	
[:SOURce]:DM:IQADjustment:EXTernal :COFFset <value>	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: COFFset <voltage>	
[:SOURce]:DM:IQADjustment:EXTernal :COFFset?	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: COFFset?	
[:SOURce]:DM:IQADjustment:EXTernal :DIOFfset <value>	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: DIOFfset <voltage>	
[:SOURce]:DM:IQADjustment:EXTernal :DIOFfset?	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: DIOFfset?	

Table G.1.2-1 Digital Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:DM:IQADjustment:EXTernal :DQOFfset <value>	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: DQOFfset <voltage>	
[:SOURce]:DM:IQADjustment:EXTernal :DQOFfset?	√	[:SOURce[1]]:DM:IQADjustment:EXTernal: DQOFfset?	
[:SOURce]:DM:IQADjustment:EXTernal :IOFFset <value>	√	[:SOURce[1]|2]:DM:IQADjustment:IOFFset <percent>	Value is input in % units.
[:SOURce]:DM:IQADjustment:EXTernal :IOFFset?	√	[:SOURce[1]|2]:DM:IQADjustment:IOFFset ?	Value is output in % units.
[:SOURce]:DM:IQADjustment:EXTernal :QOFFset <value>	√	[:SOURce[1]|2]:DM:IQADjustment:QOFFset <percent>	Value is input in % units.
[:SOURce]:DM:IQADjustment:EXTernal :QOFFset?	√	[:SOURce[1]|2]:DM:IQADjustment:QOFFset ?	Value is output in % units.
[:SOURce]:DM:IQADjustment:EXTernal :QSKew <value>	N/A	Not supported.	

Table G.1.2-1 Digital Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:DM:IQADjustment:EXTernal :QSKew?	N/A		
[:SOURce]:DM:IQADjustment:GAIN <value><unit>	√	[:SOURce[1]|2]:DM:IQADjustment:GAIN <rel_ampl>	
[:SOURce]:DM:IQADjustment:GAIN?	√	[:SOURce[1]|2]:DM:IQADjustment:GAIN?	
[:SOURce]:DM:IQADjustment:IOFFset <value><unit>	√	[:SOURce[1]|2]:DM:IQADjustment:IOFFset <percent>	
[:SOURce]:DM:IQADjustment:IOFFset?	√	[:SOURce[1]|2]:DM:IQADjustment:IOFFset ?	
[:SOURce]:DM:IQADjustment:PHASe <value><unit>	√	[:SOURce[1]|2]:DM:IQADjustment:PHASe <phase>	
[:SOURce]:DM:IQADjustment:PHASe?	√	[:SOURce[1]|2]:DM:IQADjustment:PHASe?	
[:SOURce]:DM:IQADjustment:QOFFset	√	[:SOURce[1]|2]:DM:IQADjustment:QOFFset <percent>	
[:SOURce]:DM:IQADjustment:QOFFset?	√	[:SOURce[1]|2]:DM:IQADjustment:QOFFset ?	
[:SOURce]:DM:IQADjustment:QSKew <value>	√	[:SOURce[1]|2]:DM:IQADjustment:QSKew <angle>	

Table G.1.2-1 Digital Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:DM:IQADjustment:QSKew?	√	[:SOURce[1]|2]:DM:IQADjustment:QSKew?	
[:SOURce]:DM:IQADjustment:SKEW <value>	√	[:SOURce[1]|2]:DM:IQADjustment:SKEW <time>	
[:SOURce]:DM:IQADjustment:SKEW?	√	[:SOURce[1]|2]:DM:IQADjustment:SKEW?	
[:SOURce]:DM:IQADjustment[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:DM:IQADjustment[:STATe]?	N/A	Not supported.	
[:SOURce]:DM:POLarity[:ALL] NORMal|INVert	√	[:SOURce[1]|2]:DM:POLarity[:ALL] NORMal|INVert	
[:SOURce]:DM:POLarity?	√	[:SOURce[1]|2]:DM:POLarity[:ALL]?	
[:SOURce]:DM:SOURce EXTernal|INTernal|SUM	√	[:SOURce[1]|2]:DM:SOURce EXTernal|INTernal	IQ signal source Cannot use SUM.
[:SOURce]:DM:SOURce?	√	[:SOURce[1]|2]:DM:SOURce?	IQ signal source Cannot use SUM.
[:SOURce]:DM:STATe ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:DM:STATe?	N/A	Not supported.	

G.1.3 Frequency Subsystem

Frequency Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.3-1.

Table G.1.3-1 Frequency Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:FREQuency:CENTer <num>[<freq_suffix>]|UP|DOWN	√	[:SOURce[1]]:FREQuency:CENTer <freq>	
[:SOURce]:FREQuency:CENTer? [MAXimum|MINimum]	√	[:SOURce[1]]:FREQuency:CENTer?	
[:SOURce]:FREQuency:CHANnels:BAND <band>	√	[:SOURce[1]|2]:FREQuency:CHANnels:BAND <band>	
[:SOURce]:FREQuency:CHANnels:BAND?	√	[:SOURce[1]|2]:FREQuency:CHANnels:BAND?	
[:SOURce]:FREQuency:CHANnels:NUMBer <number>	√	[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer <integer>	
[:SOURce]:FREQuency:CHANnels:NUMBer?	√	[:SOURce[1]|2]:FREQuency:CHANnels:NUMBer?	
[:SOURce]:FREQuency:CHANnels[:STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:FREQuency:CHANnels[:STATe] <boolean>	
[:SOURce]:FREQuency:CHANnels[:STATe]?	√	[:SOURce[1]|2]:FREQuency:CHANnels[:STATe]?	
[:SOURce]:FREQuency[:CW] <value><unit>	√	[:SOURce[1]|2]:FREQuency[:CW|:FIXed] <freq>	
[:SOURce]:FREQuency[:CW]?	√	[:SOURce[1]|2]:FREQuency[:CW|:FIXed]?	
[:SOURce]:FREQuency:MODE CW|FIXed|LIST	√	[:SOURce[1]|2]:FREQuency:MODE CW|FIXed|LIST	
[:SOURce]:FREQuency:MODE?	√	[:SOURce[1]|2]:FREQuency:MODE?	

Table G.1.3-1 Frequency Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:FREQuency:MULTiplier <value>	√	[:SOURce[1]|2]:FREQuency:MULTiplier <ext_numeric>	
[:SOURce]:FREQuency:MULTiplier?	√	[:SOURce[1]|2]:FREQuency:MULTiplier?	
[:SOURce]:FREQuency:OFFSet <value><unit>	√	[:SOURce[1]|2]:FREQuency:OFFSet <freq>	
[:SOURce]:FREQuency:OFFSet?	√	[:SOURce[1]|2]:FREQuency:OFFSet?	
[:SOURce]:FREQuency:OFFSet:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:FREQuency:OFFSet:STATe <boolean>	
[:SOURce]:FREQuency:OFFSet:STATe?	√	[:SOURce[1]|2]:FREQuency:OFFSet:STATe?	
[:SOURce]:FREQuency:REFerence <value><unit>	N/A	Not supported.	
[:SOURce]:FREQuency:REFerence?	N/A	Not supported.	
[:SOURce]:FREQuency:REFerence:Set	N/A	Not supported.	
[:SOURce]:FREQuency:REFerence:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:FREQuency:REFerence:STATe <boolean>	
[:SOURce]:FREQuency:REFerence:STATe?	√	[:SOURce[1]|2]:FREQuency:REFerence:STATe?	
[:SOURce]:FREQuency:SPAN <num>[<freq_suffix>]|UP|DOWN	√	[:SOURce[1]]:FREQuency:SPAN <freq>	
[:SOURce]:FREQuency:SPAN? [MAXimum|MINimum]	√	[:SOURce[1]]:FREQuency:SPAN?	
[:SOURce]:FREQuency:STARt <value><unit>	√	[:SOURce[1]]:FREQuency:STARt <freq>	
[:SOURce]:FREQuency:STARt?	√	[:SOURce[1]]:FREQuency:STARt?	
[:SOURce]:FREQuency:STOP <value><unit>	√	[:SOURce[1]]:FREQuency:STOP <freq>	

Table G.1.3-1 Frequency Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:FREQuency:STOP?	√	[:SOURce[1]]:FREQuency:STOP?	
[:SOURce]:PHASe:REFerence	N/A	Not supported.	
[:SOURce]:PHASe[:ADJust] <value><unit>	√	[:SOURce[1]|2]:PHASe[:ADJust] <ext_numeric>	
[:SOURce]:PHASe[:ADJust]?	√	[:SOURce[1]|2]:PHASe[:ADJust]?	
[:SOURce]:ROSCillator:BANDwidth:EXTernal<value>[<units>]|NARRow|WIDE|MINimum|MAXimum|DEFault	N/A	Not supported.	
[:SOURce]:ROSCillator:BANDwidth:EXTernal? |MINimum|MAXimum|	N/A	Not supported.	
[:SOURce]:ROSCillator:FREQuency:EXTernal <value>	√	[:SOURce]:ROSCillator:FREQuency:EXTernal <freq>	
[:SOURce]:ROSCillator:FREQuency:EXTernal?	√	[:SOURce]:ROSCillator:FREQuency:EXTernal?	
[:SOURce]:ROSCillator:SOURce?	√	[:SOURce]:ROSCillator:SOURce?	
[:SOURce]:ROSCillator:SOURce:AUTO ON|OFF|1|0	√	[:SOURce]:ROSCillator:SOURce:AUTO <boolean>	
[:SOURce]:ROSCillator:SOURce:AUTO?	√	[:SOURce]:ROSCillator:SOURce:AUTO?	

G.1.4 List/Sweep Subsystem

List/Sweep Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.4-1.

Table G.1.4-1 List/Sweep Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:LIST:CPOint?	√	[:SOURce]:LIST:CPOint?	
[:SOURce]:LIST:DIRection UP|DOWN	√	[:SOURce]:LIST:DIRection UP|DOWN	
[:SOURce]:LIST:DIRection?	√	[:SOURce]:LIST:DIRection?	
[:SOURce]:LIST:DWEL1 <value>{,<value>}	N/A	Not supported.	
[:SOURce]:LIST:DWEL1?	N/A	Not supported.	
[:SOURce]:LIST:DWELl:POINts?	√	[:SOURce]:LIST:DWELl:POINts?	
[:SOURce]:LIST:DWEL1:TYPE LIST|STEP	√	[:SOURce]:LIST:DWELl:TYPE LIST|STEP|SWEep	
[:SOURce]:LIST:DWEL1:TYPE?	√	[:SOURce]:LIST:DWELl:TYPE?	
[:SOURce]:LIST:FREQuency <value>{,<value>}	N/A	Not supported.	
[:SOURce]:LIST:FREQuency?	N/A	Not supported.	
[:SOURce]:LIST:FREQuency:POINts?	√	[:SOURce]:LIST:FREQuency:POINts?	
[:SOURce]:LIST:MANual <value>|UP|DOWN	√	[:SOURce]:LIST:MANual <value>|UP|DOWN	

Table G.1.4-1 List/Sweep Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:LIST:MANual?	√	[:SOURce]:LIST:MANual?	
[:SOURce]:LIST:MODE AUTO|MANual	√	[:SOURce]:LIST:MODE AUTO|MANual	
[:SOURce]:LIST:MODE?	√	[:SOURce]:LIST:MODE?	
[:SOURce]:LIST:OPTions <val>{,<val>}	N/A	Not supported.	
[:SOURce]:LIST:OPTions?	N/A	Not supported.	
[:SOURce]:LIST:OPTions:POINts?	N/A	Not supported.	
[:SOURce]:LIST:POWer <value>{,<value>}	N/A	Not supported.	
[:SOURce]:LIST:POWer?	N/A	Not supported.	
[:SOURce]:LIST:POWer:POINts?	√	[:SOURce]:LIST:POWer:POINts?	
[:SOURce]:LIST:RETRace ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:LIST:RETRace?	N/A	Not supported.	
[:SOURce]:LIST:TRIGger:SOURce BUS|IMMediate|EXTernal|KEY|TIMer|MANual	√	[:SOURce]:LIST:TRIGger:SOURce BUS|IMMediate|EXTernal|KEY|TIMer|MANual	
[:SOURce]:LIST:TRIGger:SOURce?	√	[:SOURce]:LIST:TRIGger:SOURce?	
[:SOURce]:LIST:TYPE LIST|STEP	√	[:SOURce]:LIST:TYPE LIST|STEP	
[:SOURce]:LIST:TYPE?	√	[:SOURce]:LIST:TYPE?	
[:SOURce]:LIST:TYPE:LIST:INITialize:FSTep	N/A	Not supported.	
[:SOURce]:LIST:TYPE:LIST:INITialize:PRESet	√	[:SOURce]:LIST:TYPE:LIST:INITialize:PRESet	

Table G.1.4-1 List/Sweep Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:LIST:WAVeform <name>{,<name>}	N/A	Not supported.	
[:SOURce]:LISt:WAVeform?	N/A	Not supported.	
[:SOURce]:LIST:WAVeform:POINts?	√	[:SOURce]:LIST:WAVeform:POINts?	
[:SOURce]:SWEep:CPOint?	√	[:SOURce]:SWEep:CPOint?	
[:SOURce]:SWEep:DWELl <value>	√	[:SOURce[1]|2]:SWEep:DWELl <time>	
[:SOURce]:SWEep:DWELl?	√	[:SOURce[1]|2]:SWEep:DWELl?	
[:SOURce]:SWEep:POINts <value>	√	[:SOURce[1]|2]:SWEep:POINts <value>	
[:SOURce]:SWEep:POINts?	√	[:SOURce[1]|2]:SWEep:POINts?	
[:SOURce]:SWEep:SPACing LINear|LOGarithmic	N/A	Not supported.	
[:SOURce]:SWEep:SPACing?	N/A	Not supported.	

G.1.5 Fast Subsystem

Fast Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.5-1.

Table G.1.5-1 Fast Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:FAST:FP <Freq mHz>, <power mdB>	N/A	Not supported.	
:FAST:FREQuency <Freq mHz>	N/A	Not supported.	
:FAST:POWer <power mdB>	N/A	Not supported.	

G.1.6 Marker Subsystem

Marker Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.6-1.

Table G.1.6-1 Marker Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:MARKer:AMPLitude[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:MARKer:AMPLitude[:STATe] ?	N/A	Not supported.	
[:SOURce]:MARKer:AMPLitude:VALue <num>[DB]	N/A	Not supported.	
[:SOURce]:MARKer:AMPLitude:VALue?	N/A	Not supported.	
[:SOURce]:MARKer:AOFF	N/A	Not supported.	
[:SOURce]:MARKer:DELTa? <num>,<num>	N/A	Not supported.	
[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19]: FREQuency <val><unit>	N/A	Not supported.	
[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19]: FREQuency? MAXimum|MINimum	N/A	Not supported.	
[:SOURce]:MARKer:MODE FREQuency|DELTa	N/A	Not supported.	
[:SOURce]:MARKer:MODE?	N/A	Not supported.	
[:SOURce]:MARKer:REFerence <marker>	N/A	Not supported.	
[:SOURce]:MARKer:REFerence?	N/A	Not supported.	

Table G.1.6-1 Marker Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19][:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19][:STATe]?	N/A	Not supported.	

G.1.7 Power Subsystem

Power Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.1.7-1.

Table G.1.7-1 Power Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:ALC:BANDwidth|BWIDth <num>{freq suffix]	N/A	Not supported.	
[:SOURce]:POWer:ALC:BANDwidth|BWIDth?	N/A	Not supported.	
[:SOURce]:POWer:ALC:BANDwidth|BWIDth:AUTO ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:POWer:ALC:BANDwidth|BWIDth:AUTO?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch AUTO|SPAN|ON|1|ONCE	√	[:SOURce[1]|2]:POWer:ALC:SEARch [ONCE]	Only ONCE can be used.
[:SOURce]:POWer:ALC:SEARch?	√	[:SOURce[1]|2]:POWer:ALC:SEARch?	ONCE returns.
[:SOURce]:POWer:ALC:LEVel <value><unit>	N/A	Not supported.	
[:SOURce]:POWer:ALC:LEVel?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:REFerence RMS|FIXed|MANual|MODulated	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:REFerence?	N/A	Not supported.	

Table G.1.7-1 Power Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:ALC:SEARch:REFerence:LEVel <value>	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:REFerence:LEVel?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:START <value><units>	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:START?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:STOP <value><units>	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:STOP?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE FULL|USER	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe]?	N/A	Not supported.	

Table G.1.7-1 Power Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:ALC:SOURce INTernal|DIODe	N/A	Not supported.	
[:SOURce]:POWer:ALC:SOURce?	N/A	Not supported.	
[:SOURce]:POWer:ALC:SOURce:EXTernal:COUPling <value>DB	N/A	Not supported.	
[:SOURce]:POWer:ALC:SOURce:EXTernal:COUPling?	N/A	Not supported.	
[:SOURce]:POWer:ALC[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:POWer:ALC[:STATe]?	N/A	Not supported.	
[:SOURce]:POWer:ATTenuation <value><unit>	N/A	Not supported.	
[:SOURce]:POWer:ATTenuation?	N/A	Not supported.	
[:SOURce]:POWer:ATTenuation:AUTO ON|OFF|1|0	√	[:SOURce]:POWer:ATTenuation:AUTO <boolean>	
[:SOURce]:POWer:ATTenuation:AUTO?	√	[:SOURce]:POWer:ATTenuation:AUTO?	

Table G.1.7-1 Power Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:ATTenuation:BYPass ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:POWer:ATTenuation:BYPass?	N/A	Not supported.	
[:SOURce]:POWer[:LEVel][:IMMediate]:OFFSet <value><unit>	√	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl>	
[:SOURce]:POWer[:LEVel][:IMMediate]:OFFSet?	√	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet?	
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude] <value><unit>	√	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl>	
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?	√	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude]?	
[:SOURce]:POWer:MINimum:LIMit LOW|HIGH	N/A	Not supported.	
[:SOURce]:POWer:MINimum:LIMit?	N/A	Not supported.	
[:SOURce]:POWer:MODE FIXed|LIST	√	[:SOURce[1]|2]:POWer:MODE FIXed|LIST	
[:SOURce]:POWer:MODE?	√	[:SOURce[1]|2]:POWer:MODE?	

Table G.1.7-1 Power Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:NOISe:[STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:POWer:NOISe:[STATe] <boolean>	
[:SOURce]:POWer:NOISe:[STATe]?	√	[:SOURce[1]|2]:POWer:NOISe:[STATe]?	
[:SOURce]:POWer:PROTection[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:POWer:PROTection[:STATe]?	N/A	Not supported.	
[:SOURce]:POWer:REFerence <value><unit>	N/A	Not supported.	
[:SOURce]:POWer:REFerence?	√	[:SOURce[1]|2]:POWer:REFerence?	
[:SOURce]:POWer:REFerence:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:POWer:REFerence:STATe <boolean>	
[:SOURce]:POWer:REFerence:STATe?	√	[:SOURce[1]|2]:POWer:REFerence:STATe?	
[:SOURce]:POWer:STARt <value><unit>	√	[:SOURce[1]]:POWer:STARt <ampl>	
[:SOURce]:POWer:STARt?	√	[:SOURce[1]]:POWer:STARt?	

Table G.1.7-1 Power Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:POWer:STOP <value><unit>	√	[:SOURce[1]]:POWer:STOP <ampl>	
[:SOURce]:POWer:STOP?	√	[:SOURce[1]]:POWer:STOP?	
[:SOURce]:POWer:USER:MAX <ampl>	√	[:SOURce[1]|2]:POWer:USER:MAX <ampl>	
[:SOURce]:POWer:USER:MAX?	√	[:SOURce[1]|2]:POWer:USER:MAX?	
[:SOURce]:POWer:USER:ENABle <0|1>	√	[:SOURce[1]|2]:POWer:USER:ENABle <boolean>	
[:SOURce]:POWer:USER:ENABle?	√	[:SOURce[1]|2]:POWer:USER:ENABle?	

G.2 System Commands

G.2.1 Calibration Subsystem

Calibration Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.1-1.

Table G.2.1-1 Calibration Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:CALibration:ALC:MODulator:BIAS	N/A	Not supported.	
:CALibration:BBG:CHANnel	√	:CALibration:BBG:CHANnel	
:CALibration:BBG:SKEW RFOut|EXTernal, <value in pS>	N/A	Not supported.	
:CALibration:BBG:SKEW? RFOut|EXTernal	N/A	Not supported.	
:CALibration:BBG:SKEW:RFOut	N/A	Not supported.	
:CALibration:DCFM	N/A	Not supported.	
:CALibration:IQ:DC	√	:CALibration[1]|2]:IQ:DC	
:CALibration:IQ:DEFault	√	:CALibration[1]|2]:IQ:DEFault	
:CALibration:IQ:FULL	√	:CALibration[1]|2]:IQ:FULL	
:CALibration:IQ:STARt <value><unit>	N/A	Not supported.	
:CALibration:IQ:STARt?	N/A	Not supported.	
:CALibration:IQ:STOP <value><unit>	N/A	Not supported.	
:CALibration:IQ:STOP?	N/A	Not supported.	

Table G.2.1-1 Calibration Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:CALibration:IQ:TYPE DC|USER|FULL	√	:CALibration[1]|2]:IQ:TYPE DC|USER	
:CALibration:IQ:TYPE?	√	:CALibration[1]|2]:IQ:TYPE?	
:CALibration:IQ[:USER]	N/A	Not supported.	

G.2.2 Communication Subsystem

Communication Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.2-1.

Table G.2.2-1 Communication Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:CAPability?	N/A	Not supported.	
:SYSTem:ERRor:CODe[:NEXT]?	√	:SYSTem:ERRor:CODe[:NEXT]?	
:SYSTem:ERRor[:NEXT]?	√	:SYSTem:ERRor[:NEXT]?	
:SYSTem:COMMunicate:GPIB:ADDRess <number>	√	:SYSTem:COMMunicate:GPIB:ADDRess <number>	
:SYSTem:COMMunicate:GPIB:ADDRess?	√	:SYSTem:COMMunicate:GPIB:ADDRess?	
:SYSTem:COMMunicate:GTLocal	√	:SYSTem:COMMunicate:GTLocal	
:SYSTem:COMMunicate:LAN:CONFig DHCP|MANual|AUTO|AIP	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:CONFig?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DEFaults	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DESCription <string>	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DESCription?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DHCP:TIMeout {30}|60|90|120sec	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DHCP:TIMeout?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DOMain <string>	N/A	Not supported.	

Table G.2.2-1 Communication Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:COMMunicate:LAN:DOMain?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS:DYNamic ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS:DYNamic?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS:OVERride ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS:OVERride?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS[:SERVer] <ipstring>	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:DNS[:SERVer]?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:GATeway "<ipstring>"	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:GATeway?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:HOSTname "<string>"	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:HOSTname?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:IDENtify ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:IP "<ipstring>"	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:IP?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:KEEP:TIMeout <value>	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:KEEP:TIMeout?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:KEEP[:STATe] ON|OFF|1|0	N/A	Not supported.	

Table G.2.2-1 Communication Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:COMMunicate:LAN:KEEP[:STATe]?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:MDNS ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:MDNS?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:MONitor ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:MONitor?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:NBIos ON|OFF|1|0	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:NBIos?	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:RESTart	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:SUBNet "<ipstring>"	N/A	Not supported.	
:SYSTem:COMMunicate:LAN:SUBNet?	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:DEVice <deviceName>	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:DEVice?	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:IP <ipaddr>	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:IP?	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:PORT <portNum>	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:PORT?	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:TYPE SOCKets|SOCKETS|VXI11|USB	N/A	Not supported.	
:SYSTem:COMMunicate:PMETer:TYPE?	N/A	Not supported.	

G.2.3 Display Subsystem

Display Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.3-1.

Table G.2.3-1 Display Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:DISPlay:ANNotation:AMPLitude[:STATe] ON|OFF|1|0	N/A	Not supported.	
:DISPlay:ANNotation:AMPLitude[:STATe]?	N/A	Not supported.	
:DISPlay:ANNotation:AMPLitude:UNIT DBM|DBUV|DBUVEMF|V|VEMF|DB	√	:UNIT[1]|2:POWer DBM|DBUV|DBUVEMF	
:DISPlay:ANNotation:AMPLitude:UNIT?	√	:UNIT[1]|2:POWer?	
:DISPlay:ANNotation:FREQuency[:STATe] ON|OFF|1|0	N/A	Not supported.	
:DISPlay:ANNotation:FREQuency[:STATe]?	N/A	Not supported.	
:DISPlay:ANNotation:CLOCk:DATE:FORMat MDY|DMY	N/A	Not supported.	
:DISPlay:ANNotation:CLOCk:DATE:FORMat?	N/A	Not supported.	
:DISPlay:ANNotation:CLOCk[:STATe] ON|OFF|1|0	N/A	Not supported.	
:DISPlay:ANNotation:CLOCk[:STATe]?	N/A	Not supported.	
:DISPlay:BRIGhtness <value>	N/A	Not supported.	
:DISPlay:BRIGhtness?	N/A	Not supported.	
:DISPlay:CAPTure	√	:MMEMory:STORe:SCReen [<filename>[,<device>]]	
:DISPlay:CMAP:DEFault [<palette:{BRIGht}|DARK|MONOchrome>]	N/A	Not supported.	

Table G.2.3-1 Display Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:DISPlay:CONTrast <value>	N/A	Not supported.	
:DISPlay:CONTrast?	N/A	Not supported.	
:DISPlay:REMote ON|OFF|1|0	√	:DISPlay:ENABle ON|OFF|1|0	
:DISPlay:REMote?	√	:DISPlay:ENABle?	
:DISPlay[:WINDow][:STATe] ON|OFF|1|0	√	:DISPlay:ENABle ON|OFF|1|0	
:DISPlay[:WINDow][:STATe]?	√	:DISPlay:ENABle?	

G.2.4 IEEE 488.2 Common Commands

IEEE 488.2 Common Commands device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.4-1.

Table G.2.4-1 IEEE 488.2 Common Commands Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
*CLS	√	*CLS	
*ESE <data>	√	*ESE <integer>	
*ESE?	√	*ESE?	
*ESR?	√	*ESR?	
*IDN?	√	*IDN?	
*OPC	√	*OPC	
*OPC?	√	*OPC?	
*OPT?	N/A	Not supported.	
*PSC ON|OFF|1|0	N/A	Not supported.	
*PSC?	N/A	Not supported.	
*RCL <reg>,<seq>	N/A	Not supported.	
*RST	√	*RST	
*SAV <reg>,<seq>	N/A	Not supported.	
*SRE <data>	√	*SRE <integer>	
*SRE?	√	*SRE?	

Table G.2.4-1 IEEE 488.2 Common Commands Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
*STB?	√	*STB?	
*TRG	√	*TRG	
*TST?	√	*TST?	
*WAI	√	*WAI	

G.2.5 Memory Subsystem

Memory Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.5-1.

Table G.2.5-1 Memory Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:MEMory:CATalog:BINary?	N/A	Not supported.	
:MEMory:CATalog:DMOD?	N/A	Not supported.	
:MEMory:CATalog:FIR?	N/A	Not supported.	
:MEMory:CATalog:FSK?	N/A	Not supported.	
:MEMory:CATalog:IQ?	N/A	Not supported.	
:MEMory:CATalog:LIST?	N/A	Not supported.	
:MEMory:CATalog:MDMod?	N/A	Not supported.	
:MEMory:CATalog:MTONe?	N/A	Not supported.	
:MEMory:CATalog:PTRain?	N/A	Not supported.	
:MEMory:CATalog:SEQ?	N/A	Not supported.	
:MEMory:CATalog:STATe?	N/A	Not supported.	
:MEMory:CATalog:UFLT?	N/A	Not supported.	
:MEMory:CATalog[:ALL]?	N/A	Not supported.	
:MEMory:COPY[:NAME] "<file name>","<file name>"	√	:MEMory[1]|2:COPY[:NAME] <string1>,<string2>	Only supports waveform pattern loading.
:MEMory:DATA "<file_name>",<data_block>	N/A	Not supported.	

Table G.2.5-1 Memory Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:MEMory:DATA? "<file_name>"	N/A	Not supported.	
:MEMory:DATA:APPend "<file_name>",<data_block>	N/A	Not supported.	
:MEMory:DATA:FIR "<file_name>",[REAL|COMPlex],osr,coefficient	N/A	Not supported.	
:MEMory:DATA:FIR?"<file_name>"	N/A	Not supported.	
:MEMory:DATA:FSK "<file_name>",<num_states>,<f0>,<f1>,...<f(n)>[,<diff_state>,<num_diff_states>,<diff1>,...<diff(n)>]	N/A	Not supported.	
:MEMory:DATA:FSK? "<file_name>"	N/A	Not supported.	
:MEMory:DATA:IQ "<file_name>",<offsetQ>,<num_states>,<i0>,<q0>,<i1>,<q1>,...<i(n)>,<q(n)>[,<diff_state>,<num_diff_states>,<diff0>,<diff1>,..<diff(n)>]	N/A	Not supported.	
:MEMory:DATA:IQ? "<file_name>"	N/A	Not supported.	
:MEMory:DELete:ALL	N/A	Not supported.	
:MEMory:DELete:BINary	N/A	Not supported.	
:MEMory:DELete:DMOD	N/A	Not supported.	
:MEMory:DELete:FIR	N/A	Not supported.	
:MEMory:DELete:LIST	N/A	Not supported.	
:MEMory:DELete:MDMod	N/A	Not supported.	

Table G.2.5-1 Memory Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:MEMory:DELete:MTONe	N/A	Not supported.	
:MEMory:DELete:PTRain	N/A	Not supported.	
:MEMory:DELete:SEQ	N/A	Not supported.	
:MEMory:DELete:STATe	N/A	Not supported.	
:MEMory:DELete:UFLT	N/A	Not supported.	
:MEMory:DELete[:NAME] "<file name>"	N/A	Not supported.	
:MEMory:EXPort[:ASCii]:PTRAin <"filename">	N/A	Not supported.	
:MEMory:EXPort[:ASCii]:SEParator:COLumn TAB|SEMicolon|COMMa|SPACe	N/A	Not supported.	
:MEMory:EXPort[:ASCii]:SEParator:COLumn ?	N/A	Not supported.	
:MEMory:EXPort[:ASCii]:SEParator:DECimal DOT|COMMa	N/A	Not supported.	
:MEMory:EXPort[:ASCii]:SEParator:DECimal?	N/A	Not supported.	
:MEMory:FREE[:ALL]?	√	:MEMory[1]|2:FREE[:ALL]? [<device>]	
:MEMory:IMPort[:ASCii]:PTRain <"filename">	N/A	Not supported.	
:MEMory:IMPort[:ASCii]:SEParator:DECimal DOT|COMMa	N/A	Not supported.	
:MEMory:IMPort[:ASCii]:SEParator:DECimal?	N/A	Not supported.	
:MEMory:LOAD:LIST "<file name>"	√	:MMEMory:LOAD:LIST <string>[,<device>]	
:MEMory:MOVE "<src_file>","<dest_file>"	N/A	Not supported.	

Table G.2.5-1 Memory Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:MEMory:SIZE? <"filename">	N/A	Not supported.	
:MEMory:STATe:COMMent <reg_num>,<seq_num>,"<comment>"	N/A	Not supported.	
:MEMory:STATe:COMMent? <reg_num>,<seq_num>	N/A	Not supported.	
:MEMory:STORe:LIST "<file name>"	√	:MMEMory:STORe:LIST <string>[,<device>]	
:MMEMory:CATalog? "<msus>"	N/A	Not supported.	
:MMEMory:COPY "<file name>","<file name>"	√	:MMEMory[1]|2:COPY[:NAME] <string1>,<string2>	Only supports waveform pattern loading.
:MMEMory:DATA "<file name>",<datablock>	N/A	Not supported.	
:MMEMory:DATA? "<file name>"	N/A	Not supported.	
:MMEMory:DELete:NVWFm	N/A	Not supported.	
:MMEMory:DELete:WFM	N/A	Not supported.	
:MMEMory:DELete[:NAME] "<file name>",["<msus>"]	N/A	Not supported.	
:MMEMory:HEADer:CLEar "<file name>"	N/A	Not supported.	
:MMEMory:HEADer:DESCription "<file name>","<description>"	N/A	Not supported.	
:MMEMory:HEADer:DESCription? "<file name>"	N/A	Not supported.	
:MMEMory:HEADer:ID? "<file name>"	N/A	Not supported.	
:MMEMory:LOAD:LIST "<file name>"	√	:MMEMory:LOAD:LIST <string>[,<device>]	
:MMEMory:LOAD:PTRain <"filename">	N/A	Not supported.	

Table G.2.5-1 Memory Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:MMEMory:LOAD:WFM:ALL	√	:MMEMory:LOAD:WFM:ALL [<device>]	
:MMEMory:MOVE "<src_file>","<dest_file>"	N/A	Not supported.	
:MMEMory:STORe:LIST "<file name>"	√	:MMEMory:STORe:LIST <string>[,<device>]	
:MMEMory:STORe:PTRain <"filename">	N/A	Not supported.	
:MMEMory:STORe:WFM:ALL	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:DEVice <deviceName>	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:DEVice?	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:IP <ipAddr>	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:IP?	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:PORT <portNum>	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:LAN:PORT?	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:TYPE SOCKets|SOCKETS|VXI11	N/A	Not supported.	
:SYSTem:SANalyzer:COMMunicate:TYPE?	N/A	Not supported.	

G.2.6 Output Subsystem

Output Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.6-1.

Table G.2.6-1 Output Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:OUTPut:BLANking:AUTO ON|OFF|1|0	N/A	Not supported.	
:OUTPut:BLANKing:AUTO?	N/A	Not supported.	
:OUTPut:BLANking:STATe ON|OFF|1|0	N/A	Not supported.	
:OUTPut:BLANKing:STATe?	N/A	Not supported.	
:OUTPut:MODulation[:STATe] ON|OFF|1|0	√	:OUTPut[1]|2:MODulation[:STATe] <boolean>	
:OUTPut:MODulation[:STATe]?	√	:OUTPut[1]|2:MODulation[:STATe]?	
:OUTPut:PROTection[:STATe] ON|OFF|1|0	N/A	Not supported.	
:OUTPut:PROTection[:STATe]?	N/A	Not supported.	
:OUTPut[:STATe] ON|OFF|1|0	√	:OUTPut[1]|2[:STATe] <boolean>	
:OUTPut[:STATe]?	√	:OUTPut[1]|2[:STATe]?	

G.2.7 Route Subsystem

Route Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.7-1.

Table G.2.7-1 Route Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:ROUTe[:CONNectors]:EVENt1 M1|M2|M3|M4	√	:ROUTe[:CONNectors]:EVENt1|2|3 M1|M2|M3|SF|P1|P2|P3|PS1O|PSYNc|PVIDeo |M12|M22|M32|PSYNc2|PVIDeo2	Cannot use M4.
:ROUTe[:CONNectors]:EVENt1?	√	:ROUTe[:CONNectors]:EVENt1|2|3?	
:ROUTe[:CONNectors]:SOUT SWEep|SETTled|PVIDeo|SW8757	√	:ROUTe[:CONNectors]:SOUT SWEep|SETTled	Cannot use SW8757 and PVIDeo.
:ROUTe:CONNectors:SOUT?	√	:ROUTe[:CONNectors]:SOUT?	
:ROUTe[:CONNectors]:TOUT SWEep|SETTled|PVIDeo|PSYNc|M1|M2|M3|M4	N/A	Not supported.	
:ROUTe[:CONNectors]:TOUT?	N/A	Not supported.	

G.2.8 Status Subsystem

Status Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.8-1.

Table G.2.8-1 Status Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:STATus:OPERation:CONDition?	√	:STATus:OPERation:CONDition?	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:ENABle <value>	√	:STATus:OPERation:ENABle <integer>	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:ENABle?	√	:STATus:OPERation:ENABle?	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:NTRansition <value>	√	:STATus:OPERation:NTRansition <integer>	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:NTRansition?	√	:STATus:OPERation:NTRansition?	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:PTRansition <value>	√	:STATus:OPERation:PTRansition <integer>	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:PTRansition?	√	:STATus:OPERation:PTRansition?	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:SUPPress 0|1|ON|OFF	√	:STATus:OPERation:SUPPress 0|1|ON|OFF	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation:SUPPress?	√	:STATus:OPERation:SUPPress?	The layout of the register is that of the MG3710A/10E/40A.
:STATus:OPERation[:EVENt]?	√	:STATus:OPERation[:EVENt]?	The layout of the register is that of the MG3710A/10E/40A.

Table G.2.8-1 Status Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:STATus:PRESet	√	:STATus:PRESet	
:STATus:QUEStionable:CALibration:CONDition?	N/A	Not supported.	
:STATus:QUEStionable:CALibration:ENABle <value>	N/A	Not supported.	
:STATus:QUEStionable:CALibration:ENABle?	N/A	Not supported.	
:STATus:QUEStionable:CALibration:NTRansition <value>	N/A	Not supported.	
:STATus:QUEStionable:CALibration:NTRansition?	N/A	Not supported.	
:STATus:QUEStionable:CALibration:PTRansition <value>	N/A	Not supported.	
:STATus:QUEStionable:CALibration:PTRansition?	N/A	Not supported.	
:STATus:QUEStionable:CALibration[:EVENt]?	N/A	Not supported.	
:STATus:QUEStionable:CONDition?	N/A	Not supported.	
:STATus:QUEStionable:ENABle <value>	N/A	Not supported.	
:STATus:QUEStionable:ENABle?	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:CONDition?	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:ENABle <value>	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:ENABle?	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:NTRansition <value>	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:NTRansition?	N/A	Not supported.	

Table G.2.8-1 Status Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:STATus:QUEStionable:FREQuency:PTRansition <value>	N/A	Not supported.	
:STATus:QUEStionable:FREQuency:PTRansition?	N/A	Not supported.	
:STATus:QUEStionable:FREQuency[:EVENt]?	N/A	Not supported.	

G.2.9 System Subsystem

System Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.9-1.

Table G.2.9-1 System Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:DATe <year>,<month>,<day>	N/A	Not supported.	
:SYSTem:DATe?	N/A	Not supported.	
:SYSTem:ERRor:CODE[:NEXt]?	√	:SYSTem:ERRor:CODE[:NEXt]?	
:SYSTem:ERRor[:NEXt]?	√	:SYSTem:ERRor[:NEXt]?	
:SYSTem:ERRor:SCPI[:SYNTax] ON|OFF|1|0	N/A	Not supported.	
:SYSTem:ERRor:SCPI[:SYNTax]?	N/A	Not supported.	
:SYSTem:FILesystem:STORage:EXTernal?	N/A	Not supported.	
:SYSTem:FILesystem:STORage:EXTernal:PATH <"USB media root path">	N/A	Not supported.	
:SYSTem:FILesystem:STORage:EXTernal:PATH?	N/A	Not supported.	
:SYSTem:FILesystem:STORage:TYPE INTernal|EXTernal	N/A	Not supported.	
:SYSTem:FILesystem:STORage:TYPE?	N/A	Not supported.	
:SYSTem:FILesystem:STORage:TYPE:AUTO ON|OFF|1|0	N/A	Not supported.	
:SYSTem:FILesystem:STORage:TYPE:AUTO?	N/A	Not supported.	
:SYSTem:IDN "string"	N/A	Not supported.	

Table G.2.9-1 System Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:LANGuage "SCPI"|"COMP"|"8648"|"E4428C"|"E4438C"|"E8257D"|"E8267D"|"E8663B"|"E8247C"|"E8257C"|"E8267C"|"E8241A"|"E8244A"|"E8251A"|"E8254A"|"E8247C"|"E8257C"|"E8267C"|"SMU200A"|"SMATE200A"|"SMJ100A"|"SMIQ"|"SML"|"SMV"|"3410"	√	:SYSTem:LANGuage "SCPI"|"MG3700A"	
:SYSTem:LANGuage?	√	:SYSTem:LANGuage?	
:SYSTem:LICense:AUS[:DATE]?	N/A	Not supported.	
:SYSTem:LICense:EXTernal:LIST?	N/A	Not supported.	
:SYSTem:LICense:[FPACk:]WAVeform:ADD "filename"	N/A	Not supported.	
:SYSTem:LICense[:FPACk]:WAVeform:CLEar <slot_number>	N/A	Not supported.	
:SYSTem:LICense[:FPACk]:WAVeform:FREE?	N/A	Not supported.	
:SYSTem:LICense:[FPACk]:WAVeform:IDList ?	N/A	Not supported.	
:SYSTem:LICense[:FPACk]:WAVeform:LOCK slot_number	N/A	Not supported.	
:SYSTem:LICense[:FPACk]:WAVeform:REPlace slot_number, "filename"	N/A	Not supported.	
:SYSTem:LICense[:FPACk]:WAVeform:STATus? slot_number	N/A	Not supported.	
:SYSTem:LICense:FPACk:WAVEform:USED?	N/A	Not supported.	
:SYSTem:LICense:INSTall <license_line>|<block_of_license_lines>	N/A	Not supported.	
:SYSTem:LICense:LIST?	N/A	Not supported.	

Table G.2.9-1 System Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:LICense:REMove <license_line>	N/A	Not supported.	
:SYSTem:OPT "string"	N/A	Not supported.	
:SYSTem:PDOWn	√	:SYSTem:PDOWn	
:SYSTem:PMETer[1]|2:CHANnel A|B	N/A	Not supported.	
:SYSTem:PMETer[1]|2:CHANnel?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:DEVice <deviceName>	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:DEVice?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:IP <ipAddress>	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:IP?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:PORT <portNumber>	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:LAN:PORT?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:TYPE SOCKets|SOCKETS|VXI11|USB	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:TYPE?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:USB:DEVice <device>	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:USB:DEVice?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:COMMunicate:USB:LIST?	N/A	Not supported.	

Table G.2.9-1 System Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:PMETer[1]|2:MEASure?	√	:SYSTem:PMETer[1]|2:MEASure?	
:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt <avgCount>	√	:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt <ext_integer>	
:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt?	√	:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt?	
:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt :AUTO ON|OFF|1|0	N/A	Not supported.	
:SYSTEm:PMETer[1]|2:SENSe:AVERage:COUNt :AUTO?	N/A	Not supported.	
:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe] ON|OFF|1|0	√	:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe] <boolean>	
:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe]?	√	:SYSTem:PMETer[1]|2:SENSe:AVERage[:STATe]?	
:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed] <freq><unit>	√	:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed] <freq>	
:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed]?	√	:SYSTem:PMETer[1]|2:SENSe:FREQuency[:CW|:FIXed]?	
:SYSTem:PMETer[1]|2:UNIT:POWer DBM|W	√	:SYSTem:PMETer[1]|2:UNIT:POWer DBM|W	
:SYSTem:PMETer[1]|2:UNIT:POWer?	√	:SYSTem:PMETer[1]|2:UNIT:POWer?	
:SYSTem:PMETer[1]|2[:STATe] ON|OFF|1|0	√	:SYSTem:PMETer[1]|2[:STATe] <boolean>	
:SYSTem:PMETer[1]|2[:STATe]?	√	:SYSTem:PMETer[1]|2[:STATe]?	
:SYSTem:PON:TYPE PRESet|LAST|USER	√	:SYSTem:PON:TYPE PRESet|LAST	
:SYSTem:PON:TYPE?	√	:SYSTem:PON:TYPE?	
:SYSTem:PRESet	√	:SYSTem:PRESet	Executes preset

Table G.2.9-1 System Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:PRESet:ALL	N/A	Not supported.	
:SYSTem:PRESet:LANGuage "SCPI"|"COMP"|"8648"|"E4428C"|"E4438C"|"E8257D"|"E8267D"|"E8663B"|"E8247C"|"E8257C"|"E8267C"|"E442XB"|"E443XB"|"E8241A"|"E8244A"|"E8251A"|"E8254A"|"E8247C"|"E8257C"|"E8267C"|"SMU200A"|"SMATE200A"|"SMJ100A"|"SMIQ"|"SML"|"SMV"|"3410"	N/A	Not supported.	
:SYSTem:PRESet:LANGuage?	N/A	Not supported.	
:SYSTem:PRESet:PERSistent	N/A	Not supported.	
:SYSTem:PRESet:PN9 NORMal|QUICk	N/A	Not supported.	
:SYSTem:PRESet:PN9?	N/A	Not supported.	
:SYSTem:PRESet:TYPE NORMal|USER	N/A	Not supported.	
:SYSTem:PRESet:USER	N/A	Not supported.	
:SYSTem:PRESet[:USER]:SAVE	N/A	Not supported.	
:SYSTem:SECurity:DISPlay ON|OFF|1|0	N/A	Not supported.	
:SYSTem:SECurity:DISPlay?	N/A	Not supported.	
:SYSTem:SECurity:DISPlay:RESTricted ON|OFF|1|0	N/A	Not supported.	
:SYSTem:SECurity:DISPlay:RESTricted?	N/A	Not supported.	
:SYSTem:SECurity:ERASeall	N/A	Not supported.	
:SYSTem:SECurity:LEVel NONE|ERASe|OVERwrite|SANitize	N/A	Not supported.	

Table G.2.9-1 System Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:SYSTem:SECurity:LEVel?	N/A	Not supported.	
:SYSTem:SECurity:LEVel:STATe ON|OFF|1|0	N/A	Not supported.	
:SYSTem:SECurity:LEVel:STATe?	N/A	Not supported.	
:SYSTem:SECurity:OVERwrite	N/A	Not supported.	
:SYSTem:SECurity:SANitize	N/A	Not supported.	
:SYSTem:SSAVer:DELay <value>	N/A	Not supported.	
:SYSTem:SSAVer:DELay?	N/A	Not supported.	
:SYSTem:SSAVer:MODE LIGHt|TEXT	N/A	Not supported.	
:SYSTem:SSAVer:MODE?	N/A	Not supported.	
:SYSTem:SSAVer:STATe ON|OFF|1|0	N/A	Not supported.	
:SYSTem:SSAVer:STATe?	N/A	Not supported.	
:SYSTem:TIME <hour>,<minute>,<second>	N/A	Not supported.	
:SYSTem:TIME?	N/A	Not supported.	
:SYSTem:VERSion?	√	:SYSTem:VERSion?	

G.2.10 Trigger Subsystem

Trigger Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.10-1.

Table G.2.10-1 Trigger Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
:ABORt	N/A	Not supported.	
:INITiate:CONTinuous[:ALL] ON|OFF|1|0	√	:INITiate:CONTinuous[:ALL] <boolean>	
:INITiate:CONTinuous[:ALL]?	√	:INITiate:CONTinuous[:ALL]?	
:INITiate[:IMMediate][:ALL]	√	:INITiate[:IMMediate][:ALL]	
:TRIGger:OUTPut:POLarity POSitive|NEGative	N/A	Not supported.	
:TRIGger:OUTPut:POLarity?	N/A	Not supported.	
:TRIGger[:SEQuence]:SLOPe POSitive|NEGative	√	:TRIGger[1]|2[:SEQuence]:SLOPe POSitive|NEGative	
:TRIGger[:SEQuence]:SLOPe?	√	:TRIGger[1]|2[:SEQuence]:SLOPe?	
:TRIGger[:SEQuence]:SOURce BUS|IMMediate|EXTernal|KEY|TIMer	√	:TRIGger[1]|2[:SEQuence]:SOURce BUS|IMMediate|EXTernal|KEY|TIMer	TIMer cannot be selected. Turns Trigger off in selecting IMMediate
:TRIGger[:SEQuence]:SOURce?	√	:TRIGger[1]|2[:SEQuence]:SOURce?	Returns IMM when Trigger is off in selecting IMMediate
:TRIGger[:SEQuence]:TIMer <period>	√	:TRIGger[:SEQuence]:TIMer <time>	
:TRIGger[:SEQuence]:TIMer?	√	:TRIGger[:SEQuence]:TIMer?	
:TRIGger[:SEQuence][:IMMediate]	√	:TRIGger[:SEQuence][:IMMediate]	
[:SOURce]:TSWeep	√	[:SOURce]:TSWeep	

G.2.11 Unit Subsystem

Unit Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.2.11-1.

Table G.2.11-1 Unit Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
`:UNIT:POWer DBM|DBUV|DBUVEMF|V|VEMF|DB`	√	`:UNIT[1]|2:POWer DBM|DBUV|DBUVEMF`	`V`, `VEMF`, and `DB` cannot be selected.
`:UNIT:POWer?`	√	`:UNIT[1]|2:POWer?`	
`:UNIT:VOLT:TYPE PD|EMF`	N/A	Not supported.	
`:UNIT:VOLT:TYPE?`	N/A	Not supported.	

G.3 Analog Modulation Commands

G.3.1 Amplitude Modulation Subsystem

Amplitude Modulation Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.3.1-1.

Table G.3.1-1 Amplitude Modulation Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
A[:SOURce]:AM:EXTernal:COUPling AC|DC	√	[:SOURce[1]|2]:AM:EXTernal:COUPling AC|DC	
[:SOURce]:AM:EXTernal:COUPling?	√	[:SOURce[1]|2]:AM:EXTernal:COUPling?	
[:SOURce]:AM:INTernal:FREQuency <value><unit>|UP|DOWN	√	[:SOURce[1]|2]:AM[:AM[1]|2]:INTernal:FREQuency <freq>	
[:SOURce]:AM:INTernal:FREQuency?	√	[:SOURce[1]|2]:AM[:AM[1]|2]:INTernal:FREQuency?	
[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement] <num>	√	[:SOURce[1]|2]:AM:INTernal:FREQuency:STEP[:INCRement] <freq>	
[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement]?	√	[:SOURce[1]|2]:AM:INTernal:FREQuency:STEP[:INCRement]?	
[:SOURce]:AM:INTernal:FUNCtion:SHAPe SINE	√	[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion:SHAPe SINE|TRIangle|SQUare|RAMP	
[:SOURce]:AM:INTernal:FUNCtion:SHAPe?	√	[:SOURce[1]|2]:AM[1]|2:INTernal:FUNCtion:SHAPe?	
[:SOURce]:AM:MODE DEEP|NORMal	N/A	Not supported.	
[:SOURce]:AM:MODE?	N/A	Not supported.	
[:SOURce]:AM:SOURce INT|EXT	√	[:SOURce[1]|2]:AM[1]|2:SOURce INT|EXT	
[:SOURce]:AM:SOURce?	√	[:SOURce[1]|2]:AM[1]|2:SOURce?	

Table G.3.1-1 Amplitude Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:AM:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:AM[1]|2:STATe <boolean>	
[:SOURce]:AM:STATe?	√	[:SOURce[1]|2]:AM[1]|2:STATe?	
[:SOURce]:AM:TYPE LINear|EXPonential	√	[:SOURce[1]|2]:AM:TYPE LINear|EXPonential	
[:SOURce]:AM:TYPE?	√	[:SOURce[1]|2]:AM:TYPE?	
[:SOURce]:AM[:DEPTh]:EXPonential <value>	√	[:SOURce[1]|2]:AM[1]|2[:DEPTh]:EXPonential <rel_ampl>	
[:SOURce]:AM[:DEPTh]:EXPonential?	√	[:SOURce[1]|2]:AM[1]|2[:DEPTh]:EXPonential?	
[:SOURce]:AM[:DEPTh]:STEP[:INCRement] <value><unit>	N/A	Not supported.	
[:SOURce]:AM[:DEPTh]:STEP[:INCRement]?	N/A	Not supported.	
[:SOURce]:AM[:DEPTh][:LINear] <value><unit>|UP|DOWN	√	[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear] <percent>	
[:SOURce]:AM[:DEPTh][:LINear]?	√	[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear]?	

G.3.2 Frequency Modulation Subsystem

Frequency Modulation Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.3.2-1.

Table G.3.2-1 Frequency Modulation Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:FM:EXTernal:COUPling AC|DC	√	[:SOURce[1]|2]:FM:EXTernal:COUPling AC|DC	
[:SOURce]:FM:EXTernal:COUPling?	√	[:SOURce[1]|2]:FM:EXTernal:COUPling?	
[:SOURce]:FM:INTernal:FREQuency <value><unit>|UP|DOWN	√	[:SOURce[1]|2]:FM[1]|2:INTernal:FREQuency <freq>	
[:SOURce]:FM:INTernal:FREQuency?	√	[:SOURce[1]|2]:FM[1]|2:INTernal:FREQuency?	
[:SOURce]:FM:INTernal:FREQuency:STEP[:INCRement] <num>	√	[:SOURce[1]|2]:FM:INTernal:FREQuency:STEP[:INCRement] <freq>	
[:SOURce]:FM:INTernal:FREQuency:STEP[:INCRement]?	√	[:SOURce[1]|2]:FM:INTernal:FREQuency:STEP[:INCRement]?	
[:SOURce]:FM:INTernal:FUNCtion:SHAPe SINE	√	[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion:SHAPe SINE|SQUare|RAMP|PULSe	
[:SOURce]:FM:INTernal:FUNCtion:SHAPe?	√	[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion:SHAPe?	
[:SOURce]:FM:SOURce INT|EXT	√	[:SOURce[1]|2]:FM[1]|2:SOURce INT|EXT	
[:SOURce]:FM:SOURce?	√	[:SOURce[1]|2]:FM[1]|2:SOURce?	
[:SOURce]:FM:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:FM[1]|2:STATe <boolean>	
[:SOURce]:FM:STATe?	√	[:SOURce[1]|2]:FM[1]|2:STATe?	
[:SOURce]:FM[:DEViation] <value><unit>	√	[:SOURce[1]|2]:FM[1]|2[:DEViation] <freq>	
[:SOURce]:FM[:DEViation]?	√	[:SOURce[1]|2]:FM[1]|2[:DEViation]?	

Table G.3.2-1 Frequency Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:FM[:DEViation]:STEP[:INCRement] <value><unit>|GHz|MHz|kHz|Hz	√	[:SOURce[1]|2]:FM[:DEViation]:STEP[:INCRement] <freq>[,<sg>]	
[:SOURce]:FM[:DEViation]:STEP[:INCRement]?	√	[:SOURce[1]|2]:FM[:DEViation]:STEP[:INCRement]? [<sg>]	

G.3.3 Phase Modulation Subsystem

Phase Modulation Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.3.3-1.

Table G.3.3-1 Phase Modulation Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:PM:BANDwidth|BWIDth NORMal|HIGH	N/A	Not supported.	
[:SOURce]:PM:BANDwidth|BWIDth?	N/A	Not supported.	
[:SOURce]:PM:EXTernal:COUPling AC|DC	√	[:SOURce[1]|2]:PM:EXTernal:COUPling AC|DC	
[:SOURce]:PM:EXTernal:COUPling?	√	[:SOURce[1]|2]:PM:EXTernal:COUPling?	
[:SOURce]:PM:INTernal:FREQuency <value><unit>|UP|DOWN	√	[:SOURce[1]|2]:PM[1]|2:INTernal:FREQuency <freq>	
[:SOURce]:PM:INTernal:FREQuency?	√	[:SOURce[1]|2]:PM[1]|2:INTernal:FREQuency?	
[:SOURce]:PM:INTernal:FREQuency:STEP[:INCRement] <num>	√	[:SOURce[1]|2]:PM:INTernal:FREQuency:STEP[:INCRement] <freq>	
[:SOURce]:PM:INTernal:FREQuency:STEP[:INCRement]?	√	[:SOURce[1]|2]:PM:INTernal:FREQuency:STEP[:INCRement]?	
[:SOURce]:PM:INTernal:FUNCtion:SHAPe SINE	√	[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion:SHAPe SINE|SQUare|TRIangle|RAMP|PULSe	
[:SOURce]:PM:INTernal:FUNCtion:SHAPe?	√	[:SOURce[1]|2]:PM[1]|2:INTernal:FUNCtion:SHAPe?	
[:SOURce]:PM:SOURce INT|EXT	√	[:SOURce[1]|2]:PM:[PM[1]|2]:SOURce INT1|INT2|EXT	
[:SOURce]:PM:SOURce?	√	[:SOURce[1]|2]:PM:[PM[1]|2]:SOURce?	
[:SOURce]:PM:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:PM:[:PM[1]|2]:STATe <boolean>	
[:SOURce]:PM:STATe?	√	[:SOURce[1]|2]:PM:[:PM[1]|2]:STATe?	

Table G.3.3-1 Phase Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:PM[:DEViation] <value><unit>|UP|DOWN	√	[:SOURce[1]|2]:PM[:DEViation] <ext_numeric>	
[:SOURce]:PM[:DEViation]?	√	[:SOURce[1]|2]:PM[:DEViation]?	
[:SOURce]:PM[:DEViation]:STEP[:INCRement] <value><unit>	√	[:SOURce]:PM[:DEViation]:STEP[:INCRement] <value><unit>	
[:SOURce]:PM[:DEViation]:STEP[:INCRement]?	√	[:SOURce]:PM[:DEViation]:STEP[:INCRement]?	

G.3.4 Pulse Modulation Subsystem

Pulse Modulation Subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.3.4-1.

Table G.3.4-1 Phase Modulation Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:PULM:EXTernal:POLarity NORMal|INVerted	√	[:SOURce]:PULM:EXTernal:POLarity NORMal|INVerted	
[:SOURce]:PULM:EXTernal:POLarity?	√	[:SOURce]:PULM:EXTernal:POLarity?	
[:SOURce]:PULM:INTernal:DELay:STEP <num><time_suffix>	N/A	Not supported.	
[:SOURce]:PULM:INTernal:DELay:STEP?	N/A	Not supported.	
[:SOURce]:PULM:INTernal:DELay[1]|[2] <num><time_suffix>|UP|DOWN	√	[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2 <time>	
[:SOURce]:PULM:INTernal:DELay[1]|[2]	√	[:SOURce[1]|2]:PULM:INTernal:DELay[1]|2	
[:SOURce]:PULM:INTernal:FREQuency <frequency>|MAXimum|MINimum|UP|DOWN	√	[:SOURce[1]|2]:PULM:INTernal:FREQuency <freq>	
[:SOURce]:PULM:INTernal:FREQuency?	√	[:SOURce[1]|2]:PULM:INTernal:FREQuency?	
[:SOURce]:PULM:INTernal:FREQuency:STEP[:INCRement] <freq>|MAXimum|MINimum|DEFault	√	[:SOURce[1]|2]:PULM:INTernal:FREQuency:STEP[:INCRement] <freq>	
[:SOURce]:PULM:INTernal:FREQuency:STEP[:INCRement]?	√	[:SOURce[1]|2]:PULM:INTernal:FREQuency:STEP[:INCRement]?	
[:SOURce]:PULM:INTernal:PERiod <period>|MAXimum|MINimum|UP|DOWN	√	[:SOURce[1]|2]:PULM:INTernal:PERiod <time>	
[:SOURce]:PULM:INTernal:PERiod?	√	[:SOURce[1]|2]:PULM:INTernal:PERiod?	

Table G.3.4-1 Pulse Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:PULM:INTernal:PERiod:STEP[:INCRement] <step>|UP|DOWN	N/A	Not supported.	
[:SOURce]:PULM:INTernal:PERiod:STEP[:INCRement]?	N/A	Not supported.	
[:SOURce]:PULM:INTernal:PWIDth:STEP <num><time_suffix>|MAXimum|MINimum|DEFault	N/A	Not supported.	
[:SOURce]:PULM:INTernal:PWIDth:STEP?	N/A	Not supported.	
[:SOURce]:PULM:INTernal:PWIDth[1]|2 <num><time_suffix>|UP|DOWN	√	[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2 <time>	
[:SOURce]:PULM:INTernal:PWIDth[1]|2?	√	[:SOURce[1]|2]:PULM:INTernal:PWIDth[1]|2?	
[:SOURce]:PULM:INTernal:TRAin:LIST:PRESet	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:OFFTime <value>{,<value>}	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:OFFTime?	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:ONTime <value>{,<value>}	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:ONTime?	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:REPetition <value>{,<value>}	N/A	Not supported.	
[:SOURce]:PULM:INTernal:TRAin:REPetition?	N/A	Not supported.	
[:SOURce]:PULM:INTernal[1]:VIDeo:POLarity NORMal|INVerted	√	[:SOURce]:PULM:INTernal[1]:VIDeo:POLarity NORMal|INVerted	
[:SOURce]:PULM:INTernal[1]:VIDeo:POLarity?	√	[:SOURce]:PULM:INTernal[1]:VIDeo:POLarity?	
[:SOURce]:PULM:SOURce INTernal|EXTernal	√	[:SOURce[1]|2]:PULM:SOURce INTernal|EXTernal	

Table G.3.4-1 Pulse Modulation Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:PULM:SOURce?	√	[:SOURce[1]|2]:PULM:SOURce?	
[:SOURce]:PULM:SOURce:INTernal SQUare|FRUN|TRIGgered|ADOublet|DOUBlet|GATEd|PTRain	√	[:SOURce[1]|2]:PULM:SOURce:INTernal SQUare|FRUN|TRIGgered|ADOublet|DOUBlet|GATed	
[:SOURce]:PULM:SOURce:INTernal?	√	[:SOURce[1]|2]:PULM:SOURce:INTernal?	
[:SOURce]:PULM:STATe ON|OFF|1|0	√	[:SOURce[1]|2]:PULM:STATe <boolean>	
[:SOURce]:PULM:STATe?	√	[:SOURce[1]|2]:PULM:STATe?	

G.4 Arb Commands

G.4.1 All Subsystem

All subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.4.1-1.

Table G.4.1-1 All Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
`[:SOURce]:RADio:ALL:OFF`	√	`[:SOURce[1]|2]:RADio:ALL:OFF`	ARB is turned off during execution.

G.4.2 Dual ARB Subsystem

Dual ARB subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.4.2-1.

TableG.4.2-1 Dual ARB Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:BASeband:FREQuency:OFFSet <value><unit>	√	[:SOURce[1]|2]:RADio:ARB:BASeband:FREQuency:OFFSet <value><unit>	Corresponds to the Offset A.
[:SOURce]:RADio:ARB:BASeband:FREQuency:OFFSet?	√	[:SOURce[1]|2]:RADio:ARB:BASeband:FREQuency:OFFSet?	Corresponds to the Offset A.
[:SOURce]:RADio:ARB:BASeband:FREQuency:OFFSet:PHASe:RESet	N/A	Not supported.	
[:SOURce]:RADio:ARB:CLIPping "<file name>",IJQ|IORQ,<value>[,<value>]	N/A	Not supported.	
[:SOURce]:RADio:ARB:DOPRotection ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:RADio:ARB:DOPRotection?	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:ALPHa <value>	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:ALPHa?	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:BBT <value>	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:BBT?	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:CHANnel EVM|ACP	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer:CHANnel?	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:FILTer:TYPE RNYQuist|NYQuist|GAUSsian|RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|EDGE|EWIDe|EHSR|WCDMa|AC4Fm|"<user FIR>"	N/A	Not supported.	
[:SOURce]:RADio:ARB:FILTer:TYPE?	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:FILTer[:STATe]ON|{OFF}|1|0	N/A	Not supported.	
[:SOURce]:RADio:ARB:GENerate:SINE ["<file_name>"][,<osr>],[<scale>],[I|Q|IQ][<phasedeg>]	N/A	Not supported.	
[:SOURce]:RADio:ARB:GENerate:TEST:WAVeforms	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADer:CLEar	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADER:NOISe:RMS:OVERride "<file_name>",<value>|UNSPecified	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADER:NOISe:RMS:OVERride? "<file_name>"	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADER:RMS "<file_name>",<value>|UNSPecified	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADER:RMS? "<file_name>"	N/A	Not supported.	
[:SOURce]:RADio:ARB:HEADer:SAVE	N/A	Not supported.	
[:SOURce]:RADio:ARB:IQ:MODulation:ATTen <value>	N/A	Not supported.	
[:SOURce]:RADio:ARB:IQ:MODulation:ATTen?	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO?	N/A	Not supported.	
[:SOURce]:RADio:ARB:MARKer:CLEar "<file_name>",<marker>,<first_point>,<last_point>	N/A	Not supported.	
[:SOURce]:RADio:ARB:MARKer:CLEar:ALL "<file_name>",<marker>	N/A	Not supported.	
[:SOURce]:RADio:ARB:MARKer:ROTate "<file_name>",<rotate_count>	N/A	Not supported.	
[:SOURce]:RADio:ARB:MARKer[:SET] "<file_name>",<marker>,<first_point>,<last_point>,<skip_count>	N/A	Not supported.	
[:SOURce]:RADio:ARB:MBSync OFF|MASTer|SLAVe	√	[:SOURce]:RADio:ARB:MBSync OFF|SG12|PRIMary|SECondary	
[:SOURce]:RADio:ARB:MBSync?	√	[:SOURce]:RADio:ARB:MBSync?	
[:SOURce]:RADio:ARB:MBSync:NSLaves <value>	√	[:SOURce]:RADio:ARB:MBSync:NSECondaries <ext_integer>	
[:SOURce]:RADio:ARB:MBSync:NSLaves?	√	[:SOURce]:RADio:ARB:MBSync:NSECondaries?	
[:SOURce]:RADio:ARB:MBSync:SLISten	√	[:SOURce]:RADio:ARB:MBSync:SLISten	
[:SOURce]:RADio:ARB:MBSync:SREFerence <value>	√	[:SOURce]:RADio:ARB:MBSync:SREFerence <ext_integer>	
[:SOURce]:RADio:ARB:MBSync:SREFerence?	√	[:SOURce]:RADio:ARB:MBSync:SREFerence?	
[:SOURce]:RADio:ARB:MBSync:SSLaves	√	[:SOURce]:RADio:ARB:MBSync:SSECondaries	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4	N/A	Not supported.	
[:SOURce]:RADio:ARB:MDEStination:ALCHold?	N/A	Not supported.	
[:SOURce]:RADio:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4	N/A	Not supported.	
[:SOURce]:RADio:ARB:MDEStination:PULSe?	N/A	Not supported.	
[:SOURce]:RADio:ARB:MPOLarity:MARKer1|2|3|4 NEGative|POSitive	√	[:SOURce]:RADio:ARB:MPOLarity:MARKer1|2|3 NEGative|POSitive	MARKer4 is not supported
[:SOURce]:RADio:ARB:MPOLarity:MARKer1|2|3|4?	√	[:SOURce]:RADio:ARB:MPOLarity:MARKer1|2|3?	MARKer4 is not supported
[:SOURce]:RADio:ARB:NOISe:BANDwidth <value><unit>	√	[:SOURce[1]|2]:RADio:ARB:NOISe:BANDWidth <freq>	
[:SOURce]:RADio:ARB:NOISe:BANDwidth?	√	[:SOURce[1]|2]:RADio:ARB:NOISe:BANDWidth?	
[:SOURce]:RADio:ARB:NOISe:CBRate <1bps - 999Mbps>	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:CBRate?	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:CBWidth <value><unit>	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:CBWidth?	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:CN <value><unit>	√	[:SOURce[1]|2]:RADio:ARB:NOISe:CN <rel_ampl>	
[:SOURce]:RADio:ARB:NOISe:CN?	√	[:SOURce[1]|2]:RADio:ARB:NOISe:CN?	
[:SOURce]:RADio:ARB:NOISe:CNFormat CN|EBNO	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:NOISe:CNFormat?	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:EBNO <ebno in dB>	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:EBNO?	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:NOISe:MUX SUM|CARRier|NOISe	N/A	Not supported.	
[:SOURce]:RADio[1]:ARB:NOISe:MUX?	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:POWer:CARRier <carrierPower>	√	[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CARRier <ampl>	
[:SOURce]:RADio:ARB:NOISe:POWer:CARRier?	√	[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CARRier?	
[:SOURce]:RADio:ARB:NOISe:POWer:CONTrol[:MODE]{TOTal}|CARRier|NOISe	√	[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CONTrol[:MODE] TOTal|CARRier|NOISe	
[:SOURce]:RADio:ARB:NOISe:POWer:CONTrol[:MODE]?	√	[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:CONTrol[:MODE]?	
[:SOURce]:RADio:ARB:NOISe:POWer:NOISe:CHANnel?	√	[:SOURce[1]|2]:RADio:ARB:NOISe:POWer:NOISe:CHANnel?	
[:SOURce]:RADio:ARB:NOISe:POWer:NOISe:TOTal <totalNoisePowerInDbm>	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe:POWer:NOISe:TOTal?	N/A	Not supported.	
[:SOURce]:RADio:ARB:NOISe[:STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:RADio:ARB:NOISe[:STATe] <boolean>	
[:SOURce]:RADio:ARB:NOISe[:STATe]?	√	[:SOURce[1]|2]:RADio:ARB:NOISe[:STATe]?	
[:SOURce]:RADio:ARB:PHASe:NOISe:F1 <value><unit>	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:PHASe:NOISe:F1?	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe:F2 <value><unit>	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe:F2?	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe:LMID <value>	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe:LMID?	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe[:STATe] ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:RADio:ARB:PHASe:NOISe[:STATe] ?	N/A	Not supported.	
[:SOURce]:RADio:ARB:REGister[:STATus]?	√	[:SOURce[1]|2]:RADio:ARB:REGister[:STATus]?	
[:SOURce]:RADio:ARB:RETRigger ON|OFF|1|0|IMMediate	√	[:SOURce[1]|2]:RADio:ARB:RETRigger ON|OFF|1|0|IMMediate	
[:SOURce]:RADio:ARB:RETRigger?	√	[:SOURce[1]|2]:RADio:ARB:RETRigger?	
[:SOURce]:RADio:ARB:RSCaling <value>	N/A	Not supported.	
[:SOURce]:RADio:ARB:RSCaling?	N/A	Not supported.	
[:SOURce]:RADio:ARB:SCALing "<file_name>",<value>	N/A	Not supported.	
[:SOURce]:RADio:ARB:SCLock:RATE <value>	N/A	Not supported.	
[:SOURce]:RADio:ARB:SCLock:RATE?	√	[:SOURce[1]|2]:RADio:ARB:SCLock:RATE?	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:SEQuence[:MWAVeform] <filename>,<waveform1>,<reps>,NONE|M1|M2|M3|M4|M1M2|M1M3|M1M4|M2M3|M2M4|M3M4|M1M2M3|M1M2M4|M1M3M4|M2M3M4|M1M2M3M4|ALL,{,<waveform2>,<reps>,NONE|M1|M2|M3|M4|M1M2|M1M3|M1M4|M2M3|M2M4|M3M4|M1M2M3|M1M2M4|M1M3M4|M2M3M4|M1M2M3M4|ALL,}	N/A	Not supported.	
[:SOURce]:RADio:ARB:SEQuence[:MWAVeform]? <filename>	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE|SADVance	√	[:SOURce[1]|2]:RADio:ARB:TRIGger:TYPE CONTinuous|SINGle	CONTinuous: MG3710A/10E/40A is set to Off. SINGle: MG3710A/10E/40A is set to On. GATE|SADVance cannot be used.
[:SOURce]:RADio:ARB:TRIGger:TYPE?	√	[:SOURce[1]|2]:RADio:ARB:TRIGger:TYPE?	CONTinuous: MG3710A/10E/40A is set to Off. SINGle: MG3710A/10E/40A is set to On. GATE|SADVance cannot be used.
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|TRIGger|RESet	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE LOW|HIGH	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE?	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGle|CONTinuous	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger[:SOURce] KEY|EXT|BUS	√	[:SOURce[1]|2]:RADio:ARB:TRIGger:SOURce KEY|EXT|BUS	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]?	√	[:SOURce[1]|2]:RADio:ARB:TRIGger:SOURce?	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <value>	√	[:SOURce[1]|2]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <time>	The argument is <time> in the MG3710A/10E/40A Commands (SCPI mode).
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?	√	[:SOURce[1]|2]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?	The argument is <time> in the MG3710A/10E/40A Commands (SCPI mode).
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|1|0	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative	√	[:SOURce[1]|2]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?	√	[:SOURce[1]|2]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2	N/A	Not supported.	
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?	N/A	Not supported.	

Table G.4.2-1 Dual ARB Subsystem Device Messages (Cont'd)

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:ARB:WAVeform "WFM1:file_name"|"SEQ:file_name"	√	[:SOURce[1]|2]:RADio:ARB:WAVeform <string>	
[:SOURce]:RADio:ARB:WAVeform?	√	[:SOURce[1]|2]:RADio:ARB:WAVeform?	
[:SOURce]:RADio:ARB:WAVeform:NHEaders "WFM1:file_name"|"SEQ:filename"	√	[:SOURce[1]|2]:RADio:ARB:WAVeform:NHEaders <string>	
[:SOURce]:RADio:ARB:WAVeform:NHEaders?	√	[:SOURce[1]|2]:RADio:ARB:WAVeform:NHEaders?	
[:SOURce]:RADio:ARB[:STATe] ON|OFF|1|0	√	[:SOURce[1]|2]:RADio:ARB[:STATe] <boolean>	
[:SOURce]:RADio:ARB[:STATe]?	√	[:SOURce[1]|2]:RADio:ARB[:STATe]?	

G.4.3 LARB Subsystem

LARB subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table G.4.3-1.

Table G.4.3-1 LARB Subsystem Device Messages

N5162A/N5182A Commands	Compatibility	MG3710A/10E/40A Commands (SCPI mode)	Remarks
[:SOURce]:RADio:LARB[:STATe] ON|OFF|1|0	√	[:SOURce]:RADio:LARB[:STATe] <boolean>	
[:SOURce]:RADio:LARB[:STATe]?	√	[:SOURce]:RADio:LARB[:STATe]?	

Appendix H Panel Keys and Keyboard Operations

Table H-1 Correspondences Between Panel Keys and Keyboard Operations

Panel Key	USB Keyboard
Preset	Ctrl+Shift+R
Local	Ctrl+Shift+O
Cal	Ctrl+Shift+9
Save	Ctrl+S
Recall	Ctrl+O
Copy	Ctrl+Shift+8
Top	Ctrl+Shift+ ↑
F1	F1
F2	F2
F3	F3
F4	F4
F5	F5
F6	F6
F7	F7
F8	F8
More	Ctrl+Shift+ →
Back	Ctrl+Shift+ ←
SG1	Ctrl+Shift+U
SG2	Ctrl+Shift+I
IQpro	Ctrl+Shift+P
Frequency	Ctrl+Shift+Y
Sweep/List	Ctrl+Shift+6
AM	Ctrl+Shift+1
I/Q	Ctrl+Alt+X
Level	Ctrl+Shift+L
Mode	Ctrl+Alt+V
FM/ϕM	Ctrl+Shift+5
AUX Fctn	Ctrl+Shift+3
Load	Ctrl+Shift+F1
Select	Ctrl+Shift+F2
Pulse	Ctrl+Shift+4
Utility	Ctrl+Alt+B

Note:

The figure in Ctrl+Shift+"figure" cannot be entered by the numeric keypad.

Table H-1 Correspondences Between Panel Keys and Keyboard Operations (Cont'd)

Panel Key	USB Keyboard
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
+ A	A
+ B	B
+ C	C
+ D	D
+ E	E
+ F	F
.	.
–/+	–
Tab	Tab
Shift	Shift
BS	Back Space
Ctrl	Ctrl
Alt	Alt
Alt Tab	Alt+Tab
Cancel	Esc
Help	Ctrl+Shift+H
Enter	Enter
Incr Set	Ctrl+Shift+7
Context	Application, Right-click of a mouse
+ Windows	Windows

Note:

The figure in Ctrl+Shift+"figure" cannot be entered by the numeric keypad.

Table H-1 Correspondences Between Panel Keys and Keyboard Operations (Cont'd)

Panel Key		USB Keyboard
↑		↑
→		→
↓		↓
←		←
	Rotary knob, clockwise	Mouse wheel up
	Rotary knob, counter-clockwise	Mouse wheel down
RF Output Mod On/Off		Ctrl+Shift+Q
RF Output On/Off		Ctrl+Shift+G
2nd RF Output Mod On/Off		Ctrl+Shift+E
2nd RF Output On/Off		Ctrl+Shift+S

Note:

The figure in Ctrl+Shift+"figure" cannot be entered by the numeric keypad.

Appendix I Scanning for Virus

For the MG3710A/MG3710E/MG3740A, we recommend not installing virus scanning software to ensure the best possible performance of the equipment. In some user operating environments, however, the MG3710A/MG3710E/MG3740A might not be completely protected from virus infection, and periodic virus scans might be required.

This chapter provides a procedure to use to check for viruses and the related cautions. The following shows an overview of the virus scanning procedure, in which the MG3710A/MG3710E/MG3740A drives are mounted (assigned) to network drives on an external PC, and then viruses are checked for using antivirus software installed in that computer:

I.1 For Windows Embedded Standard 2009 ..... I-3
- I.1.1 Connecting external PC to MG3710A/MG3740A I-3
- I.1.2 Checking IP address of MG3710A/MG3740A I-3
- I.1.3 Configuring shared settings I-5
- I.1.4 Changing user account for MG3710A/MG3740A I-6
- I.1.5 Shared settings for MG3710A/MG3740A I-9
- I.1.6 Mounting MG3710A/MG3740A drives to external PC drives I-11
- I.1.7 Scanning for virus I-12
- I.1.8 Dismounting MG3710A/MG3740A drives from external PC drives I-12
- I.1.9 Making MG3710A/MG3740A drives unshared I-12
- I.1.10 Restoring previous user account setting for MG3710A/MG3740A I-12
- I.1.11 Enabling Simple File Sharing I-13

I.2 For Windows 7 Professional or Windows Embedded Standard 7 ..... I-14
- I.2.1 Connecting external PC to MG3710A/MG3710E/MG3740A I-14
- I.2.2 Checking IP address of MG3710A/MG3710E/MG3740A I-14
- I.2.3 Configuring shared settings I-16
- I.2.4 Changing user account for MG3710A/MG3710E/MG3740A I-18
- I.2.5 Shared settings for MG3710A/MG3710E/MG3740A I-21
- I.2.6 Mounting MG3710A/MG3710E/MG3740A drives to external PC drives I-23

I.2.7 Scanning for virus I-25
I.2.8 Dismounting MG3710A/MG3710E/MG3740A drives from external PC drives I-25
I.2.9 Making MG3710A/MG3710E/MG3740A drives unshared I-25
I.2.10 Restoring previous user account setting for MG3710A/MG3710E/MG3740A I-25
I.2.11 Enabling Sharing Settings I-26
I.3 For Windows 10 ..... I-27
I.3.1 Connecting External PC to MG3710A/MG3710E/MG3740A I-27
I.3.2 Checking IP address of MG3710A/MG3710E/MG3740A I-27
I.3.3 Configuring shared settings I-29
I.3.4 Changing user account for MG3710A/MG3710E/MG3740A I-31
I.3.5 Shared Settings for MG3710A/MG3710E/MG3740A I-35
I.3.6 Mounting MG3710A/MG3710E/MG3740A drives to the external PC drives I-38
I.3.7 Scanning for virus I-40
I.3.8 Unmounting the equipment drives from the external PC drives I-40
I.3.9 Making MG3710A/MG3710E/MG3740A drives unshared I-40
I.3.10 Restoring the previous user account setting for MG3710A/MG3710E/MG3740A I-40
I.3.11 Enabling Simple File Sharing I-41

Notes:

- Be sure to follow the procedure described in this document. If this procedure is not followed, not only will it not be possible to check for viruses, but the MG3710A/MG3710E/MG3740A might become unusable.

  If the MG3710A/MG3710E/MG3740A runs abnormally after removing viruses, execute system recovery to restore all drives to the factory default settings. For the procedures, refer to 9.7.6 “System Recovery Functions”.

  After performing system recovery, the firmware might have to be upgraded to the latest version depending on when the MG3710A/MG3710E/MG3740A was released.

- Before using antivirus software, be sure to check its usage and the license scope.

I.1 For Windows Embedded Standard 2009

I.1.1 Connecting external PC to MG3710A/MG3740A

Connect MG3710A/MG3740A and the external PC with a LAN cable.

For details about how to set up the network for the MG3710A/MG3740A, refer to Appendix E “Remote Control”.

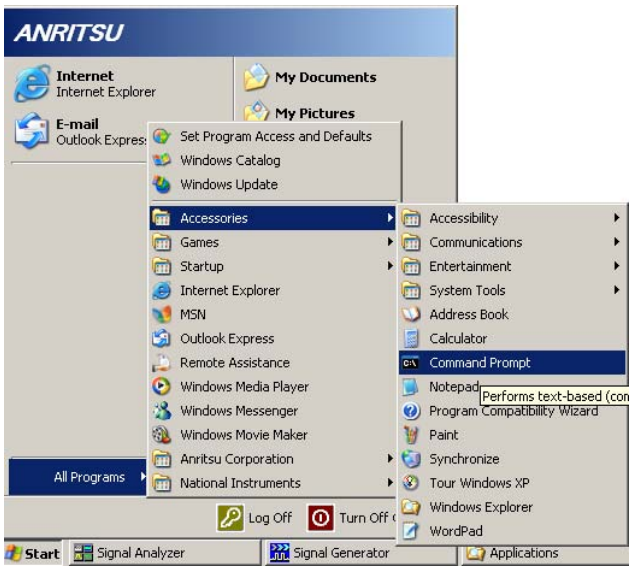
I.1.2 Checking IP address of MG3710A/MG3740A

If the IP address is automatically assigned upon establishing a DHCP connection, check the IP address by using the following procedure:

1. Display the MG3710A/MG3740A desktop.

   To display the desktop, right-click anywhere on the screen and select **Show the Desktop**.

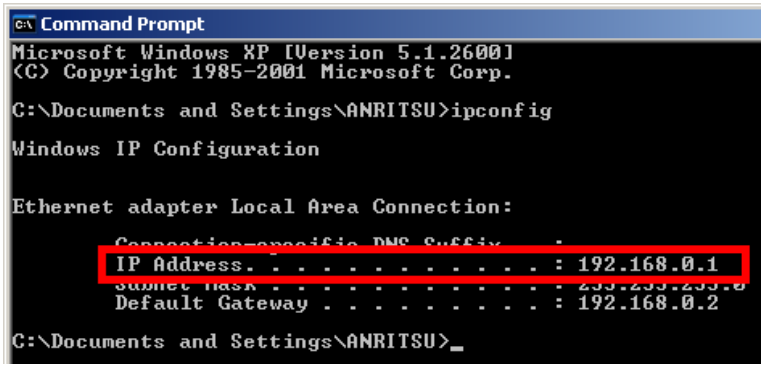
2. Display the MS-DOS Prompt. On the MG3710A/MG3740A, select **Start** – **All Programs** – **Accessories** – **Command Prompt**.



3. Enter the following:

   `ipconfig`

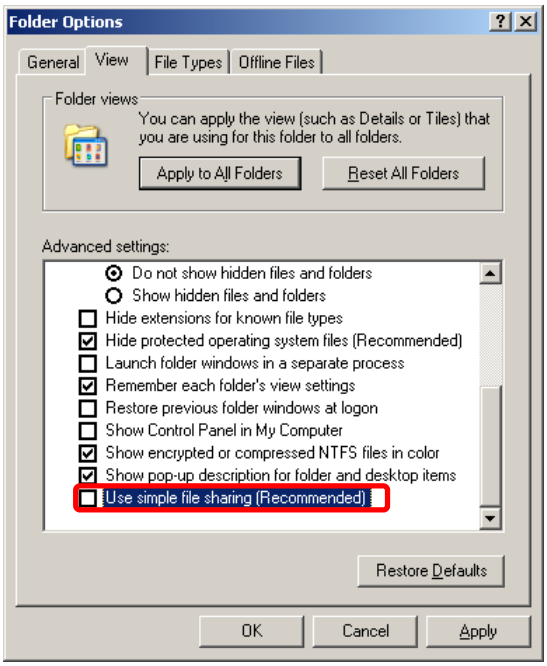
   The assigned IP address displays as shown.



I.1.3 Configuring shared settings

Simple File Sharing is enabled for the MG3710A/MG3740A by default. If authentication is performed by way of a network while Simple File Sharing is enabled, the accessing user is regarded as having a Guest account and cannot access important folders and files such as the Windows folder. To avoid this, use the following procedure to temporarily disable Simple File Sharing:

1. On the MG3710A/MG3740A, click the **Start** button and then click **My Computer**.
2. In the **Tool** menu, click **Folder Options**, and click the **View** tab.
3. From the **Advanced Settings** list, make sure that the **Use simple file sharing (Recommended)** check box is NOT selected.

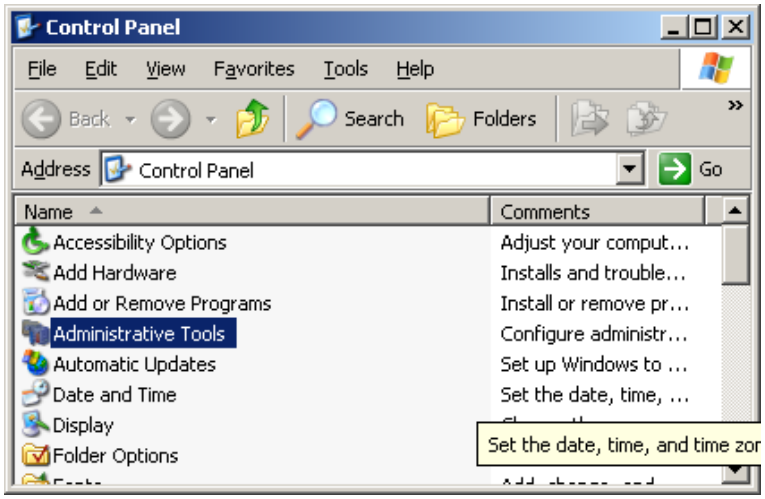


4. Click **OK**.

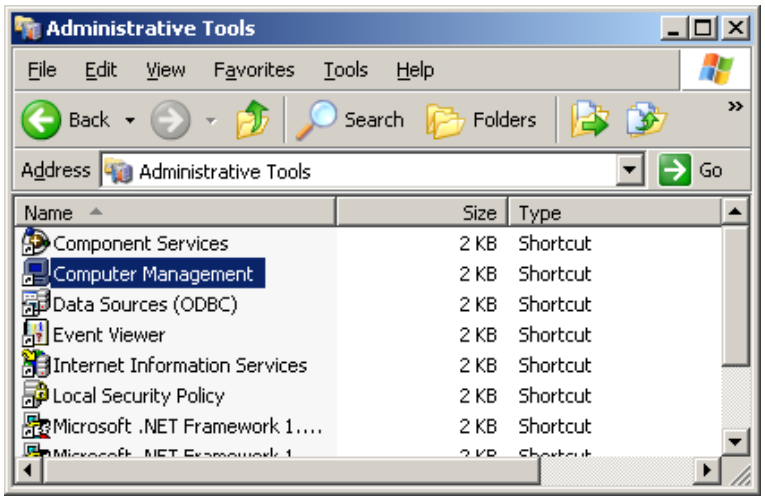
I.1.4 Changing user account for MG3710A/MG3740A

This section describes how to change the user account used when the MG3710A/MG3740A drives are mounted to network drives.

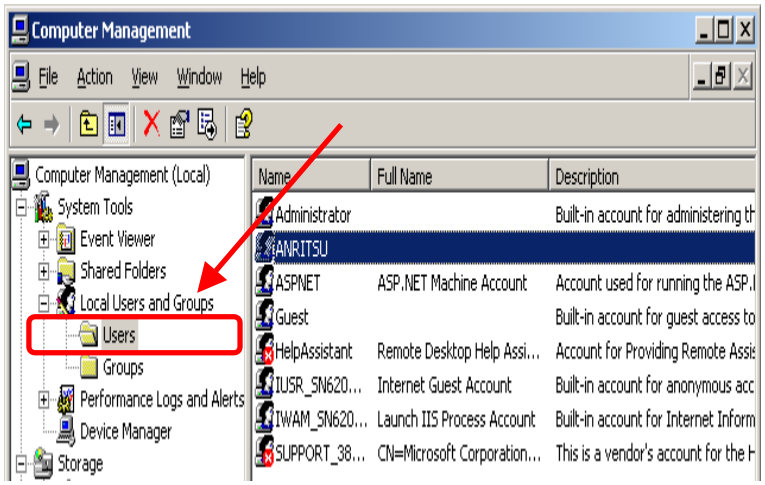
1. From the Start menu, select **Control Panel.**
2. Select **Administrative Tools** from the Control Panel.



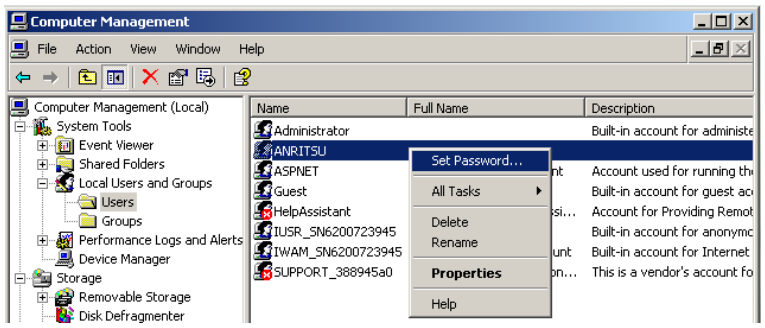
3. In Administrative Tools, select **Computer Management**.



4. In the Computer Management tree, select **Users** under **Local Users and Groups**.



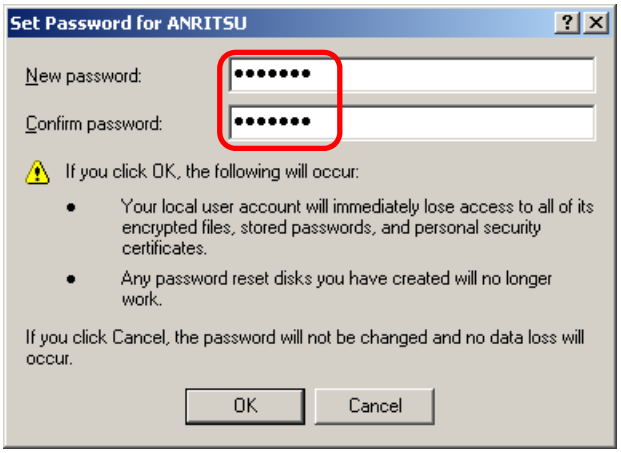
5. Right-click the user account **ANRITSU** to use, and select the **Set Password...**menu.



6. When the message below is shown during the password setting, select **Proceed**.



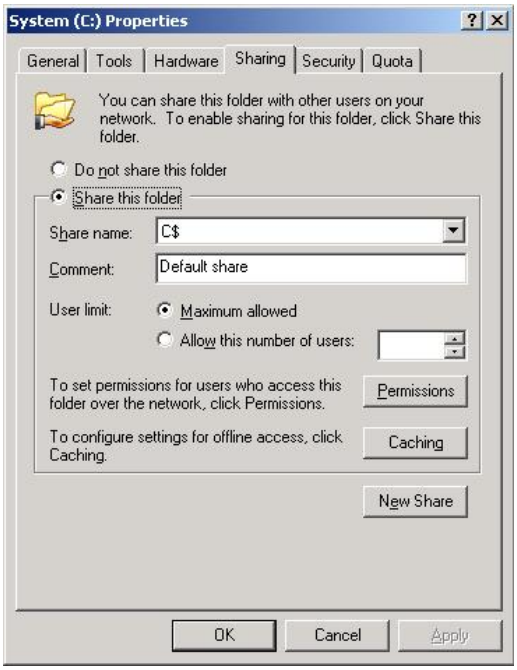
7. Type “ANRITSU” for the password of the user account **ANRITSU**.



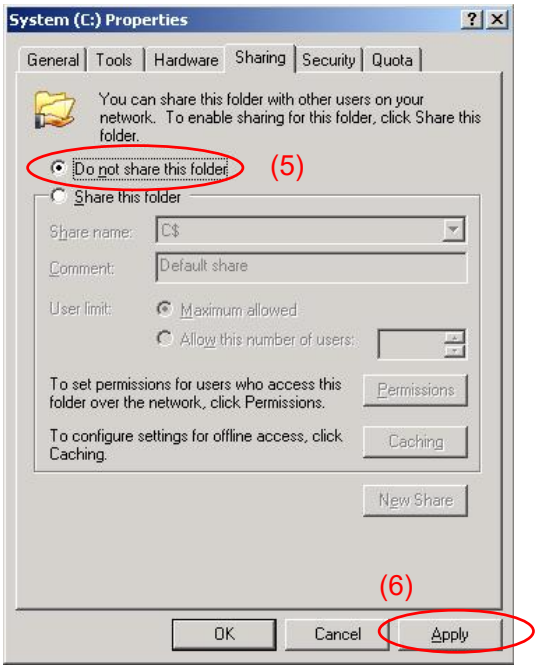
8. After setting the password, click **OK** in the dialog for confirmation.

I.1.5 Shared settings for MG3710A/MG3740A

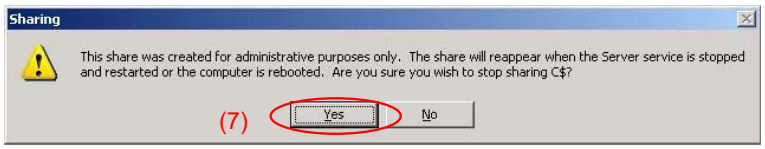
1. From the Start menu, select **My Computer**.
2. Right-click the C drive.
3. Select **Sharing and Security**.
4. Select the **Sharing** tab.



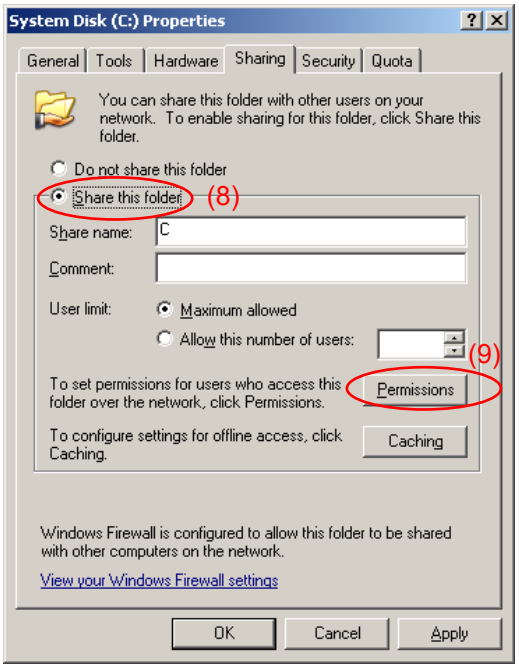
5. To disable the default sharing setting, select **Do not share this folder**.
6. Click the **Apply** button.



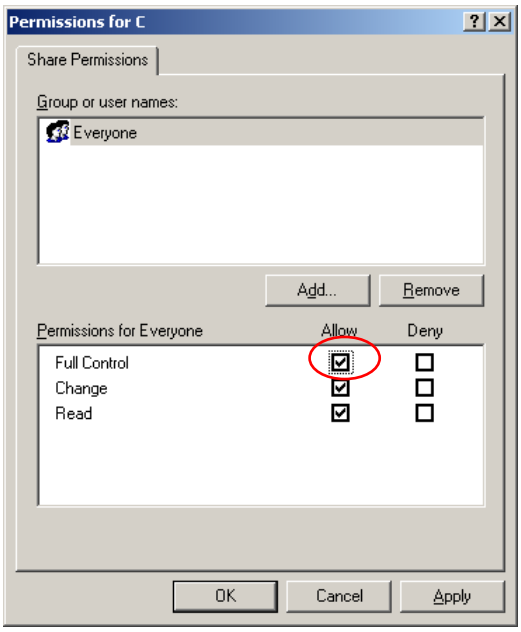
7. A dialog appears. Select **Yes**.



8. Select **Share this folder**.
9. Click the **Permissions** button.



10. Select the **Allow** check box for **Full control**.



11. Click **OK** to close two dialogs displayed.

12. Repeat steps 3 to 11 to the D drive.

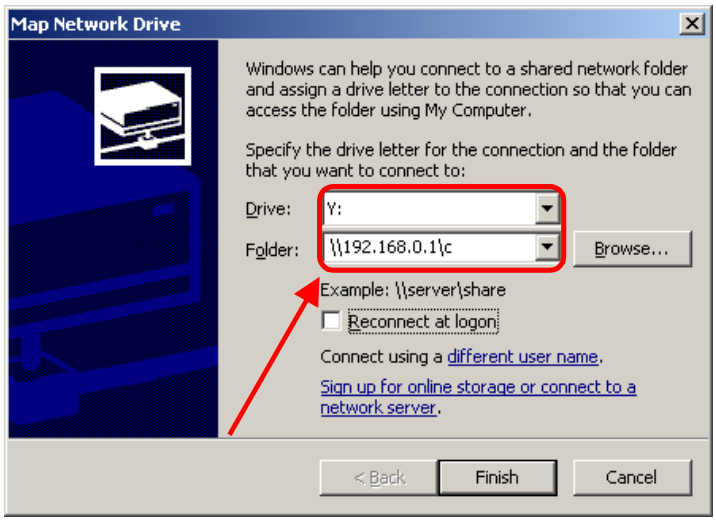
I.1.6 Mounting MG3710A/MG3740A drives to external PC drives

1. On the PC connected by way of the network (which is used to run the virus scanning software), mount (assign) all the shared drives of the MG3710A/MG3740A as network drives.
2. On the PC, right-click **My Network Places**, and select **Map Network Drive**.
3. Enter "The IP address of MG3710A/MG3740A + drive name" for the folder name.

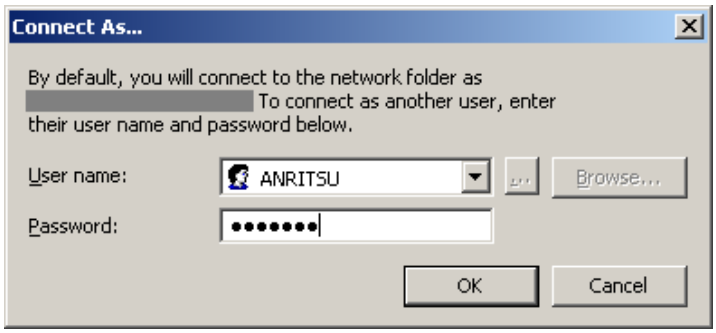
Example When the IP address of the MG3710A/MG3740A is 192.168.0.1:

To mount the C drive, specify Y for Drive and \\192.168.0.1\c for Folder.

To mount the D drive, specify Z for Drive and \\192.168.0.1\d for Folder.



4. Click **Connect using a different user name**.
5. Enter "ANRITSU" for the User name, and also "ANRITSU" for the Password (as specified in Section I.1.4, Step 7).



6. Click **OK** – **Finish** to complete mounting the network drive.

7. Repeat steps 2 to 6 to the D drive.

I.1.7 Scanning for virus

Scan the network drives mounted on the external PC for viruses.

Even if network drives cannot be scanned using your software, scanning might be possible by dragging and dropping a network drive onto the virus software icon in Windows Explorer.

I.1.8 Dismounting MG3710A/MG3740A drives from external PC drives

Right-click **My Network Places** on the external PC, and select **Disconnect Network Drive**.

Dismount the two mapped drives.

I.1.9 Making MG3710A/MG3740A drives unshared

1. From the **Start** menu, select **My Computer**.
2. Right-click the C drive.
3. Select **Sharing and Security**.
4. Select the **Sharing** tab.
5. Select the **Do not share this folder** button.
6. Repeat steps 2 to 5 to the D drive.

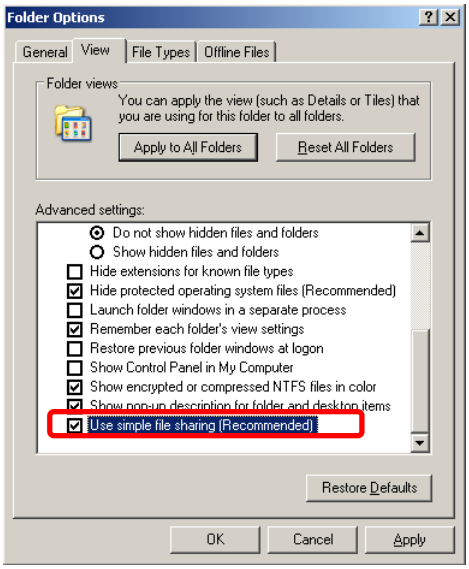
I.1.10 Restoring previous user account setting for MG3710A/MG3740A

The user account password has been changed in Section I.1.4 “Changing user account for the MG3710A/MG3740A” for mounting the MG3710A/MG3740A drives to network drives of the external PC. Restore the password before change in the same way as it was changed. Note that “anritsu” is specified by default.

I.1.11 Enabling Simple File Sharing

Simple File Sharing has been disabled in Section I.1.3 "Configuring shared settings" for sharing drives. To restore the original settings, enable Simple File Sharing by using the following procedure:

1. On the MG3710A/MG3740A, click the **Start** button and then click **My Computer**.
2. In the **Tool** menu, click **Folder Options**, and click the **View** tab.
3. From the **Advanced Settings** list, make sure that the **Use simple file sharing (Recommended)** check box is selected.



4. Click **OK**.

I.2 For Windows 7 Professional or Windows Embedded Standard 7

I.2.1 Connecting external PC to MG3710A/MG3710E/MG3740A

Connect MG3710A/MG3710E/MG3740A and the external PC with a LAN cable.

For details about how to set up the network for the MG3710A/MG3710E/MG3740A, refer to Appendix E “Remote Control”.

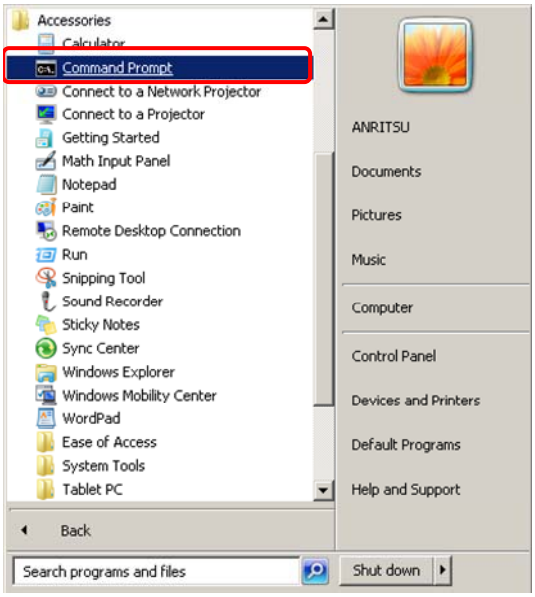
I.2.2 Checking IP address of MG3710A/MG3710E/MG3740A

If the IP address is automatically assigned upon establishing a DHCP connection, check the IP address by using the following procedure:

1. Display the MG3710A/MG3710E/MG3740A desktop.

   To display the desktop, right-click anywhere on the screen and select **Show the Desktop**.

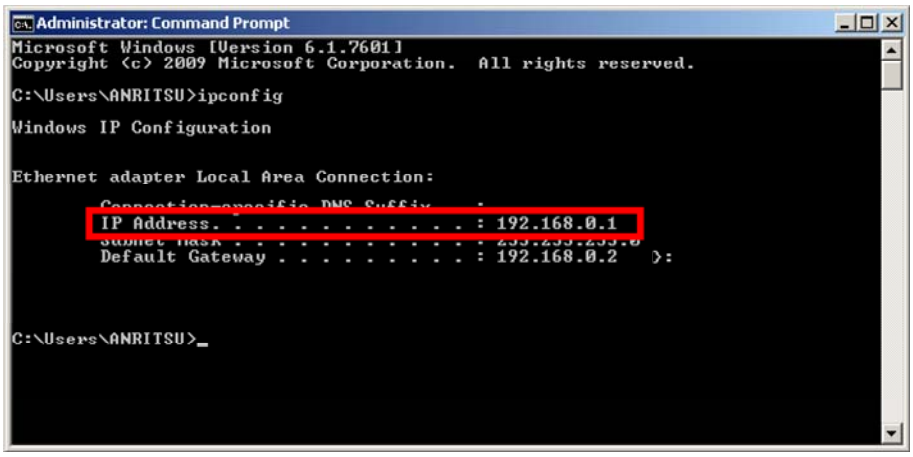
2. Display the MS-DOS Prompt. On the MG3710A/MG3710E/MG3740A, select **Start** – **All Programs** – **Accessories** – **Command Prompt**.



3. Enter the following:

   `ipconfig`

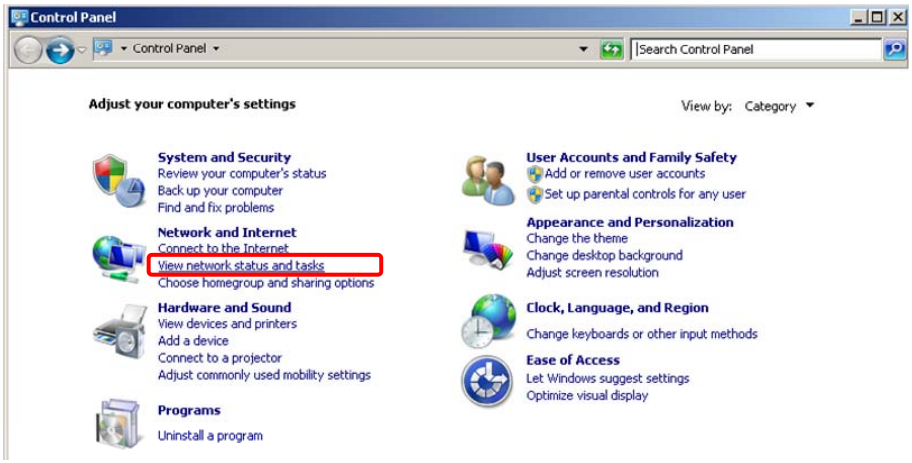
   The assigned IP address displays as shown.


Administrator: Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\ANRITSU>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection:
IP Address. . . . . : 192.168.0.1
Default Gateway . . . . . : 192.168.0.2
C:\Users\ANRITSU>

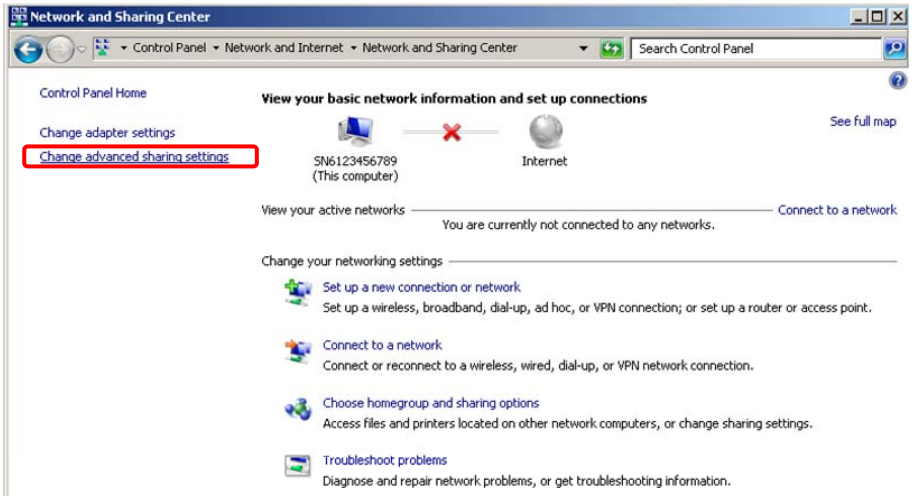
I.2.3 Configuring shared settings

Sharing Settings is enabled for the MG3710A/MG3710E/MG3740A by default. If authentication is performed by way of a network while Sharing Settings is enabled, the accessing user is regarded as having a Guest account and cannot access important folders and files such as the Windows folder. To avoid this, use the following procedure to temporarily disable Sharing Settings:

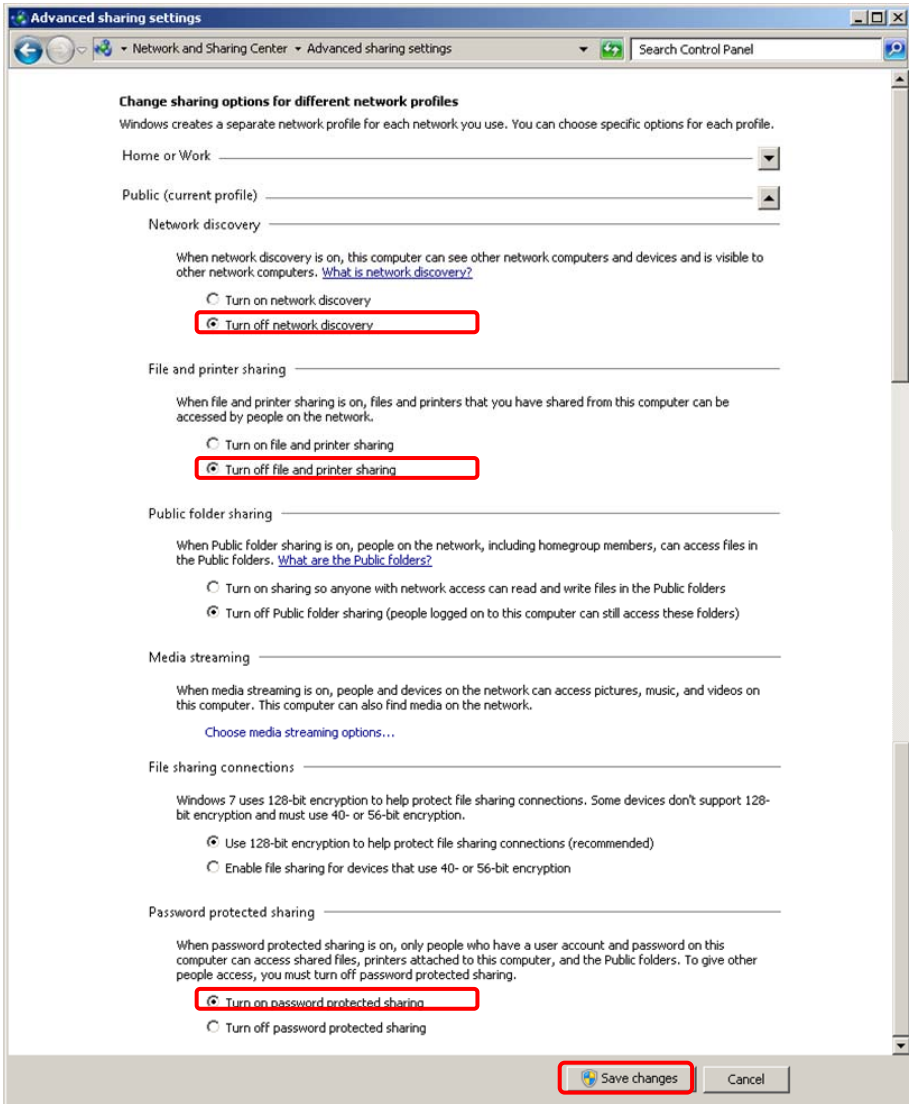
1. On the MG3710A/MG3710E/MG3740A, click the **Start** button and then click **Control Panel**.
2. From the **Control Panel** menu, click **View network status and tasks**.



3. From the **Network and sharing Center** menu, click **Change advanced sharing settings**.



4. In the **Advanced sharing settings** dialog box, click **Turn off network discovery**, **Turn off file and printer sharing**, and **Turn on Password protected sharing**.

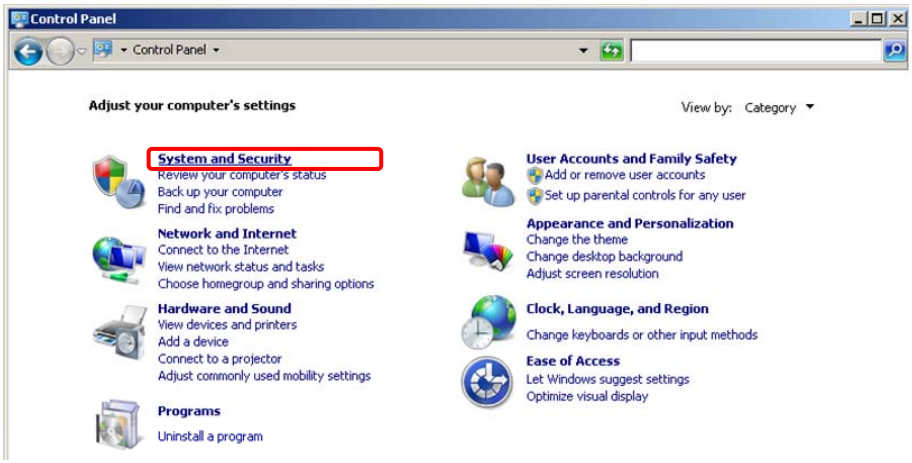


5. Click **Save changes**.

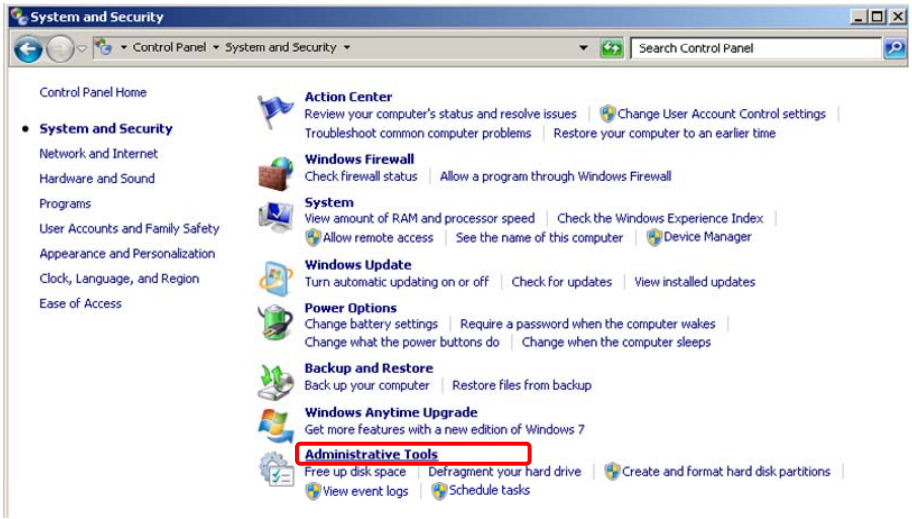
I.2.4 Changing user account for MG3710A/MG3710E/MG3740A

This section describes how to change the user account used when the MG3710A/MG3710E/MG3740A drives are mounted to network drives.

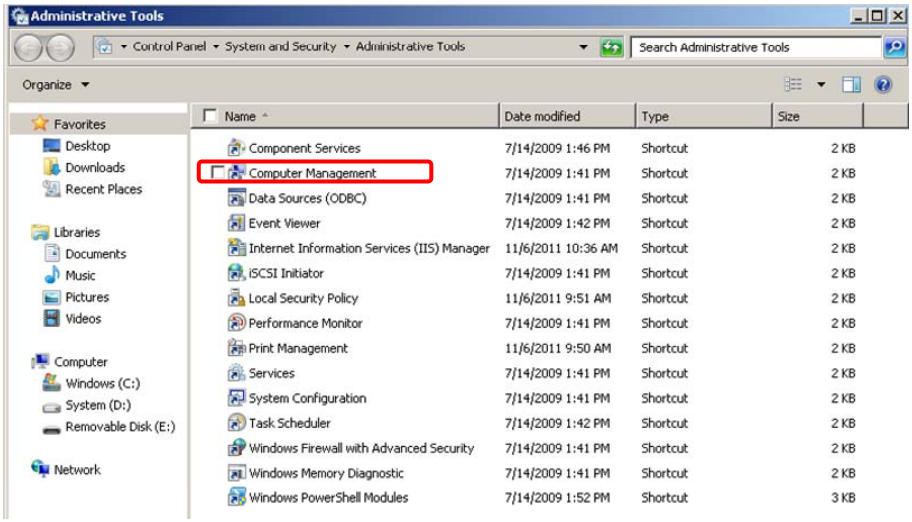
1. From the Start menu, select **Control Panel.**
2. From the **Control Panel** menu, click **System and Security**.



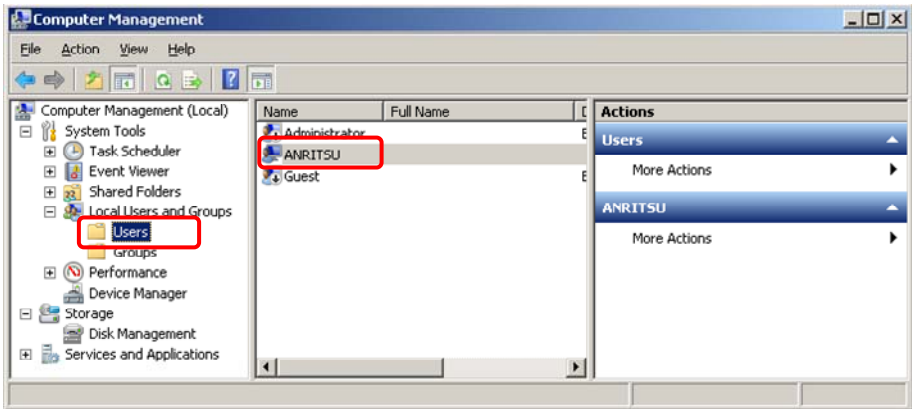
3. From the **System and Security** menu, click **Administrative Tools**.



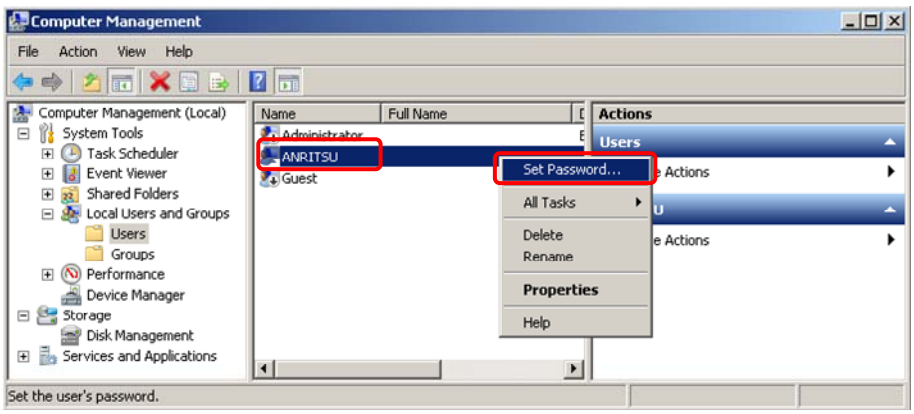
4. From the **Administrative Tools** menu, select **Computer Management**.



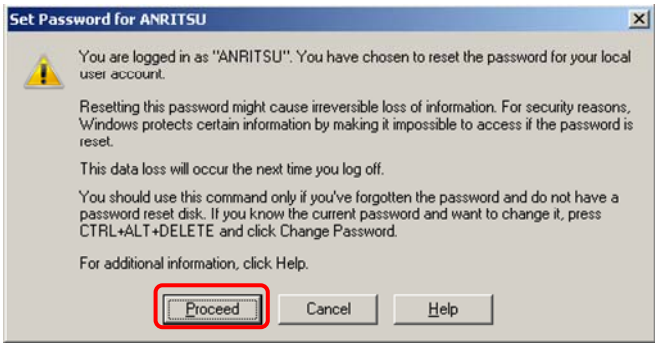
5. In the Computer Management tree, select **Users** under **Local Users and Groups**.



6. Right-click the user account **ANRITSU** to use, and select the **Set Password...**menu.



7. When the message below is shown, select **Proceed**.



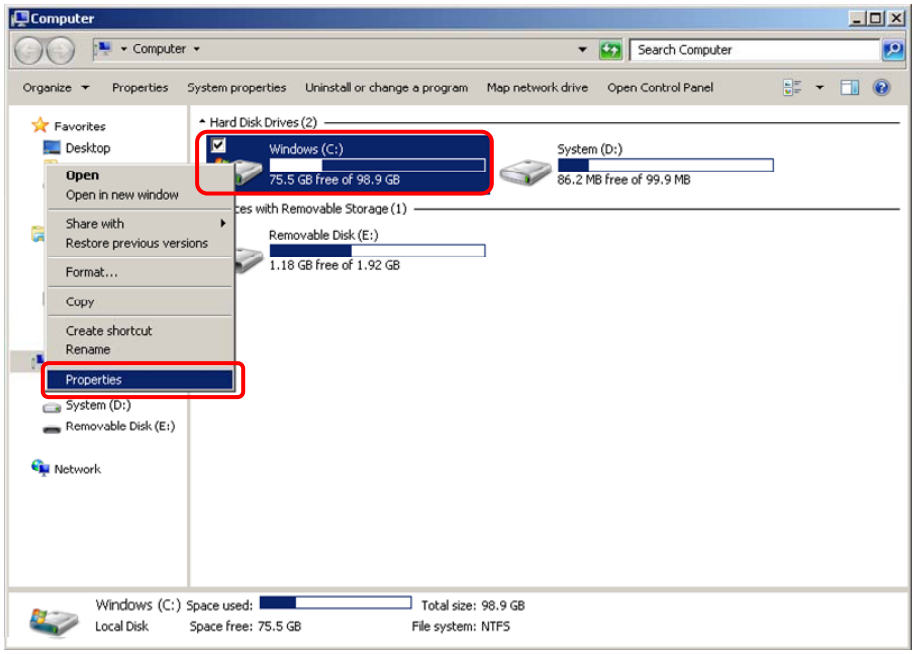
8. Type "ANRITSU" for the password of the user account **ANRITSU**.



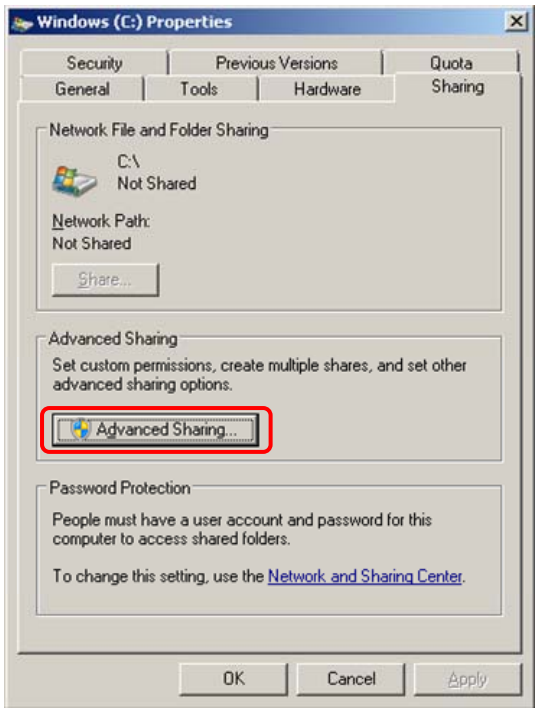
9. After setting the password, click **OK** in the dialog for confirmation.

I.2.5 Shared settings for MG3710A/MG3710E/MG3740A

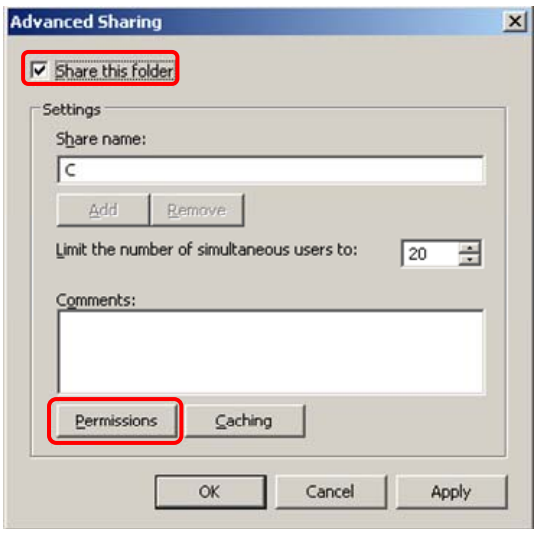
1. From the Start menu, select **Computer**.
2. Right-click the C drive and select **Properties.**



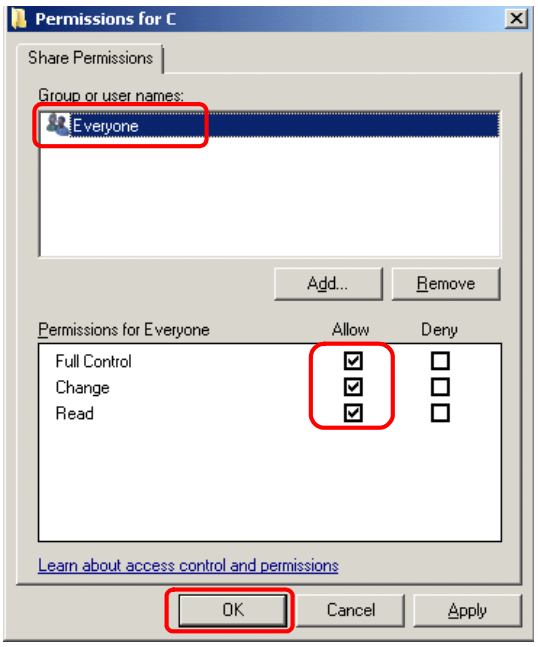
3. Select the **Sharing** tab and click the **Advanced Sharing...**button.



4. Select the **Share this folder** check box and click the **Permissions** button.



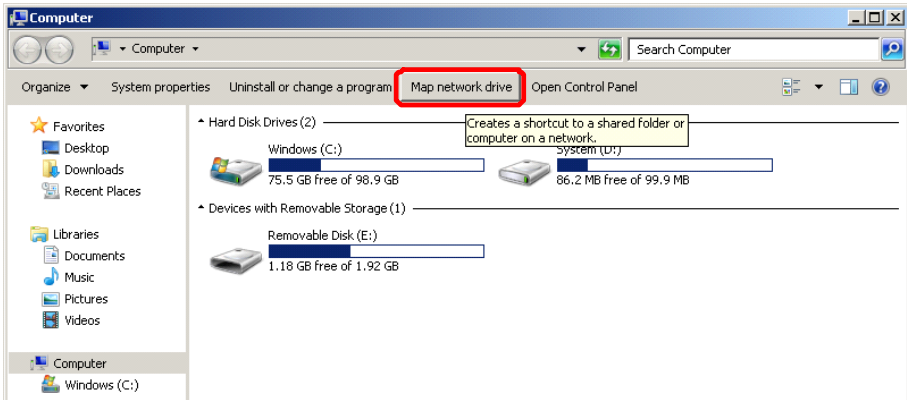
5. Make sure **Everyone** is selected, and select the **Allow** check boxes for **Full Control** and **Change**.



6. Click **OK** to close two dialogs displayed.
7. Repeat steps 2 to 7 to the D drive.

I.2.6 Mounting MG3710A/MG3710E/MG3740A drives to external PC drives

1. On the PC connected by way of the network (which is used to run the virus scanning software), mount (assign) all the shared drives of the MG3710A/MG3710E/MG3740A as network drives.
2. On the PC, click **Start** and then click **Computer**.
3. From the **Computer** menu, select **Map Network Drive**.

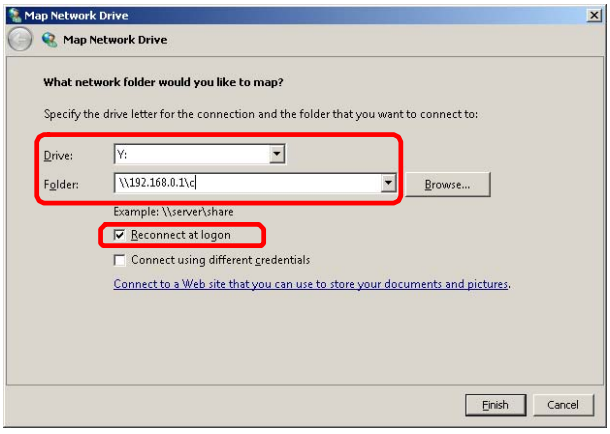


4. Enter "The IP address of MG3710A/MG3710E/MG3740A + drive name" for the folder name.

Example When the IP address of the MG3710A/MG3710E/MG3740A is 192.168.0.1:

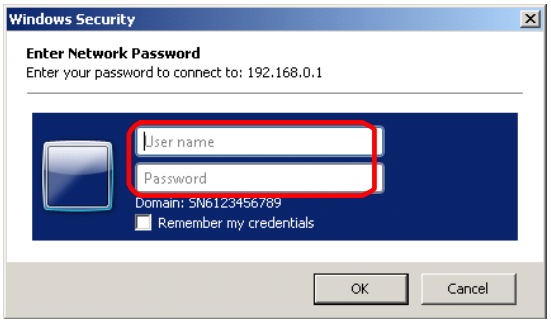
To mount the C drive, specify Y for Drive and \\192.168.0.1\c for Folder.

To mount the D drive, specify Z for Drive and \\192.168.0.1\d for Folder.



5. Select the **Connect using different credentials (C)** check box.

6. Enter “ANRITSU” for the User name, and also “ANRITSU” for the Password (as specified in Section I.2.4, Step 7).



7. Click **OK** – **Finish** to complete mounting the network drive.

8. Repeat steps 2 to 7 to the D drive.

I.2.7 Scanning for virus

Scan the network drives mounted on the external PC for viruses.

Even if network drives cannot be scanned using your software, scanning might be possible by dragging and dropping a network drive onto the virus software icon in Windows Explorer.

I.2.8 Dismounting MG3710A/MG3710E/MG3740A drives from external PC drives

1. On the PC, click **Start**. From the Start menu, right-click **Computer**.
2. Click **Disconnect Net Drive**.
3. Select the network drive to dismount, and then click **OK**.

Dismount the two mapped drives.

I.2.9 Making MG3710A/MG3710E/MG3740A drives unshared

1. From the **Start** menu, select **Computer**.
2. Right-click the C drive.
3. Select the **Sharing** tab.
4. Click the **Advanced Sharing…**button.
5. Deselect the **Share this folder** check box.
6. Repeat steps 2 to 5 to the D drive.

I.2.10 Restoring previous user account setting for MG3710A/MG3710E/MG3740A

The user account password has been changed in Section I.2.4 “Changing user account for the MG3710A/MG3710E/MG3740A” for mounting the MG3710A/MG3710E/MG3740A drives to network drives of the external PC. Restore the password before change in the same way as it was changed. Note that “anritsu” is specified by default.

I.2.11 Enabling Sharing Settings

Sharing Settings has been disabled in Section I.2.3 “Configuring shared settings” for sharing drives. To restore the original settings, enable Sharing Settings by using the following procedure:

1. On the MG3710A/MG3710E/MG3740A, click the **Start** button and then click **Control Panel**.
2. From the **Control Panel** menu, click **View network status and tasks**.
3. From the **Network and sharing Center** menu, click **Change advanced sharing settings**.
4. In the **Advanced sharing settings** dialog box, click **Turn on network discovery**, **Turn on file and printer sharing**, and **Turn off Password protected sharing**.
5. Click **Save changes**.

I.3 For Windows 10

I.3.1 Connecting External PC to MG3710A/MG3710E/MG3740A

Connect MG3710A/MG3710E/MG3740A and the external PC with LAN cable.

For details about how to set up the network for the MG3710A/MG3710E/MG3740A, refer to Appendix E “Remote Control”.

I.3.2 Checking IP address of MG3710A/MG3710E/MG3740A

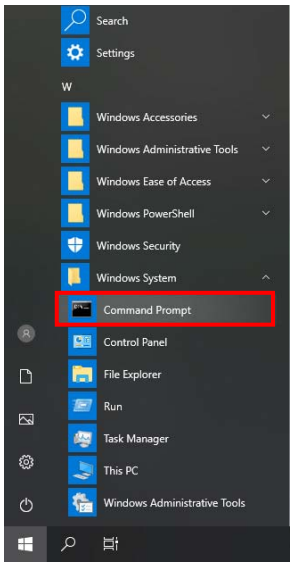
If the IP address is automatically assigned upon establishing a DHCP connection, check the IP address by using the following procedure:

1. Display the MG3710A/MG3710E/MG3740A Windows desktop.

   To display the Windows desktop, right-click anywhere on the screen and select **Show the Desktop**.

2. Display the MS-DOS Prompt. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar.

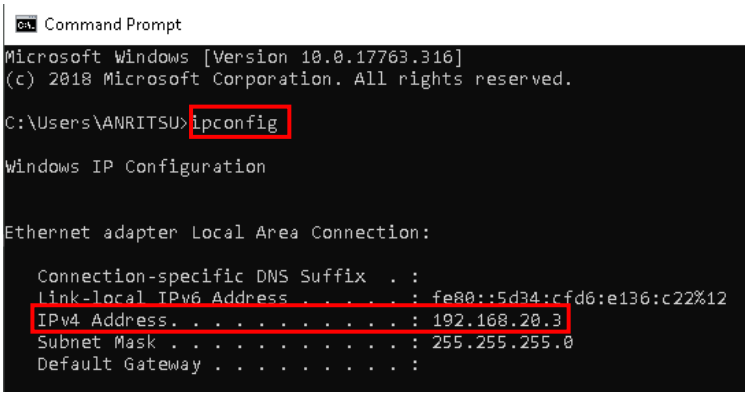
   Click the **Start** icon to open the Start menu, and then click **Windows System > Command Prompt** in the **W** column of the app list displayed.



3. Enter the following:

   `ipconfig`

   The assigned IP address displays as shown.

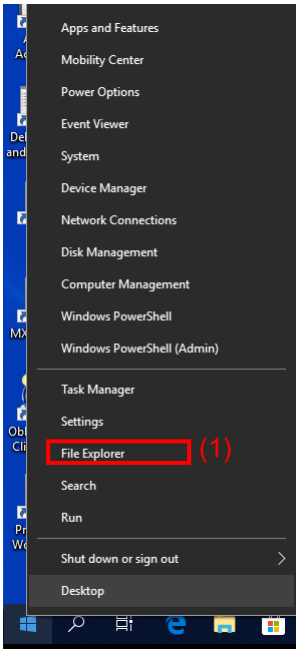


I.3.3 Configuring shared settings

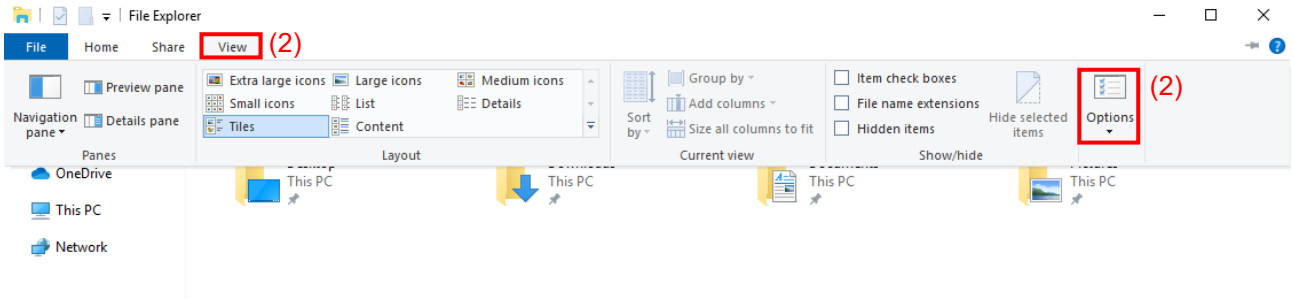
Simple File Sharing is enabled for the MG3710A/MG3710E/MG3740A by default. If authentication is performed by way of a network while Simple File Sharing is enabled, the accessing user is regarded as having a Guest account and cannot access important folders and files such as the Windows folder. To avoid this, use the following procedure to temporarily disable Simple File Sharing.

1. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar.

   Right click the **Start** icon, and then click **File Explorer**.

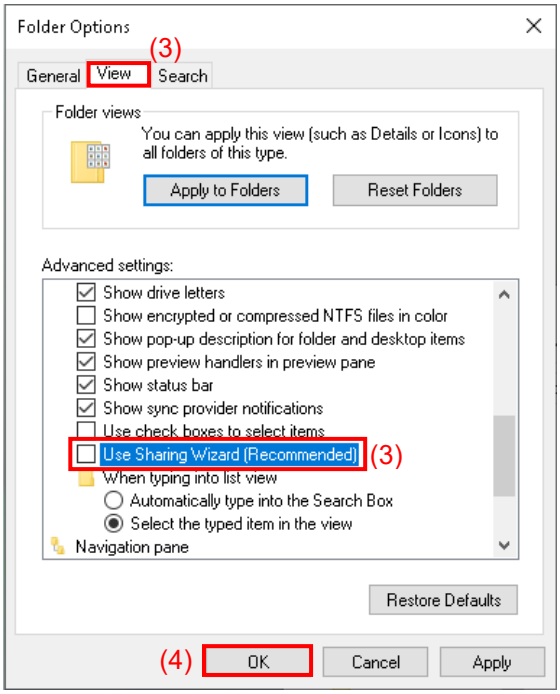


2. In **File Explorer** window, click **View** tab and then click **Options**.



3. In **Folder Options** dialog box, click **View** tab.

   Advanced Settings list, turn off **Use Sharing Wizard (Recommended)** check box.



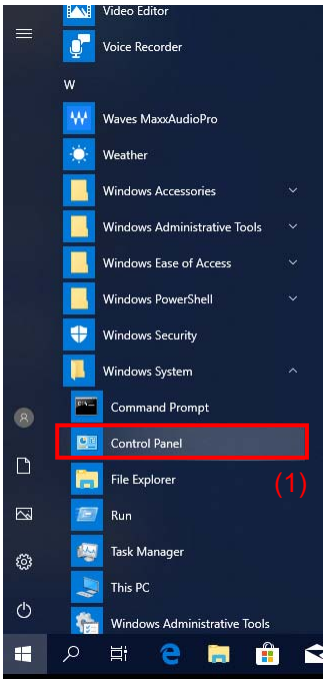
4. Click **OK**.

I.3.4 Changing user account for MG3710A/MG3710E/MG3740A

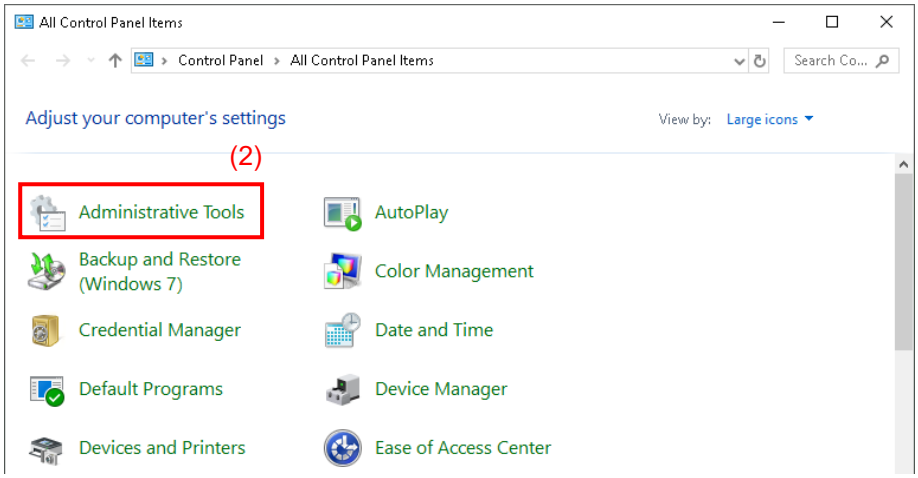
This section describes how to change the user account used when the MG3710A/MG3710E/MG3740A drives are mounted to network drives.

1. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar.

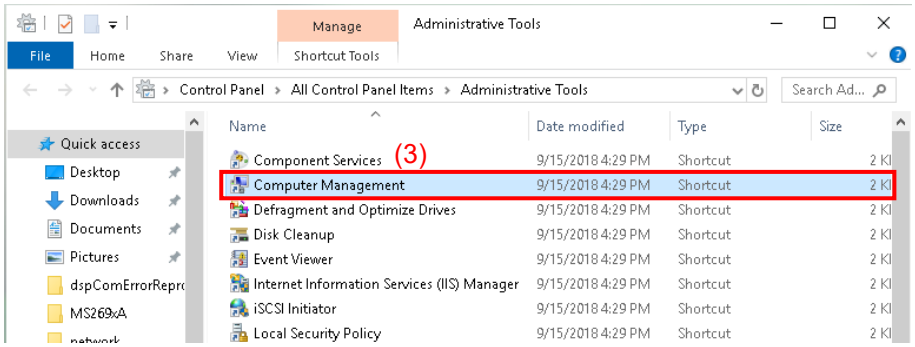
   Click the **Start** icon to open the Start menu, and then click **Windows System > Control Panel** in the **W** column of the app list displayed.



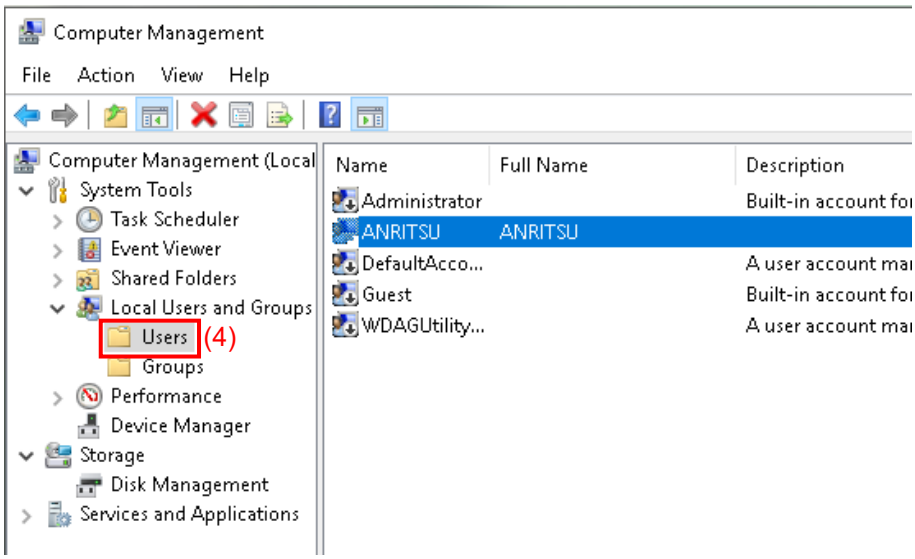
2. Click **Administrative Tools** from the Control Panel.



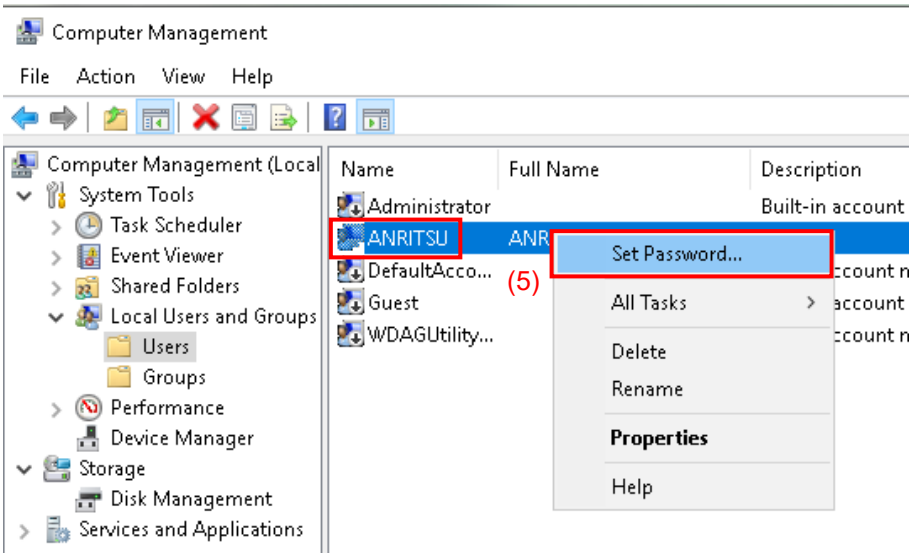
3. Click **Computer Management** in the Administrative Tools window.



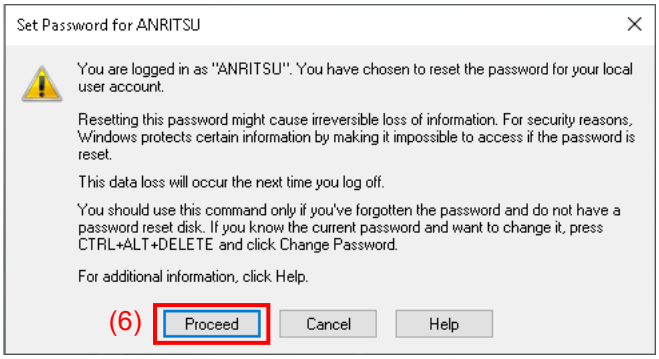
4. In Computer Management tree, click **Users** under **Local Users and Groups**.



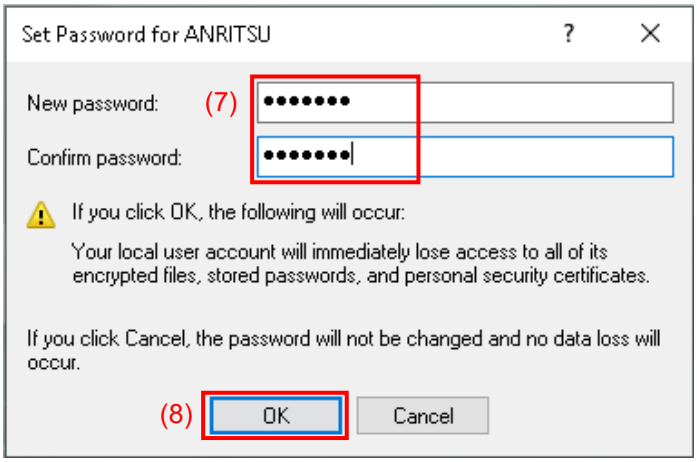
5. Right click the user account **ANRITSU** to use, and click **Set Password...**



6. When the message below is shown, click **Proceed**.



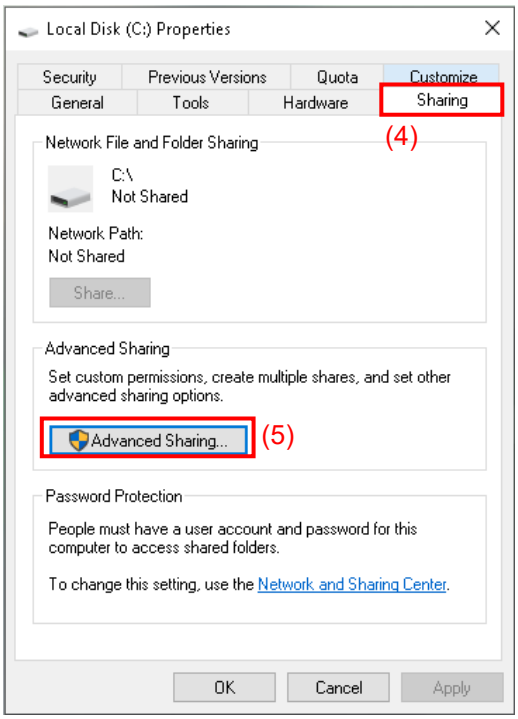
7. Type “anritsu” for the password of the user account **ANRITSU**.



8. Confirm and click **OK**.

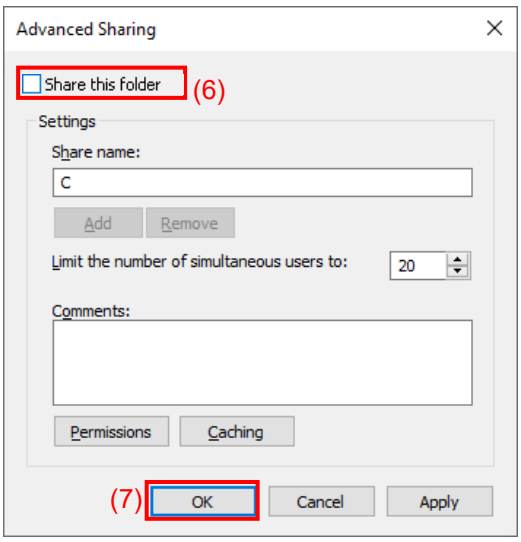
I.3.5 Shared Settings for MG3710A/MG3710E/MG3740A

1. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar. Right click the **Start** icon, and then click **File Explorer > This PC**.
2. Right-click the C drive.
3. Click **Properties**.
4. Click the **Sharing** tab.

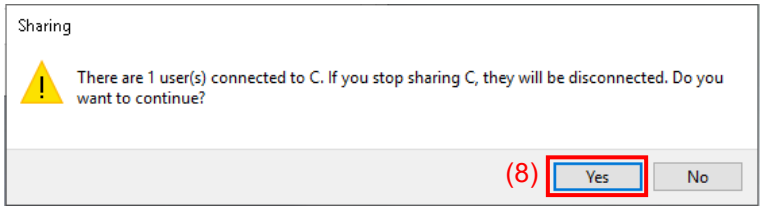


5. Click **Advanced Sharing...**

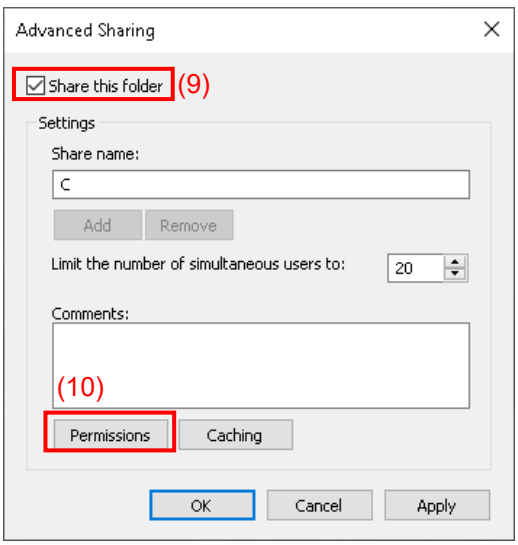
6. Turn off **Share this folder** check box to disable currently enabled folder sharing setting.



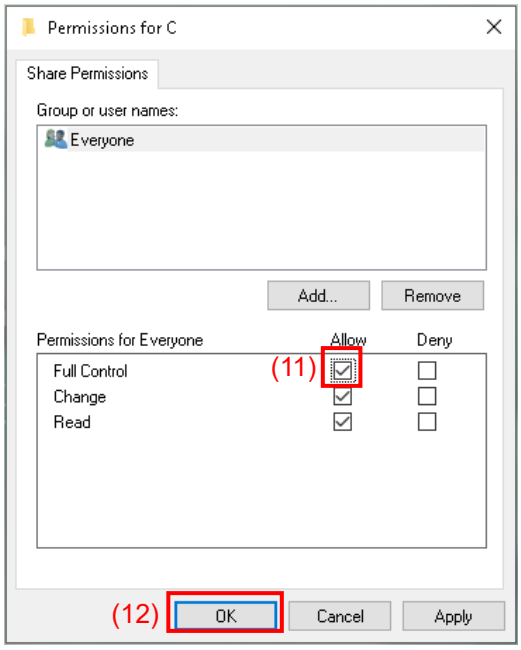
7. Click **OK**.
8. **Sharing** dialog box appears. Click **Yes**.



9. Turn on **Share this folder** check box.
10. Click **Permissions**.



11. Turn on **Allow** check box of **Full Control**.

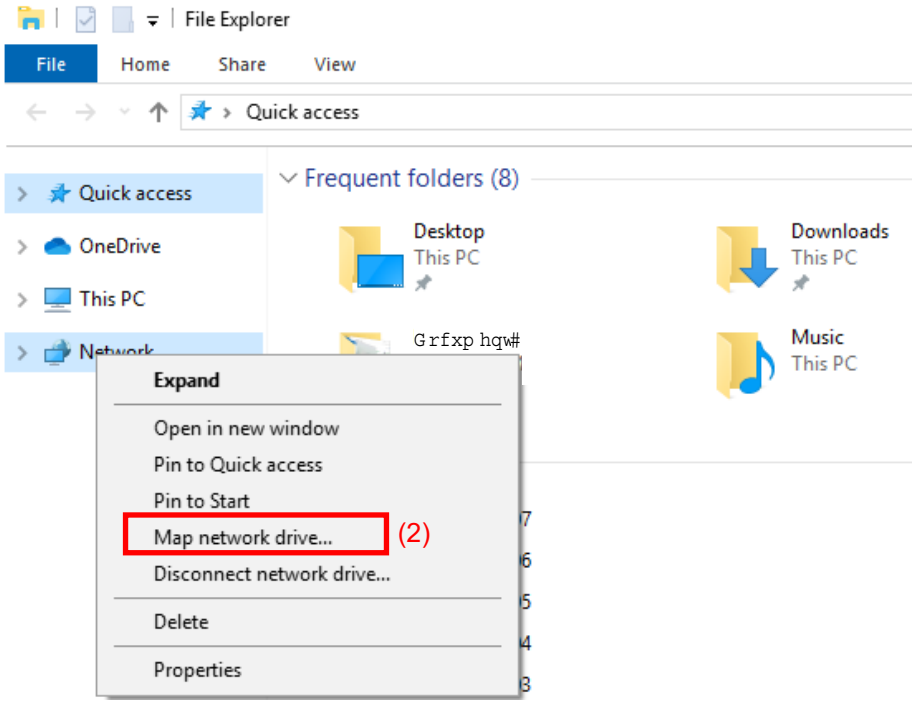


12. Click **OK** to close the two dialog boxes respectively.
13. Repeat steps 3 to 12 to the D drive.

I.3.6 Mounting MG3710A/MG3710E/MG3740A drives to the external PC drives

On the PC connected by way of the network (which is used to run the anti-virus software), mount (assign) all the shared drives of the MG3710A/MG3710E/MG3740A as network drives.

1. Right click **Start** icon of the Windows taskbar on the external PC and then click **File Explorer**.
2. Right click **Network** on the Navigation window and click **Map network drive...**

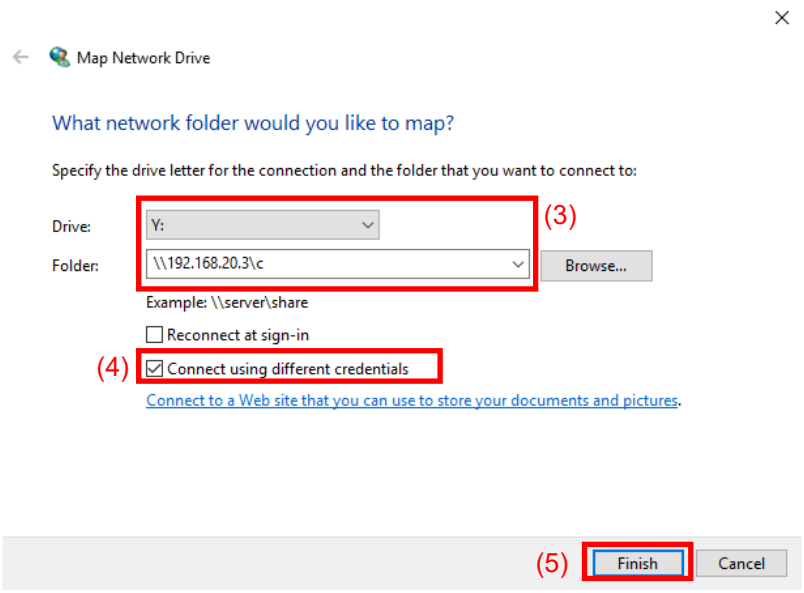


3. Enter "The IP address of MG3710A/MG3710E/MG3740A + drive name" for the folder name.

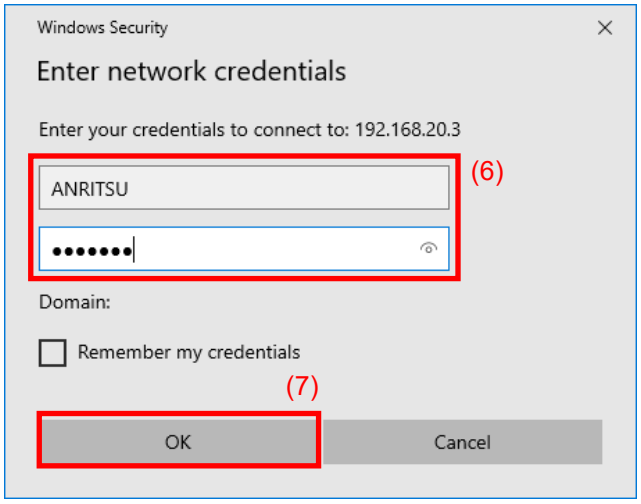
Example When the IP address of the MG3710A/MG3710E/MG3740A is 192.168.20.3:

To mount the C drive, specify Y for Drive and \\192.168.20.3\c for Folder.

To mount the D drive, specify Z for Drive and \\192.168.20.3\d for Folder.



4. Turn on **Connect using different credentials** check box.
5. Click **Finish.**
6. Enter “ANRITSU” for the User name, and also “anritsu” for the Password (as specified in I.3.4, Step 7).



7. Click **OK** > **Finish** to complete.
8. Repeat steps 2 to 7 to the D drive.

I.3.7 Scanning for virus

Scan the network drives mounted on the external PC for viruses.

I.3.8 Unmounting the equipment drives from the external PC drives

1. Right click **Start** icon of the Windows taskbar on the external PC and then click **File Explorer**.
2. Right click **Network** on the Navigation window and click **Disconnect network drive**.
3. Unmount the two mapped drives.

I.3.9 Making MG3710A/MG3710E/MG3740A drives unshared

1. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar. Right click the **Start** icon, and then click **File Explorer > This PC**.
2. Right-click the C drive.
3. Click **Properties**.
4. Click **Sharing** tab.
5. Click **Advanced Sharing**
6. Turn off **Share this folder** check box.
7. Click **OK.**
8. **Sharing** dialog box appears. Click **Yes**.
9. Repeat steps 3 to 8 to the D drive.

I.3.10 Restoring the previous user account setting for MG3710A/MG3710E/MG3740A

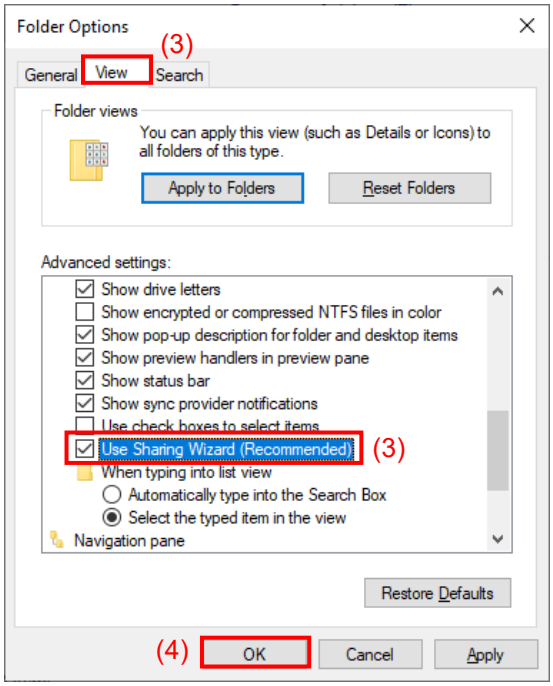
The user account password has been changed in Section I.3.4 “Changing user account for the MG3710A/MG3710E/MG3740A” for mounting the equipment drives to network drives of the external PC. Restore the password before change in the same way as it was changed. Note that the password “ANRITSU” is specified by default.

I.3.11 Enabling Simple File Sharing

Simple File Sharing has been disabled in Section I.3.3 “Configuring shared settings” for sharing drives. To restore the original settings, enable Simple File Sharing by using the following procedure:

1. On the MG3710A/MG3710E/MG3740A Windows desktop, move the mouse pointer to the bottom of the screen to display the Windows taskbar. Right click the **Start** icon, and then click **File Explorer**.
2. In **File Explorer** window, click **View** tab and then click **Options**.
3. In **Folder Options** dialog box, click **View** tab.

   From the **Advanced Settings** list, Turn on **Use Sharing Wizard (Recommended)** check box.



4. Click **OK**.

Appendix J MG3641A/42A Compatible Command

This appendix describes SCPI commands for signal generators supported by the MG3710A/MG3710E/MG3740A (hereafter "MG3710A/10E/40A").

Supported signal generators

Anritsu MG3641A/MG3642A

J.1 Basic Function Commands J-2
J.1.1 Frequency Setting J-2
J.1.2 Output Setting J-4
J.1.3 Sweep Function J-6
J.1.4 Amplitude Modulation J-8
J.1.5 Frequency Modulation J-9
J.1.6 Phase Modulation J-10
J.1.7 Modulation Signal Source J-11
J.1.8 Memory Setting J-13
J.2 System Commands J-14
J.2.1 Display Subsystem J-14
J.2.2 SCPI Commands J-15
J.2.3 IEEE 488.2 Common Commands J-16

J.1 Basic Function Commands

J.1.1 Frequency Setting

Frequency setting device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.1-1.

Table J.1.1-1 Frequency Setting Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:FREQuency[:CW] <freq>	[:SOURce[1]|2]:FREQuency[:CW|:FIXed] <freq>	Same as the compatible command
:FREQuency[:CW]?	[:SOURce[1]|2]:FREQuency[:CW|:FIXed]?	Same as the compatible command
:FREQuency[:CW]:STEP[:INCRement] <freq>	[:SOURce[1]|2]:FREQuency:STEP[:INCRement] <freq>	Same as the compatible command
:FREQuency[:CW]:STEP[:INCRement]?	[:SOURce[1]|2]:FREQuency:STEP[:INCRement] <freq>	Same as the compatible command
:FREQuency:RELative <boolean>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:REFerence:STATe <boolean>
:FREQuency:RELative?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:REFerence:STATe?
:FREQuency:OFFSet	[:SOURce[1]|2]:FREQuency:OFFSet <freq>	Same as the compatible command
:FREQuency:OFFSet?	[:SOURce[1]|2]:FREQuency:OFFSet?	Same as the compatible command
:FREQuency:SWEep RUN|STOP|PAUSE|CONT	MG3641A/MG3642A Commands can be used.	:INITiate[:IMMediate][:ALL] Available only for a function corresponding to RUN.
:FREQuency:SWEep:STARt <freq>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:STARt <freq>
:FREQuency:SWEep:STARt?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:STARt?

Table J.1.1-1 Frequency Setting Device Messages (Cont'd)

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:FREQuency:SWEep:STOP <freq>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:STOP <freq>
:FREQuency:SWEep:STOP?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:STOP?
:FREQuency:SWEep:CENTer <freq>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:CENTer <freq>
:FREQuency:SWEep:CENTer?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:CENTer?
:FREQuency:SWEep:SPAN <freq>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:SPAN <freq>
:FREQuency:SWEep:SPAN?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:FREQuency:SPAN?
:FREQuency:SWEep:STEP:SIZE	Not supported.	
:FREQuency:SWEep:STEP:SIZE?	Not supported.	
:FREQuency:SWEep:STEP:NUMBer	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:POINts Refer to the same parameter in frequency and level.
:FREQuency:SWEep:STEP:NUMBer?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:POINts? Refer to the same parameter in frequency and level.
:FREQuency:SWEep:MODE AUTO|SINGLE|MANUAL	MG3641A/MG3642A Commands can be used.	[:SOURce]:LIST:MODE AUTO|MANual Refer to the same parameter in frequency and level.
:FREQuency:SWEep:MODE?	MG3641A/MG3642A Commands can be used.	[:SOURce]:LIST:MODE? Refer to the same parameter in frequency and level.
:FREQuency:SWEep:TIME	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:DWELl Refer to the same parameter in frequency and level.

J.1.2 Output Setting

Output setting device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.2-1.

Table J.1.2-1 Output Setting Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:FREQuency:SWEep:TIME?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:DWELl? Refer to the same parameter in frequency and level.
:FREQuency:SWEep:MARKer	Not supported.	
:FREQuency:SWEep:MARKer?	Not supported.	
:FREQuency:SWEep:PATTern SIZE|NO|LOG	Not supported.	
:FREQuency:SWEep:PATTern?	Not supported.	
:FREQuency:SWEep:TYPE 0|1	Not supported.	
:FREQuency:SWEep:TYPE?	Not supported.	
:AMPLitude[:OUT]:LEVel	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude]
:AMPLitude[:OUT]:LEVel?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate][:AMPLitude]?
:AMPLitude[:OUT]:LEVel:STEP[:INCRement]	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:STEP[:INCRement]
:AMPLitude[:OUT]:LEVel:STEP[:INCRement]?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:STEP[:INCRement]?
:AMPLitude[:OUT]:UNIT	Not supported.	
:AMPLitude[:OUT]:UNIT?	Not supported.	

Table J.1.2-1 Output Setting Device Messages (Cont'd)

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:AMPLitude[:OUT]:STATe <boolean>	MG3641A/MG3642A Commands can be used.	:OUTPut[1]|2[:STATe] <boolean>
:AMPLitude[:OUT]:STATe?	MG3641A/MG3642A Commands can be used.	:OUTPut[1]|2[:STATe]?
:AMPLitude[:OUT]:CONTinuous	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:ATTenuation:AUTO
:AMPLitude[:OUT]:CONTinuous?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:ATTenuation:AUTO?
:AMPLitude[:OUT]:SAFety	Not supported.	
:AMPLitude[:OUT]:SAFety?	Not supported.	
:AMPLitude[:OUT]:VOLT EMF|TERM	MG3641A/MG3642A Commands can be used.	:UNIT[1]|2:POWer DBM|DBUV|DBUVEMF
:AMPLitude[:OUT]:VOLT?	MG3641A/MG3642A Commands can be used.	:UNIT[1]|2:POWer?
:AMPLitude[:OUT]:RELative <boolean>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:REFerence:STATe <boolean>
:AMPLitude[:OUT]:RELative?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:REFerence:STATe?
:AMPLitude[:OUT]:OFFSet <rel_ampl>	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl>
:AMPLitude[:OUT]:OFFSet?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer[:LEVel][:IMMediate]:OFFSet?
:AMPLitude[:OUT]:ISOLation <boolean>	Not supported.	
:AMPLitude[:OUT]:ISOLation?	Not supported.	
:AMPLitude[:OUT]:RPPReset	MG3641A/MG3642A Commands can be used.	:OUTPut:PROTection:RESume

J.1.3 Sweep Function

Sweep function device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.3-1.

Table J.1.3-1 Sweep Function Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:AMPLitude[:OUT]:SWEep RUN|STOP|PAUSE|CONT	MG3641A/MG3642A Commands can be used.	:INITiate[:IMMediate][:ALL] Available only for a function corresponding to RUN.
:AMPLitude[:OUT]:SWEep:STARt	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:STARt <ampl>
:AMPLitude[:OUT]:SWEep:STARt?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:STARt?
:AMPLitude[:OUT]:SWEep:STOP	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:STOP <ampl>
:AMPLitude[:OUT]:SWEep:STOP?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:POWer:STOP?
:AMPLitude[:OUT]:SWEep:CENTer	Not supported.	
:AMPLitude[:OUT]:SWEep:CENTer?	Not supported.	
:AMPLitude[:OUT]:SWEep:SPAN	Not supported.	
:AMPLitude[:OUT]:SWEep:SPAN?	Not supported.	
:AMPLitude[:OUT]:SWEep:STEP:SIZE	Not supported.	
:AMPLitude[:OUT]:SWEep:STEP:SIZE?	Not supported.	

Table J.1.3-1 Sweep Function Device Messages (Cont'd)

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:AMPLitude[:OUT]:SWEep:STEP:NUMBer	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:POINts Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:STEP:NUMBer?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:POINts? Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:MODE AUTO|SINGLE|MANUAL	MG3641A/MG3642A Commands can be used.	[:SOURce]:LIST:MODE AUTO|MANual Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:MODE?	MG3641A/MG3642A Commands can be used.	[:SOURce]:LIST:MODE? Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:TIME	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:DWELl Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:TIME?	MG3641A/MG3642A Commands can be used.	[:SOURce[1]|2]:SWEep:DWELl? Refer to the same parameter in frequency and level.
:AMPLitude[:OUT]:SWEep:MARKer <rel_ampl>	Not supported.	
:AMPLitude[:OUT]:SWEep:MARKer?	Not supported.	
:AMPLitude[:OUT]:SWEep:PATTern SIZE|NO	Not supported.	
:AMPLitude[:OUT]:SWEep:PATTern?	Not supported.	
:AMPLitude[:OUT]:SWEep:TYPE 0|1	Not supported.	
:AMPLitude[:OUT]:SWEep:TYPE?	Not supported.	

J.1.4 Amplitude Modulation

Amplitude modulation device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.4-1.

Table J.1.4-1 Amplitude Modulation Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:AM[:DEPTh] <percent>	[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear] <percent>	Same as the compatible command
:AM[:DEPTh]?	[:SOURce[1]|2]:AM[1]|2[:DEPTh][:LINear]?	Same as the compatible command
:AM:STATe <boolean>	[:SOURce[1]|2]:AM[1]|2:STATe <boolean>	Same as the compatible command
:AM:STATe?	[:SOURce[1]|2]:AM[1]|2:STATe?	Same as the compatible command
:AM:SOURce INT1|INT2|INT3|EXT1|EXT2	MG3641A/MG3642A Commands can be used. (Numeric characters will be ignored.)	
:AM:SOURce?	MG3641A/MG3642A Commands can be used.	

J.1.5 Frequency Modulation

Frequency modulation device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.5-1.

Table J.1.5-1 Frequency Modulation Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:FM[:FM1][:DEViation] <freq>	[:SOURce[1]|2]:FM[1]|2[:DEViation] <freq>	Same as the compatible command
:FM[:FM1][:DEViation]?	[:SOURce[1]|2]:FM[1]|2[:DEViation] ?	Same as the compatible command
:FM[:FM1]:STATe	[:SOURce[1]|2]:FM[1]|2:STATe <boolean>	Same as the compatible command
:FM[:FM1]:STATe?	[:SOURce[1]|2]:FM[1]|2:STATe?	Same as the compatible command
:FM[:FM1]:SOURce INT1|INT2|INT3|EXT1|EXT2	MG3641A/MG3642A Commands can be used. (Numeric characters will be ignored.)	
:FM[:FM1]:SOURce?	MG3641A/MG3642A Commands can be used.	
:FM:FM2[:DEViation] <freq>	Not supported.	
:FM:FM2[:DEViation]?	Not supported.	
:FM:FM2:STATe	Not supported.	
:FM:FM2:STATe?	Not supported.	
:FM:FM2:SOURce INT1|INT2|INT3|EXT1|EXT2	Not supported.	
:FM:FM2:SOURce?	Not supported.	

J.1.6 Phase Modulation

Phase modulation device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.6-1.

Table J.1.6-1 Phase Modulation Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:PM:STATe <boolean>	[:SOURce[1]|2]:PM:STATe <boolean>	[:SOURce[1]|2]:PULM:STATe <boolean>
:PM:STATe?	[:SOURce[1]|2]:PM:STATe?	[:SOURce[1]|2]:PULM:STATe?
:PM:IMPedance HIGH|LOW	Not supported.	
:PM:IMPedance?	Not supported.	

J.1.7 Modulation Signal Source

Modulation signal source device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.7-1.

Table J.1.7-1 Modulation Signal Source Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:LFSource:FREQuency 0|1|400HZ|1kHz	[:SOURce[1]|2]:LFSource:FREQuency <freq>	[:SOURce[1]|2]:FM[1]:INTernal:FREQuency <freq> Cannot change to 400Hz|1kHz by 0|1.
:LFSource:FREQuency?	[:SOURce[1]|2]:LFSource:FREQuency?	[:SOURce[1]|2]:FM[1]:INTernal:FREQuency?
:LFSource:FREQuency2 <freq>	[:SOURce[1]|2]:LFSource:FREQuency2 <freq>	[:SOURce[1]|2]:FM2:INTernal:FREQuency <freq>
:LFSource:FREQuency2?	[:SOURce[1]|2]:LFSource:FREQuency2?	[:SOURce[1]|2]:FM2:INTernal:FREQuency?
:LFSource:WAVeform2 SIN|TRI|SAW|SQR	[:SOURce[1]|2]:LFSource:WAVeform2 SIN|TRI|SAW|SQR	[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion:SHAPe SINE|TRIangle|SQUare|RAMP
:LFSource:WAVeform2?	[:SOURce[1]|2]:LFSource:WAVeform2?	[:SOURce[1]|2]:FM[1]|2:INTernal:FUNCtion:SHAPe?
:LFSource:FREQuency3 <freq>	Not supported.	
:LFSource:FREQuency3?	Not supported.	
:LFSource:WAVeform3 SIN|TRI|SAW|SQR	Not supported.	
:LFSource:WAVeform3?	Not supported.	
:LFSource:EXTernel:COUPling AC|DC	[:SOURce[1]|2]::LFSource:EXTernel:COUPling AC|DC	[:SOURce[1]|2]:EXTMod:COUPling DC|AC
:LFSource:EXTernel:COUPling?	[:SOURce[1]|2]:LFSource:EXTernel:COUPling?	[:SOURce[1]|2]:EXTMod:COUPling?

Table J.1.7-1 Modulation Signal Source Device Messages (Cont'd)

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:LFSource:EXTernel2:COUPling AC|DC	Not supported.	
:LFSource:EXTernel2:COUPling?	Not supported.	
:LFSource:OUTPut:LEVel	Not supported.	
:LFSource:OUTPut:LEVel?	Not supported.	
:LFSource:OUTPut:SOURce INT1|INT2|INT3|EXT1|EXT2|OFF	Not supported.	
:LFSource:OUTPut:SOURce?	Not supported.	

J.1.8 Memory Setting

Memory Setting device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.1.8-1.

Table J.1.8-1 Memory Setting Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:MEMory:RECall <ext_numeric>	Not supported.	:MMEMory:LOAD:STATe <string>[,<device>]
:MEMory:RECall:TYPE 0|1|2	Not supported.	
:MEMory:STORe <numeric>	Not supported.	:MMEMory:STORe:STATe [<string>[,<device>]]
:MEMory:SKIP	Not supported.	
:MEMory:CLEar	Not supported.	:MMEMory:DELete:STATe <filename>,<device>
:MEMory:SWEep RUN|STOP|PAUSE|CONT	Not supported.	
:MEMory:SWEep:SATRt	Not supported.	
:MEMory:SWEep:STARt?	Not supported.	
:MEMory:SWEep:STOP	Not supported.	
:MEMory:SWEep:STOP?	Not supported.	
:MEMory:SWEep:MODE AUTO|SINGLE|MANUAL	Not supported.	
:MEMory:SWEep:MODE?	Not supported.	
:MEMory:SWEep:TIME	Not supported.	
:MEMory:SWEep:TIME?	Not supported.	
:MEMory:SWEep:MARKer	Not supported.	
:MEMory:SWEep:MARKer?	Not supported.	

J.2 System Commands

J.2.1 Display Subsystem

Display subsystem device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.2.1-1.

Table J.2.1-1 Display Subsystem Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:DISPlay:STATe 0|1|2	MG3641A/MG3642A Commands can be used.	:DISPlay:ENABle ON|OFF|1|0
:DISPlay:STATe?	:DISPlay:STATe?	:DISPlay:ENABle?
:DISPlay:MENU	Not supported.	
:SYSTem:BELL <boolean>	MG3641A/MG3642A Commands can be used.	:SYSTem:BEEPer ON|OFF|0|1 No distinction between bell and alarm.
:SYSTem:BELL?	MG3641A/MG3642A Commands can be used.	:SYSTem:BEEPer? No distinction between bell and alarm.
:SYSTem:ALARm	MG3641A/MG3642A Commands can be used.	:SYSTem:BEEPer ON|OFF|0|1 No distinction between bell and alarm.
:SYSTem:ALARm?	MG3641A/MG3642A Commands can be used.	:SYSTem:BEEPer? No distinction between bell and alarm.
:SYSTem:MEMory SET|CLEAR	Not supported.	
:SYSTem:ERRor?	MG3641A/MG3642A Commands can be used.	:SYSTem:ERRor:CODe[:NEXT]?
:SYSTem:TRIGger?	Not supported.	

J.2.2 SCPI Commands

SCPI device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.2.2-1.

Table J.2.2-1 SCPI Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
:STATus:QUEStionable [:EVENt]?	MG3641A/MG3642A Commands can be used.	
:STATus:QUEStionable:CONDition?	MG3641A/MG3642A Commands can be used.	
:STATus:QUEStionable:ENABle	MG3641A/MG3642A Commands can be used.	
:STATus:QUEStionable:ENABle?	MG3641A/MG3642A Commands can be used.	
:STATus:QUEStionable:PTRansition?	MG3641A/MG3642A Commands can be used.	
:STATus:QUEStionable:NTRansition?	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation [:EVENt] ?	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation:CONDition?	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation:ENABle	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation:ENABle?	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation:PTRansition?	MG3641A/MG3642A Commands can be used.	
:STATus:OPERation:NTRansition?	MG3641A/MG3642A Commands can be used.	

J.2.3 IEEE 488.2 Common Commands

IEEE 488.2 Common Commands device messages available in MG3710A/MG3710E/MG3740A are shown in Table J.2.3-1.

Table J.2.3-1 IEEE 488.2 Common Commands Device Messages

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
*IDN?	*IDN?	
*OPC	*OPC	
*OPC?	*OPC?	
*TST?	*TST?	
*WAI	*WAI	
*CLS	*CLS	
*ESE	*ESE	
*ESE?	*ESE?	
*ESR?	*ESR?	
*SRE	*SRE	
*SRE?	*SRE?	
*STB?	*STB?	

Table J.2.3-1 Modulation Signal Source Device Messages (Cont'd)

MG3641A/MG3642A Commands	MG3710A/10E/40A Commands (MG364xA mode)	MG3710A/10E/40A Commands (SCPI mode) / Remarks
*PCS	Not supported.	
*PCS?	Not supported.	
*SAV	Not supported.	
*RCL	Not supported.	
*OPT?	Not supported.	
*RST	*RST	

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