MP1570A
SONET/SDH/PDH/ATM Analyzer
Operation Manual
Vol.1
Basic Operation SONET

15th 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-W1720AE-15.0

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

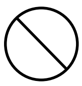
DANGER ⚠ This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

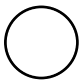
CAUTION ⚠ This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

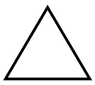
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



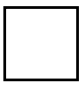
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



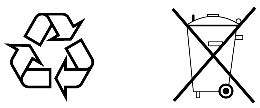
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



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.

MP1570A
SONET/SDH/PDH/ATM Analyzer
Operation Manual Vol.1 Basic Operation SONET Edition

21 February 2000 (First Edition)
14 December 2007 (15th Edition)

For Safety

WARNING ⚠

1. 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.

2. IEC 61010 Standard
   The IEC 61010 standard specifies four categories to ensure that an instrument is used only at locations where it is safe to make measurements. This instrument is designed for measurement category I (CAT I). DO NOT use this instrument at locations specified as category II, III, or IV as defined below.
   Measurement category I (CAT I):
   Secondary circuits of a device that is not directly connected to a power outlet.
   Measurement category II (CAT II):
   Primary circuits of a device that is directly connected to a power outlet, e.g., portable tools or home appliance.
   Measurement category III (CAT III):
   Primary circuits of a device (fixed equipment) to which power is supplied directly from the distribution panel, and circuits running from the distribution panel to power outlet.
   Measurement category IV (CAT IV):
   Building service-line entrance circuits, and circuits running from the service-line entrance to the meter or primary circuit breaker (distribution panel).

For Safety

WARNING ⚠

3. Laser radiation warning
   - NEVER look directly into the cable connector on the equipment nor into the end of a cable connected to the equipment. There is a risk of injury if laser radiation enters the eye.
   - The Laser Safety label is attached to the equipment for safety use as indicated in "Laser Safety" later in this section.

Electric Shock

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

Repair

WARNING ⚠

5. This equipment cannot be repaired by the operator. DO NOT attempt to remove the equipment covers or unit covers or to disassemble internal components. Only qualified service personnel with a knowledge of electrical fire and shock hazards should service this equipment. 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.

Calibration

6. 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. If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed. Be careful not to break the seal by opening the equipment or unit covers.

Falling Over

7. 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.

For Safety

WARNING ⚠

Battery Fluid

8. 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.

LCD

9. This instrument uses a Liquid Crystal Display (LCD). DO NOT subject the instrument 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.

For Safety

CAUTION ⚠

Fuse Replacement

CAUTION ⚠

1. Always remove the mains power cable from the power outlet before replacing blown fuses. There is a risk of electric shock if fuses are replaced with the power cable connected. Always use new fuses of the type and rating specified on the rear panel of the instrument. There is a risk of fire if a fuse of a different rating is used.

   10A indicate a normal fusing type fuse.

Cleaning

2. Keep the power supply and cooling fan free of dust.
   - 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

3. The maximum input levels of the optical signal are 0 dBm for MU150002A 10G input, –8 dBm for MU150002A Option 01 2.5G input, and +3 dBm for MU150017A/B input. Excessive input level can damage the internal devices and circuit.

   Before performing a self loop-back test, always install 15 dB (when MP0127A/MP0128A/MP0129A or MU150008A/MU150009A/MU150010A installed), 10 dB (when MU150002A installed), or 5 dB (when MU150017A/B installed) attenuator between the output connector and the input connector.

For Safety

Class 1, 1M indicate the danger degree of the laser radiation specified below according to IEC 60825-1:2001.

Class 1: Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Class 1M: Lasers emitting in the wavelength range from 302.5 to 4000 nm that are safe under reasonably foreseeable conditions of operation, but may be hazardous if the user employs optics within the beam. Two conditions apply:

a) for diverging beams, if the user views the laser output with certain optical instruments (for example, eye loupes, magnifiers and microscopes) within a distance of 100 mm; or

b) for collimated beams, if the user views the laser output with certain optical instruments (for example, telescopes and binoculars).

For Safety

Class I, IIa, II, IIIa, IIIb indicate the degree of danger of the laser radiation outlined below as defined by 21 CFR 1040.10:1995.

Class I: Class I levels of laser radiation are not considered to be hazardous.

Class IIa: Class IIa levels of laser radiation are not considered to be hazardous if viewed for any period of time less than or equal to 1×10^3 seconds but are considered to be a chronic viewing hazard for any period of time greater than 1×10^3 seconds. The wavelength range of laser radiating is in 400 to 710 nm.

Class II: Class II levels of laser radiation are considered to be a chronic viewing hazard. The wavelength range of laser radiating is in 400 to 710 nm.

Class IIIa: Class IIIa levels of laser radiation are considered to be, depending upon the irradiance, either an acute intrabeam viewing hazard or chronic viewing hazard, and an acute viewing hazard if viewed directly with optical instruments. The wavelength range of laser radiating is in 400 to 710 nm.

Class IIIb: Class IIIb levels of laser radiation are considered to be an acute hazard to skin and eyes from direct radiation.

CAUTION ⚠

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The use of optical instruments with this product will increase eye hazard.

For Safety

WARNING ⚠

Laser Safety

Before using this instrument, always ensure that the warning light is lit when the optical output switch is turned on.

If this warning light does not turn on, the equipment may be faulty and for safety reasons should be returned to an Anritsu service center or representative for repair.

The laser in the plug-in unit provided for this equipment is classified as Class 1, 1M according to the IEC 60825-1:2001 standard, or as Class I, IIIb according to the 21 CFR 1040.10:1995 standard.

Never use optical instruments to directly view Class 1M laser products. Doing so may result in serious damage to the eyes.

Table 1 Laser Safety Classifications Based on IEC 60825-1:2001

Model Name	Class	Max. Optical Output Power (W)*	Pulse Width (s)/ Repetition Rate	Emitted Wavelength (nm)	Laser Aperture
MP0111A	1	0.32	CW	1310	Fig. 1 [1]
MP0112A	1	1	CW	1550	Fig. 1 [2]
MP0113A	1	0.32	CW	1310	Fig. 1 [1]
		1	CW	1550	Fig. 1 [2]
MP0122B	1	0.32	CW	1310	Fig. 2, 3 [1]
MP0127A	1	0.84	CW	1310	Fig. 4, 5 [1]
MP0128A	1	0.84	CW	1550	Fig. 4, 5 [1]
MP0129A	1	0.84	CW	1310	Fig. 4, 5 [1]
		0.84	CW	1550	Fig. 4, 5 [1]
MU150001A/B	1	0.84	CW	1550	Fig. 6, 7 [1]
MU150001A/B-01/03	1	0.84	CW	1550	Fig. 6, 7 [1]
MU150001A/B-02/03	1	0.84	CW	1310	Fig. 6, 7 [1]
MU150008A	1	0.84	CW	1310	Fig. 4, 5 [1]
MU150009A	1	0.84	CW	1550	Fig. 4, 5 [1]
MU150010A	1	0.84	CW	1310	Fig. 4, 5 [1]
		0.84	CW	1550	Fig. 4, 5 [1]
MU150031A/C	1	2.75	CW	1550	Fig. 6, 7 [1]
MU150061A/B	1M	3.32	CW	1310	Fig. 6, 7 [1]

*: Indicates the possible optical output power when each and every reasonably foreseeable single-fault condition is included.

Table 2 Laser Safety Classifications Based on FDA21 CFR 1040.10:1995

Model Name	Class	Max. Optical Output Power (W) *	Pulse Width (s)/ Repetition Rate	Emitted Wavelength (nm)	Laser Aperture
MP0111A	I	0.32	CW	1310	Fig. 1 [1]
MP0112A	I	1	CW	1550	Fig. 1 [2]
MP0113A	I	0.32	CW	1310	Fig. 1 [1]
	I	1	CW	1550	Fig. 1 [2]
MP0122B	IIIb	0.32	CW	1310	Fig. 2, 3 [1]
MP0127A	IIIb	0.84	CW	1310	Fig. 4, 5 [1]
MP0128A	IIIb	0.84	CW	1550	Fig. 4, 5 [1]
MP0129A	IIIb	0.84	CW	1310	Fig. 4, 5 [1]
	IIIb	0.84	CW	1550	Fig. 4, 5 [1]
MU150001A/B	IIIb	0.84	CW	1550	Fig. 6, 7 [1]
MU150001A/B-01/03	IIIb	0.84	CW	1550	Fig. 6, 7 [1]
MU150001A/B-02/03	IIIb	0.84	CW	1310	Fig. 6, 7 [1]
MU150008A	IIIb	0.84	CW	1310	Fig. 4, 5 [1]
MU150009A	IIIb	0.84	CW	1550	Fig. 4, 5 [1]
MU150010A	IIIb	0.84	CW	1310	Fig. 4, 5 [1]
	IIIb	0.84	CW	1550	Fig. 4, 5 [1]
MU150031A/C	IIIb	2.75	CW	1550	Fig. 6, 7 [1]
MU150061A/B	IIIb	3.32	CW	1310	Fig. 6, 7 [1]

*: Indicates the possible optical output power during normal operation.

Table 3 Indication Labels on Product *(Ex: Label list)*

	Type	Sample	Affixed to:	Model Name
1	Aperture	AVOID EXPOSURE INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE	Fig. 5, 6, 7 A	MP0127A,MP0128A,MP0129A, MU150008A,MU150009A, MU150010A, MU150001A/B,MU150031A/C, MU150061A/B
2	Explanation	DANGER INVISIBLE LASER RADIATION AVOID DIRECT EXPOSURE TO BEAM MAXIMUM POWER 10 mW WAVELENGTH 1.31/1.55 μm CLASS IIIb LASER PRODUCT	Fig. 3, 5, 7 B	MP0112B, MP0127A,MP0128A,MP0129A, MU150008A,MU150009A, MU150010A MU150001A/B,MU150031A/C, MU150061A/B
3	Explanation	CLASS 1 LASER PRODUCT	Fig. 1, 2, 3, 4, 6 C	MP0111A,MP0112A,MP0113A, MP0112B, MP0127A,MP0128A,MP0129A, MU150008A,MU150009A, MU150010A, MU150001A/B,MU150031A/C, MU150061A/B
4	Certification	CERTIFICATION LABEL THIS PRODUCT CONFORMS TO ALL APPLICABLE STANDARDS UNDER 21 CFR 1040.10	Fig. 3, 5, 7 D	MP0112B, MP0127A,MP0128A,MP0129A, MU150008A,MU150009A, MU150010A, MU150001A/B,MU150031A/C, MU150061A/B
5	Identification	IDENTIFICATION LABEL ANRITSU CORP. 5-1-1,ONNA,ATSUGI-SHI KANAGAWA 243-8555,JAPAN MANUFACTURED AT:TOHOKU ANRITSU CO., LTD KORIYAMA PLANT, .20	Fig. 3, 5, 7 E	MP0112B, MP0127A,MP0128A,MP0129A, MU150008A,MU150009A, MU150010A, MU150001A/B,MU150031A/C, MU150061A/B

For Safety

Laser Radiation Markings

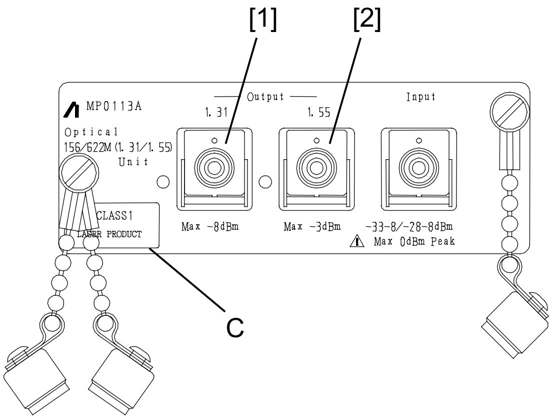


Fig. 1 Locations of Laser Beam Apertures and Affixed Labels

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit.
Please, attach it to the place, shown above.

For Safety

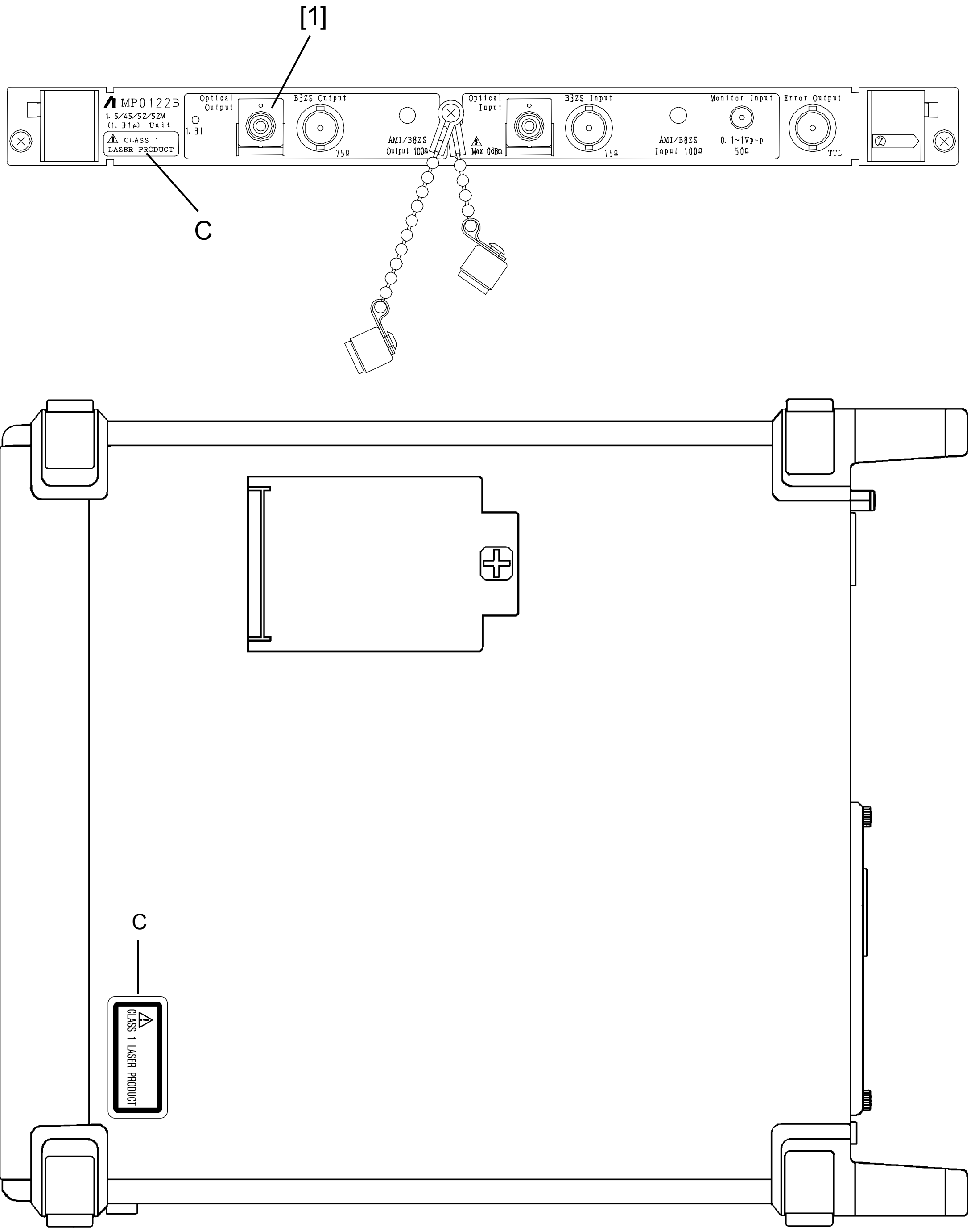


Fig. 2 MP0122B Front Panel of Unit and Top Panel of MP1570A (Products shipping besides U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit. Please, attach it to the place, shown above.

For Safety

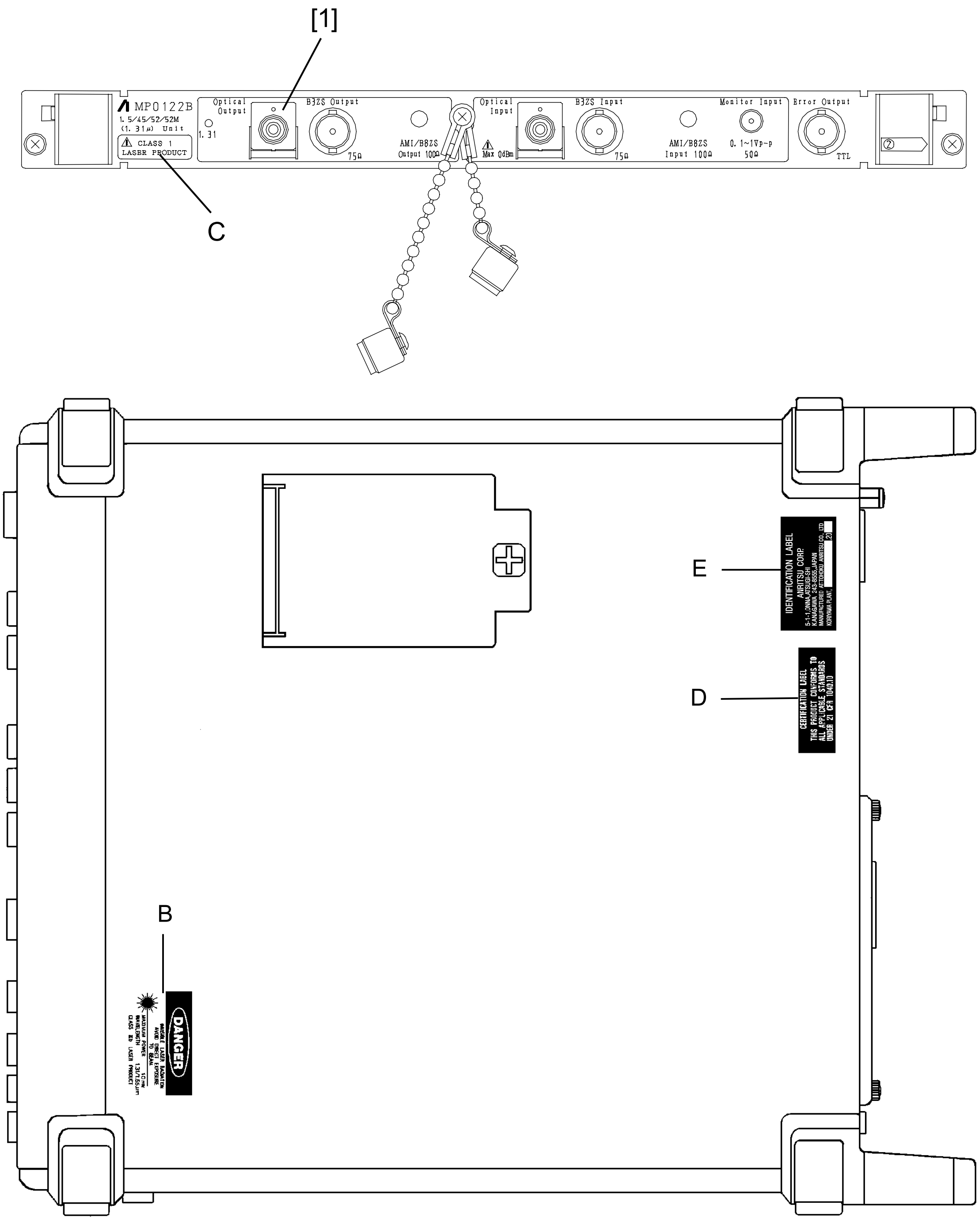


Fig. 3 MP0122B Front Panel of Unit and Top Panel of MP1570A (Products shipping to U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit. Please, attach it to the place, shown above.

For Safety

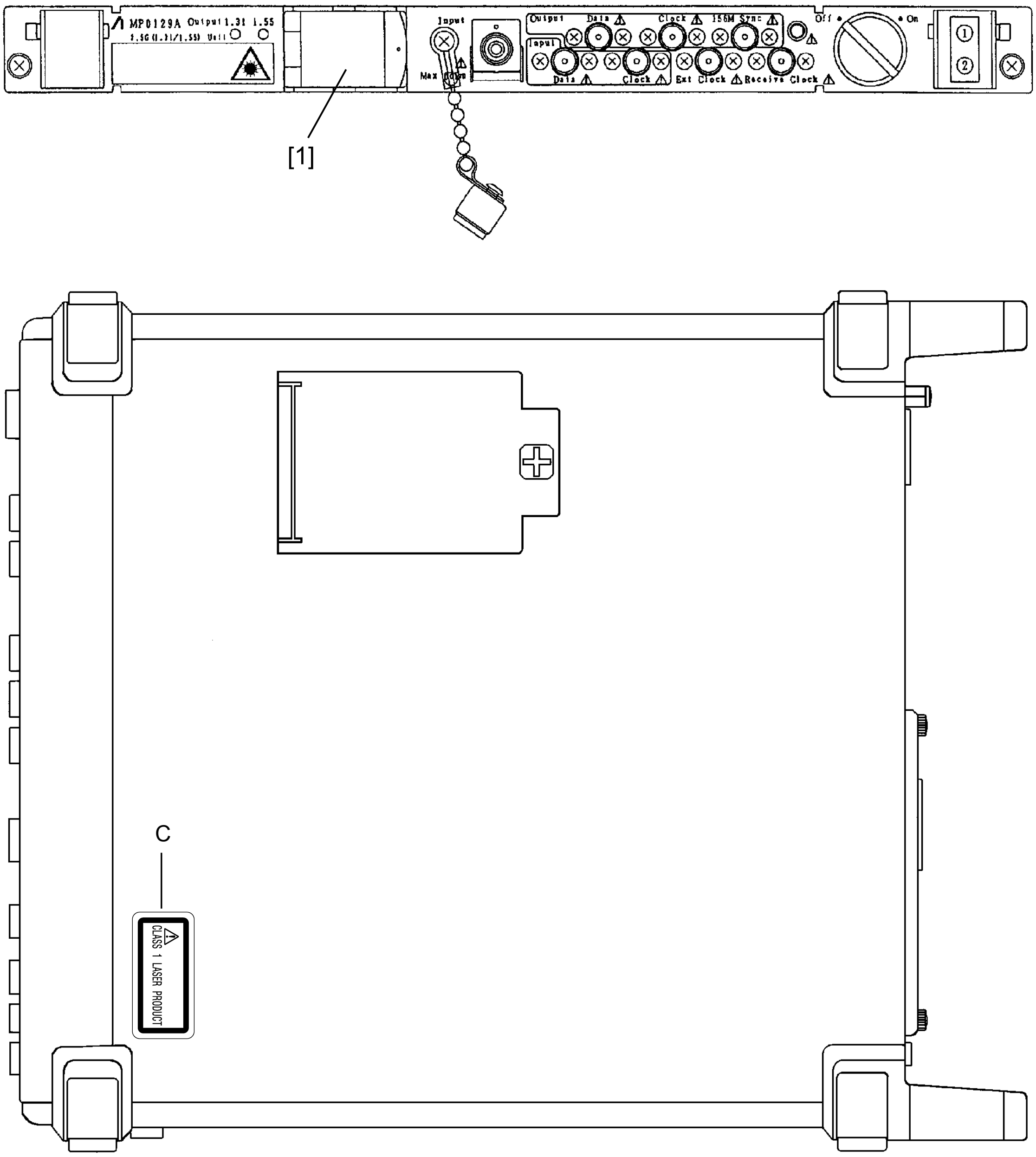


Fig. 4 MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A
Front Panel of Unit and Top Panel of MP1570A
(Products shipping besides U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit.
Please, attach it to the place, shown above.

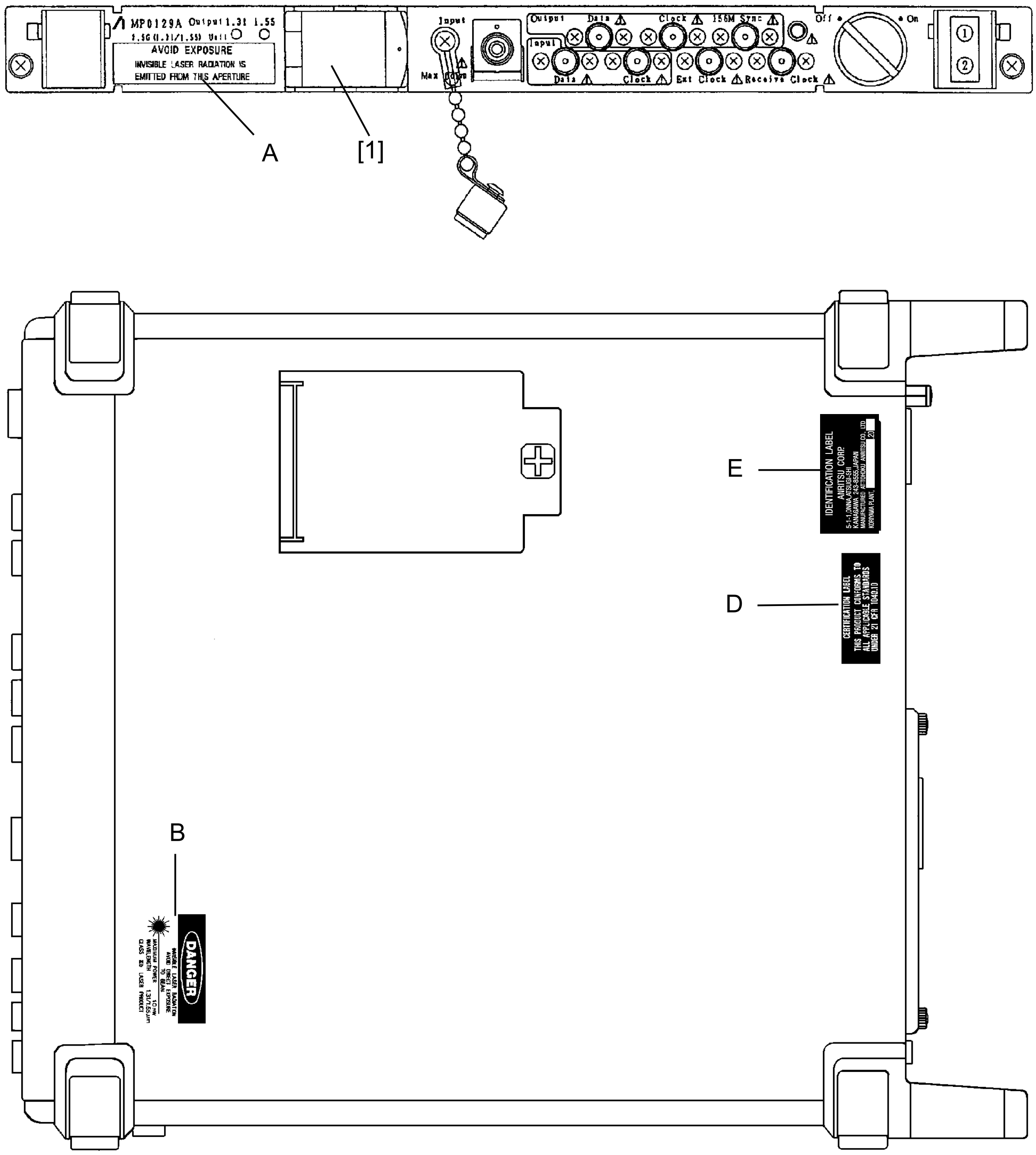
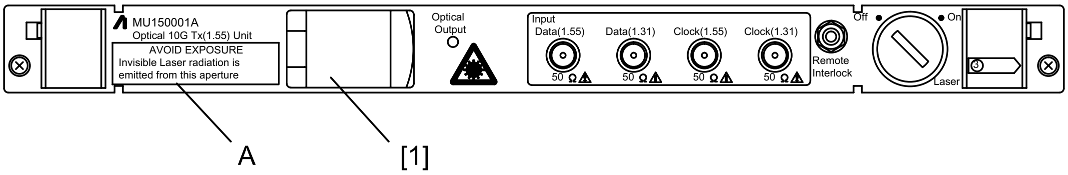


Fig. 5　MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A
Front Panel of Unit and Top Panel of MP1570A
(Products shipping to U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit.
Please, attach it to the place, shown above.



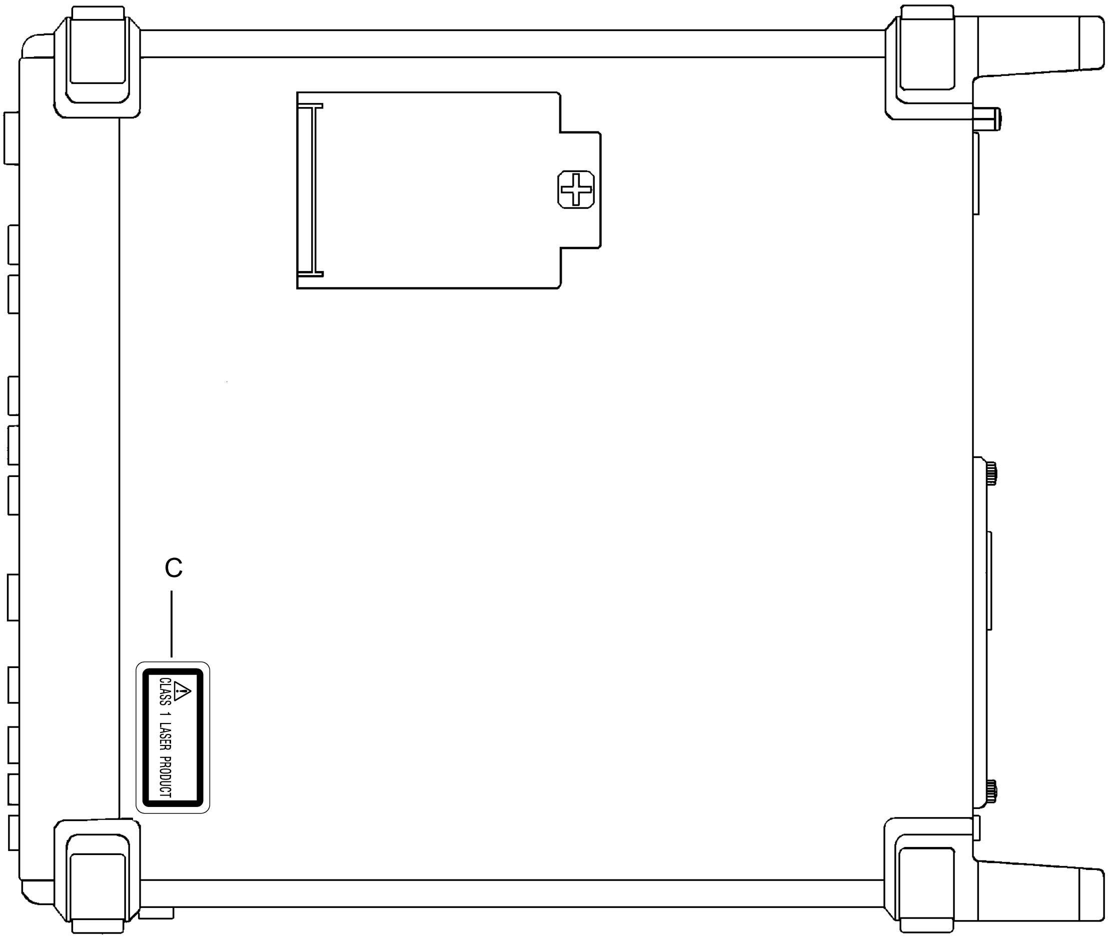


Fig. 6 MU150001A/B, MU150031A/C, MU150061A/B

Front Panel of Unit and Top Panel of MP1570A

(Products shipping besides U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit.

Please, attach it to the place, shown above.

For Safety

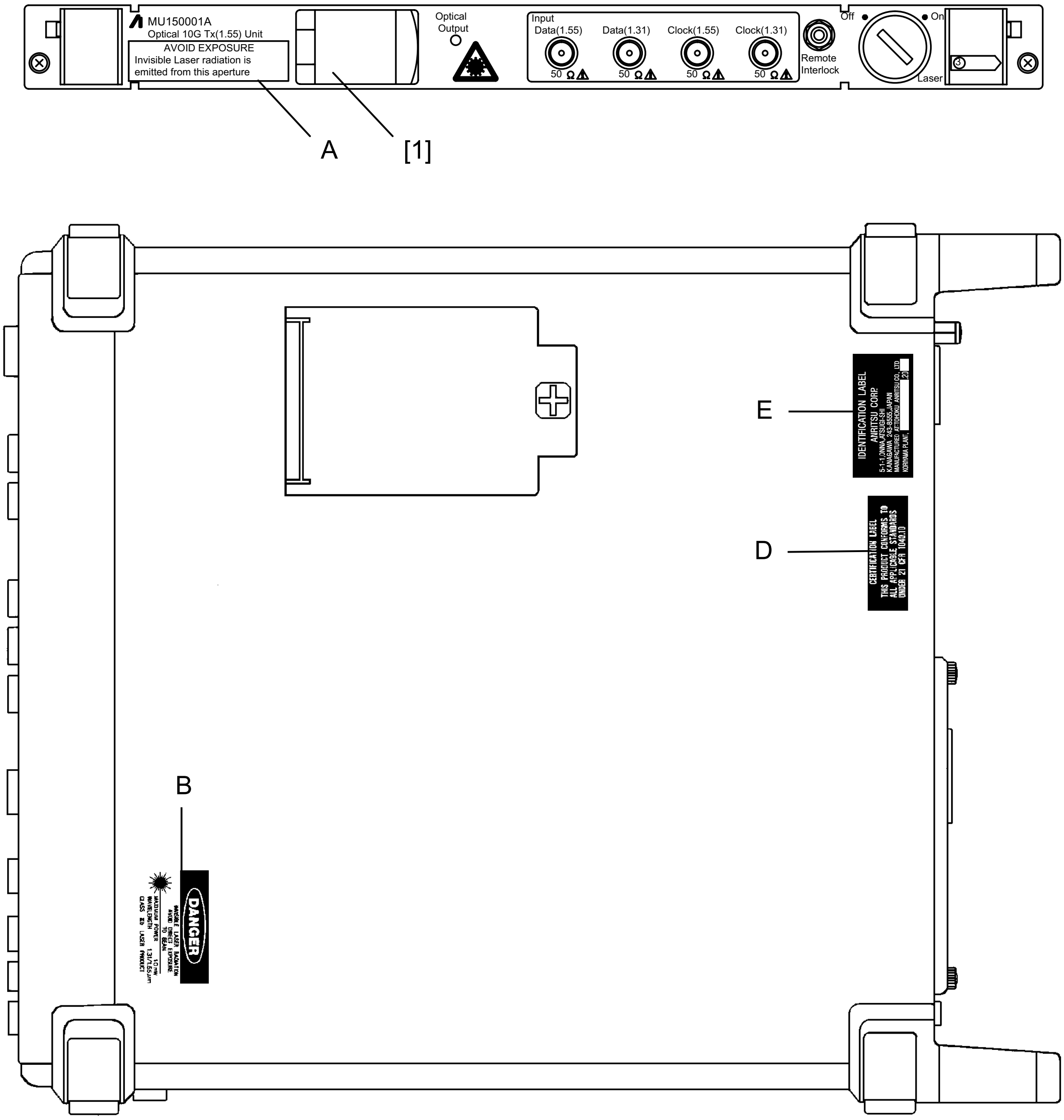


Fig. 7   MU150001A/B, MU150031A/C, MU150061A/B

Front Panel of Unit and Top Panel of MP1570A

(Products shipping to U.S.A.)

CAUTION ⚠

When only a Unit is purchased, an adhesive label is supplied with the Unit.
Please, attach it to the place, shown above.

For Safety

Security Measure Functions

The MP0127A, MP0128A, MP0129A, MU150001A/B, MU150008A, MU150009A, MU150010A, MU150031A/C, MU150061A/B are provided with the following security measure functions to prevent the possibility of infliction bodily injury on operators.

- Laser cut-off
  When the cable is disconnected from the optical output section, the protective cover closes and the laser emission stops.
- Laser output key lock
  The laser output is mainly controlled by the key switch of the laser On/Off. When the switch is set to the OFF position, the key can be removed. In this state, the laser is locked off.
- Remote control using the remote interlock connectors
  To ensure safe control of the laser output from a remote location, the laser output can be controlled using the remote interlock connectors of the Laser Output Remote Interlock section.
  When both the ends of these two connectors (white and black) are connected electrically, the laser can be emitted. When both the ends are disconnected, it is not possible to emit the laser. For the voltage of the open end, the potential is +5 V at the white connector for the black connector. The laser output can be controlled by any equipment with a 0/+5 V interface.
- Laser emission indicators
  These indicators on the optical output light while laser is being emitted.
- Laser output warning
  When the laser is set to ON, the laser emission indicator lights as a warning or 3 to 4 seconds before laser is actually emitted. The laser is not emitted during this period.

Handling

The following safety precautions should be observed when handling the MP0127A, MP0128A, MP0129A, MU150001A/B, MU150008A, MU150009A, MU150010A, MU150031A/C, MU150061A/B.

- Before installing/removing this unit in/from the main frame, always make sure the main frame power switch is set to OFF.
- Before connecting/disconnecting a cable to/from the optical output section of this unit, always be sure to set the Laser On/Off key switch to OFF.

CAUTION ⚠

Replacing Memory Back-up Battery

This equipment uses a Poly-carbomonofluoride 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.

Make sure that the output level from the MP0111A, MP0112A, MP0113A, MP0122B, MP0127A, MP0128A, MP0129A, MU150001A, MU150001B, MU150008A, MU150009A, MU150010A, MU150031A/C or MU150061A does not exceed the maximum rated input level when connecting.

The laser output is mainly controlled by the key switch of the laser On/Off. Before turning the equipment on, be sure to set the Laser On/Off key switch to OFF.

Before making the connections, make sure that the input level does not exceed the absolute maximum rating level of the equipment.
The input device may be damaged when the input level exceeds the maximum rating of MP0127A, MP0128A, MP0129A, MU150002A, MU150008A, MU150009A and MU150017A/B in particular. Before performing a self loop-back test, always insert the attached 15-dB optical attenuator between the input and output connectors for the MP0127A, MP0128A, MP0129A, MU150008A, MU150009A and MU150010A. For the MU150002A or MU150017A/B, use the 10-dB or 5-dB attenuator, respectively. The input device will be damaged if the direct output is connected by using the optical cable only.

Floppy Disk

Do not place in a dusty area.
Clean the magnetic head periodically to ensure normal operation.
Refer to the section on cleaning the head later in this manual.

Use in a residential environment

This instrument is designed for an industrial environment.
In a residential environment this instrument may cause radio interference in which case the user may be required to take adequate measures.

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, under the condition that this warranty is void when:

- The fault is outside the scope of the warranty conditions 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, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

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 injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Anritsu Corporation Contact

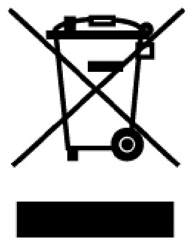
In the event that this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the CD version.

Notes On Export Management

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.
When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2002/96/EC (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.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking

1. Product Model

Model: MP1570A SONET/SDH/PDH/ATM ANALYZER

2. Applied Directive

EMC: Directive 2004/108/EC
LVD: Directive 2006/95/EC

3. Applied Standards

- EMC: Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003 (Class A)
  Immunity: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003 (Annex A)

	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 61000-4-11 (V dip/short)	B

*: Performance Criteria
A: During testing, normal performance within the specification limits.
B: During testing, temporary degradation, or loss of function or performance which is self-recovering.

Harmonic current emissions:
EN 61000-3-2: 2000 + A2: 2005 (Class A equipment)

- LVD: EN 61010-1: 2001 (Pollution Degree 2)

4. Authorized representative

Name:	Loic Metais European Quality Manager ANRITSU S.A. France
Address, city:	16/18 Avenue du Québec SILIC 720 Zone de Courtaboeuf 91951 Les Ulis Cedex
Country:	France

C-tick Conformity Marking

Anritsu affixes the C-tick mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

C-tick marking

N274

1. Product Model

Model: MP1570A SONET/SDH/PDH/ATM ANALYZER

2. Applied Standards

EMC:Emission: EN 61326: 1997 + A1: 1998 + A2: 2001 + A3: 2003
(Class A equipment)

Power Line Fuse Protection

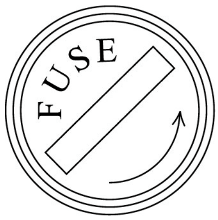
For safety, Anritsu products have either one or two fuses in the AC power lines as requested by the customer when ordering.

Single fuse: A fuse is inserted in one of the AC power lines.

Double fuse: A fuse is inserted in each of the AC power lines.

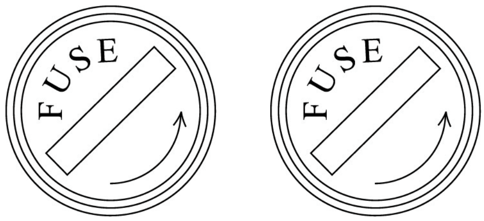
Example 1: An example of the single fuse is shown below:

Fuse Holder



Example 2: An example of the double fuse is shown below:

Fuse Holders



About MP1570A Operation Manuals

MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manuals comprise of the following eight documents. Use them properly according to the usage purpose.

Organization of MP1570A Operation Manuals

- **Vol. 1**
  - **Basic Operation SDH Edition**
    Describes the basic operation of MP1570A, PDH measurement and SDH measurements up to 622M (STM 4). (The contents of this manual are basically the same as those of 'Basic Operation SONET Edition').
  - **Basic Operation SONET Edition (this manual)**
    Describes the basic operation of MP1570A, DSn measurement and SONET measurement of up to 622M (STS12). (The contents of this manual are basically the same as those of 'Basic Operation SDH Edition'.).
- **Vol. 2**
  - **Remote Control**
    Describes the remote control and program examples using the GPIB and RS-232C interfaces. (MP1570A is compatible with SPCI).
- **Vol. 3**
  - **ATM Measurment**
    Describes the contents of screens, operation procedures and remote control for the generation and analysis of the ATM signal.
- **Vol. 4**
  - **2.5G/10G Measurement**
    Describes the contents of screens, operation procedures and remote control for the generation and analysis of 2.5G (STM16) and 10G (STM64) signals.
- **Vol. 5**
  - **Add/Drop Measurement**
    Describes the contents of screens, operation procedures and remote control for the generation and analysis of Add/Drop.
- **Vol. 6**
  - **Jitter/Wander Measurement**
    Describes the contents of screens, operation procedures and remote control for the generation and analysis of Jitter (TX)/Frequency offset and Jitter (RX).
- **Vol. 7**
  - **2.5G Jitter/Wander Measurement**
    Describes the contents of screens, operation procedures and remote control for the generation and analysis of 2.5G Jitter (TX)/Frequency offset and Jitter (RX).

Using This Operation Manual

This Operation Manual describes the following.

Operation Manual for MP1570A, Vol. 1, Basic Operation SONET Edition mainly describes the following:

(1) Basic functions of MP1570A

(2) TX and RX measurement of DSn signal.

(3) TX and RX measurements of SONET signal up to 622M (STS-12)

- This manual is meant for SONET, therefore, the user interfaces and screen displays for SONET are used in this manual.
- This manual describes the measurements of DSn and SONET signals up to 622M (STS-12). The measurement examples are based on the plug-in units and interface units listed in the table below. (For 2.5G (STS-48) and 10G (STS-192) measurements, see the Operation Manual for MP1570A, Vol. 5, 2.5G/10G Operation Manual).

Plug-in unit

Unit name	Remarks
MP0121A 2/8/34/139/156M Unit	PDH
MP0122A 1.5/45/52M Unit	DSn
MP0122B 1.5/45/52M 1.31µm Unit	DSn optical : 1.31 µm

Interface unit

Unit name	Remarks
MP0105A CMI Unit	CMI 156M type
MP0108A NRZ Unit	NRZ 156M/622M type
MP0111A Optical 156M/622M (1.31) Unit	optical : 1.31 µm 156M/622M type
MP0112A Optical 156M/622M (1.55) Unit	optical : 1.55 µm 156M/622M type
MP0113A Optical 156M/622M (1.31/1.55) Unit	optical : 1.31/1.55 µm 156M/622M type

Using This Operation Manual

Screen Names

MP1570A has 4 major screens, namely, 'Setup', 'Test menu', 'Result', and 'Analyze', and each major screen has its own subscreens. (For details, see 'Section 4 Screens and Parameter Setting').

If 'Setup' is selected as the main screen and 'Mapping' as the subscreen, see 'Setup: Mapping' screen in the manual for the explanation.

CONTENTS

CONTENTS

CONTENTS

Section 1 General

1.1 Product Outline

MP1570A SONET/SDH/PDH/ATM Analyzer is a portable error rate measuring instrument which performs quality evaluation of digital lines. It is ideal for evaluating instruments during their manufacture and installation, and for maintenance after line installation. One unit can handle SONET, SDH, PDH(DSn) and ATM as various interfaces can be selected by combining the units.

1.2 Features

The main features of MP1570A are as follows:

- Compact (W: 322 mm, H: 177 mm and D: 350 mm) and portable.
- Simple operations using a menu selection system for setting the measurement conditions.
- Equipped with a large display that is capable of displaying all errors and alarms simultaneously.
- In-service and out-of-service measurements are enabled.
- Measurements at a protected monitor point that conforms to ITU-T G. 772 are possible. In addition, tests can be performed without halting the service.
- 2/8/34/139/156/622M, 1.5/45/52M, 2.5G, 10G, or optical/electrical interface can be freely selected depending on the units to be used.
- Performance measurements that conform to ITU-T recommendations M.2100, M2101, G.821, G.826, M.2110 and M.2120 can be performed. Error and alarm statuses are recorded and displayed as bar graphs.
- A maximum of 10 setting conditions can be saved in the built-in memory, and can be retrieved easily.
- Since delay measurements are possible at all bit rates, an ADM equipped with two different interfaces can be measured precisely.
- Remote testing using the GPIB, RS-232C, or Ethernet interface is possible. The remote control commands conform to SCPI.
- Measurements at the lower TRIBUTARY are possible using the MUX/DEMUX function of up to 64 kbit/s.
- A dummy channel setting is possible.
- The APS (Automatic Protection Switch) measurement function measures the time required for switching the transmission line.
- A tandem connection measurement that conforms with ITU-T G.707is possible.

1.3 Equipment Configuration

1.3.1 Equipment Configuration with Standard Accessories

The standard configuration of MP1570A is shown in the table below.

Main unit (MP1570A)

Model	Name	Remarks
MP1570A	SONET/SDH/PDH/ATM Analyzer	

Standard accessories

Model	Name	Qty	Remarks
Z0169	Printer paper	1	5 roles
W1719AE or	MP1570A Operation Manual Vol. 1 Basic Operation SDH Edition	1	Accessory for MP1570A option 10
W1720AE	MP1570A Operation Manual Vol. 1 Basic Operation SONET Edition	1	Accessory for MP1570A option 11
W1721AE	MP1570A Operation Manual Vol. 2 Remote Control	1	
F0079	Fuse, 10A	2	
	Power supply cord 2.6m or Power supply cord 2.5m	1	
B0329G	Protective cover	1	For front panel
Z0486	Side cover	1	For side panel

1.3.2 Plug-in Unit Configuration

The table below shows the plug-in units that can be installed on MP1570A.

Model/ Order No.	Name	Remarks
MP0121A	2/8/34/139/156M Unit	
MP0122A	1.5/45/52M Unit	
MP0122B	1.5/45/52/52M(1.31) Unit	Optical 1.31 μ m
MP0123A	ATM Unit	
MP0124A	2/8/34/139M 156/622M Jitter Unit	
MP0125A	1.5/45/52M 156/622M Jitter Unit	
MP0126A	2/8/34/139M 1.5/45/52M 156/622M Jitter Unit	
MP0127A	2.5G(1.31) Unit	Optical 1.31 μ m
MU150008A	2.5G(1.31) Unit	Optical 1.31 μ m
MP0128A	2.5G(1.55) Unit	Optical 1.55 μ m
MU150009A	2.5G(1.55) Unit	Optical 1.55 μ m
MP0129A	2.5G(1.31/1.55) Unit	Optical 1.31/1.55 μ m
MU150010A	2.5G(1.31/1.55) Unit	Optical 1.31/1.55 μ m
MP0130A	2.5G Jitter Unit	
MP0131A	Add/Drop Unit	
MU150000A	2.5G/10G Unit	
MU150001A	Optical 10G Tx (1.55) Unit	Optical 1.55 μ m transmitter
MU150001B	Optical 10G Tx (1.55) Unit	Optical 1.55 μ m transmitter (for long span transmission)
MU150002A	Optical 10G Rx (Narrow) Unit	(Narrow band clock recovery) Optical receiver
MU150017A	Optical 10G Rx (Wide) Unit	(Wide band clock recovery) Optical receiver
MU150017B	Optical 2.5G/10G Rx (Wide) Unit	(Wide band clock recovery) Optical receiver

Model/ Order No.	Name	Remarks
MU150031A	Optical 10G(1.55) High Power Tx Unit	Optical 1.55 μm transmitter High Power Output
MU150031C	Optical 2.5G(1.55)/10G(1.55) High Power Tx Unit	Optical 1.55 μm transmitter High Power Output
MU150061A	Optical 10G(1.31) Tx Unit	Optical 1.31 μm transmitter
MU150061B	Optical 2.5(1.31)/10G(1.31) Tx Unit	Optical 1.31 μm transmitter

Plug-in Unit Accessories

Model	Name	Qty	Remarks
W1722AE	MP1570A Operation Manual Vol.3 ATM Measurement	1	Accessory for MP0123A
W1723AE	MP1570A Operation Manual Vol.4 2.5G/10G Measurement	1	Accessory for MP0127A/ MP0128A/ MP0129A/ MU150000A/ MU150001A/ MU150001B/ MU150002A/ MU150008A/ MU150009A/ MU150010A/ MU150017A/ MU150017B
W1724AE	MP1570A Operation Manual Vol.5 Add/Drop Measurement	1	Accessory for MP0131A
W1725AE	MP1570A Operation Manual Vol.6 Jitter Measurement	1	Accessory for MP0124A, MP0125A/MP0126A/MU150005A/MU150006A/ MP0150007A
W1726AE	MP1570A Operation Manual Vol.7 2.5G Jitter Measurement	1	Accessory for MP0130A/MU150011A

1.3.3 Interface Unit Configuration

The table below shows the interface units that can be installed on MP1570A.

Model/ Order No.	Name	Remarks
MP0105A	CMI Unit	156M
MP0108A	NRZ Unit	156/622M
MP0111A	Optical 156M/622M(1.31) Unit	Optical 1.31 μm
MP0112A	Optical 156M/622M(1.55) Unit	Optical 1.55 μm
MP0113A	Optical 156M/622M(1.31/1.55) Unit	Optical 1.31/1.55 μm

1.3.4 Application Software Configuration

Model	Name	Remarks
MX150001A	Wander (MTIE, TDEV) Measurement Application Software	for MP0124A/ MP0125A/ MP0126A-02

Application Software Accessories

Model	Name	Qty	Remarks
W1323AW	MX150001A Wander (MTIE, TDEV) Application Software Operation Manual	1	Accessory for MX150001A

Note

Make sure that all items on the configuration list are included. Contact Anritsu or one of our dealers if you find missing or damaged items.

Section 2 Preparations Before Use

This section describes precautions you need to know before use.
You should thoroughly read this section as it contains safety information and precautions for avoiding failure during operation.

2.1 Installation Site Environmental Conditions

MP1570A operates normally at ambient temperatures from 0 to 40°C. However, avoid using MP1570A at any of the following locations:

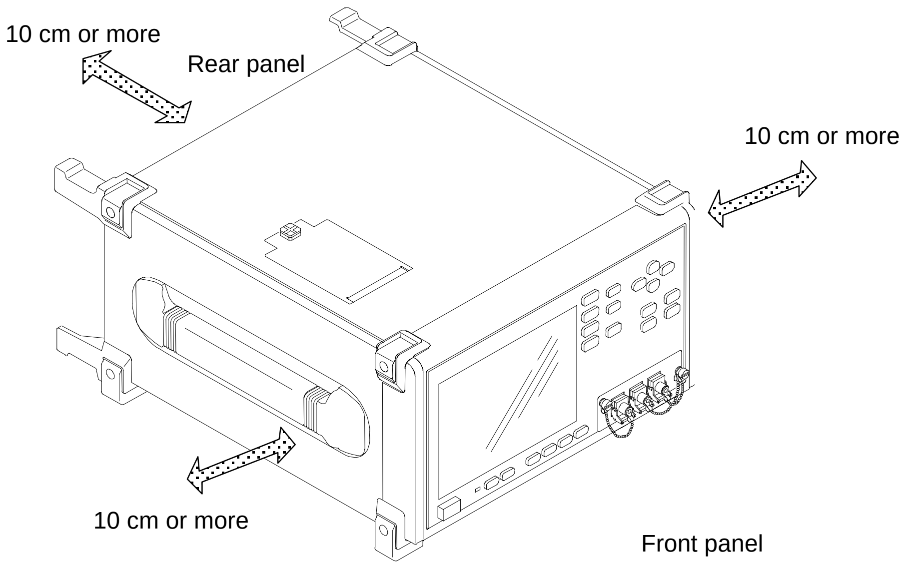
- Where there are strong vibrations
- Where there is high humidity or dust
- Where there is exposure to sunlight
- Where there is exposure to corrosive gasses
- Where there are large temperature fluctuations

CAUTION ⚠

If MP1570A is operated at a high temperature after being used for a long time at low temperature, there is a risk of short-circuiting caused by condensation. To prevent this, allow MP1570A to dry out completely before turning the power on.

2.2 Distance Between Fan Ventilation Grills and Nearby Equipment

MP1570A has a fan ventilation grill on the rear panel. The rear panel must be at least 10 cm from nearby equipment or other obstacles to allow free air circulation. Insufficient air circulation results in an increase in internal temperature and may cause component damage.



2.3 Power Voltage

The supplied power must be in the range of AC100 V to 120 V or AC200 V to 225 V and at a frequency of 47.5 Hz to 63 Hz. It is not necessary to set the unit for 100 V and 200 V series. The power consumption is 150 VA or less.

2.4 Connecting the Power Cord

Check that the power switch on the front panel is turned off (switched to the (O) side).

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

WARNING ⚠

If the power cord is connected without the instrument grounded, there is a risk of receiving a fatal electric shock. In addition, the peripheral devices connected to the instrument may be damaged.

When connecting to the power supply, DO NOT connect to an outlet without a ground terminal. Also, avoid using electrical equipment such as an extension cord or a transformer.

CAUTION ⚠

If an emergency arises causing the instrument to fail or malfunction, disconnect the instrument from the power supply by either turning off the power switch on the front panel (switch to the (O) side), or by pulling out the power cord or the power inlet.

When installing the instrument, place the instrument so that an operator may easily operate the power switch.

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

2.5 Connecting the Peripherals

Connect any peripherals, including printer, after turning on the power to MP1570A. Turning the power on after connecting the peripherals may damage MP1570A.

2.6 Connecting Other Devices

Before connecting MP1570A to other devices, confirm input and output levels.

CAUTION ⚠

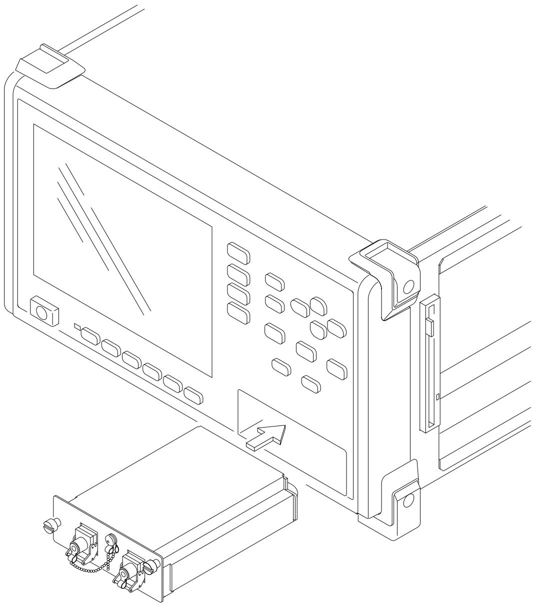
Errors and alarms may occur for the MP1570A mainframe and interface unit by ESD.

2.7 Inserting and Removing an Interface Unit

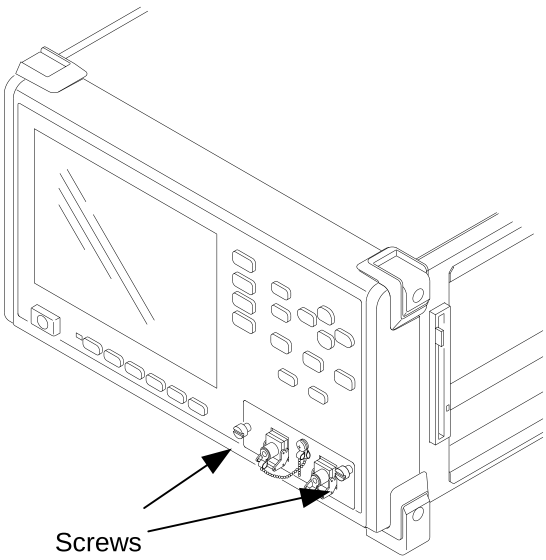
2.7.1 Inserting an Interface Unit

(1) Turn off the power switch to MP1570A.

(2) Plug in the interface unit so that the connector is firmly engaged in the slot on the front panel of the main unit.



(3) Tighten the screws on the right and left sides of the interface unit. Loose screws may cause a malfunction of the equipment.



CAUTION ⚠

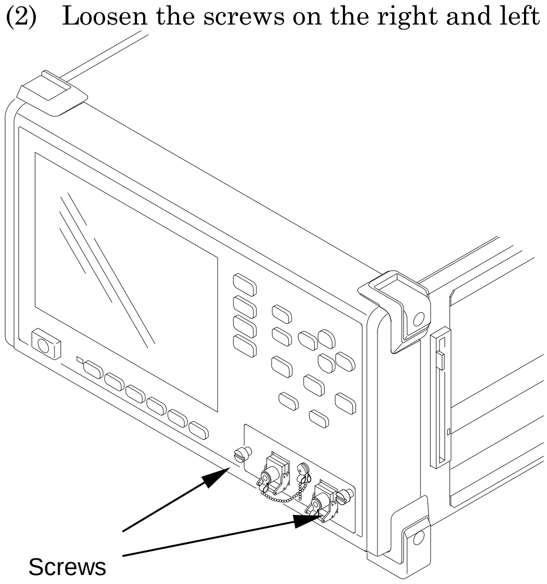
Before replacing the interface unit, make sure that the power switch of MP1570A is turned off. If an interface unit is plugged in while MP1570A is turned on, it may cause a malfunction.

Tighten the screws on the right and left sides after the interface unit is plugged in. Faulty operation will occur if the screws are loose.
If no interface unit is to be mounted, cover the slot with a blank panel.

2.7.2 Removing an Interface Unit

(1) Turn off the power to MP1570A.

(2) Loosen the screws on the right and left sides of the interface unit.



(3) Hold the screws and slowly disconnect the interface unit.

CAUTION ⚠

Before disconnecting an interface unit, make sure that the power switch of MP1570A is turned off. If an interface unit is disconnected while MP1570A is turned on, it may cause it to malfunction.

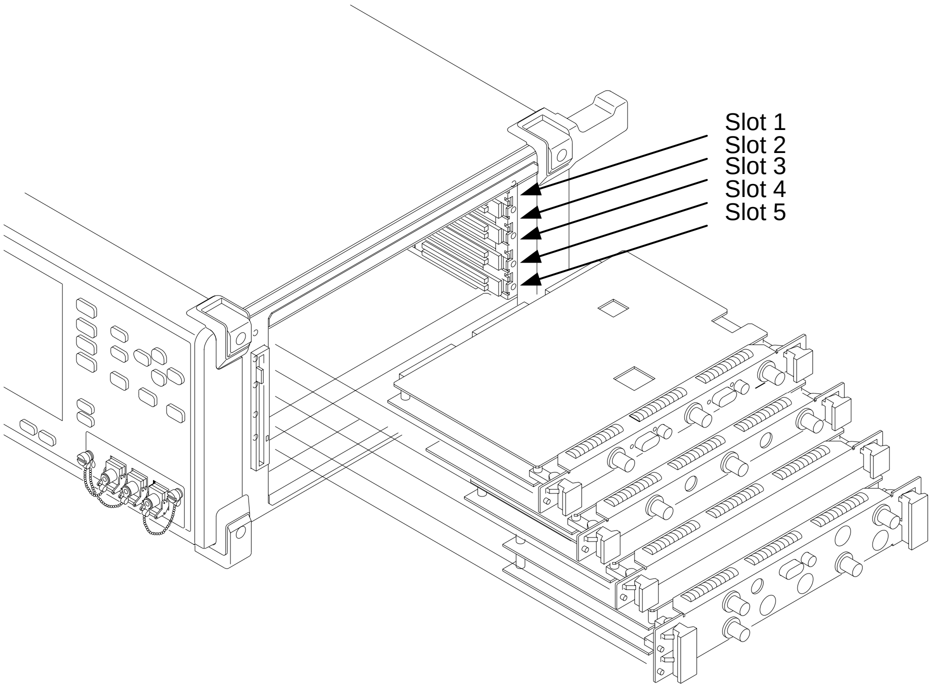
If no interface unit is to be mounted, cover the slot with a blank panel.

2.8 Inserting and Removing the Plug-in Unit

2.8.1 Inserting the Plug-in Unit

(1) Turn off the power to MP1570A.

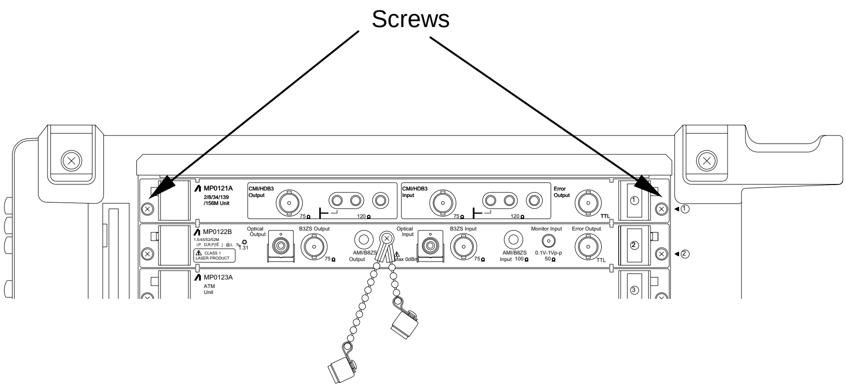
(2) Insert the plug-in unit into one of the slots on the right.



- The slot numbers from top to bottom are Slot 1, Slot 2, ... and Slot 5.
- The locations of the slots are restricted as given in the table on the next page. (A unit that is not inserted in its specified location is considered as not being mounted).

(3) Insert the unit completely along the internal guide rail.

(4) Then, tighten the screws on the right and left sides of the plug-in unit using a screwdriver.



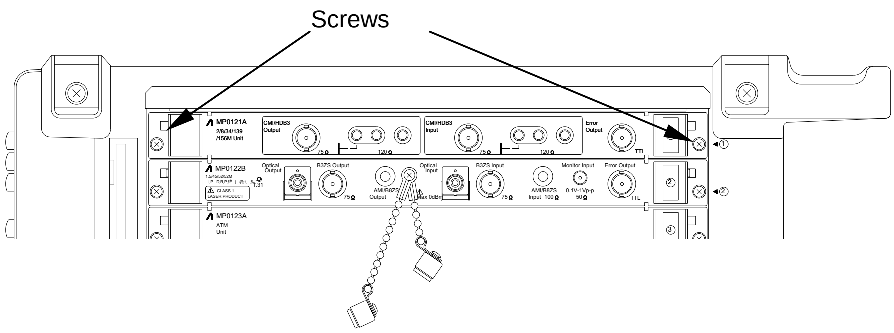
CAUTION ⚠

- When inserting a plug-in unit, make sure that the power switch is turned off. If a plug-in unit is inserted while MP1570A is turned on, it may cause it to malfunction.
- After inserting the plug-in unit, tighten the screws on the right and left sides. Faulty operation will occur if the screws are loose.
- Insert a unit into a specified slot. For the slot specifications, see '2.9 Slots for Inserting Plug-in Units.'
- A unit inserted outside its specified location is considered as not being mounted: If the Option/Revision screen is displayed, proper operation of MP1570A is not guaranteed. (see Appendix K for the Option/Revision screen).
- Do not touch the electric-component installed sections of the plug-in units to prevent them from being damaged.
- Store the unused plug-in units in the provided cases.

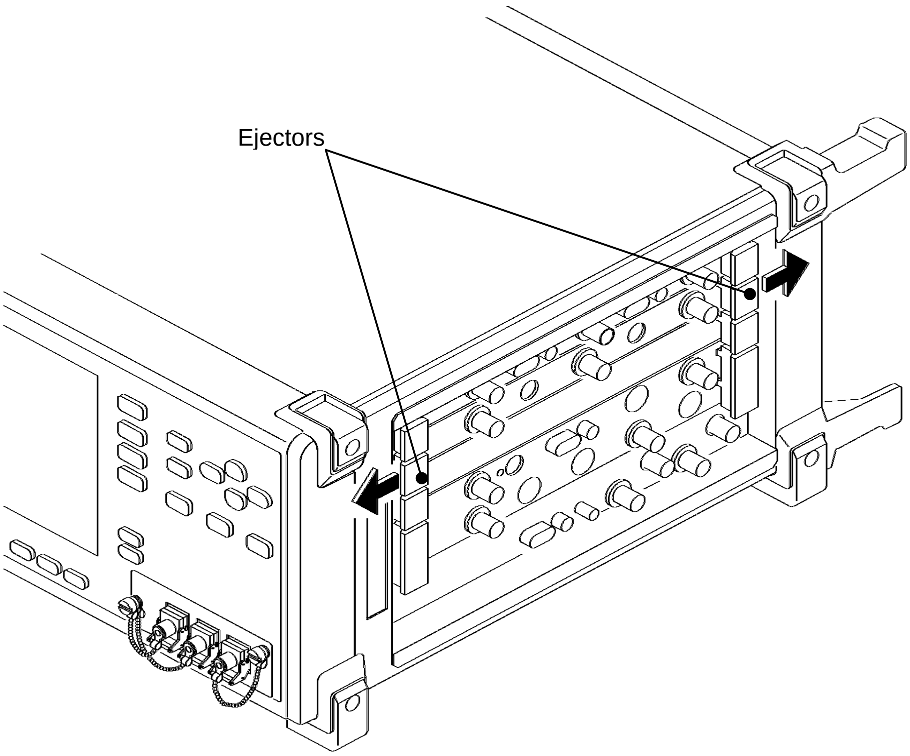
2.8.2 Removing the Plug-in Unit

(1) Turn off the power switch of MP1570A.

(2) Loosen the right and left screws of the plug-in unit to be removed.



(3) Push the ejectors outward in the direction of the arrows.



(4) Gently pull out the plug-in unit while holding the ejectors.

CAUTION ⚠

- When removing a plug-in unit, make sure that the power switch is turned off. Removal of a plug-in unit while MP1570A is turned on, may cause it to malfunction.
- Do not touch the electric-component installed sections of the plug-in units to prevent them from being damaged.
- Store the unused plug-in units in the provided cases.

2.9 Slots for Inserting Plug-in Units

The table below shows the slots where the plug-in units are to be inserted.

Slots where plug-in units are to be inserted

Unit	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
MP0121A 2/8/34/139/156M Unit	○	−	−	−	−
MP0122A 1.5/45/52M Unit	○*2	○	−	−	−
MP0122B 1.5/45/52/52M(1.31) Unit	○*2	○	−	−	−
MP0123A ATM Unit	−	−	○	−	−
MP0124A 2/8/34/139M 156/622M Jitter Unit	−	−	−	○ *1	
MP0125A 1.5/45/52M 156/622M Jitter Unit	−	−	−	○ *1	
MP0126A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit	−	−	−	○ *1	
MP0127A 2.5G(1.31) Unit	○	○	−	−	−
MP0128A 2.5G(1.55) Unit	○	○	−	−	−
MP0129A 2.5G(1.31/1.55) Unit	○	○	−	−	−
MP0130A 2.5G Jitter Unit	−	−	○	−	−
MP0131A Add/Drop Unit	○	○	−	−	−
MU150000A 2.5G/10G Unit	−	−	−	○ *1	
MU150001A Optical 10G Tx(1.55) Unit	−	−	○	−	−
MU150001B Optical 10G Tx(1.55) Unit	−	−	○	−	−
MU150002A Optical 10G Rx(Narrow) Unit	−	○	−	−	−
MU150008A 2.5G(1.31) Unit	−	○	−	−	−
MU150009A 2.5G(1.55) Unit	−	○	−	−	−
MU150010A 2.5G(1.31/1.55) Unit	−	○	−	−	−
MU150017A Optical 10G Rx(Wide) Unit	−	○	−	−	−
MU150017B Optical 2.5G/10G Rx(Wide) Unit	−	○	−	−	−

○ .... Plug-in unit can be inserted.

− .... Plug-in unit cannot be inserted.

- A blank panel can be inserted into all slots.

*1 .... Use both Slot 4 and Slot 5.

*2 .... When the MP0123A is inserted in Slot 3, Slot 1 cannot be used for insertion.

NOTE

- The MP1570A may not start up normally for some unit combination.

NOTE

- MP1570A will not operate if 2 units of MP0122A or MP0122B are inserted at the same time.

- For the unit combinations when using the MP0123A ATM unit, see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 3 ATM Operation Manual'.

- For the unit combinations when using the 2.5G unit (MP0127A, MP0128A, MP0129A, MU150008A, MU150009A or MU150010A), see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 4 2.5G/10G Operation Manual'.

- For the unit combinations when using the MP0131A Add/Drop unit, see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 5 Add/Drop Operation Manual'.

- For the unit combinations when using the Jitter unit (MP0124A, MP0125A, MP0126A, MP0130A), see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 6 Jitter Operation Manual'.

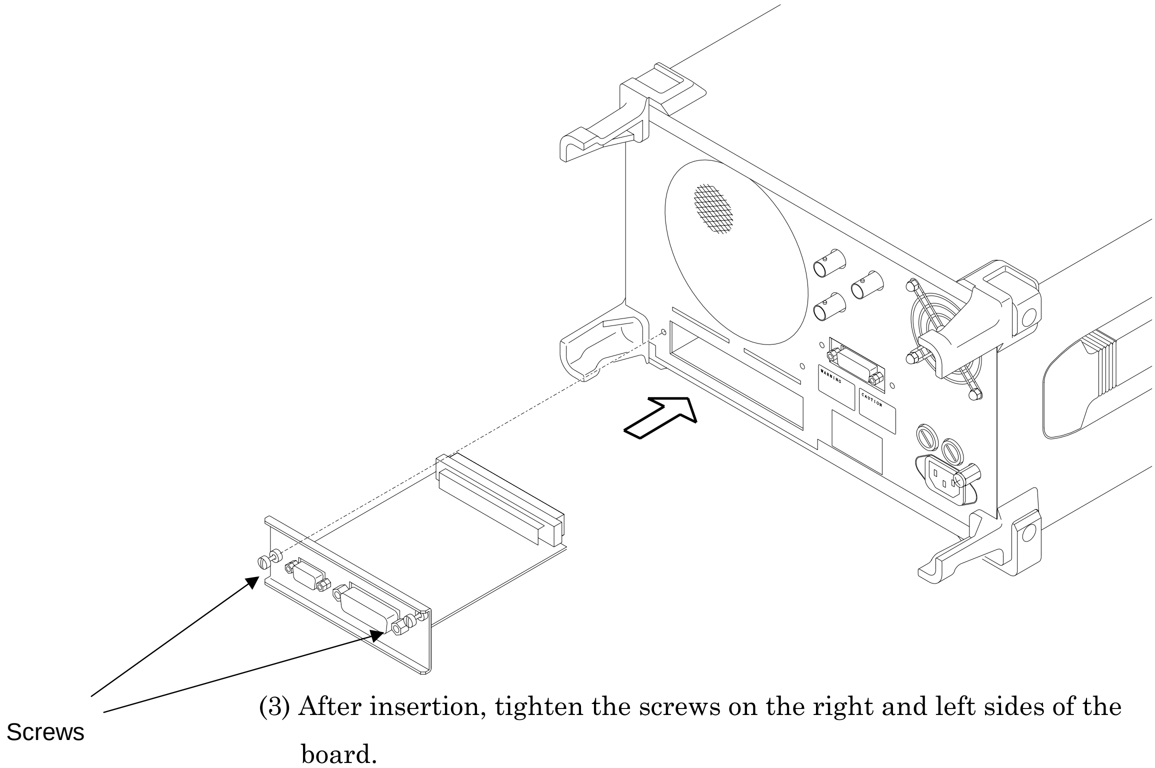
2.10 Inserting and Removing the GPIB/232C Board, Video Output Board and Ethernet Board

GPIB/232C board, Video output board and Ethernet board can be inserted into the slots on the rear panel of MP1570A. The insertion and removal methods are as follows:

2.10.1 Inserting the Boards

(1) Turn off the power switch of MP1570A.

(2) Insert the GPIB/232C board, Video output board or Ethernet board.



(3) After insertion, tighten the screws on the right and left sides of the board.

- Always insert the GPIB/232C board except when the Video output board or Ethernet board is inserted.

CAUTION ⚠

- Make sure that the power switch of MP1570A is turned off before inserting the GPIB/232C board, Video output board or Ethernet board. If a board is inserted while MP1570A is turned on, it may cause it to malfunction.
- Insert the GPIB/232C board except when the Video output board (GPIB, RS-232C) option is inserted.

2.10.2 Removing the Board

(1) Turn off the power switch of MP1570A.

(2) Loosen the screws of GPIB/232C board, Video output board or Ethernet board.

(3) Carefully remove the board.

CAUTION ⚠

- Make sure that the power switch of MP1570A is turned off before removing the GPIB/232C board, Video output board or Ethernet board. If a board is removed while MP1570A is turned on, it may cause the latter to malfunction.

- Insert the GPIB/232C board except when the Video output board or Ethernet board is inserted.

2.11 Units and Optional Items Required for Tx and Rx Signals

For sending and receiving DSn and SONET signals, the following units and optional items shown in the table below must be installed on MP1570A according to the bit rate and mapping.

2.11.1 In the case of DSn

When the sent and received signals are DSn, the plug-in units shown in the table below must be installed according to the bit rate.

Bit rate	MP0121A	MP0122A or MP0122B
2M	○	—
8M	○	—
34M	○	—
139M	○	—
1.5M	—	○
45M	—	○

○ ....Unit that must be installed.

— ....Unit that need not be installed.

Route	MP0121A	MP0122A or MP0122B	Option-08
45M-2M	○	○	○

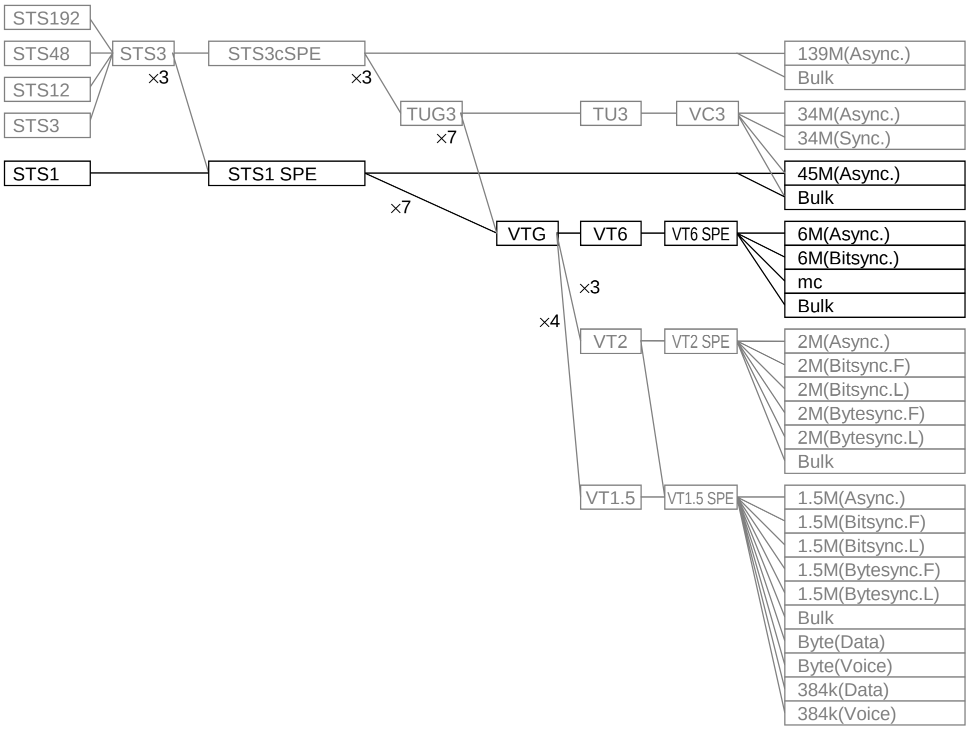
○ ....Unit and option that must be installed.

2.11.2 In the case of SONET

When the sent and received signals are SONET, the plug-in units, interface units and optional items shown in the table below must be installed according to the mapping route.

(1) STS1

(1/4)



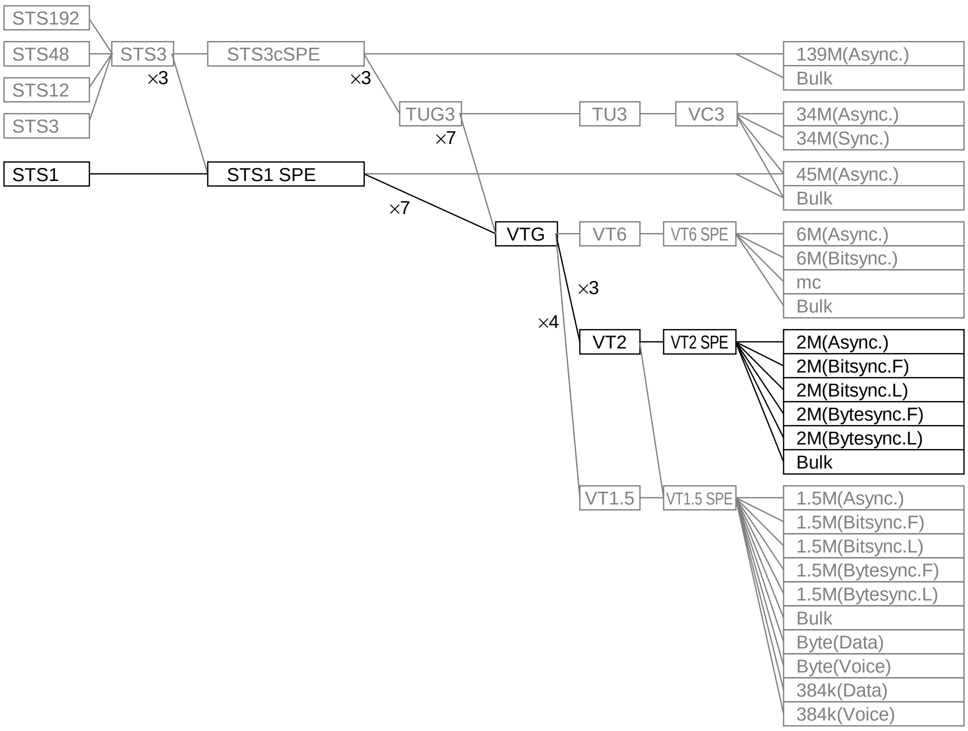
Mapping	Interface	Plug-in unit		
		MP0121A	MP0122A	MP0122B
STS1-STS1SPE-45M(Async.) STS1-STS1SPE-Bulk STS1-STS1SPE-VTG-VT6-VT6SPE-6M(Async.) STS1-STS1SPE-VTG-VT6-VT6SPE-6M(Bitsync.) STS1-STS1SPE-VTG-VT6-VT6SPE-mc STS1-STS1SPE-VTG-VT6-VT6SPE-Bulk	optical	—	—	○
	Electrical B3ZS	—	○ *1	

○ .... Unit that must be installed.

— .... Unit that need not be installed.

*1 .... Either MP0122A or MP0122B must be installed.

(2/4)



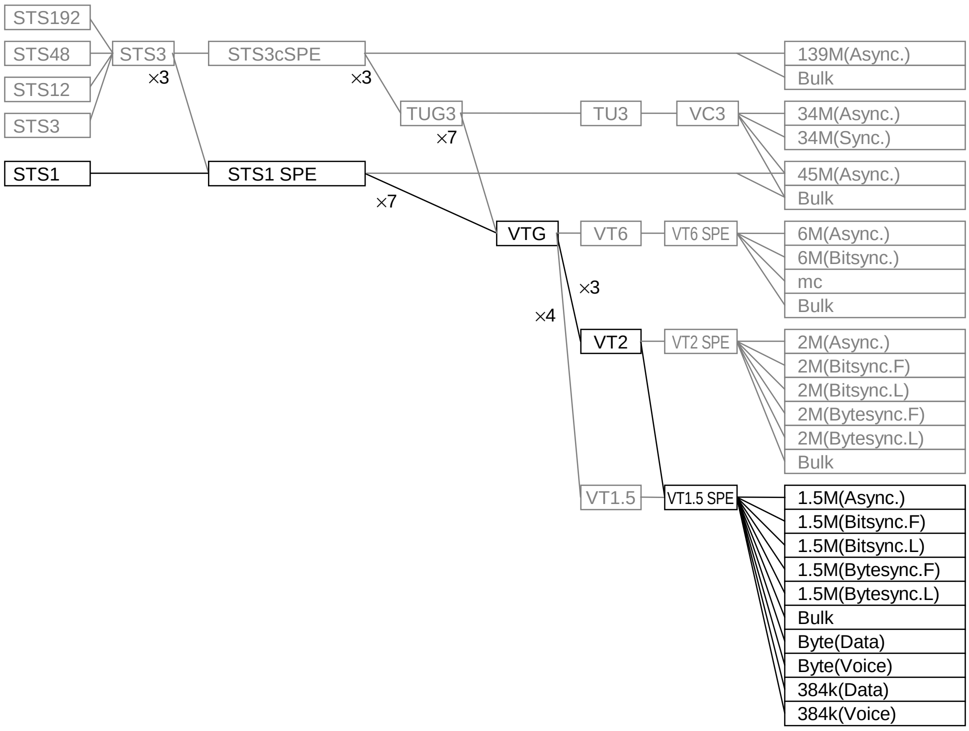
Mapping	Interface	Plug-in unit		
		MP0121A	MP0122A	MP0122B
STS1-STS1SPE-VTG-VT2-VT2SPE-2M(Async.) STS1-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.F) STS1-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.L) STS1-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.F) STS1-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.L) STS1-STS1SPE-VTG-VT2-VT2SPE-Bulk	optical	○	—	○
	Electric B3ZS	○	○ *1	

○ ....Unit that must be installed.

— ....Unit that need not be installed.

*1 ....Either MP0122A or MP0122B must be installed.

(3/4)



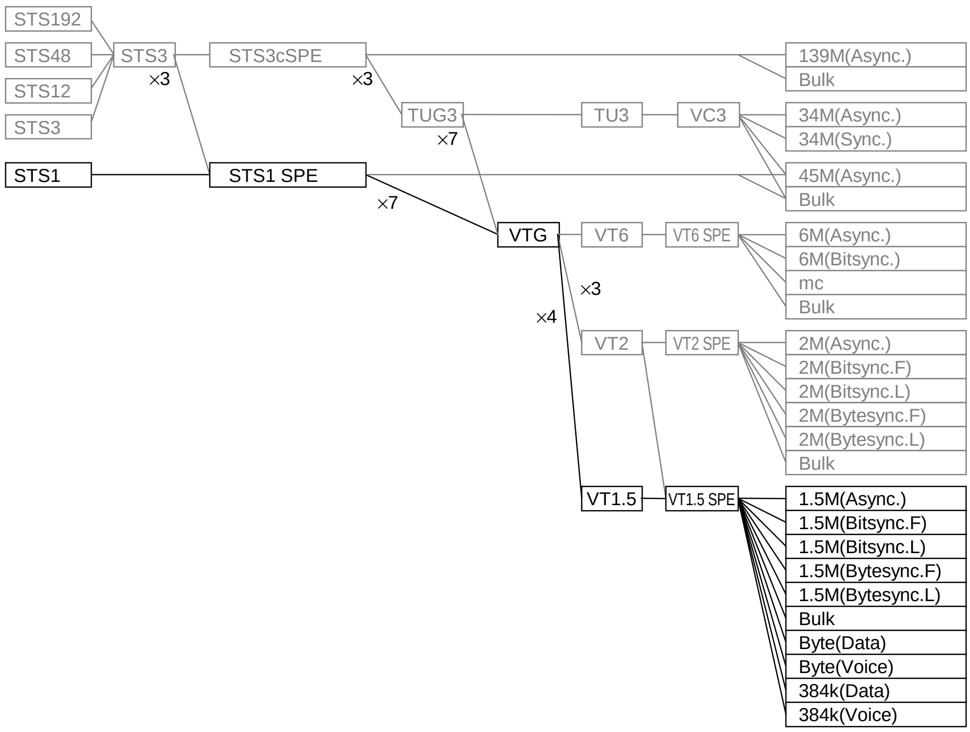
<table>
<tr><th rowspan="2">Mapping</th><th rowspan="2">Interface</th><th colspan="3">Plug-in unit</th><th rowspan="2">option
-09</th></tr>
<tr><th>MP0121A</th><th>MP0122A</th><th>MP0122B</th></tr>
<tr><td rowspan="2">STS1-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Async.)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-Bulk</td><td>optical</td><td>—</td><td>—</td><td>○</td><td>—</td></tr>
<tr><td>Electric
B3ZS</td><td>—</td><td colspan="2">○ *1</td><td>—</td></tr>
<tr><td rowspan="2">STS1-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Data)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Voice)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-384k(Data)
STS1-STS1SPE-VTG-VT2-VT1.5SPE-384k(Voice)</td><td>optical</td><td>—</td><td>—</td><td>○</td><td>○</td></tr>
<tr><td>Electric
B3ZS</td><td>—</td><td colspan="2">○ *1</td><td>○</td></tr>
</table>

○ .... Unit and option that must be installed.

— .... Unit and option that need not be installed.

*1 .... Either MP0122A or MP0122B must be installed.

(4/4)



Mapping	Interface	Plug-in unit			option -09
		MP0121A	MP0122A	MP0122B	
STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Async.) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.F) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.L) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.F) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.L) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-Bulk	optical	—	—	○	—
	Electric B3ZS	—	○ *1		—
STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-Byte(Data) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-Byte(Voice) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-384k(Data) STS1-STS1SPE-VTG-VT1.5-VT1.5SPE-384k(Voice)	optical	—	—	○	○
	Electric B3ZS	—	○ *1		○

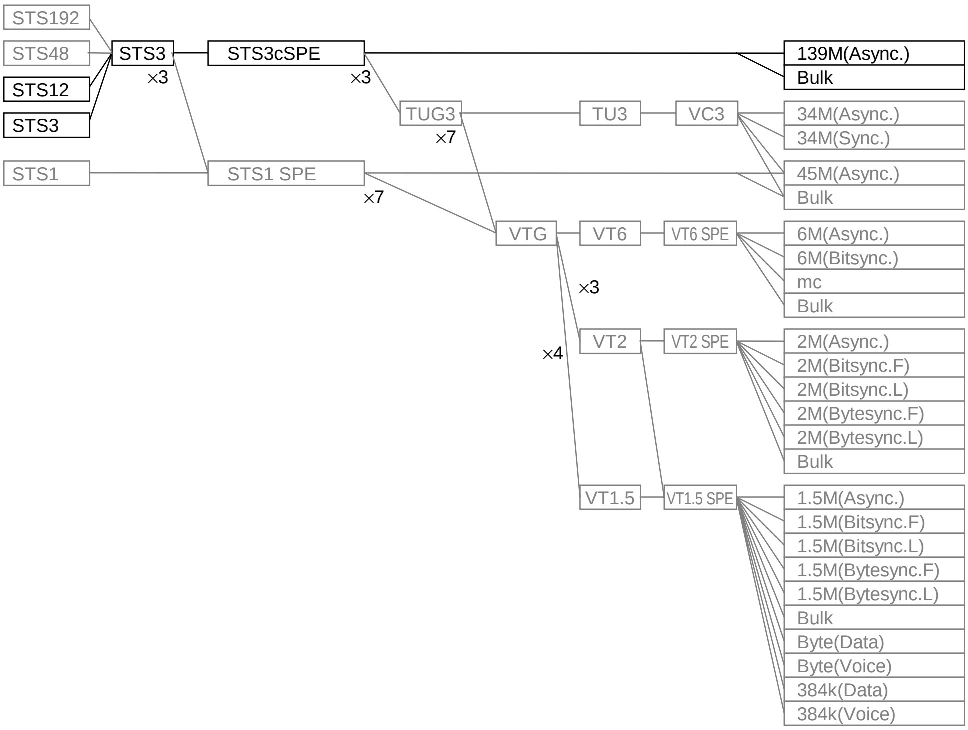
○ ....Unit and option that must be installed.

— ....Unit and option that need not be installed.

*1 ....Either MP0122A or MP0122B must be installed.

(2) STS3 / STS12

(1/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS3cSPE-139M(Async.) STS12-STS3-STS3cSPE-Bulk	optical	○	—	—	—	○
	NRZ	○	—	—	○	—
STS3-STS3-STS3cSPE-139M(Async.) STS3-STS3-STS3cSPE-Bulk	optical	○	—	—	—	○
	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ ..... Unit that must be installed.

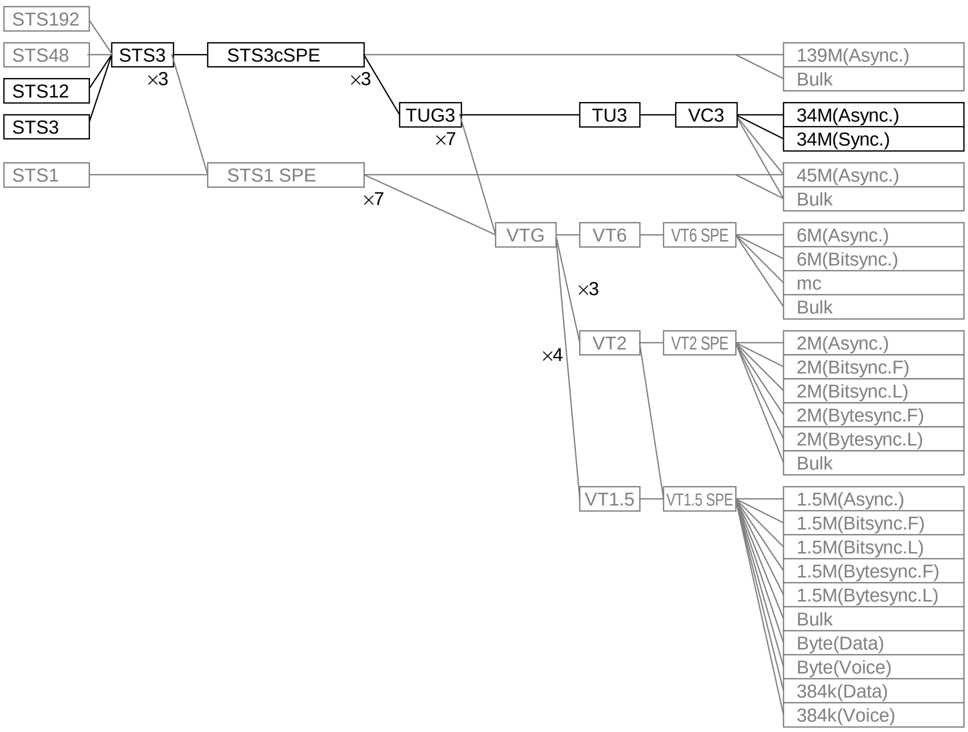
— ..... Unit that need not be installed.

*1 ...... Either MP0122A or MP0122B must be installed.

*2 ...... An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

(2/16)

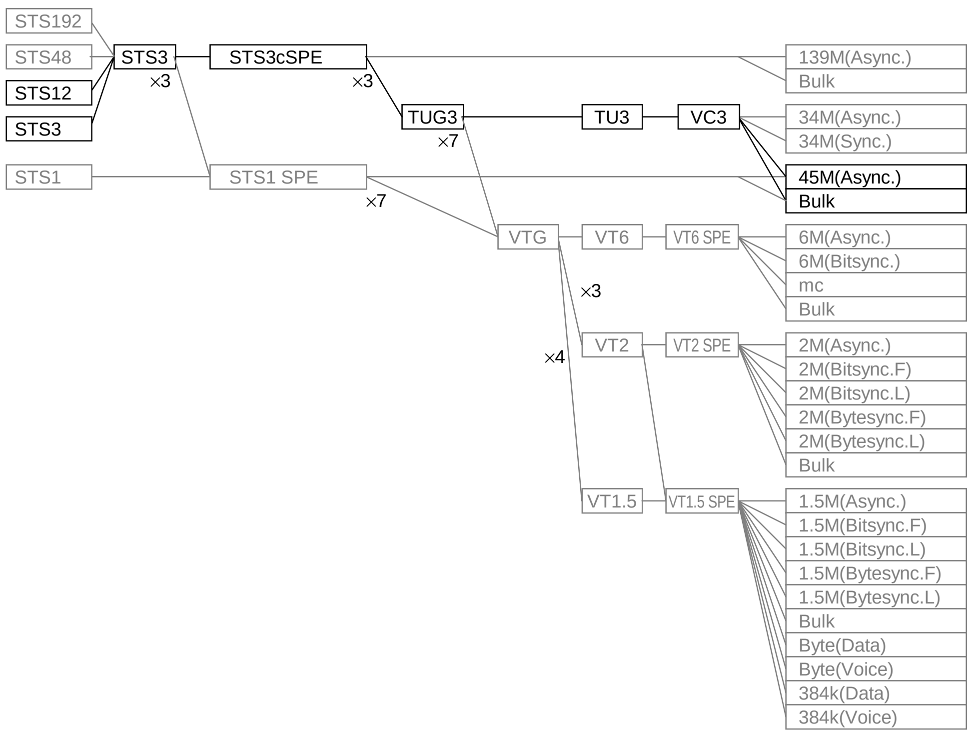


Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STS12-STS3-STS3cSPE-TUG3-TU3-VC3-34M(Async.)	optical	○	—	—	—	○
STS12-STS3-STS3cSPE-TUG3-TU3-VC3-34M(Sync.)	NRZ	○	—	—	○	—
STS3-STS3-STS3cSPE-TUG3-TU3-VC3-34M(Async.)	optical	○	—	—	—	○
STS3-STS3-STS3cSPE-TUG3-TU3-VC3-34M(Sync.)	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ ...... Unit that must be installed.
— ...... Unit that need not be installed.
*1 ...... Either MP0122A or MP0122B must be installed.
*2 ...... An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

(3/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS3cSPE-TUG3-TU3-VC3-45M(Async.)	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STS12-STS3-STS3cSPE-TUG3-TU3-VC3-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STS3-STS3-STS3cSPE-TUG3-TU3-VC3-45M(Async.)	optical	—	○	—	—	○
	CMI	○	○	—	—	—
		—	○	○	—	—
	NRZ	—	○	—	○	—
STS3-STS3-STS3cSPE-TUG3-TU3-VC3-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ ..... Unit that must be installed.

— ..... Unit that need not be installed.

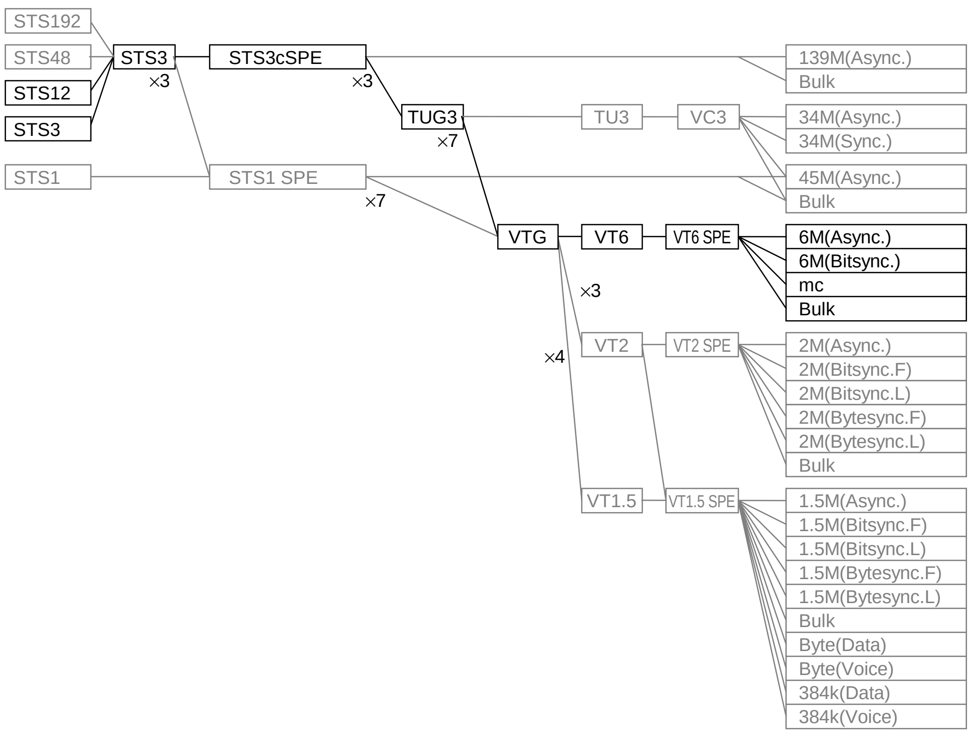
*1 ...... Either MP0122A or MP0122B must be installed.

*2 ...... An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

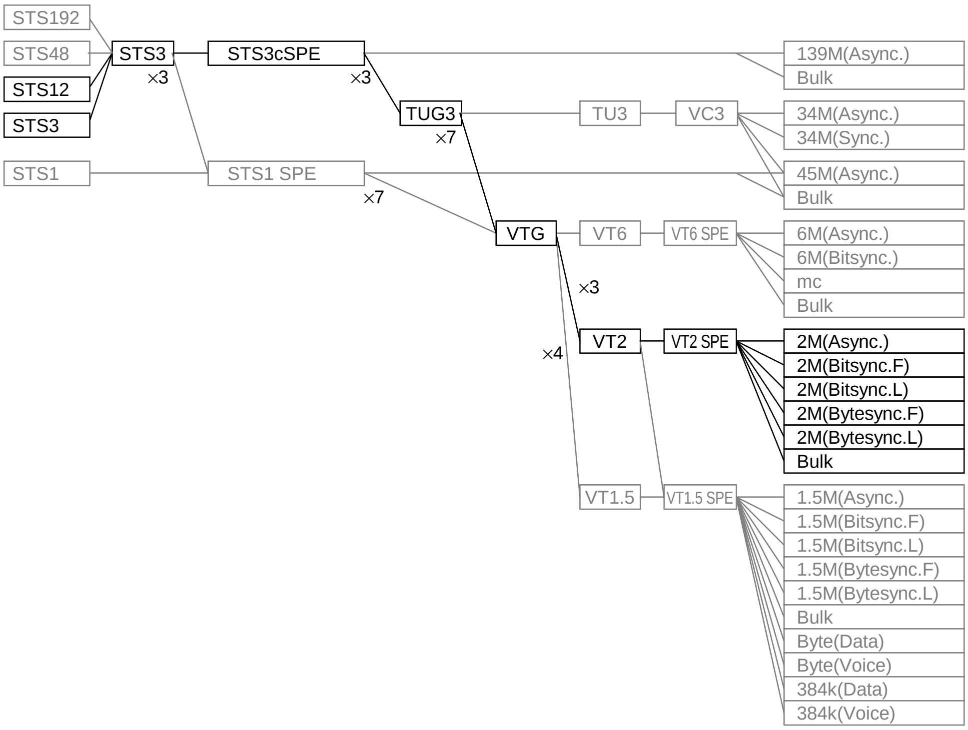
*3 ...... Any one unit from MP0121A, MP0122A and MP0122B must be installed.

(4/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STS12-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-6M(Async.) STS12-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-6M(Bitsync.) STS12-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-mc STS12-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-6M(Async.) STS3-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-6M(Bitsync.) STS3-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-mc STS3-STS3-STS3cSPE-TUG3-VTG-VT6-VT6SPE-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ ...... Unit that must be installed.
— ...... Unit that need not be installed.
*1 ...... Either MP0122A or MP0122B must be installed.
*2 ...... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength
*3 ...... Any one of MP0121A, MP0122A and MP0122B must be installed.

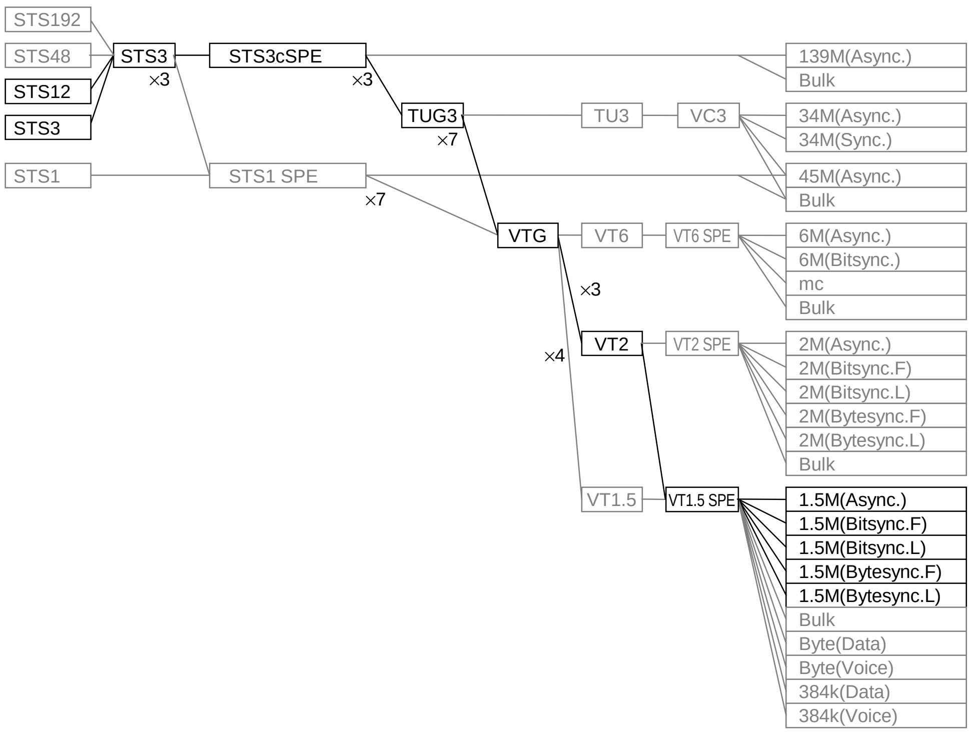


(5/16)

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Async.) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bitsync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bitsync.L) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bytesync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bytesync.L) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-Bulk	optical	○	—	—	—	○
	NRZ	○	—	—	○	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Async.) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bitsync.F) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bitsync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bytesync.F) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bytesync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-Bulk	optical	○	—	—	—	○
	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ .... Unit that must be installed.
— .... Unit that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

(6/16)



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<tr><th rowspan="2">Mapping</th><th rowspan="2">Interface</th><th colspan="2">Plug-in unit</th><th colspan="3">Interface unit</th></tr>
<tr><th>MP0121A</th><th>*1
MP0122A/
MP0122B</th><th>MP0105A</th><th>MP0108A</th><th>*2
MP0111A/
MP0112A/
MP0113A</th></tr>
<tr><td rowspan="2">STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Async.)
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F)
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L)
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F)
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L)
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Bulk</td><td>optical</td><td colspan="2">○ *4</td><td>—</td><td>—</td><td>○</td></tr>
<tr><td>NRZ</td><td colspan="2">○ *4</td><td>—</td><td>○</td><td>—</td></tr>
<tr><td rowspan="4">STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Async.)
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F)
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L)
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F)
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L)
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Bulk</td><td>optical</td><td colspan="2">○ *4</td><td>—</td><td>—</td><td>○</td></tr>
<tr><td rowspan="2">CMI</td><td>○</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>—</td><td>○</td><td>○</td><td>—</td><td>—</td></tr>
<tr><td>NRZ</td><td colspan="2">○ *4</td><td>—</td><td>○</td><td>—</td></tr>
</table>

○ ....Unit that must be installed.

— ....Unit that need not be installed.

*1 ....Either MP0122A or MP0122B must be installed.

*2 ....An optical interface unit must be installed according to the optical wavelength.

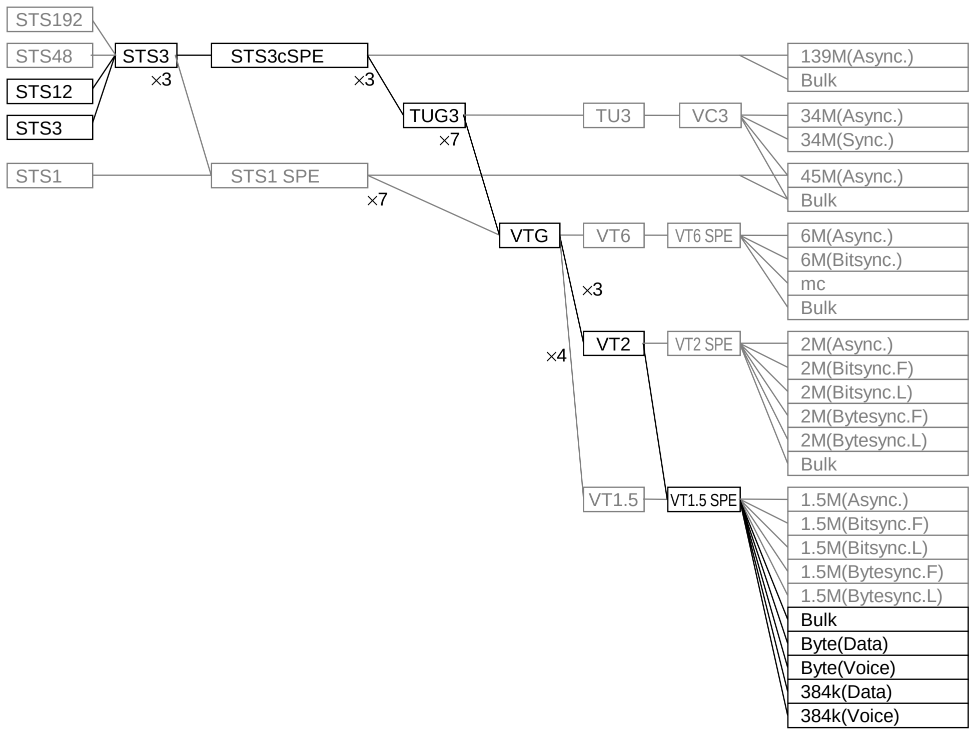
MP0111A: For 1.31 µm wavelength

MP0112A: For 1.55 µm wavelength

MP0113A: For 1.31/1.55 µm wavelength

*4 ....One of MP0121A, MP0122A and MP0122B must be installed.
However, in the case of MP0121A, '1.5M(Async.)', '1.5M(Bitsync. F)', '1.5M(Bitsync. L)', '1.5M(Bytesync. F)', and '1.5M(Bytesync. L)' patterns should be without a frame.

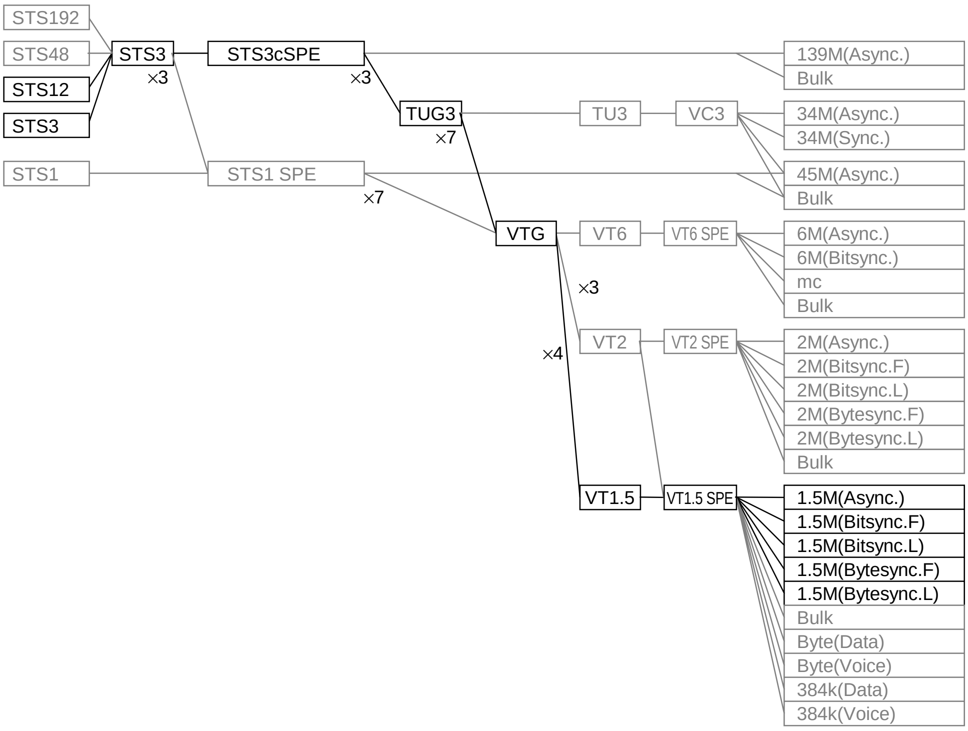
(7/16)



Mapping	Interface	Plug-in unit		Interface unit			Option-09
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Data) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Voice) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-384k(Data) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-384k(Voice)	optical	○ *3		—	—	○	○
	NRZ	○ *3		—	○	—	○
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Data) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Voice) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-384k(Data) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-384k(Voice)	optical	○ *3		—	—	○	○
	CMI	○		—	—	—	○
		—		○	○	—	○
	NRZ	○ *3		—	○	—	○

○ ....Unit and option that must be installed.
— ....Unit and option that need not be installed.
*1 ....Either MP0122A or MP0122B must be installed.
*2 ....An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength
*3 ....One of MP0121A, MP0122A and MP0122B must be installed.

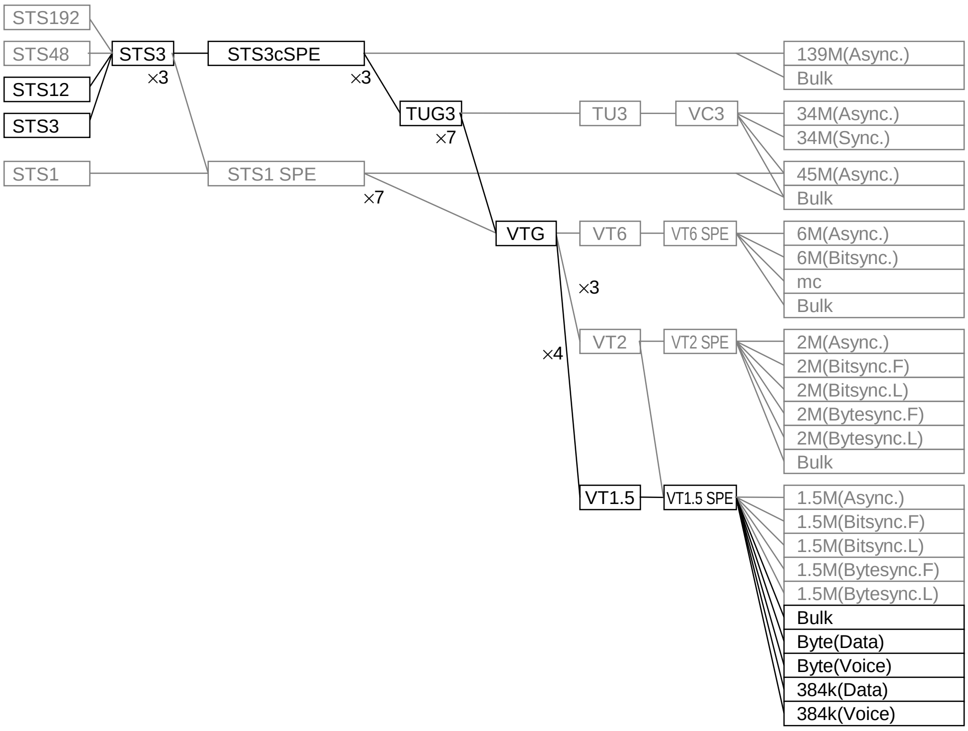
(8/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Async.) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.L)	optical	—	○	—	—	○
STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.L) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Bulk	NRZ	—	○	—	○	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Async.) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.F)	optical	—	○	—	—	○
STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bitsync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.F)	CMI	—	○	○	—	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M(Bytesync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Bulk	NRZ	—	○	—	○	—

○ .... Unit that must be installed.
— .... Unit that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

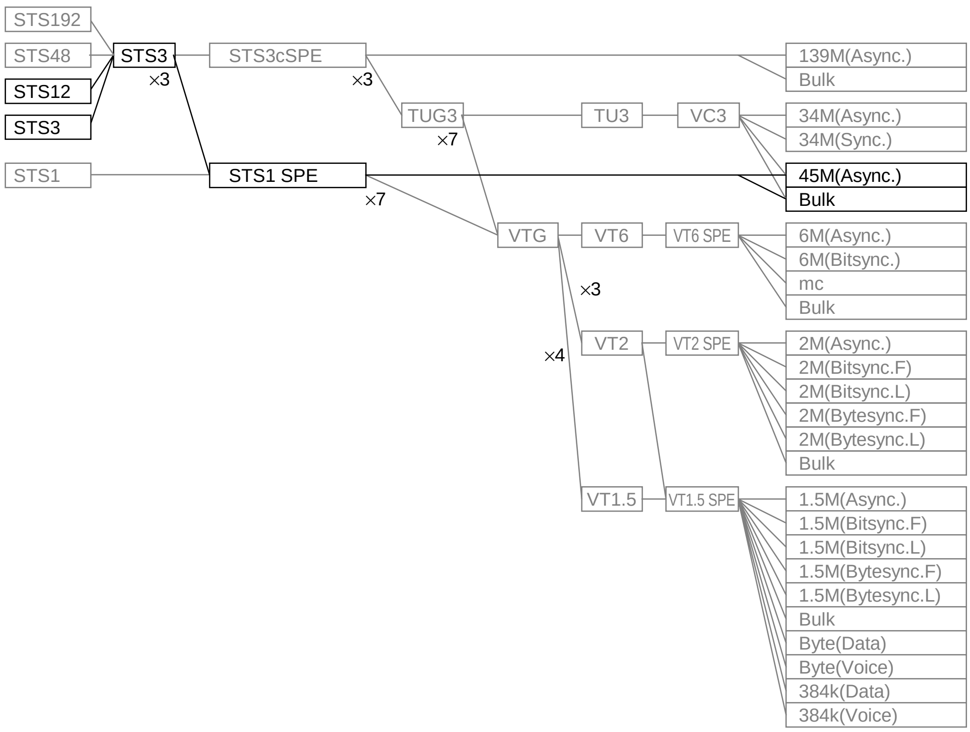
(9/16)



Mapping	Interface	Plug-in unit		Interface unit			Option-09
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	
STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Byte(Data) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Byte(Voice)	optical	—	○	—	—	○	○
STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-384k(Data) STS12-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-384k(Voice)	NRZ	—	○	—	—	—	○
STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Byte(Data) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-Byte(Voice) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-384k(Data) STS3-STS3-STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-384k(Voice)	optical	—	○	—	—	○	○
	CMI	—	○	○	—	—	○
	NRZ	—	○	—	○	—	○

○ .... Unit and option that must be installed.
— .... Unit and option that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

(10/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS1SPE-45M(Async.)	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STS12-STS3-STS1SPE-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STS3-STS3-STS1SPE-45M(Async.)	optical	—	○	—	—	○
	CMI	○	○	—	—	—
		—	○	○	—	—
	NRZ	—	○	—	○	—
STS3-STS3-STS1SPE-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ .... Unit that must be installed.

— .... Unit that need not be installed.

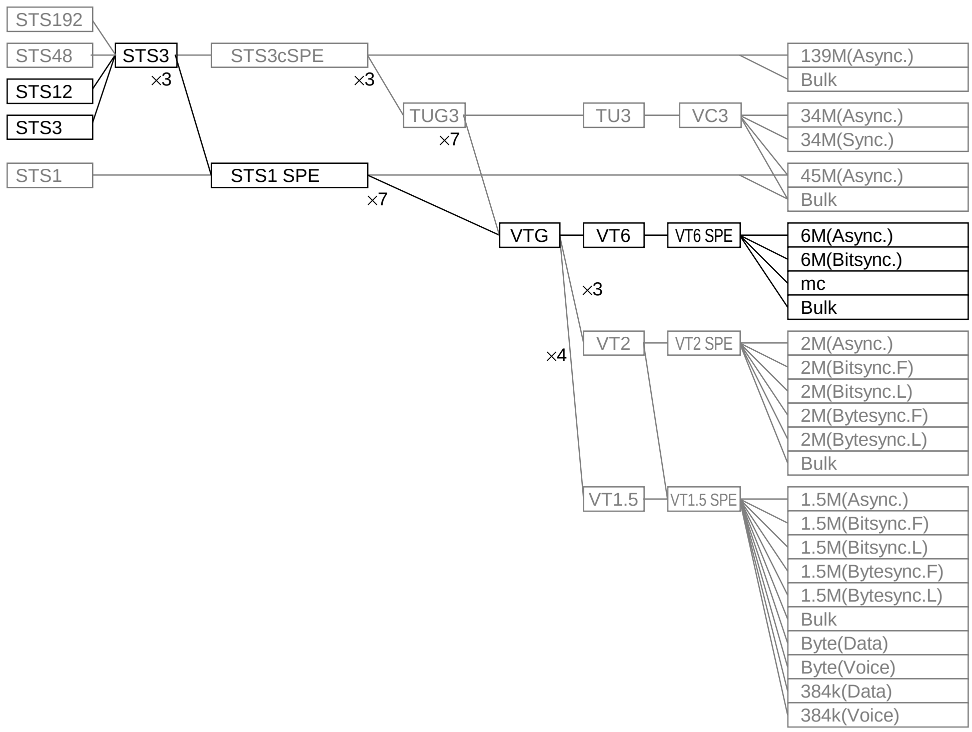
*1 .... Either MP0122A or MP0122B must be installed.

*2 .... An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

*3 .... Any one of MP0121A, MP0122A and MP0122B must be installed.

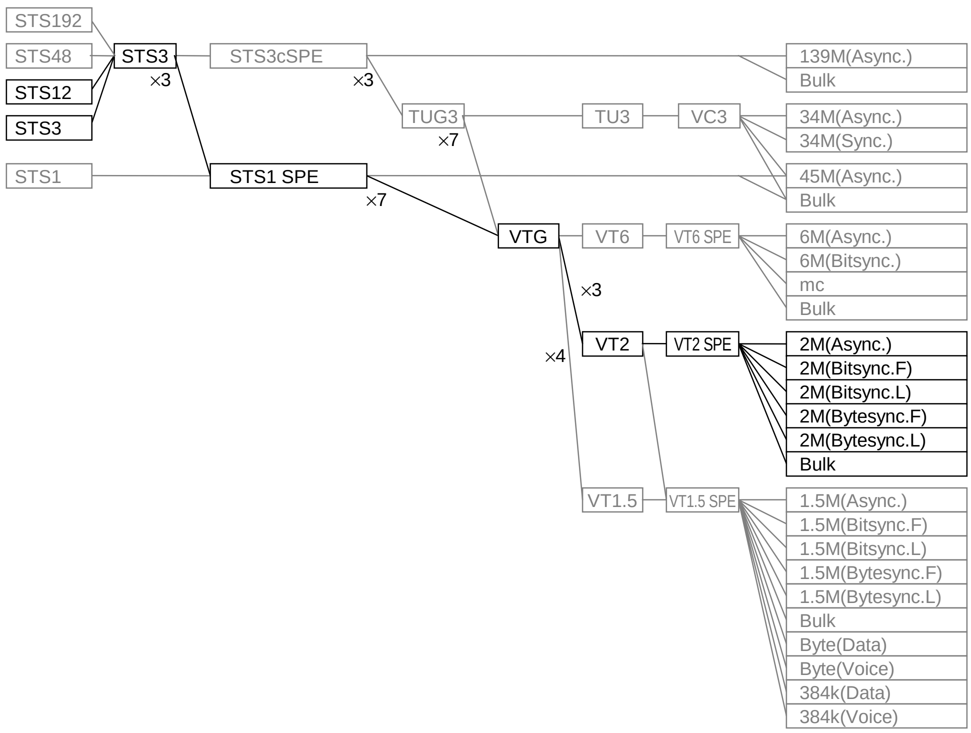
(11/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS1SPE-VTG-VT6-VT6SPE-6M(Async.) STS12-STS3-STS1SPE-VTG-VT6-VT6SPE-6M(Bitsync.) STS12-STS3-STS1SPE-VTG-VT6-VT6SPE-mc STS12-STS3-STS1SPE-VTG-VT6-VT6SPE-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STS3-STS3-STS1SPE-VTG-VT6-VT6SPE-6M(Async.) STS3-STS3-STS1SPE-VTG-VT6-VT6SPE-6M(Bitsync.) STS3-STS3-STS1SPE-VTG-VT6-VT6SPE-mc STS3-STS3-STS1SPE-VTG-VT6-VT6SPE-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

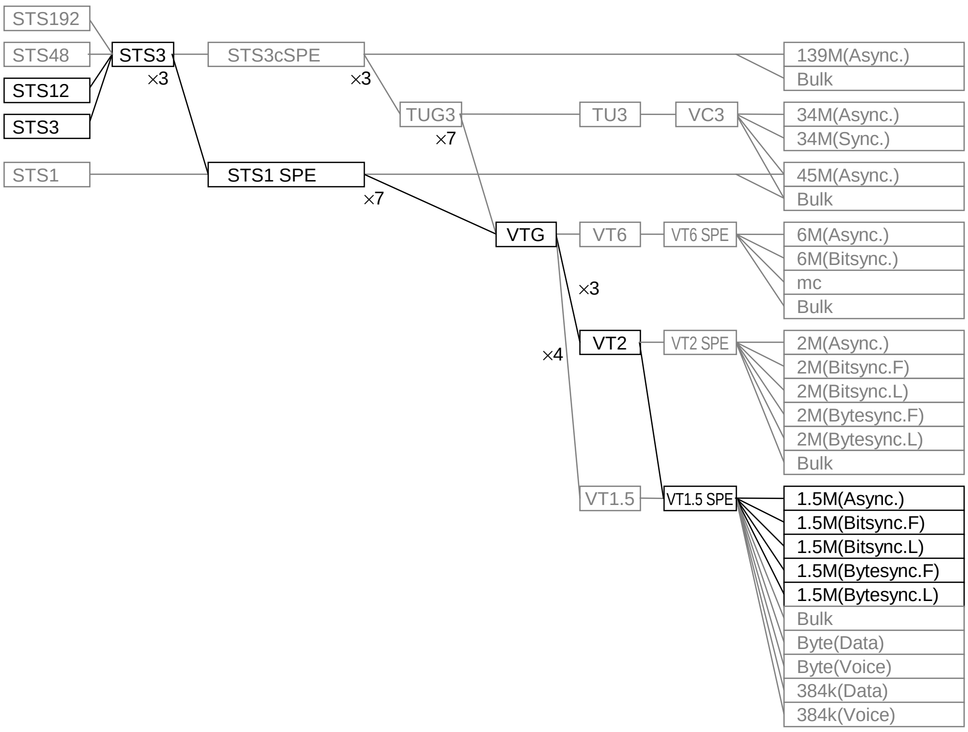
○ ....Unit that must be installed.
— ....Unit that need not be installed.
*1 ....Either MP0122A or MP0122B must be installed.
*2 ....An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength
*3 ....Any one of MP0121A, MP0122A and MP0122B must be installed.

(12/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Async.) STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.F) STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.L)	optical	○	—	—	—	○
STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.F) STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.L) STS12-STS3-STS1SPE-VTG-VT2-VT2SPE-Bulk	NRZ	○	—	—	○	—
STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Async.) STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.F)	optical	○	—	—	—	○
STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bitsync.L) STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.F)	CMI	○	—	—	—	—
STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-2M(Bytesync.L) STS3-STS3-STS1SPE-VTG-VT2-VT2SPE-Bulk	NRZ	○	—	—	○	—

○ .... Unit that must be installed.
— .... Unit that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

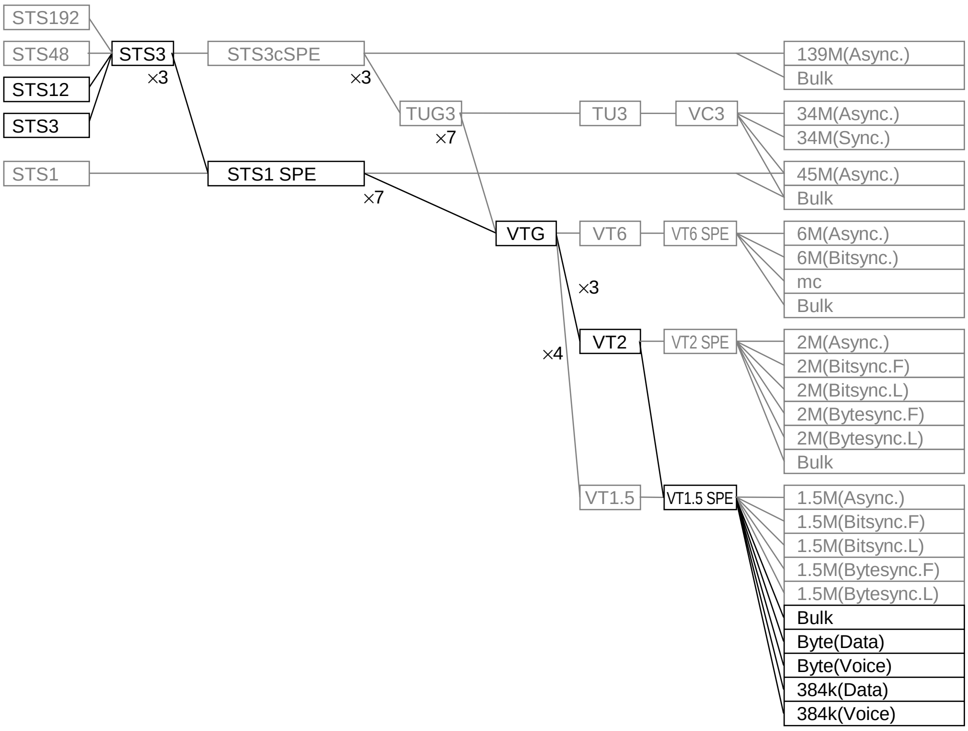


(13/16)

Mapping	Interface	Plug-in unit: MP0121A	Plug-in unit: MP0122A/ MP0122B *1	Interface unit: MP0105A	Interface unit: MP0108A	Interface unit: MP0111A/ MP0112A/ MP0113A *2
STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Async.) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Bulk	optical	○ *4		—	—	○
	NRZ	○ *4		—	○	—
STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Async.) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Bulk	optical	○ *4		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *4		—	○	—

○ .... Unit that must be installed.
— .... Unit that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength
*4 .... Any one of MP0121A, MP0122A and MP0122B must be installed.
However, in the case of MP0121A, '1.5M(Async.)', '1.5M(Bitsync. F)', '1.5M(Bitsync. L)', '1.5M(Bytesync. F)', and '1.5M(Bytesync. L)' patterns should be without a frame.

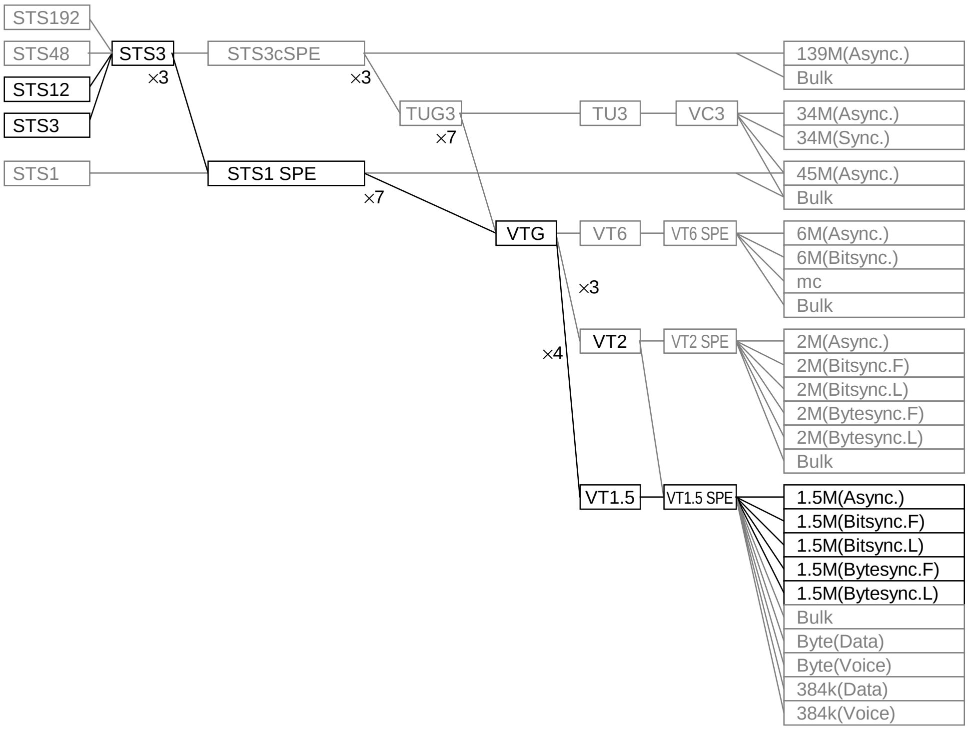
(14/16)



Mapping	Interface	Plug-in unit		Interface unit			Option
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2	-09
STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Data) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Voice) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-384k(Data) STS12-STS3-STS1SPE-VTG-VT2-VT1.5SPE-384k(Voice)	optical	○ *3		—	—	○	○
	NRZ	○ *3		—	○	—	○
STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Data) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-Byte(Voice) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-384k(Data) STS3-STS3-STS1SPE-VTG-VT2-VT1.5SPE-384k(Voice)	optical	○ *3		—	—	○	○
	CMI	○	—	—	—	—	○
		—	○	○	—	—	○
	NRZ	○ *3		—	○	—	○

○ .... Unit and option that must be installed.
— .... Unit and option that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength
*3 .... Any one of MP0121A, MP0122A and MP0122B must be installed.

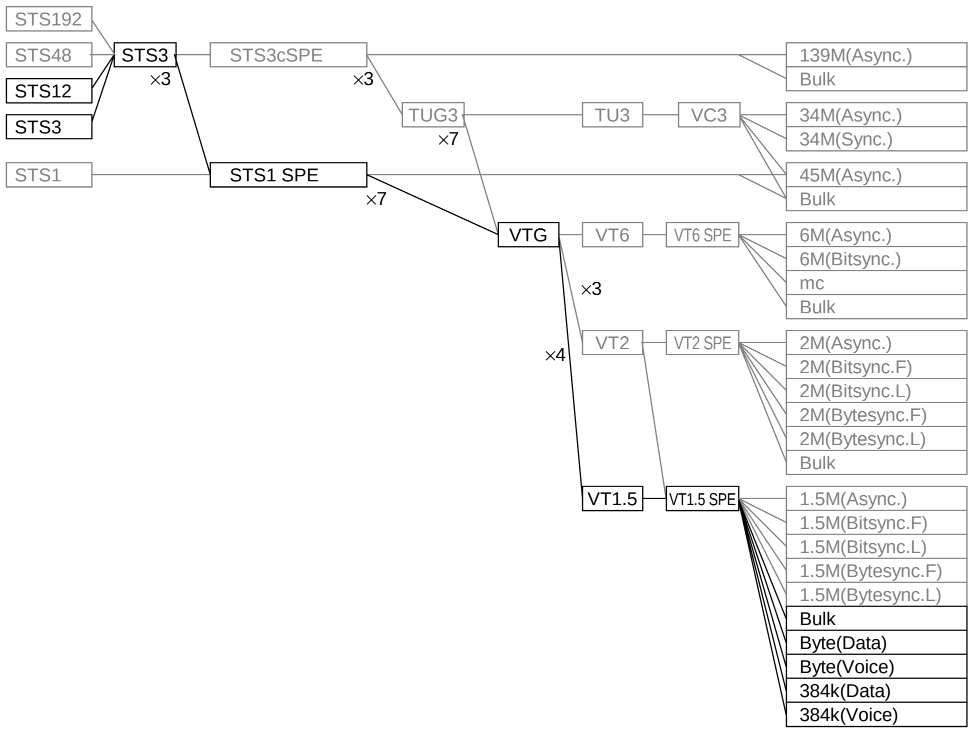
(15/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Async.) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L)	optical	—	○	—	—	○
STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L) STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Bulk	NRZ	—	○	—	○	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Async.) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.F)	optical	—	○	—	—	○
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bitsync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.F)	CMI	—	○	○	—	—
STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M(Bytesync.L) STS3-STS3-STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Bulk	NRZ	—	○	—	○	—

○ .... Unit that must be installed.
— .... Unit that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength

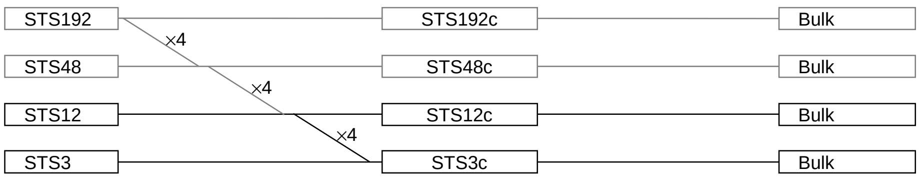
(16/16)



Mapping	Interface	Plug-in unit		Interface unit			Option
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	-09
STS12-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Data) STS12-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Voice)	optical	—	○	—	—	○	○
STS12-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-384k(Data) STS12-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-384k(Voice)	NRZ	—	○	—	○	—	○
STS3-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Data) STS3-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-Byte(Voice) STS3-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-384k(Data) STS3-STS3-STS1SPE-TUG3-VTG-VT2-VT1.5SPE-384k(Voice)	optical	—	○	—	—	○	○
	CMI	—	○	○	—	—	○
	NRZ	—	○	—	○	—	○

○ .... Unit and option that must be installed.
— .... Unit and option that need not be installed.
*1 .... Either MP0122A or MP0122B must be installed.
*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 µm wavelength
MP0112A: For 1.55 µm wavelength
MP0113A: For 1.31/1.55 µm wavelength
*3 .... Any one of MP0121A, MP0122A and MP0122B must be installed.

(3) Concatenation Mapping



Mapping	Interface	Interface unit		
		MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STS12-STS12c-Bulk	optical	—	—	○
STS12-STS3c-Bulk	NRZ	—	○	—
STS3-STS3c-Bulk	optical	—	—	○
	CMI	○	—	—
	NRZ	—	○	—

○ .... Unit that must be installed.

— .... Unit that need not be installed.

*1 .... Either MP0122A or MP0122B must be installed.

*2 .... An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

(4) CID Pattern and Non-frame Pattern

When the sent and received signals are the CID pattern or non-frame pattern, the plug-in units and interface units shown in the table below must be installed.

Bit rate	Interface	Plug-in Unit		Interface Unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
52M	optical	—	○	—	—	—
	B3ZS	—	○	—	—	—
156M	optical	—	–	—	—	○
	CMI	—	–	○	—	—
	NRZ	—	–	—	○	—
622M	optical	—	–	—	—	○
	CMI	—	–	○	—	—
	NRZ	—	–	—	○	—

○ ....Unit that must be installed.

— ....Unit that need not be installed.

*1 ....Either MP0122A or MP0122B must be installed.

*2 ....An optical interface unit must be installed according to the optical wavelength.

MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

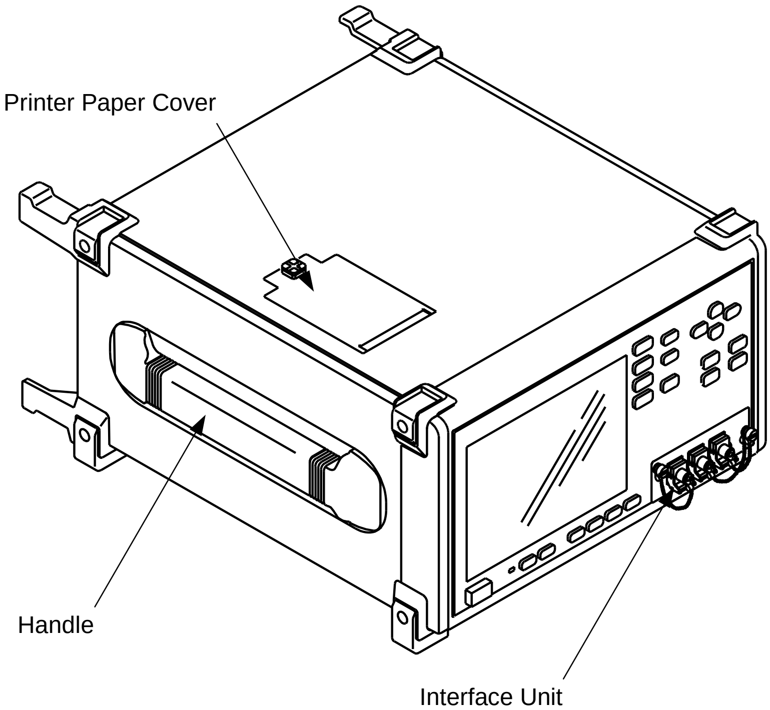
*3 ....Any one of MP0121A, MP0122A and MP0122B must be installed.

Section 3 Panel Description

This section describes names and functions of parts on MP1570A and the units to be installed on it.

3.1 Description of MP1570A Panel

The names and functions of the MP1570A components are as follows.



Handle

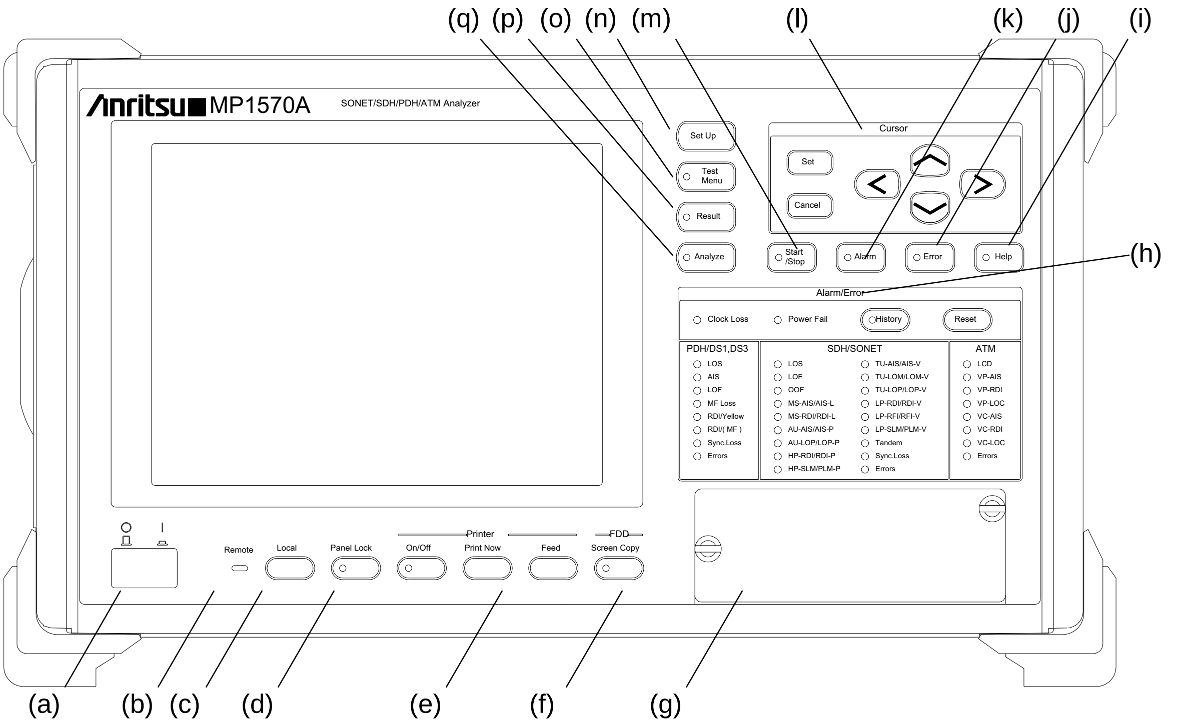
For carrying the MP1570A unit.

Printer Paper Cover

Remove the cover for supplying the printer paper.

The names and functions of the front, rear, and right-hand side panels of MP1570A are described on the following pages.

3.1.1 Front Panel



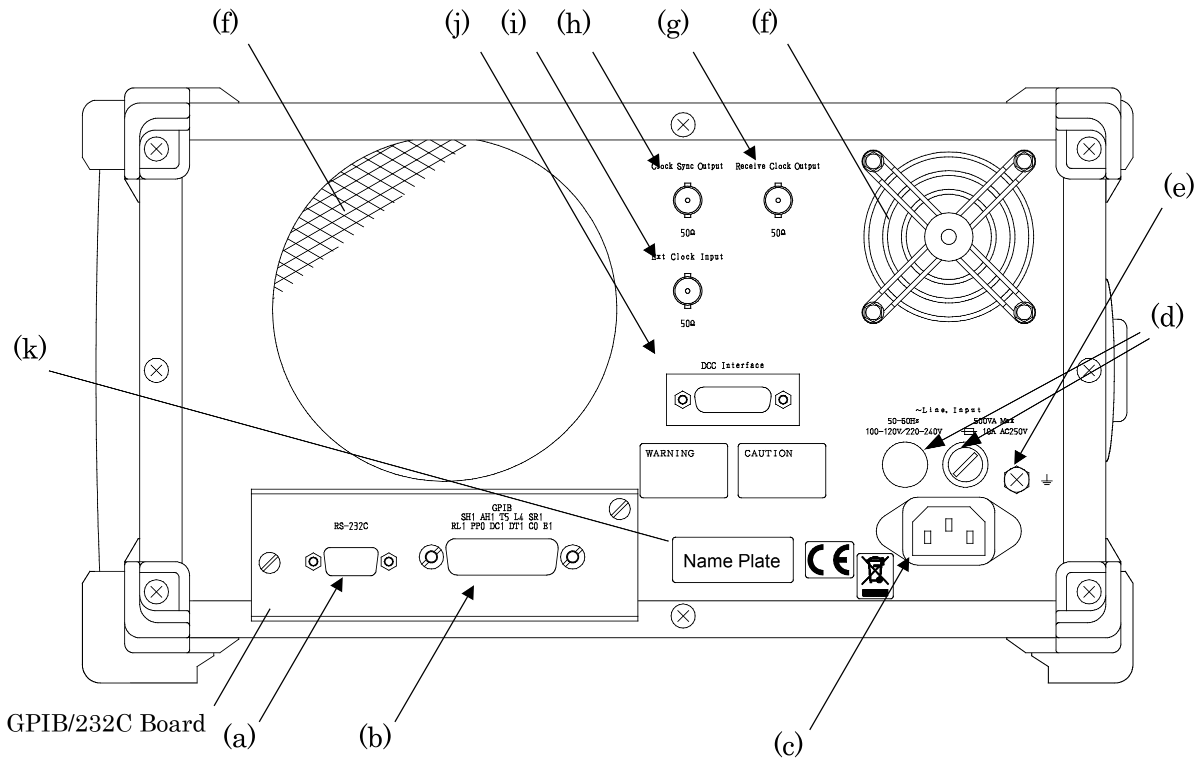
(a)		Switch used to turn MP1570A on or off.
(b)	Remote	Lamp that goes on when MP1570A is in remote mode (i.e. when this unit is being controlled through the GPIB , RS-232C, or Ethernet interface).
(c)	Local	Key that is effective when MP1570A is in remote mode. Used for seeing it to local control mode (i.e., state in which panel controls can be used). This key cannot be used when MP1570A is in local mode.
(d)	Panel Lock	Key used to validate or invalidate keys other than Panel Lock Local. When the keys other than the above two keys are invalidated, the lamp of Panel Lock goes on.

(e)	Printer	
	●On/Off	Key used to turn the built-in printer on or off. When the built-in printer is on, the lamp of ●On/Off goes on.
	Print Now	Key used to display a help screen. When ●Help is off.
	Feed	Key to feed forms on the built-in printer. Hold it down for feeding.
(f)	FDD Screen Copy ●	Key to save the data displayed on the screen in the floppy disk.
(g)	Interface unit insertion slot	Slot for inserting an interface unit. Remove the blank panel to insert an interface unit.
(h)	Alarm/Error	Lamps for indicating receiver alarms, errors, clock loss and power loss state on the front panel. - The 'Errors' lamps indicate the total errors detected. - The 'Tandem' lamps indicate the errors related to the tandem connection detected. - The Clock Loss lamp indicates the clock loss of external clock pulses or indicates the clock loss or clock unlock state of DCS input pulses (75, 100 or 120Ω).
	●History	Key used to select current display mode or history display mode. The lamp of ●History is on while the history display mode is active. - In the current display mode, the currently sensed states are indicated by the corresponding lamps. - In the history display mode, all sensed states recorded after the measurement is started (including Repeat start) are indicated by the corresponding lamps.
	Reset	This key is used to reset the history data that turned on the lamp, and to create new history data. It is usable only in history display mode.

(i)	Help	Key used to display a help screen. When Help is pressed, the information related to the item pointed by the cursor is displayed.
(j)	Error	Key used to select error addition mode. In the mode, the lamp of Error is on. - In single error mode, one error is added each time Error is pressed. After an error is added, the Error lamp goes off. - The items to which an error can be added and Single-Rate mode are selected from the 'Test Menu : Manual' screen. When the unit is in the no-error addition mode, the Error lamp is off.
(k)	Alarm	Key used to select alarm addition mode. In the mode, the lamp of Alarm is on. - The items to which an alarm can be added can be selected from the 'Test Menu : Manual' screen. When the unit is in the no-alarm addition mode, the Alarm lamp is off.
	Cursor	
(l)	Set	Key used to open the selection window, numeric input window, ASCII window, and character string window at data setting. When these windows are already open, the item, where the cursor displayed in reverse video is set, is selected.
	Cancel	Key used to cancel the selection window, numeric input window, ASCII window, and character string window at data setting. The setting before opening the window is retained.
	∧ ∨ < >	Keys used to move the screen and window cursor. - In the numeric input window, < > are used to increment or decrement the displayed value. - The displayed value can be changed by holding down one of these keys.

(m)	Start /Stop	Key used to start or stop measurement. During the measurement, the Lamp of Start /Stop is on.
(n)	Set Up	Key used to display the Setup main screen. When the Setup main screen is already displayed, this key is used to close the screen.
(o)	Test Menu	Key used to display the Test Menu main screen. When the Test Menu main screen is already displayed, this key is used to close the screen. The lamp of Test Menu is on while the Test Menu main screen is displayed.
(p)	Result	Key used to display the Result main screen. When the Result main screen is already displayed, this key is used to close the screen. The lamp of Test Menu is on while the Result main screen is displayed.
(q)	Analyze	Key used to display the Analyze main screen. When the Analyze main screen is already displayed, this key is used to close the screen. The lamp of Analyze is on while the Analyze main screen is displayed.
(r)	[LCD screen]	LCD for displaying measurement items, setup items, and measurement results.

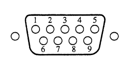
3.1.2 Rear Panel



(a)	RS-232C Connector	....	RS-232C interface connector. - This interface can be set to Control mode or Printer mode from the 'Setup : System' screen when the RS-232C option is installed. *

Pin positions .....

NO	I/O	Name	
1	I	DCD(CD)	Detect
2	I	RXD(RD)	Receive Data
3	O	TXD(SD)	Send Data
4	O	DTR(ER)	Equipment
5	-	SG	Signal Ground
6	I	DSR(DR)	Data Set Ready
7	O	RTS(RS)	Request to Send
8	I	CTS(CS)	Clear to Send
9	I	RI(CI)	Call Indication



(b)	GPIB connector	GPIB interface connector . - This interface can be set to Control mode or Printer mode from the 'Setup : System' screen when the GPIB option is installed. *
(c)	AC power .... connector	Connector for AC power supply. Always connect the attached power supply cable to this connector.
(d)	Fuse holder	Holders for AC power fuses. - When replacing a blown fuse, be sure to use a new fuse of the same rating.
(e)	Functional earth terminal................	This is the terminal that is electrically connected to the chassis of the equipment.
(f)	Fans	Cooling fans. Do not obstruct these openings on the rear panel.
(g)	Receive Clock Output 50Ω	Outputs the clock reproduced from the received data
	Output Bit rate	2/8/34/139M, 1.5/45M, 52/156/622M
	Output Level	ECL(AC)
	Connector	BNC50Ω
(h)	Clock sync. Output	Outputs the clock that synchronizing the bit rate to be outputted
	Output Bit rate	2/8/34/139M, 1.5/45M, 52/156/622M
	Output Level	ECL(AC)
	Connector	BNC50Ω

(i) External Clock input 50Ω — Clock input connector used for inputting the transmitting clock source from outside.

Input Frequency 2.048MHz, 8.448MHz, 34.368MHz, 139.264MHz
1.544MHz, 44.736MHz, 155.52MHz, 622.08MHz, ±100ppm

Output Level ..... ECL(AC)

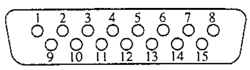
Connector BNC50Ω

(j) DCC Interface .... These are input connectors for inputting the data entered from D1 to D3 and from D4 to D12 of the transmission SONET, and output connectors for outputting the data outputted from D1 to D3 and from D4 to D12.

- Switching from D1 to D3 and from D4 to D12 is carried out by selecting DCC on the Setup : OH Preset DATA screen.
- It's used as an input/output connector when OH Add/Drop is performed in OH test. Data for performing Add/Drop is set on the 'Test menu : Manual' screen.

Pin positions .....

No	I/O	Name	No	I/O	Name	No	I/O	Name
1	-	GND	6	O	TC(A)	11	O	RD(B)
2	I	TD(A)	7	O	RC(A)	12	-	Open
3	-	Open	8	-	GND	13	O	TC(B)
4	O	RD(A)	9	I	TD(B)	14	O	RC(B)
5	-	Open	10	-	Open	15	-	Open



TC/RC(A/B) : DCC clock output pin for sending and receiving signals
TD(A/B) : DCC data input pin for sending signals
RD(A/B) : DCC data output pin for receiving signals

Output clock frequency 192 kHz (D1 to D3) or 576 kHz (D4 to D12)

input/output data ..... 192 kb/s (D1 to D3) or 576 kb/s (D4 to D12)

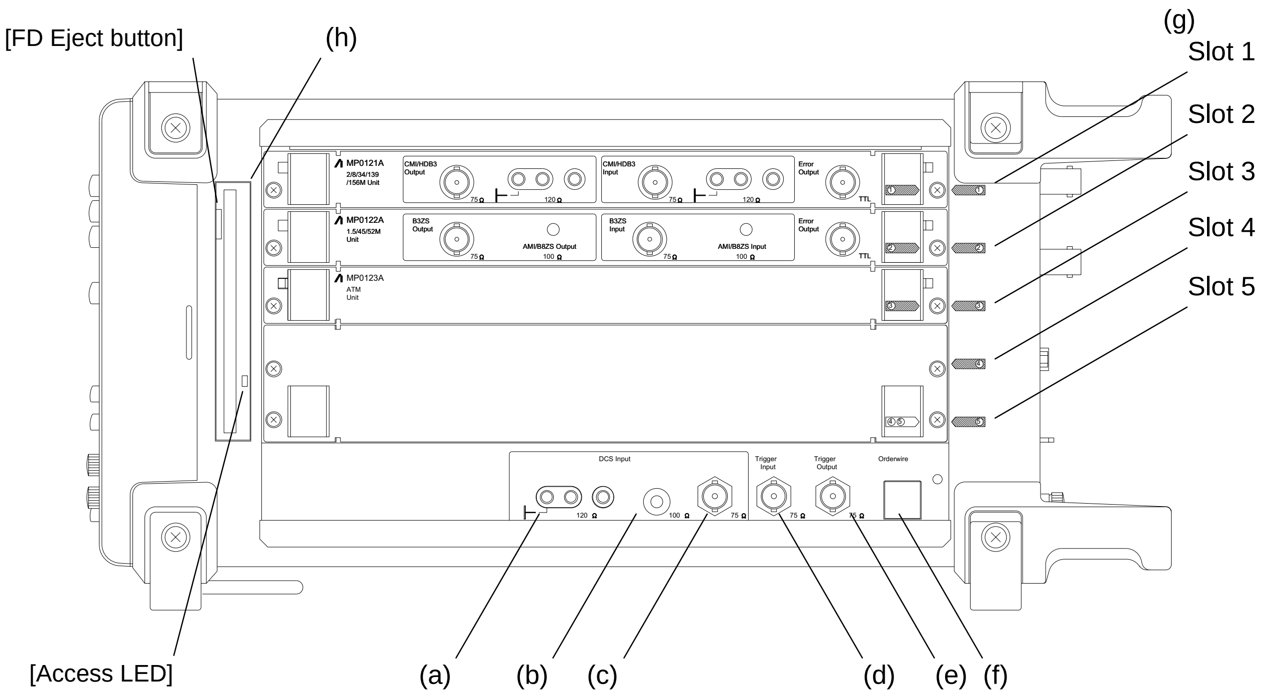
Level V.11

Connector ..... Multiple pins (D-sub 15 pins)

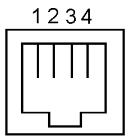
(k) Name plate — Indicates the serial number and the installed option numbers.

* ...... When the GPIB and RS-232C options are installed, both the GPIB interface and RS-232C interface cannot be set to Control mode or Pinter mode at the same time.

3.1.3 Right Side Panel



(a)	DCS Input 120**Ω**	Connector for inputting external clock pulses for synchronizing the SONET sending signal. Input clock pulses or HDB3 data that conform to ITU-T G. 703-10.
	Input frequency..	2.048 MHz, 64kHz+8kHz
	Bite rate	2.048 Mbit/s
	Connector.....	3pin Siemens 120Ω balanced
(b)	DCS Input 100**Ω**	Connector for inputting external clock pulses for synchronizing the SONET sending signal. Input HDB3, AM1, B8ZS data or clock pulses that conform to ANSI T1.
	Input frequency..	1.544 MHz
	Bite rate	1.544 Mbit/s
	Connector.....	BANTAM 100Ω
(c)	DCS Input 75**Ω**	Connector for inputting external clock pulses for synchronizing the SONET sending signal. Input clock pulses or HDB3 data that conform to ITU-T G. 703-10.
	Input frequency..	2.048 MHz
	Bite rate	2.048 Mbit/s
	Connector.....	BNC 75Ω unbalanced

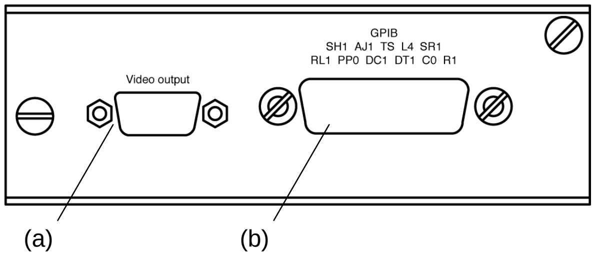
(d)	Trigger Input 50Ω	Trigger input connector used when the APS test and the fame capture are performed.
	Level	TTL
	Connector	BNC50Ω
(e)	Trigger Output 75Ω	Connector that outputs clock synchronizing the error, alarm, synchronized frame, and SONET signal detected in the receiving side.
	Level	TTL
	Connector	BNC50Ω
(f)	Orderwire	Orderwire interface using SONET E1 and E2 byte.
	Connector	RJ11
	Pin	 1 GND 2 Output 3 GND 4 Input
(g)	Plug-in unit............ insertion slots	Slots for inserting the plug-in units. - Slot numbers are, from top to bottom, Slot 1, Slot 2, ... Slot 5. - For the unit combination that can be installed, see '2.8.1 Inserting the plug-in unit'.
(h)	3.5inch FDD	Floppy disk drive for saving or restoring setup condition information and analysis graph data. - The floppy disks used must be in MS-DOS 720 Kbyte or 1.44 Mbyte format. - Both 2HD and 2DD can be used.
	[FD Eject button]	Push-button for ejecting the floppy disk.
	[Access LED]	The access lamp goes is illuminated in green when the inserted floppy disk is accessed.

CAUTION ⚠

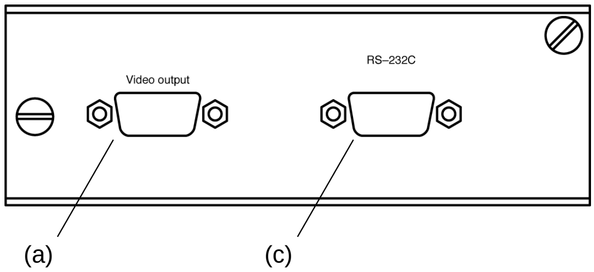
Do not eject the floppy disk while the access lamp is on. If a floppy disk is ejected during access, data on the floppy disk may be destroyed

3.2 Description of Video Output Board Panel

Video Output Board (GPIB)

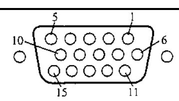


Video Output Board (RS-232C)



(a) Video output — Signal output connector to display the MP1570A screen on an external CRT display (for video output option).
Signals are always outputted when the Video output board is inserted.
The table below shows the pin layout.

No.	I/O	Name	No.	I/O	Name
1	O	Red video signal	9	-	Not used
2	O	Green video signal	10	-	Signal ground
3	O	Blue video signal	11	-	Not used
4	-	Not used	12	-	Not used
5	-	Signal ground	13	O	Horizontal synchronizing signal
6	-	Signal ground	14	O	Vertical synchronizing signal
7	-	Signal ground	15	-	Not used
8	-	Signal ground			

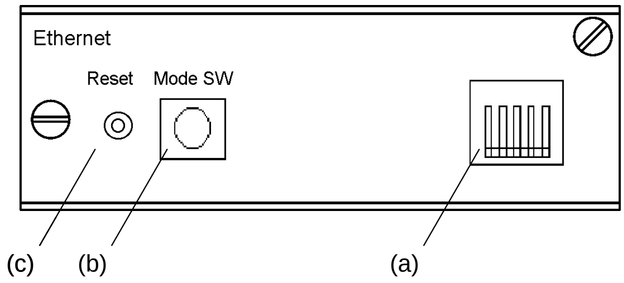


Connector ..... Multiple D-SUB high-density 15 pins

(b) GPIB .... GPIB interface connector . (The function is the same as that of the GPIB connector installed in the GPIB/232C Board.)

(c) RS-232C .... RS-232C interface connector . (The function is the same as that of the RS-232C connector installed in the GPIB/232C Board.)

3.3 Description of Ethernet Board Panel

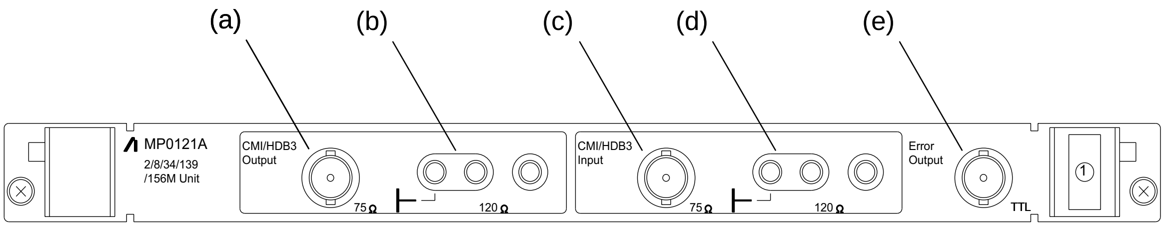


(a)	Ethernet connector.	Ethernet interface connector.
(b)	Mode SW	Sets the mode of the Ethernet board.
(c)	Reset	Used to reset the Ethernet board.

- See 'MP1570A Operation Manuals Vol.2 Remote Control' for the details of Ethernet.

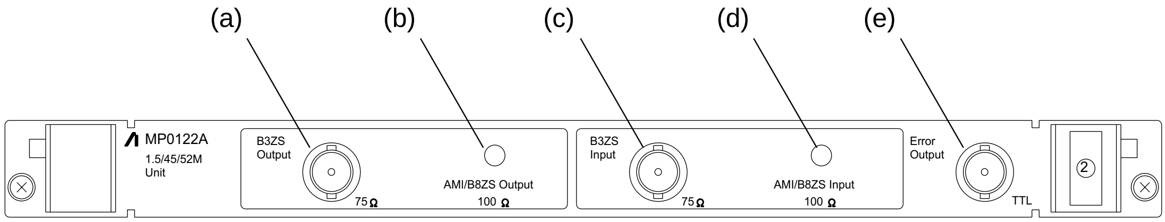
3.4 Description of Plug-in Unit Panel

3.4.1 MP0121A 2/8/34/139/156M Unit



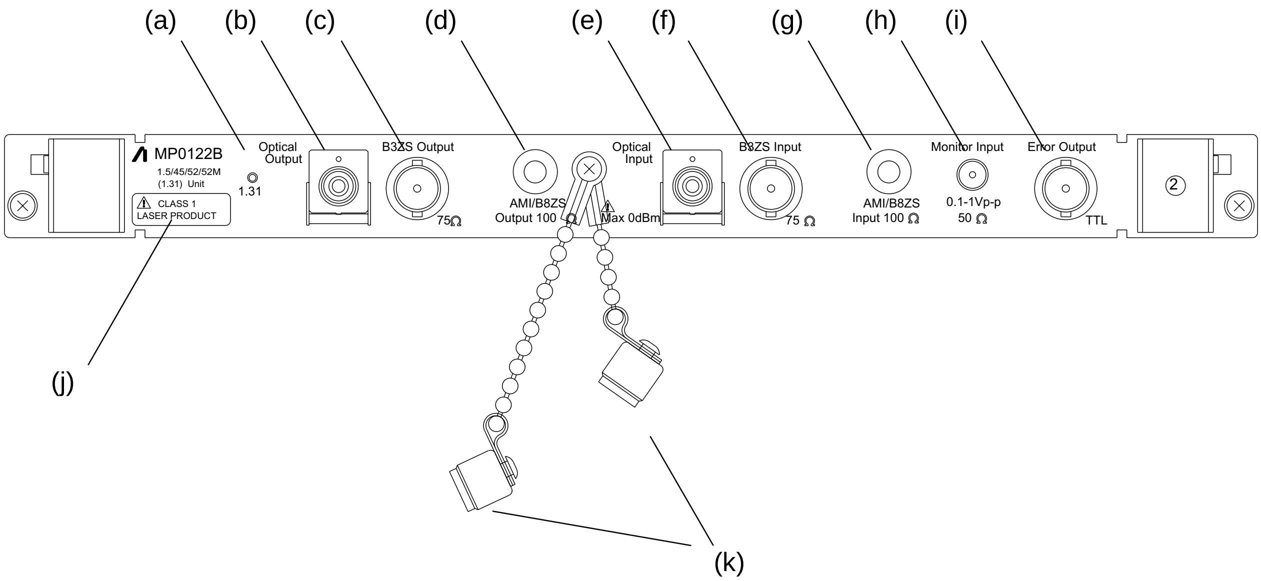
(a)	CMI/HDB3 Output 75Ω.....		Connector for outputting 2M/8M/34M/139M/156M signals.
		Bit rate	2.048 Mbit/s 8.448 Mbit/s 34.368 Mbit/s 139.264 Mbit/s 155.520 Mbit/s
		Connector	BNC75Ω
(b)	CMI/HDB3 Output 120Ω..		Connector for outputting 2M signal.
		Bit rate	2.048 Mbit/s
		Connector	3pin Siemens 120Ω
(c)	CMI/HDB3 Input 75Ω		Connector for inputting 2M/8M/34M/139M/156M signals.
		Bit rate	2.048 Mbit/s 8.448 Mbit/s 34.368 Mbit/s 139.264 Mbit/s 155.520 Mbit/s
		Connector	BNC75Ω
(d)	CMI/HDB3 Input 120Ω......		Connector for inputting 2M signal.
		Bit rate	2.048 Mbit/s
		Connector	3pin Siemens 120Ω
(e)	Error Output		Pulse output connector for test pattern error detection during 2/8/34/139/156M mapping.
		Level	TTL
		Connector	BNC

3.4.2 MP0122A 1.5/45/52M Unit

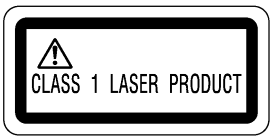


(a)	B3ZS Output 75Ω	Connector for outputting 45M/52M signals.
	Bit rate	44.736 Mbit/s 51.84 Mbit/s
	Connector	BNC75Ω
(b)	AMI/B8ZS Output 100Ω.....	Connector for outputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100Ω
(c)	B3ZS Input 75Ω	Connector for inputting 45M/52M signals.
	Bit rate	44.736 Mbit/s 51.84 Mbit/s
	Connector	BNC75Ω
(d)	AMI/B8ZS Input 100Ω........	Connector for inputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100Ω
(e)	Error Output	Pulse output connector for test pattern error detection during 1.5/45/52M (B3ZS) mapping.
	Level	TTL
	Connector	BNC

3.4.3 MP0122B 1.5/45/52M/52M (1.31) Unit

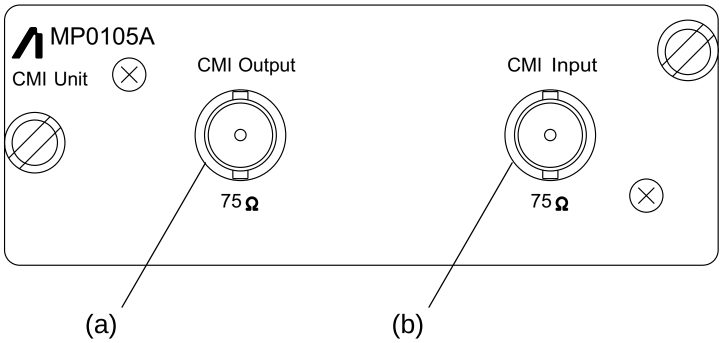


(a)	[Lamp]		Illuminated when an optical signal is outputted.
(b)	Optical Output		Connector for outputting 52M optical signal.
		Bit rate	51.84 Mbit/s
		Optical wavelength	1.31 μm
		Level	-11.5dBm±3.5dB
		Connector	FC-PC(SM) connector
(c)	B3ZS Output 75Ω		Connector for outputting 45M/52M signals.
		Bit rate	44.736 51.84 Mbit/s
		Connector	BNC75Ω
(d)	AMI/B8ZS Output 100Ω.....		Connector for outputting 1.5M signal.
		Bit rate	1.544 Mbit/s
		Connector	BANTAM 100Ω

(e)	Optical Input .... ⚠ Max 0dBm Peak	Connector for inputting 52M optical signal.
	Bit rate	51.84 Mbit/s
	Optical wavelength	1.31 μ m
	Level	-33～-8dBm
	Connector	FC-PC(SM) connector
	Absolute maximum level ...	0dBm（Peak power） - An input exceeding the indicated allowable input level (0 dBm) can damage the unit.
(f)	B3ZS Input 75Ω	Connector for inputting 45M/52M signals.
	Bit rate	44.736 Mbit/s 51.84 Mbit/s
	Connector	BNC75Ω
(g)	AMI/B8ZS Input 100Ω........	Connector for inputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100Ω
(h)	Monitor Input	A 52M optical signal monitor input connector.
	Bit rate	51.84 Mbit/s
	Connector	SMA
(i)	Error Output	Pulse output connector for test pattern error detection.
	Level	TTL
	Connector	BNC
(j)		Label indicating the class of the laser beam outputted from output connector (b). - The label shown here indicates that this unit belongs to Class 1 of the IEC 60825-1 standard.
(k)	[Optical connector cap]	Optical connector cap for (b) and (e). - Always use the optical connector cap when the optical connector is not being used.

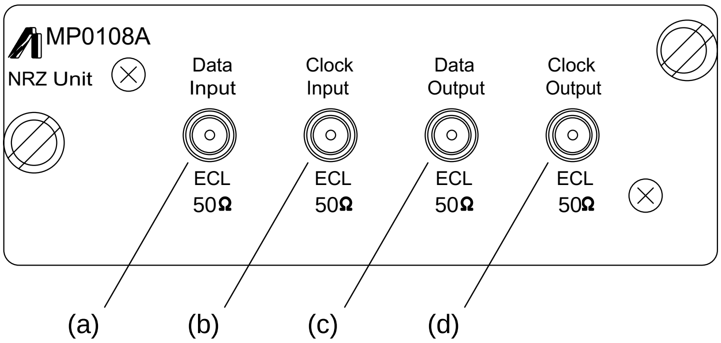
3.5 Description of the Interface Unit Panel

3.5.1 MP0105A CMI Unit



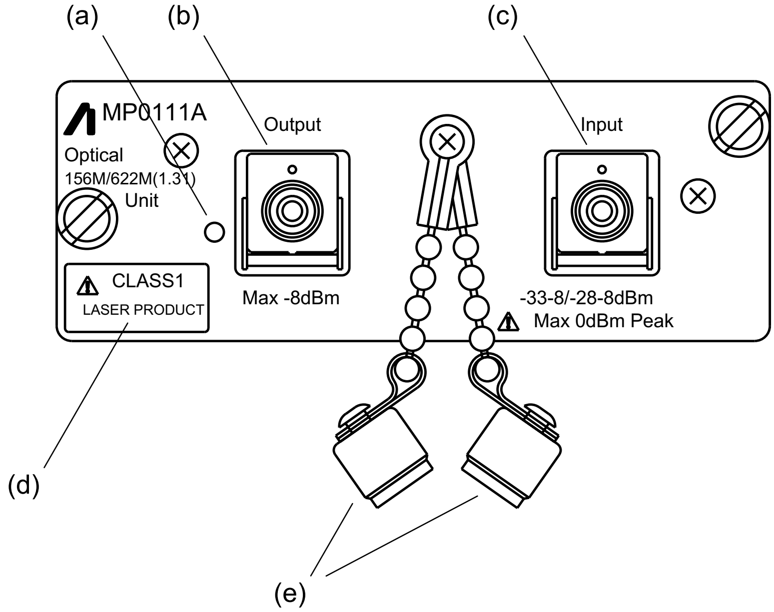
(a)	CMI Output 75Ω	A CMI signal output connector
	Bit rate	155.52 Mbit/s
	Interface	ITU-T G.703 Table 11, Fig 24, Fig 25
	Connector	BNC 75Ω Unbalanced
(b)	CMI Input 75Ω	A CMI signal input connector
	Bit rate	155.52 Mbit/s
	Interface	1Vpp±0.1V+cable loss : when monitor is off 0.1Vpp±0.01V+ cable loss : when monitor is on
	Cable loss	0~12.7dB
	Connector	BNC 75Ω unbalanced - The monitor can be turned on or off using Monitor on the 'Setup : Mapping' screen.

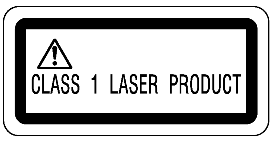
3.5.2 MP0108A NRZ Unit



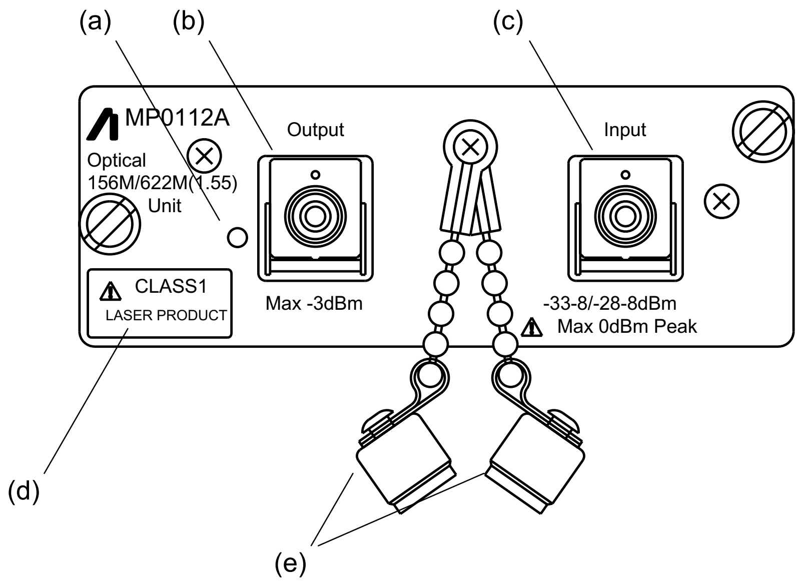
(a)	Data Input 50Ω		A SONET measurement signal (data) input connector.
		Bit rate	155.52 Mbit/s 622.08 Mbit/s
		Level	ECL (terminated in 50Ω, -2 V)
		Code	NRZ
		Connector	SMA 50Ω
(b)	Clock Input 50Ω		A SONET measurement signal (clock) input connector.
		Level	ECL (terminated in 50Ω, -2 V)
		Code	NRZ
		Connector.....	SMA 50Ω
(c)	Data Output 50Ω		A SONET measurement signal (data) output connector.
		Bit rate	155.52 Mbit/s 622.08 Mbit/s
		Level	ECL (terminated in 50Ω, -2 V)
		Code	NRZ
		Connector.....	SMA 50Ω
(d)	Clock Output 50Ω........		A SONET measurement signal (clock) output connector.
		Level	ECL (terminated in 50Ω, -2 V)
		Code	NRZ
		Connector.....	SMA 50Ω

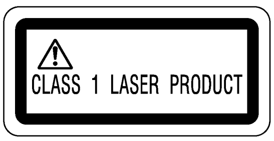
3.5.3 MP0111A Optical 156M/622M (1.31) Unit



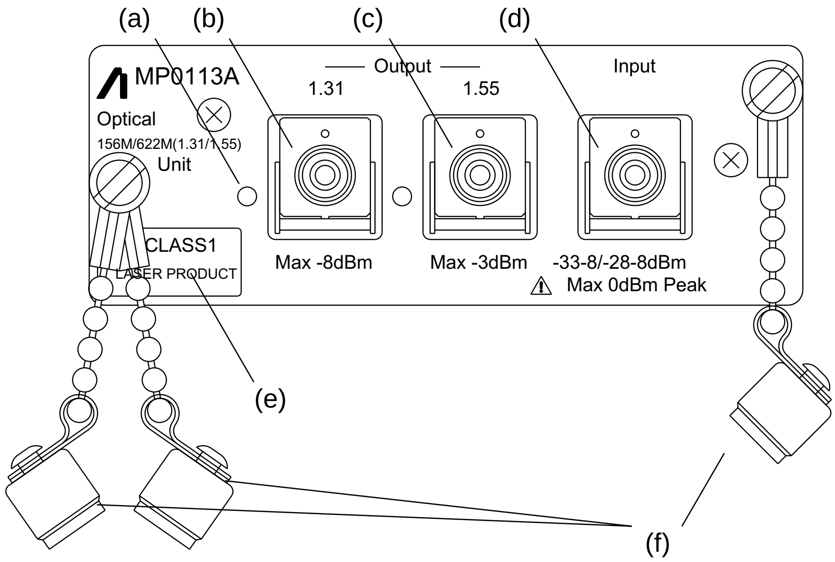
(a) [Lamp]	Illuminated when an optical signal is outputted.
(b) Output	A 156M/622M optical signal output connector.
Bit rate	155.52 Mbit/s 622.08 Mbit/s
Emitted beam wavelength band	1.31 μ m
Level	-11.5dBm±3.5dB
Connector	FC-PC(SM) Connector
(c) Input -33~-8/-28~-8dBm...... ⚠ Max 0dBm Peak	A 156M/622M optical signal input connector.
Bit rate	155.52 Mbit/s 622.08 Mbit/s
Received beam wavelength band ...	1.31 μ m
Level	-33~-8dBm (156M), -28~-8dBm (622M)
Connector	FC-PC(SM) Connecto
Absolute maximum level	0dBm（peak power）
	- An input exceeding the absolute maximum allowable input level (0 dBm) can damage the unit.
(d) 	Label indicating the class of the laser beam outputted from output connector (b). - The label shown here indicates that this unit belongs to Class 1 of the IEC 60825-1 standard.
(e) Optical connector cap	Optical connector cap for (b) and (c). - Always use the optical connector cap when the optical connector is not being used.

3.5.4 MP0112A Optical 156M/622M (1.55) Unit

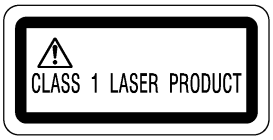


(a) [Lamp]	Illuminated when an optical signal is output
(b) Output .... Max -8dBm	A 156M/622M optical signal output connector.
Bit rate	155.52 Mbit/s 622.08 Mbit/s
Emitted beam wavelength band	1.55 μ m
Level	-5dBm±2dB
Connector	FC-PC(SM)Connector
(c) Input -33~-8/-28~-8dBm...... ⚠ Max 0dBm Peak	A 156M/622M optical signal input connector.
Bit rate	155.52 Mbit/s 622.08 Mbit/s
Received beam wavelength band....	1.55 μ m
Level	-33~-8dBm (156M), -28~-8dBm (622M)
Connector	FC-PC(SM)Connector
Absolute maximum level	0dBm（peak power） - An input exceeding the absolute maximum allowable input level (0 dBm) can damage MP1570A.
(d) 	Label indicating the class of the laser beam outputted from output connector (b). - The label shown here indicates that this unit belongs to Class 1 of the IEC 60825-1 standard.
(e) Optical connector cap	Optical connector cap for (b) and (c). - Always use the optical connector cap when the optical connector is not being used.

3.5.5 MP0113A Optical 156M/622M (1.31/1.55) Unit



(a)	[Lamp]	Illuminated when an optical signal is outputted.
(b)	Output 1.31 µm .... Max -8dBm	A 156M/622M optical signal output connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Emitted beam wavelength band	1.31 µm
	Level	-11.5dBm±3.5dB
	Connector	FC-PC(SM)Connector
(c)	Output 1.55 µm .... Max -3dBm	A 156M/622M optical signal output connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Emitted beam wavelength band	1.55 µm
	Level	-5dBm±2dB
	Connector	FC-PC(SM)Connector

(d)	Input -33~-8/-28~-8dBm...... ⚠ Max 0dBm Peak	A 156M/622M optical signal input connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Received beam wavelength band ...	1.31/1.55 μm
	Level	-33~-8dBm (156M), -8dBm (622M)
	Connector	FC-PC(SM)Connector
	Absolute maximum level	0dBm (peak power) - An input exceeding the absolute maximum allowable input level (0 dBm) can damage MP1570A.
(e)		Label indicating the class of the laser beam outputted from output connector (b). - The label shown here indicates that this unit belongs to Class 1 of the IEC 60825-1 standard.
(f)	Optical connector cap	Optical connector cap for (b),(c) and (d). - Always use the optical connector cap when the optical connector is not being used.

Section 4　Screen Description and Parameter Setting

This Section describes the screens of MP1570A and procedures to set the measurement conditions.

4.1 Main Screen

4.1.1 Main Screen Configurations

MP1570A displays the following main screens, and each main screen displays its own subscreens.

- Setup main screen .... for setting up the measurement
- Test menu main screen ..... for selecting the test items
- Result main screen .... for displaying the measurement results
- Analyze main screen .... for analyzing the measurement results

4.1.2 Main Screen Selection

You can select the desired main screen by [Set Up], [Test Menu], [Result], or [Analyze]. Here are the operating procedures for screen display. For two- and three-division displays, see '4.1.3 Main screen layout'.

Displaying the ‘Setup’ Main Screen

The Setup main screen is displayed when you press [Set Up] while either the Test menu, Result or Analyze main screen (including their two- or three-division screen) is displayed.

- The Setup main screen is closed and the screen with, [Test Menu], [Result], and [Analyze] lamps illuminated is displayed if you press [Set Up].

Displaying the ‘Test menu’ Main Screen

The Test menu main screen is displayed when you press [Test Menu] while its lamp is off. The main screen divided into Test menu main screen and Result or Analyze screen (i.e. two- or three-division screen) is displayed if the lamp of [Result] or [Analyze] is on.

- The screen remains unchanged if [Test Menu] is pressed while only the Test menu main screen is displayed.
- The two-division main screen of Test menu and Result, or Test menu and Analyze changes into the Result main screen or Analyze main screen, if you press [Test Menu] during such a two-division screen display.
- The three-division screen of Test menu, Result, and Analyze changes into the two-division screen of Result and Analyze if you press [Test Menu] during such a three-division screen display.

Displaying the ‘Result’ Main Screen

The Result main screen is displayed when Result is pressed while its lamp is off. The Result main screen and Test Menu or Analyze screen (i.e. two- or three-division screen) is displayed if the lamp of Test Menu or Analyze is on.

- Screen remains unchanged if Result is pressed while only the Result main screen is displayed.
- The two-division screen of Test Menu and Result, or Result and Analyze changes into the Test Menu main screen or Analyze main screen, if Result is pressed during such a two-division screen display.
- The three-division screen of Test menu, Result, and Analyze changes into the two-division screen of Test Menu and Analyze if Result is pressed during such a three-division screen display.

Displaying the ‘Analyze’ Main Screen

The Analyze main screen is displayed when you press Analyze while its lamp is off. The Analyze main screen and Result or Analyze screen (i.e. two- or three-division screen) is displayed if the lamp of Test Menu or Result is on.

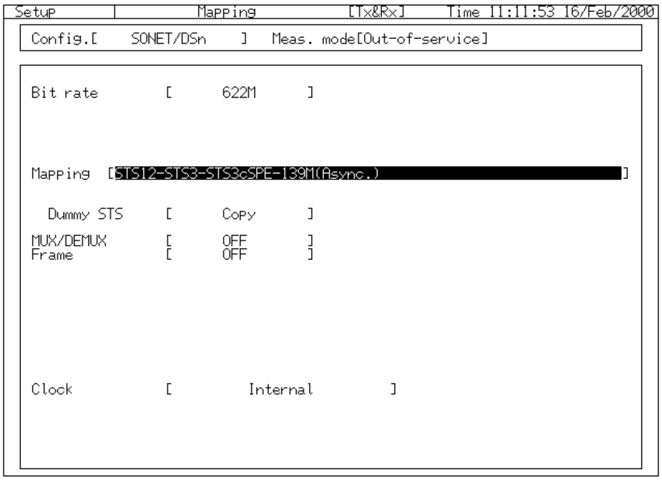
- Screen remains unchanged if you press Analyze while only the Analyze main screen is displayed.
- The two-division screen of Test menu and Analyze, or Result and Analyze changes into the Test menu main screen or Result main screen, if you press Analyze during such a two-division screen display.
- The three-division screen of Test menu, Result, and Analyze changes into the two-division screen of Test menu and Result if you press Analyze during such a three-division screen display.

4.1.3 Main Screen Layout

MP1570A can display single, two-division and three-division screens as follows:

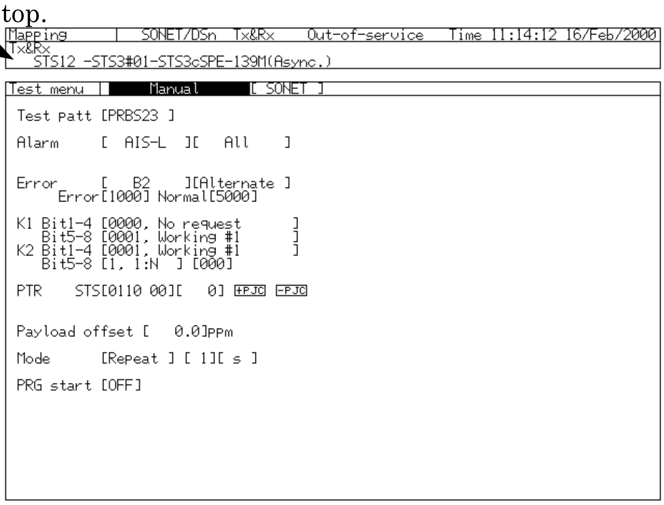
Single-screen Display

- Displays a screen from the Setup, Test menu, Result and Analyze main screens.



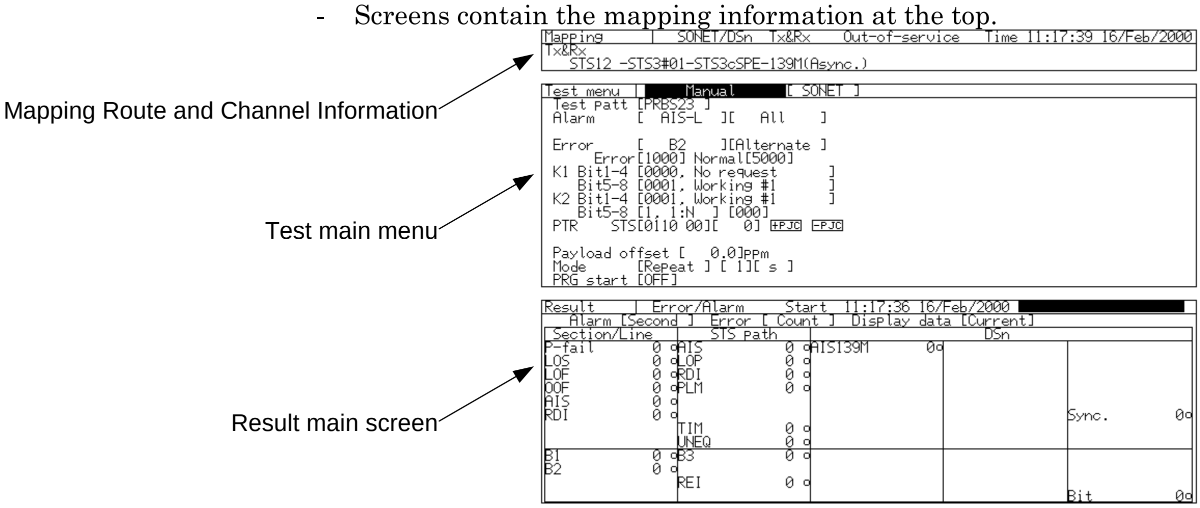
- Screens other than Setup contain the mapping information at the top.

Mapping Route and Channel Information



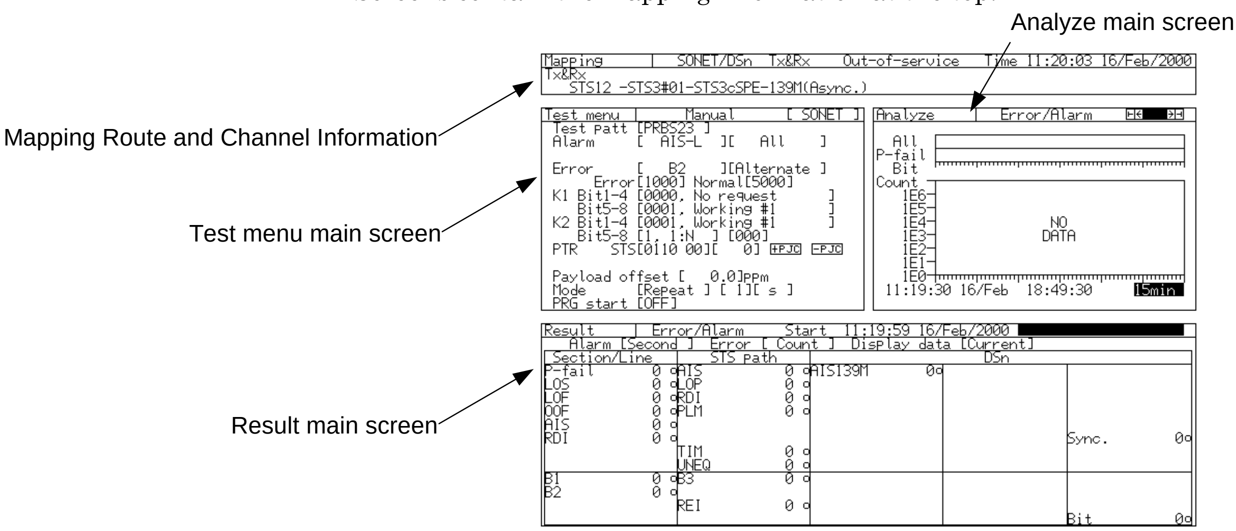
Two-division Display

- MP1570A can simultaneously display two screens from the Test menu, Result and Analyze main screens. (Setup main screen cannot be displayed simultaneously with the other screens.)
- The lamps of Test Menu, Result, and Analyze show the displayed screen.
- Screens contain the mapping information at the top.



Three-division Display

- MP1570A can simultaneously display the Test menu, Result and Analyze screens. (Setup screen cannot be displayed simultaneously with the other screens.)
- All lamps of Test Menu, Result, and Analyze are illuminated.
- Screens contain the mapping information at the top.



4.2 Subscreens

Each main screen can show the following subscreens that are set in accordance with the target and purpose of measurement.

4.2.1 Subscreens of 'Setup' Main Screen

Display	Description
Mapping	Selects the type of signal, the interface, and measurement conditions, according to the measured item,.
Memory	Saves and retrieves the measurement condition data and graphic data on the Analyze screen.
Print	Sets the printing conditions.
OH preset data	Presets the overhead conditions of send signal.
Tandem	Sets the tandem connection measurement.
Dummy preset	Sets the dummy channel.
APS program data	Sets the APS (Automatic Protection Switch) measurement of transmission line.
System	Sets the buzzer, clock, screen color, GPIB and RS-232C.
Floppy disk	Saves the measurement conditions data and graphic data of Analyze main screen in the floppy disk, retrieves them from the disk.
Custom function	Sets specific functions that cannot be set on other screens.
Measurement condition	Sets the error and alarm detection release conditions, tandem connection conditions and performance measurement conditions.
PTR64 frame	Sets the pointer value to generate 64 frames of SONET pointer.
Sequence test	Performs an automatic measurement based on the saved setting data.
OH change data	Presets the OH change data pattern of the SONET OH test function.
IP packet	Sets the PPP packet and IP packet to be inserted into the payload.
Frame memory	Sets the frame memory to be sent.
Signaling preset	Sets the signaling data.
Selftest	Performs the self test.
Auto setup	Automatically sets the bit rate according to the input signal.

4.2.2 Subscreens of ‘Test menu’ Main Screen

Display	Description
Trouble search	Sets the measurement conditions of trouble search.
Manual	Sets the conditions of manual measurement.
Pointer sequence	Sets the type and time interval of pointer sequence measurement.
Delay	Sets the conditions of delay measurement.
OH test	Sets the conditions of overhead test.
APS test	Sets the APS test conditions.
Performance check	Sets the performance check conditions.
IP test	Sets the IP transmission conditions.
Frame memory	Sets the frame transmission conditions.

4.2.3 Subscreens of ‘Result’ Main Screen

Display	Description
Trouble search	Displays the trouble search measurement results.
Error / Alarm	Displays the error and alarm measurement results.
Justification	Displays the justification measurement results.
Zoom	Zooms up the error and alarm measurement results.
Performance	Displays the performance measurement results.
B2 error	Displays the B2 measurement results.
Simultaneous	Displays the simultaneous errors and alarms measurement results of VT6 SPE(7ch), VT2 SPE(21ch) and VT1.5 SPE(28ch) of TUG3 or STS1 SPE.
Delay	Displays the delay measurement results.
APS test	Displays the APS test measurement results.
Recall	Displays the automatic measurement results.

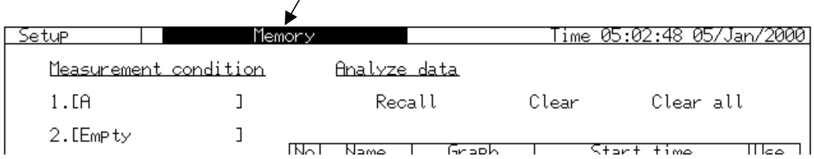
4.2.4 Subscreens of 'Analyze' Main Screen

Display	Description
Trouble search	Analyzes the trouble search measurement result.
Error / Alarm	Displays the error and alarm measurement result on graphs.
OH monitor	Displays the overhead monitor result together with the path trace, payload, pointer value, and K1/K2 byte monitor result.
)pt. power meter	Displays the power monitor, wavelength setting and optical power of the optical signal.
Pointer monitor	Monitors the SONET pointer value.
Sequence test	Analyzes the automatic measurement result.
APS capture	Set the capturing of K1/K2 byte used in the APS test, and analyzes it.
OH capture	Set the capturing of 1,023 bytes of SONET overhead, and analyzes it.
Frame capture	Set the capturing of SONET framed, and displays the result.
IP capture	Performs the IP analysis.
Recall	Displays the graph data stored in the memory or floppy disk.

4.2.5 Selecting a Subscreen

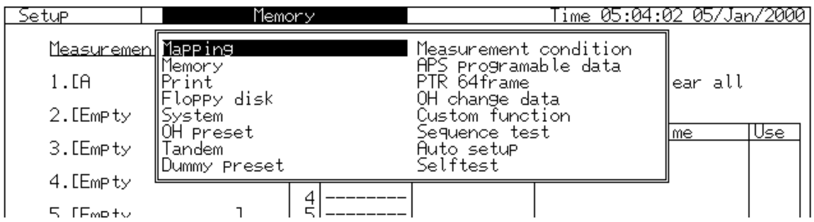
(1) Move the cursor to the subscreen selection field on the main screen (on the right panel of the main screen).

Subscreen selection field

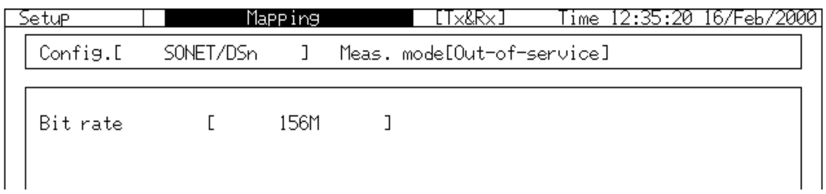


(2) Press Set, and the subscreen selection window is displayed.

(3) Move the cursor with ∧ ∨ < > to the desired subscreen item.



(4) Press Set, and the subscreen selection window is closed and the selected subscreen is displayed.



4.3 Setting Parameters through Windows

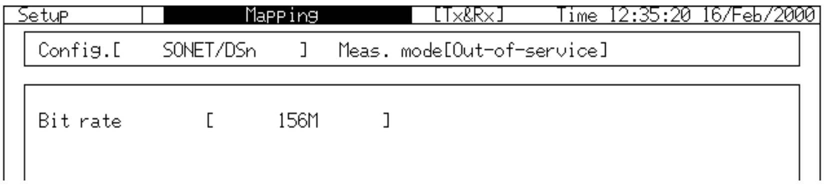
Measurement conditions displayed on the screen are set through windows or one-shot entry as described in 4.4, depending on the contents of the entry. The windows include item selection, numeric entry and character entry windows as follows:

4.3.1 Setting through Item Selection Window

By selecting an item an item selection window is displayed for setting the measurement conditions. Operation procedure in this window is described below.

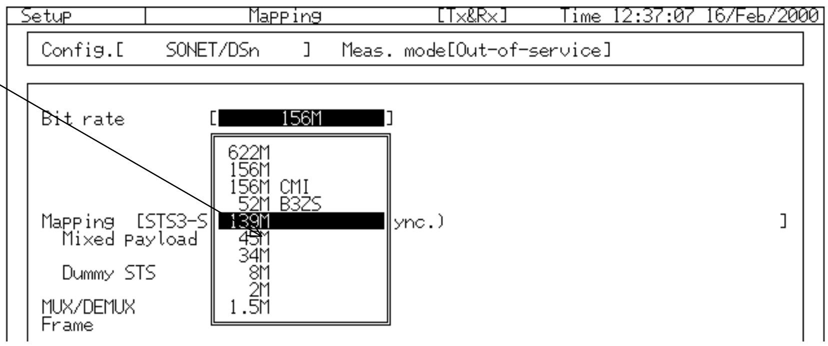
Example ... Setting the bit rate to ‘139M’ on the ‘Setup : Mapping’ screen.

(1) Move the cursor with ∧ ∨ < > to the desired item.



(2) Press Set to close the item selection window. Now the desired item is set.

Item Selection Window

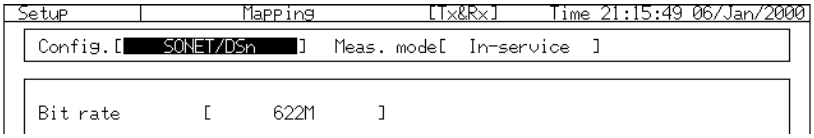


4.3.2 Setting 'Yes/No' Dialog Box

A 'Yes/No' dialog box for operator confirmation is displayed for some selection items.

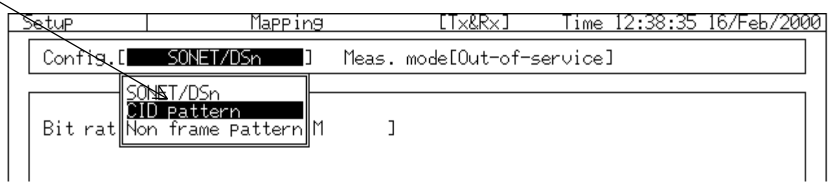
Example....Changing the 'Config' from 'SONET/DSn' to 'CID pattern' on the 'Setup : Mapping' screen.

(1) Move the cursor to 'Config' and press Set.



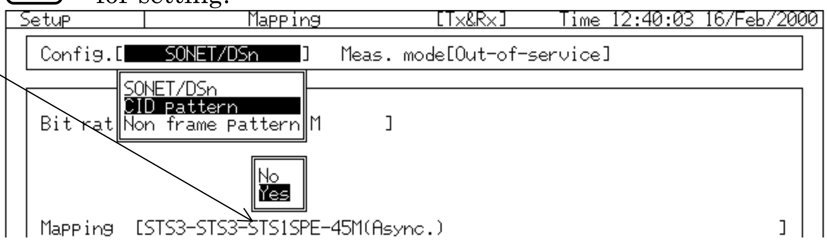
(2) An item selection window is opened. Move the cursor to 'CID pattern' and press Set.

Item Selection Window



(3) A 'Yes/No' dialog box is opened. Move the cursor to 'Yes' and press Set for setting.

'Yes/No' Dialog Box



- Move the cursor to 'No' and press Set, or press Cancel to cancel the setting.

4.3.3 Setting through Numeric Entry Window

The numeric entry window is displayed for setting the measurement conditions by numeric entry. The operation procedure in this window is as follows:

Example ... Setting the number of a frame to '6,401', when selecting 'Burst' as an alarm(AIS-L) item on the 'Test menu : Manual' screen.

(1) Move the cursor with ∧ ∨ to the numeric-entry location.

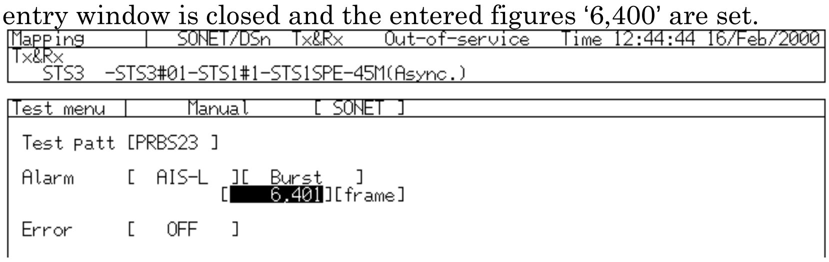
(2) A numeric entry window is opened, Move the cursor with < > to the desired character.

(3) Change the value using ∧ ∨.

Numeric Entry Window

(4) Repeat steps (2) and (3) until the desired value is obtained.

(5) Press Set after completing the numeric entry. The numeric entry window is closed and the entered figures '6,400' are set.

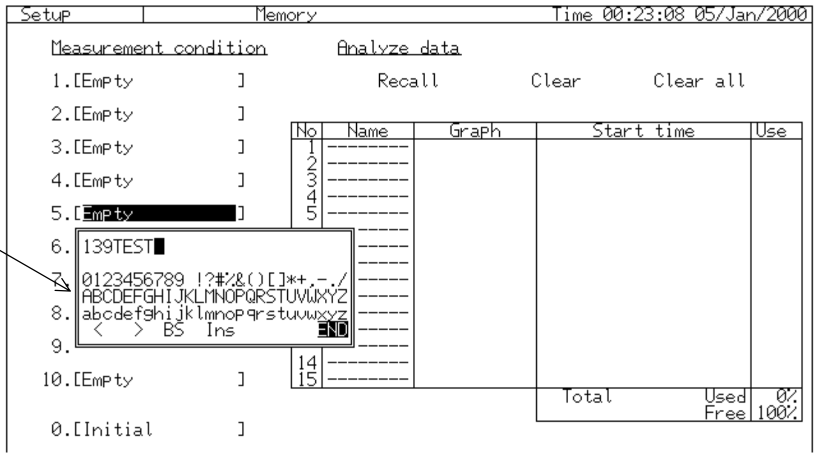


4.3.4 Setting through Character Entry Window

A character entry window is opened if settings are required for an item, as in the case of saving data which requires a file name entry. Operation procedure in this window is described below.

Example.... Saving the measurement conditions named '139TEST' in the 5th memory on the ‘Setup : Memory’ screen.

Character Entry Window



(1) Open the 'Setup : Memory' screen.

(2) Verify that '5.' on the 'Measurement condition' indicates 'Empty' (free memory space).

(3) Move the cursor to '5.' on 'Measurement condition' and press Set.

(4) The item selection window is opened. Make sure that it displays 'Store', and press Set.

(5) The character entry window appears. Input the character string, '139TEST'.

(6) After entering the string, move the cursor to 'END'.

(7) The character entry window is closed and the measurement conditions file named '139TEST' is saved in the 5th memory when you press Set.

NOTE

The setting character strings should be up to 15 characters, and the excess characters are deleted.

The character entry window has the following function characters.

Function character	Operation
<	Moves the setting position cursor to the left. Moves the cursor to the right end if it is located at the left end of the setting character field.
>	Moves the setting position cursor to the right. Moves the cursor to the left end if it is located at the right end of the setting character field.
BS	Deletes a character on the left of the setting position cursor, and moves the character strings located after the position of the setting position cursor to the left. If the setting position cursor is located at the left end of the setting character field, no character is deleted.
Ins	Moves the character strings located after the position of the setting position cursor to the right by one character, and inserts a blank at the position of the setting position cursor.
END	Sets the character strings and closes the character string window.

4.4 One-shot Entry

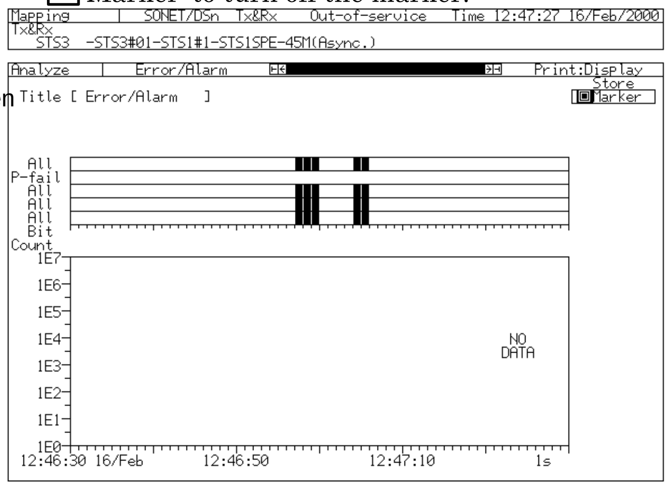
One-shot entry allows an entry to be completed when [Set] is pressed without any window for setting. Here is an example.

Example ...Alternating On/Off setting of marker on the 'Analyze : Error/Alarm' screen by one-shot entry.

'■ Marker' and '□ Marker' mean marker on and marker off, respectively. The setting can be changed as follows:

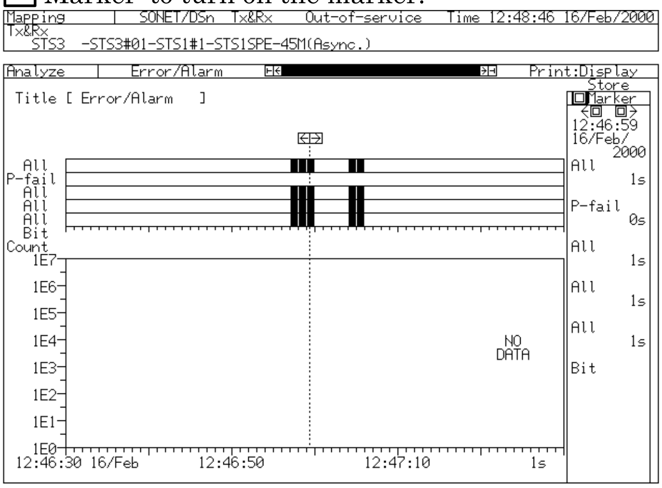
(1) Move the cursor to ' ■ Marker' and press [Set]. It changes into '□ Marker' to turn off the marker.

'Analyze : Error/Alarm' screen without Maker



(2) Move the cursor to ' □ Marker' and press [Set]. It changes into '■ Marker' to turn on the marker.

'Analyze : Error/Alarm' screen with Maker



This way, each time [Set] is pressed, the condition changes between on and off alternately.

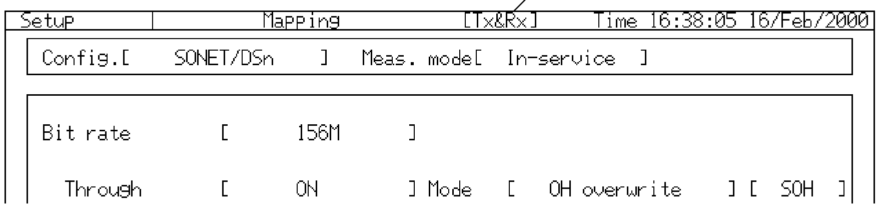
Section 5 Basic Setting and Application Examples of Connection

This Section describes the applications of connections and the basic setup performed on the 'Setup : Mapping' screen, through measurement examples. (*****) [*****] in this section represent front panel keys.

5.1 Setting Basic Parameters *'Setup : Mapping' screen*

When the MP1570A and the equipment to be tested are connected, basic parameters, such as a signal type, an interface, and a frame structure, are set on the 'Setup : Mapping' screen. The explanations for each parameter are shown below.

(a)



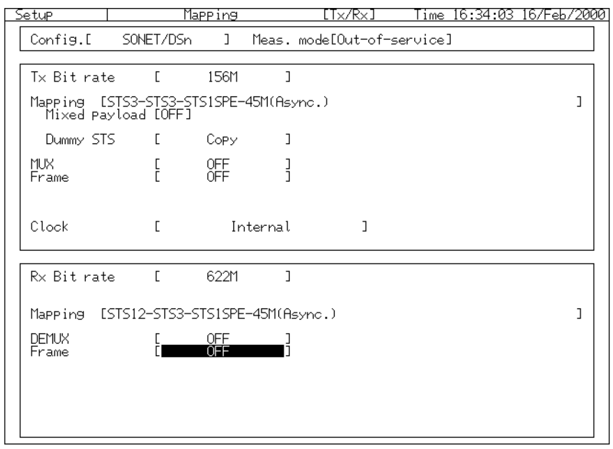
(a) [Operation mode] ..... Sets the Tx and RX operation mode
Tx&Rx.....Tx signal and Rx signal are set up simultaneously.

Display Example of the "Tx&Rx" Mode

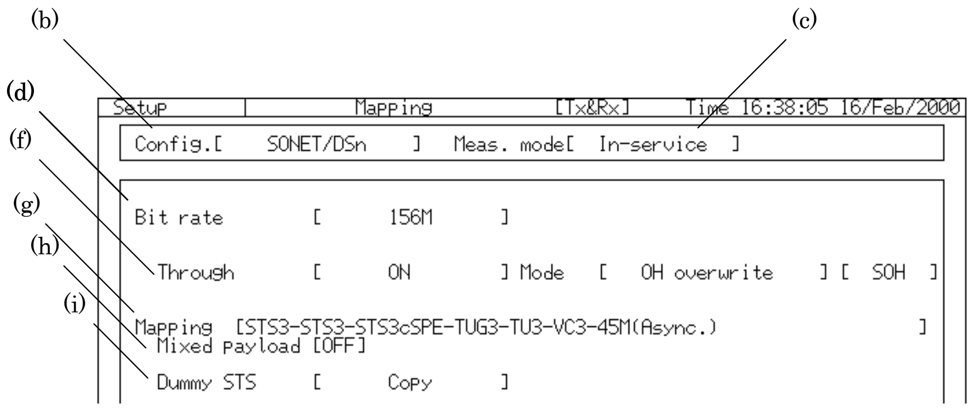
Tx/Rx .....Tx signal and Rx signal are set up separately.

Display Example of the "Tx/Rx" Mode

- Parameters for Tx and Rx are displayed separately.



- When changing the mode from the Tx/Rx mode to the Tx&Rx mode, the Tx signal is set as same as the Rx signal.



(b) Config. .....Sets a signal type to be measured, a frame type, and a payload type.

- When the “Config.” mode is changed, the setup on the screen is initialized.

(c) Meas. Mode .....Specifies the measurement mode.

In-service .....Select this mode when the equipment to be tested is in service. In this case, the payloads of the signal are not measured.

Out-of-service ....Select this mode when the equipment to be tested is not in service.

- “In-service” is valid for Tx&Rx only.

(d) Bitrate .....Sets the bit rate and interface

Note

When the MP0121A and an interface unit are being installed, “156 CMI” and “156M” are displayed on the item selection window of the bit rate.

156M CMI .....Select “156M CMI” when using 156M CMI interface of the MP0121A.

156M .....Select “156M” when using 156M interface of the interface unit.

(e) Monitor input .....Set it to “ON” when using electric NRZ interface. The MP1570A reproduces a clock from the received NRZ data, and measures the NRZ data.

- This parameter can be set when the optical interface of the MP0122B is selected as the receiving interface.

(f) Through .....Set it to "ON" when the received SONET signal is outputted through the MP1570A. There are the following three types.

Transparent ..... Outputs the received data as it is.

OH overwrite .....Outputs the received data overwriting the overheads to the preset overheads.

TOH 1 byte overwrite.... Converts the any 1 byte within TOH of the received signal to the preset data, and sends it.

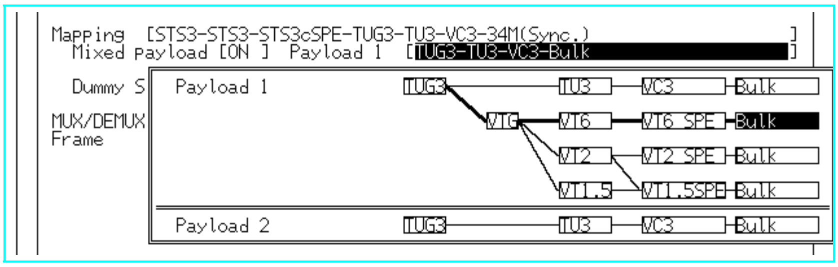
POH 1 byte overwrite.... Converts the any 1 byte within POH of the received signal to the preset data, and sends it.

Payload overwrite .....Outputs the received data overwriting the payloads.

- When the through mode is set to On, a send clock is set to the clock reproduced from the received data (Receive) automatically.

(g) Mapping .....Specifies the mapping of the measurement channel.

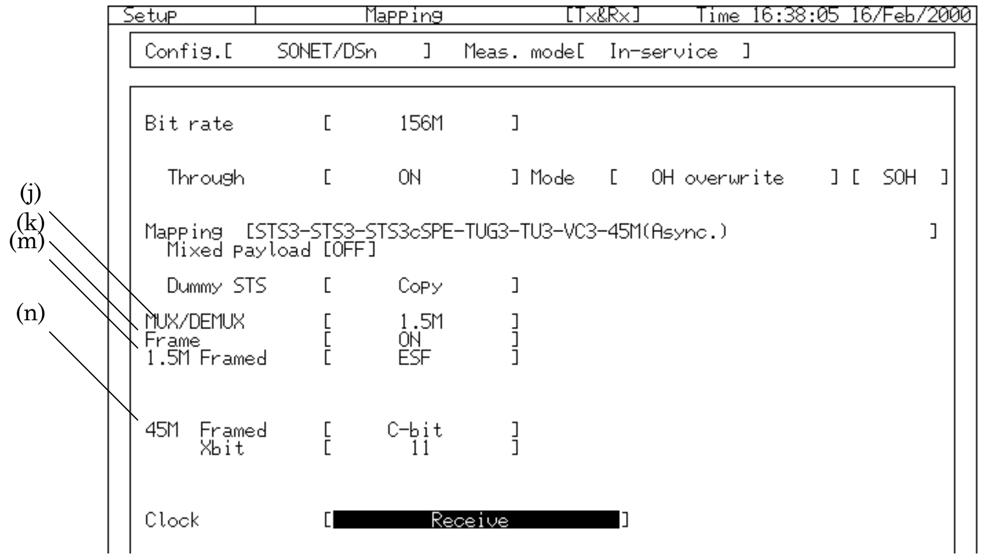
(h) Mixed payload .....On the mapping including TUG3 or STS1 SPE, MP1570A allows the setting of mapping for TUG3 or STS1 SPE channels without the measurement channel which is different from that of the measurement channel. See "6.7 Editing Dummy Channel" for the details.



(i) Dummy......The MP1570A can set channels other than the SONET signal measurement channel. See "6.7 Editing Dummy Channel" for the details.

Copy.....Inserts the same pattern as that of STS3 with measurement channel.

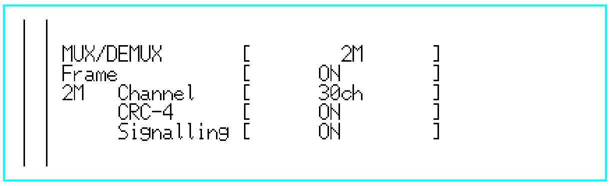
Dummy.....The mapping includes Bulk mapping of the layer with measurement channel.



(j) MUX/DEMUX.....Set the hierarchical configuration of PDH/DSn. The selected rate is the lowest stage.

(k) Frame.....Sets the frame On/Off for the PDH/DSn lowest stage.When “MUX/DEMUX” is set to On, it sets the lowest stage frame On/Off.

(l) 2M setting .....Sets parameters for 2M frame and interface.



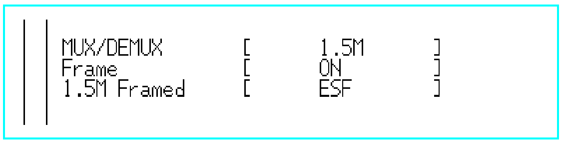
Channel.....Selects the number of channels (30 or 31) of the 2M frame.

CRC-4.....Set the CRC-4-On/Off of the 2M frame.

Signaling...The alarm of the signalling frame is analyzed by setting it to “ON”.

Interface.....Selects Balanced mode or Unbalanced mode for the 2M signal.

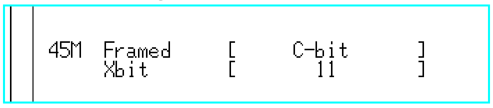
(m) 1.5M setting.....Sets parameters for the 1.5M frame and interface.



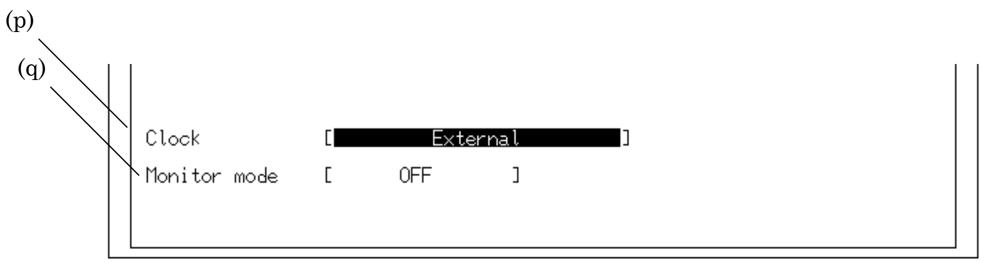
Frame.....Specify the frame type when “Frame” is set to “ON”.

Code....Set the 1.5M signal code.

(n) 45M setting.....Sets the 45M frame and the X bit.



(o) DSX.....Specifies DSx when the bit rate is 1.5M, 45M, or 52M.



(p) Clock.....Selects the clock source for transmission.

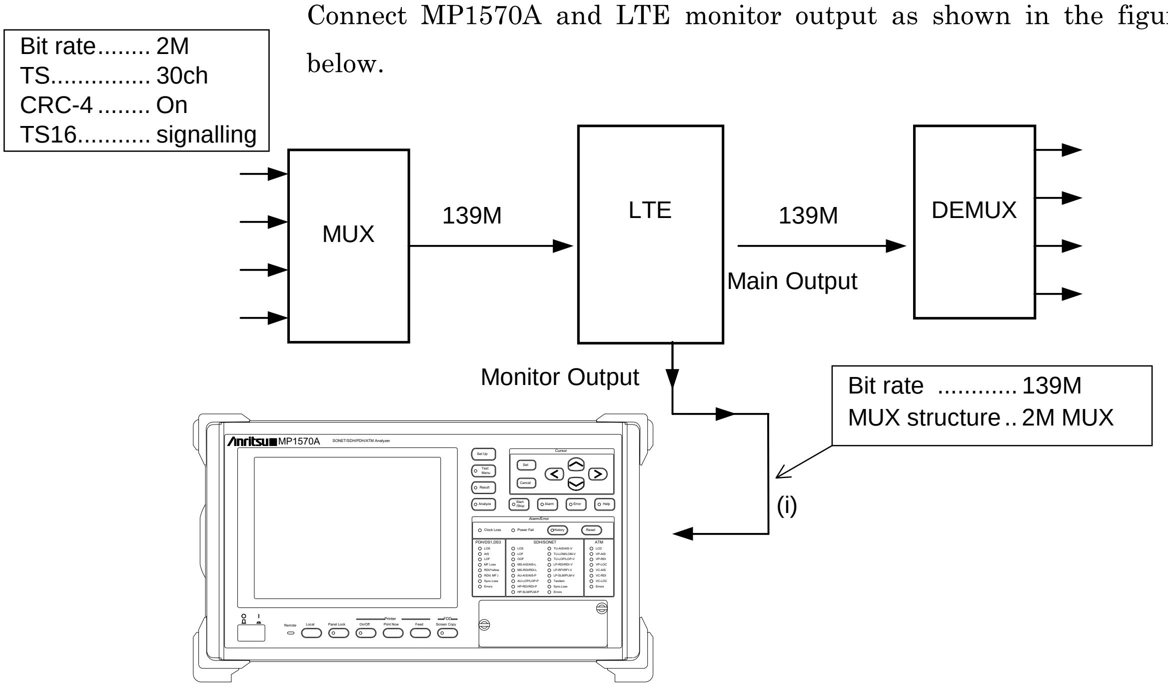
(q) Monitor mode......Set it to “ON” when connecting the MP1570A to the monitoring point of the equipment to be tested.

5.2　DSn Monitoring

In the following example, the 139M DSn signal, that is, the muitiplexed 2M signal, is measured by the monitor output of LTE (Line Terminal Equipment) in-service mode.

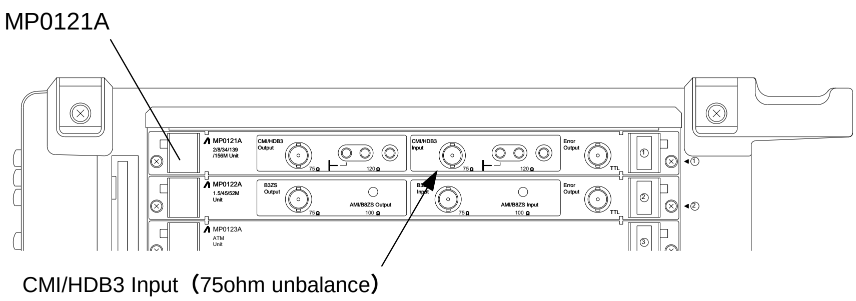
5.2.1　Connection

Connect MP1570A and LTE monitor output as shown in the figure below.



(i)　Turn off the power switch of MP1570A and install the MP0121A 2/8/34/139/156M unit.

(ii)　Connect the LTE monitor output and the CMI/HDB3 input connector of MP0121A with the BNC (75 ohm) coaxial cable.



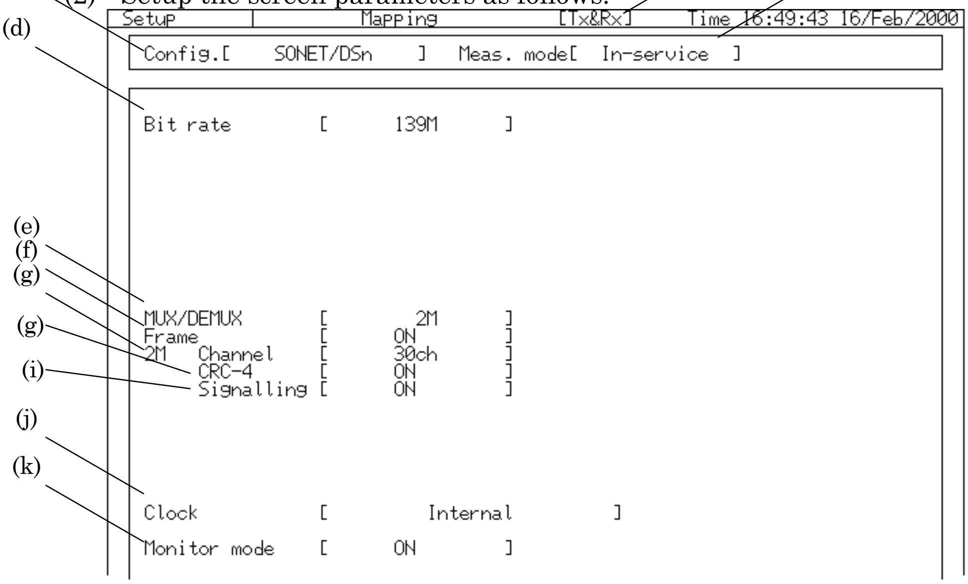
(iii) Turn on the power switch of MP1570A after verifying the connection in (ii).

5.2.2 Initial Setting *'Setup : Mapping' screen*

Here is the initial setting procedure for the measurement structure described on the previous page.

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode]... Select the 'Tx&Rx' operation mode.

(b) Config................ Select the 'SONET/DSn' configuration.

(c) Meas. Mode........ Select the 'In-service' measuring mode.

(d) Bit rate.............. Set the bit rate to '139M'.

(e) MUX/DEMUX... Set the hierarchical DSn configuration.

- It's displayed when MUX/DEMUX option is installed.

(f) Frame .... Set the DSn frame to 2M

(g) 2M Chan .... Set the 2M frame channel number to 30ch.

(h) CRC-4 .... Turn on the 2M frame 'CRC-4'.

(i) Signalling .... Turn on the 2M frame 'Sigalling'.

- (g), (h), and (i) are displayed only when (d) bit rate is set at 2M or when (e) MUX/DEMUX is set at 64K or 2M.

(j) Clock .... No setting is required, because no signal is sent.

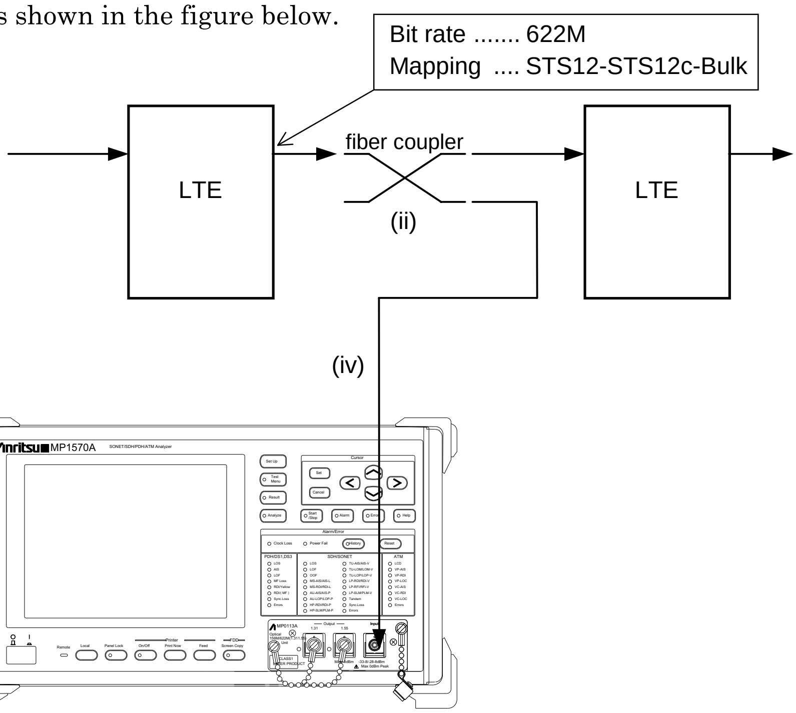
(k) Monitor mode ... Turn on the monitor mode in this example, because the unit is connected to the LTE monitor point which outputs the signal after attenuation by 20 dB.

5.3 SONET Monitoring (Measurement of LTE output through a coupler)

In the following example, the SONET signal of STS12-STS12c-Bulk concatenation mapping is measured in the in-service mode.

5.3.1 Connection

Connect MP1570A to LTE output after the latter is branched by a coupler as shown in the figure below.



(i) Turn off the power switch of MP1570A and install the MP0111A, MP0112A, or MP0113A Optical Interface Unit.

(ii) Branch the LTE main output signal to be inputted to the MP1570A with an optical fiber coupler.

(iii) Confirm that the input level of the optical signal does not exceed the absolute maximum rating (0 dBm at peak power).

(iv) Connect the signal branched in procedure (ii) to the input connector of the optical interface unit, with an optical fiber.

(v) After performing the connection steps (ii) through (iv), turn on the power switch of MP1570A.

CAUTION ⚠

Remember that the input level of the optical signal to the optical interface unit or the MP0122B must not exceed the absolute maximum rating (0 dBm at peak power). Excessive input level can damage the internal devices and circuit.

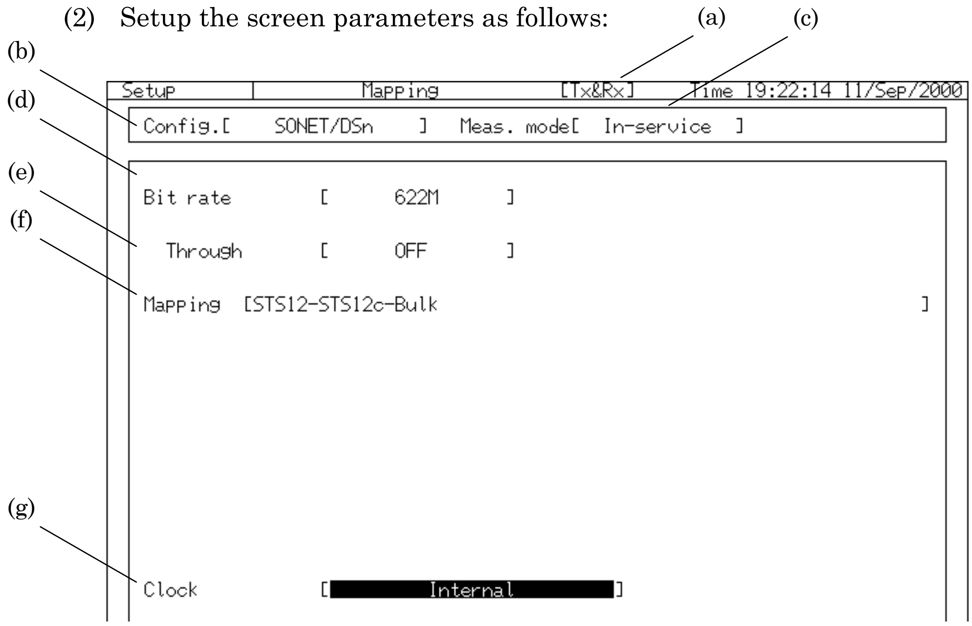
5.3.2 Initial Setting

'Setup : Mapping' screen

Here is the initial setting procedure for the measurement structure described on the previous page.

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode]......... Select the 'Tx&Rx' operation mode.

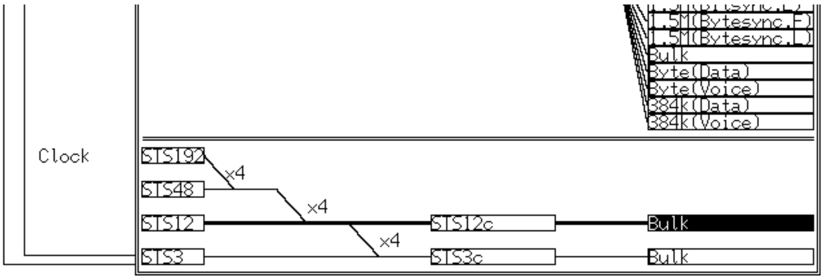
(b) Config. .... Select the 'SONET/DSn' configuration.

(c) Meas. Mode....... Select the 'In-service' measuring mode.

(d) Bit rate............. Set the bit rate to '622M'.

(e) Through .... Turn off the through mode.

(f) Mapping.............The mapping selection window below is displayed if you move the cursor here and press Set. Select 'STS12-STS3cSPEc-Bulk' with ∧ ∨ < >.



- The mapping differs according to the installed plug-in units, optical interface unit, and optional items.

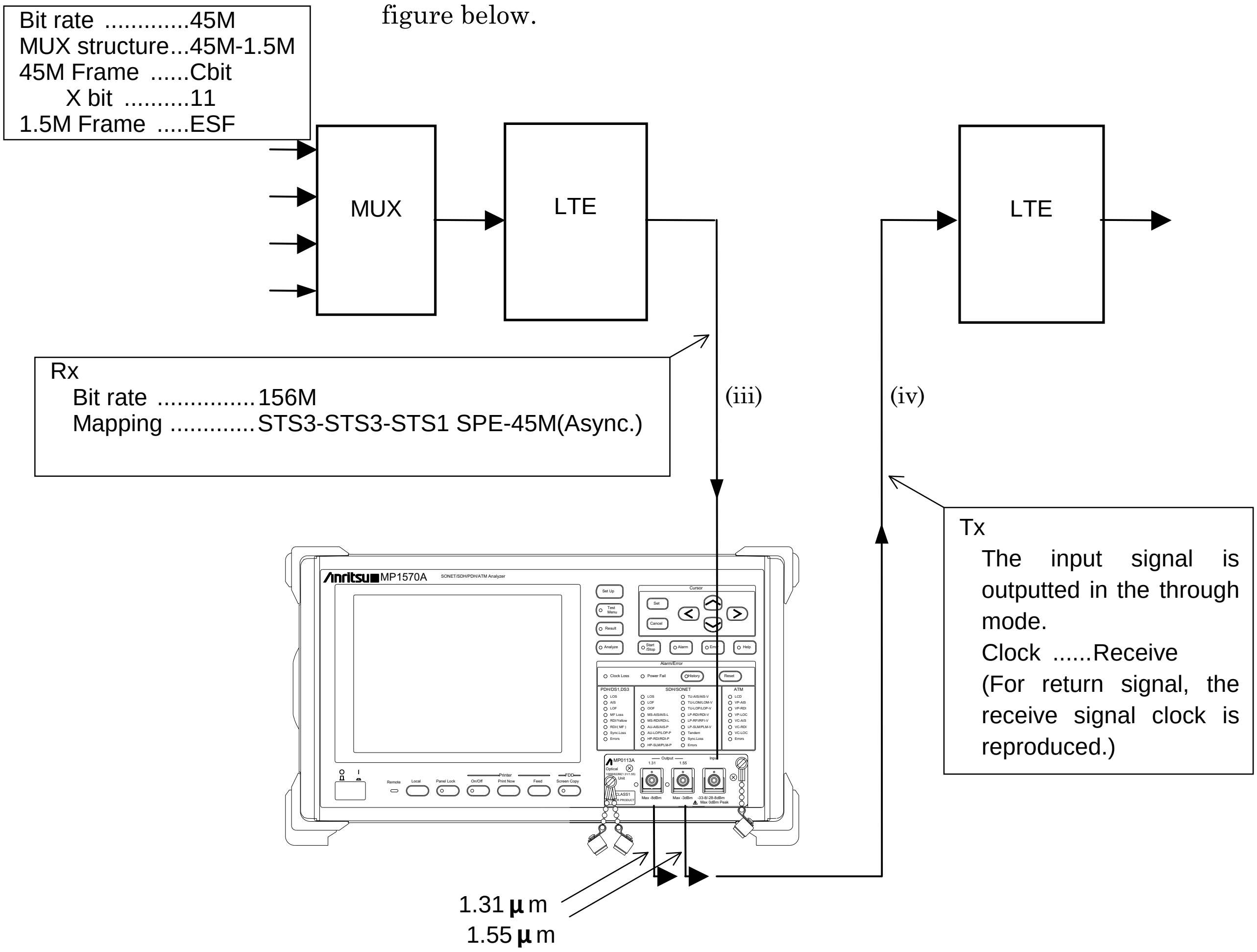
(g) Clock .... No setting is required, because no signal is sent.

5.4 SONET Monitoring (Through-mode monitoring)

Here is the measurement procedure of the SONET signal of STS3-STS3-STS1SPE-45M(Async.) measured in the through mode.

5.4.1 Connection

Connect the input and output of LTE and MP1570A as shown in the figure below.



(i) Turn off the power switch of MP1570A and install the MP0111A/12A/13A, and MP0122A or MP0122B unit.

(ii) Verify that the LTE signal level input to MP1570A is below the absolute maximum rating (0 dBm at peak power) of the optical interface unit.

(iii) Connect the signal after the level check, to the input connector of the optical interface unit with the optical fiber in single mode.

(iv) Connect the output connector (connector with the same wavelength as that of input signal) of optical interface unit to the LTE input connector with the single mode optical fiber.

(v) After connection steps (iii) through (iv), turn on the power switch of MP1570A.

CAUTION ⚠

- Remember that the input level of the optical signal to the optical interface unit or MP0122B must not exceed the absolute maximum rating (0 dBm at peak power). Excessive input level can damage the internal devices and circuit.
- In through mode measurement, make sure before making the connections that the output level from the optical interface unit of MP1570A does not exceed the absolute maximum rating level.

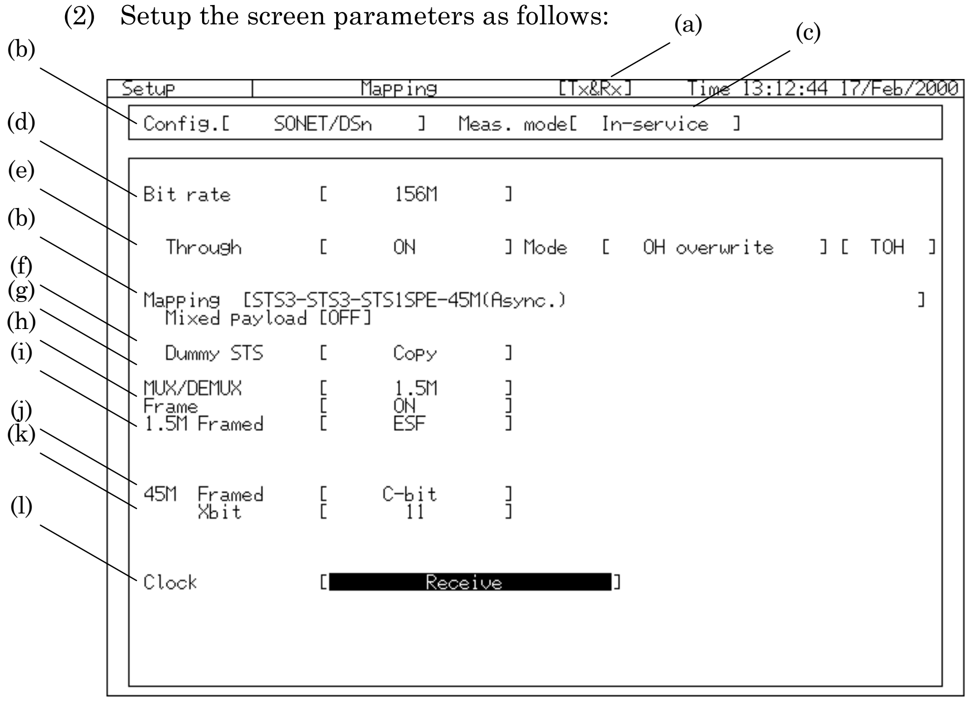
5.4.2 Initial Setting

'Setup : Mapping' screen

Here is the initial setting procedure for the measurement structure described on the previous page.

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode]......... Select the 'Tx&Rx' operation mode.

(b) Config............... Select the 'SONET/DSn' configuration.

(c) Meas. Mode....... Select the 'In-service' measuring mode.

(d) Bit rate............. Set the bit rate to '156M'.

- The signal type differs according to the installed unit when 156M is selected. The 156M NRZ signal is selected when MP0108A is installed, while 156M optical signal is selected when MP0111A, MP0112A or MP0113A is installed.

(e) Through .... Turn on the through mode, selecting one from the following three items.

Transparent......... Loops and sends the received signal as it is.

OH overwrite ...... Converts the overhead of the received signal to the preset data, and sends it. The overhead to be edited is selected from “All”, “TOH”, “POH”, “K1/K2”, and “S1” (“K1/K2” and “S1” are available when option-22 (K1/K2 Overwrite Through) is installed). For the overhead presetting, see ‘6.4 Editing SONET Overhead'.

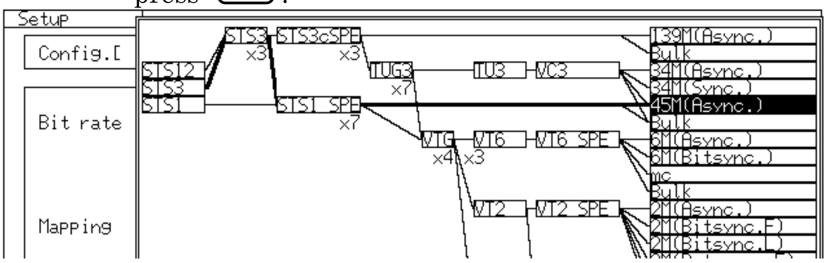
TOH 1 byte overwrite ...... Converts the any 1 byte within TOH of the received signal to the preset data, and sends it.

POH 1 byte overwrite ... Converts the any 1 byte within POH of the received signal to the preset data, and sends it. For the overhead presetting, see ‘6.4 Editing SONET Overhead’.

Payload overwrite ... Converts the payload of the received signal to the test pattern preset on the 'Test menu : Manual' screen, and sends it. For the test pattern setting, see ‘7.2 Manual measurement’.

(f) Mapping ....Set the mapping to ‘STS3-STS3-STS1 SPE-45M(Async.)’

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press the Set. Select the mapping and route with ∧ ∨ < > and press Set.



- The mapping differs according to the installed plug-in unit, optical interface unit and optional items.

(g) MUX/DEMUX .. Set it to ‘1.5M’.

(h) Frame .... Turn on the ‘PDH (DSn) frame’.

(i) 1.5 Framed .... Set the 1.5M frame to ‘ESF’.

(j) 45M Framed ..... Set the 45M frame to ‘Cbit’.

(k) Xbit .... Set the Xbit to ‘11’.

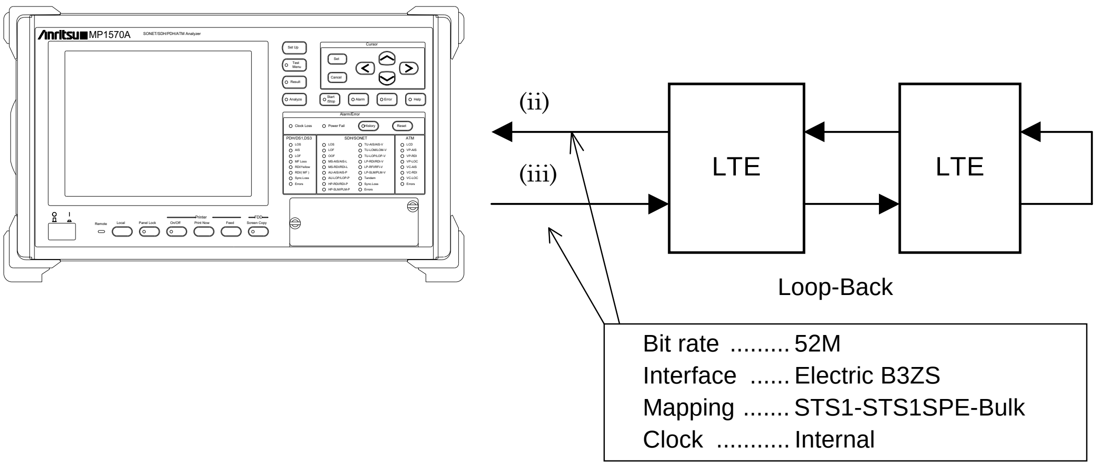
(l) Clock .... The transmitting signal clock source is set to 'Receive' automatically when the through mode is set to On.

5.5 Loop-Back Test

Here is the procedure for receiving/sending the mapping 'STS1-STS1SPE-Bulk' signal and testing it through the measurement system containing a loop back.

5.5.1 Connection

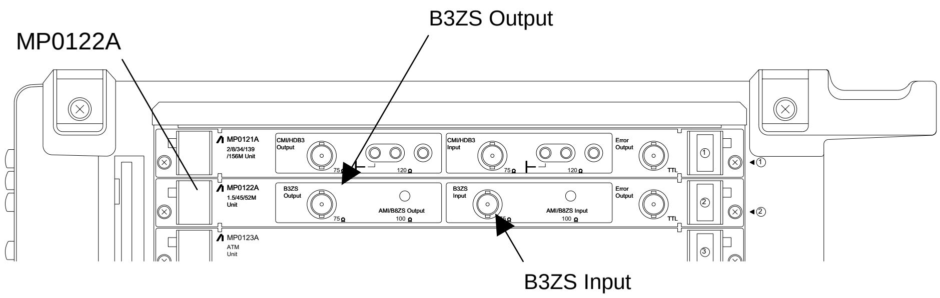
Connect the input and output of LTE and MP1570A as shown in the figure below.

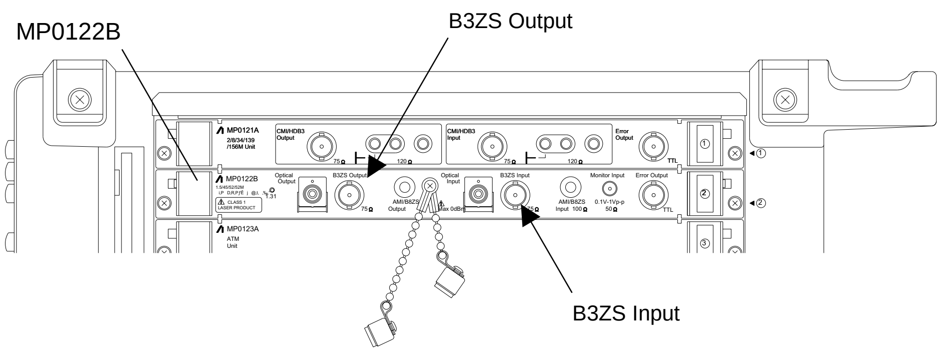


(i) Turn off the power switch of MP1570A, and install MP0122A or MP0122B.

(ii) Connect the LTE output connector and the B3ZS input connector of MP0122A or MP0122B to the BNC (75 ohm unbalance) cable.

(iii) Connect the LTE input connector and the B3ZS output connector of MP0122A or MP0122B to the BNC (75 ohm unbalance) cable.





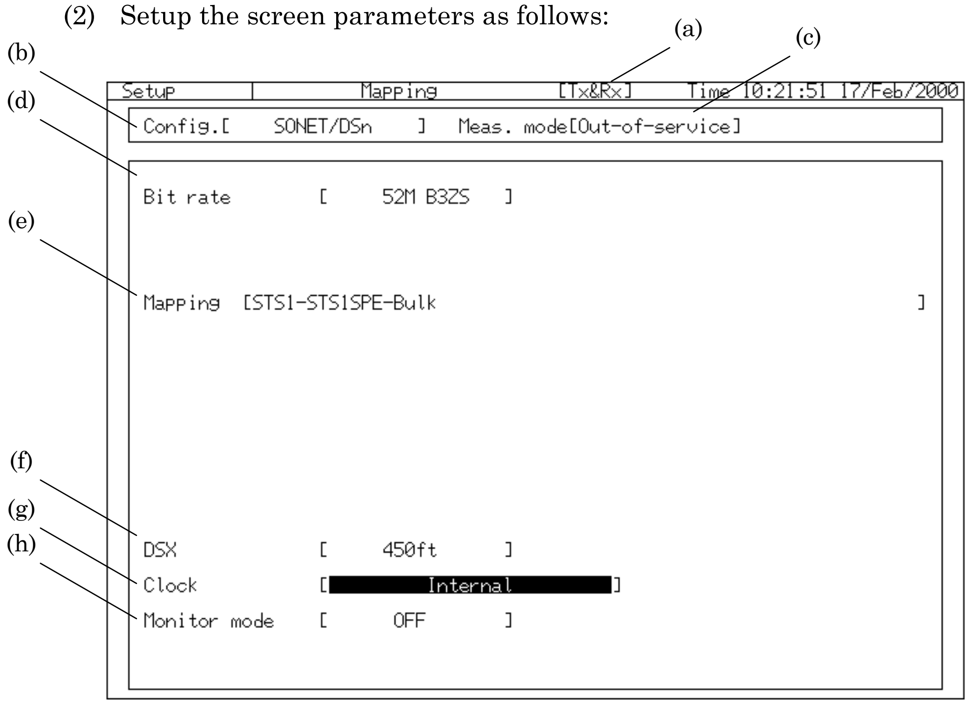
(iv) Turn on the power switch of MP1570A after performing the connections in steps (ii) and (iii).

5.5.2 Initial Setting

'Setup : Mapping' screen

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode]......... Select the 'Tx&Rx' operation mode.

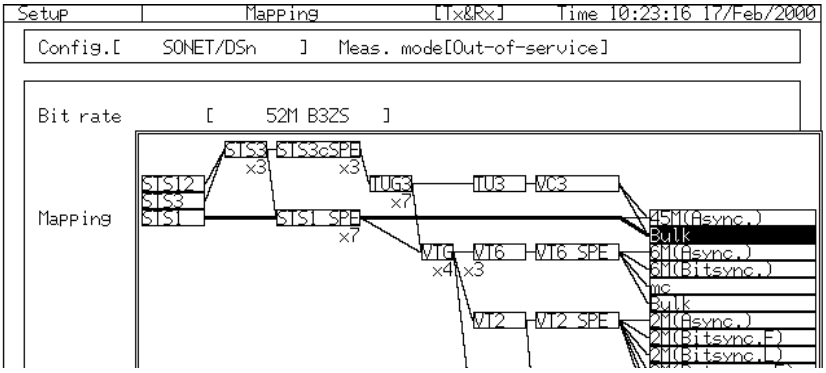
(b) Config................ Select the 'SONET/DSn' configuration.

(c) Meas. Mode....... Select the 'Out-of-service' measuring mode.

(d) Bit rate.............. Set the bit rate to '52M B3ZS'.

(e) Mapping... Set the mapping to 'STS1- STS1 SPE-Bulk'

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press [Set]. Select 'STS1- STS1 SPE-Bulk' with [∧] [∨] [<] [>].



- The mapping differs according to the installed plug-in unit, optical interface unit and optional items.

(f) DSX... Set the DSX.

(g) Clock... Set 'Internal' as the transmitting signal clock source.

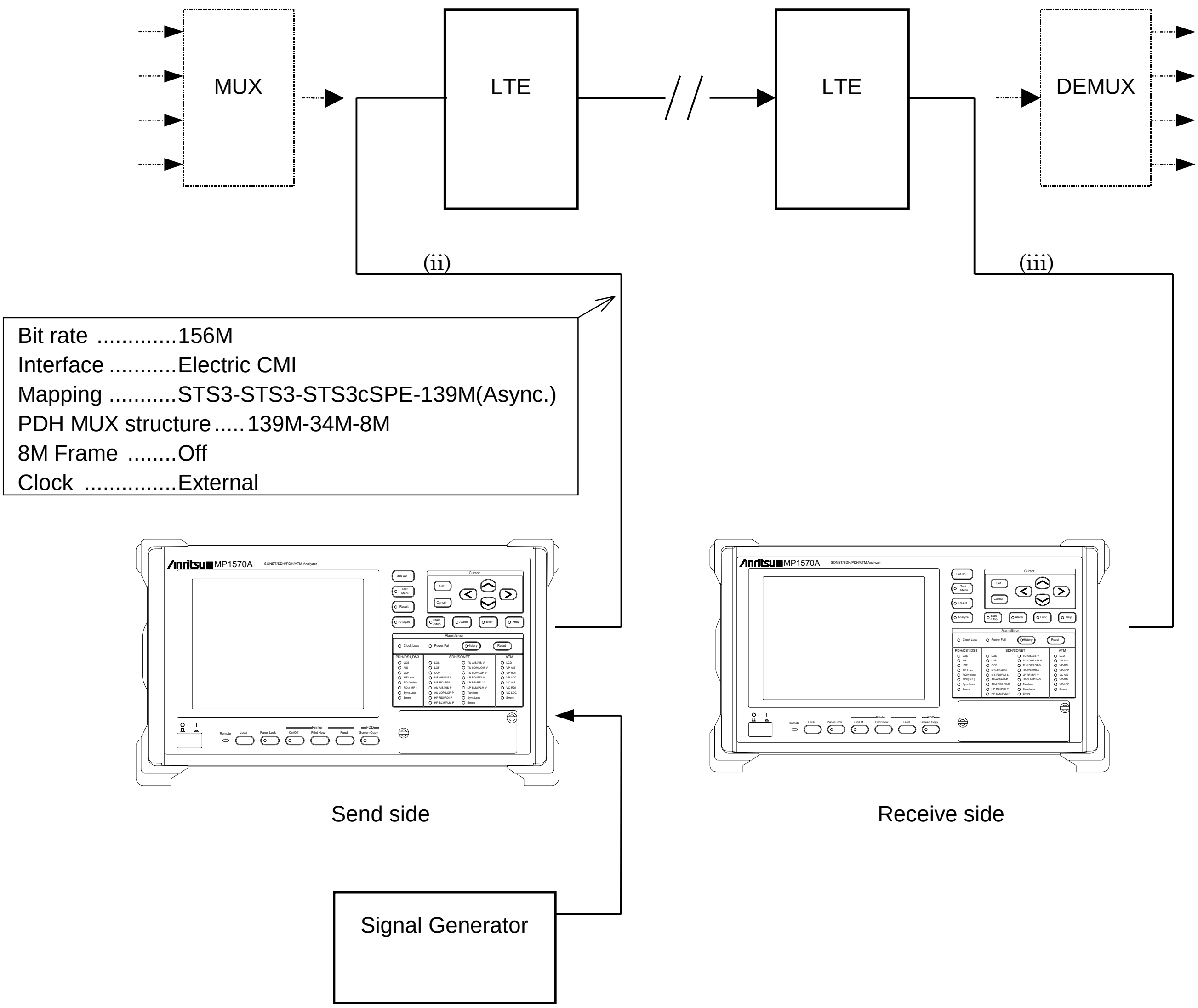
(h) Monitor mode ....Turn off the monitor mode because it is connected to the main output of LTE.

5.6 End-to-End Measurement

Here is the end-to-end measurement procedure using one unit each of MP1570A at the transmitting side and receiving side of one line.

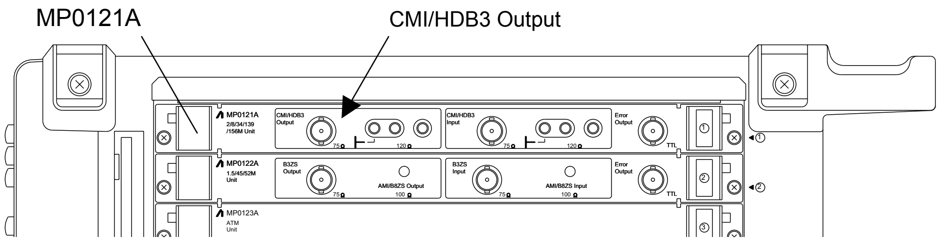
5.6.1 Connection

Connect MP1570A and the line as shown in the figure below.

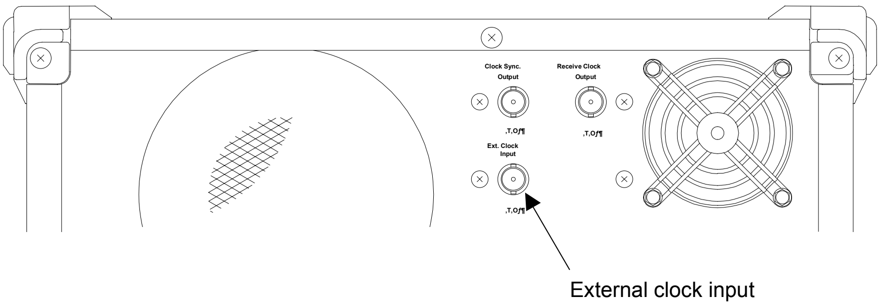


(i) Turn off the power switch of MP1570A at both transmitting and receiving sides, and install MP0121A.

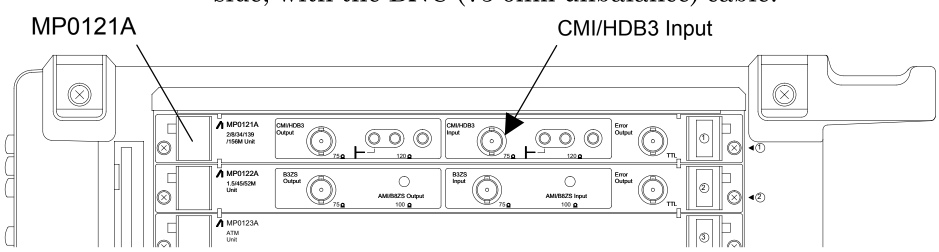
(ii) Connect the CM1/HDB3 output connector of MP0121A of MP1570A at the transmitting side to the input connector of LTE at the transmitting side, with the BNC (75 ohm unbalance) cable.



(iii) Connect the clock output of the signal generator to the External clock input connector of the MP1570A, with the BNC (50 ohm unbalance) cable.



(iv) Connect the CM1/HDB3 input connector of MP0121A of MP1570A at the receiving side to the output connector of LTE at the receiving side, with the BNC (75 ohm unbalance) cable.



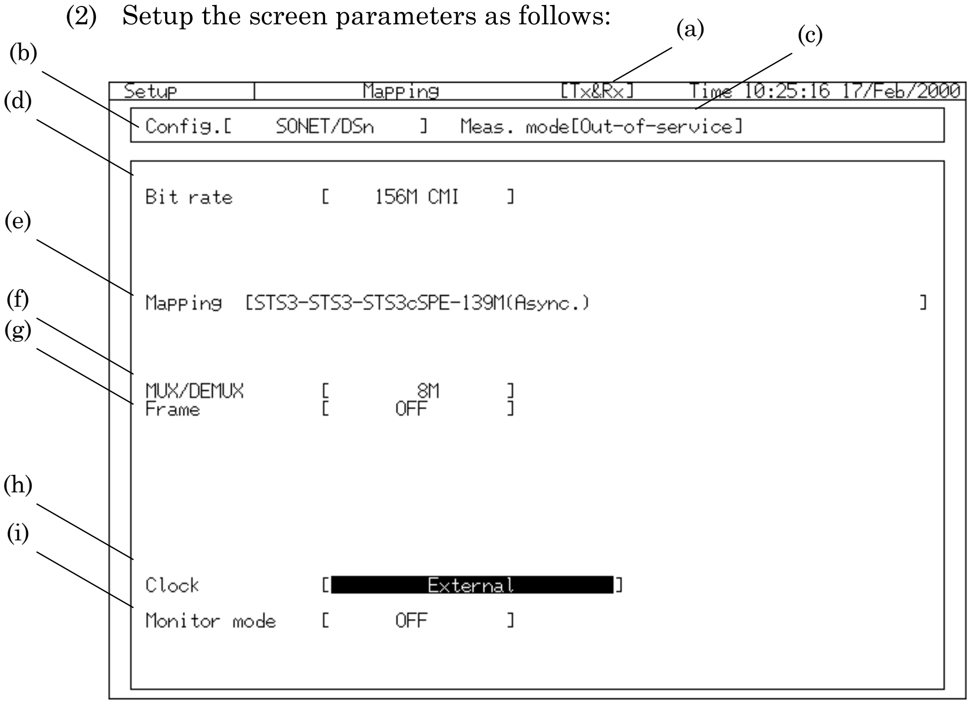
(v) Turn on the power switch of MP1570A at the transmitting and receiving sides after performing the connections in steps (ii) to (iv).

5.6.2 Initial Setting *'Setup : Mapping' screen*

Set MP1570A at the transmitting and receiving sides as follows.

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode] .... Select the ‘Tx&Rx’ operation mode.

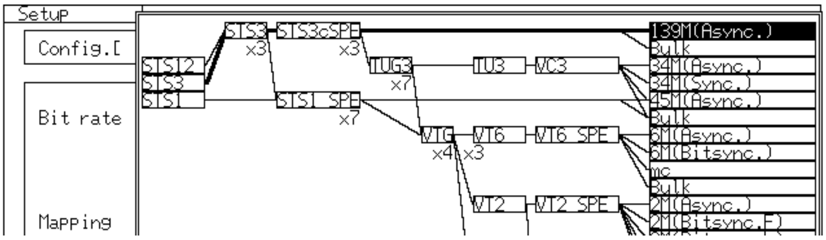
(b) Config. .... Select the ‘SONET/DSn’ configuration.

(c) Meas. Mode ...... Select the ‘Out-of-service’ measuring mode.

(d) Bit rate .... Set the bit rate to ‘156M CMI’.

(e) Mapping . Set the mapping to ‘STS3-STS3-STS3cSPE-139(Async.)’

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press [Set]. Select the mapping with [∧] [∨] [<] [>], and press [Set].



- The mapping window differs according to the installed plug-in unit, optical interface unit and optional item.

(f) MUX/DEMUX .... Set the MUX structure of the DSn signal to '8M'.
  - It is displayed when MUX/DEMUX option item is installed.

(g) Frame .... Turn off the bottom layer frame of DSn.

(h) Clock .... Set 'External' as the transmitting signal clock source. No need of setting for MP1570A at receiving side.

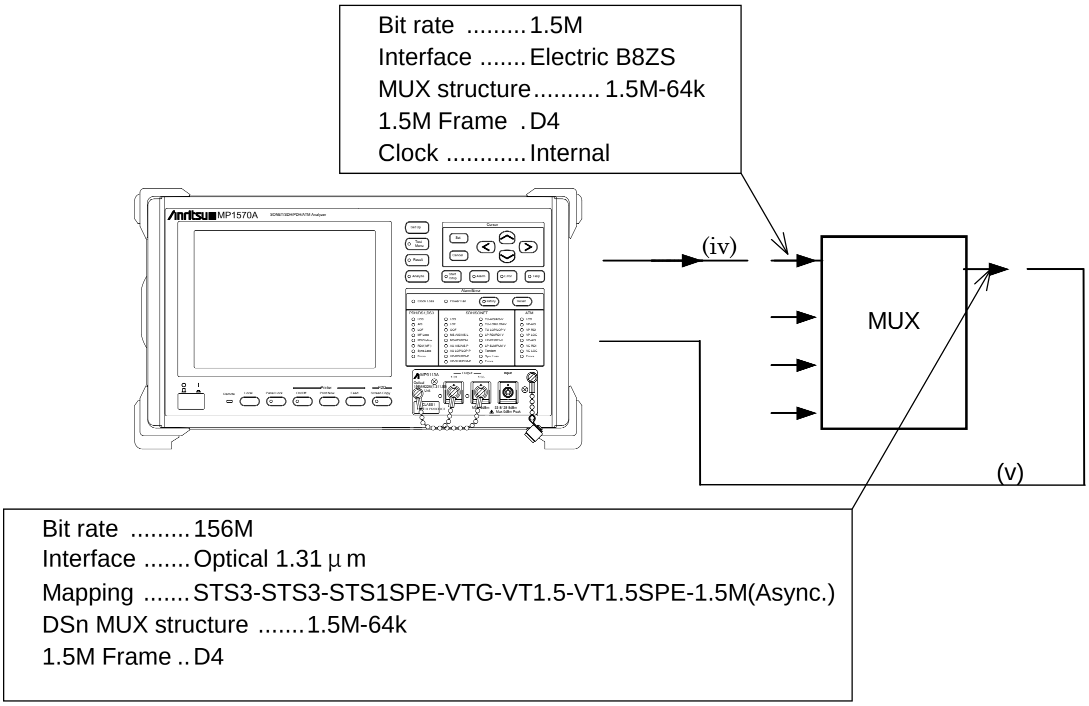
(i) Monitor mode .... Turn off the monitor mode on connecting with the main output of LTE.

5.7 MUX Evaluation Test

Here is the evaluation procedure for the DEMUX (Multiplexer) which multiplexes the 1.5M DSn signal to output the 156M SONET signal.

5.7.1 Connection

Connect the MUX to MP1570A as shown in the figure below.

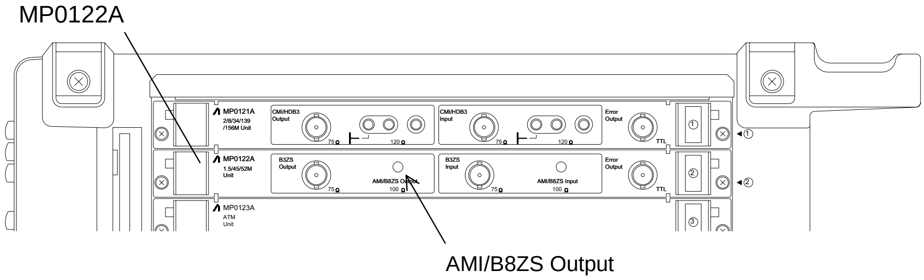


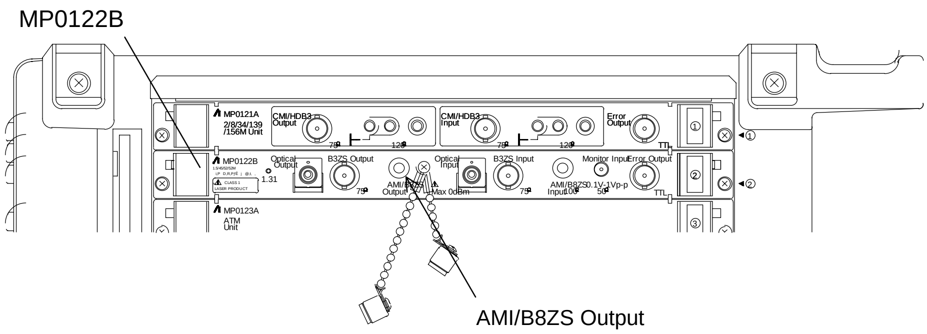
(i) Turn off the power switch of MP1570A.

(ii) Install MP0122A or MP0122B on MP1570A.

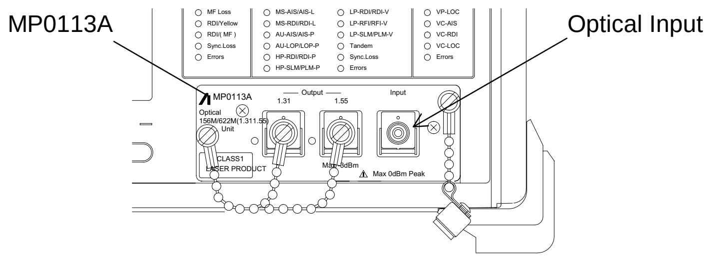
(iii) Install MP0111A, MP0112A, or MP0113A optical interface unit on MP1570A.

(iv) Connect the B3ZSS output connector of MP0122A or MP0122B to the MUX input connector.





(v) Connect the MUX output connector and the optical input connector of the interface unit.

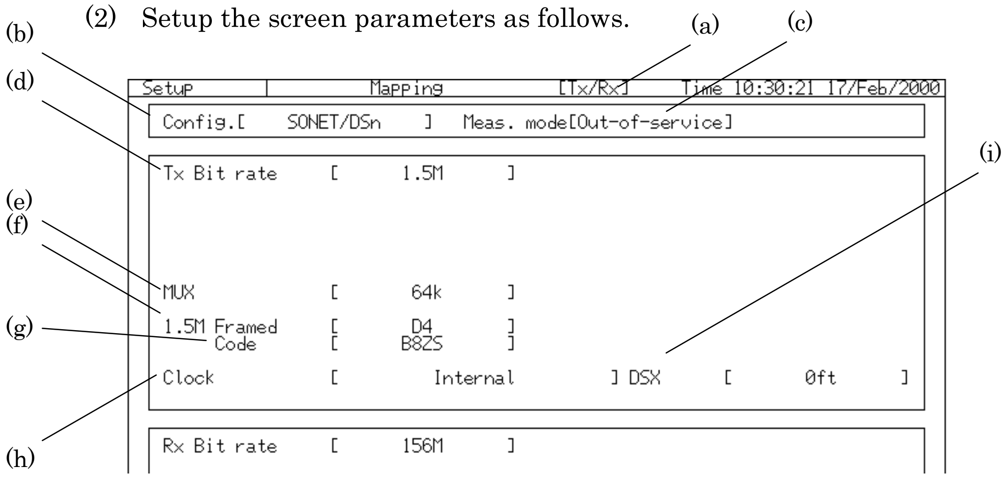


(vi) After the connection, turn on the power switch of MP1570A.

5.7.2 Initial Setting *'Setup : Mapping' screen*

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows.



(a) [Operation mode] .... Select the 'Tx/Rx' operation mode.

(b) Config. .... Select the 'SONET/DSn' configuration.

(c) Meas. Mode .... Select the 'Out-of-service' measuring mode.

Tx side setting

(d) Tx Bit rate .... Set the bit rate to '1.5M'.

(e) MUX .... Set the MUX structure of the DSn signal. In this example, set it to '64k'.

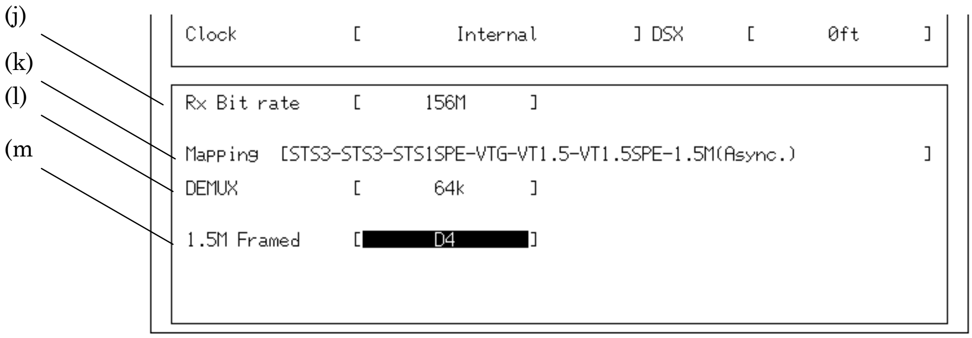
- It is displayed when MUX/DEMUX option item is installed.

(f) 1.5M Framed..... Set the 1.5M frame to 'D4'.

(g) Code .... Set the 1.5M code to 'B8ZS'.

(h) Clock .... Select 'Internal' as the transmitting signal clock source (built-in clock of MP1570A).

(i) DSx .... Select the DSx of 1.5M output signal

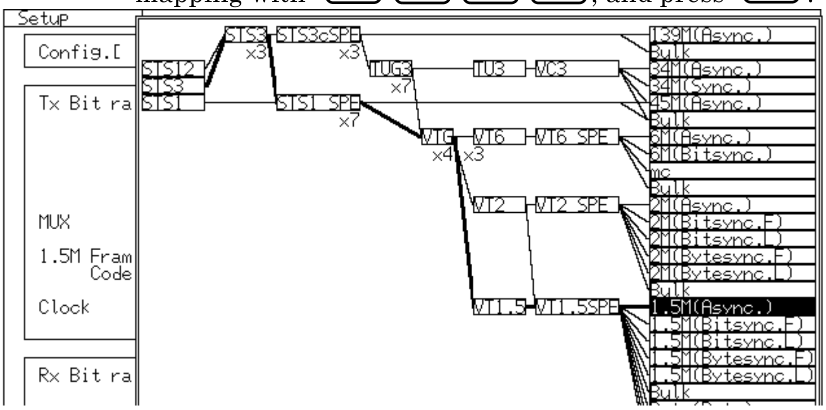


Rx (receive) side setting

(j) Rx Bit rate .... Set the Rx bit rate to ‘156M’.

(k) Mapping .... Set the mapping to ‘STS3-STS3-STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M(Async.)’

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press Set. Select the mapping with ∧ ∨ < >, and press Set.



- The mapping window differs according to the installed plug-in unit, optical interface unit and optional item.

(l) DEMUX .... Set the DEMUX structure of the DSn signal. In this example, set it to ‘64k’.

- It is displayed when MUX/DEMUX option is installed.

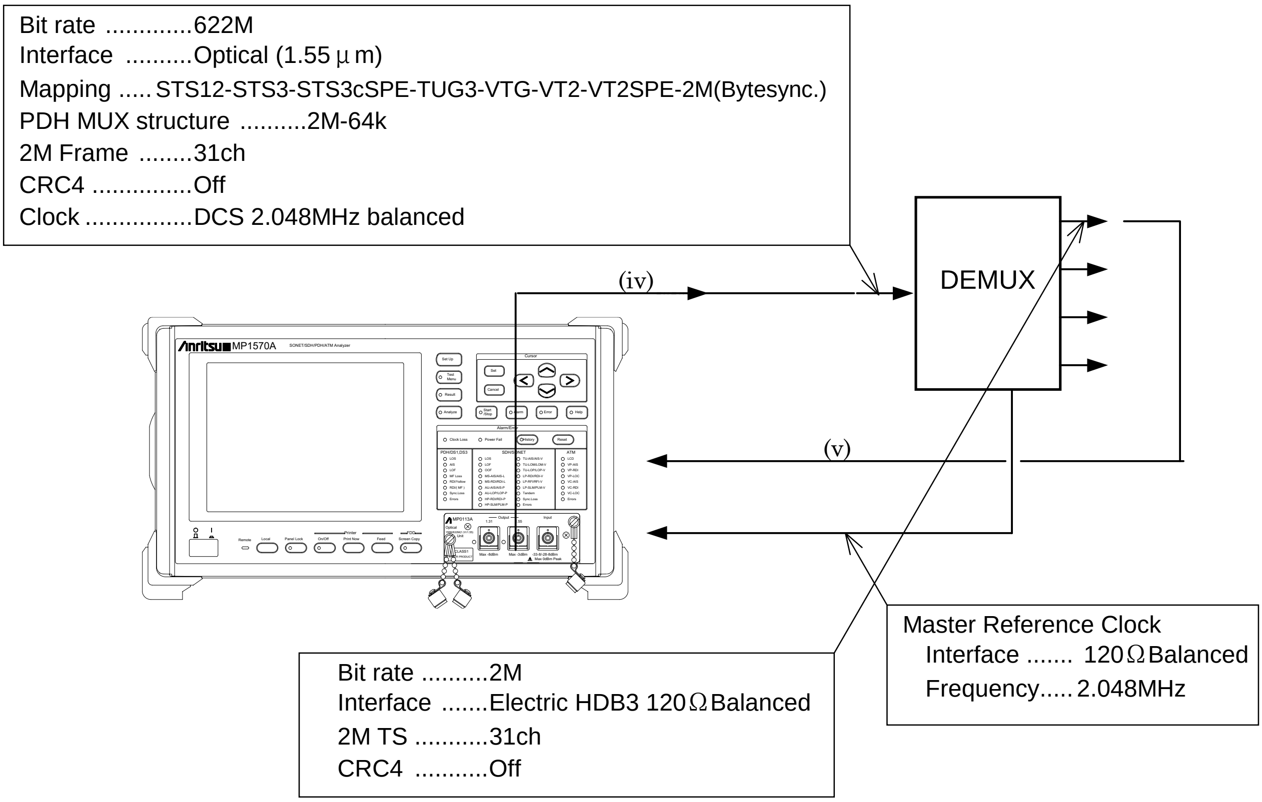
(m) 1.5M Frame ...... Set 1.5M Frame to ‘D4’.

5.8 DEMUX Evaluation Test

Here is the evaluation procedure for the DEMUX (Demultiplexer) which de-multiplexes the 622M SONET signal to the 2M DSn signal.

5.8.1 Connection

Connect the DEMUX to MP1570A as shown in the figure below.

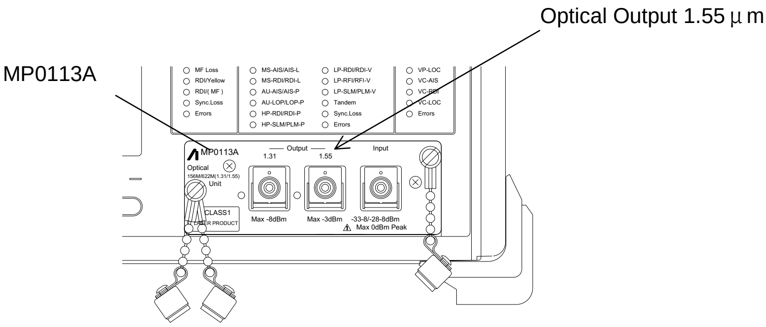


(i) Turn off the power switch of MP1570A.

(ii) Install MP0121 on MP1570A.

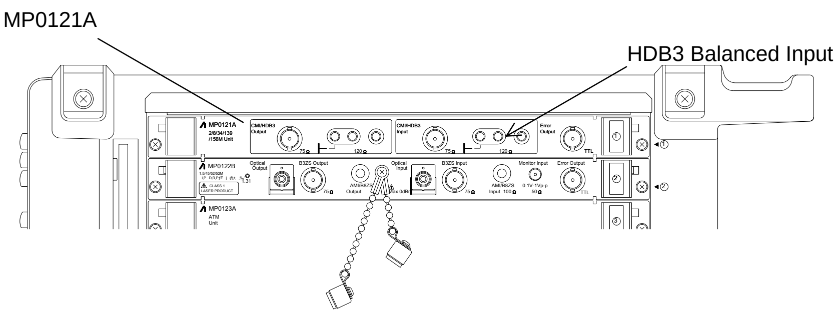
(iii) Install MP0112A or MP0113A optical interface unit on MP1570A.

(iv) Connect the optical output connector of the MP0112A or MP0113A to the DEMUX input connector.



(v) Connect the Master Reference Clock of the DEMUX to the DCS input 120Ω Balanced connector of the MP1570A.

(vi) Connect the DEMUX output connector to the input connector of CMI/HDB3 of MP0121A.



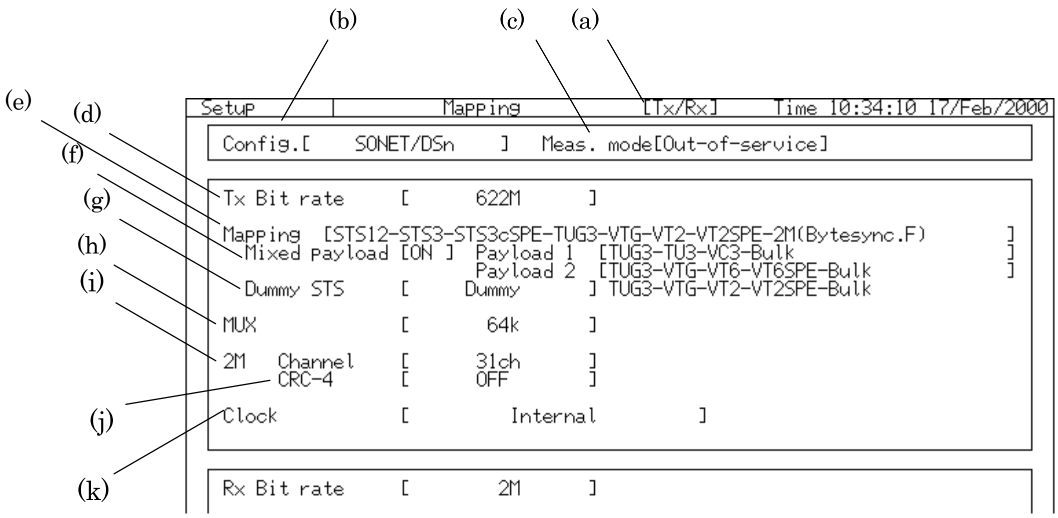
(vii) After the connection, turn on the power switch of MP1570A.

5.8.2 Initial Setting *'Setup : Mapping' screen*

Here is the initial setting procedure for the measurement described on the previous page.

(1) Open the 'Setup : Mapping' screen.

(2) Setup the screen parameters as follows:



(a) [Operation mode] .... Select the 'Tx/Rx' operation mode.

(b) Config. .... Select the 'SONET/DSn' configuration.

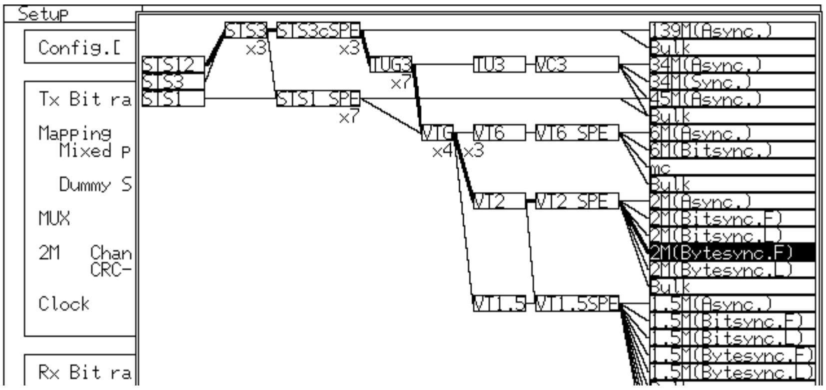
(c) Meas. Mode ...... Select the 'Out-of-service' measuring mode.

Tx side setting

(d) Tx Bit rate .... Set the bit rate to '622M'.

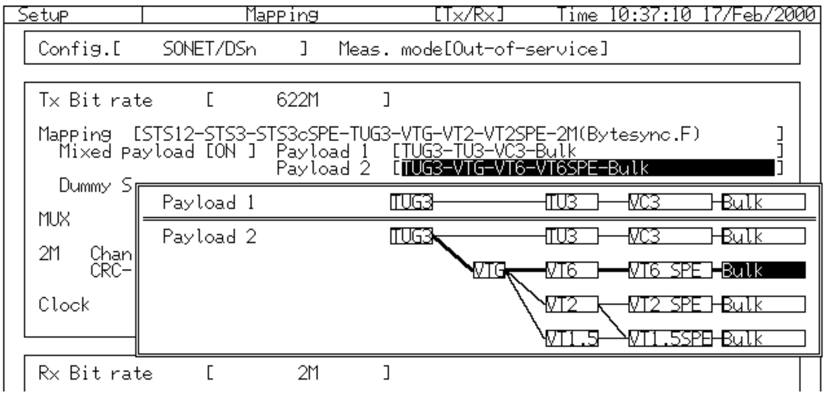
(e) Mapping .... Set the mapping to 'STS12-STS3-STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M(Bytesync.)'

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press Set. Select the mapping with ∧ ∨ < >, and press Set.



- The mapping window differs according to the installed plug-in unit, optical interface unit and optional items.

(f) Mixed payload .... Select 'ON' and press [Set] when you specify a different mapping (DSn signal) to TUG3 of the rest of two channels of the main channel set in (e). The mixed payload mapping edition screen is displayed. Set Payload 1 and Payload 2 mappings. See '6.7 Editing Dummy Channel' for the details.



- When the main channel does not pass through TUG3 or STS1SPE, (STS3-STS3cSPE-139M(Async.)/Bulk and STS1SPE-45M(Async.)/Bulk), the Mixed payload is not displayed.

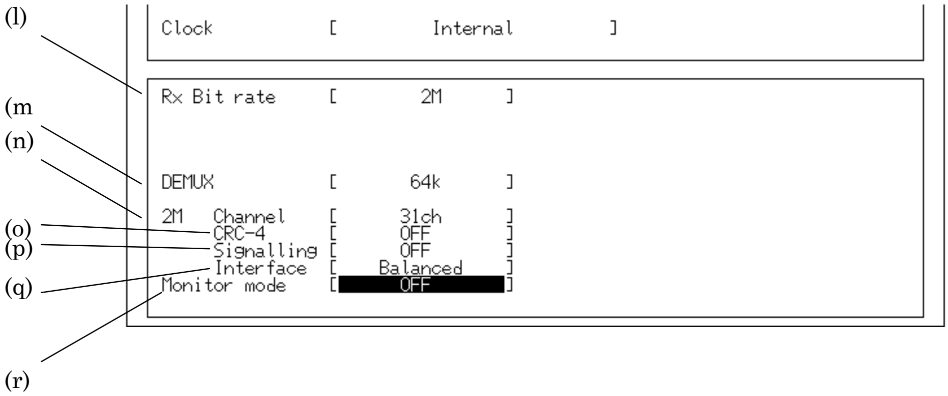
(g) Dummy STM-1 .... Set the payload data of SONET frame (including POH) of channels other than the main channel of the mapping set in step (e). See ‘6.7.2 Setting Dummy STM‘ for the details.

(h) MUX .... Set the MUX structure of the DSn signal. In this example, set it to ‘64k’.
  - It is displayed when MUX/DEMUX option is installed.

(i) 2M Frame ... Set the 2M frame to ‘31ch’.

(j) CRC-4 .... Turn off ‘2M CRC-4’.

(k) Clock .... Select ‘Lock 2MHz Balanced’ (complying with DCS 2.048MHz) as the transmitting signal clock source.



Rx side setting

(l) Rx Bit rate .... Set the Rx bit rate to 2M.

(m) DEMUX .... Set the DEMUX structure of the DSn signal.
In this example, set it to '64k'.
- It is displayed when MUX/DEMUX option item is installed.

(n) 2M Channel ...... Set the 2M Channel to '31ch'.。

(o) CRC-4 .... Turn off '2M CRC-4'.

(p) Signalling .... Turn off 'Signalling'.

(q) Interface .... Select 'Balanced 120Ω' as the 2M signal interface.

(r) Monitor mode ... Turn off the monitor mode.

Section 6 Other Settings about the Measurement

This Section describes the settings except the basic settings described in 'Section 5 Application Examples and Basic Setting'.

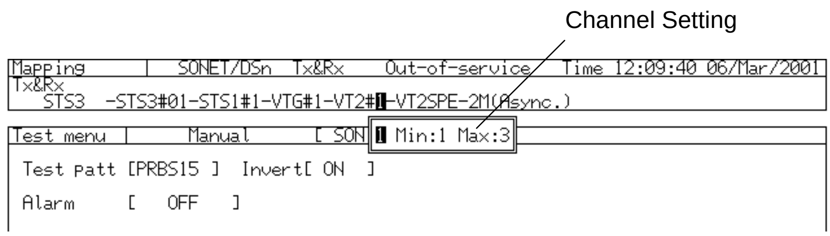
***** ***** in this manual represent front panel keys.

6.1 Setting the Measurement Channel *'Mapping' screen*

The 'Mapping' screen allows the setting of channels for error and alarm measurements. The 'Mapping' screen appears on the upper part of the 'Test menu', 'Result', and 'Analyze' main screens. Set the channels as follows:

(1) The mapping route is displayed on the 'Mapping' screen. Move the cursor to the channel to be set, and press [Set].

(2) The numeric input window is displayed. Set the channel with [∧] [∨].

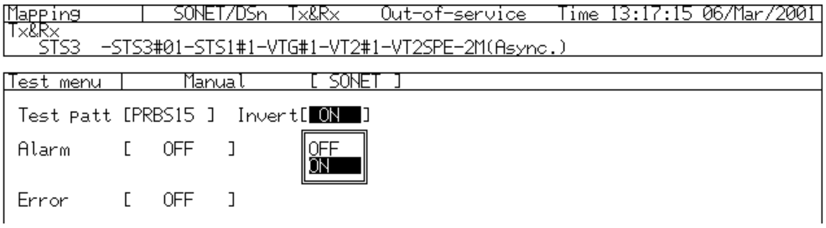


6.2 Setting a Test Pattern *'Test Menu : Manual' screen*

The test pattern to be inserted into the payload of measurement channel can be set on the 'Test Menu : Manual' screen. Here is the setting procedure.

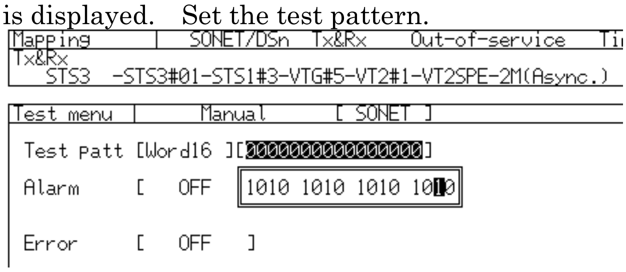
(1) Open the 'Test Menu : Manual' screen.

(2) Move the cursor to the Test pattern, and press Set.



(3) The window for item selection appears. Select the test pattern to be used, and press Set.

- If you select 'Word 16', the window for numerical input in binary is displayed. Set the test pattern.



Note

- The allowed test pattern depends on the installed plug-in unit.
- The set test pattern applies to both signal transmission and reception. You can not set it for transmission or reception only.
- The test pattern cannot be not set when the through mode is set at 'Transparent through' or 'OH overwrite' on the 'Setup : Mapping' screen.
- PRBS can select Inverted or Non-inverted output.

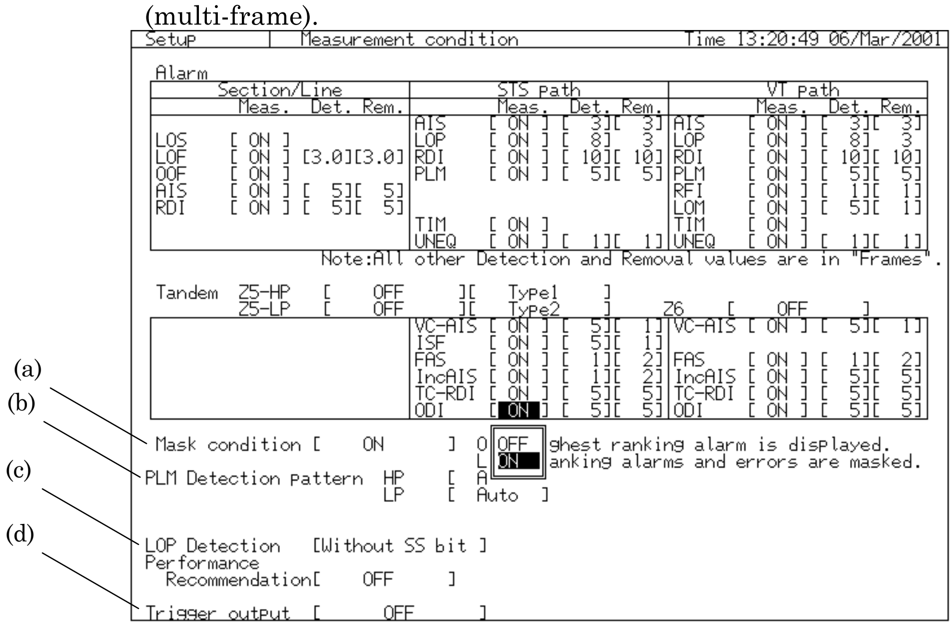
6.3 Setting of Trigger Output and Alarm Detection/Removal Condition

'Setup : Measurement condition' screen

The SONET trigger output, alarm detection condition, and removal condition can be set. (The DSn signal alarm detection and removal conditions cannot be set.) For the allowed alarm types and setting values, see 'Appendix E Alarm Detection and Removal Conditions'. Here are the setting procedures for trigger output, alarm detection condition, and removal condition.

(1) Open the 'Setup :Measurement condition' screen.

(2) Set for each alarm item whether it is to be measured or not. If you set it at 'OFF', the alarm item is not measured. Set the alarm detection and removal conditions when you set an item at 'ON'. Set LOF in the unit of ms, and the others in the unit of frame (multi-frame).



(a) [Mask condition] .... If you set it at 'ON', the alarms detected in the lower layer are not measured when an alarm is detected in an upper layer.

(b) [SLM detection pattern] ... Sets the expected value to detect signal label mismatch.

Auto .... The pattern preset by mapping becomes the expected value. For the expected value, see 'Appendix D Initial Values'.

Manual ..... The set pattern becomes the expected value. The window for signal label setting appears when you select 'Manual'. Enter the pattern in hexadecimal numbers.

(c) [LOP Detection] .... This item decides to include the state of SSbit for LOP alarm detection.

(d) [Trigger output] ....Selects trigger output type.
The trigger types are shown below:

(i) OFF: Does not output trigger.
(ii) Capture: Output the trigger selected on the “OH capture”, “APS capture”, “Frame capture”, or “IP capture” screen of Capture: Analyze screen.
(iii) Tx frame: Outputs the frame of SONET or DSn signal to be transmitted.
(iv) Tx clock (19 MHz): Outputs the clock synchronized to the SONET signal to be transmitted.
(v) Rx frame: Outputs the frame of the received SONET signal.
(vi) Rx clock (19 MHz): Outputs the clock synchronized to the received SONET signal.

Note:

If the setting of the detection removal condition is changed, the measurement is restarted from that changed time.

6.4 Editing SONET Overhead

Here is the editing procedure for TOH (Transport Overhead) of sent SONET signal and POH (Path Overhead) for major channel. For dummy channel editing, see '6.6 Editing Dummy Channel Data'.

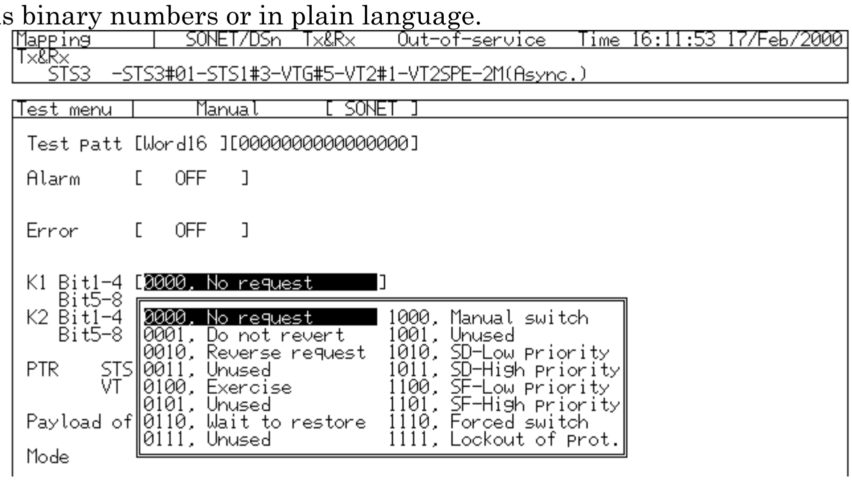
6.4.1 H1 Byte and H2 Byte *'Test menu : Manual' screen*

The NDF bit, SS bit, and pointer value (in decimal numbers) of H1 byte and H2 byte can be set on the 'Test menu : Manual' screen. Pointer actions are taken according to the set values.

- Refer to ‘6.12 Changing Pointer’ for the detail of how to set the pointer.

6.4.2 K1 Byte and K2 Byte *'Test menu : Manual' screen*

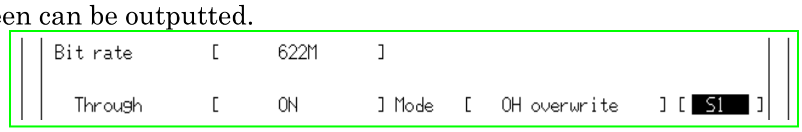
The K1 byte and K2 byte can be set on the 'Test menu : Manual' screen, as binary numbers or in plain language.



For generating the APS sequence pattern, see '7.11 APS (Automatic Protection Switch) Test'.

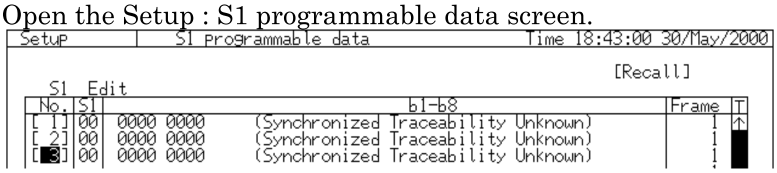
6.4.3 S1 Byte

When the through mode is On and the mode is set to "OH overwrite S1", S1 bytes that are set on the 'S1 programmable data' or 'OH preset' screen can be outputted.



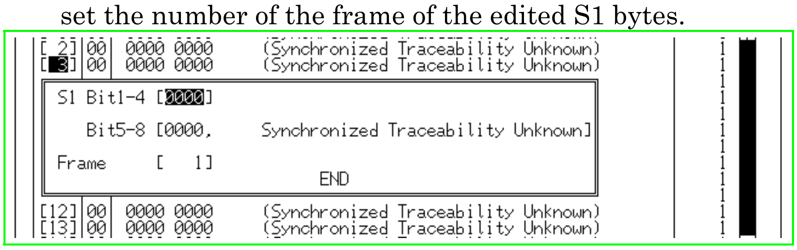
Here is the procedure for editing S1 programmable data and outputting S1 data.

(1) Open the Setup : S1 programmable data screen.

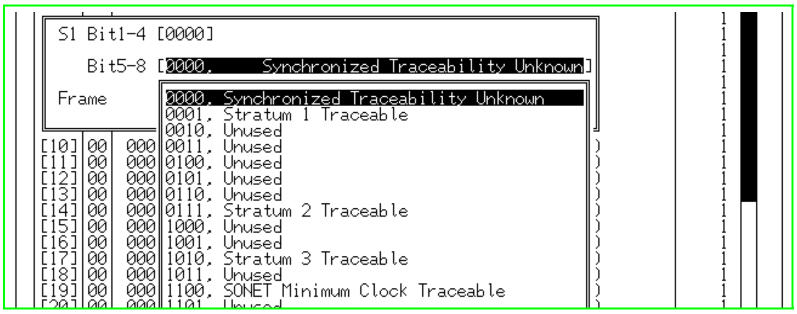


(2) On S1 edit table, move the cursor to the desired "No." and press Set, in order to display an S1 edit window. Set bit 1 to 4 in binary and bit 5 to 8 in plain language respectively. In addition, set the number of the frame of the edited S1 bytes.

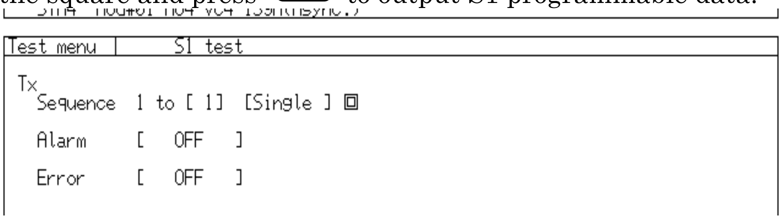
Bit 1- 4



Bit 5- 8



(3) On the test menu : S1 test screen, set the S1 send method. Set the sequence of S1 bytes set on table shown above. In addition, select "Single" or "Repeat" to perform the sequence. Move the cursor to the square and press Set to output S1 programmable data.



6.4.4 Other Overheads

'Setup : OH preset' screen

You can edit overhead other than those mentioned above on the 'Setup : OH preset' screen. The 'Setup : OH preset' screen allows the editing of TOH and POH meshed on each bit rate.

(1) When bit rate is 52M:

	TOH			POH		
	1	2	3	STS	STS	VT
1	A1	A2	J0	J1	J1	V5
2	B1	E1	F1	B3	B3	J2
3	D1	D2	D3	C2	C2	Z6
4	H1	H2	H3	G1	G1	Z7
5	B2	K1	K2	F2	F2	
6	D4	D5	D6	H4	H4	
7	D7	D8	D9	Z3	Z3	
8	D10	D11	D12	Z4	Z4	
9	S1	M1	E2	Z5	Z5	

(2) When bit rate is 156M:

TOH

	1	2	3	4	5	6	7	8	9
1	A1	A1	A1	A2	A2	A2	J0	X18	X19
2	B1	X22	X23	E1	X25	X26	F1	X28	X29
3	D1	X32	X33	D2	X35	X36	D3	X38	X39
4	H1	H1	H1	H2	H2	H2	H3	H3	H3
5	B2	B2	B2	K1	X55	X56	K2	X58	X59
6	D4	X62	X63	D5	X65	X66	D6	X68	X69
7	D7	X72	X73	D8	X75	X76	D9	X78	X79
8	D10	X82	X83	D11	X85	X86	D12	X88	X89
9	S1	Z1	Z1	Z2	Z2	M1	E2	X98	X99

POH

STS	STS	VT
J1	J1	V5
B3	B3	J2
C2	C2	Z6
G1	G1	Z7
F2	F2	
H4	H4	
Z3	Z3	
Z4	Z4	
Z5	Z5	

(3) When bit rate is 622M:

TOH#1

	1	5	9	13	17	21	25	29	33
1	A1	A1	A1	A2	A2	A2	J0	X18	X19
2	B1	X22	X23	E1	X25	X26	F1	X28	X29
3	D1	X32	X33	D2	X35	X36	D3	X38	X39
4	H1	H1	H1	H2	H2	H2	H3	H3	H3
5	B2	B2	B2	K1	X55	X56	K2	X58	X59
6	D4	X62	X63	D5	X65	X66	D6	X68	X69
7	D7	X72	X73	D8	X75	X76	D9	X78	X79
8	D10	X82	X83	D11	X85	X86	D12	X88	X89
9	S1	Z1	Z1	Z2	Z2	Z2	E2	X98	X99

POH

STS3	STS1	VT
J1	J1	V5
B3	B3	J2
C2	C2	Z6
G1	G1	Z7
F2	F2	
H4	H4	
Z3	Z3	
Z4	Z4	
Z5	Z5	

TOH#2

	2	6	10	14	18	22	26	30	34
1	A1	A1	A1	A2	A2	A2	Z0	X18	X19
2	X21	X22	X23	X24	X25	X26	X27	X28	X29
3	X31	X32	X33	X34	X35	X36	X37	X38	X39
4	H1	H1	H1	H2	H2	H2	H3	H3	H3
5	B2	B2	B2	X54	X55	X56	X57	X58	X59
6	X61	X62	X63	X64	X65	X66	X67	X68	X69
7	X71	X72	X73	X74	X75	X76	X77	X78	X79
8	X81	X82	X83	X84	X85	X86	X87	X88	X89
9	Z1	Z1	Z1	Z2	Z2	Z2	X97	X98	X99

TOH#3

	3	7	11	15	19	23	27	31	35
1	A1	A1	A1	A2	A2	A2	Z0	X18	X19
2	X21	X22	X23	X24	X25	X26	X27	X28	X29
3	X31	X32	X33	X34	X35	X36	X37	X38	X39
4	H1	H1	H1	H2	H2	H2	H3	H3	H3
5	B2	B2	B2	X54	X55	X56	X57	X58	X59
6	X61	X62	X63	X64	X65	X66	X67	X68	X69
7	X71	X72	X73	X74	X75	X76	X77	X78	X79
8	X81	X82	X83	X84	X85	X86	X87	X88	X89
9	Z1	Z1	Z1	M1	Z2	Z2	X97	X98	X99

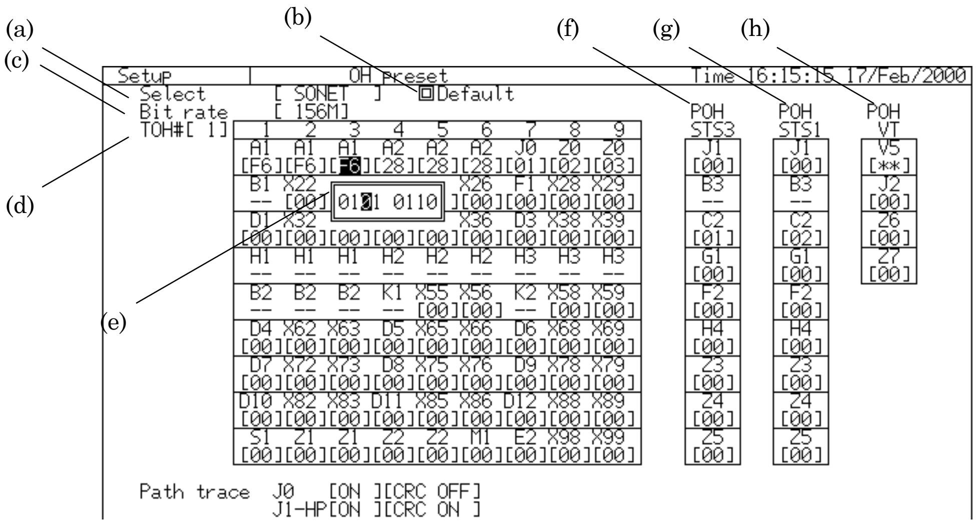
TOH#4

	4	8	12	16	20	24	28	32	36
1	A1	A1	A1	A2	A2	A2	Z0	X18	X19
2	X21	X22	X23	X24	X25	X26	X27	X28	X29
3	X31	X32	X33	X34	X35	X36	X37	X38	X39
4	H1	H1	H1	H2	H2	H2	H3	H3	H3
5	B2	B2	B2	X54	X55	X56	X57	X58	X59
6	X61	X62	X63	X64	X65	X66	X67	X68	X69
7	X71	X72	X73	X74	X75	X76	X77	X78	X79
8	X81	X82	X83	X84	X85	X86	X87	X88	X89
9	Z1	Z1	Z1	Z2	Z2	Z2	X97	X98	X99

6.4.5 Editing the Overhead

(1) Open the 'Setup : OH preset data' screen.

(2) Setup the screen parameters as follows.



(a) Select .... Sets at 'SONET'.

(b) Default .... Returns the TOH and POH send data to the default data (Added path trace and DCC eternal are not initialized). For the initial value of each byte, see 'Appendix D Initial Values'.

(c) Bit rate .... Sets the overhead bit rate to be edited. You can set TOH send overhead data for bit rates 52M, 156M and 622M separately.

(d) TOH# ..... Selects the TOH channel set in (e) for the bit rate 622M.

(e) [TOH] ..... Area to set TOH.

When you edit the byte data, move the cursor to the desired byte with [∧] [∨] [<] [>] and press [Set]. The numeric input window is displayed. Enter the desired value in binary numbers.

- You can set S1 byte data in plain language as well.

(f) POH STS3 ...... The area to set STS3 POH data The setting procedure is the same as that for TOH data in (e). You can also set C2 byte data in plain language.

(g) POH STS1 ...... The area to set STS1 POH data The setting procedure is the same as that in (e). You can also set C2 byte data in plain language.

(h) POH VT .... The area to set VT POH data. The setting procedure is the same as that shown in (e).

- You cannot set BIP-2 bit of V5.

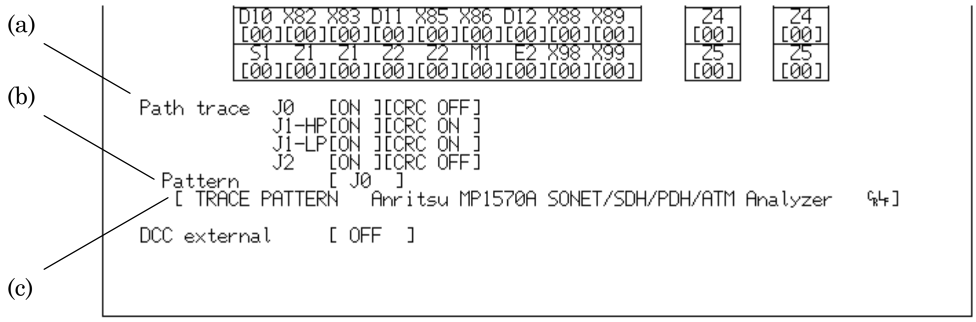
- The default values on mapping are sent if you select '**'.

6.4.6 Setting Path Trace *'Setup : OH preset' screen*

You can set the path trace generation for J0, J1, and J2 on the 'Setup : OH preset' screen. Here is the setting procedure.

(1) Open the 'Setup : OH preset data' screen.

(2) Setup the screen parameters as follows.



(a) Path trace ...... Selects the type of path trace to be set.

(J1-HP is J1 of STS3, and J1-LP is J1 of STS1.)

- If you set this at 'ON', the path trace data is inserted into each trace byte data, and if set at 'OFF', the pattern set by OH preset is inserted.
- Selects whether to add or not CRC-7 when you send the path trace.

(b) Pattern .... Selects the byte to be preset in (c).

(c) [Path trace data input] ..... Inserts into the byte data preset in (b).

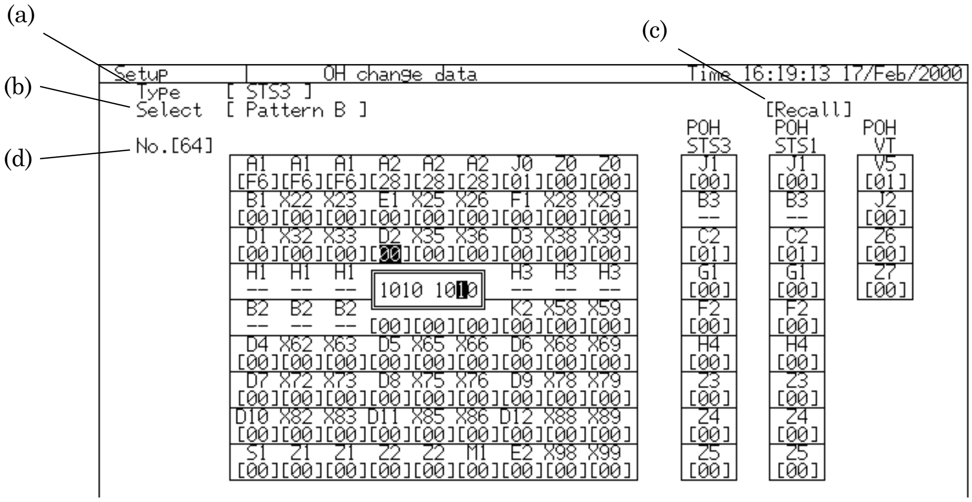
Move the cursor there and press [Set], and the character input window opens. Input the desired character string.

6.5 Changing the Overhead Data per Frame *'Setup : OH change data' screen*

You can set the change of overhead data per frame in two ways on the 'Setup : OH change data' screen. Here are the setting procedures.

(1) Open the 'Setup : OH change data' screen.

(2) Setup the screen parameters as follows.



(a) Type ....Selects the STS frame type to be edited.

- STS3 can be set when MP0121A is installed.
- STS1 can be set when MP0122A or MP0122B is installed.

(b) Select ....Selects the pattern to be edited, Pattern A or Pattern B.

(c) Recall ....Initializes the set STS OH change data.

- Default ....If you move the cursor to Preset and press [Set], the overhead data return to initial ones.
- Preset overwrite ....If you move the cursor there and press [Set], the window shown below appears. Specify the OH source and OH paste, and move the cursor to END and press [Set].

(d) No. ....Specifies the TOH (STS3) No. to be edited on the 'Setup : OH preset' screen.

6.6 Setting the Orderwire and the DCC Interface *'Setup : System' screen*

6.6.1 Setting the Orderwire

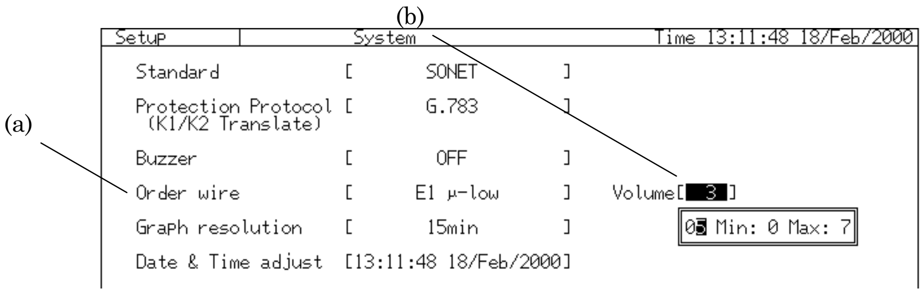
The MP1570A can do the order wire using E1 byte and E2 byte that are used for TOH sound signal of SONET.

Here is the procedure for setting the order wire.

(1) Open the 'Setup : System' screen.

(2) Move the cursor to 'Orderwire', and press Set .

(3) Setup the screen parameters as follows.



(a) Set the byte used for the order wire and the code expansion rate.

(b) Set the volume of the headset from 1 to 8 by 1 steps.

Note

Refer to '3.1 Description of MP1570A Unit Panel' for the connection of the headset used for the orderwire and the layout of the pins.

6.6.2 Setting the DCC Interface

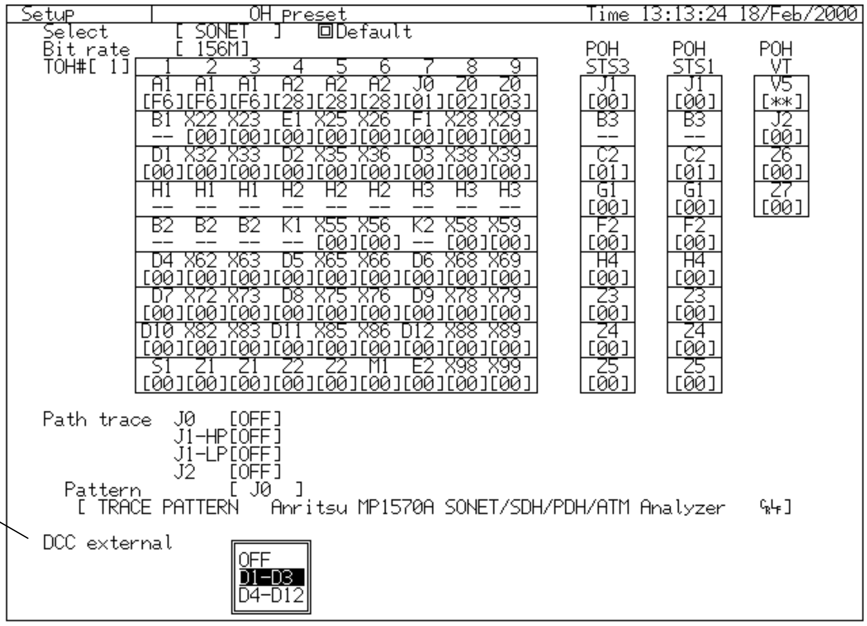
Here is the procedure for using TOH data communication channel (D1 byte to D2 byte) of SONET signal.

(1) Open the ‘Setup : System’ screen.

(2) Move the cursor to ‘DCC external’, and press [Set].

(3) Setup the screen parameters as follows.

(a)



(a) Select the byte used for the DCC interface.

- If it’s set to Off or it’s not selected as the interface, Data set on the ‘Setup : OH preset’ screen is inserted in the DCC byte.

Note

Refer to ‘3.1 Description of MP1570A Unit Panel’ for the connection and the layout of the pins of the DCC interface connector.

6.7 Editing Dummy Channel

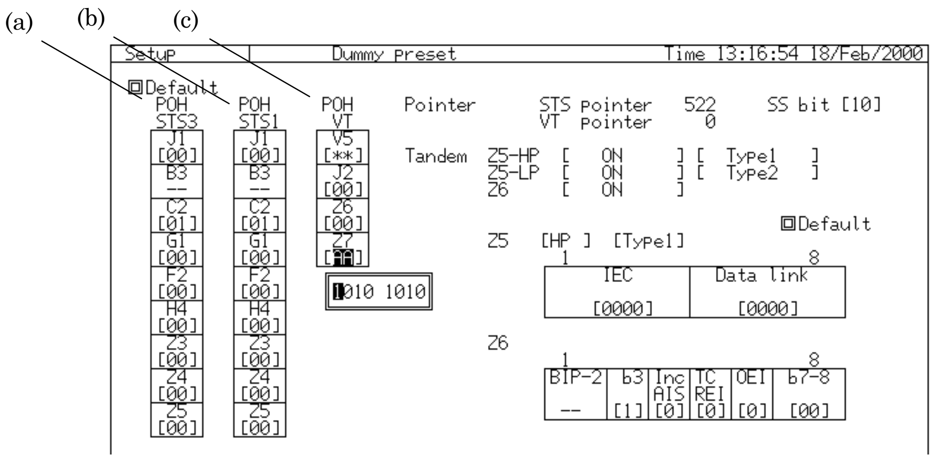
This section describes the setting of channels other than the SONET signal measurement channel. Edit the dummy channel of MP1570A in 2 ways according to the type as follows:

- STS and VT (dummies of main channel) without measurement channels in STS3 containing the measurement channel
- All STS and VT (dummies of STS) in STS3 without measurement channels

6.7.1 Setting a Dummy of the Main Channel *'Setup : Dummy preset' screen*

Setting Path Overhead

Set the path overhead of the channels other than the measurement channel on the 'Setup : Dummy preset' screen.



(a) POH STS3 .... Sets the POH of STS3. The setting method is the same as the editing method for the overhead of measurement channel.

(b) POH STS1 .... Sets the POH of STS1. The setting method is the same as the editing method for the overhead of measurement channel.

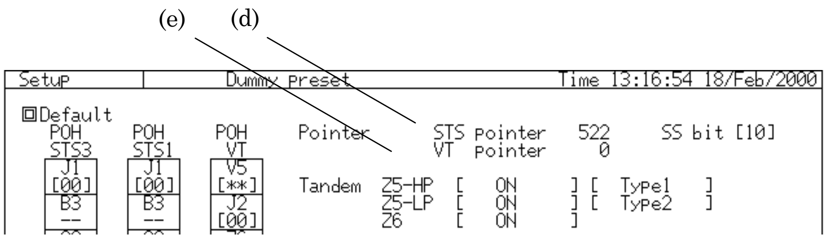
(c) POH VT .... Sets the POH of VT. The setting method is the same as the editing method for the overhead of measurement channel.

Note

You cannot edit the overhead for each channel. The values set on this screen apply to overhead common to all dummies of the main channel.

Setting STS Pointer and VT Pointer

Only the SS bit is allowed for the pointers except the measurement channel. Set the pointers on the 'Setup : Dummy preset' screen.



(d) Sets the SS bit value for the STS Pointer. Move the cursor to SS bit and press Set . The numerical input window appears. Set it as a binary number.

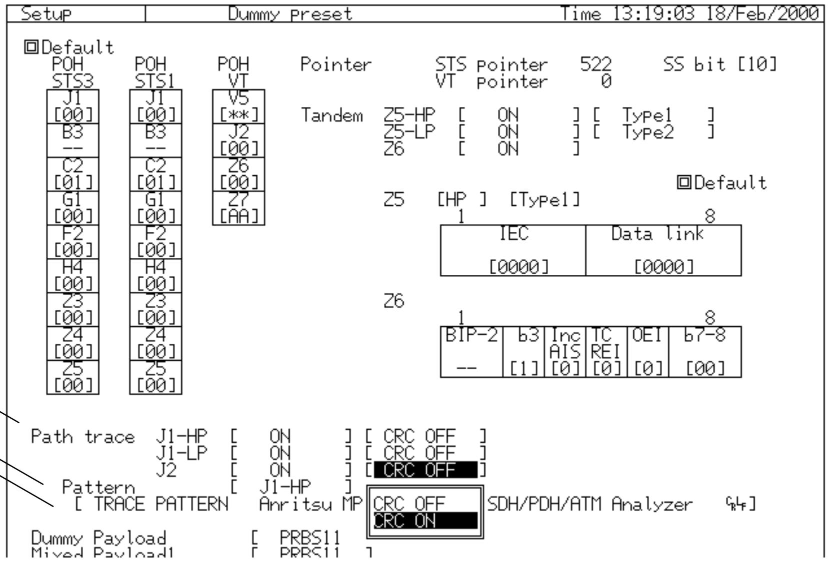
(e) Sets the SS bit value for the VT Pointer. The setting method is the same as that for the SS bit of STS Pointer.

- The NDF bit is fixed at '0110' (binary number) for all channels.
- STS Pointer value is fixed at '522' (decimal number) for all channels.
- VT Pointer value is fixed at '0' (decimal number) for all channels.

Setting the Path Trace

Edit the path trace for channels other than the measurement channel on the 'Setup : Dummy preset' screen.

(f)
(g)
(h)



(f) Select the path trace type to be set. ('J1-HP' is J1 of STS3, and 'J1-LP' is J1 of STS1.)

- If you set it at 'ON', the path trace data is inserted into each trace byte data. If you set it at 'OFF', the pattern set by the dummy POH preset is inserted.
- Selects whether CRC-7 is added when the path trace is sent.

(g) Pattern ..... Selects the byte set in step (f).

(h) [Inputting the path trace data] ..... Inputs the path trace data to be inserted into the byte data set in step (g). The inputting method is the same as the method of setting path trace for the measurement channel.

Note

You cannot edit the path trace for each channel. The values set on this screen apply to the path trace common to all dummies of main channel.

Setting the Mixed Payload

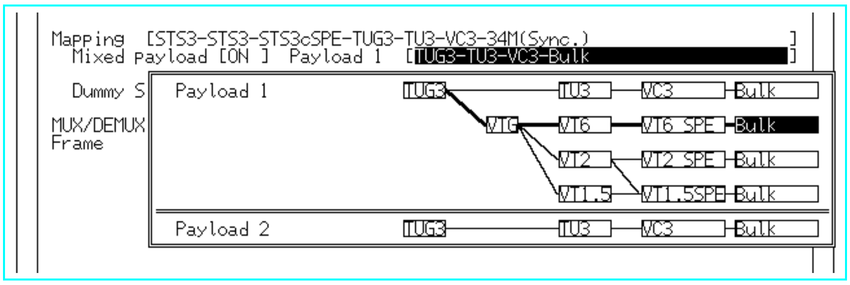
On the mapping including TUG3 or STS1SPE, MP1570A allows the setting of mapping for TUG3 or STS1SPE channels without the measurement channel which is different from that of the measurement channel. Here is the setting procedure.

(1) Open the 'Setup : Mapping' screen.

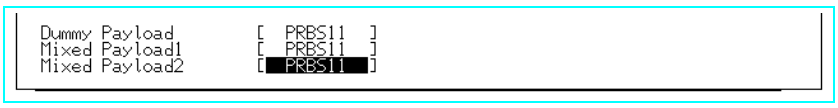
(2) Move the cursor to the Mixed payload, and press Set .

(3) The item selection window opens. Choose Yes and press Set .

(4) Move the cursor to each payload and press Set . The payload selection window opens. Select the payload.



(5) On the 'Setup : Dummy preset' screen, select the test pattern to be inserted into the Mixed payload. If the Mixed payload is set at 'OFF', the test pattern selected in Dummy payload is inserted.



Note

If the Mixed payload is not set, the same mapping as that of the measurement channel is set for TUG3 or STS1SPE with measurement channel.

6.7.2 Setting Dummy STS *'Setup : Mapping' screen*

Dummy STS selects either Copy or Dummy as follows:

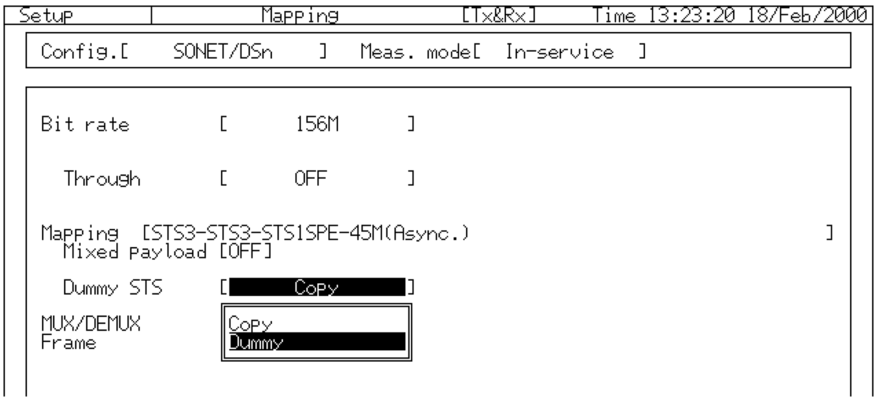
- Copy .... Inserts the same pattern as that of STS3 with measurement channel.
- Dummy ..... The mapping includes Bulk mapping of the layer with measurement channel. The pattern inserted into the payload includes the pattern set by Dummy on the 'Setup : Dummy preset' screen.

Here is the setting procedure.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor to 'Dummy STS' and press Set.

(3) Select 'Copy' or 'Dummy'.



Note

- The test pattern to be inserted in the payload is the one set at 'Dummy preset' on the 'Setup : Dummy preset' screen.
- If the 'Mixed payload' is set to Off, the pattern to be inserted in the payload is the same as the Dummy pattern of the main channel.

6.8 Setting the Tandem Connection

This section describes the tandem connection.

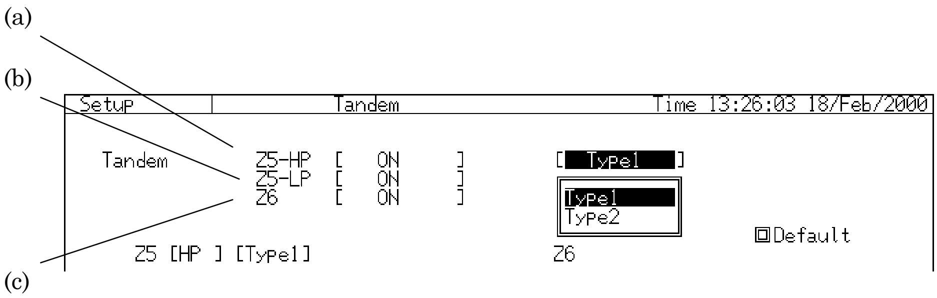
6.8.1 Setting the Type

'Setup : Tandem' screen

The 'Setup : Tandem' screen allows the setting of whether Z5 byte or Z6 is to be are used as tandem connection, along with the setting of the type. Here is the setting procedure.

(1) Open the 'Setup : Tandem' screen.

(2) Setup the screen parameters.



(a) Z5-HP .... Specifies whether tandem connection uses Z5 byte of high order path of the measurement channel. When set at 'ON', select 'Type 1' or 'Type 2'.

(b) Z5-LP .... Specifies whether tandem connection uses Z5 byte of low order path of the measurement channel.

(c) Z6 .... Specifies whether tandem connection uses Z6 byte of the measurement channel.

6.8.2 Editing the Tandem Connection Byte *'Setup : Tandem' screen*

The 'Setup : Tandem' screen allows the editing of the tandem connection byte of the measurement channel. The meshed area below shows the bits that you can edit on the screen.

Z5-HP (Type1)

1	2	3	4	5	6	7	8
IEC				Data LInk*			

1	FLAG		
2	SAPI	CR	EA
3	TEI		EA
4	CONTROL		
5 80	76 octet information field		
81 82	FCS		

1 * ..... Can be set when measurement channel is #1.

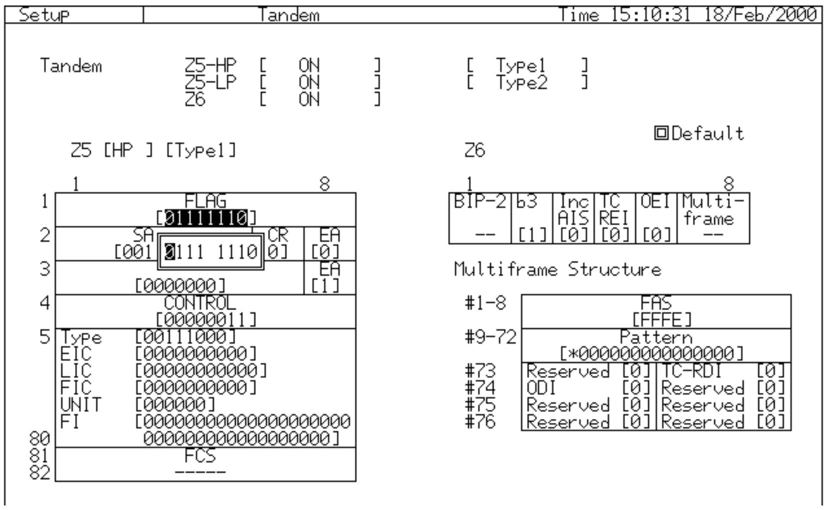
Z5-HP (Type2)
Z5-LP

1	2	3	4	5	6	7	8
IEC				TC-REI	OEI	Multiframe	

Frame#	bit7	bit8
1-8	FAS	
9-12	TC-APId byte#1	
13-16	TC-APId byte#2	
:	:	
65-68	TC-APId byte#15	
69-72	TC-APId byte#16	
73	Reserved	TC-RDI
74	ODI	Reserved
75	Reserved	Reserved
76	Reserved	Reserved

Here is the setting procedure.

(1) Open the 'setup : Tandem' screen.



(2) Move the cursor to the desired tandem connection type and press Set .

(3) The numerical selection window appears. Move the cursor with < > and set the value with ∧ ∨.

- ☐ Default .... If you move the cursor here and press Set , the tandem connection setting is initialized.

6.8.3 Setting the Measurement Conditions *'Setup : Measurement condition' screen*

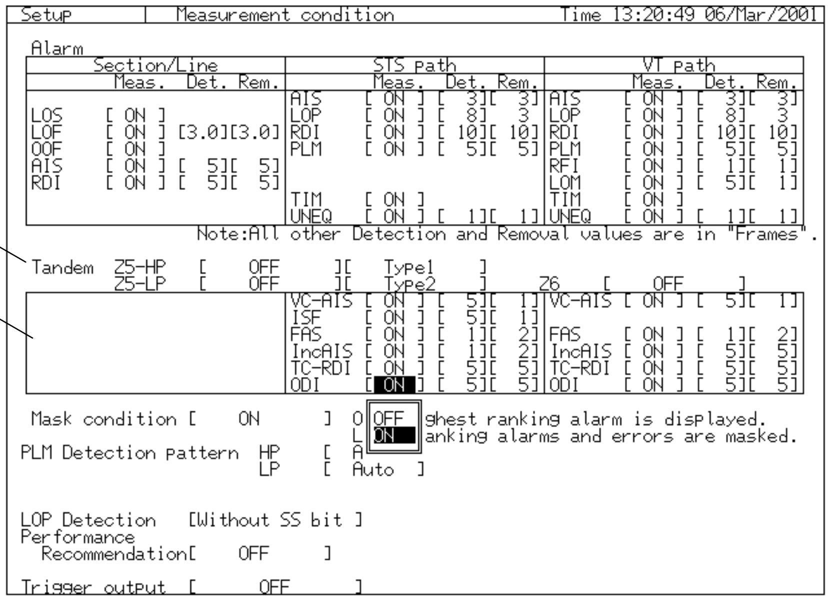
Here is the procedure for setting error and alarm measurements to On/Off, and alarm detection and removal conditions for tandem connection.

(1) Open the 'Setup : Measurement condition' screen.

(2) Set each measurement item to On or Off.

(a)

(b)



(a) Tandem .... Set On/Off and the type of the tandem connection path to be measured.

(b) Set the Alarm Detection and Removal Conditions of the path to be measured by frames.

- The items set to ‘OFF’ is not measured.
- Set the detection and removal conditions of the alarm item per frame if you set it at 'ON'.

Note

If the Alarm Detection and Removal Conditions is changed, the measurement will start again.

6.9 Editting the Signalling *'Setup : Signaliing preset' screen*

The installation of optional item 09 allows the presetting of the signaling bit.

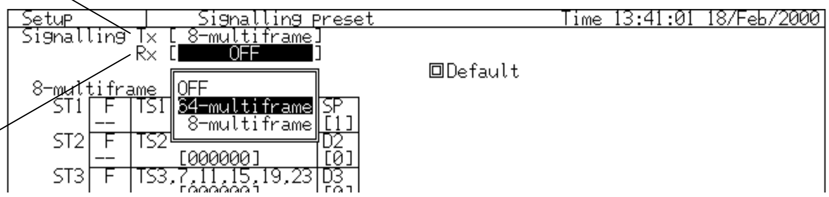
6.9.1 Selecting the Signalling Pattern

(1) Open the 'Setup : Signalling preset' screen.

(2) Set the screen parameters.

(a)

(b)



(a) Signalling Tx ..... Select the multi-frame structure inserted into the signalling pattern in the transmitting side. If it's set to 'OFF', '0' is inserted into the signalling bit.

(b) Signalling Rx ..... Select the frame structure to monitor the received signalling pattern and measure the alarm. If it's set to 'OFF', the signalling is not measured.

6.9.2 Editing the Signalling Bits

The bits meshed on the figure below can be preset.

8-Multiframe Setting

ST1	F	TS1	TS5	TS9	TS13	TS17	TS21	SP
ST2	F	TS2	TS6	TS10	TS14	TS18	TS22	D2
ST3	F	TS3	TS7	TS11	TS15	TS19	TS23	D3
ST4	F	TS4	TS8	TS12	TS16	TS20	TS24	D4

64-Multiframe Setting

1	Fs	(Fs)	(Fs)	(Fs)
2	AIS(ch1)	AIS(ch7)	AIS(ch13)	AIS(ch19)
3	AIS(ch2)	AIS(ch8)	AIS(ch14)	AIS(ch20)
4	AIS(ch3)	AIS(ch9)	AIS(ch15)	AIS(ch21)
5	AIS(ch4)	AIS(ch10)	AIS(ch16)	AIS(ch22)
6	AIS(ch5)	AIS(ch11)	AIS(ch17)	AIS(ch23)
7	AIS(ch6)	AIS(ch12)	AIS(ch18)	AIS(ch24)
8	1.5MBAIS	Kx	Ky	Kz
9	Fs	(Fs)	(Fs)	(Fs)
10-15	BAIS(ch1-24)			
16	LOOP-OCU	LOOP-1.5M	....	....
17	Fs	(Fs)	(Fs)	(Fs)
18-23	PTY(ch1-24)			
24	....	....	....	....
25	Fs	(Fs)	(Fs)	(Fs)
26-31	BEER(ch1-24)			
32	....	....	....	....
33	Fs	(Fs)	(Fs)	(Fs)
34	LOOP2(B1)	LP		
35	LOOP2(B3)	LP		
36	LOOP2(D)	LP		
37-39	LP			
40	....	....	....	....
41	Fs	(Fs)	(Fs)	(Fs)
42-47	TRACE(ch1-24)			
48	....	....	....	....
49	Fs	(Fs)	(Fs)	(Fs)
50-55	reserved (s)			
56	....	....	....	....
57	Fs	(Fs)	(Fs)	(Fs)
58-63	reserved (UNR)			
64	....	....	....	....

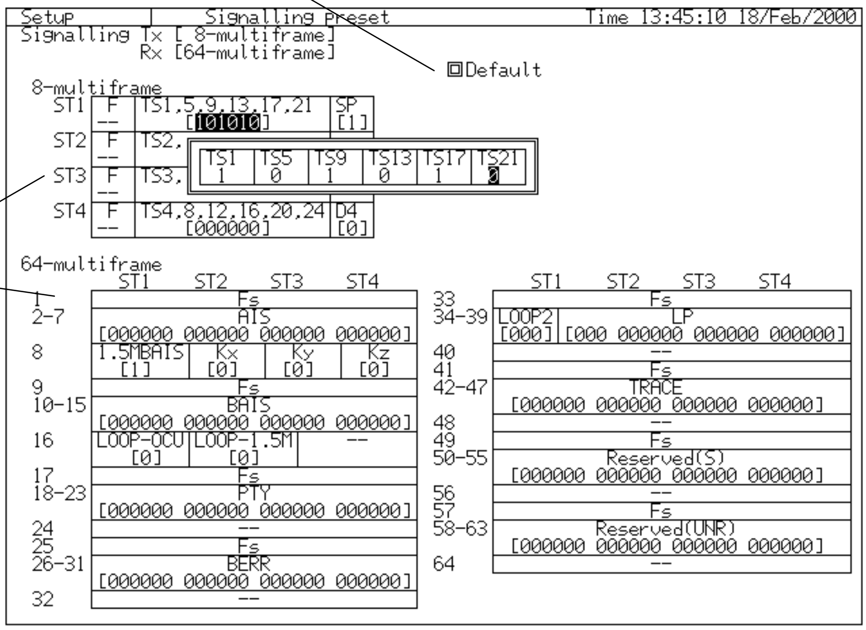
Here is the setting procedure.

(1) Open the 'Setup : Signaling preset' screen.

(2) Setup the screen parameters.

(a)

(b)



(a) Default ..... Sets the signaling bit at the default value.

(b) Presets the signaling bit. ..... Move the cursor to the desired bit and press [Set]. The numeric input window appears. Input binary numbers.

6.10 Setting the CID Pattern *'Setup : Mapping' screen*

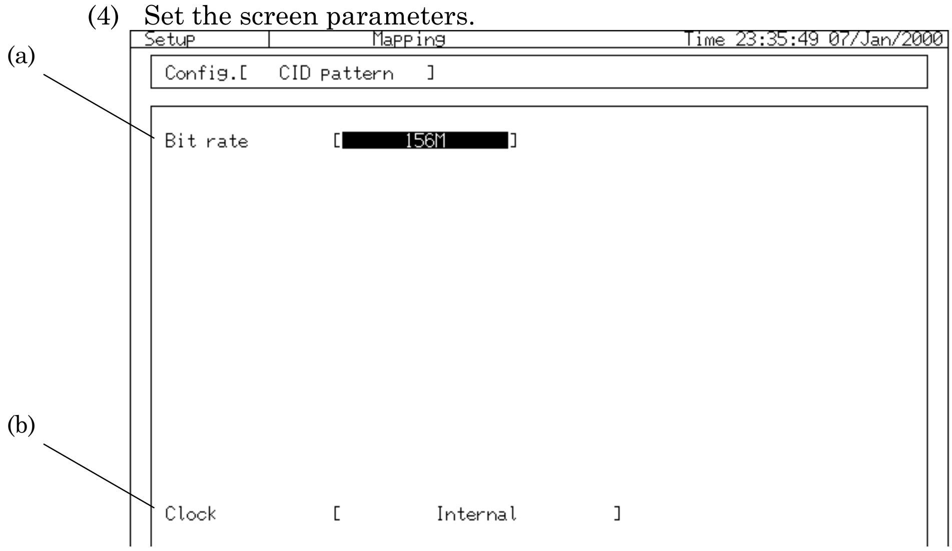
Here is the measuring procedure for CID pattern.

(1) Open 'Setup : Mapping' screen.

(2) Move the cursor to ‘Config.’, and press [Set].

(3) The item selection window appears. Select 'CID pattern'.

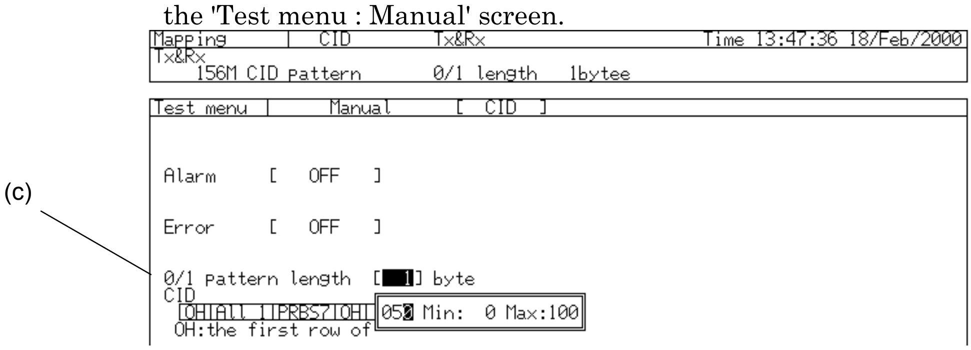
(4) Set the screen parameters.



(a) Bitrate Sets the bit rate.

(b) Clock .... Selects the send clock.

(5) Set the length of consecutive-0 pattern or consecutive-1 pattern on the 'Test menu : Manual' screen.



(c) Specify the 0/1 pattern length in units of byte.

Note

When the measurement is performed with the CID pattern, the Tx signal and the Rx signal cannot be set separately.

6.11 Setting the Non Frame Pattern *'Setup : Mapping' screen*

This section describes the procedure to generate a test pattern without information on the frame including overhead for performing Bit Error Rate Test (BERT).

6.11.1 Bit rate : PDH/DSn (2/8/34/139M, 1.5/45M)

(1) Open the 'Setup: Mapping ' screen and set the bit rate to 2M, 8M, 34M, 139M, 1.5M, or 45M.

(2) Set 'MUX/DEMUX' to OFF.

(3) Set 'Frame' to OFF.

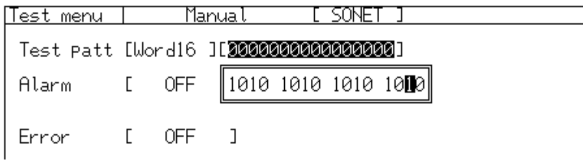
- Refer to '5.1 Setting Basic Parameters' for other parameters on this screen.

(4) Open the 'Test menu; Manual' screen to set a test pattern.

(5) Move the cursor to 'Test patt' and press Set .

(6) The item selection window appears. Select the test pattern to be used.

- When the ‘Word 16’ is selected, the numerical input window appears. Move the cursor to the desired bit and press Set, and input binary numbers.



6.11.2 Bit rate : SONET(52/156/622M)

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor to 'Config.', and press Set.

(3) The item selection window appears. Select 'Non frame pattern'.

(a) Bitrate .... Sets the bit rate.

(b) Clock .... Set the clock of the Tx signal.

(4) The test pattern is set on the 'Test menu : Manual' screen. Open the 'Test menu : Manual' screen.

(5) Move the cursor to 'Test patt', and press Set.

(6) The item selection window appears. Select the test pattern to be used.

- When the 'Word 16' is selected, The numerical input window appears. Move the cursor to the desired bit and press Set, and input binary numbers.

Note

- The test pattern depends on the plug-in-unit installed.
- When the bit rate is 52M, 156M, or 622M, the test pattern is used for the Tx signal and the Rx signal. It cannot be set separately.

6.12 Adding Error and Alarm *'Test menu : Manual' screen*

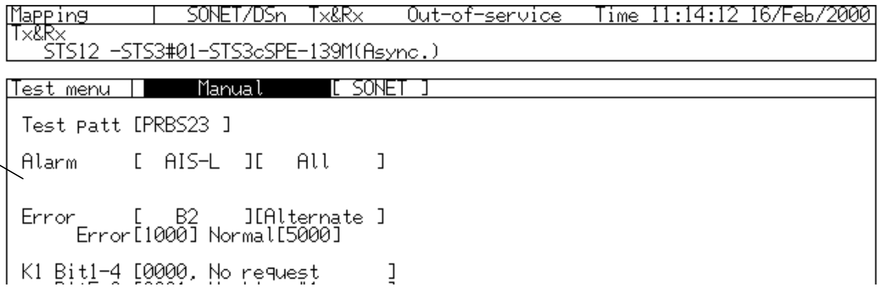
When adding errors and alarms to the Tx signal, the type and the insertion rate of the errors and the alarms to be added are set on the 'Test menu : Manual' screen. Here is the setting procedure.

6.12.1 Adding Alarm

(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.

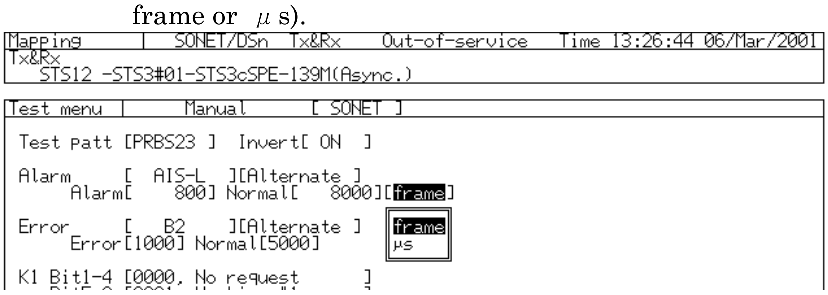
(a)



(a) [Alarm timing] .... When the bit rate is 2M, 8M, 34M, 139M, 1.5M, or 45M (PDH/DSn), 'All' is always set. When the bit rate is 52M, 156M, or 622M (SONET), select 'Single', 'Burst' 'Alternate' or 'All' as the alarm timing.

- If the alarm timing is 'All', the alarm is continuously added by pressing Alarm .
- If the alarm timing is 'Burst', set timing value and unit (frame or μ s) to insert the alarm.

- If the alarm timing is 'Alternate', set Alarm length (in unit of frame or μ s) and Normal length (in unit of frame or μ s).



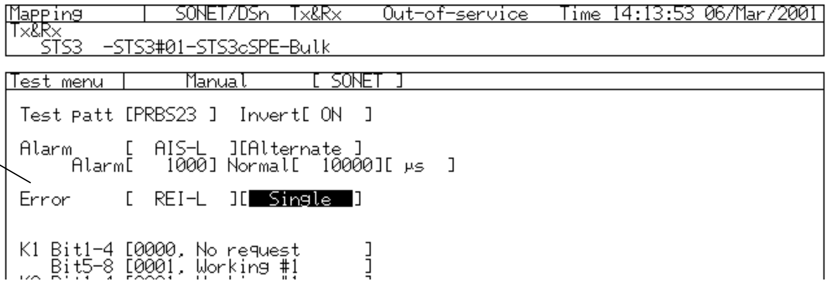
(3) After the setting shown above, the alarm is added by pressing Alarm on the front panel.

6.12.2 Adding Error

(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.

(a)



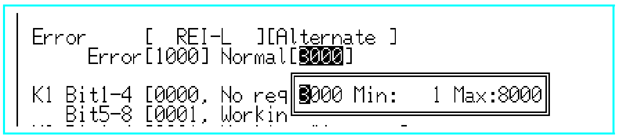
(a) [Error] ....Select error to be added to the Tx signal.

- If 'Bit all' is selected, the error is added to the all Tx signals.
- If 'Bit info' is selected, the error is added to the payload of the measurement channel.

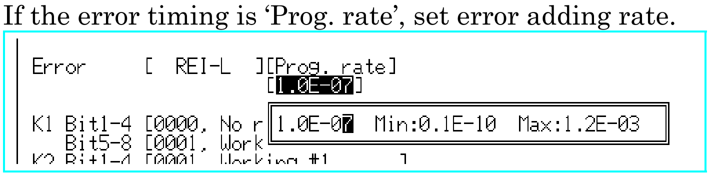
(b) [Error timing] .... Set error timing.

- If the error timing is 'Burst', set the number of the error bits to be inserted.

- If the error timing is 'Alternate', set the number of the Error frames and Normal frames.



- If the error timing is 'Prog. rate', set error adding rate.



Note

The error timing depends on the error to be added.

(3) After the setting shown above, the error is added by pressing Error on the front panel.

6.13 Setting Pointer *'Test menu : Manual' screen*

This section describes the procedure to set STS Pointer value and VT Pointer value of the Tx signal of the measurement channel, and to offset the payload by C bit.

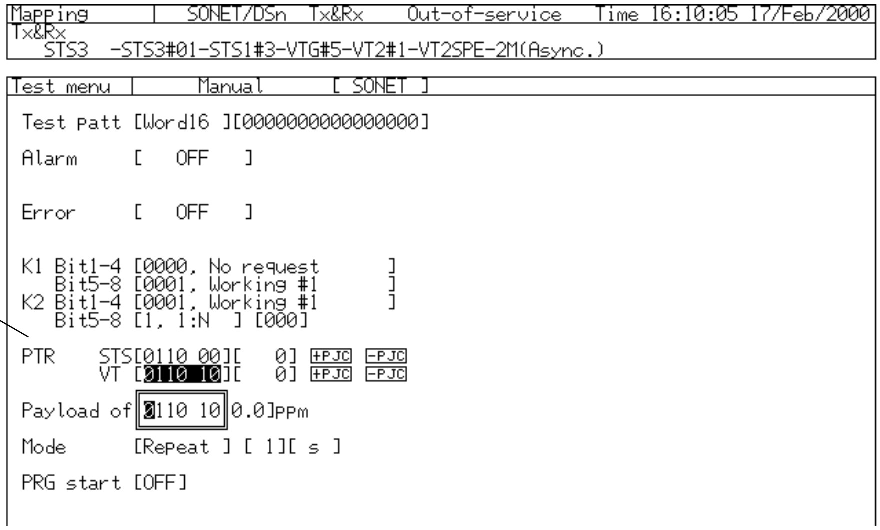
6.13.1 Setting and Changing Pointer Value

STS Pointer value and VT Pointer value of the Tx SONET signal are set on the 'Test menu : Manual' screen. Pointer value by NDF is set as well.

(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.

(a)



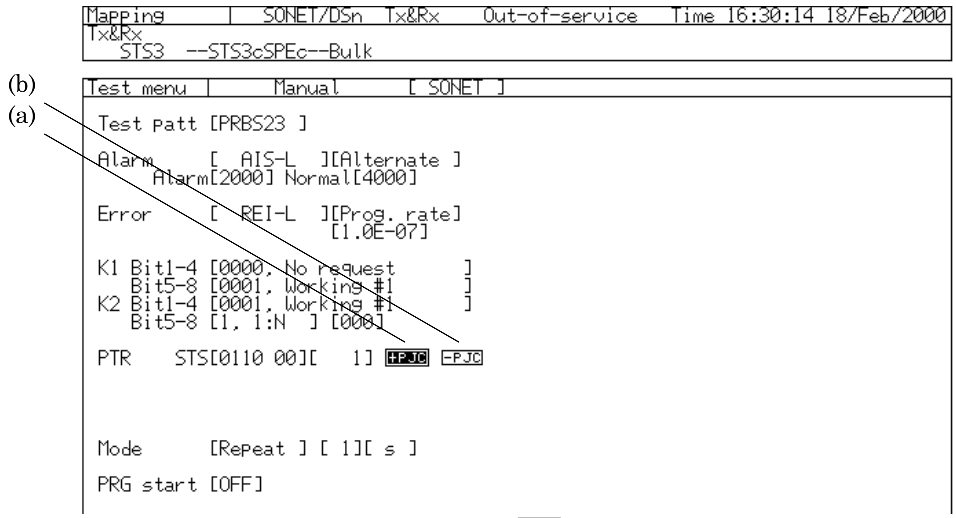
(a) STS Pointer value and VT Pointer value can be set in decimal numbers, respectively. After entering values, NDF is generated and pointer value is changed by pressing Set.

6.13.2 Changing Pointer by Justification

The generation of positive and negative justification is set on the 'Test menu : Manual' screen.

(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.



(a) Move the cursor and press [Set]. I bit is inverted and positive justification is generated.

(b) Move the cursor and press [Set]. D bit is inverted and negative justification is generated.

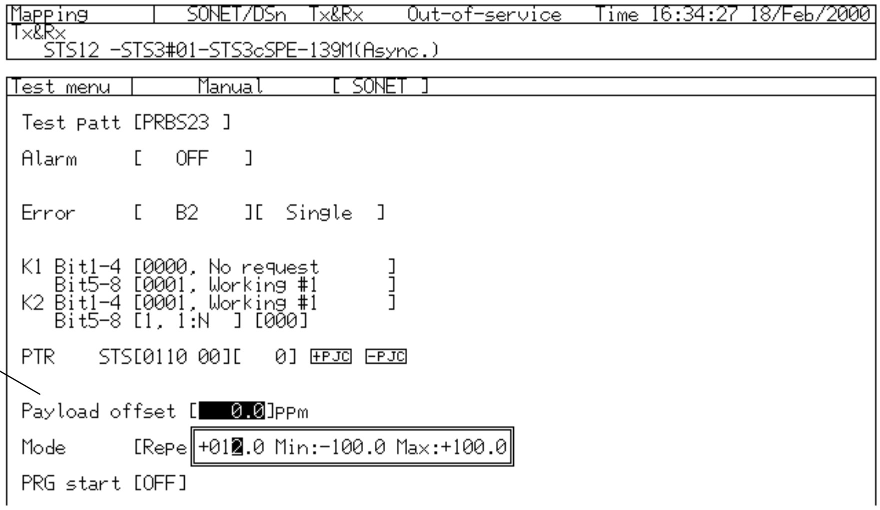
6.13.3 Offsetting Payload by C bit

The payload of the measurement channel can be set with C bit (C1 bit/C2 bit). It is set in the unit of ppm. The offset value is set on the 'Test menu : Manual' screen.

(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.

(a)



(a) Payload offset .... Enter the offset value to be set, and press Set. According to the offset value set internally, stuff is controlled automatically.

Section 7 Measurement and Analysis

This Section describes measurement and analysis. Before you perform the measurements and analysis, the connection and initial setting of measurement route must be completed as explained in 'Section 5 Application Examples and Basic Settings'.

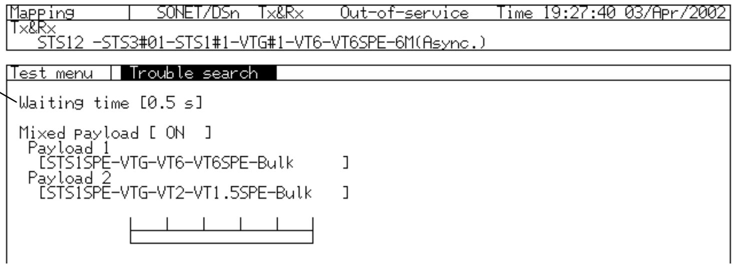
7.1 Continuity Test of All Channels by Trouble Search Function

MP1570A can perform the conduction test on all channels for the mapping route set on the 'Setup : Mapping' screen with its trouble (error and alarm) search function. The error and alarm measurement results are displayed for each channel. Here is the testing procedure.

7.1.1 Setting and Starting Search *'Test menu : Trouble search' screen*

(1) Open the 'Test menu : Trouble search' screen.

(a)



(2) Setup the screen parameters as follows:

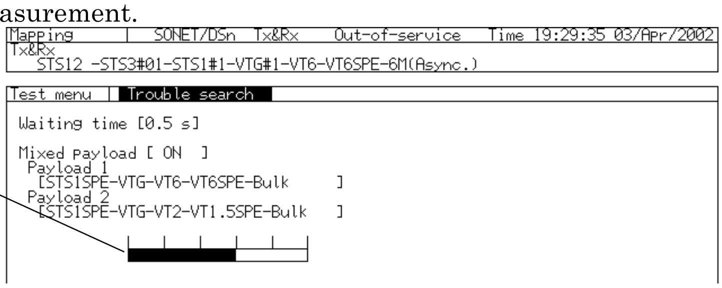
(a) Waiting time ....sets the time required for stable test signal switching. Set this at 0.5 seconds, the shortest time, if no time setting is required.

(b) Mixed payload.....independently sets the different mapping for that of the other two remaining channels of TUG3 or STS1 SPE to be measured. When set to 'Off', sets the same payload as that of the measurement channel.

(3) Press [Start/Stop] and start the measurement.

(4) The bar graph on the screen displays the progress of the measurement.

Bar graph



(5) After the measurement, the measurement result is displayed on the ‘Result’ screen and ‘Analyze’ screen.

Note

When the trouble search function is used in the Tx/Rx mode, the channel to be searched is restricted as shown below.

- If there is a mapping of the transmitting side that corresponds to the mapping of the receiving side, only the mapping is searched.
- If there is not a mapping of the transmitting side that corresponds to the mapping of the receiving side, the mapping set in the receiving side is searched.
- If the Mixed payload setting is ‘On’, only the channels set in the receiving side is searched.

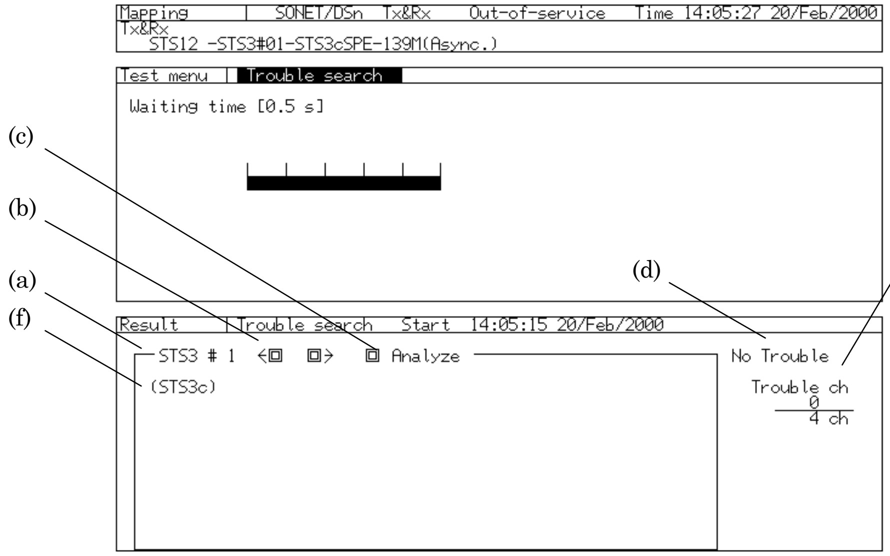
7.1.2 Displaying Search Result

'Result : Trouble search' screen

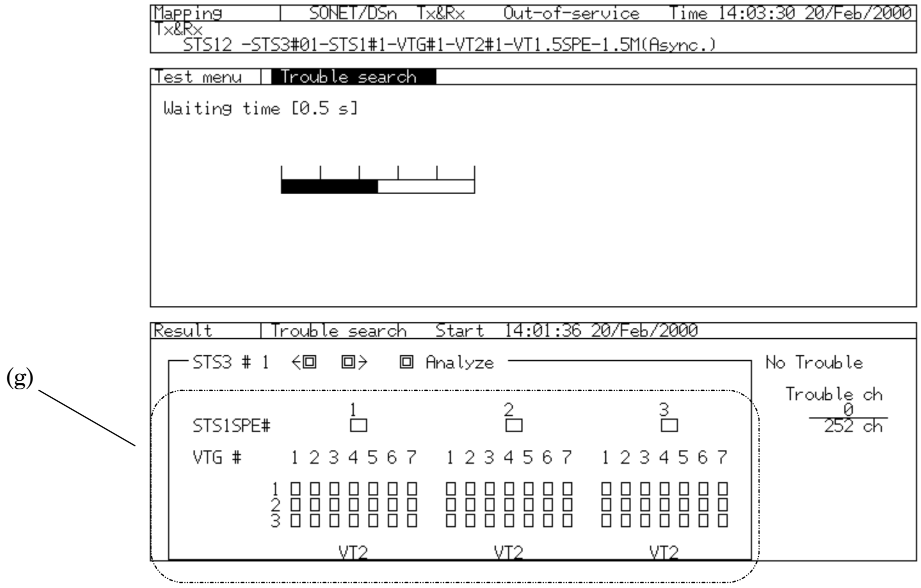
(1) Open the 'Result : Trouble search' screen. (The 'Result : Trouble search' screen appears if you press Result while the 'Test menu : Trouble search' screen is open.)

(2) The screen displays the trouble search measurement results. The measured results are for all channels on each mapping route. Here are three examples: measurement results for STS3cSPE route, and STS3cSPE-TUG3-VTG-VT2-VT2SPE route.

STS3cSPE route



for STS3cSPE-TUG3-VTG-VT2-VT2SPE route



(a) STS3#** ..... displays the channel under measurement (The channel automatically changes during the measurement, i.e. '#**' following AUG changes to #01, #02, to #xx.).

(b) ←□ □→..... Trouble search is started if you move the cursor here and press Set.

- The channel number for which trouble has occurred blinks on the screen if you search with ←□ or □→.
- Buzzer is sounded if no channel trouble exists in the direction of search.

(c) □ Analyze ..... After the completion of the measurement, if there exists an AUG for which trouble has occurred, then if you move the cursor here and press Set, the 'Analyze : Trouble search' screen is opened and displays the detailed error and alarm information.

(d) [Trouble search results] ..... displays the trouble search results after the measurement.

Trouble .... indicates that trouble has occurred for one of the channels.

No Trouble ..... indicates that all channels are trouble free.

(e) Trouble ch .....indicates the number of channels for which trouble search was performed and the number of channels for which trouble was found.

(f) (STS3) ..... Illuminated in red when an error excluding LOS, LOF and AIS, or an alarm occurs in Section/STS Path.

(g) [Measured results display field (enclosed by a two-dot chain line)]… displays the measured results of all channels (The display style differs according to the selected mapping route.).

□ (illuminated in white) ..... No trouble has occurred.

■ (illuminated in red) ..... A trouble has occurred.

- Take appropriate actions in steps (a) to (d) after the measurement.

7.1.3 Analysis of the Search Results

'Analyze : Trouble search' screen

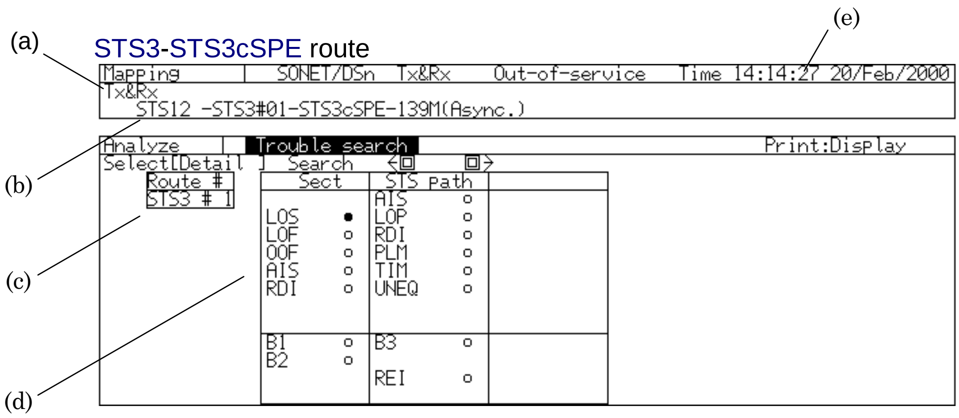
The 'Analyze : Trouble search' screen displays the detailed error and alarm data for each channel and error and alarm detection path (NG path) according to the trouble measurement results.

Detected Error and Alarm Data for Each Channel

(1) Open the 'Analyze : Trouble search' screen (The 'Analyze : Trouble search' screen is displayed if you press [Result] while the 'Result : Trouble search' screen is open).

Here is an example of display for the STS3-STS3cSPE route.

STS3-STS3cSPE route



(a) Select ..... Select 'Detail' to display the type of the error and alarm.

(b) Search ..... Searches for a route for which trouble has occurred.

←□ ....Searches the route for which trouble has occurred and that which comes before the route currently displayed, and displays it.

□→ ....Searches for a route for which trouble has occurred and that which comes after the route currently displayed, and displays it.

(c) Route # ..... shows each hierarchy channel of the displayed route.

- Move the cursor to the desired figure and press [Set]. The window for numeric entry is displayed. The displayed route is changed if you change the channel.

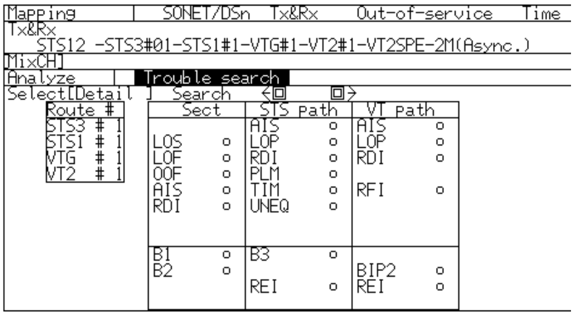
(d) Trouble content ..... displays the trouble contents for the current route.

○ (illuminated in white) ..... No trouble has occurred.

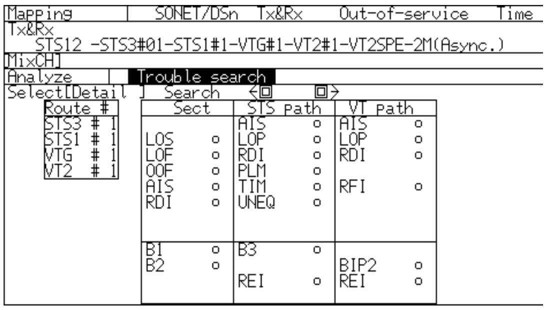
● (illuminated in red).......... Trouble has occurred.

- The displayed trouble contents differs according to the mapping. The figure on previous page shows the display for the STS3-STS3cSPE route. Here are more display examples.

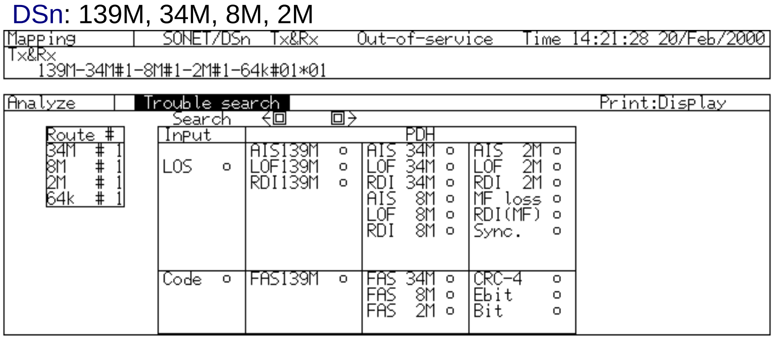
STS3-STS3cSPE-TUG3#-TU3 route



STS3-STS1SPE#-VTG#-VT6/VT2/VT1.5 route



DSn: 139M, 34M, 8M, 2M



(e) Print ..... selects the contents to be printed (For printing, press Print Now .).

Display ....Trouble for the currently displayed route

After ....Trouble for the route that comes after the currently displayed route

Before ....Trouble for the route that comes before the currently displayed route

All ....Trouble for all the routes

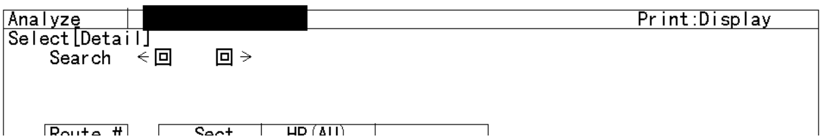
Display of NG Paths (paths for which errors and alarms were detected)

Here is the procedure for displaying the NG path routes to be taken on completion of the measurement.

(1) Open the 'Analyze : Trouble search' screen. (The 'Analyze : Trouble search' screen is displayed when you press [Result] while the 'Result : Trouble search' screen is open.)

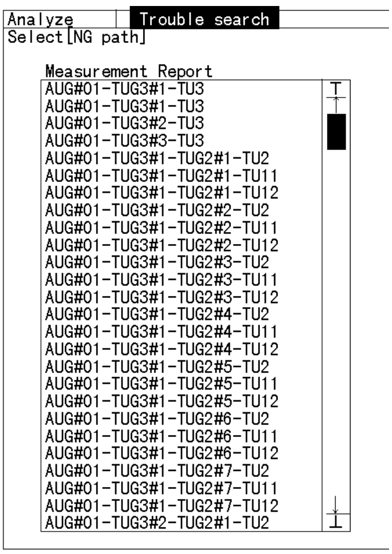
(2) Move the cursor to ‘Select’ and press [Set].

(3) ‘Item selection window’ is displayed. Select ‘NG path’ with [∧] [∨] and press [Set] to display the NG paths.

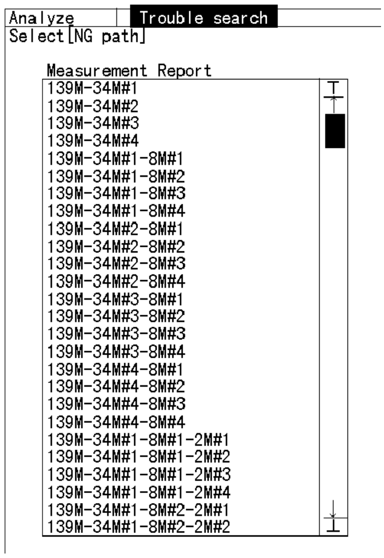


- Examples of routes of NG paths are displayed below.

Simultaneous SONET measurement



Simultaneous DSn measurement



7.2 Manual Measurement (Measurement of One Channel on a Mapping Route)

Manual measurement allows the following measurements of one channel on a mapping route.

Error and alarm measurement

Justification measurement

Performance measurement

The start of manual measurement clears all previously measured results.

Here is the procedure of manual measurement, along with the steps for displaying and analyzing the measured results.

7.2.1 Setting and Starting the Measurement *'Test menu : Manual' screen*

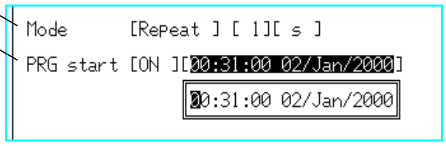
(1) Connect the MP1570A and the equipment to be examined as described in the 'Section 5' and 'Section 6'.

(2) Open the 'Test menu : Manual' screen.

(3) Setup the screen parameters as follows:

(a)

(b)



(a) Mode ..... sets the measurement mode as follows:

Single ..... Single measurement

Repeat ..... Repeated measurement

Manual ..... Once the measurement is started, it continues until you press Start/Stop.

- Measurement time is set on 'Single' or 'Repeat' mode.

(b) PRG start ..... Automatically starts a measurement at the measurement start time if this is set at ON (programming start). Input the measurement start time.

(4) Start measurement by pressing Start/Stop after the setting in step (3).

Note

- Press [Start/Stop] to stop the measurement.
- If you change the alarm detection and removal conditions, the system clock, and the graph resolution during the measurement, data is discarded, and a measurement is started from the beginning.

7.2.2 Display and Analysis of the Error and Alarm Measurement Results

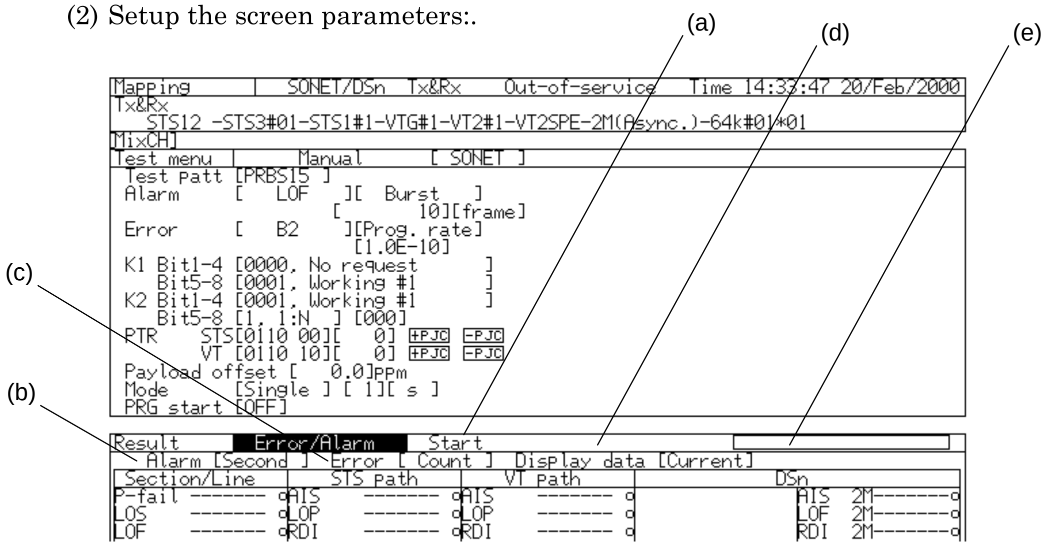
Here is the procedure for displaying and analyzing the error and alarm measurement results obtained by manual measurement explained in '7.2.1 Setting and Starting the Measurement'.

Displaying the Error and Alarm Measurement Results

'Result : Error/Alarm' screen

(1) Open the 'Result : Error/Alarm' screen.

(2) Setup the screen parameters:.



(a) [Measurement time display] ..... selects the display pattern of measurement time as follows:

Start.............displays the time at which the measurement was started.

Elapsed........displays the elapsed time after a measurement is started.

- The bar graph shows the measurement progress.

(b) Alarm ..... selects the display pattern of alarm measurement results.

Second .... displays the number of seconds for which the alarm is to be generated.

Frame .... displays the frame at which the alarm has occurred.

(c) Error ..... selects the display pattern of error measurement results.

Count .... displays the generated error count.

Rate .... Converts and displays the generated error into rate.

(d) Display data ..... selects the display pattern of measured results.

Current........ displays the measured results from measurement start to the present time.

Last............. displays the measured results on completion of measurement. This is useful for repeated short-time measurements.

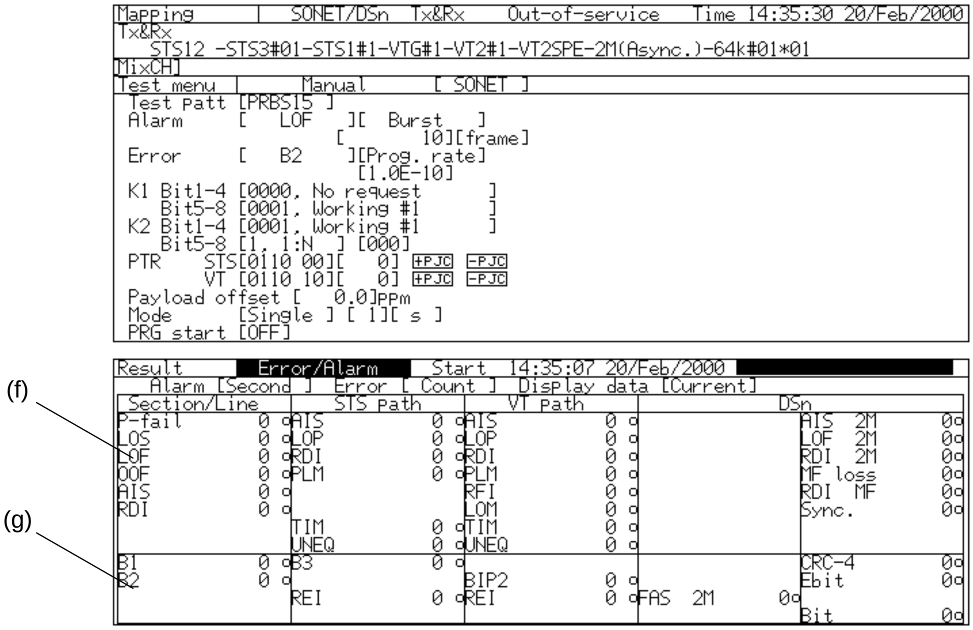
(e) [Display type] ..... selects the display type when on the two- or three- division display.

SONET........ displays the measured results regarding DSn and SONET frame.

TC/Sig.......... displays the measured results regarding the tandem connection and signalling.

(3) After the setting, start the measurement by pressing ● Start /Stop .

(4) Measured results are displayed as shown in the examples below.



(f) [Alarm measurement results] ..... displays the alarm measurement results in accordance with the setting in (b).

(g) [Error measurement results] ..... displays the error measurement results in accordance with the setting in (c).

● (illuminated in red) ..... Appears when an error occurs regardless of measurement start and stop.

History Display of the Errors and Alarms

The detected errors and alarms detected during the measurement can be memorized (History display). Here is the setting procedure.

(1) press ●History during the measurement.

(2) If errors and alarms are detected after the measurement starts or pressing ●History, the lump on the front panel are turned on. In addition, '●' is illuminated in red on the screen

- Press Reset to clear the data.

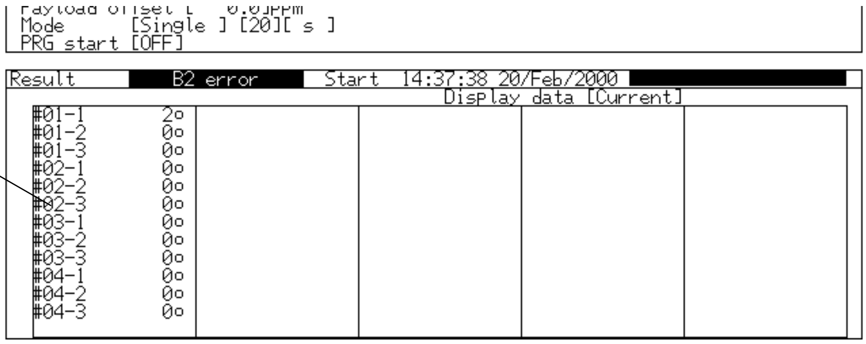
Display of the B2 Error Measurement Results *'Result : B2 error' screen*

B2 error of each byte can be displayed simultaneously. Here is the procedure for displaying the B2 error measurement results,

(1) Open the 'Result : B2 Error' screen.

(2) B2 error of each byte is displayed.

(a)



(a) #xx-y ….. 'xx' represents AUG under the measurement. 'y' represents the B2 byte channel. '1' is the first byte.

Note

B2 error measurement results are displayed in count. It can not be display in rate.

Displaying the Error and Alarm of VT Channel

'Result : Simultaneous' screen

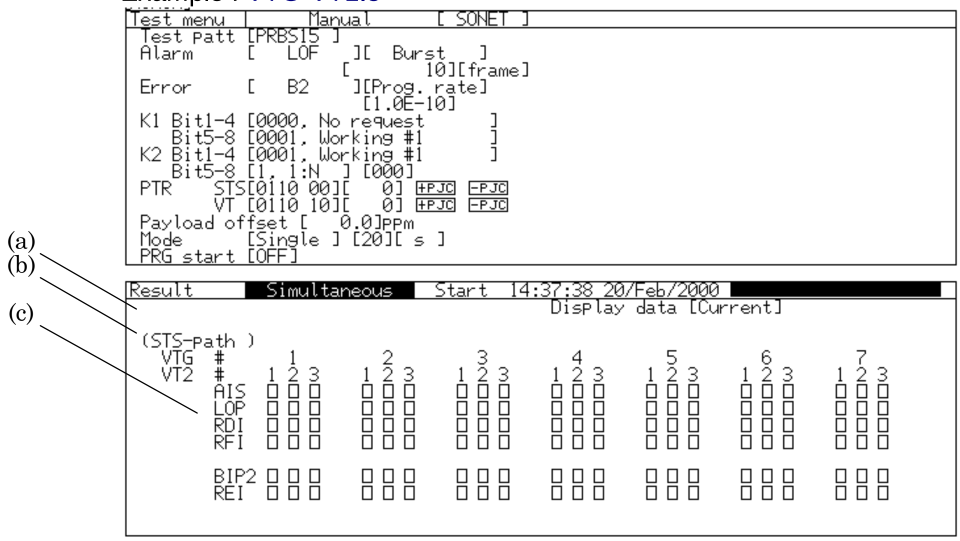
The errors and alarms of STS1, VT6SPE (7ch), VT2SPE (21ch), and VT1.5SPE (28ch) mapped to the specified TUG3 or STS1 can be detected and displayed.

Here is the procedure for performing this measurement.

(1) Open the 'Result : Simultaneous' screen.

(2) The screen displays the measured results as shown in the examples below. In each case, the measured results for all channels mapped to the measurement channel TUG3 or STS1 are displayed.

Example : VTG-VT1.5



(a) (Section) .... Illuminated in red when an error or alarm occurs in the section.

(b) (STS Path) ...... Illuminated in red when an error or alarm occurs in STS Path.

- This screen displays whether the section and STS Path have an error or alarm. The 'Result : Error/Alarm' screen displays the error and alarm details.

(c) [VT measured results display area] ..... displays the measured results of all channels (The display mode differs according to the selected mapping route.).

□ (illuminated in white) ..... No trouble has occurred.

■ (illuminated in red) ..... Trouble has occurred.

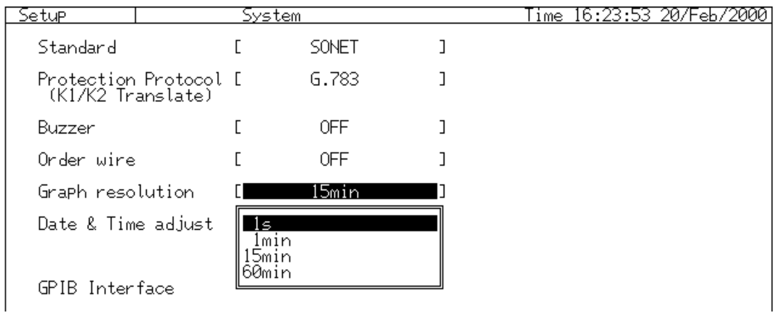
Analysis of the Error and Alarm Measurement Results

'Analyze : Error Alarm' screen

The measurement results obtained by the manual measurement can be displayed on a bar graph. By displaying the graph, time the error and alarm occur and their frequency can be analyzed. Here is the procedure for graph display of error and alarm measurement results.

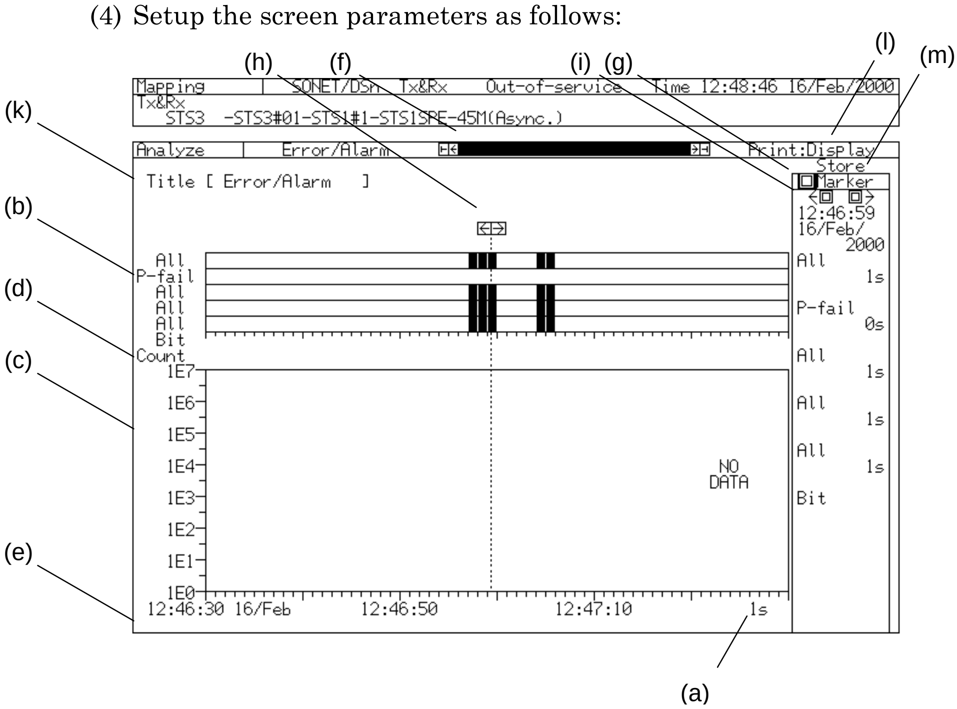
(1) Firstly, open the 'Setup : System' screen to set graph resolution.

(2) Select the graph resolution from '1s', '1min', '15min', and '60min'.



(3) Open the 'Analyze : Error Alarm' screen ('Analyze : Error Alarm' screen appears if you press Alarm while Manual is selected on the Test menu main screen.).

(4) Setup the screen parameters as follows:



Setting the graph

(a) [Abscissa scale] ..... selects the abscissa scale from 1s, 1min, 15min, and 60min.

(b) [Alarm] ..... selects the alarm to be displayed.

- Move the cursor to the left-hand side of the graph and press Set. The window for alarm selection is opened. Select the alarm to be displayed on the window.
- Up to five alarms can be simultaneously displayed on single-screen display. Up to two alarms can be displayed on two- and three-division screens .
- displays the logical sum of all alarms that have occurred, if you select All under Alarm.

(c) [Error] ..... selects the error to be displayed.

- displays no other error simultaneously.

(d) [Error display mode] ..... selects the error display mode.

Count ..... displays the generated error count.

Rate ..... displays the generated error rate converted from the error count.

(e) [Graph top time display] ..... displays the time at the top of the graph on the screen. You can scroll the graph by changing the time.

(f) [Graph scroll] ..... scrolls the graph horizontally if you move the cursor here and press Set.

⊢ ....scrolls the screen to the top page.

← ....scrolls the screen to a half page before.

→ ....scrolls the screen to a half page after.

⊣ ....scrolls the screen to the last page.

Setting the Maker

(g) Marker ..... displays the On/Off of the Marker. This function is only available for single-screen display.

□ .....indicates that the Marker is set to Off. You can turn it On by pressing Set.

■ ..... indicates that the Marker is set to On. You can turn it Off by pressing Set.

(h) [Moving maker] ..... Move the cursor here and press Set to move the cursor.

[←] .... Moves the maker to left.

[→] .... Moves the maker to right.

- Set the marker to on or off in step (i)

(i) [Search] ..... Searches for the errors and alarms. This function is enabled only when the marker is displayed.

←[□] ..... Moves the marker to the previous errors or to the time at which an alarm occurred.

[□]→ ..... Moves the marker to the subsequent errors or to the time at which an alarm occurred.

(j) [Time and detailed data for marker position] ..... displays the time and detailed data of errors and alarms at the marker position.

- Counts only the alarm items and displays them as alarm measurement results, if 'Count' is selected in (g).
- displays only the error items which have been converted into the error rate as the error measurement results if 'Rate' is selected in (g).

Setting on storing analyzed data

(k) Title ..... Assigns a title to the screen currently displayed. This function is only available on a single display screen.

- If you press Set, the character input window is opened. Input the title.

(l) Print ..... selects the contents to be printed. (Press Print Now to start the printing.)

Display ..... Data is displayed on the screen

All ..... Data from the start of measurement

Before ..... Data before the currently displayed data

After ..... Data after the currently displayed data

(m) Store ..... stores the graph data in the memory. This is only available for single-screen display. If you press Set, the character input window is opened. Input a name and save it in the memory.

Note

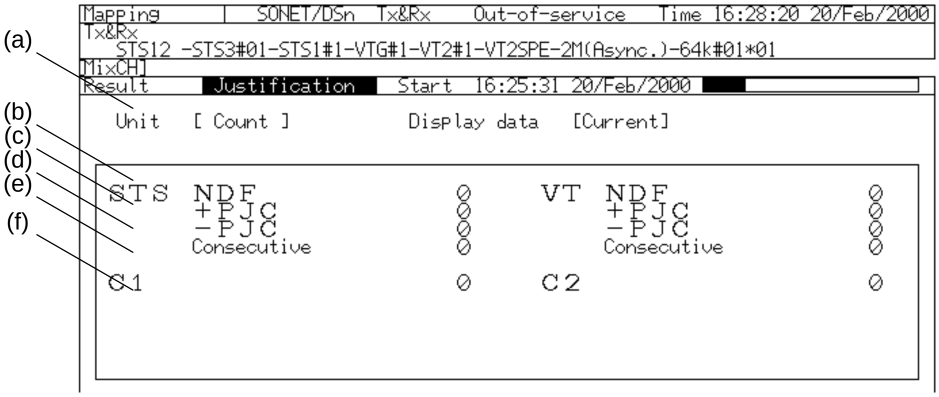
The 'Log memory full' condition will suspend Error/Alarm graph creation. In particular, if the graph resolution is set at '1s', the graph creation for a screen may be stopped halfway.

7.2.3 Displaying the Justification Count *'Result : Justification' screen*

The type of the pointer change detected during the measurement and the counting result can be displayed. Here is the procedure for displaying them.

(1) Open the 'Result : Justification' screen in the state of having performed the manual measurement.

(2) The type of the STS Pointer change and VT Pointerchange and the counting result, which are detected from the measurement start, are displayed.



(a) Unit ..... selects the display mode of measured results for the generated justification.

Count.... displays the justification count.

Rate ...... displays the justification rate converted from the justification count.

ppm....... displays the generated justification in ppm.

(b) NDF.......... displays the pointer change or rate caused by NDF.

(c) +PJC .... displays the positive pointer justification count or rate.

(d) -PJC .... displays the negative pointer justification count or rate.

(e) Consecutive .... displays the pointer change or rate caused by three pointers that had the same pointer.

(f) C ..... displays the bit count or rate of information bit based on the justification of the C bit in the mapping of STS3cSPE-139M and STS1-45M (Async.)

C1 ..... displays the bit count or rate of information bit based on the justification of the C bit in the mapping of STS1-34(Async.), VT6SPE-6M(Async.), VT2SPE-2M(Async.), and VT1.5SPE-1.5M(Async.).

C2 ..... displays the fixed stuff bit count or rate based on the justification of the C bit in the mapping of STS1-34(Async.), VT6SPE-6M(Async.), VT2SPE-2M(Async.), and VT1.5SPE-1.5M(Async.).

7.3 Display of Performance Measurement Results *'Result : Performance' screen*

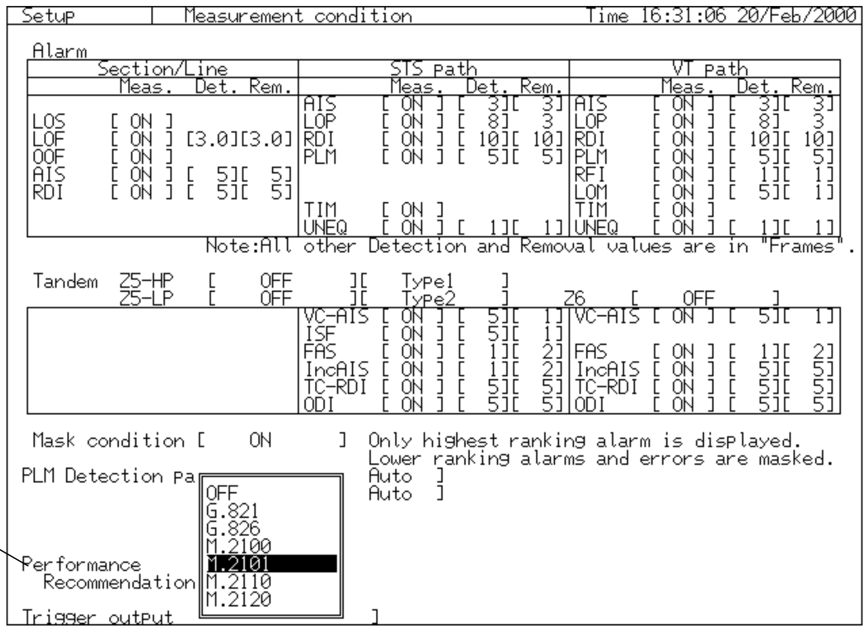
The MP1570A can evaluate a line in accordance with the standard of the performance measurement stipulated by ITU-T.

- The MP1570A can automatically generate the error and alarm patterns corresponding to the detective conditions of each performance parameter.
- See 'Appendix F Performance Measurement' for the details.

7.3.1 Selecting Performance

The standard of the performance measurement is selected on the 'Result : Performance' screen.

(a)



(a) Performance Recommendation .....Select the standard of the performance measurement.

7.3.2 Measurement

After selecting the standard of the performance measurement, set parameters on the 'Result : Performance' screen and start a measurement by pressing Start/Stop. And the measurement results are shown according to the selected standard.

- Supplement -

On Performance measurement, the MP1570A handles the error measurement results (related to MS-REI) only at concatenation mapping (involving STS3cSPE-Bulk) for the specified bit rate.

The related measurements are as follows:

・G.826

Measurement results related to MS-REI at Error item [REI]

・M.2101

Tx item (ES/SES)

・M.2110

Tx item (ES/SES) at Layer [SONET] [Section] and the related Tx measurement results

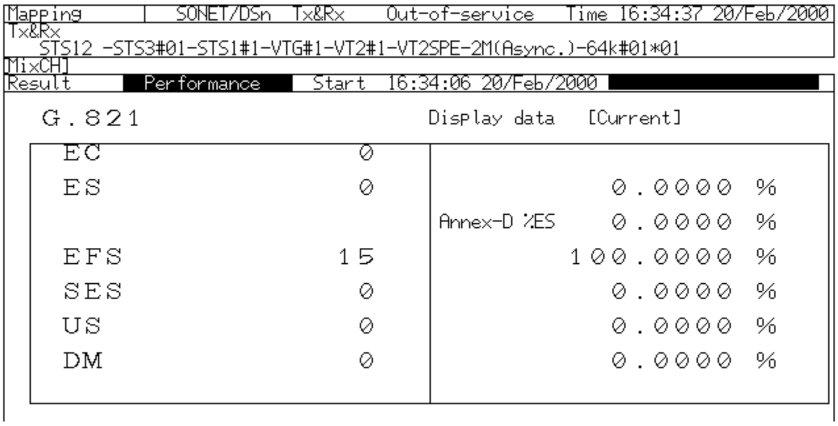
・M.2120

Tx item (ES/SES) at Layer [SONET] [Section] and the related TR results

When you select G.821 for performance:

When you select G.821 for performance on the 'Setup : Measurement condition' screen, the following performance measurement results are displayed

– In case of G.821, no parameters have to be set.



EC............Error Count

ES............Ratio between Error seconds and effective measurement time

Annex-D %ES .....Ratio between ES of ITU-T G.821 Annex-D and effective measurement time

EFS..........Ratio of error free seconds to effective measurement time

SES..........Ratio of severe error seconds to effective measurement time

US............Ratio of unavailable seconds to effective measurement time

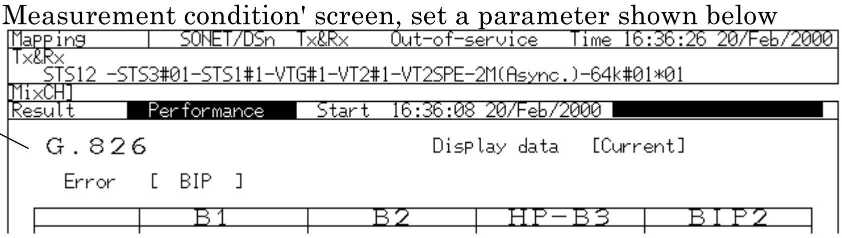
DM...........Ratio of degraded minutes to effective measurement time

Code ES...Code error seconds

When you select G.826 for Performance:

(1) When you select G.826 for performance on the 'Setup : Measurement condition' screen, set a parameter shown below

(a)



(a) Error ..... Specify the type of the error to be measured.

BIP ..... measures the SONET parity operation error.

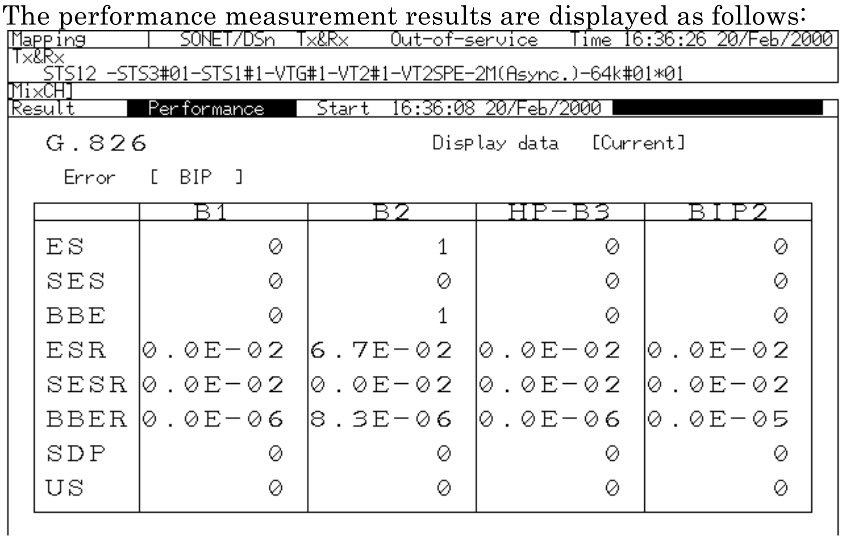
REI ..... measures the REI error.

FAS/CRC .....

Parity ..... measures the parity operation error of the 45M frame

Bit ..... measures the information error.

(2) The performance measurement results are displayed as follows:



	B1	B2	HP-B3	BIP2
ES	0	1	0	0
SES	0	0	0	0
BBE	0	1	0	0
ESR	0.0E-02	6.7E-02	0.0E-02	0.0E-02
SESR	0.0E-02	0.0E-02	0.0E-02	0.0E-02
BBER	0.0E-06	8.3E-06	0.0E-06	0.0E-05
SDP	0	0	0	0
US	0	0	0	0

EC .... Error Count

SES .... Ratio of Severe Error Seconds to effective measurement time

BBE......... Background Block Error count

ESR .... Error Second Ratio

SESR....... Severe Error Second Ratio

BBER ...... Background Block Error Second Ratio

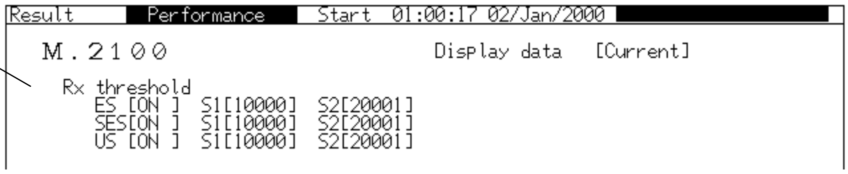
SDP .... Severely Disturbed Period count

US .... Ratio of Unavailable Seconds to effective measurement time

When you select M.2100 for performance:

(1) When you select M.2100 for performance on the 'Setup : Measurement condition' screen, set the threshold for judging the received signal and transmitted signal

(a)



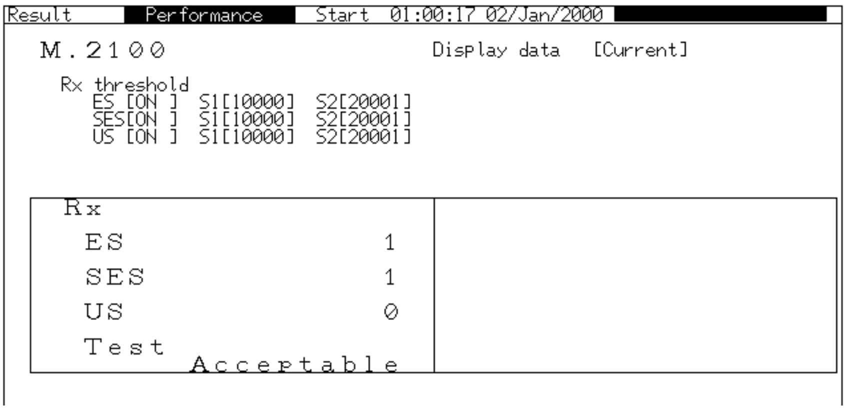
(a) Rx threshold ..... sets the threshold for judging the received signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(b) Tx threshold ..... sets the threshold for judging the transmitted signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(2) The performance measurement results are displayed as follows:



EC............Error Count

SES..........Severe Errored Seconds

US............Unavailable Seconds

Test..........Judgement results against the thresholds set in (a) and (b)

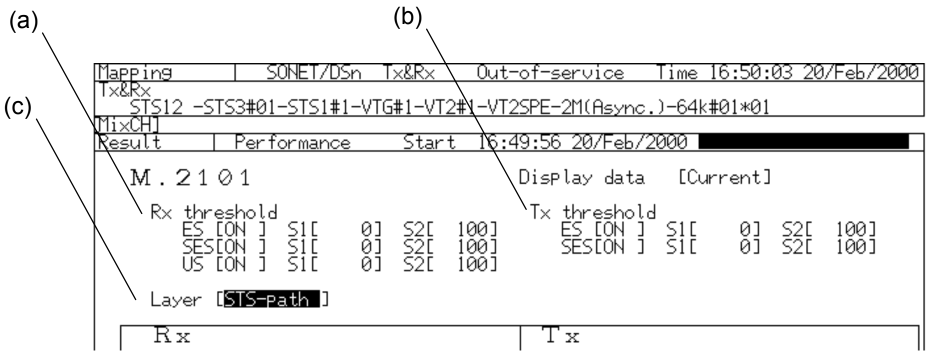
Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	≤	Measured results		

- The display priority is Unacceptable > Degraded > Acceptable.

When you select M.2101 for performance:

(1) Set the parameters as shown below when you select M.2101 for performance on the 'Setup : Measurement condition' screen.



(a) Rx threshold ..... sets the threshold for judging the received signal.

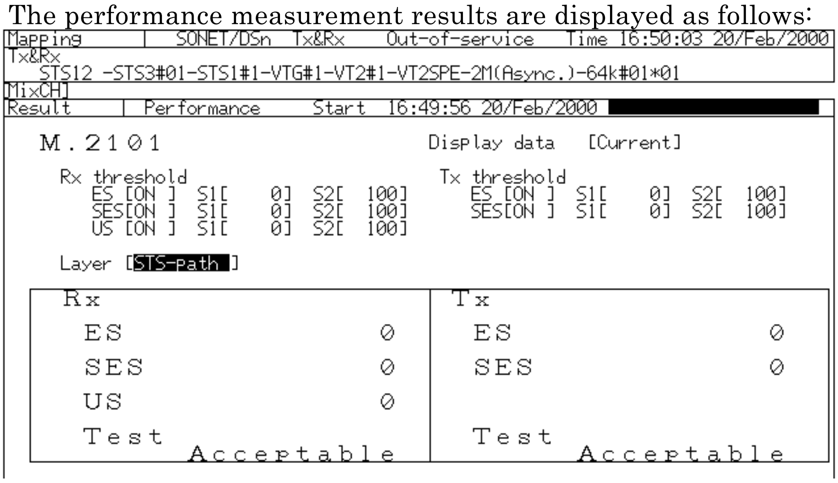
If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(b) Tx threshold ..... sets the threshold for judging the transmitted signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(c) Layer ..... selects the measured item range from Section, AU-path and TU-path.

(2) The performance measurement results are displayed as follows:



EC........ Error Count

SES...... Severe Error Seconds

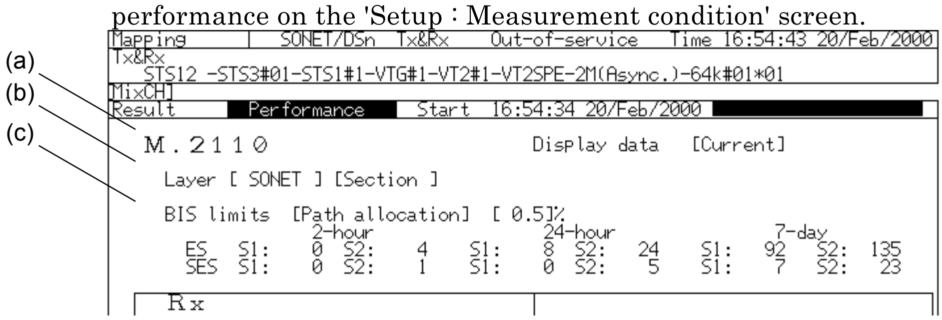
US........ Unavailable Seconds

Test...... Judgement results for the thresholds set in (a) and (b)

- The display priority is Unacceptable > Degraded > Acceptable.

When you select M.2110 for Performance:

(1) Set the parameters as shown below when you select M.2110 for performance on the 'Setup : Measurement condition' screen.

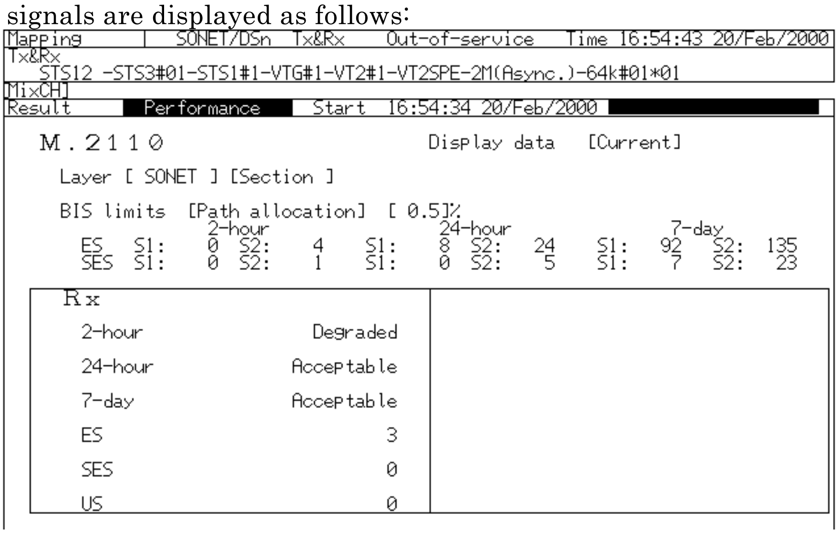


(a) Layer ..... sets the measured item range of M.2110.

(b) BIS limits ..... sets the BIS limits for M.2110.

(c) 2-hour, 24-hour, 7-day ..... ES and SES settings are displayed in the order of 2 hours, 24 hours, and 7 days.

(2) Performance measured results for received and transmitted signals are displayed as follows:

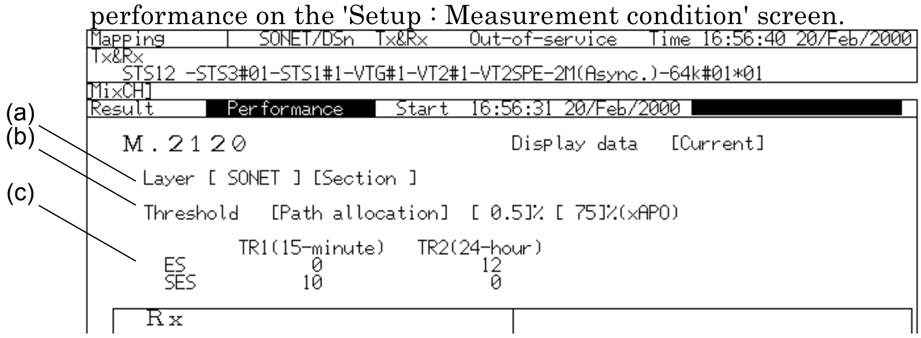


2-hour, 24-hour, 7-day ..... ES and SES judgement results are displayed for 2 hours, 24 hours, and 7 days.

ES .... Error Seconds
SES .... Severe Error Seconds
US .... Unavailable Seconds

When you select M.2120 for Performance:

(1) Set the parameters as shown below when you select M.2101 for performance on the 'Setup : Measurement condition' screen.

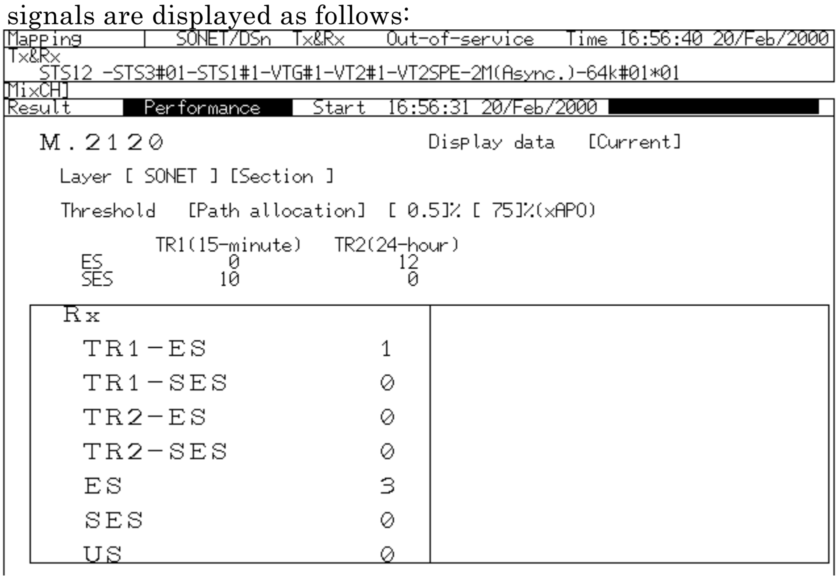


(a) Layer ..... sets the measured item range of M.2120.

(b) Threshold ..... sets the threshold for M.2120.

(c) TR1(15-minutes), TR2(24-hour) ..... displays the ES and SES of TR1 and TR2 if the threshold is user.

(2) Performance measurement results for received and transmitted signals are displayed as follows:



TR1-ES ..... TR1 Error Seconds

TR1 SES ... TR1 Severe Error Seconds

TR2-ES ..... TR2 Error Seconds

TR2 SES ... TR2 Severe Error Seconds

ES .... Error Seconds

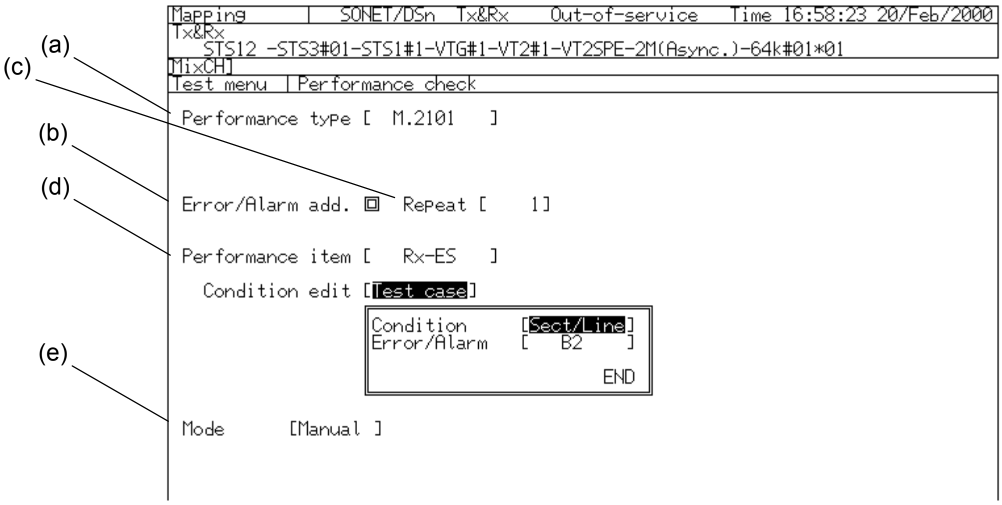
US .... Unavailable Seconds

7.3.3 Error Performance Check

The MP1570A can generate errors and alarms exceeding the threshold of each performance measurement parameter. Here is the procedure for measurement.

(1) Open the 'Test menu : Performance check' screen.

(2) Set up the screen parameters.



(a) Performance type .....selects a performance measurement standard.

(b) Error/Alarm add. □ .....The errors and alarms begin to be inserted by moving the cursor here and pressing Set.

□ .....indicates that the error and alarms are not inserted.

■ ..... indicates that the error and alarms are being inserted.

(c) Repeat ....sets the number of repeating the errors and alarms.

(d) Performance item .....selects a performance parameter for performing the performance check.

(e) Mode .....displays the measurement mode. When the error performance check is executed, it is fixed to 'Manual'.

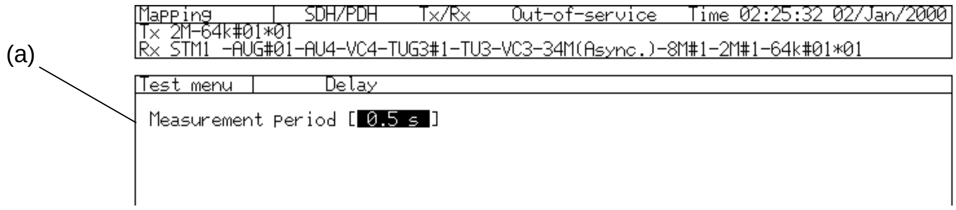
7.4 Delay Measurement

MP1570A is a measurement route with send and receive performance as described in '5.5 Loop back Test', '5.7 MUX Evaluation Test' and '5.8 DEMUX Evaluation Test'. The measurement functions include the delay measurement (i.e. the measurement of time required to receive a signal after it is sent.). Here is the procedure for measurement.

7.4.1 Setting and Starting the Measurement *'Test menu : Delay' screen*

(1) Open the 'Test menu : Delay' screen.

(2) Setup the screen parameters as follows:



(a) Measurement period ..... sets the cycle of measurement.

(3) Start the measurement by pressing Start/Stop.

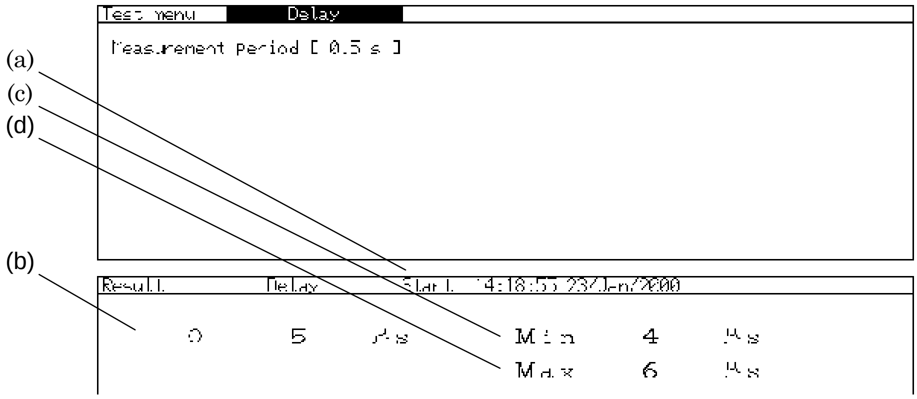
Note

The time required to receive a signal after it is sent by MP1570A is measured using Delay Measurement. We recommend that you check device to be examined is connected properly before the measurement.

7.4.2 Displaying the Measured Results *'Result : Delay' screen*

(1) Open the 'Result : Delay' screen. ('Result : Delay' screen appears if you press Result while the 'Test menu : Delay' screen is displayed.)

(2) The delay measurement results are displayed.



(a) [Measurement time] . selects the display mode of measurement time.

Start .... displays the time at which the measurement was started.

Elapsed .... displays the elapsed time after the measurement was started.

(b) [Measured results] ... displays the latest measured results.

○ .... Displayed at every measurement cycle.

Timeout............... Displayed when a measurement could not be performed within the measurement cycle.

(c) Min .... Minimum delay value after the measurement start is displayed.

(d) Max .... Maximum delay value after the measurement start is displayed.

Note

- The delay measurement shows the following errors for send and DSn

	Send	Receive
DSn	± 1 μs	± 1 μs
SONET-STS3cSPE Bulk/139M	± 1 μs	± 1 μs
SONET-STS1 Bulk/45M/34M	± 1 μs	± 1 μs
SONET-VT6SPE Bulk/mc/6M	± 1 μs	± 1 μs
SONET-VT2SPE/VT1.5SPE	±10 μs	±10 μs

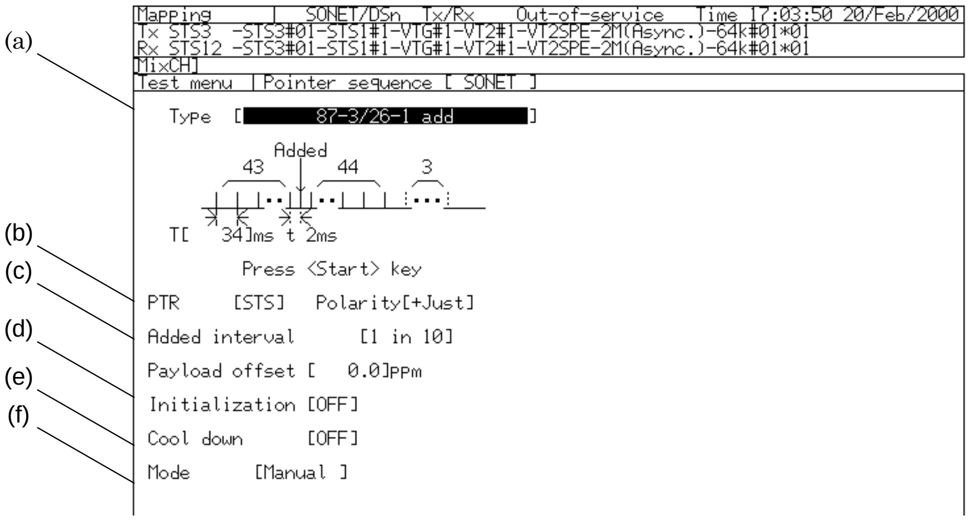
- The definite error is the sum of send and receive errors. If you send a DSn 2M signal and receive it with SONET VT2SPE-2M, for example, the sum of send error, ± μs and receive error, ±10 μs becomes the definite error, ±11 μs.
- Approximate ±120 μs may occur if you measure at 64k×N using the MUX/DEMUX function.

7.5 Pointer Sequence Test *'Test menu : Pointer sequence' screen*

MP1570A allows specific pointer sequence tests by applying the justification to the signal to be transmitted. Here is the procedure for the test.

(1) Open the 'Test menu : Pointer sequence' screen.

(2) Setup the screen parameters:



(a) Type ..... selects the pointer sequence type from the table below.

Regular with double	ITU-T G.783 :	Regular Pointers Plus One Double Pointer
Single of opposite polarity	ITU-T G.783 :	Single Pointers of Opposite Polarity
Regular with missing	ITU-T G.783 :	Regular Pointers with One Missing Pointer
Double of opposite polarity	ITU-T G.783 :	Double Pointers of Opposite Polarity
87-3/26-1 Normal	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Normal)
87-3/26-1 Add	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Add)
87-3/26-1 Cancel	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Cancel)
Continuous pattern : normal	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Normal)
Continuous pattern : Add	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Add)

	Continuous pattern : Cancel	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Cancel)
*1	G.783:Single pointer adjustment	ITU-T G.783:	Periodic Pointer Adjustment test Sequence
*2	G.783:Muxmam Rate pointer burst	ITU-T G.783:	Periodic Pointer Adjustment test Sequence
*2	G.783:Phase transient pointer burst	ITU-T G.783:	Periodic Pointer Adjustment test Sequence

*1 .... Effective only for SONET mode.

*2 .... Effective only for 45M mapping

(b) PTR.................. selects the pointer to be tested.

STS..................STS Pointer is tested.

VT....................VT Pointer is tested.

(c) Added Interval ....sets the added point intervals.

(d) Initialization.. sets the time of initialization at the beginning of the sequence. Some sequences need no setting.

(e) Cool down....... sets the cool-down time at the beginning of the sequence. Some sequences need no setting.

(f) Mode .... Measurement mode similar to that set on the 'Test menu : Manual' screen.

Single ....Single measurement

Repeat ....Repeated measurement

Manual............Once the measurement is started, it continues until you press [Start/Stop].

- sets the measurement time if you select 'Single' or 'Repeat'.

(3) MP1570A allows specific pointer sequence tests by applying the justification to the signal to be transmitted. Start the measurement by pressing [Start/Stop] after setting the parameters in (2).

7.6 Capturing Overheads

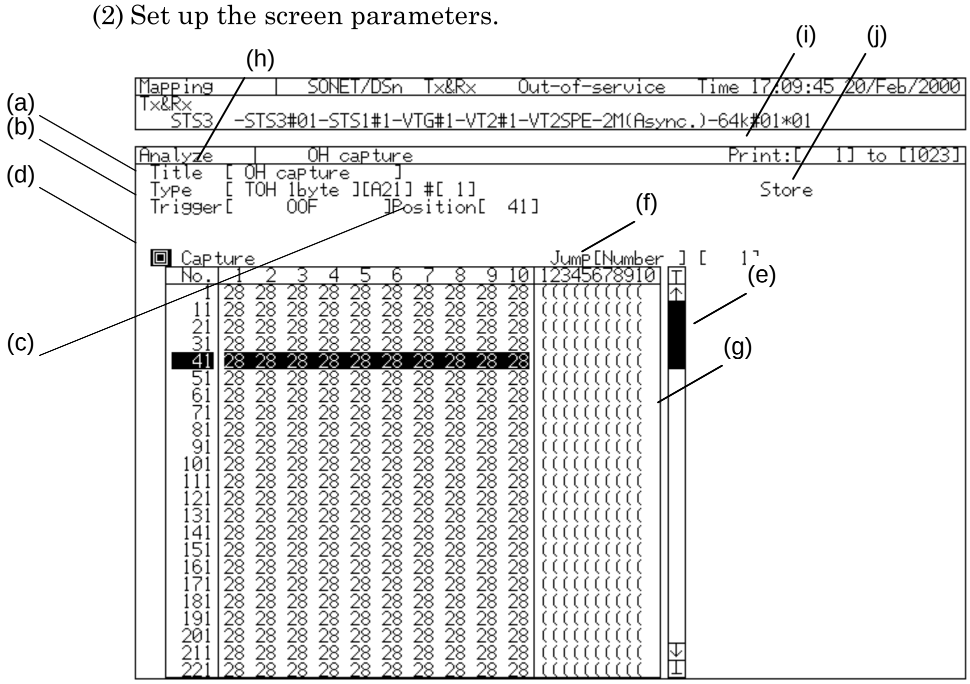
"Analyze : OH capture" screen

MP1570A can take in 1,023 frames of SONET overhead bytes arbitrarily to the internal memory, and display them. Here is the procedure for capturing, analyzing, and storing the data.

Setup and Start of a Capture

(1) Open 'Analyze : OH capture screen.

(2) Set up the screen parameters.



(a) Type ….. selects an overhead to be captured.

- When selecting TOH 1 byte or POH 1 byte, specify a byte and a channel to be captured.

(b) Trigger ….. selects the type of trigger to capture the data.

- When 'Manual' is selected, □ is displayed next to the "Position". Move the cursor here and press Set . And it is triggered off.

(c) Position …..specifies the frame number to be triggered off.

(d) Capture …..Move the cursor here and press Set . A capturing begins.

▣ …..indicates that the capturing has begun and it is waiting a trigger. 'Waiting for trigger' is displayed.

□ …..indicates that the capturing has finished.

- In the example shown above, the overhead bytes are captured in the position of frame No.41, using "OOF" as a trigger. Therefore, 1,023 frames are captured continuously, from 40 frames before "OOF" is detected.

Analyzing the Captured Data

(e) [Data scroll] ….. scrolls the data upwards and downwards.

T........................ Moves to the top of the data.

↑........................ Moves 5 lines upwards.

↓........................ Moves 5 lines downwards.

⊥........................ Moves to the bottom of the data.

(f) Jump ….. scrolls the screen to the specified capture data position.

Trigger ….. scrolls the screen to number specified as the trigger position.

Number …..scrolls the screen to the number specified by the numerical input window displayed in right-hand side.

(g) [ASCII display] …..In Single screen display, the captured data can be displayed in ASCII.

Storing and Printing the Captured Data

(h) Title …..A title can be attached to the screen currently displayed. Move the cursor here and press Set, and a character input window appears. Input a title.

- This function is effective when the single screen is displayed.

(i) Print …..Select contents to be printed.

- Specify the range to print, by frame number.
- See "8.5 Printing" for the details of printing.

(j) Store …..stores the Graph data in the internal memory. Press Set, and a character input window opens. Input a name and store the data.

7.7 Monitor

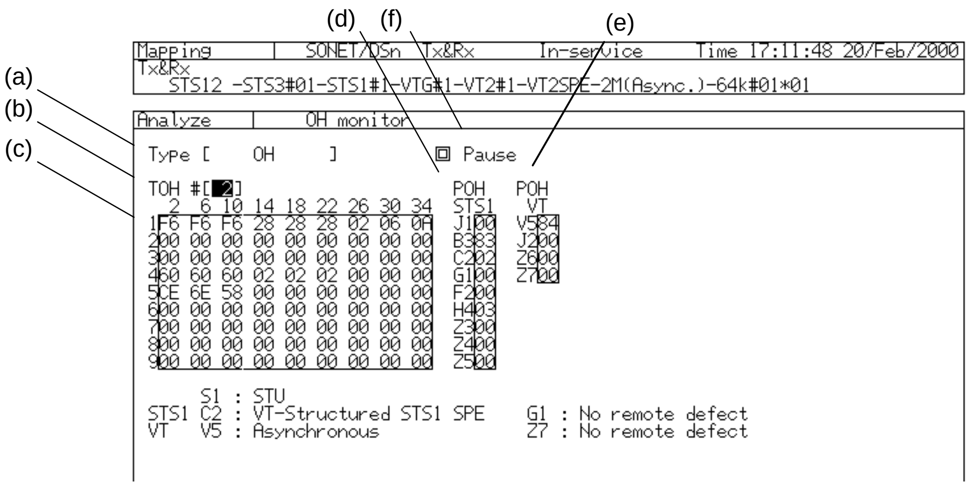
'Analyze : OH monitor' screen

7.7.1 Monitoring Overheads

Here is the procedure for monitoring the TOH and POH of the SONET signal.

(1) Open the 'Analyze : OH monitor' screen

(2) Setup the screen parameters as follows:



(a) Type.............Set the monitor type to 'OH'.

(b) TOH#...........sets TOH# if the receive signal bit rate is 622M or more.

(3) The overhead monitor results are displayed.

(c) displays the TOH monitor results.

(d) displays the POH monitor results.

(e) displays S1, STS3 C2, STS1C2... S1 and C2 in plain language.

(f) Pause...........sets the display updating to on or off of.

☐..............updates the display. This function is turned off if you move the cursor here and press Set.

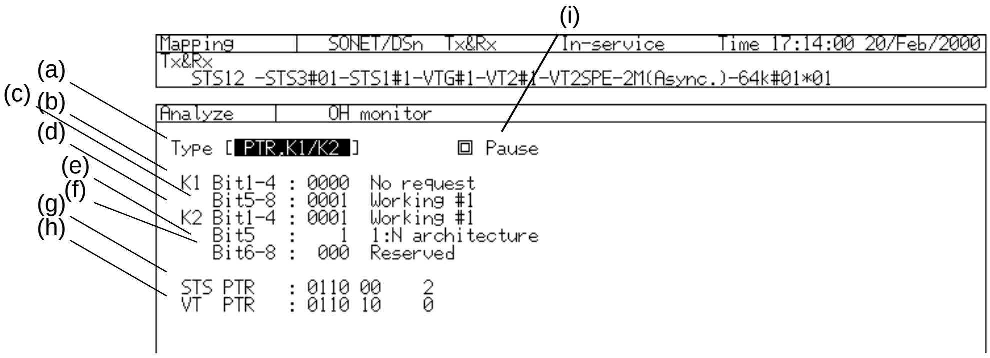
■..............does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.2 Monitoring the Pointer and K1/K2 Bytes

Here is the procedure for monitoring the pointer, K1 byte and K2 byte of SONET. This function is available only while SONET signal is being received.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



(a) Type .... Set the monitor type to 'PTR, K1/K2'.

(3) The monitoring results of pointer, K1 byte and K2 byte are displayed.

(b) K1 Bit1-4....... displays Bit1-4 of K1 byte.

(c) Bit5-8............. displays Bit5-8 of K1 byte.

(d) K2 Bit1-4....... displays Bit1-4 of K2 byte.

(e) Bit5................ displays Bit5 of K2 byte.

(f) Bit6-8............. displays Bit6-8 of K2 byte.

(g) STS PTR .... displays the STS Pointer.

(h) VT PTR .... displays the VT Pointer.

- STS and VT Pointers are displayed as follows:

1001 10 1023

1023 → Pointer value (decimal number)

10 → S Bit (binary number)

1001 → NDF (binary number)

(i) Pause .... sets the display updating to on or off of.

□ .... updates the display. This function is turned off if you move the cursor here and press Set.

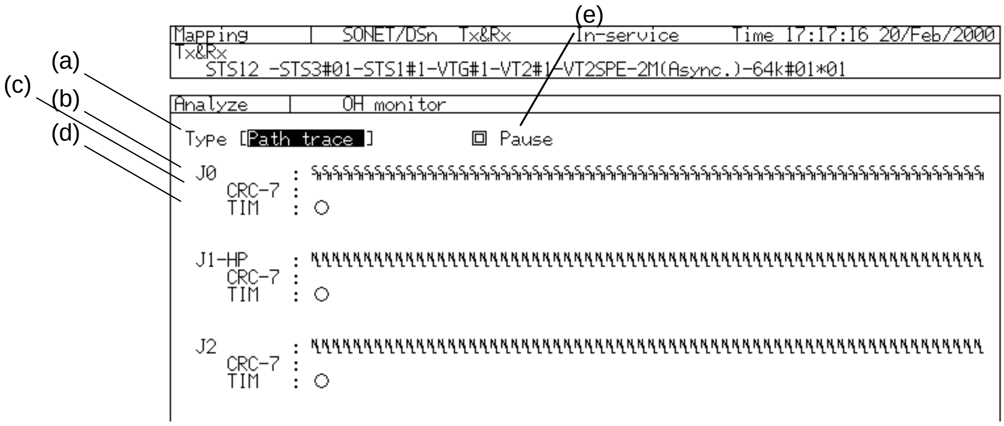
■ .... does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.3 Monitoring the Path Trace

Here is the procedure for monitoring the SONET path trace. This function is available only while SONET signal is being received.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



(a) Type .... Set the monitor type to 'Path trace'.

(3) The monitoring results of J0 byte, J1 byte and J2 byte are displayed.

(b) The path trace of each byte displays 64 characters.

(c) CRC-7........... Calculates CRC-7 that is regarded as being included and displays whether or not an error exists.

● (illuminated in red) : CRC-7 error exists.

○ (not lit) : CRC-7 error does not exist.

(d) TIM .... displays whether or not an TIM exists. When TIM errors detected by the MP1570a does not coincide with the path trace data set up on the 'Setup : OH preset' screen, it is regarded as an error.

● (illuminated in red) .....TIM error exists.

○ (not lit) .....TIM error does not exist.

(e) Pause .... sets the display updating function to on or off.

□............... updates the display. This function is turned off if you move the cursor here and press Set .

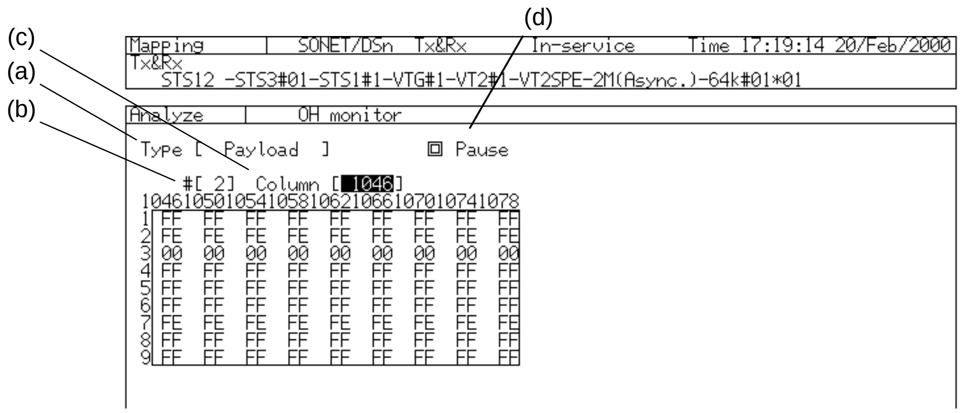
■............... does not update the display. This function is turned on if you move the cursor here and press Set .

7.7.4 Monitoring the Payload

Here is the procedure for monitoring SONET payload.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



(a) Type..............Set the monitor type to 'Payload'.

(b) TOH#........... sets TOH# if the bit rate of receive signal is 622M or more.

(c) Column .....specifies the top column position to be monitored.

(3) The monitoring results of payload are displayed.

(d) Pause............sets the display updating function to on or off.

□...............updates the display. This function is turned off if you move the cursor here and press Set.

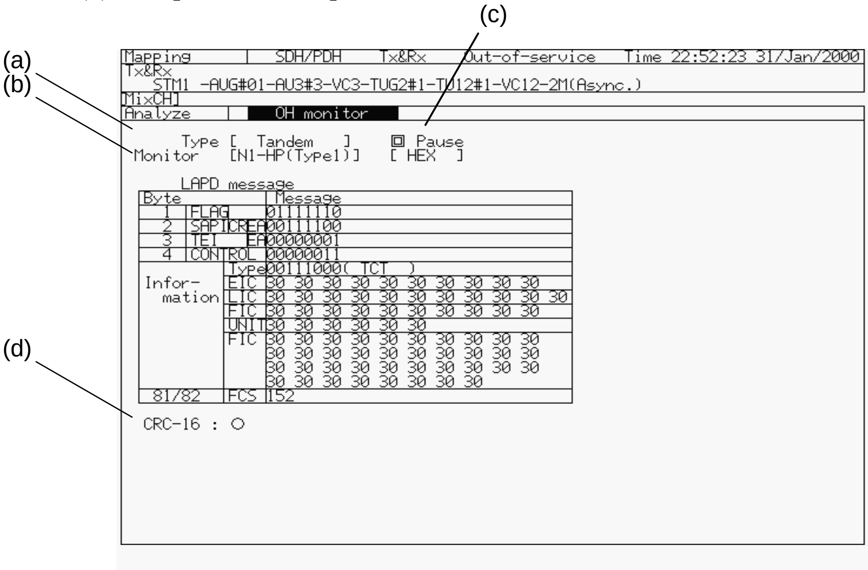
■...............does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.5 Monitoring the Tandem Connection

Here is the procedure for monitoring tandem connection. This function is available only when the measurement related to the tandem connection is turned on, on the 'Setup : Measurement condition' screen.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



(a) Type........... sets the monitor type as 'Tandem'.

(b) Monitor........ selects the item to be monitored from 'Z5-HP(Type1)', 'Z5-HP(Type2)', 'Z5-LP(Type2)' and 'Z6'. And, select the displayed item of DSn frame, and display mode from 'HEX' and 'ASCII'.

(3) The monitoring result is displayed.

(c) Pause .... sets the display updating function to on or off.

□ .... updates the display. This function is turned off if you move the cursor here and press [Set].

■ .... does not update the display. This function is turned on if you move the cursor here and press [Set].

(d) CRC-16 .....calculates CRC-16 and the measurement result is displayed.

● (illuminated in red) .....CRC-16 error exists.

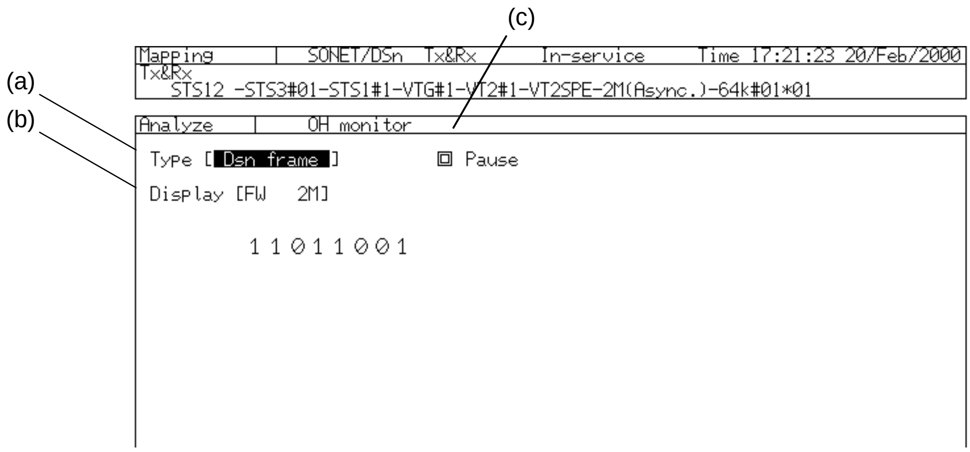
○ (not lit) .....CRC-16 error does not exist.

7.7.6 Monitoring the DSn Frame

Here is the procedure for monitoring DSn frame.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



(a) Type.............sets the monitor type at 'Path trace'.

(b) Display ....selects the display item of DSn frame.

(3) The monitoring results are displayed.

(c) Pause.............sets the display updating function to on or off.

□ ....updates the display. This function is turned off if you move the cursor here and press Set .

■ ....does not update the display. This function is turned on if you move the cursor here and press Set .

Note

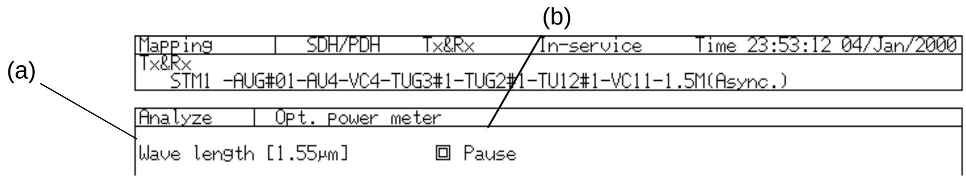
The 1.5M frame and the 45M frame can not be monitored.

7.8 Measuring the Optical Power

Here is the procedure for measuring the optical signal level inputted into the optical interface unit or the plug-in unit.

(1) Open the 'Analyze : Opt. power meter' screen.

(2) Setup the screen parameters.



(a) Wavelength ..... sets the wavelength.

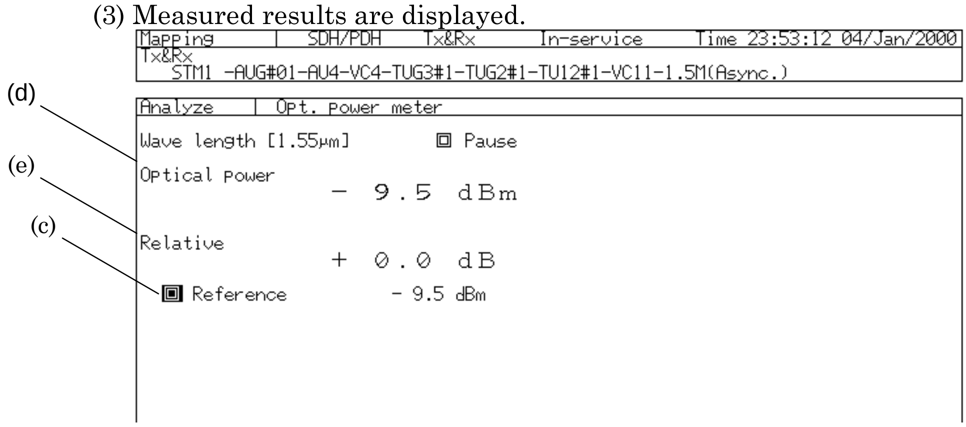
(b) Pause .... turns the display updating function on or off.

□............... updates the display. This function is turned off if you move the cursor here and press Set .

■............... does not update the display. This function is turned on if you move the cursor here and press Set .

(c) Reference........... The current value of the optical signal level is displayed if you move the cursor here and press Set . This level is regarded as the reference level.

(3) Measured results are displayed.



(d) Optical power .... displays the optical power value.

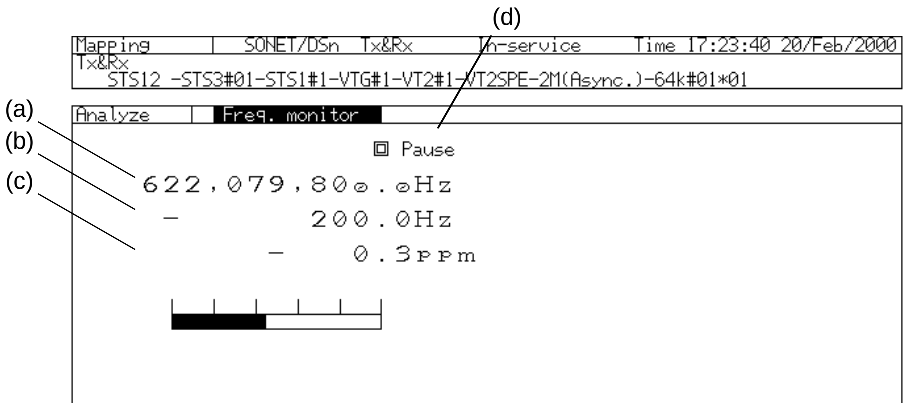
(e) Relative .... displays the value of the optical signal level relative to the reference value in (c) above in the range of -40.0 to +40.0 dB.

7.9 Measuring the Frequency of the Received Signal

Here is the procedure for displaying the frequency of the reproduced clock from the received signal.

7.9.1 Real Time Monitor of Frequency *'Analyze : Freq. monitor' screen*

A Real time monitor of frequency is displayed on the 'Analyze : Freq. monitor' screen.



(a) Displays the frequency of the clock.

(b) Displays the difference to the measurement bit rate in the unit of Hz.

(c) The difference shown in (b) is displayed in ppm.

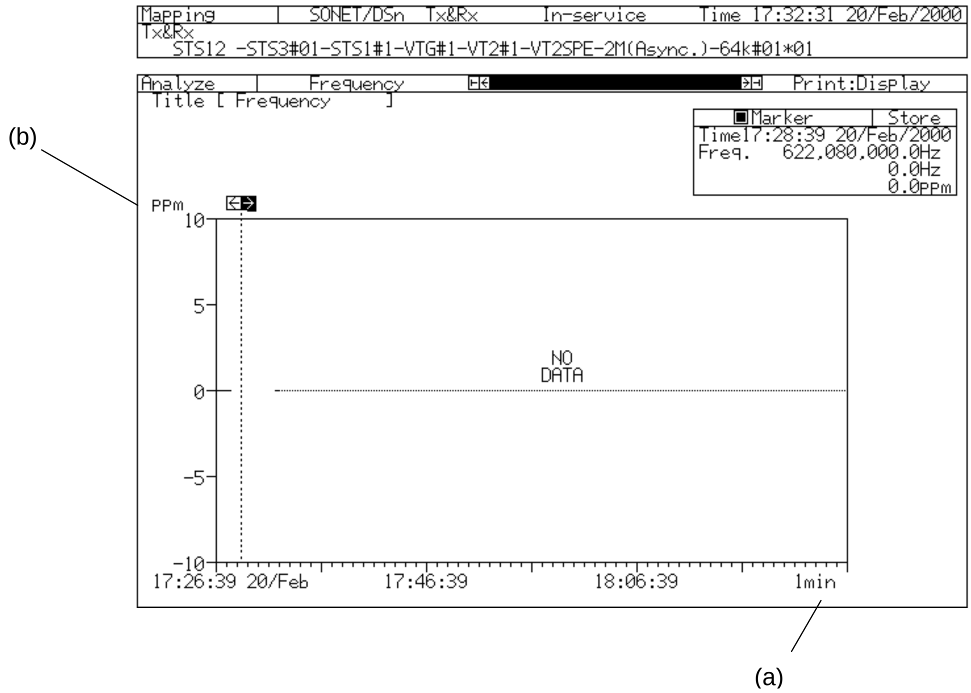
(d) 'Pause' holds the measurement result currently displayed.

□ .... updates the display. This function is turned off if you move the cursor here and press Set.

■ .... does not update the display. This function is turned on if you move the cursor here and press Set.

7.9.2 Displaying the Deviation of the Frequency *'Analyze : Frequency' screen*

The Deviation of the Frequency can be displayed on the 'Analyze : Frequency' screen.



(a) [Abscissa scale] …..sets a sampling interval.

(b) Sets the accuracy of the measurement result displayed in ppm

7.10 Overhead Tests *'Test menu : OH test' screen*

There are the following 4 kinds of the overhead tests.

OH Change	It generates an OH pattern preset on the "Setup : OH change data" screen.
OH BERT	It inserts a PRBS pattern into one byte of any OH. And, it measures the error rate of the pattern.
PTR 64 Frame	it generates pointers preset on the "Setup : PTR 64frame" screen.
OH Add/Drop	It inserts data inputted from the exterior into one byte of any OH. And, it outputs any one byte to outside.

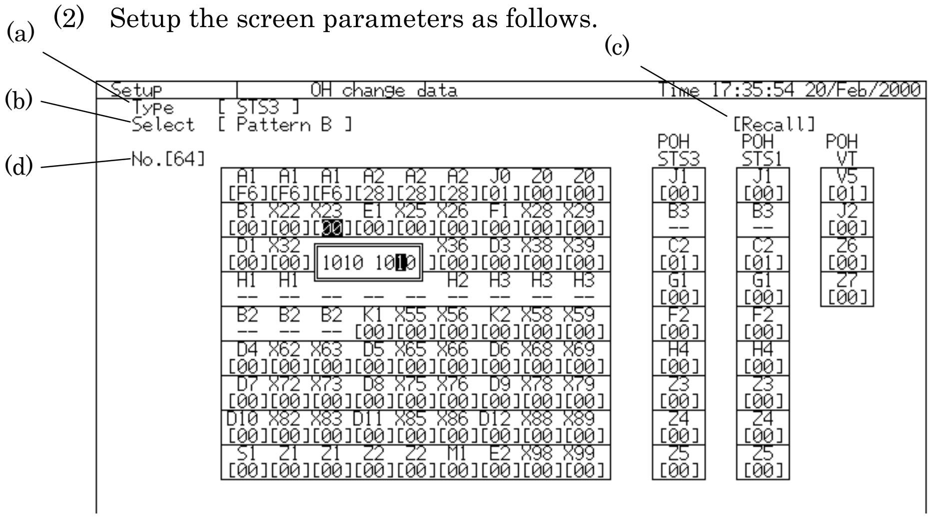
7.10.1 OH Change Test

Here is the procedure for generating 64 frames of overhead patterns (A pattern and B pattern).

Editing the Program Pattern *'Setup : OH change data' screen*

(1) Open the 'Setup : OH change data' screen.

(2) Setup the screen parameters as follows.



(a) Type .... selects the STS frame type to be edited, STS1 or STS3.

- "STS1" is available for the OH change test when the bit rate is 52M.
- "STS3" is available for the OH change test when the bit rate is 156M or more.

When the bit rate is 622M or more, the OH change test corresponding to one channel of STS3 level can be performed. The overhead data set up on the "Setup : OH preset" screen is inserted into the other channels.

(b) Select .... selects the pattern to be edited, Pattern A or Pattern B.

(c) Recall ...... initializes the set STS OH change data.

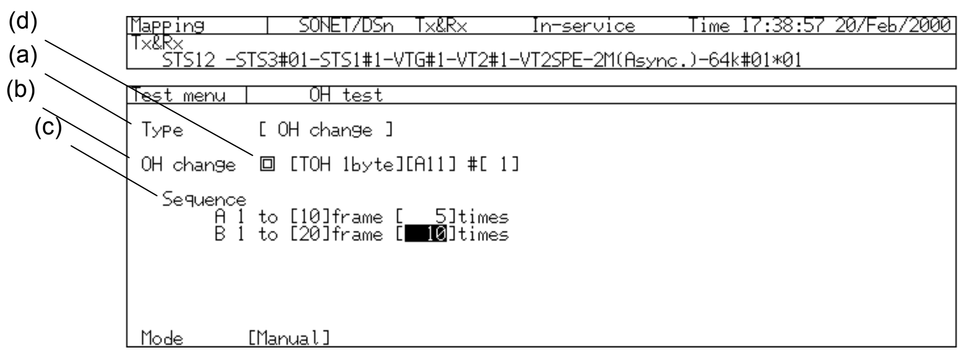
- Default...... If you move the cursor to Preset and press Set, the overhead data return to initial ones.
- Preset overwrite .....If you move the cursor there and press Set, a window appears. Specify the OH source and OH paste, and move the cursor to 'END' and press Set.

(d) No. .... specifies the TOH (STS3) No. to be edited on the 'Setup : OH preset' screen.

Generating the Programmed Pattern *'Test menu : OH test' screen*

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



(a) Type .....Select "OH change".

(b) OH change .....Select the type of the overhead to be tested.

- POH of the measurement channel is tested. POH of the dummy channel is not tested.
- When testing a TOH, specify the TOH channel.

(c) Sequence specifies a test sequence. Specify the final frame and the number of times to repeat the test, of each of A pattern and B pattern. In the example shown above, the test sequence is generated as follows.

A pattern : No.1 - No.10 frame, "5" times

B pattern : No.1 - No.20 frame, "10" times

(d) ▣..... The sequence pattern is generated by moving the cursor here and pressing Set. 'Pause' holds the measurement result currently displayed.

■ .....indicates that the sequence is being generated.

▣.....indicates that the sequence is not generated.

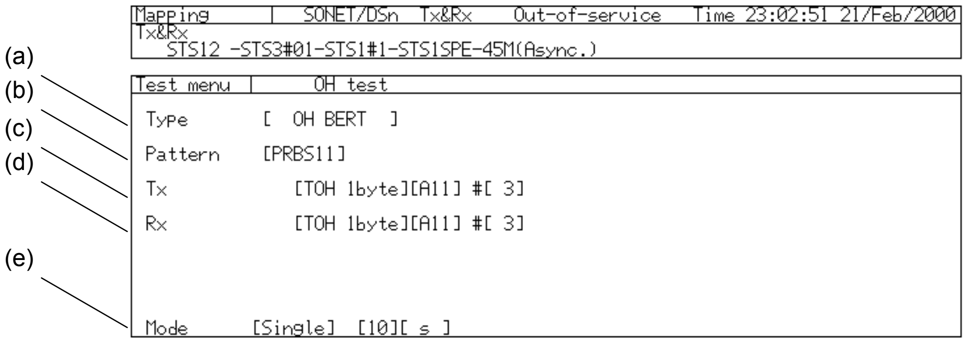
7.10.2 OH BERT Test

MP1570A can measure the error rate of one byte of any overhead, D1-D3 bytes, and D4-D12 bytes, taking advantage of the PRBS pattern

Setting and Starting Measurement *'Test menu : OH test' screen*

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



(a) Type ….. Select "OH BERT".

(b) Pattern …..Select a test pattern.

(c) Tx PRBS byte. ....Select a byte into which PRBS pattern is inserted. When the bit rate is 622M or more, specify a channel.

– Inserting PRBS pattern starts just after the byte is selected.

(d) Rx PRBS byte. …..Select a byte in which PRBS error is measured. When the bit rate is 622M or more, specify a channel.

(e) Mode .... Specify a mode and measurement time to measure the error. When selecting "Single" or "Repeat", specify the measurement time.

Single ....Sends the pattern only once.

Repeat ....Sends the pattern repeatedly.

Manual ....Sends the pattern until ● Start /Stop is pressed.

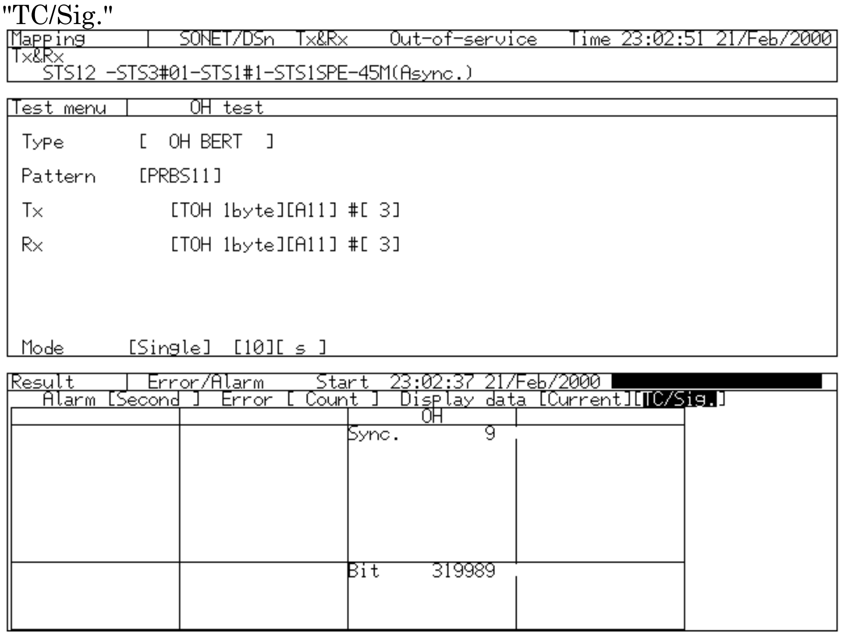
Note

The mode setting is the same as the one set up in the manual measurement. They can not be set separately.

(3) Start the measurement by pressing (Start/Stop).

Displaying the Measurement Result

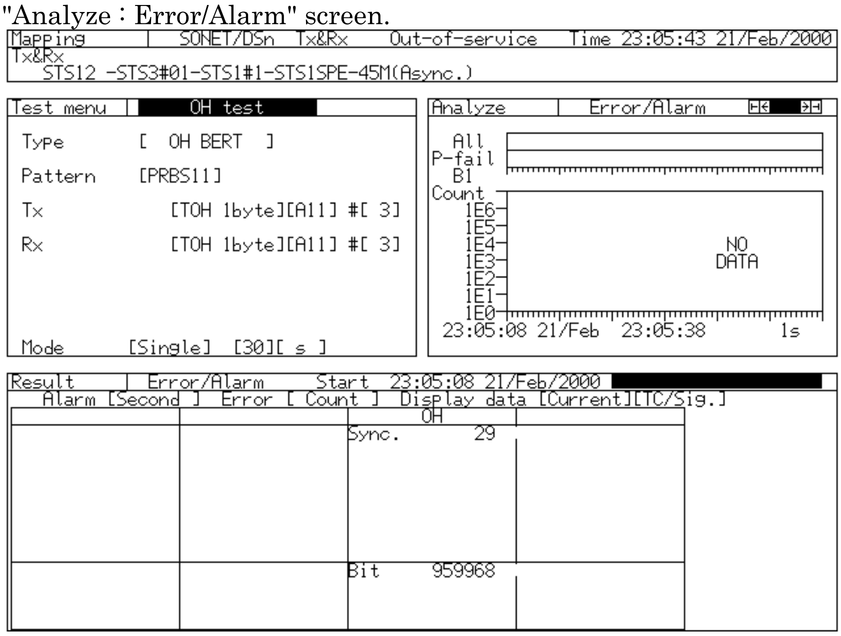
The measurement result is displayed on the "Result : Error/Alarm" screen. When two- or three-division screen is displayed, select "TC/Sig."



– See "7.2.2 Displaying the error and alarm measurement results" for the details.

Analyzing the Measurement Results

The measurement result can be displayed on a bar graph, on the "Analyze : Error/Alarm" screen.



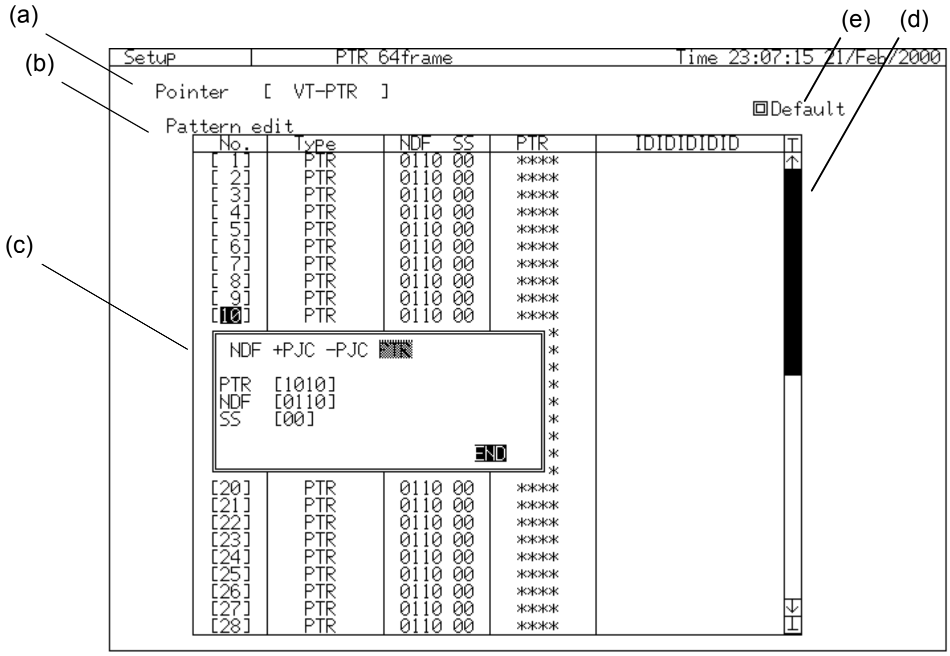
7.10.3 PTR 64 frame

MP1570A can generate 64 frames of preset pointers.

Editing Pointer Type to Be Generated

(1) Open the "Setup : OH change data" screen.

(2) Set up the screen parameters.



(a) Pointer ... selects the pointer type to be preset.

(b) No. ... shows the order of the pointers. Move the cursor here and press Set . And, a window for setting the pointer type is opened.

(c) Type .....selects the operation type of the pointer to be generated.

NDF ...... changes NDF pointer values. In this case, set the pointer values. Besides, NDF bits and SS bits can be set.

+PJC ..... generates a positive justification. The ordinary positive justification (I bit inverted, D bit not-inverted) is generated at [***---*]. When the inversion/no-inversion is desired to be changed, specify the bit to "M". Besides, NDF bits and SS bits can be set.

Example: +PJC from 0 of PTR value

For [**---*],

IDIDIDIDID

1010101010

For [*M*M---*M],
IDIDIDIDID
1111111111
For [M*M*M*---],
IDIDIDIDID
0000000000

-PJC --- generates a negative justification. The ordinary negative justification (D bit inverted, I bit not-inverted) is generated at [***---*]. When the inversion/no-inversion is desired to be changed, specify the bit to “M”.

Example: -PJC from 0 of PTR value
For [**---*],
IDIDIDIDID
0101010101
For [*M*M---*M],
IDIDIDIDID
0000000000
For [M*M*M*---],
IDIDIDIDID
1111111111

PTR ..... sets the NDF bit, SS bit, and Pointer value. Action of PTR pointer change does not performed, but the set bit is output. When [*****] is selected for pointer value setting, the current pointer value is output as it is.

(d) [Data scroll] ..... scrolls the data upwards and downwards.

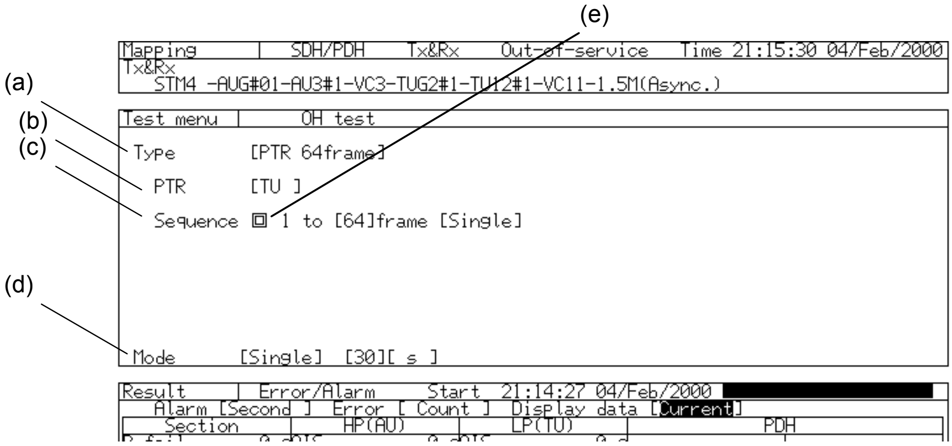
$\boxed{\mathrm{T}}$ ....Moves to the top of the data.
$\boxed{\uparrow}$ ....Moves 5 lines upwards.
$\boxed{\downarrow}$ ....Moves 5 lines downwards.
$\boxed{\perp}$ ....Moves to the bottom of the data.

(e) Default .....initializes the set data.

Setting a Pointer Sequence

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



(a) Type .....Select "PTR 64frame".

(b) PTR .....specifies the pointer type to be generated.

(c) Sequence frame... specifies "No." of the final frame of the pointer.

(d) Mode .....specifies the sequence generation mode.

Single .....Only one sequence is generated.

Repeat .....The sequences are generated repeatedly.

(e) ⧈..... The sequence is generated by moving the cursor here and pressing Set.

■ .....indicates that the sequence is being generated.

⧈.....indicates that the sequence is not generated.

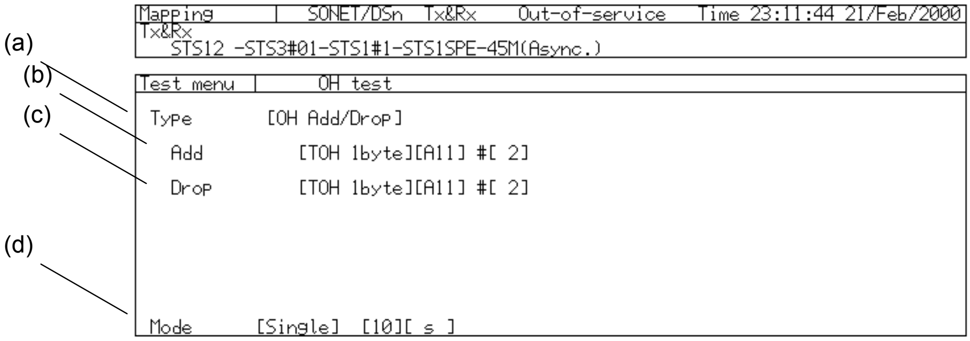
7.10.4 OH Add/Drop

One byte of any overhead, D1-D3 bytes, and D4-D12 bytes can be inputted and outputted. Here is the setting procedure.

– See "3.1.2 Rear Panel" for the connection between external interface and connector.

(1) Open the "Test menu : OH Add/Drop" screen.

(2) Set up the screen parameters.



(a) Type .....Select "OH Add/Drop".

(b) Add ....selects the byte into which the data inputted from exterior is inserted. When the bit rate is 622M or more, specify a channel.

– The inputted data begins to be inserted from exterior just after the byte is selected.

(c) Drop .....selects the byte to which the data is outputted.

– The data begins to be outputted just after the byte is selected.

(d) Mode .....specifies the sequence generation mode.

Single .....Only one sequence is generated.

Repeat .....The sequences are generated repeatedly.

7.11 APS (Automatic Protection Switch) Test

Here is the procedure for testing the APS (Automatic Protection Switch). There are three types in the APS test.

Generating APS sequence pattern	Generates programmed K1 and K2 bytes.
APS sequence capture	Displays captured K1 and K2 bytes by the specified trigger.
Measuring switching time	Measures the switching time.

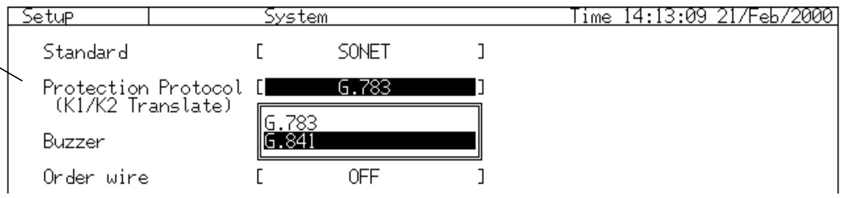
7.11.1 Setting the Protection Protocol

When the APS test is performed, the protection protocol has to be set. Here is the procedure for defining SONET K1 byte and K2 byte by setting the protection protocol.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.

(a)



(a) Protection Protocol...... Select G.783 or G.841.

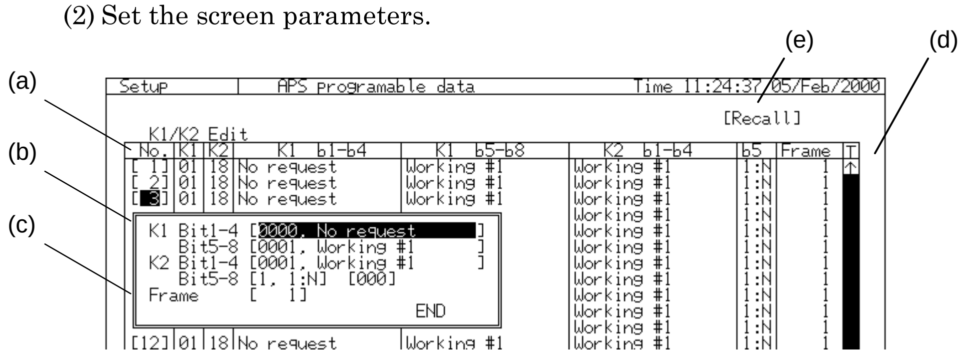
7.11.2 Generating APS Sequence Pattern *'Setup : APS programmable data' screen*

Here is the procedure for generating the K1 and K2 sequence pattern set beforehand.

- One sequence is composed of the K1 and K2 byte patterns and the continuous generation frames (1 to 8,000). Up to 64 sequenced can be set.

(1) Open the 'Setup : APS programmable data' screen to edit the program pattern to be generated.

(2) Set the screen parameters.



(a) No. .....displays the sequence number. Move the cursor and press Set . A window to set the pattern appears.

(b) K1/K2 pattern .....sets K1 and K2 pattern in plain language or binary.

(c) Frame ....Set the frame No. to generate the pattern set in step (b).

(d) [Data scroll] ..... scrolls the data upwards and downwards.

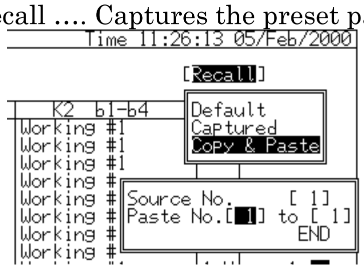
T ....Moves to the top of the data.

↑ ....Moves 5 lines upwards.

↓ ....Moves 5 lines downwards.

⊥ ....Moves to the bottom of the data.

(e) Recall …. Captures the preset pattern and copies it to other data.



Default …..initializes the set data.

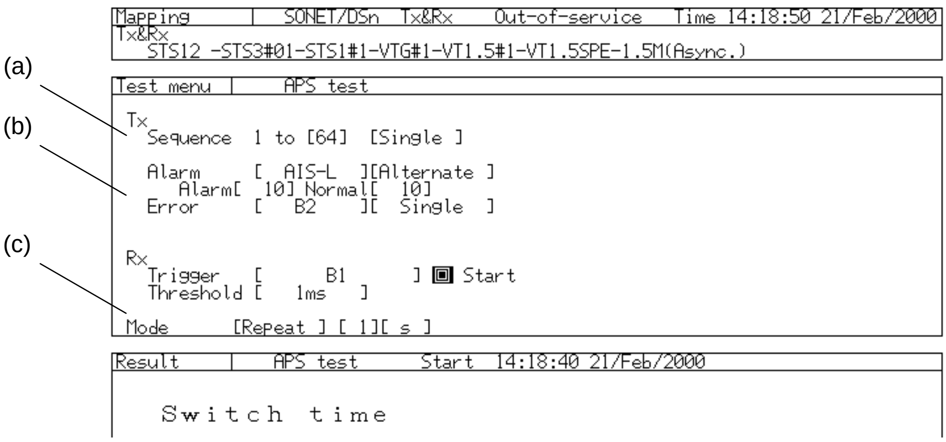
Captured …..Copies 64 sequences captured by this function from No.1 to No.64.

Copy & Paste …..copies the set sequence to other sequence.

Source …..specifies the sequence number to which the data is pasted.

(3) After editing APS sequence pattern, open the 'Test menu : APS test' screen to generate the programmed sequence.

(4) Set up the screen parameters.



(a) Sequence............ sets No. of the final sequence set on the 'Setup : APS programmable data' screen.

(b) Error/Alarm addition …..Errors and alarms can be added to the generated pattern. See "6.12 Adding Error and Alarm" for the details.

(c) Mode …..sets the sequence mode as follows:

Single .... sends the pattern only once.

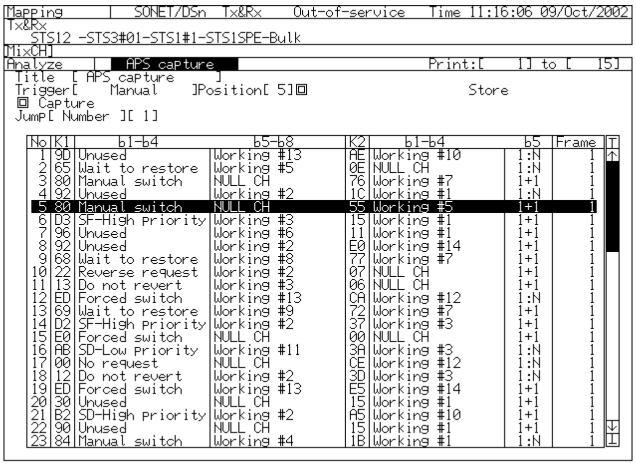
Repeat .... sends the pattern repeatedly.

7.11.3 APS Sequence Capture *'Analyze : APS capture' screen*

The K1 and K2 byte sequence can be captured and displayed by the specified trigger. One capture sequence continues until a change of the K1 and K2 byte is detected, and it captures 64 sequences. However, the number of the receive frame of one sequence is 8,000. If the K1 and K2 pattern do not change for more than 8,000 frames, it shifts to the next capture sequence.

(1) Open the 'Analyze : APS capture' screen.

(2) Setting the parameter of screen.


Mapping | SONET/DSn Tx&Rx Out-of-service Time 11:16:06 09/Oct/2002
Tx&Rx
STS12 -STS3#01-STS1#1-STS1SPE-Bulk
[MixCH]
Analyze | APS capture Print:[1] to [15]
Title [APS capture]
Trigger[Manual]Position[5]□ Store
□ Capture
Jump[Number][1]

No	K1	b1-b4	b5-b8	K2	b1-b4	b5	Frame
1	9D	Unused	Working #13	AE	Working #10	1:N	1
2	65	Wait to restore	Working #5	0E	NULL CH	1:N	1
3	80	Manual switch	NULL CH	76	Working #7	1+1	1
4	92	Unused	Working #2	1C	Working #1	1:N	1
5	80	Manual switch	NULL CH	55	Working #5	1+1	1
6	D3	SF-High priority	Working #3	15	Working #1	1+1	1
7	96	Unused	Working #6	11	Working #1	1+1	1
8	92	Unused	Working #2	E0	Working #14	1+1	1
9	68	Wait to restore	Working #8	77	Working #7	1+1	1
10	22	Reverse request	Working #2	07	NULL CH	1+1	1
11	13	Do not revert	Working #3	06	NULL CH	1+1	1
12	ED	Forced switch	Working #13	CA	Working #12	1:N	1
13	69	Wait to restore	Working #9	72	Working #7	1+1	1
14	D2	SF-High priority	Working #2	37	Working #3	1+1	1
15	E0	Forced switch	NULL CH	00	NULL CH	1+1	1
16	AB	SD-Low priority	Working #11	3A	Working #3	1:N	1
17	00	No request	NULL CH	CE	Working #12	1:N	1
18	12	Do not revert	Working #2	3D	Working #3	1:N	1
19	ED	Forced switch	Working #13	E5	Working #14	1+1	1
20	30	Unused	NULL CH	15	Working #1	1+1	1
21	B2	SD-High priority	Working #2	A5	Working #10	1+1	1
22	90	Unused	NULL CH	15	Working #1	1+1	1
23	84	Manual switch	Working #4	1B	Working #1	1:N	1

Capturing

(a) Trigger ….selects the type of the trigger to capture.

- If 'Manual' is selected for the trigger, □ is displayed next to 'Position'. It is triggered off, by moving the cursor here and pressing Set.
- If 'External' is selected for the trigger, it is triggered off by a rise edge of the signal inputted from "Trigger input" connector. See "3.1.3 Right Side Panel" for the details.

(b) Position …… specifies the sequence No. to be triggered off.

(c) Capture ….. A capture starts by moving the cursor here and pressing Set.

■ …..indicates that it is waiting for a trigger. "Waiting for trigger" is displayed.

□ …..indicates that the capturing has finished.

Analyzing the Captured Data

Open the 'Analyze : APS capture' screen.

(a) No. ….displays the sequence No. of the captured data.

(b) K1 …..displays the captured data in hexadecimal or plain language.

(c) K2 …..displays the captured data in hexadecimal or plain language.

(d) Frame …..displays the number of the frames that received displayed K1 and K2 bytes. If K1 and K2 pattern do not change for more than 8,000 frames, it shifts to the next capture sequence.

(e) [Data scroll] ….. scrolls the data upwards and downwards.

- [T]........................ Moves to the top of the data.
- [↑]........................ Moves 5 lines upwards.
- [↓]........................ Moves 5 lines downwards.
- [⊥]........................ Moves to the bottom of the data.

(f) Jump ….. scrolls the screen to the captured data specified.

Trigger ….scrolls the screen to No. specified as the trigger position.

Number ….. scrolls the screen to No. inputted from a numeric input screen.

Storing the Captured Data

(a) Title ..... assigns a title to the screen currently displayed. This function is only available on a single display screen.

- If you press [Set], the character input window is opened. Input the title.

(b) Print ..... selects the contents to be printed. (Press [Print Now] to start the printing.) The range of printing is specified by the sequence number.

(c) Store ..... stores the graph data in the memory. This is only available for single-screen display. If you press [Set], the character input window is opened. Input a name and save it in the memory.

7.11.4 Measurement of Line Switching Time *'Test menu : APS test' screen*

Switching time of lines is obtained by measuring time when errors and alarm are generated.

This measurement is available when the bit rate is SDH/SONET or 2 Mb/s.

Measurement Principle

APS switching time is measured according to the following procedure.

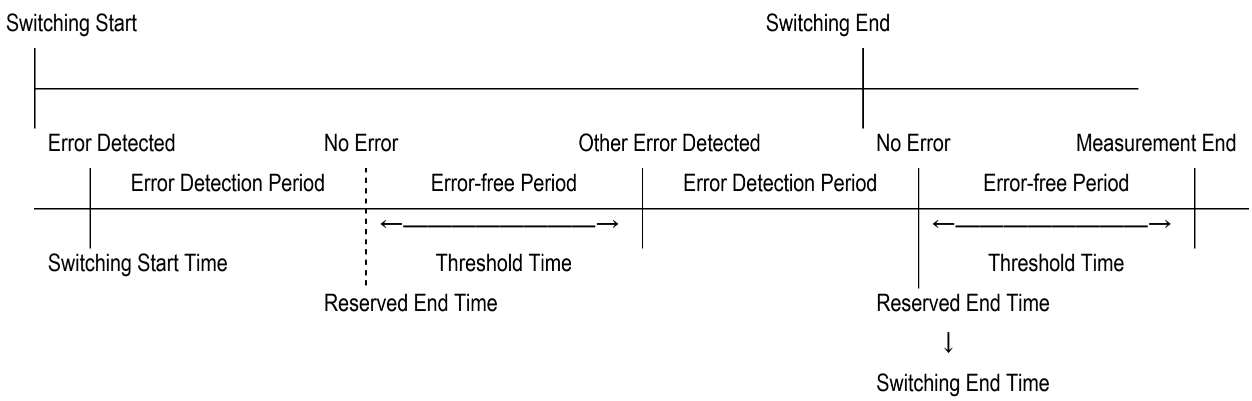
(1) When lines are switched, the errors and alarms, which are recognized as trigger, occur. Time when the error and alarm occur is regarded as switching start time.

(2) When the alarm is selected as the trigger, time when the alarm is released is regarded as the switching end time, and the measurement is finished. When an error is selected as the trigger, time when the error generation is finished is used as the reserved switching end time.

(3) After the reserved end time, if no time error set as a threshold is detected, the measurement is finished, regarding the reserved end time as the switching end time.

(4) If an error is detected during time set as a threshold, reserved end time is cleared. And time when the error generation is finished again is regarded as reserved end time.

(5) The procedures shown from (2) to (4) are repeated.

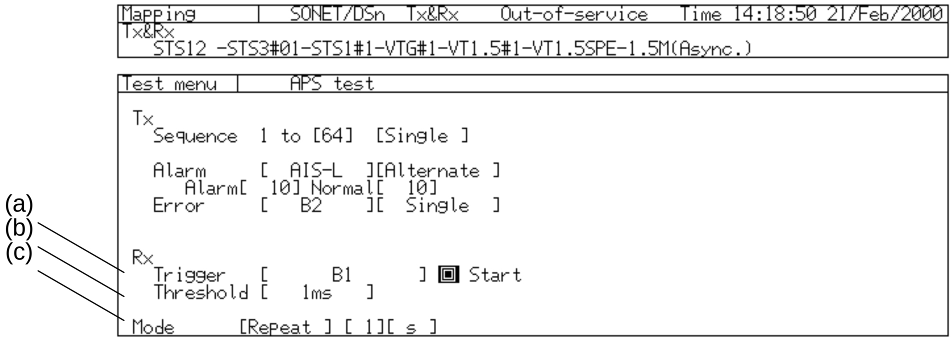


Measurement Procedure

Switching time is measured on the "Test menu : APS test" screen.

(1) Open the "Test menu : APS test" screen.

(2) Set up the screen parameters.



(a) Trigger ….selects an error or an alarm to be adopted as a trigger for starting measurement.

(b) Threshold …..When the error was selected as the trigger, set up a waiting time which is a period from error detection time to measurement end time.

(c) Mode …..Manual measurement can be performed along with APS measurement. When performing manual measurement, set up the measurement mode.

(3) After the setup, start the measurement. Move the cursor to "□" and press Set to start the measurement.

■ …..indicates that the measurement is being performed.

□ …..indicates that the measurement is not performed.

Displaying the Measurement Result.

(1) Open the "Result : APS test" screen to display the measurement result.

(2) "Waiting for trigger" is displayed on the screen. It is in the state of waiting a trigger input. If the trigger is inputted, the measurement starts and the measurement result will be displayed. If measurement is started newly, the former measurement results will be cleared and a new measurement result will be displayed.

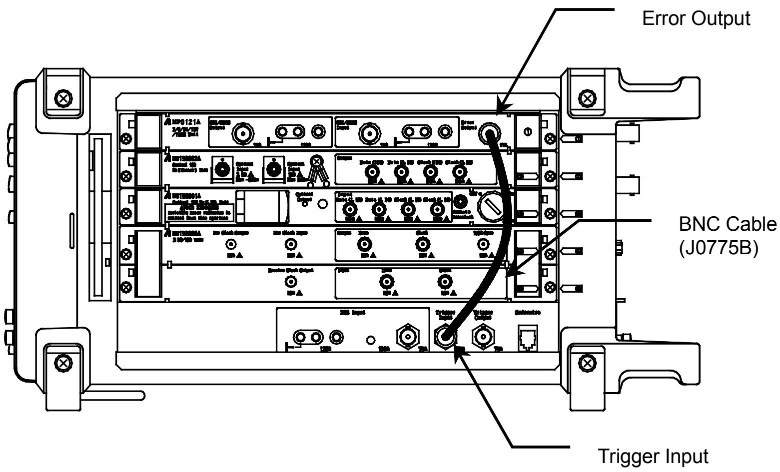
- The measurement result is displayed in the unit of ms.
- If switching time exceeds 2s, ">2000.0ms" is displayed.

Connection example:

This measurement may require an external cable connection, depending on the trigger setting.
The following triggers require an external connection.

(1) External
(2) Bit (for 2 Mb/s and other than concatenation mapping)

The connection example for Bit trigger at 2 Mb/s is shown below.



7.12 Frame Memory and Frame Capture

MP1570A equipped with option 13 (Frame Memory/Frame Capture) can perform the frame memory and frame capture.

Frame Memory

When the bit rate is 156M or 622M, 64 frames of patterns including payloads are preset, and the frame memory is generated in accordance with the set sequence.

Frame Capture

64 frames of the received data including payloads are memorized and displayed.

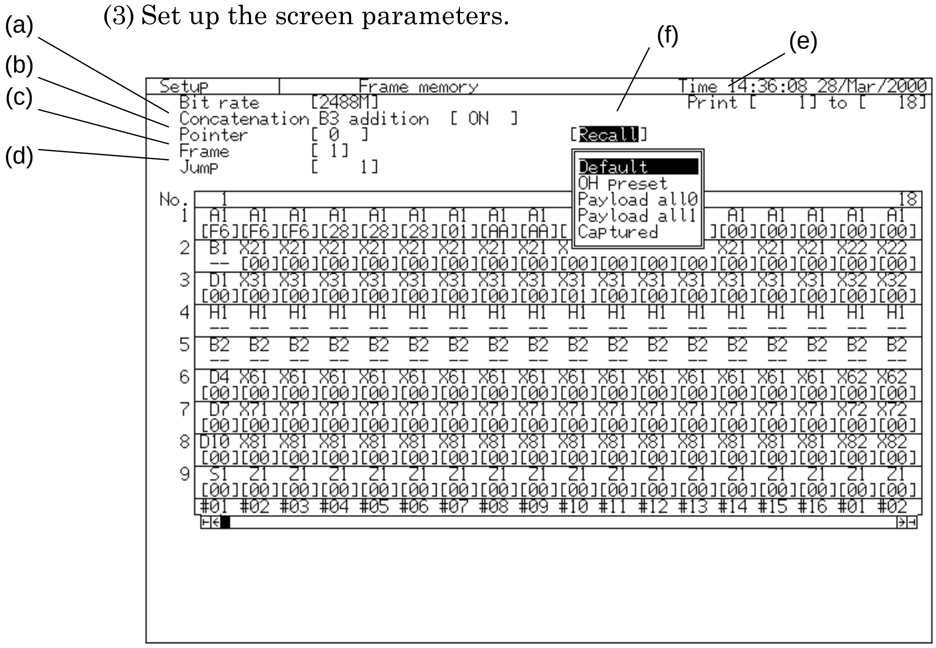
7.12.1 Frame Memory

'Setup : Frame memory' and 'Test menu : Frame memory" screen

(1) Set the bit rate on the "Setup : Mapping" screen.

(2) To edit the frame pattern to be generated, open the "Setup : Frame memory" screen.

(3) Set up the screen parameters.



(a) Concatenation B3 addition …..sets whether to perform the B3 calculation and add B3.

(b) Pointer …..sets the pointer value to "0" or "522".

(c) Frame …..specifies frame number to be edited.

(d) Jump …..specifies column number of the first frame to be displayed.

(e) Print …..When printing the displayed frame, specify the column number. See "8.5 Printing" for the details.

(4) Preset data as follows. Move the cursor to the desired byte and press Set . A numerical input window is displayed. Set the byte in hexadecimal numbers.

(f) Default .....sets the pattern.

Default .....initializes the pattern.

OH preset .....overwrites data which was set on the "Setup : OH preset" screen.

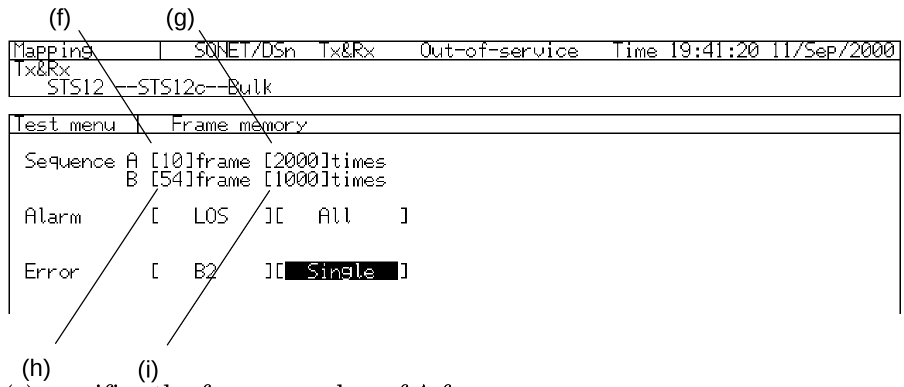
Payload all 0 .....sets all payload patterns to "0".

Payload all 1 .....sets all payload patterns to "1".

Captured ......overwrites 64 frames of data captured by the frame capture.

(5) After the settings shown in (4), open the "Test menu : Frame memory" screen to generate the edited frame data.

(6) Set up the screen parameters.



(g) specifies the frame number of A frame.

(h) specifies the times to repeat A frame.

(i) specifies the frame number of B frame.

(j) specifies the times to repeat B frame.

About Sequence to Be Generated

64 frames of data edited on the "Setup : Frame memory" screen are divided into A frame and B frame.

A frame …..Frames from No.1 to No.n (n=1 to 64) can be set.

B frame …..Frame from No.n+1 to No.m (m=n+1 to 64) can be set.

In the example shown below, the test sequences are generated as follows.

(1) A pattern .. No.1 - No.10, "2000" times

(2) B pattern .. No.11 - No.64, "1000" times

(3) The sequences shown in (1) and (2) are repeated.

Note:

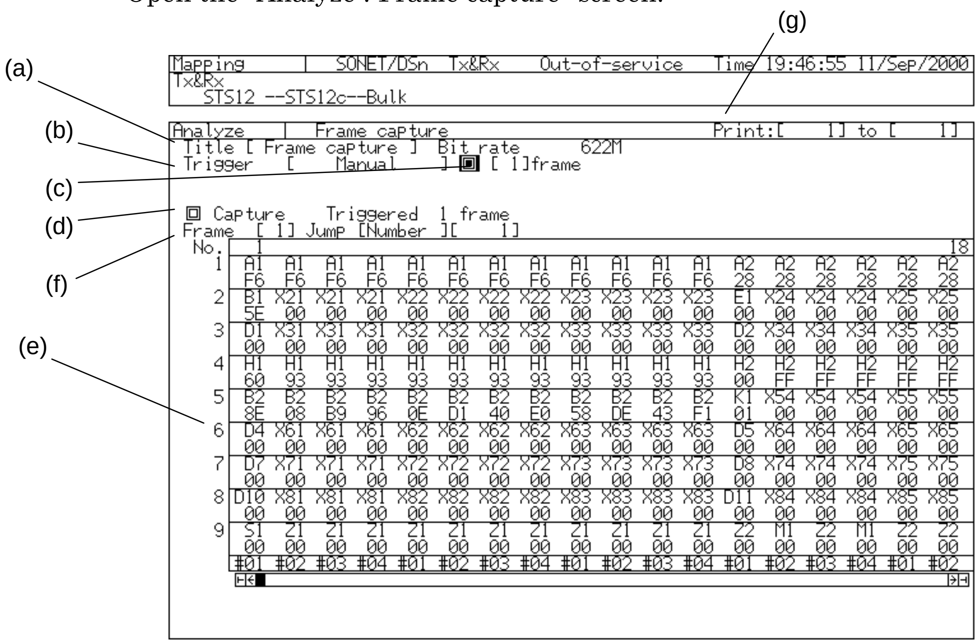
- The frame memory pattern begins to be generated, just after the "Test menu : Frame memory" screen is displayed.
- When the setting of (f), (g), (h), or (i) is changed, it is reflected by pressing Set.

7.12.2 Frame Capture

'Analyze : Frame capture' screen

The received data can be captured on the "Analyze : Frame capture" screen. Here is the procedure for the capture.

Open the "Analyze : Frame capture" screen.



Capturing procedure

(a) Title ….. assigns a title to the screen currently displayed. This function is only available on a single display screen.

- The title is needed when the analyze data is recalled on the Setup : Memory screen.

(b) Trigger …..selects the type of the trigger for capturing the data.

- When "Manual" is selected as a trigger, ⧈ is displayed next to "Position". It is triggered off by moving the cursor here and pressing Set.
- When "External" is selected as a trigger, it is triggered off by the rise edge of the signal which is inputted from the "Trigger input" connector on the right side panel. See "3.1.3 Right Side Panel" for Trigger input.

(c) Trigger frame …..specifies the frame to be triggered. When "5 frame" is inputted as the frame to be triggered, 4 frames before it and 59 frames after it are captured.

(d) Capture .....The capture starts by moving the cursor here and pressing Set .

■ .....indicates that the capturing has started and a trigger is waited.

□ .....indicates that the capturing has finished.

- In the example shown above, No.1 frame is captured using a manual trigger.

Analyzing the Captured Data

The captured data is displayed in 9 row * (270*n) column.

(e) [Data scroll] ..... scrolls the data upwards and downwards.

⊢........................ Moves to the top page.

←........................ Moves half page before.

→........................ Moves half page forward.

⊣........................ Moves to the last page.

(f) Frame ....displays the specified capture frame.

Printing the Captured Data

(g) Print .... Specify column number to select the contents to be printed (Press Print Now to start the printing). Refer to “8.5 Printing” for the details.

Storing the Captured Data

The captured data can be stored into floppy disks after the capture. Refer to “8.6 Floppy Disk” for the details.

Note:

When all captured frames are store, two or more floppy disks might be needed.

7.13 IP over SONET

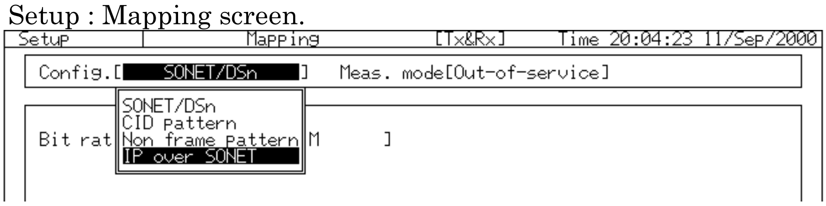
By installing a Frame Memory/Frame Capture option (option-13) and an IP over SONET option (option-14), MP1570A can measure IP packet which is mapped to the SONET frame.

Sending IP packet .... Three types of PPP packet and IP packet (version 4 and version 6) can be edited. The edited packet specifies the generation sequence, is mapped to SONET, and is outputted.

IP capture .... captures the packet of the specified address from the received SONET frame, and displays its contents.

7.13.1 Switching IP Measurement Screen.

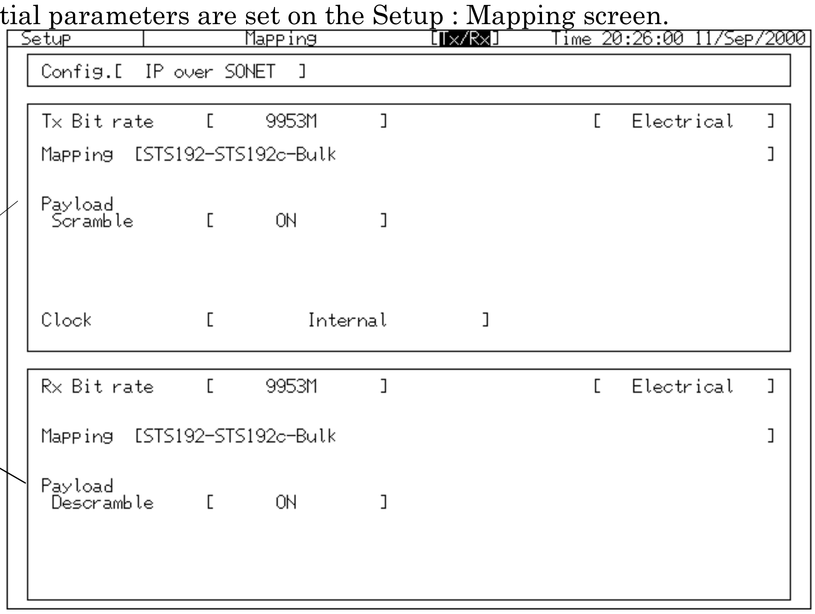
When making an IP measurement, set "Config." to "IP over SONET" on the Setup : Mapping screen.



7.13.2 Initial Setting

'Setup : Mapping' screen

Initial parameters are set on the Setup : Mapping screen.



(a)

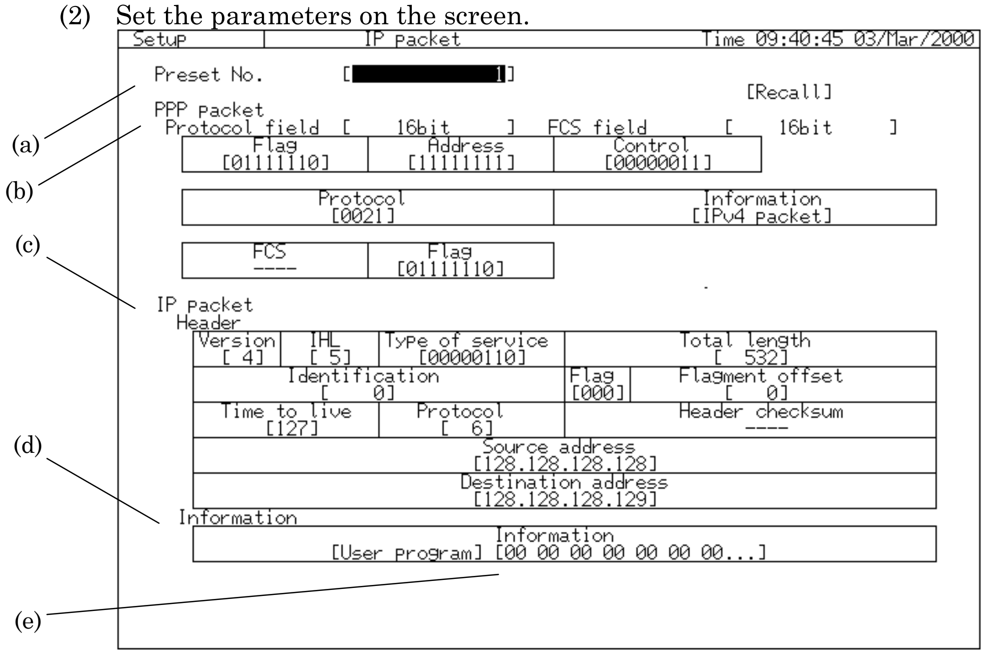
(a) Sets the scramble and the descramble of the packets.

- Refer to "Section 5 Application Examples and Basic Settings" for the settings of the other parameters.

7.13.3 Generating IP Packet *'Setup : IP packet' screen*

(1) Open the Setup : IP packet screen in order to edit a frame pattern to be generated.

(2) Set the parameters on the screen.



(a) Preset No. ....specifies the packet to be generated.

- MP1570A can set three types of IP packet, and output them in accordance with the regulated sequence.

(b) PPP packet ....edits the PPP packet. Enter it in binary or hexadecimal numbers.

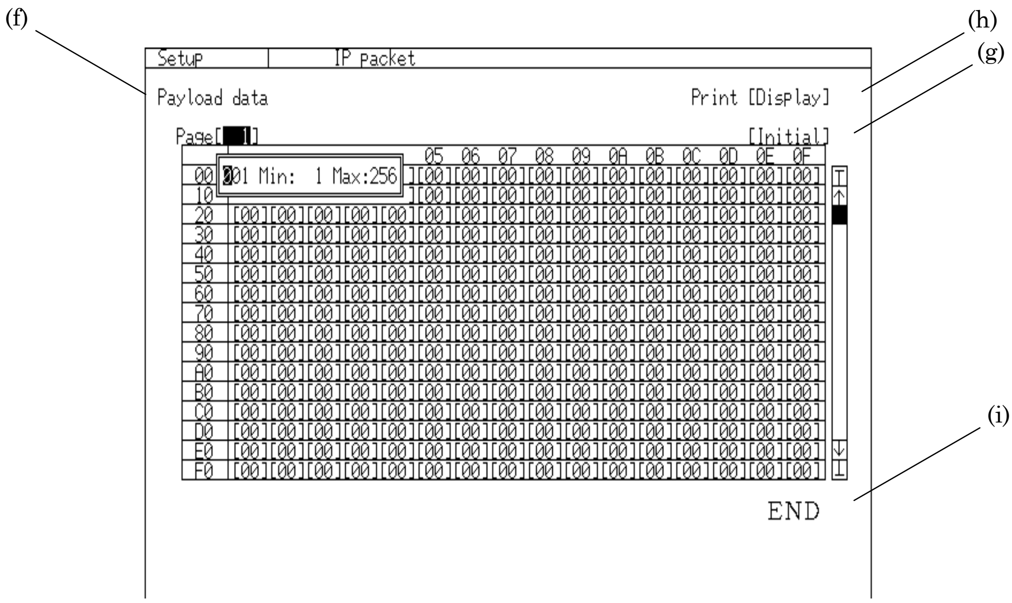
(c) IP packet...........edits the header of the IP packet. Enter it in binary or hexadecimal numbers.

(d) Information ....sets a test pattern which is inserted into the IP packet information domain.

(e) Preset data ....When "User program" is selected as the test pattern, edit the test pattern. Move the cursor here and press Set. And the test pattern edit window is displayed. Up to 65,535 bytes can be edited.

Note

The escape codes are automatically added and outputted.



(f) Payload data ..... displays the data to be inserted into the payload in the array format. The time flow of the data is from Row00/Column00 to RowF0/ColumnF0 and from Page 1 to Page 256.

(g) Initial .... As the initial values, all payload data can be set to the same value. Move the cursor here and press [Set], and the numerical input screen is displayed. Enter the value in binary numbers.

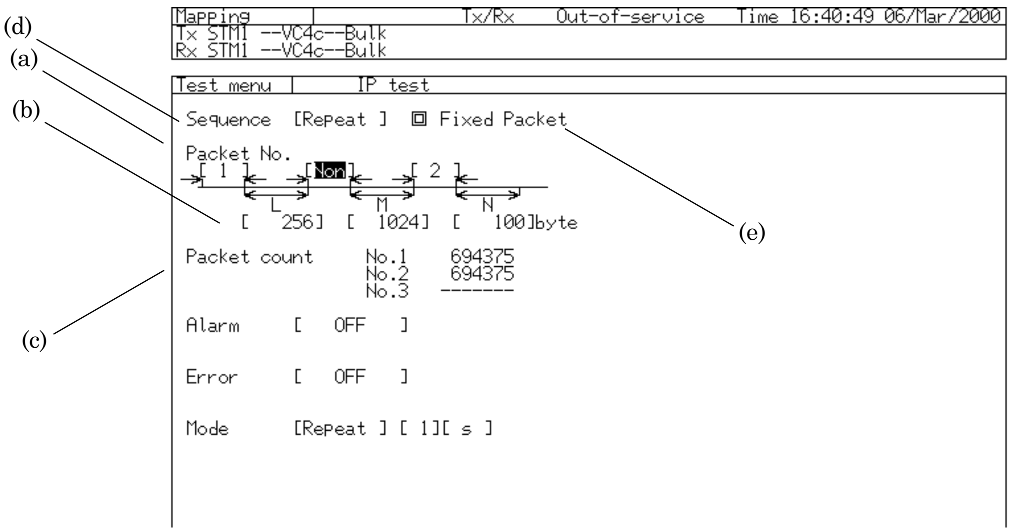
(h) Print .... selects the contents to be printed. (Press [Set] to start the printing.) Refer to “8.5 Printing” for the details.

Display .... Data is displayed on the screen
All .... Data from the start of measurement
After .... Data after the currently displayed data
Before .... Data before the currently displayed data

(i) END .... Move the cursor here and press [Set] to display the previous screen.

(3) Open the Test menu : IP test screen to generate the IP sequence.

(4) Set the screen parameters.



(a) Packet No. .....sets a sequence to generate the IP packet. Specify the packet number which was set on the Setup :IP packet screen. When "Non" is selected, the packet at the point is not outputted.

(b) L, M, N ....specifies the idle bytes number which sets the interval between two IP packets.

(c) Packet count..displays the number of the outputted packets. The accumulative time is one second.

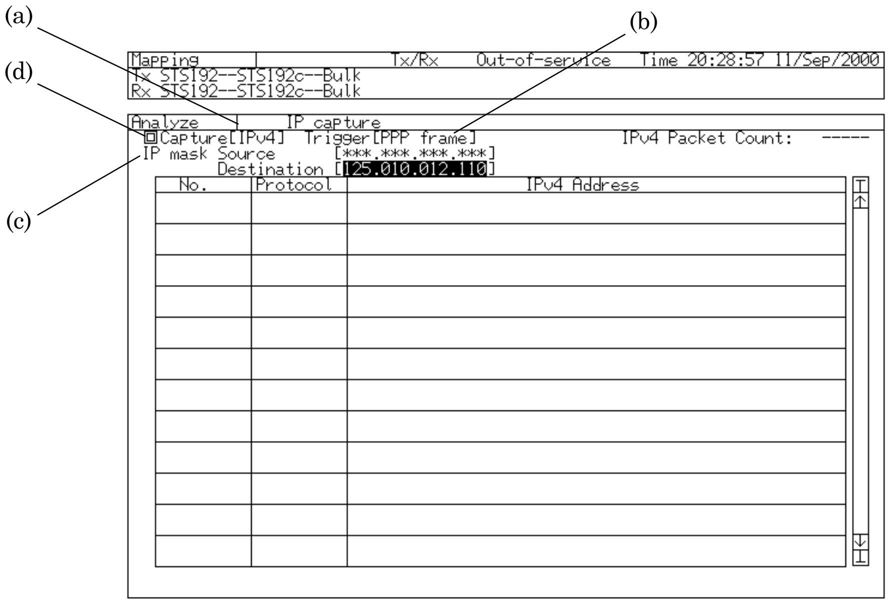
(d) Sequence ....specifies the sequence generation method.

(e) Fixed packet..After (a) and (b) are set, move the cursor here and press Set to fix the send packet. When it is fixed, "Start" is displayed. Move the cursor here and press Set again to output the packets.

7.13.4 Capturing IP Packet *'Analyze : IP capture' screen*

(1) The received IP packets are captured on the Analyze : IP capture screen. Open the Analyze : IP capture screen.

(2) Set the screen parameters.



(a) [Selecting IP format] .... selects the IP format to be captured.

(b) Trigger............. selects a trigger to start a capture.

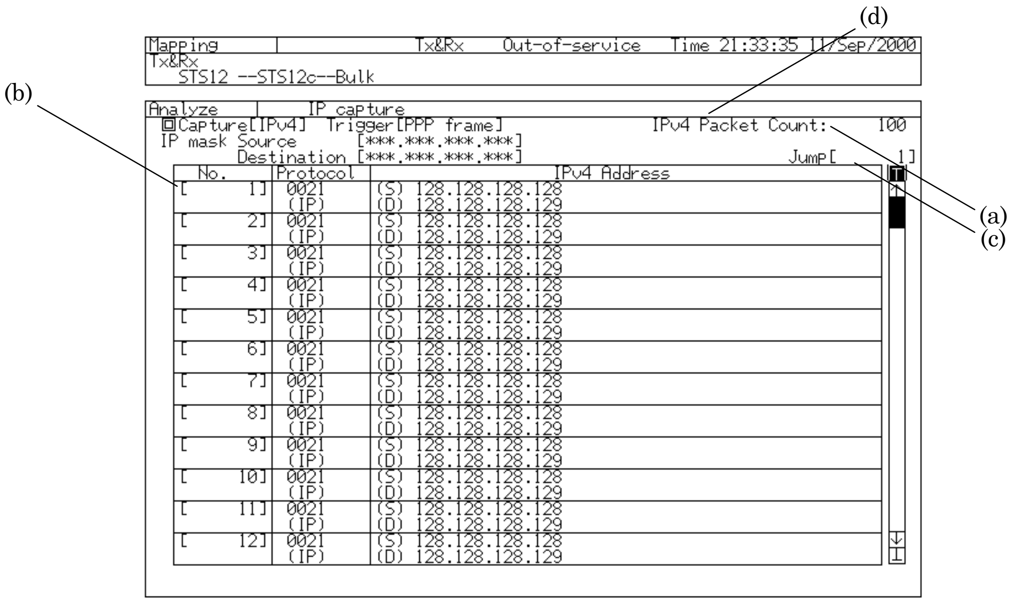
(c) IP mask .... sets the IP address to be captured (Address Filter). Addresses of the source and the destination can be set separately. Instead of specifying the address, the address value is ignored and the capture is performed by selecting "**" (Address Mask).

(d) Capture .... Move the cursor here and press Set to start the capture.

■ .... indicates that the capture has started and is waiting for a trigger. "Waiting for trigger" is displayed on the screen.

7.13.5 Displaying Captured IP Packets *'Analyze : IP capture' screen*

(1) When all captures are completed, the captured data is displayed on the Analyze : IP capture screen.



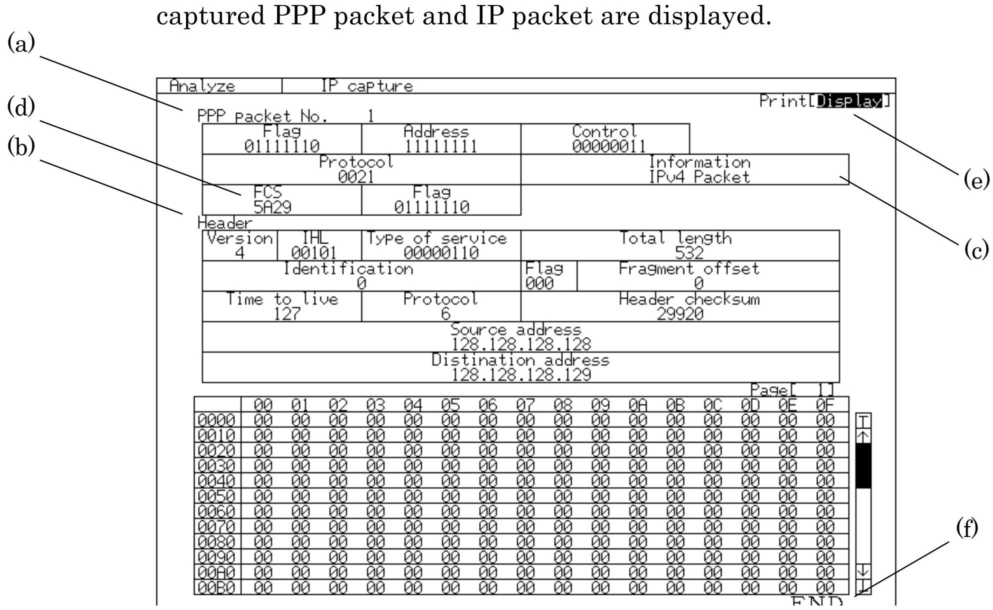
(a) IP packet count …displays the number of the captured IP packets.

(b) No. ....No. is added to the captured packet. And its protocol and address are displayed.

(c) Jump ....moves the screen to the specified packet number.

(d) Print..................prints out the measurement results of the captured data. Specify the start and the end of the packet numbers. Refer to "8.5 Printing" for the details of printing.

(2) Move the cursor to the desired number and press [Set] in order to display detailed information on the packet with the number. The captured PPP packet and IP packet are displayed.



(a) PPP packet .... displays the detected PPP packet.

(b) Header .... displays the header of the detected PPP packet.

(c) Information....... displays the information field of the detected IP packet.

(d) FCS .... displays the information field of the detected IP packet. FCS It is displayed in array. FCS When an FCS error is detected, the FCS field is displayed in red. The detection result of the IP header is not displayed. And the measurement results of the captured data in which Flag of the PPP packet is in the lead are displayed.

(e) Print .... prints out the captured data. Refer to "8.5 Printing" for the details.

Display .... Data is displayed on the screen

All .... Data from the start of measurement

After .... Data after the currently displayed data

Before .... Data before the currently displayed data

(f) END.................. Move the cursor here and press [Set] in order to return to the previous screen.

Note

The escape codes are automatically detected, and not displayed.

7.14 Sequence Test

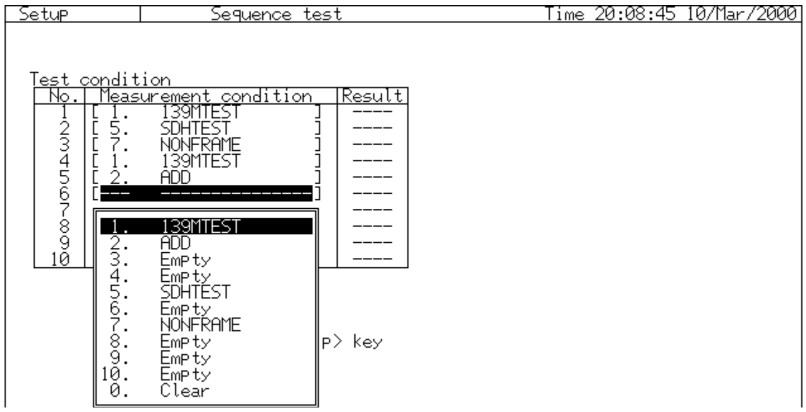
MP570A can automatically read several measurement conditions stored in the memory and make measurements in order of specified conditions. (Sequence test) Refer to "8.4 Saving and Reading the Data" for the details of storing measurement conditions to the memory.

7.14.1 Setting Measurement Sequence *'Setup :Sequence test' screen*

A measurement sequence is set on the Setup : Sequence test screen. Here is the setting procedure.

(1) Open the Setup : Sequence test screen.

(2) Specify the measurement conditions from the table on the screen in order of desired measurements. Move the cursor here and press Set to display a measurement condition selection window. Select a desired measurement condition.



(3) Repeat the procedure shown above to make the measurement sequence.

(4) After setting the sequence, press Start/Stop in accordance with a direction shown on the screen to start the measurement.

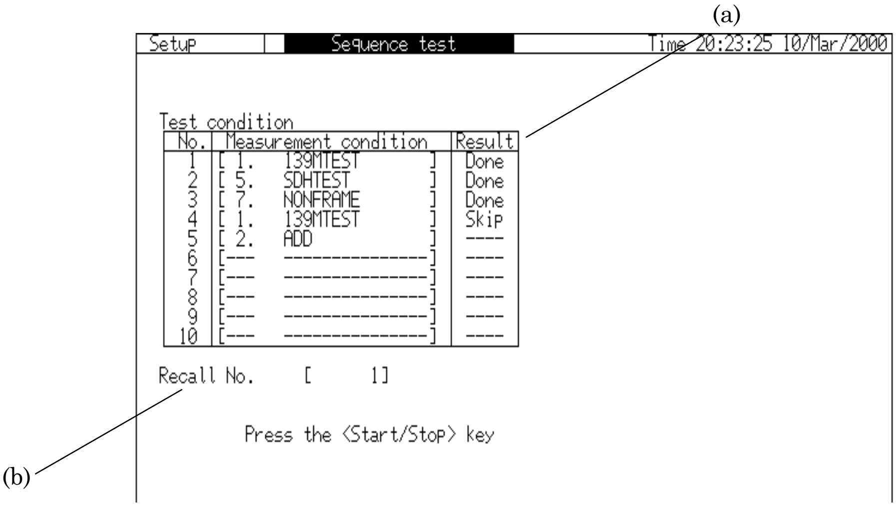
Note:

- The error and alarm measurement (performance measurement) and the frequency measurement can be performed in the sequence test. The other measurements can not be performed in the sequence test.
- When the measurement mode of the sequence measurement is set to "Repeat", it is changed to "Single". Besides, when the setting of measurement time is more than one hour or the manual measurement is set, the measurement condition is changed to "Single" and its measurement time is changed to one hour.

7.14.2 Displaying and Analyzing Measurement Results

'Result :Sequence test' and 'Analyze :Sequence test' screens

(1) When all measurements finish, table in which sequence number can be selected is displayed (The measurement results of the selected sequence can be displayed).



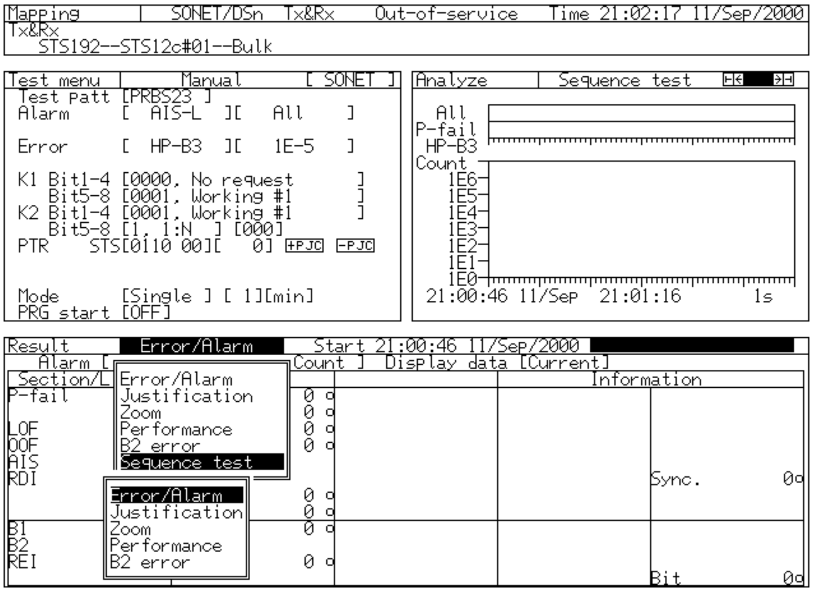
(a) Result .... indicates the measurement process.

Done .... indicates that the measurement finished.

Skip .... indicates that the measurement wasn't performed because the stored measurement condition didn't match to the condition of the sequence test.

(b) Recall No........... selects the sequence number to display the measurement results.

(2) The measurement results selected on the Setup : Sequence test screen is displayed on the Result : Sequence test screen and the Analyze : Sequence test screen.



- On the Result : Sequence screen, move the cursor to the desired measurement result and press Set . The displayed measurement result can be stored like normal measurements.
- On the Analyze : Sequence test screen, move the cursor to the desired analysis data and press Set . The displayed analysis data can be stored and printed like normal measurements.

Section 8 Other Functions

This section describes the other functions of MP1570A.

8.1 Setting the System *'Setup : System' screen*

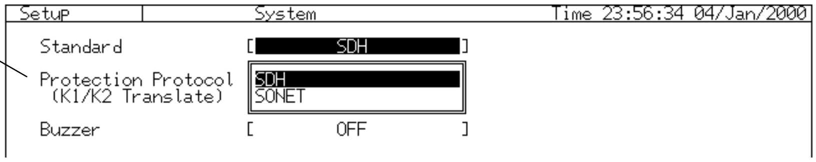
8.1.1 Selection of either SDH or SONET Display

MP1570A allows the selection of either SDH or SONET display if option-10 and option-11 are installed. (An explanation for SDH display is provided in this Operation Manual.) The selection procedure is as follows.

(1) Open the 'Setup : System' screen

(2) Setup the screen parameters.

(a)



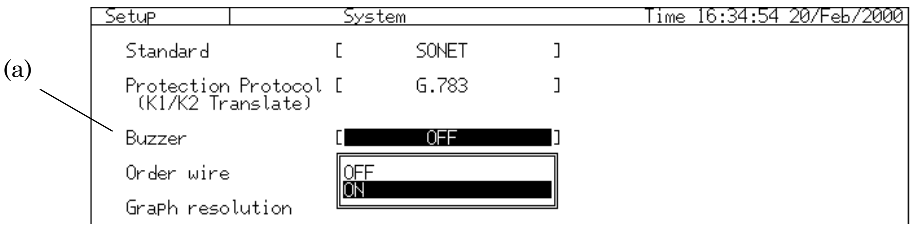
(a) Standard............Select SDH or SONET display.

8.1.2 Setting the Buzzer

Here is the procedure for setting the buzzer. If this function is set at ON, the buzzer is sounded whenever an error or alarm is detected.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.



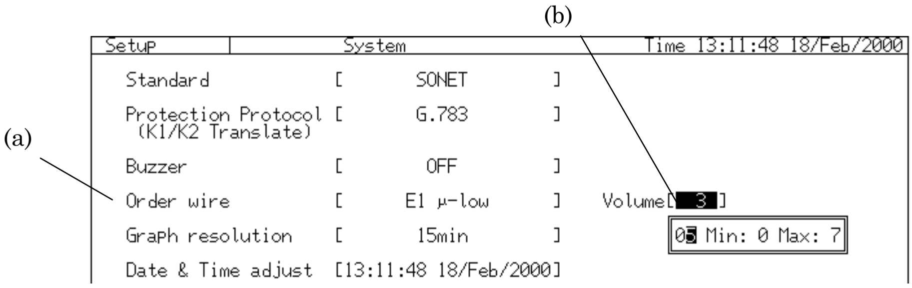
(a) Buzzer .... Sets on or off of the buzzer.

8.1.3 Setting the Orderwire (Voice Entry)

MP1570A allows the order wiring through the RJ11 connector on the right-hand side of the panel. Here is the setting procedure.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters as follows:



(a) Order wire .... Select either 'E1 μ-low', 'E1 a-low', 'E2 μ-low' or 'E2 a-low' for turning on the Order wire.

(b) Volume .... Set the volume.

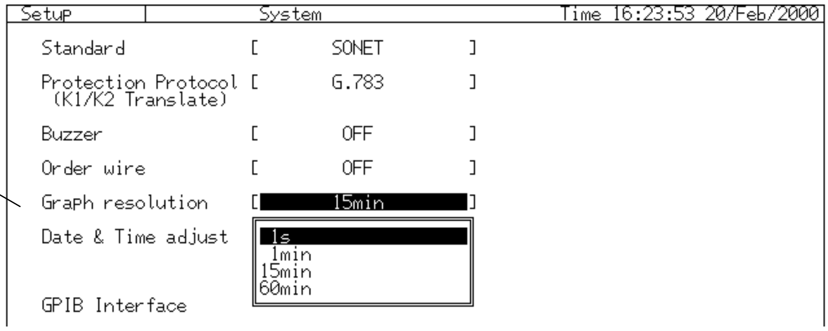
8.1.4 Setting the Graph Resolution

The procedure for setting the resolution of a graph on measurement results LOG graphs (including the graphs showing the error and measured results of alarm and traffic monitors) displayed on the Analyze screen is as follows.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.

(a)



(a) Graph resolution .... Select the resolution from '1s', '1min', '15min' and '60min'.

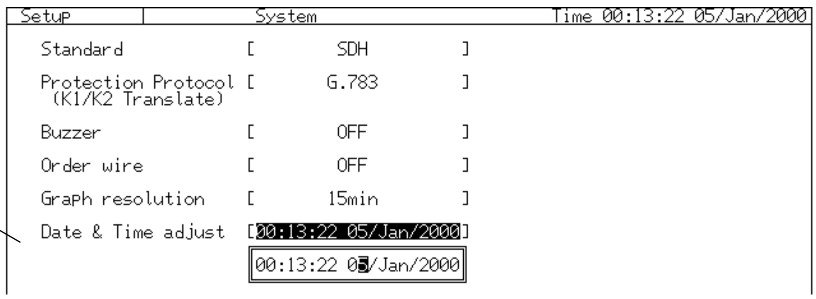
8.1.5 Setting the Clock

Here is the procedure for setting the clock.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.

(a)



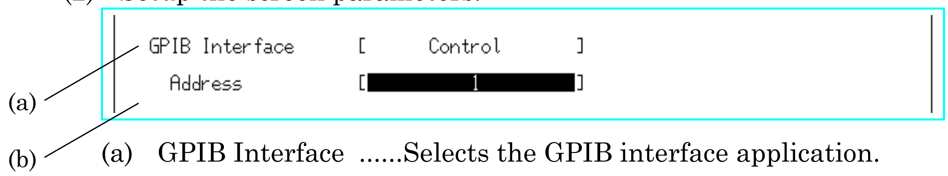
(a) Date & Time adjust .... Set the time and date.

8.1.6 Setting the GPIB Interface

Set the GPIB function if a GPIB board and the optional software are installed on MP1570A. Here is the setting procedure.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.



(a) GPIB Interface ......Selects the GPIB interface application.

Control ...... Uses the GPIB interface for remote control.

Printer ...... Uses the GPIB interface for printer output.

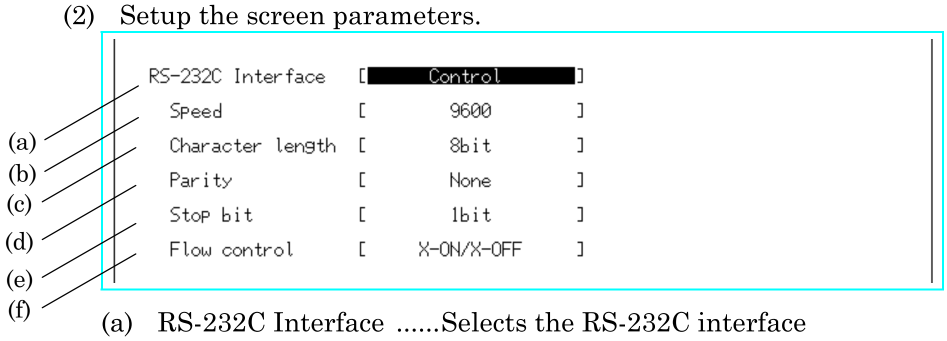
(b) Address ....Selects the interface address.

8.1.7 Setting the RS-232C Interface

Set the RS-232C function if a RS-232C board and the optional software are installed on MP1570A. Here is the setting procedure.

(1) Open the 'Setup : System' screen.

(2) Setup the screen parameters.



(a) RS-232C Interface ......Selects the RS-232C interface application.

Control ...... Uses the RS-232C interface for remote control.

Printer ...... Uses the RS-232C interface for printer output.

(b) Speed ....Sets the baud rate.

(c) Character length ....Sets the bit length.

(d) Parity ....Sets the parity.

(e) Stop bit ....Sets the stop bit length.

(f) Flow control ....Sets the flow control.

8.2 Auto. Setup *'Setup : Auto setup' screen*

MP1570A recognizes the input signal and performs an automatic setup of (blank). Here is the setting procedure.

(1) Open the 'Setup : Auto setup' screen.

(2) Setup the screen parameters as follows:

(a) [Operation mode] ... Selects the send and receive operation mode of MP1570A from 'Tx&Rx' and 'Tx/Rx'.

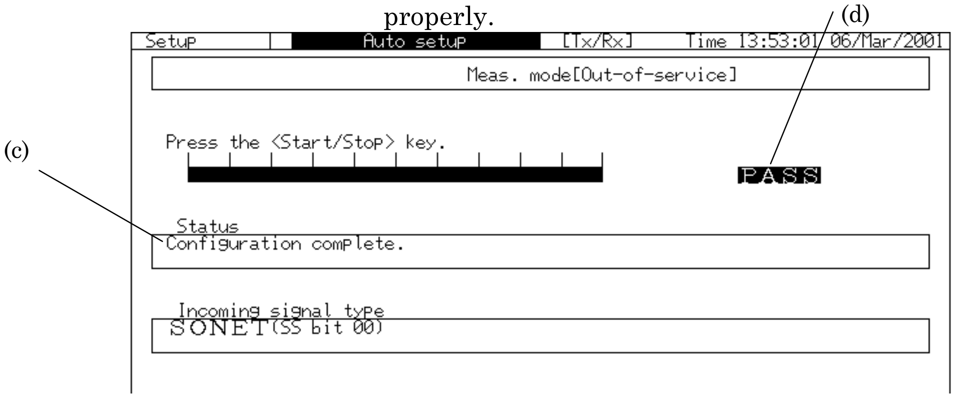
(b) Meas. Mode............. Selects the measurement mode from 'In-service' and 'Out-of-service'.

(3) Start the setting by pressing [Start/Stop].

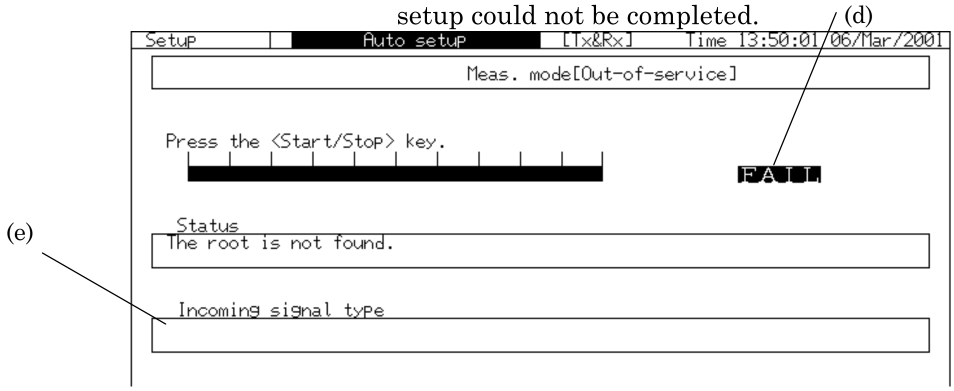
(c) Status...................... Displays the progress of setup on a bar graph.

(d) [Result] .... Displayed on completion of the setup

PASS .... Indicates that the setup was completed properly.



FAIL .... Indicates that a trouble exists and hence the setup could not be completed.



(e) Incoming Signal Type .... Displays SS-bit type of AU pointer of input signal.

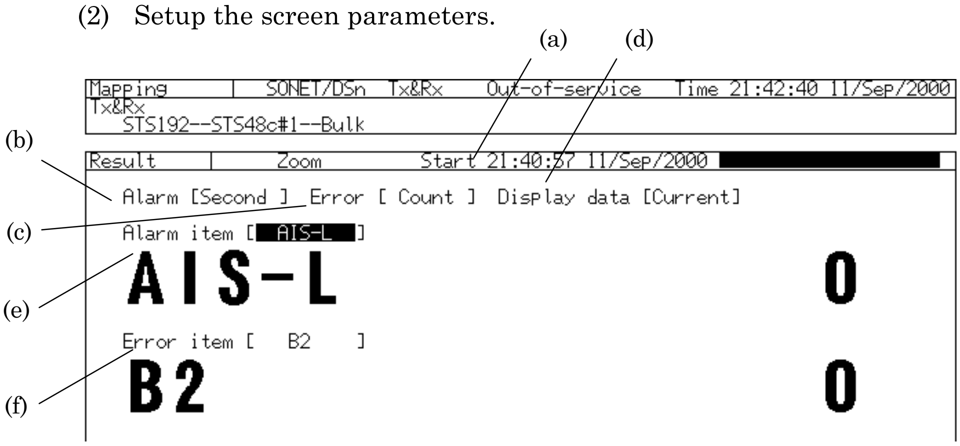
8.3 Zooming Up the Error and Alarm Measurement Results Display

'Result : Zoom' screen

Here is the procedure for zooming up the display of error and alarm measured results on the Error/Alarm screen.

(1) Open the 'Result : Zoom' screen.

(2) Setup the screen parameters.



(a) [Measurement time display] ....Selects the measurement time display mode as follows:

Start .... Displays the time at which the measurement was started.

Elapsed .... Displays the time elapsed after the measurement was started.

- The bar graph shows the progress of measurement.

(b) Alarm ....Selects the display mode of alarm measurement results.

Second............ Displays the number of seconds for which the alarm is to be sounded.

Frame .... Displays the frame at which the alarm occurred.

(c) Error........................Selects the display mode of error measurement results.

Count .... Displays the generated error count.

Rate................ Displays the generated error rate converted.

(d) Display data .... Selects the display mode of measured results.

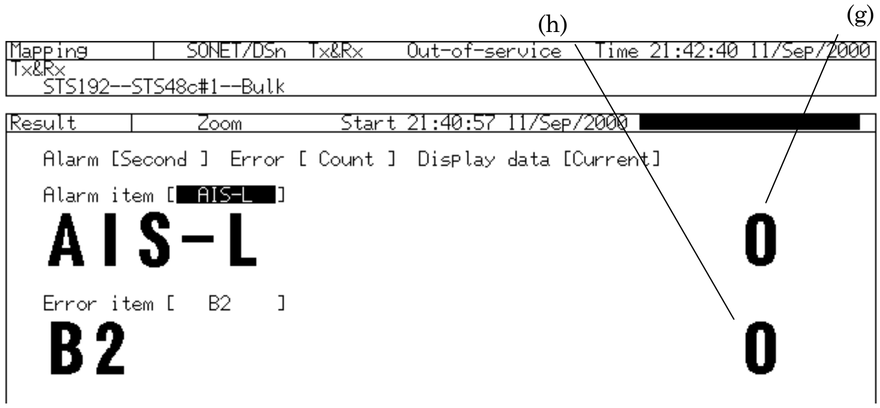
Current............Displays the measured results from measurement start to the present time.

Last..................Displays the measured results on completion of measurement. This is useful for repeated short-time measurements.

(e) Alarm item ....Selects the displayed alarms.

(f) Error item ....Selects the displayed errors.

(3) Measured results are displayed.



(g) Displays the number of seconds for which the alarm was sounded and frame count.

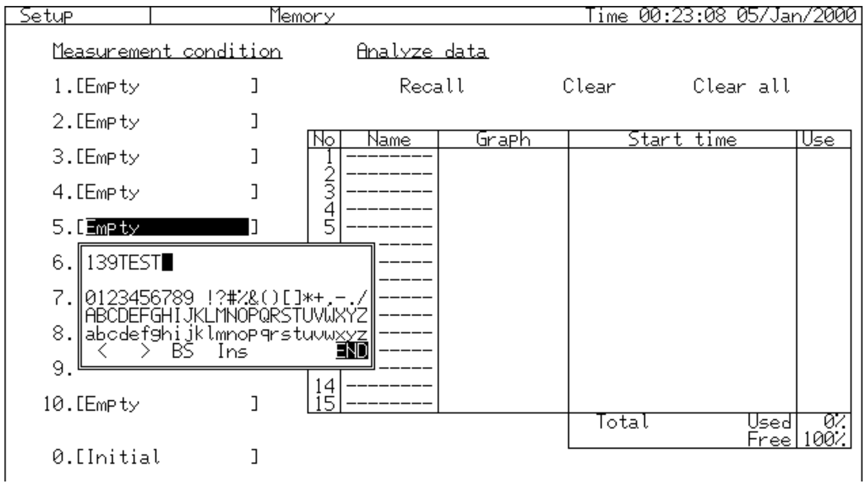
(h) Displays the generated error count or rate.

8.4 Saving and Reading the Data *'Setup : Memory' screen*

8.4.1 Saving the Measurement Conditions.

Here is the procedure for saving the measurement conditions.

For example, when you save the measurement conditions named '139TEST' in the 5th memory:



(1) Open the 'Setup : Memory' screen.

(2) Verify that '5.' on the 'Measurement condition' indicates 'Empty' (free memory space).

(3) Move the cursor to '5.' on 'Measurement condition' and press [Set].

(4) The item selection window is opened. Make sure that it displays 'Store', and press [Set].

(5) The character entry window appears. Input the character string, '139TEST'.

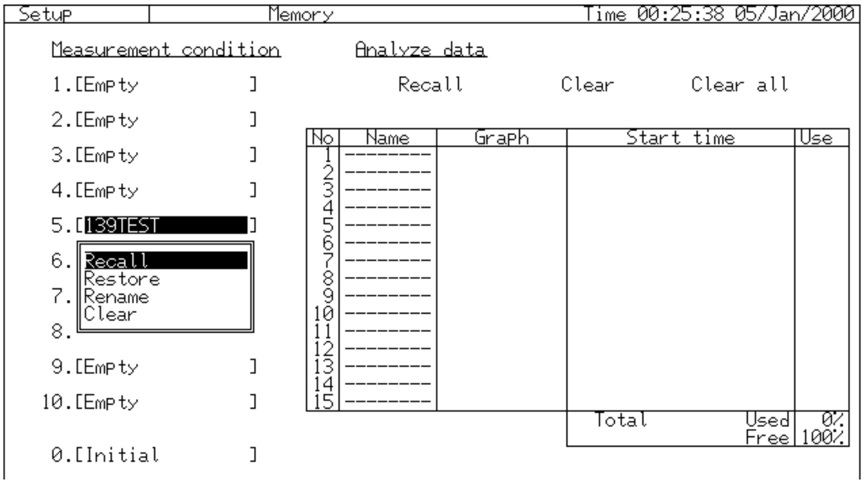
(6) After entering the string, move the cursor to 'END'.

(7) The character entry window is closed and the measurement conditions file named '139TEST' is saved in the 5th memory when you press [Set].

- A default name, 'Memory*(*:1-10)' is set if you close the character entry window without setting the character string.

8.4.2 Reading the Measured Results

Here is the procedure for reading out the saved measurement conditions.



(1) Open the 'Setup : Memory' screen.

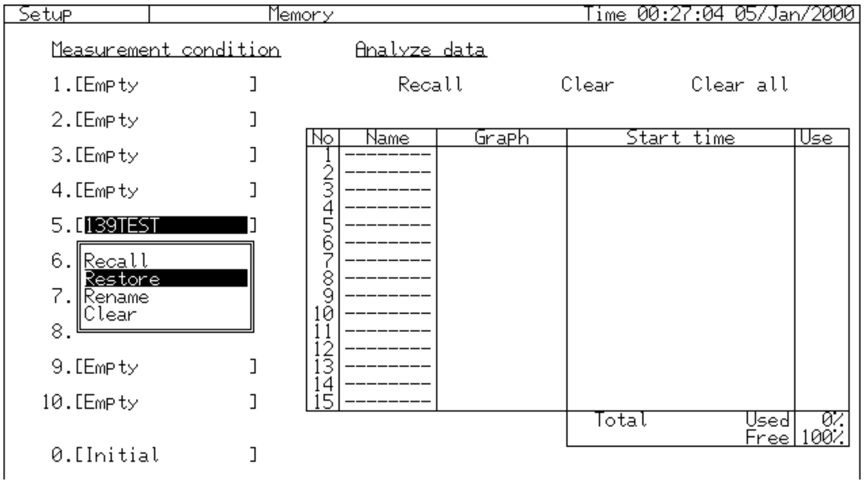
(2) Move the cursor to the memory of 'Measurement condition' to be read and press Set.

(3) The item selection window is opened. Move the cursor to 'Recall'.

(4) Press Set, and the measurement conditions are read out.

8.4.3 Overwriting the Measurement Conditions

Here is the procedure for overwriting the measurement conditions.



(1) Open the 'Setup : Memory' screen.

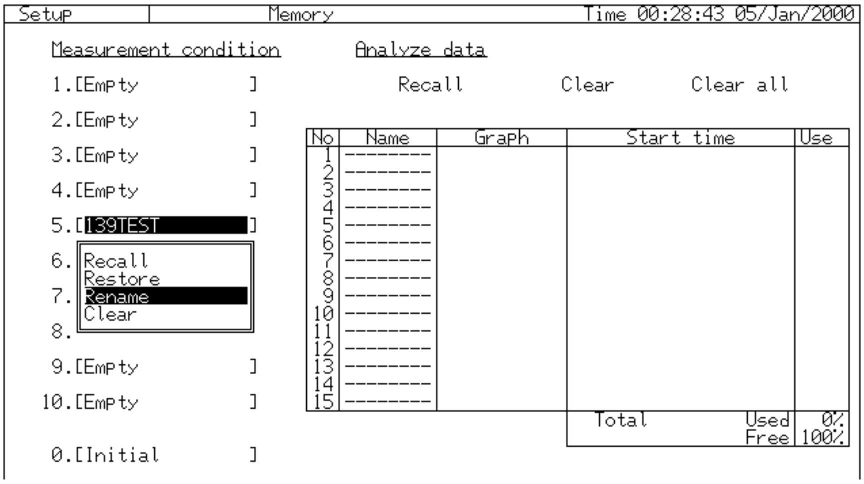
(2) Move the cursor to the 'Measurement condition' memory of to be overwritten and press Set .

(3) The item selection window is opened. Move the cursor to 'Restore' and press Set .

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set . The measurement conditions are overwritten and saved.

8.4.4 Renaming the Measurement Conditions

Here is the procedure for renaming the saved measurement conditions file.



(1) Open the 'Setup : Memory' screen.

(2) Move the cursor to the memory of 'Measurement condition' to be renamed and press Set .

(3) The item selection window is opened. Move the cursor to 'Rename' and press Set .

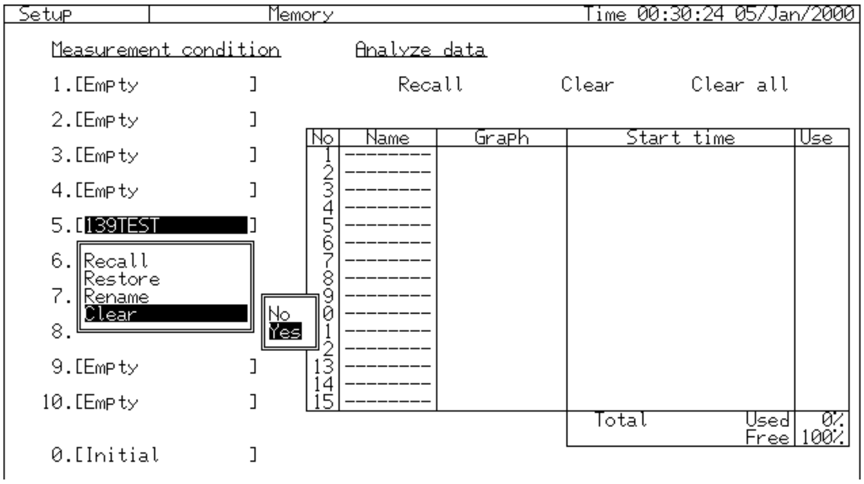
(4) The character entry window appears. Input a new name.

(5) Move the cursor to 'END' on completion of file name input.

(6) The character entry window is closed and the measurement conditions file is saved with the new name when you press Set .

8.4.5 Deleting the Measurement Conditions

Here is the procedure for deleting the measurement conditions.



(1) Open the 'Setup : Memory' screen.

(2) Move the cursor to the memory of 'Measurement condition' to be deleted and press Set.

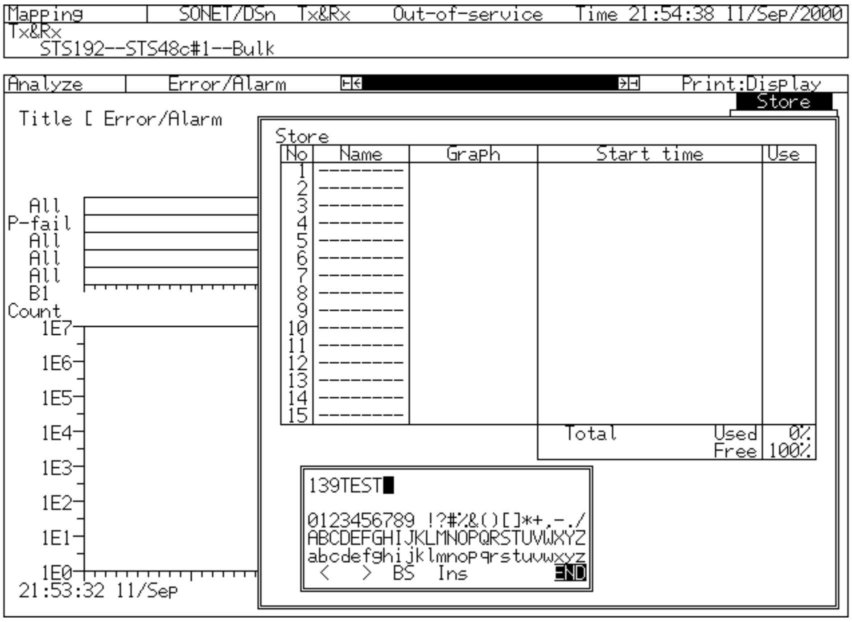
(3) The item selection window is opened. Move the cursor to 'Clear' and press Set.

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The measurement conditions are deleted.

8.4.6 Saving the Analysis Graph Data

Here is the procedure for saving the analysis graph data.

For example, when you want to save the displayed analysis graph data as '139TEST':



(1) Open the single display 'Analyze : Error/Alarm' screen.

- You cannot save the analysis graph data on a two- or three-division display screen.

(2) Move the cursor to 'Store' and press Set.

(3) The memory saving window appears. Enter the character string, '139TEST'.

(4) Move the cursor to 'END' after inputting the file name.

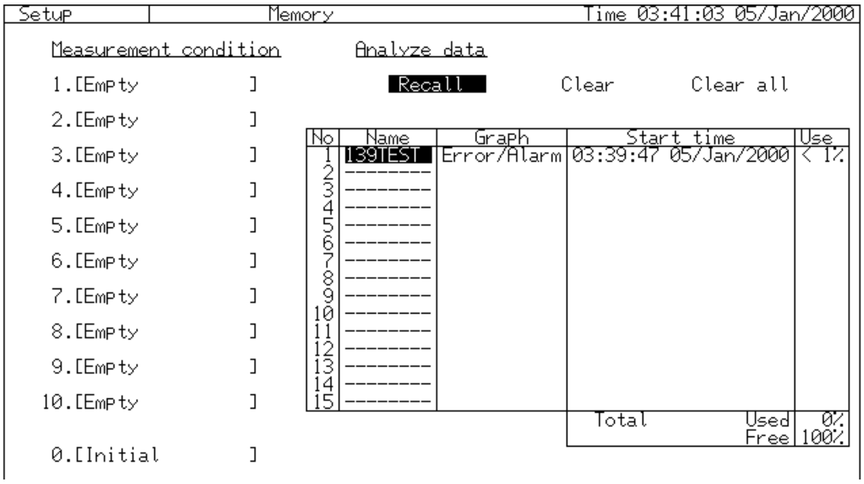
(5) The character entry window is closed and the analysis graph data is saved when you press Set.

NOTE

- Up to 15 data points can be saved. You cannot save data if all 15 memory units are occupied.
- The default name, 'Memory' is set if you close the memory saving window without setting the file name.
- When the data volume being saving exceeds the free memory space, the data cannot be saved.

8.4.7 Reading out the Analysis Graph Data

Here is the procedure for reading out the analysis graph data from the memory and displaying it on the screen.



(1) Open the 'Setup : Memory' screen.

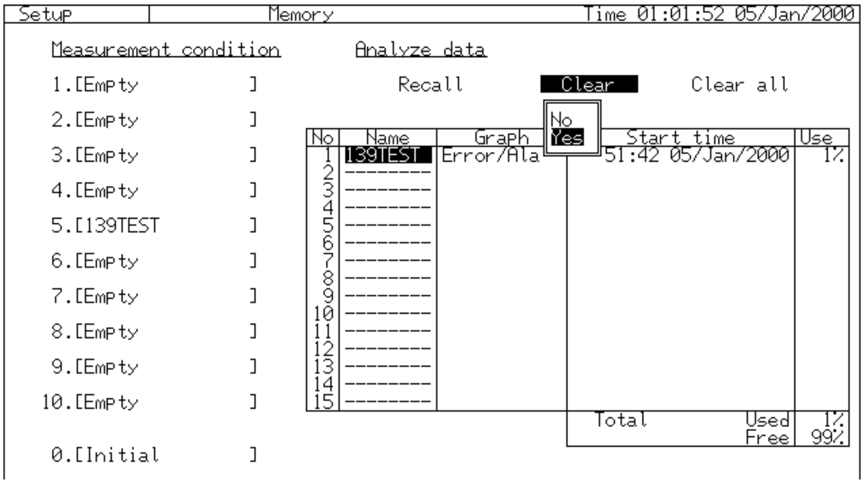
(2) Move the cursor to 'Recall' and press Set.

(3) The memory saving window is opened. Move the cursor to the memory from which the data is read, and press Set.

(4) The Analyze main screen appears, and displays the analysis graph data read out on it.

8.4.8 Deleting the Analysis Graph Data

Here is the procedure for deleting the saved analysis graph data.



(1) Open the 'Setup : Memory' screen.

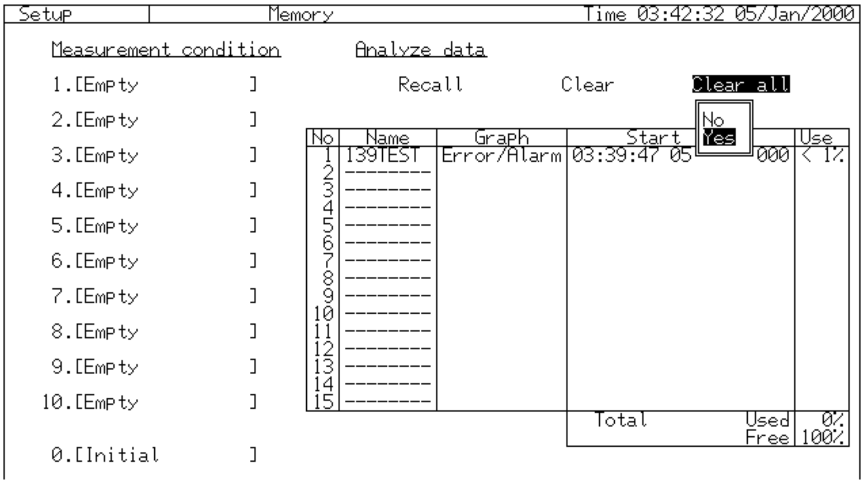
(2) Move the cursor to 'Clear' and press Set.

(3) The memory list is displayed. Move the cursor to the memory from which you want to delete the data, and press Set.

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The data is deleted.

8.4.9 Deleting the Entire Analysis Graph Data

Here is the procedure for deleting the entire analysis graph data that has been saved.



(1) Open the 'Setup : Memory' screen.

(2) Move the cursor to 'Clear ALL' and press Set.

(3) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The data is deleted.

8.5 Printing

MP1570A offers 3 types of printing functions as follows:

(a) Screen data printing by pressing Print Now

(b) Automatic printing of measurement data by making the setting on the 'Setup : Print' screen

(c) Automatic printing of self test results by making the settings on the 'Setup : Self test' screen

Printing in the cases of (a) and (b) is as follows. For (c) set on the 'Setup : Self test' screen, see 'Section 9 Performance Test'.

NOTE

- Printout of screen data by pressing Print Now (a), has higher priority over automatic printing (b) and (c). If you press Print Now during automatic printing, automatic printing stops and is restarted after the screen data printing is completed.

- The ●On/Off lamp of the built-in printer should be illuminated when you use the printer. Press ●On/Off to turn it on.

- Open the 'Setup : System' screen and set the GPIB Interface or RS-232 Interface in 'Printer' when you use an external printer. For details, see '8.1.7 Setting the GPIB interface' and '8.1.8 Setting the RS-232C interface'.

- The data to be printed is lost if you press Print Now during printing by the built-in printer. The printing is not resumed if the key is pressed again.

- Press Feed to feed the printer form.

8.5.1 Printing the Screen Data

You can print out the screen data with (Print Now).

Here is an example of using the built-in printer to print out the 'Setup : Memory' screen data. The printing steps are:

(1) Verify that the (●On/Off) lamp of the printer is illuminated. Press the key and turn it on if it is off.。

(2) The built-in printer prints out the data on the screen when you press (Print Now).

A printout example ('Setup : Mapping' screen)

```
        Time 10:24:01 21/Feb/2000
Setup         :    Mapping  Tx/Rx
 Config       :        SONET/DSn
 Meas. mode   :   Out-of-service
------------- Tx -------------
 Bit rate     :             156M
 Mapping      :      34M(Async.)
              :    STS3>TUG>  TU3
  Mix.payload:                ON
  payload 1   :
       TUG3>VTG>VT6>VT6SPE>Bulk
  payload 2   :
       TUG3>VTG>VT2>VT2SPE>Bulk
  Dummy STM   :             Copy
 MUX          :              64k
 2M setting
  2Mch        :             30ch
  CRC-4       :              OFF
 Clock        :         Internal
------------- Rx -------------
 Bit rate     :             622M
 Mapping      :      34M(Async.)
              :    STS3>TUG>  TU3
 DEMUX        :              64k
 2M setting
  2Mch        :             30ch
  CRC-4       :              OFF
  Signalling  :              OFF
```

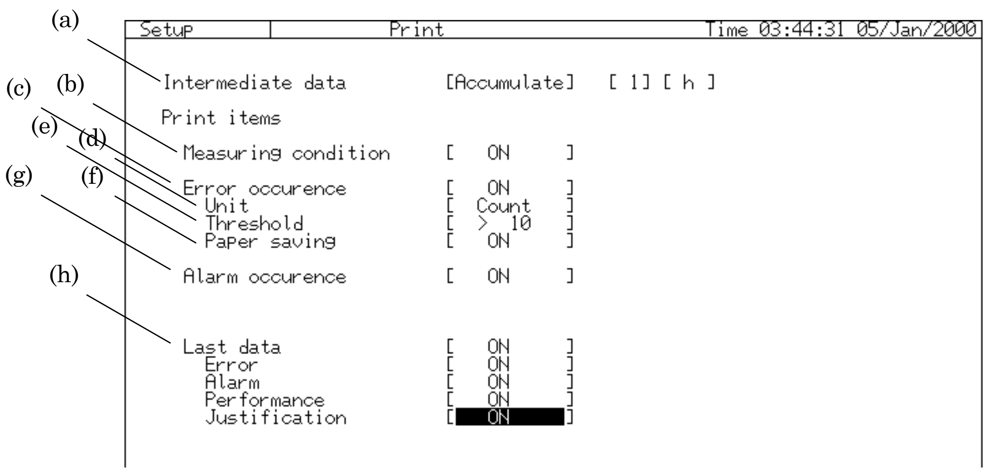
8.5.2 Automatic Printing of Measurement Data *'Setup : Memory' screen*

Here is the procedure for automatic printing of measurement data.

(1) Verify that the ●On/Off lamp of the printer is illuminated. Press the key and turn it on if it is off.

(2) Open the 'Setup : Memory' screen.

(3) Set the screen parameters.



(a) Intermediate data .... Sets intermediate data printout at certain time intervals during the measurement.

OFF .... Does not print out intermediate data.

Individual .... Prints out the measurement values within a certain time.

Accumulate .... Prints out the accumulated measurement values after measurement start.

- Printing cycles must be set for 'Individual' and 'Accumulate' settings.

(b) Measurement condition .... Sets to On/Off the printout of measurement conditions set at the time of measurement start.

(c) Error occurrence..........Sets the printout of error occurrence on or off.

(d) Unit .... Sets the conditions of error printout as follows:

Count....................Prints out the error count.

Rate ....Prints out the error rate converted from the error count.

(e) Threshold.....................Selects the printout threshold. Indicated by the error count or rate per second.

(f) Paper saving ....Turns the paper-saving function on or off

- You can stop the printing after error occurrence for 10 consecutive seconds, in order to save the printer paper. Printing restarts after the consecutive error occurrence stops.

(g) Alarm occurrence ....Sets the printout of alarm occurrence on or off.

(h) Last data ....Sets on or off the printout of measurement data on the completion of the measurement.

- Sets to on and off the printout for Error, Alarm, Performance and Justification, respectively.

(4) Data is automatically printed out as set on (3) when you start the measurement by pressing ● Start /Stop .

An example of automatic printout of measurement data

```
Measuring    Condition    Tx/Rx
  Meas. mode:         In-service
  Bit rate  :               34M
  DEMUX     :         34M> 8M>
                         #1  #1
  Frame     :                ON
  Pattern   :            PRBS15
  Invert    :                ON
  Mode      :     Single  2hour
********************************
* 12:10:10 25/Dec/96  Start    *
********************************
  12:15:40  25/Dec/96
    FAS  8M            1.0E-03
  12:15:41  25/Dec/96
    FAS  8M            1.0E-03
********************************
* 13:10:10 25/Dec/96  Inter    *
********************************
--------- Error/Alarm ----------
------------ Input -------------
   P-fail                    0s
   LOS                       0s
   Code          0     0.0E-09
------------- PDH --------------
   AIS 34M                   0s
   LOF 34M                   0s
~                                ~
   FAS  8M       0     0.0E-10
   Bit           0     0.0E-10
------  Performance G.821p20----
   EC           0
   ES           0      0.0000%
                  AnD  0.0000%
   EFS       3600    100.0000%
   SES          0      0.0000%
   US           0      0.0000%
   DM           0      0.0000%
   Code ES       0
13:18:50 25/Dec/96
   RA 34M            Occur
13:19:15 25/Dec/96
   RA 34M            Recover
********************************
* 13:19:00 25/Dec/96  Saving   *
********************************
********************************
* 13:19:30 25/Dec/96 Saving OFF*
********************************
********************************
* 14:10:10 25/Dec/96  Stop     *
********************************
--------- Error/Alarm ----------
------------ Input -----------
   P-fail                    0s
   LOS                       0s
   Code          0     0.0E-09
------------ PDH ---------------
   AIS  34M                  0s
~                                ~
   DM                        0s
   Code ES            2.37E-05
```

- Measurement conditions set at the time of measurement start
- Measurement start time
- Printout due to the occurrence of an error exceeding the threshold value
- Time of intermediate data printout
- Intermediate data
- Printout due to occurrence of alarm
- Paper-saving start time
- Paper-saving stop time
- Final measurement end time
- Measurement results

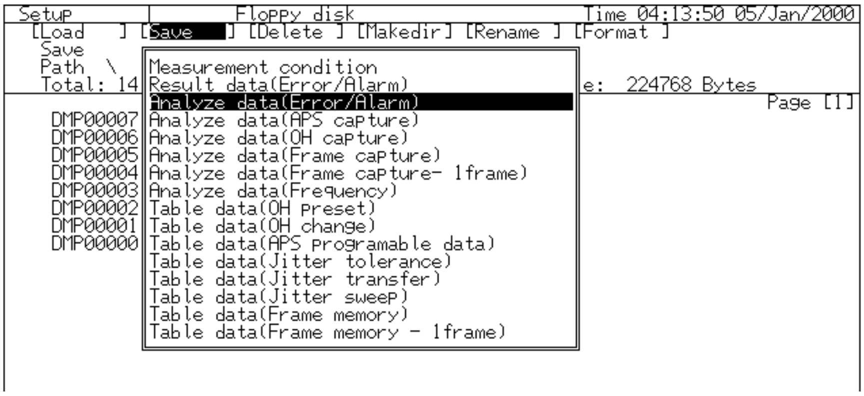
NOTE

Printing speed may not be sufficiently fast for printing a large volume of data when frequent errors and alarms occur or when repeated measurements are performed for short time intervals, such as 1s. Data can be lost on such occasions.

8.6 Floppy Disk *'Setup : Floppy disk' screen*

Here is the procedure for saving the measurement conditions and analysis graph data onto a floppy disk, and reading it out from the floppy disk.

8.6.1 Saving Data onto a Floppy Disk



(1) Open the 'Setup : Floppy disk' screen.

(2) Move the cursor to 'Save' and press Set.

(3) The item selection window appears. Move the cursor to the type of data to be saved and press Set.

(4) The character entry window opens. Input the file name to be saved.

(5) After inputting it, move the cursor to 'END'.

(6) The character entry window closes and the data is saved when you press Set.

NOTE

- The character string for file name should contain 12 characters or less including an extension that is automatically added.
- A file is created on a directory displayed on the screen.
- Data is not saved if you close the character entry window without inputting a file name.

The analysis graph data is saved in text format if you select 'Text format' on the character entry window, but you cannot read a file saved in the text format with MP1570A. Here is a text file example of analysis graph data.

Text file example of analysis graph data

(a) "ANRITSU;MP1570A;01.00;A;A_EALM","","","","","","","","","","","","","","","",
"",
"","","","","","","","","","","","","","","","","","" ↓

(b) "Date","Time","LOS","LOF139M","LOF34M","LOF8M","LOF2M","MF-LOSS","AIS139M","AI
S34M","AIS8M","AIS2M","RDI139M","RDI34M","RDI8M","RDI2M","RDI-MF","LOF","OOF",
"MS-AIS","MS-RDI","AU-AIS","AU-LOP","HP-RDI","TU-AIS","TU-LOP","TU-LOM","LP-RD
I","SYNC","P-FAIL","BIT(EC)","FAS139M(EC)","FAS34M(EC)","FAS8M(EC)","FAS2M(EC)
","CRC-4(EC)","E-BIT(EC)","CODE(EC)","B1(EC)","B2(EC)","HP-B3(EC)","LP-B3(EC)",
"BIP-2(EC)","MS-REI(EC)","HP-REI(EC)","LP-REI(EC)","BIT(ER)","FAS139M(ER)","FA
S34M(ER)","FAS8M(ER)","FAS2M(ER)","CRC-4(ER)","E-BIT(ER)","CODE(ER)","B1(ER)",
"B2(ER)","HP-B3(ER)","LP-B3(ER)","BIP-2(ER)","MS-REI(ER)","HP-REI(ER)","LP-REI
(ER)" ↓

(c) "23/Dec/99","08:23:40",123456,"",123456,123456,123456,123456,123456,123456,123
456,123456,123456,123456,123456,123456,123456,123456,123456,123456,123456,1234
56,123456,123456,123456,123456,123456,123456,123456,123456,789012,789012,78901
2,789012,789012,789012,789012,789012,789012,789012,789012,789012,789012,789012,
789012,789012,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,
1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05 ↓

(d) ·
·

- The values are separated by commas.
- ‘↓’ feeds lines into (a), (b), (c) and (d).

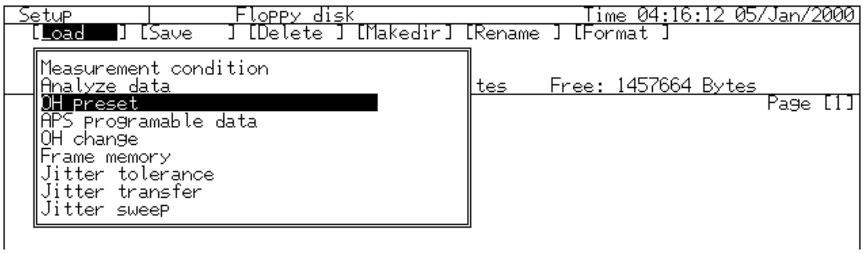
(a) ...... Document data

(b) ...... Dates, times, alarm items, error count items and error rate items that are constant regardless of MP1570A setting.

(c) ...... Graph resolution setting time unit data on the 'Setup : System' screen corresponding to each item in (b).

(d) .... Graph resolution time data following (c). The contents are the same as those of (c). This pattern is repeated.

8.6.2 Reading out Data from a Floppy Disk



(1) Open the 'Setup : Floppy disk' screen.

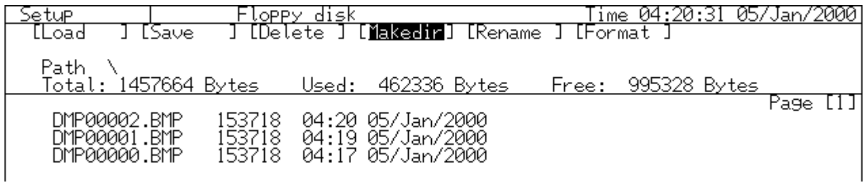
(2) Move the cursor to 'Load' and press Set .

(3) The item selection window appears. Move the cursor to the type of file 'Measurement condition' or 'Analyze data') from which you want to read out data, and press Set .

(4) Names of files saved in the disk are displayed. Move the cursor to the desired file name and press Set .

(5) The data is read out.

8.6.3 Creating a Directory



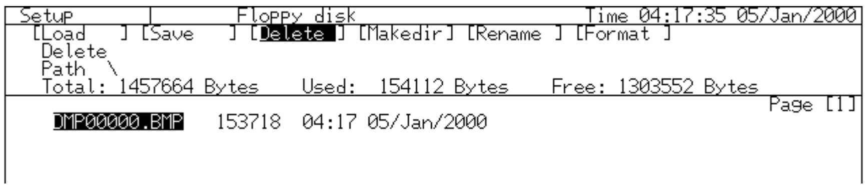
(1) Open the 'Setup : Floppy disk' screen.

(2) Move the cursor to 'Makedir' and press Set .

(3) The character entry window appears. Input a directory name.

(4) After inputting it, move the cursor to 'END' and press Set . A new directory is created.

8.6.4 Deleting a File or a Directory



(1) Open the 'Setup : Floppy disk' screen.

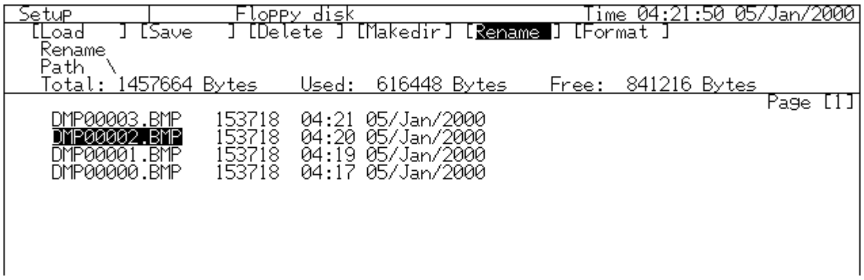
(2) Move the cursor to 'Delete' and press Set .

(3) Files are displayed. Move the cursor to the file or directory to be deleted and press Set .

(4) The Yes/No confirmation dialog opens. To delete the file, select 'Yes' and then press Set .

- All files in a directory must be deleted first in order to delete a directory.

8.6.5 Renaming a File



(1) Open the 'Setup : Floppy disk' screen.

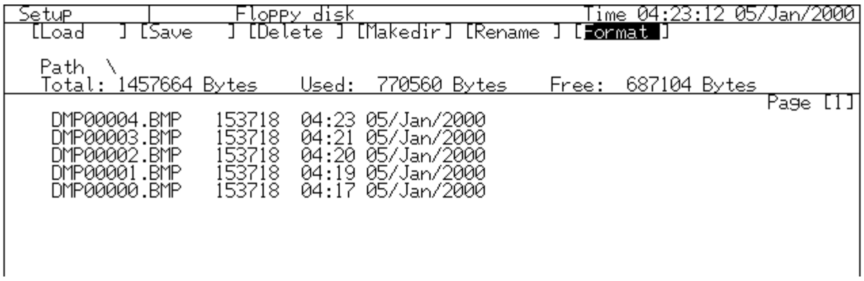
(2) Move the cursor to 'Rename' and press Set.

(3) The cursor is displayed in the file display field. Move the cursor to the file to be renamed and press Set.

(4) The character entry window appears. Input a new file name.

(5) After inputting it, move the cursor to 'END' and press Set. The file is renamed.

8.6.6 Formatting a Floppy Disk



(1) Open the 'Setup : Floppy disk' screen.

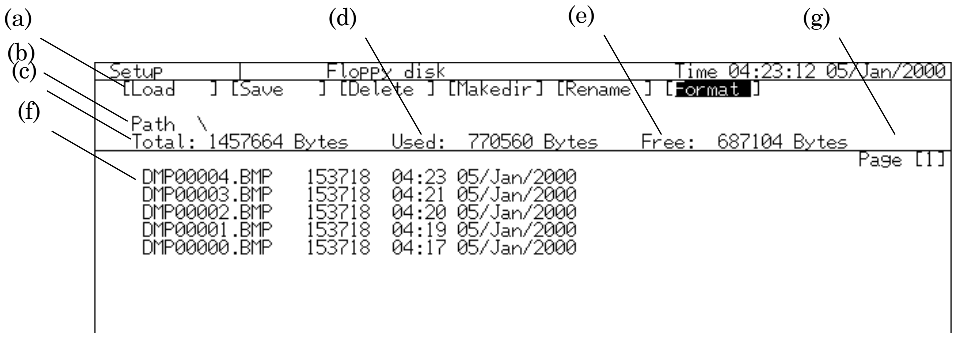
(2) Move the cursor to 'Format' and press Set.

(3) The Yes/No confirmation dialog opens. For formatting, choose 'Yes' and then press Set. The disk is formatted.

- An inserted disk is automatically formatted to 720 KB or 1.44 MB.

8.6.7 Description of 'Setup : Floppy disk' screen

This section describes the 'Setup : Floppy disk' screen.



(a) [Status] .... Displayed during a process related to a floppy disk.

(b) Path .... Displays the current directory.

(c) Total .... Displays the total capacity of a floppy disk.

(d) Used .... Displays the used space of a floppy disk.

(e) Free .... Displays the free space of a floppy disk.

(f) [File list] .... Displays file names and directory names. The directories are indicated in the ‘< _____ >’ format.

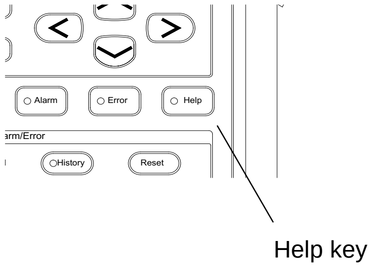
[Moving files] .... A file can be moved between directories if you move the cursor to a directory and press Set.

(g) Page .... Goes to the next page if file display exceeds a page.

8.7 Help Function

The MP1570A can display the functions and contents of parameters displayed on the screen (Help function). This function is convenient when the function of the parameter is not clear. Here is the procedure for using the help function.

(1) When the function and the content of a parameter displayed on the screen are not clear, move the cursor to the parameter and press Help.



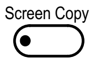
(2) Information on the parameter is displayed on the screen.

(3) Press Help again to display the screen which had been displayed before this function was used.

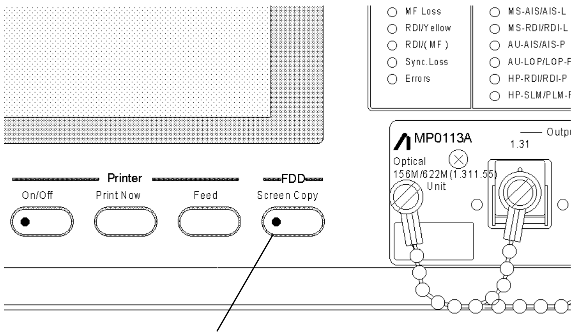
8.8 Screen Copy

The MP1570A can save the currently displayed screen on a floppy disk (Screen Copy). Here is the procedure for saving a screen.

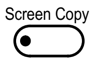
(1) Insert a floppy disk into the floppy disk drive. See "8.6 Floppy Disk" for the disk format form and so on.

(2) Press 

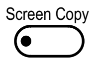
the screen copy key to save the currently displayed screen.



Screen Copy key

- The lamp of 

lights up, during saving the screen.

(3) When saving the screen is finished, the lamp of 

is turned off. The file name of the saved screen is "DMPxxxxxx." A number is automatically added to "xxxxxx."

Section 9 Performance Test

This section describes the procedures for performing an operational check of MP1570A, Plug-in unit and Interface unit, as well as the steps to check the output waveform. Contact Anritsu or our dealer if you detect any in conformities with the specifications during the performance test as the device may be faulty. (*****) [*****] in this manual indicate front panel keys.

9.1 About Measurement Instruments Required to Execute Performance Test

The following table shows performance test items and measurement instruments required to execute the performance tests.

Test Item	Installed Unit	Required Measurement Instruments
Selftest		
Checking the CPU and Peripherals	——	——
Checking the Built-in Printer	——	——
Checking MP1570A	——	——
Checking the Interface Unit	——	——
2M Balanced Signal Output Waveform	MP0121A	120Ω/50Ω Impedance Converter Oscilloscope
2M/8M/34M/139M/156M Unbalanced Signal Output Waveform	MP0121A	75Ω/50Ω Impedance Converter Oscilloscope
1.5M Balanced Signal Output Waveform	MP0122A/B	100Ω/50Ω Impedance Converter Oscilloscope
45M/52M Unbalanced Signal Output Waveform	MP0122A/B	75Ω/50Ω Impedance Converter Oscilloscope
52M Optical Signal Output Waveform	MP0122B	MP9653A O/E Converter MA1418A 4th Bessel LPF Oscilloscope
MP0105A CMI Unit Output Signal Waveform	MP0105A	75Ω/50Ω Impedance Converter Oscilloscope
MP0108A NRZ Unit Output Signal Waveform	MP0108A	ECL Terminal × 2 Oscilloscope
MP0111A Optical 156M/622M(1.31) Unit Output Signal Waveform	MP0111A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope
MP0112A Optical 156M/622M(1.55) Unit Output Signal Waveform	MP0112A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope
MP0113A Optical 156M/622M(1.31/1.55) Unit Output Signal Waveform	MP0113A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope

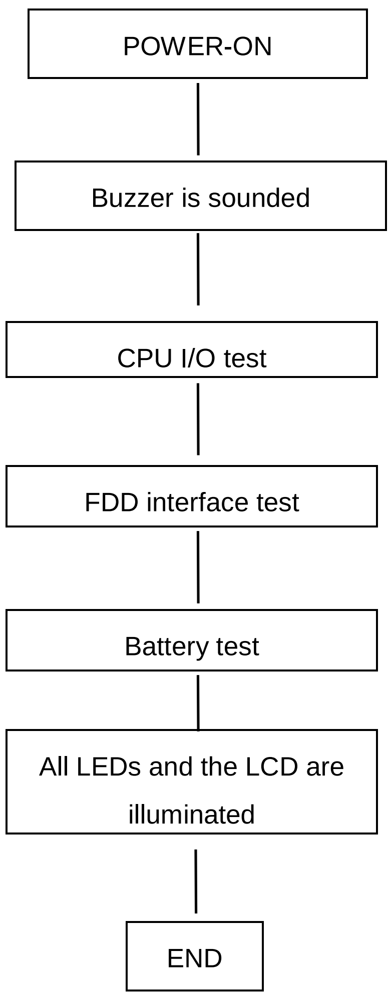
9.2 Selftest Items

The four self test items of MP1570A are:

- Check of CPU and peripherals
- Check of built-in printer
- Check of MP1570A functions
- Check of the interface unit

9.2.1 Checking the CPU and Peripherals

The self-test function of MP1570A checks the buzzer, CPU, peripheral IC, backup battery, lamps and LCD, etc. Upon power-on, MP1570A performs a check in the following order:



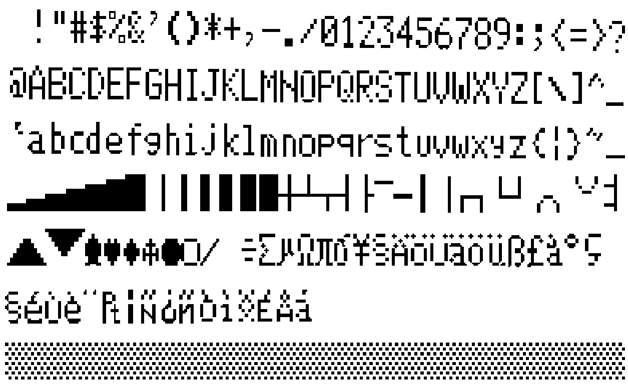
9.2.2 Checking the Built-in Printer

Here is the procedure for checking the built-in printer.

(1) Turn on the power switch of MP1570A while pressing Print Now .

(2) The built-in printer starts the printing test. You can check the printer operation by the test print.

A properly operating printer should print out as follows. If not, the printer may be faulty. Contact the Anritsu Corporation or our nearby dealer.



NOTE

The difference between turning on the power switch while pressing Print Now and turning on the power switch without pressing Print Now (as usually done) is only that the former performs the test printing. The other functions are completely the same.

9.2.3 Checking MP1570A

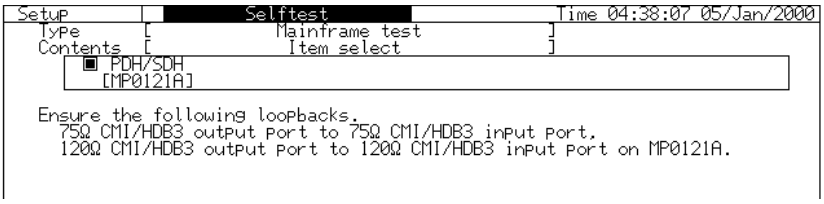
Here is the procedure for checking MP1570A.

(1) Open the 'Setup : Self test' screen.

(2) Move the cursor with [∧] [∨] [<] [>] to 'Type' and press [Set].

(3) The item selection window opens. Move the cursor with [∧] [∨] to 'Mainframe test' and press [Set].

(4) Connect the output and input connectors of the plug-in unit according to the message displayed on the screen.



(5) Start the self-test by pressing [Start/Stop].

(6) The test ends automatically when all check items are checked.

(7) After the test is completed, the buzzer is sounded and the judgement result as shown below is displayed on the screen.

PASS.......... Self test result is normal.

FAIL........... Self test result is abnormal.

- The built-in printer automatically prints out the judgement result when it is turned on (i.e. when the lamp of [On/Off] on the front panel is illuminated).
- An error code is displayed when the self-test result is abnormal. For error codes, see 'Appendix G'.

9.2.4 Checking the Interface Unit

Here is the procedure for checking the operation of the interface unit.

(1) Turn off the power switch of MP1570A
(2) Install the interface unit to be checked on MP1570A.
(3) Turn on the power switch of MP1570A
(4) Open the 'Setup : Self test' screen.
(5) Move the cursor with ∧ ∨ < > to 'Type' and press Set.
(6) The item selection window opens. Move the cursor with ∧ ∨ to 'MPxxxxx Interface test' and press Set.
(7) Connect the output and input connectors of the interface unit according to the message displayed on the screen. (The connection instructions are given on the same location of the screen as that described in '9.1.3 Checking MP1570A'.)
(8) Start the self test of the interface unit by pressing Start/Stop.
(9) The test ends automatically when all check items are checked.
(10) After the test is completed, the buzzer is sounded and the judgement result as shown below is displayed on the screen.
PASS.......... Self test result is normal.
FAIL .... Self test result is abnormal.

- The built-in printer automatically prints out the judgement result when it is turned on (i.e. when the lamp of On/Off on the front panel is illuminated).
- An error code is displayed when the self test result is abnormal. For error codes, see 'Appendix G'.

NOTE

For performing the interface test of the MP0111A, MP0112A or MP0113A, directly connect the single-mode optical cable to the unit without the attenuator. The measured optical power shows FAIL if the attenuator is inserted.

9.3 2/8/34/139/156M CMI/HDB3 Output Waveform

Here is the procedure for checking the 2/8/34/139/156M CMI/HDB3 output waveform.

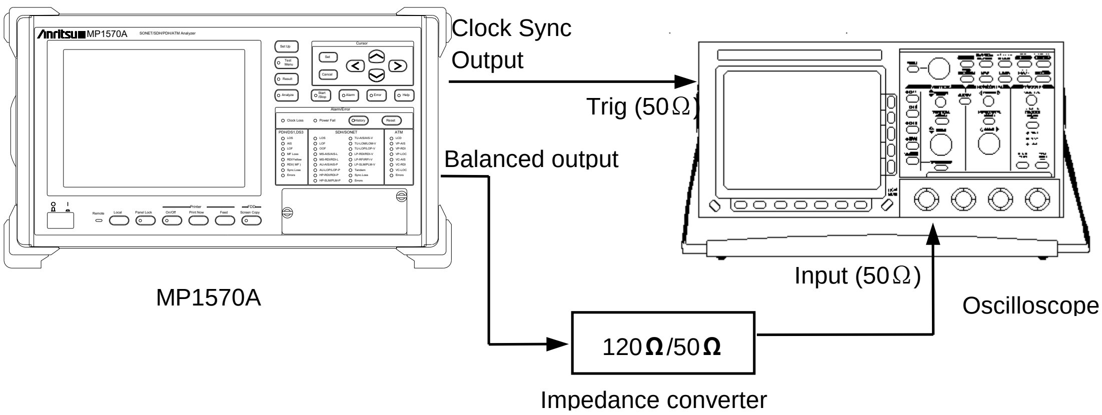
The waveform check is only possible when the MP0121A 2/8/34/139/156M unit is installed.

9.3.1 Connection

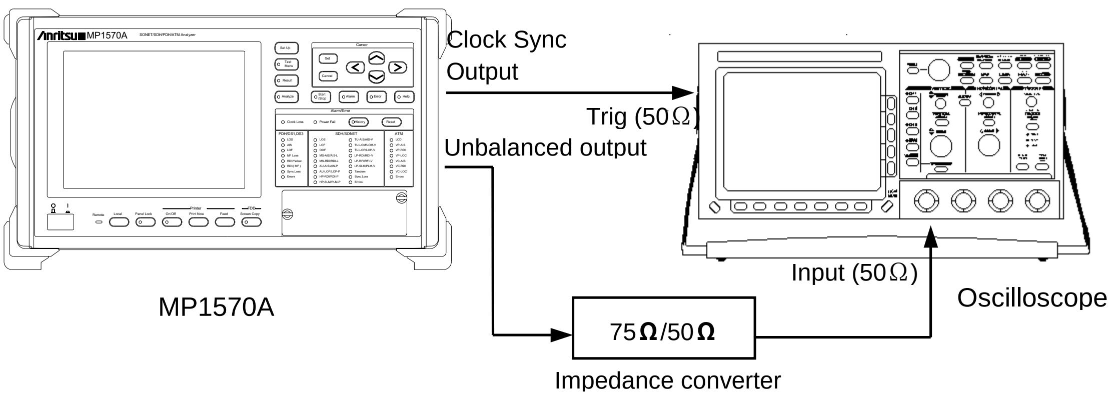
(1) Turn off the power switch of MP1570A.

(2) Install the MP0121A 2/8/34/139/156M unit on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below according to the bit rate and interface.



2M balanced



2M/8M/34M/139M/156M unbalanced

(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.3.2 Testing Procedures

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The item selection window opens. Move the cursor with ∧ ∨ to 'Bit rate' and press Set.

(4) If you set the bit rate at '2M', move the cursor to 'Interface' and press Set. The item selection window opens. Select 'Balanced' or 'Unbalanced' on the window and press Set.

(5) Verify that the waveform displayed on the oscilloscope is included in the waveforms shown in '9.2.3 Pulse Mask (2/8/34/139/156M)'.

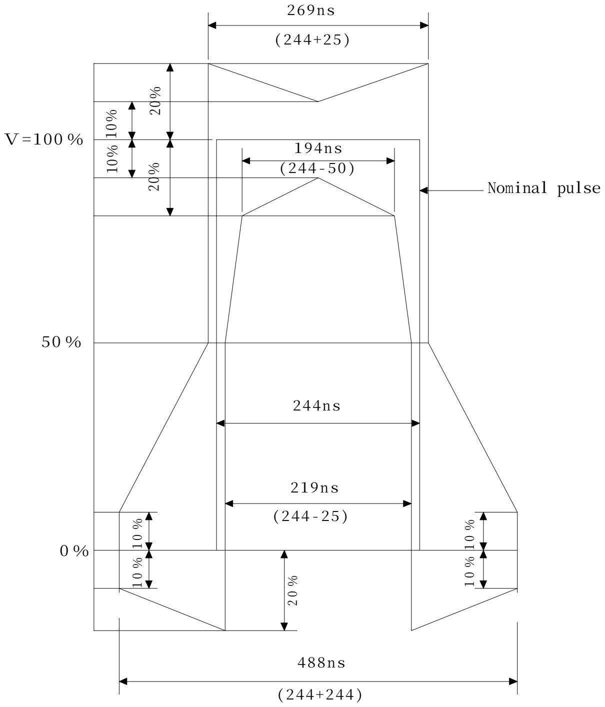
(6) Repeat the steps (1) to (5) for each bit rate and interface.

NOTE

The attenuation of the impedance converter is not included in the waveform shown in '9.2.3 Pulse Mask (2/8/34/139/156M)'. Recalculate the values taking into account the attenuation and inspect the level.

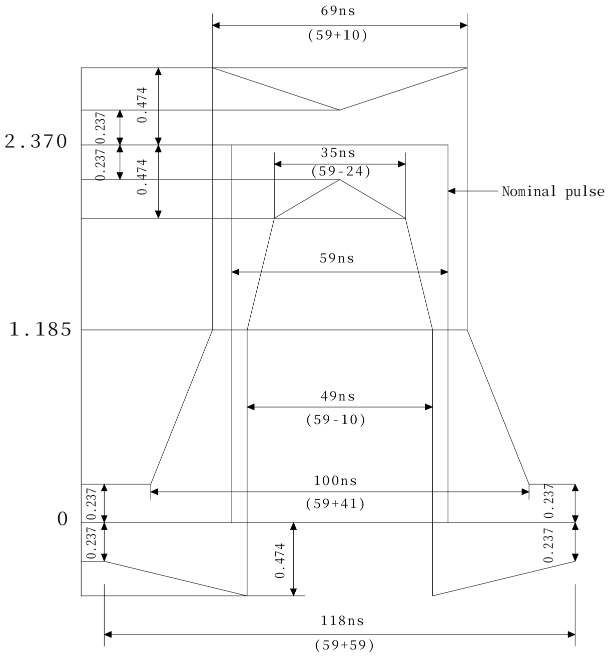
9.3.3 Pulse Mask (2/8/34/139/156M)

2 M

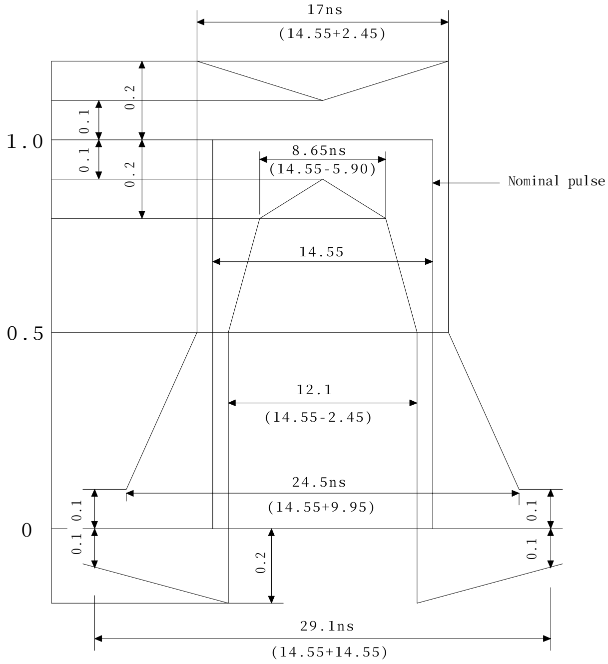


V = 100%
Balanced : 3V
Unbalanced : 2.37V

8 M



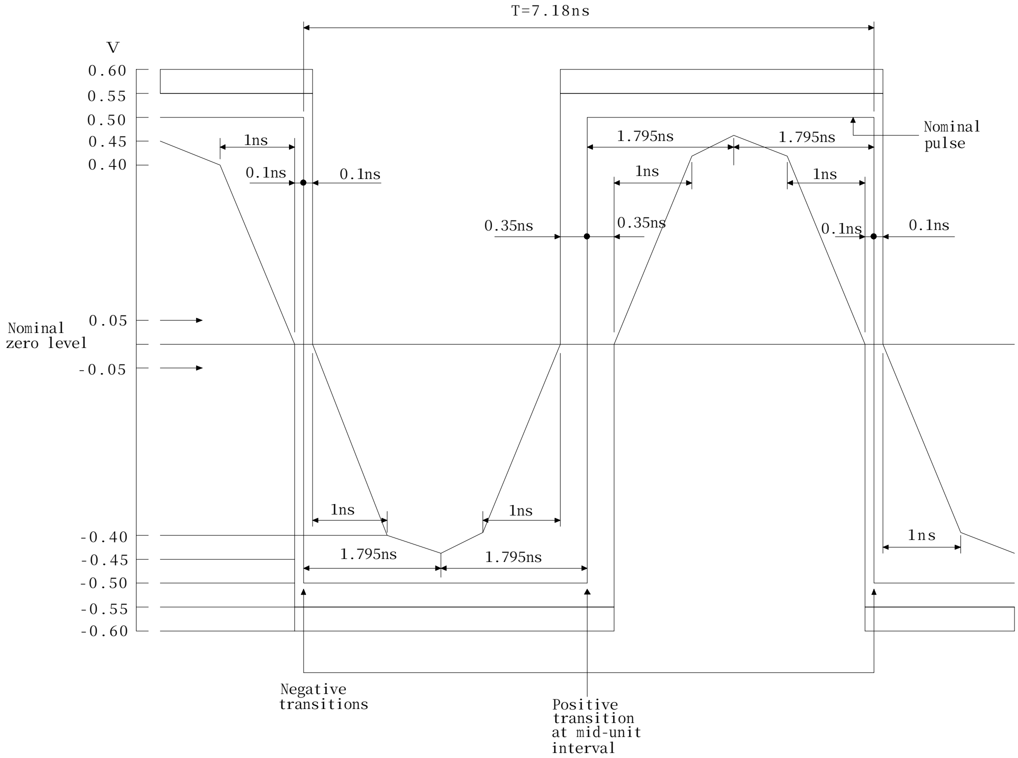
34 M


17ns
(14.55+2.45)
1.0
0.5
0
0.1
0.2
8.65ns
(14.55-5.90)
Nominal pulse
14.55
12.1
(14.55-2.45)
24.5ns
(14.55+9.95)
29.1ns
(14.55+14.55)

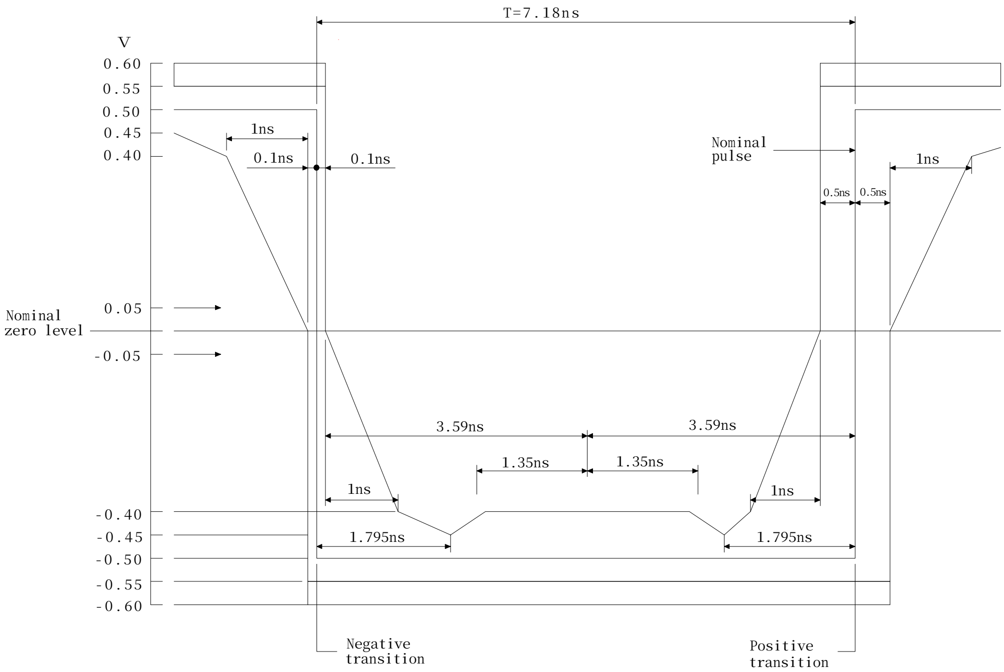
139M CMI

Nominal Peak-to-peak voltage(V): 1±0.1V

binary 0

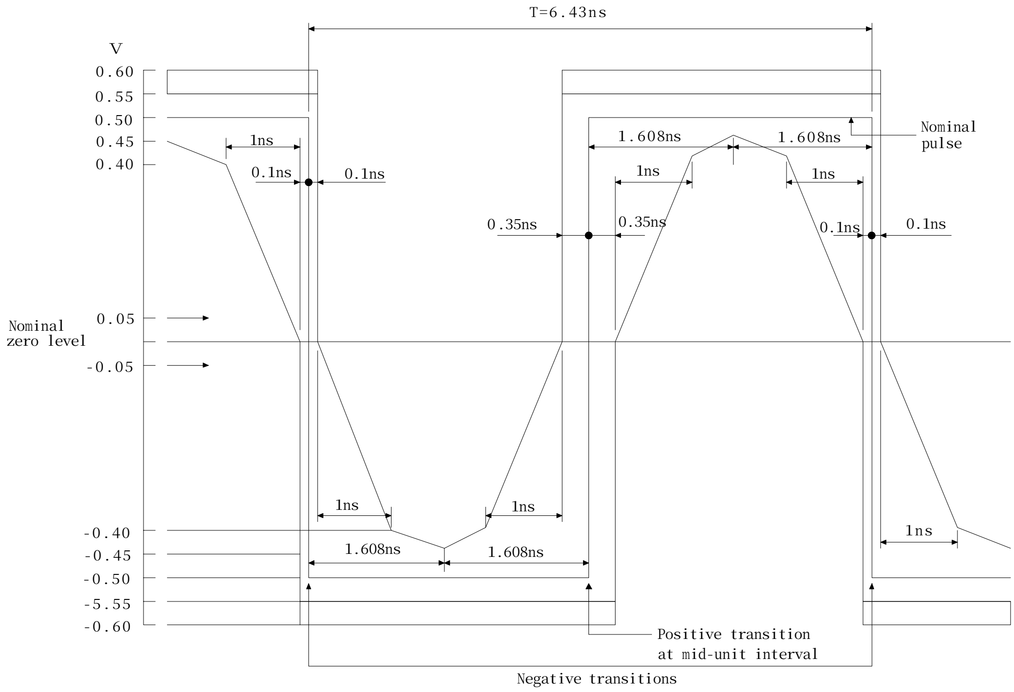


binary 1

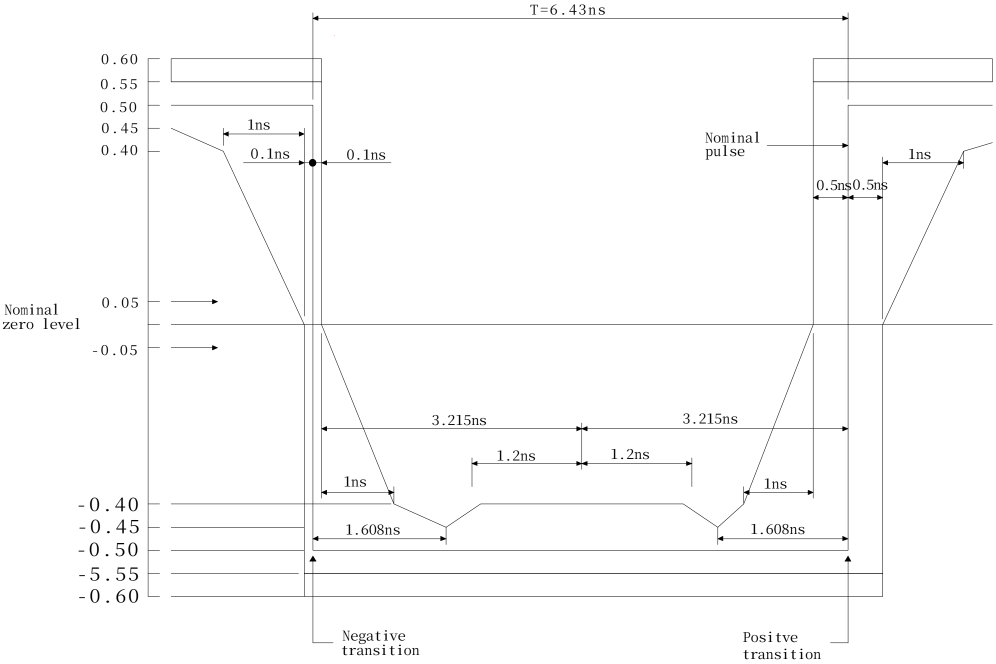

T=7.18ns
V
0.60
0.55
0.50
0.45
0.40
1ns
0.1ns
0.1ns
Nominal pulse
1ns
0.5ns
0.5ns
0.05
Nominal zero level
-0.05
3.59ns
3.59ns
1.35ns
1.35ns
1ns
1ns
-0.40
-0.45
1.795ns
1.795ns
-0.50
-0.55
-0.60
Negative transition
Positive transition

156M CMI

binary 0



binary 1


T=6.43ns
0.60
0.55
0.50
0.45
0.40
1ns
0.1ns
0.1ns
Nominal pulse
1ns
0.5ns
0.5ns
Nominal zero level
0.05
-0.05
3.215ns
3.215ns
1.2ns
1.2ns
1ns
1ns
-0.40
-0.45
-0.50
-5.55
-0.60
1.608ns
1.608ns
Negative transition
Positve transition

9.4 1.5/45/52M AMI/B8ZS/B3ZS Output Waveform

Here is the procedure for checking the 1.5/45/52M AMI/B8ZS/B3ZS output waveform.

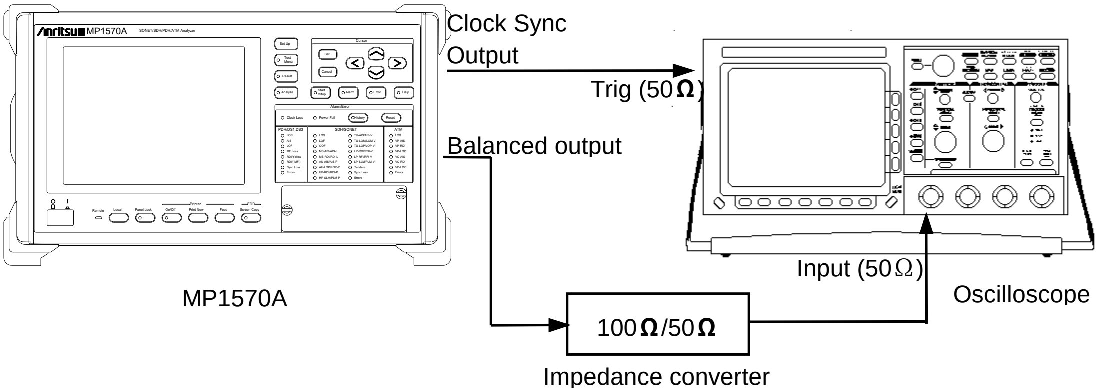
The waveform check is possible only when the MP0122A 1.5/45/52M unit or MP0122B 1.5/45//52/52M(1.31) unit is installed.

9.4.1 Connection

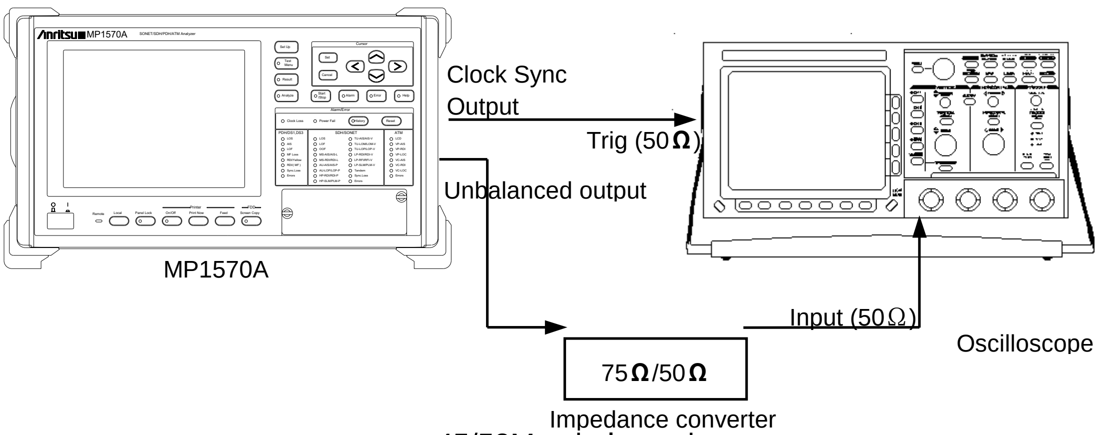
(1) Turn off the power switch of MP1570A.

(2) Install the MP0122A or MP0122B on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below according to the bit rate and interface.



1.5M balanced



45/52M unbalanced

(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.4.2 Testing Procedure

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to 'Bit rate' and press Set.

(4) If you set the bit rate at '1.5M', move the cursor to 'Interface' and press Set. The items selection window opens. Select 'Balanced' or 'Unbalanced' on the window and press Set.

(5) Verify that the waveform displayed on the oscilloscope is included in the waveforms shown in '9.4.3 Pulse Mask (1.5/45/52M)'.

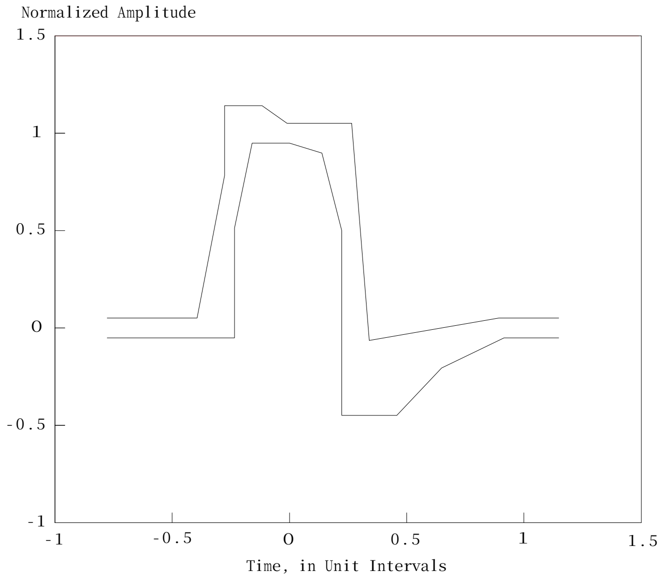
(6) For each bit rate and interface, repeat the steps (1) through (5).

NOTE

The attenuation of the impedance converter is not included in the waveform shown in '9.4.3 Pulse Mask (1.5/45/52M)'. Recalculate the values taking into account the attenuation and inspect the level.

9.4.3 Pulse Mask (1.5/45/52M)

1.5 M

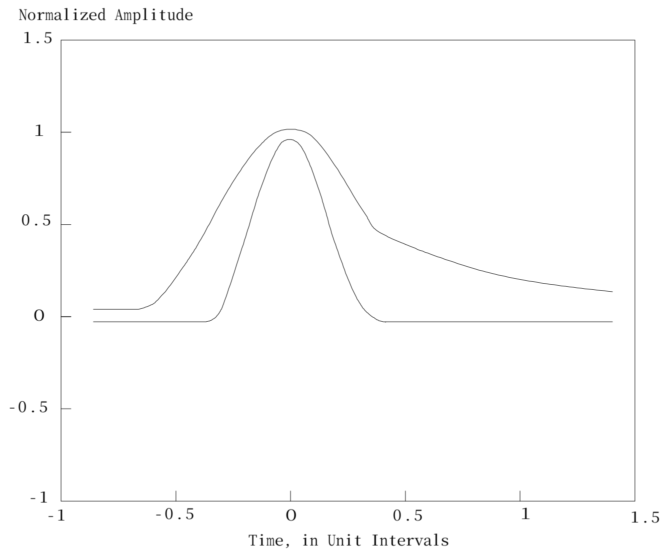


V=100%

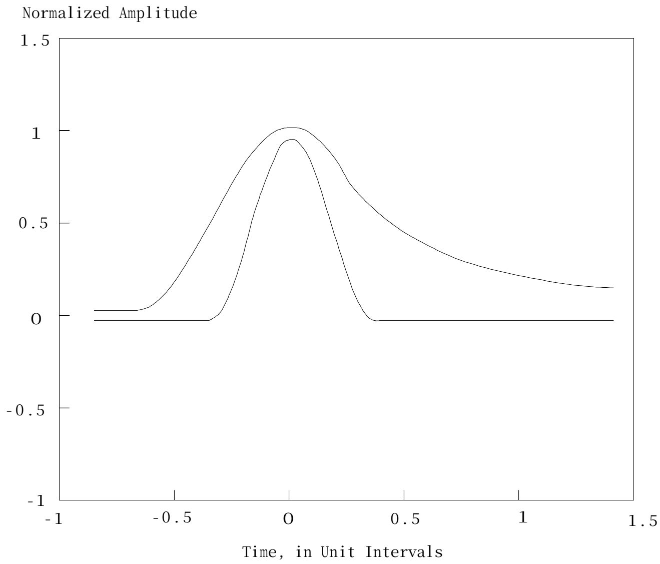
Balanced : 3V

Unbalanced: 2.37V

45 M



52 M


Normalized Amplitude
1.5
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5
Time, in Unit Intervals

9.5 52M Optical Output Waveform

Here is the procedure for checking the 52M optical output waveform.

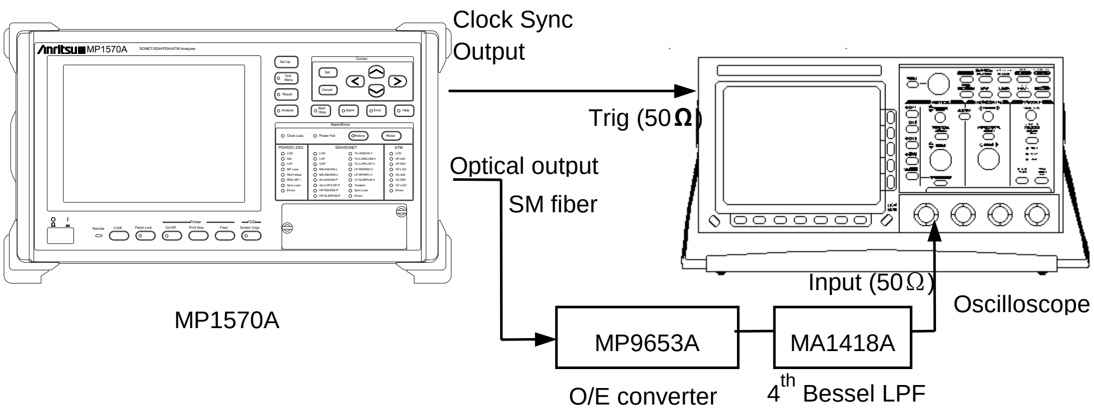
The waveform check is possible only when the MP0122B 1.5/45/52/52M(1.31) Unit is installed.

9.5.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0122B 1.5/45//52/52M(1.31) unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.5.2 Testing Procedure

Here is the procedure for testing the output waveform.

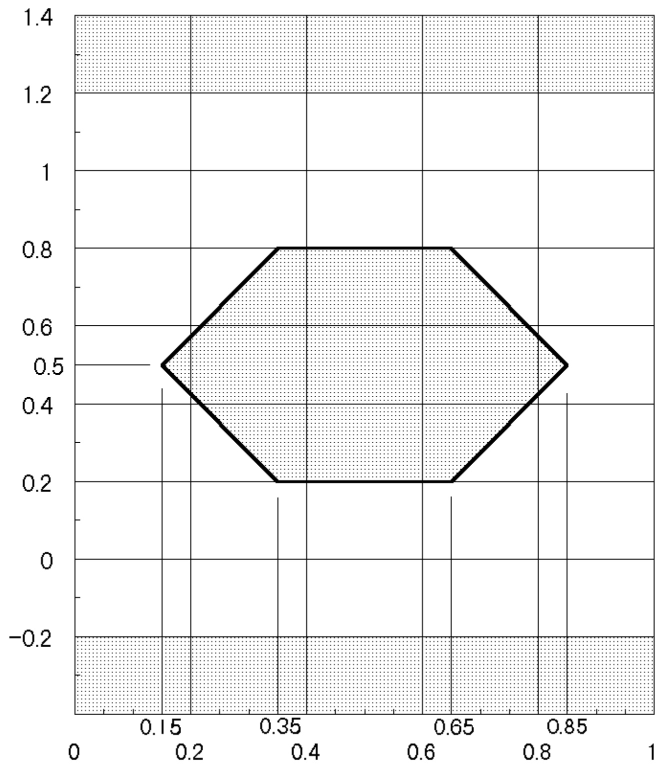
(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '52M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms given for pulse mask below.

9.5.3 Pulse Mask (52M)



9.6 MP0105A CMI Unit Output Waveform

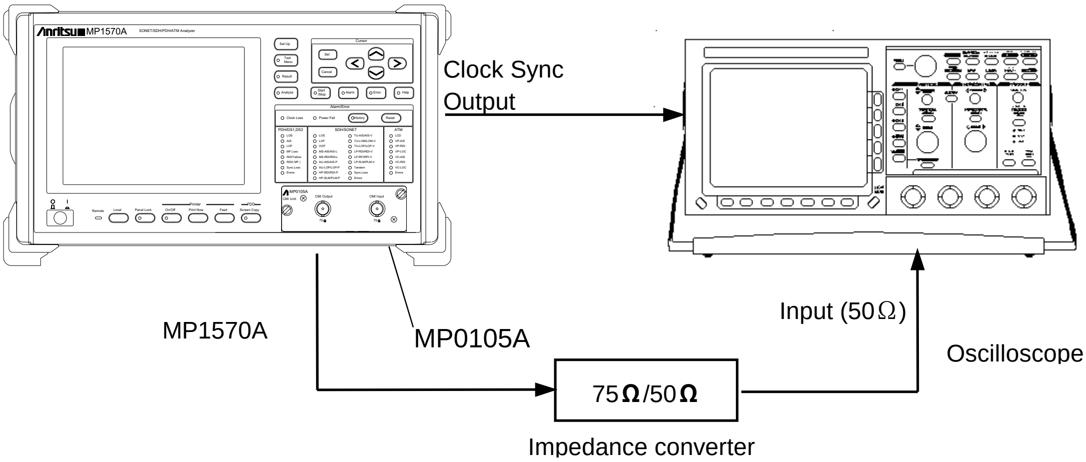
Here is the procedure for checking the output waveform of the MP0105A CMI unit. The waveform check is possible only when the MP0105A CMI unit is installed.

9.6.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0105A CMI unit in MP1570A.

(3) Connect MP1570A with the oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.6.2 Testing Procedure

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' and press.

- If the MP0121A is installed, '156M CMI' and '156M' are displayed. When testing the 156M CMI signal outputted from the MP0105A, select '156M'.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of 156M CMI given in '9.3.3 Pulse mask (2/8/34/139/156M)'.

NOTE

The attenuation of the impedance converter is not included in the 156M CMI pulse mask given in '9.3.3 Pulse mask (2/8/34/139/156M)'. Recalculate the values taking into account the attenuation and inspect the level.

9.7 MP0108A NRZ Unit Output Waveform

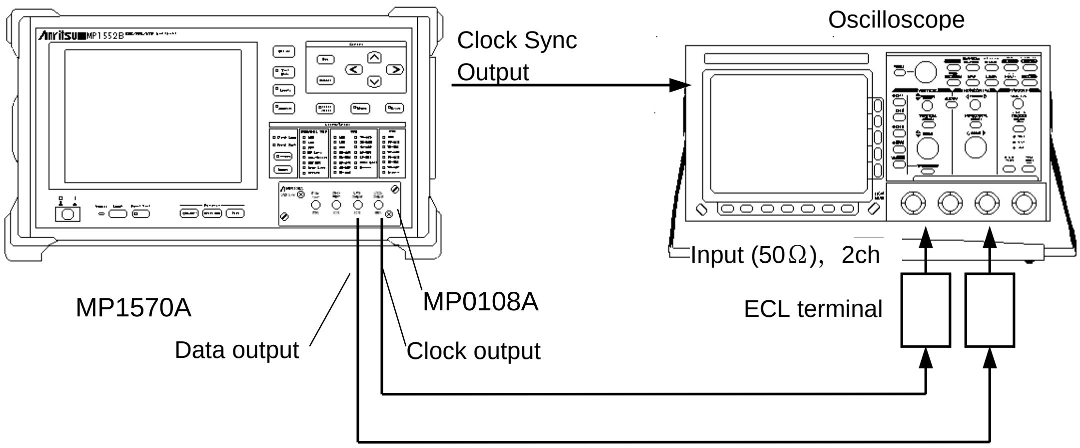
Here is the procedure for checking the output waveform of the MP0108A NRZ unit.

9.7.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0108A NRZ unit on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.7.2 Testing Procedure

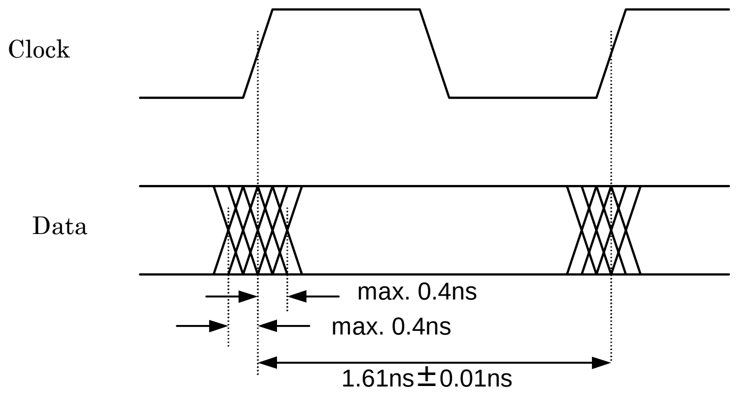
Here is the procedure for testing the output waveform.

(3) Open the 'Setup : Mapping' screen.

(4) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(5) The items selection window opens. Move the cursor with ∧ ∨ to '622M' and press Set.

(6) Verify that the waveform displayed on the oscilloscope meets the timing requirements as shown below.


Clock
Data
max. 0.4ns
max. 0.4ns
1.61ns±0.01ns

9.8 MP0111A Optical 156/622M (1.31) Unit Output Waveform

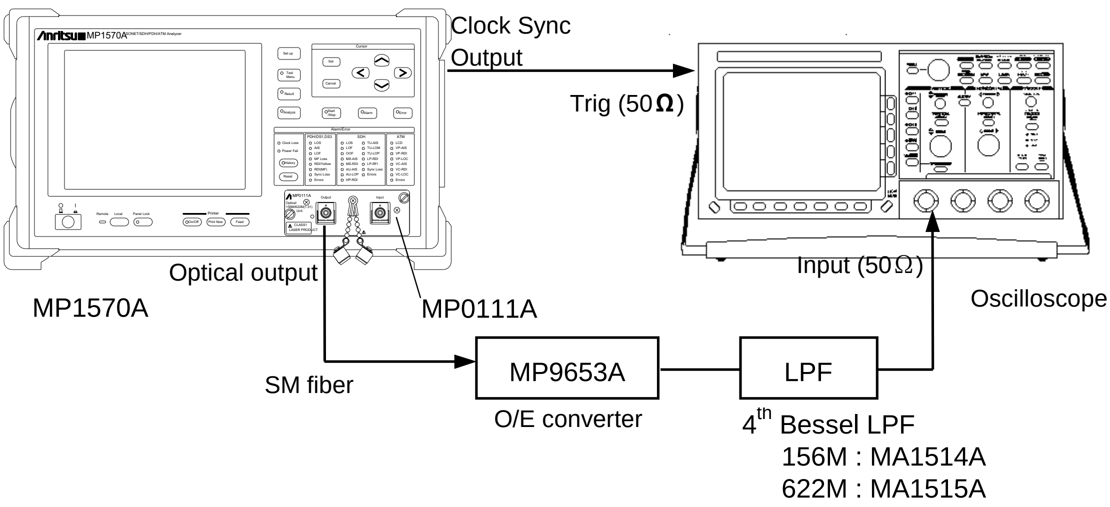
Here is the procedure for checking the output waveform of the MP0111A Optical 156/622M (1.31) unit.

9.8.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0111A Optical 156/622M unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.8.2 Testing Procedure

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

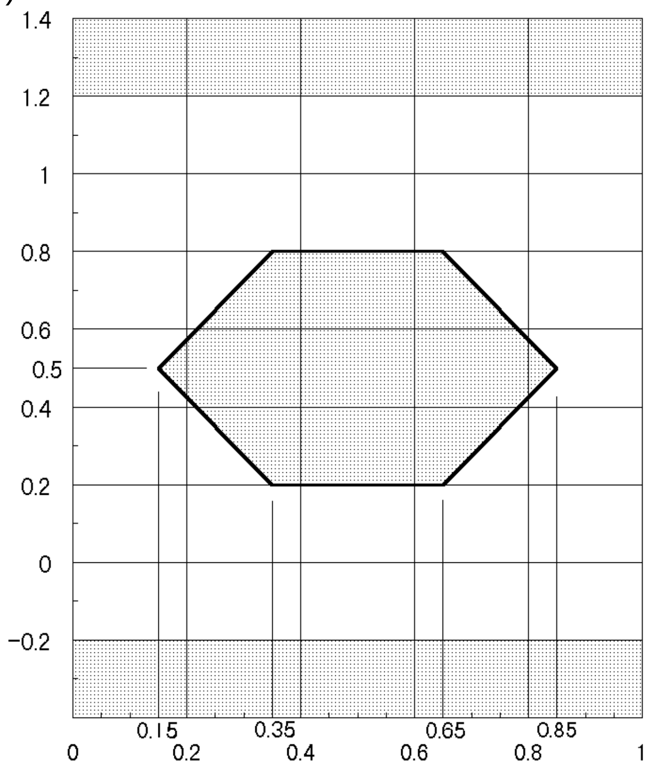
(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

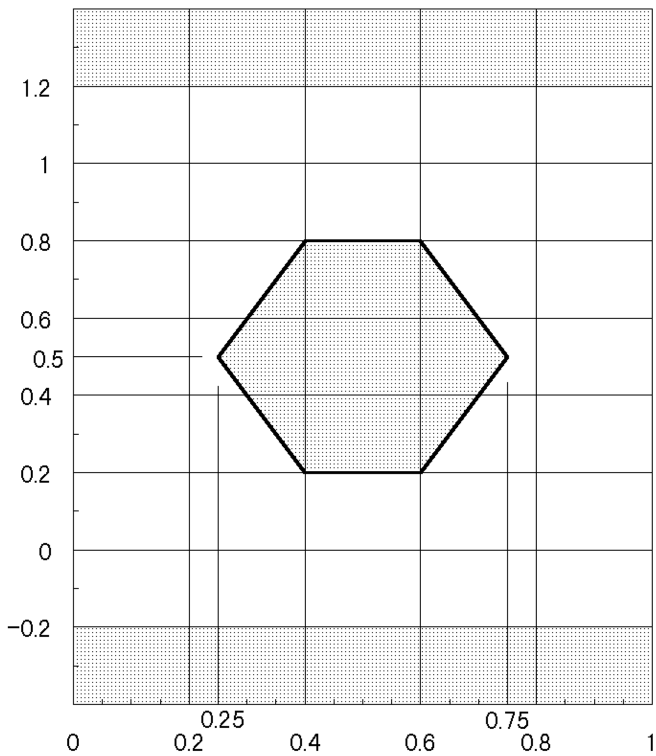
(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given on the next page.

(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the pulse mask.

9.8.3 Pulse Mask (156/622M)



156M Pulse mask



622M Pulse mask

9.9 MP0112A Optical 156/622M (1.55) Unit Output Waveform

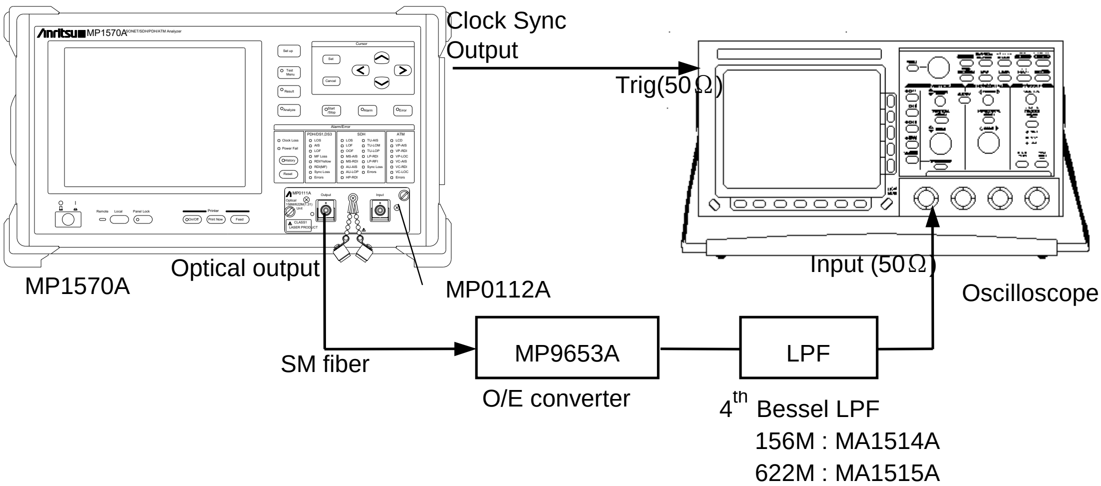
Here is the procedure for checking the output waveform of the MP0112A Optical 156/622M (1.55) unit.

9.9.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0112A Optical 156/622M unit on MP1570A

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.9.2 Testing Procedure

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

9.10 MP0113A Optical 156/622M (1.31/1.55) Unit Output Waveform

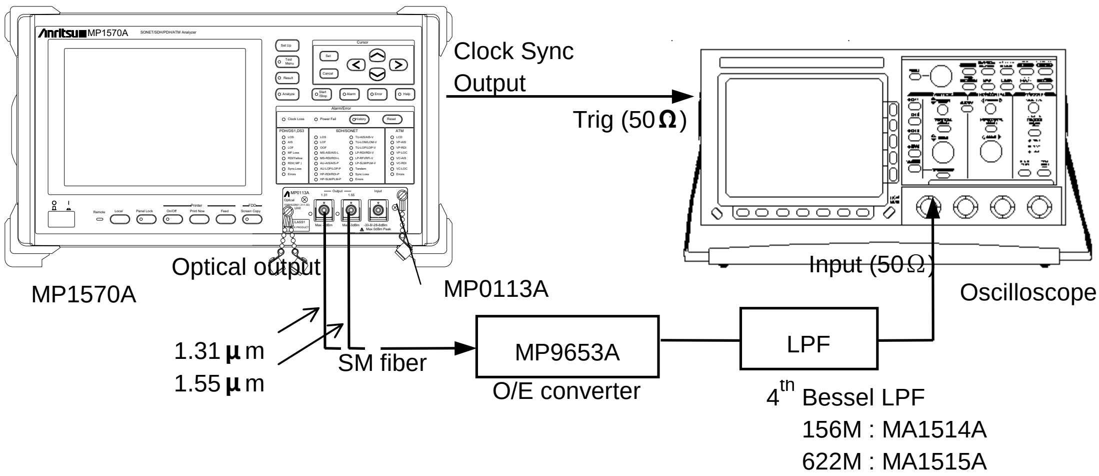
Here is the procedure for checking the MP0113A Optical 156/622M (1.31/1.55) unit output waveform.

9.10.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0113A Optical 156/622M unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



Turn on the power switch of MP1570A after connecting as shown in (3).

9.10.2 Testing Procedure

Here is the procedure for testing the output waveform.

(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

Appendix A Specifications

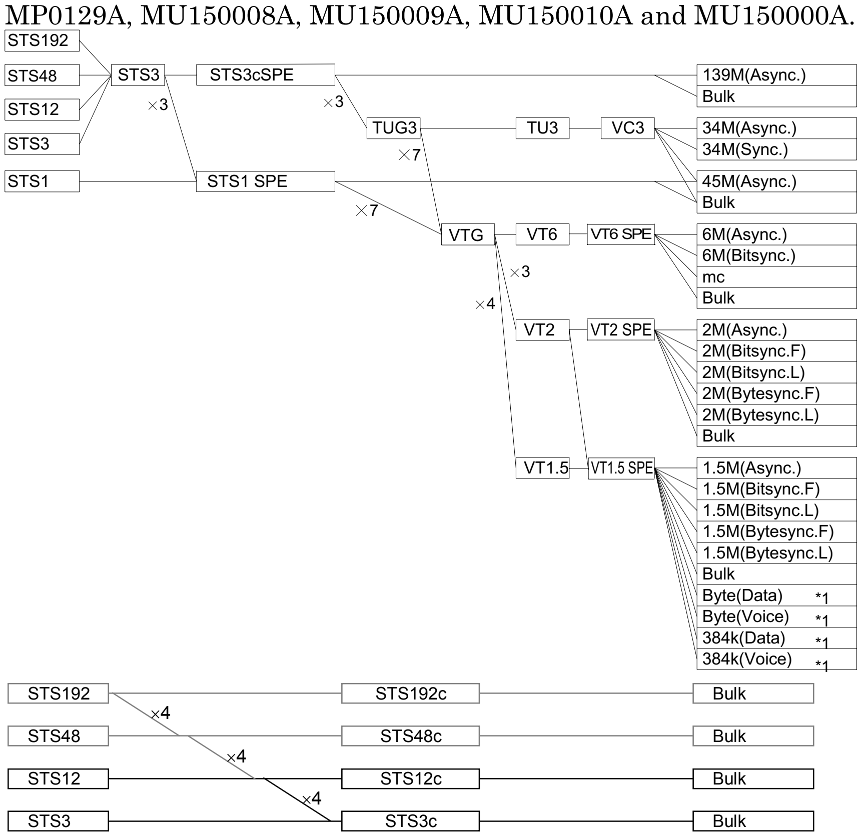
A.1 Specifications of the MP1570A

	Item	Specifications
1	Electrical performance	
1.1	External interface	SONET output Interface : 1.31um : -11.5dBm±3.5dB (MP0111A,MP0113A,MP0122B) 1.55um : -5dBm±2dB(MP0112A,MP0113A) B3ZS : ANSI T1.102(MP0122A/B) CMI : ITU-T G.703 Table11 Fig.24,25 (MP0105A,MP0121A) NRZ : ECL(MP0108A) Connector : FC-PC(SM) (MP0111A,MP0112A,MP0113A,MP0122B) BNC75Ω(MP0105A,MP0121A,MP0122A/B) SMA50Ω(-2V) (MP0108A) Extinction ratio : 10dB or more (MP0111A,MP0112A,MP0113A,MP0122B) SONET input 1.31um : -33dBm to -8dBm(52M,156M) -28dBm to -8dBm(622M) (+10℃ to +40℃) (MP0111A,MP0113A,MP0122B) 1.55um : -33dBm to -8dBm(156M) -28dBm to -8dBm(622M) (+10℃ to +40℃) (MP0112A,MP0113A) B3ZS : 0.91Vop -6dB to +6dB+0 to 900 feet 728 cable Monitor mode : 0.091Vop -6dB to +6dB + 0 to 900 feet728 cable (MP0122A/B) CMI : 1Vpp±0.1V+cable loss 0 to 12dB MP0105A,MP0121A) NRZ : ECL(MP0108A) Connector: FC-PC(SM) (MP0111A,MP0112A,MP0113A,MP0122B) BNC75Ω(MP0105A,MP0121A,MP0122A/B) SMA50Ω(-2V) (MP0108A) Optical input power measurement: Range : -30 to 0dBm(Peak) Accuracy : less than ±1dB(at -20dBm) Linearity : less than ±1dB(-30dBm to 0dBm) (MP0111A,MP0112A,MP0113A,MP0122B) Monitor input: Bitrate : 51.84Mbit/s Level : 0.1Vpp to 1.0Vpp(AC) Connector : SMA 50Ω (MP0122B)

	Item	Specifications
1.1.1	External clock input	
	Frequency	2.048MHz,8.448MHz,34.368MHz,139.264MHz± 100ppm 1.544MHz,44.736MHz ±100ppm 155.52MHz,622.08MHz ±100ppm
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.2	DCS input	2M,1.5M,64k
	Frequency	(2M) 2.048MHz ±50ppm, 2.048Mbit/s ±50ppm (1.5M)1.544MHz ±50ppm, 1.544Mbit/s ±50ppm (64k) 64kHz+8kHz ±50ppm
	Interface	(2M) ITU-T G.703 Table10,HDB3(2M) (1.5M)B8ZS,AMI(1.5M) ANSI T1.403
	Level	(64k) 0.63Vo-p to 1.1Vo-p
	Code	(64k) AMI with 8k violation
	Connector	BNC75Ω SIEMENS 120ΩBalanced BANTAM 100ΩBalanced
1.1.3	Trigger output	SONET : B1,B2,B3,BIP-2,REI-L,REI-P,REI-V,Frame(Tx,Rx),19MHz(Tx,Rx), bit LOF,AIS-L,RDI-L,AIS-P,LOP-P, PLM-P,RDI-P,UNEQ-P,AIS-V,LOP-V,LOM-V,PLM-V,RDI-V, UNEQ-V,RFI-V DSn : Frame(Tx)
	Frequency(Frame)	SONET,8M,34M,139M,1.5M,45M 1 frame cycle 2M 1 multi-frame cycle
	Level	TTL(active High)
	Connector	BNC75Ω

	Item	Specifications
1.1.4	DCC input	1Byte OH,K1-K2,D1 to D3,D4 to D12
	Clock output	64KHz ,128kHz, 192kHz ,576kHz
	Level	V.11
	Connector	Multi-pin connector (D-sub 15pin)
1.1.5	DCC output	1Byte OH,H1-H2,K1-K2,D1 to D3,D4 to D12
	Clock output	64KHz ,128kHz, 192kHz ,576kHz
	Level	V.11
	Connector	Multi-pin connector (D-sub 15pin)
1.1.6	Clock sync.output	PDH,DSn,52M,156M,622M
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.7	Receive clk output	PDH,DSn,52M,156M,622M
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.8	Trigger input	for Logging, APS test
	Level	TTL (active High)
	Connector	BNC75Ω
1.1.9	Order wire	E1,E2
	Connector	RJ11
1.2	Measurement Mode	Manual Single 1 to 99s, 1 to 99min, 1 to 99h, 1 to 99day Repeat 1 to 99s, 1 to 99min, 1 to 99h, 1 to 99day
	Display	Current, Last
	Program start	Measurement start time can be set.
1.3	Power fail detection	Measures Power fail during Error/Alarm measurement.
	Measurement range	0 to 999999,1.0E06 to 9.9E15,>9.9E15(s)
1.4	LED	Clock Loss, Power fail, (SDH/SONET) :LOS, LOF, OOF, MS-AIS/AIS-L, HP-RDI/RDI-L, AU-AIS/AIS-P, AU-LOP/LOP-P, HP-RDI/RDI-P, PLM-P, TU-AIS/AIS-V, TU-LOM/LOM-V, TU-LOP/LOP-V, LP-RDI/RDI-V, LP-RFI/RFI-V, PLM-V, Tandem, Sync. loss, Errors (DSn) LOS, AIS, LOF, MF loss, RDI/Yellow, RDI(MF), Sync. Loss, Errors (ATM) LCD, VP-AIS, VP-RDI, VP-LOC, VC-AIS, VC-RDI, VC-LOC, Errors
	History display	Displays the history for LEDs except Clock Loss.

	Item	Specifications
1.5	SONET function	For details of 2.5G and 10G, see the specifications for MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A and MU150000A.
1.5.1	mapping	



	Item	Specifications
		- 2M, 34M, 139M: when MP0121A is installed - 1.5M, 45M: when MP0122A or MP0122B is installed - STS-1: when MP0122A or MP0122B is installed - STS192, STS-192c: when MU150000A is installed - STS48: when MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A or MU150000A is installed - STS-48c: when MU150008A, MU150009A, MU150010A or MU150000A is installed - *1 : Effective when Option09 is installed.
1.5.2	Frame format	Framed/Unframed
1.5.3	Clock	Internal, External(except STS-1), Receive, Lock
	Internal clock Accuracy	±3.5ppm
	Clock loss LED	Illuminated when 'External clock loss', 'DCS clock loss' and 'Unlock' occur.
1.5.4	Through mode	only on Tx & Rx mode
	Bitrate	52M, 156M, 622M, 2488.320M, 9953.28Mbit/s
	Mode	Transparent through, OH overwrite, TOH 1 byte overwrite, POH 1 byte overwrite and Payload overwrite

	Item	Specifications
1.5.5	Insert/Extract	In this mode, errors and alarms can be added to only the following:
	Bitrate	10G: STS3
		2.5G: STS3
	Error	FAS, Bit all, Bit info, B1, B2
	Alarm	LOS, LOF, AIS-L, RDI-L
1.5.6	Test pattern	PRBS : 2^{11}-1,2^{15}-1,2^{20}-1,2^{23}-1,2^{20}-1(Zero suppress),2^{31}-1(only 192c,48c mapping), Invert ON/OFF Word: 16bit. Program,all0, all1, Add/Drop : At the time of Async of 1.5M, 2M, 34M, 45M and 139M. (when MP0131A is installed)
1.5.7	Error addition	FAS, Bit all, Bit info, B1, B2, B3, HP IEC, BIP-2, REI-L, REI-P, REI-V, Z6 BIP-2, TC-REI, OEI
	Timing	Single Single burst: 1 to 64000 bits Rate: $1*10^{-3}$, $1*10^{-4}$, $1*10^{-5}$, $1*10^{-6}$, $1*10^{-7}$, $1*10^{-8}$, $1*10^{-9}$ Rate User program: $A*10^{-B}$(A=1.0 to 9.9 step 0.1 B=2 to 10) Alternative: error=0 to 8000, normal=1 to 8000(frame)
1.5.8	Alarm addition	LOS, LOF, AIS-L, RDI-L, AIS-P, LOP-P, PLM-P, TIM-P, RDI-P, UNEQ-P, AIS-V, LOP-V, LOM-V, PLM-V, TIM-V, RDI-V, UNEQ-V, RFI-V, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI, LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Timing	Single Single burst: 1 to 64000 frame Alternative: alarm=0 to 8000, normal=1 to 8000(frame) All

<table>
<tr><th></th><th>Item</th><th>Specifications</th></tr>
<tr><td>1.5.9</td><td>OH preset data</td><td></td></tr>
<tr><td>(1)</td><td>TOH/POH</td><td>TOH All Bytes except B1, B2, H1, H2 and H3
STS1/STS3 POH All Bytes except B3
VT POH All bytes except BIP-2</td></tr>
<tr><td>(2)</td><td>Dummy channel POH</td><td>STS1/STS3 POH All Bytes except B3
VT POH All bytes except BIP-2</td></tr>
<tr><td>(3)</td><td>K1,K2 setting</td><td>Set in plain language or in bit unit.</td></tr>
<tr><td>(4)</td><td>Pointer setting</td><td>STS pointer/VT pointer
NDF 0000 to 1111
SS 00 to 11
Pointer value 0 to 1023
Adds +Justification/-Justification</td></tr>
<tr><td>(5)</td><td>Dummy channel pointer</td><td>STS pointer fixed at 522 SS: 00 to 11
VT pointer fixed at 0 SS: 00 to 11</td></tr>
<tr><td>(6)</td><td>Path trace
Stting</td><td>J0, J1, J2(with or without CRC7)
ASCII data</td></tr>
<tr><td>(7)</td><td>Dummy Path trace
Stting</td><td>J1, J2(with or without CRC7)
ASCII data</td></tr>
<tr><td>(8)</td><td>Tandem connection
High order Z5(Type1)</td><td>Selects ON/OFF for Z5 and Z6. Selects type1 or type2 when Z5 is ON.
<table><tr><td>b1</td><td>b2</td><td>b3</td><td>b4</td><td>b5</td><td>b6</td><td>b7</td><td>b8</td></tr><tr><td colspan="4">IEC</td><td colspan="4">Data link</td></tr></table>8 bits can be set. (In the case of measurement channel #1, LAPD is inserted into the lower 4 bits.)</td></tr>
</table>

	Item	Specifications
		LAPD message structure

	1	2	3	4	5	6	7	8	Note
1	FLAG								01111110
2	SAPI						CR	EA	SAPI=15,OR=0(DTE/1(Carrier),EA=0
3	TEI							EA	TEA=0,EA=1
4	CONTROL								00000011
5	76 OCTET INFORMATION FIELD								ECI 10 Octet
									LCI 11 Octet
									FIC 10 Octet
									UNT 6 Octet
80									FIC 38 Octet
81									
82	FCS								CRC16

High order Z5(Type2)
Low order Z5

b1	b2	b3	b4	b5	b6	b7	b8
IEC				TC-REI	OEI	TC-APID,TC-RDI,ODI	

IEC,TC-REI,OEI: Can be set.
TC-APId: 76frames can be set.

Low order Z6

b1	b2	b3	b4	b5	b6	b7	b8
BIP-2		"1"	IncomingAIS	TC-REI	OEI	TC-APID,TC-RDI,ODI	

BIP2 : Same data as that for BIP2 of V5.
b3-6 : Can be set.
TC-APId : 76 frames can be set.

APId

Frame#	Bit7	Bit8
1-8	Frame Aligment Signal : 1111111111111110	
9-12	TC-APId byte#1 : $1C_1C_2C_3C_4C_5C_6C_7$	
13-16	TC-APId byte#2 : 0XXXXXXX	
17-20	TC-APId byte#3 : 0XXXXXXX	
	:	
65-68	TC-APId byte#15 : 0XXXXXXX	
69-72	TC-APId byte#16 : 0XXXXXXX	
73	Reserved(=0)	TC-RDI
74	ODI	Reserved(=0)
75	Reserved(=0)	Reserved(=0)
76	Reserved(=0)	Reserved(=0)

	Item	Specifications
(9)	Dummy channel Tandem Connection	
	High order Z5(Type1)	8bitCan be set.
	High order Z5(Type2)	IEC,TC-REI,OEI: Can be set.
	Low order Z5	ditto
	Low order Z6	The same data as that for BIP2 of V5. b3-8: Can be set.

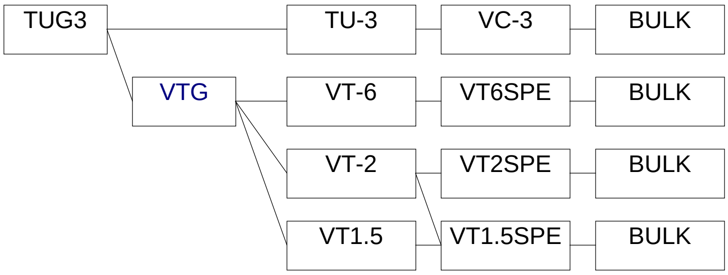
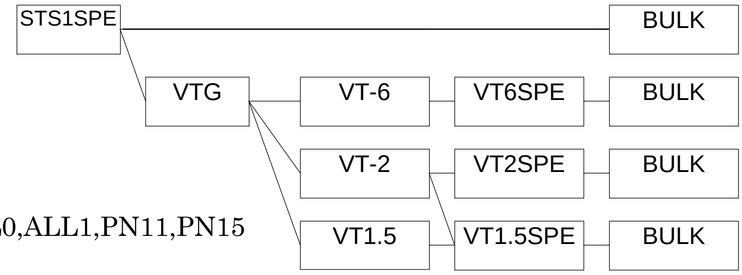
<table>
<tr><th></th><th>Item</th><th>Specifications</th></tr>
<tr><td>(10)</td><td>Japan mapping
Signaling(ST)
(Option09)

8-multiframe Setting

8-multiframe Alarm</td><td>Can be set for 384k data/voice, Byte data/voice
W byte
<table>
<tr><td>b1</td><td>b2</td><td>ST1</td><td>ST2</td><td>ST3</td><td>ST4</td><td>1</td><td>1</td></tr>
</table>
<table>
<tr><td>ST1</td><td>F</td><td>TS1</td><td>TS5</td><td>TS9</td><td>TS13</td><td>TS17</td><td>TS21</td><td>SP</td></tr>
<tr><td>ST2</td><td>F</td><td>TS2</td><td>TS6</td><td>TS10</td><td>TS14</td><td>TS18</td><td>TS22</td><td>D2</td></tr>
<tr><td>ST3</td><td>F</td><td>TS3</td><td>TS7</td><td>TS11</td><td>TS15</td><td>TS19</td><td>TS23</td><td>D3</td></tr>
<tr><td>ST4</td><td>F</td><td>TS4</td><td>TS8</td><td>TS12</td><td>TS16</td><td>TS20</td><td>TS24</td><td>D4</td></tr>
</table>
F(ST frame): 1 and 0 are repeated.
TS1-TS24 (signaling bit): user program
SP (BAIS): normal=1, BAIS=0 user program (initial value=1)
D2-D4 (switching signal) : user program (initial value All=0)

HG AIS,HG REC,1.5MBAIS</td></tr>
</table>

	Item	Specifications				
	64-multiframe Setting	1	Fs	(Fs)	(Fs)	(Fs)
		2	AIS(ch1)	AIS(ch7)	AIS(ch13)	AIS(ch19)
		3	AIS(ch2)	AIS(ch8)	AIS(ch14)	AIS(ch20)
		4	AIS(ch3)	AIS(ch9)	AIS(ch15)	AIS(ch21)
		5	AIS(ch4)	AIS(ch10)	AIS(ch16)	AIS(ch22)
		6	AIS(ch5)	AIS(ch11)	AIS(ch17)	AIS(ch23)
		7	AIS(ch6)	AIS(ch12)	AIS(ch18)	AIS(ch24)
		8	1.5MBAIS	Kx	Ky	Kz
		9	Fs	(Fs)	(Fs)	(Fs)
		10-15	BAIS(ch1-24)			
		16	LOOP-OCU	LOOP-1.5M	....	....
		17	Fs	(Fs)	(Fs)	(Fs)
		18-23	PTY(ch1-24)			
		24	....	....	....	....
		25	Fs	(Fs)	(Fs)	(Fs)
		26-31	BEER(ch1-24)			
		32	....	....	....	....
		33	Fs	(Fs)	(Fs)	(Fs)
		34	LOOP2(B1)	LP		
		35	LOOP2(B3)	LP		
		36	LOOP2(D)	LP		
		37-39	LP			
		40	....	....	....	....
		41	Fs	(Fs)	(Fs)	(Fs)
		42-47	TRACE(ch1-24)			
		48	....	....	....	....
		49	Fs	(Fs)	(Fs)	(Fs)
		50-55	Spare (s)			
		56	....	....	....	....
		57	Fs	(Fs)	(Fs)	(Fs)
		58-63	Spare (UNR)			
		64	....	....	....	....
		Fs: 11010110 11000001 10011010 10011100 11110110 10000101 Other: user program				
	64-multiframe Alarm	AIS,BAIS,1.5M BAIS				

	Item	Specifications
1.5.10	Mixed payload	Can be set for 2 dummy values of TUG3 of STS-3 in the measured channel.
	mapping STS3cSPE	
	STS1SPE	
	Pattern	ALL0,ALL1,PN11,PN15
1.5.11	Dummy chennel	
	Mode	Copy/Dummy
	Pattern	All0,All1,PN11,PN15(PN is for Bulk only.) In Dummy mode 1) An STS-3 having measurement channels can obtain a mapping upto the same hierarchy as that of the measurement channels. 2) An STS-3 that has mixed time measurement channels can obtain a mapping upto the bulk. 3) An STS-3 that has no measurement channels can obtain a mapping upto bulk in the same hierarchy as that of the measurement channels.
1.5.12	Payload offset	±100ppm/0.1ppm step
	Mode	C-bit Control

	Item	Specifications
1.5.13	Measurement *In-service	
(1)	Error	B1, B2, B3, HP IEC, BIP-2, REI-L, REI-P, REI-V, Z6 BIP-2, TC-REI, OEI
	Measurement range	Error count : 0 to 999999, 1.0E06 to 9.9E15,>9.9E15 Error ratio : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15
(2)	Alarm	LOS,LOF,OOF,AIS-L,RDI-L,AIS-P,LOP-P,PLM-P,TIM-P,RDI-P, UNEQ-P, AIS-V, LOP-V, LOM-V, PLM-V, TIM-V, RDI-V, UNEQ-V, RFI-V, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI , LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Measurement range	Alarm :0-999 μs,1-999ms, 1-999999s, 1.0E06 to 9.9E15, 9.9E15 (μs ... measured at every 125 μs) Alarm count(frame): 0 to 999999, 1.0E06 to 9.9E15,>9.9E15
(3)	Performance	(Add performance parameters) G.821/M2100: Same as MP0121A,MP0122A /B specifications. ES, SES, ESR, SESR, BBER, US, BBE, SDP: 0 to 999999, 1.0E06 to 9.9E15, 9.9E15 M2101,M2110,M2120
	*Out-of-service	
(4)	Error	B1, B2, B3, HP IEC, BIP-2, REI-L, REI-P, REI-V, Z6 BIP-2, TC-REI, OEI, Bit
	Measurement range	Error count : 0 to 999999, 1.0E06 to 9.9E15,>9.9E15 Error ratio : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15
(5)	Alarm	PLM-P, TIM-P, RDI-P, UNEQ-P, AIS-V, LOP-V, LOM-V, PLM-V, TIM-V, RDI-V, UNEQ-V, RFI-V, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI , LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Measurement range	Alarm :0-999 μs,1-999ms, 1-999999s, 1.0E06 to 9.9E15, 9.9E15 (μs は 125 μ step) Alarm count(frame): 0 to 999999, 1.0E06 to 9.9E15,>9.9E15
(6)	Performance	Out-of-service M2101/M2110/M2120 (Add performance parameters) G.821/M2100: Same as MP0121A,MP0122A /B specifications G826 : Same as In-service G826

	Item	Specifications		
(7)	ON/OFF conditions	Measurement ON/OFF		
		LOS	Detection :	No optical input
			Removal :	Proper optical input
		OOF	Detection :	5 frames (4 frames: for 2.5G of MP0127/28/29, MU150008A/09A/10A)
			Removal :	2 frames
		LOF	Detection :	1-5ms/step0.1ms (3ms)
			Removal :	1-5ms/step0.1ms (3ms)
		AIS-L	Detection :	b678=111 of K2 in 1-15 frames (5 frames)
			Removal :	Excluding b678=111 of K2 in 1-15 frames (5 frames)
		RDI-L	Detection :	b678=110 of K2 in 1-15 frames (5 frames)
			Removal :	Excluding b678=110 of K2 in 1-15 frames (5 frames)
		AIS-P	Detection :	H1, H2 all 1 in 1-15 frames (3 frames)
			Removal :	Normal H1, H2 in 1-15 frames (3 frames)
		LOP-P	Detection :	Abnormal H1, H2 in 1-15 frames (3 frames)
			Removal :	Common in AIS-P
		UNEQ-P	Detection :	Excluding 00(h) of C2 in 1-15 frames (1 frame)
			Removal :	Conflict with C2 set in receive in 1-15 frames (5 frames)
		PLM-P	Detection :	No conflict with C2 set in receive in 1-15 frames (5 frames)
			Removal :	No conflict with C2 set in receive in 1-15 frames (5 frames)
		RDI-P	Detection :	b5=1 of G1 in 1-15 frames (10 frames)
			Removal :	b5=0 of G1 in 1-15 frames (10 frames)
		AIS-V	Detection :	H1, H2/V1, V2 all 1 in 1-15 frames (3frames)
			Removal :	Normal H1, H2/V1, V2 in 1-15 frames (3 frames)
		LOM-V	Detection :	Abnormal H4 in 1-15 frames (5frames)
			Removal :	Normal H4 in 1-15 frames (1 frame)
		LOP-V	Detection :	Abnormal H1, H2/V1, V2 in 1-15 frames (8 frames)
			Removal :	Normal H1, H2/V1, V2 in 1-15 frames (3 frames)
		UNEQ-V	Detection :	00(h) of C2 or b5-b7000 of V5 in 1-15 frames (1 frame)
			Removal :	Excluding above in 1-15 frames (1frame)
		RDI-V	Detection :	b5=1 of V5 in 1-15 frames (10 frames)
			Removal :	b5=1 of V5 in 1-15 frames (10 frames)

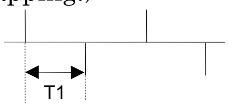
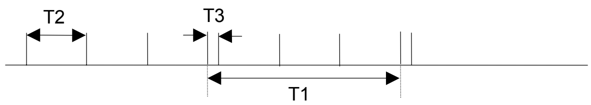
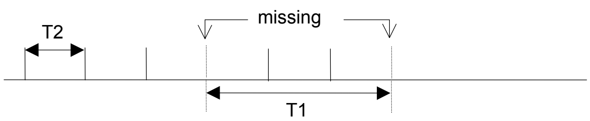
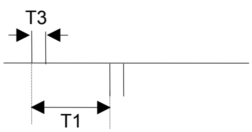
	Item	Specifications		
		PLM-V	Detection :	No conflict with C2 set in receive in 1-15 frames (5 frames)
			Removal :	Conflict with C2 set in receive in 1-15 frames (5 frames)
		RFI-V	Detection :	b4=1 of V5 detected in 1-15 frames (1 frame)
			Removal :	b4=0 of V5 detected in 1-15 frames (1 frame)
		VC-AIS	Detection :	FF(h) of C2 or b5-b7"111" of V5 in 1-15 frames (1 frame)
			Removal :	Excluding those above in 1-15 frames (1 frame)
		ISF	Detection :	IEC="1111" of Z5 in 1-15 frames (1 frame)(type1)
			Removal :	Excluding those above in 1-15 frames (1 frame)
		FAS	Detection :	b7, b8="FFFE" of Z5 in 1-15 frames (1 frame)
			Removal :	Excluding those above in 1-15 frames (2 frames)
		HP-Incoming AIS	Detection :	IEC="1110" of Z5 in 1-15 frames (1 frame)(type2)
			Removal :	Excluding those above in 1-15 frames (2 frames)
		HP-TC-RDI	Detection :	TC-RD1=1 in 1-15 frames (5frames)(type2)
			Removal:	Excluding those above in 1-15 frames (5 frames)
		HP-ODI	Detection :	ODI=1 in 1-15 frames (5 frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-Incoming AIS	Detection :	b4"1" of Z6 in 1-15 frames (5 frames)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-TC-RDI	Detection :	TC-RDI=1 of Z5 or Z6 in 1-15 frames (5 frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-ODI	Detection :	ODI=1 in 1-15 frames (5frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)

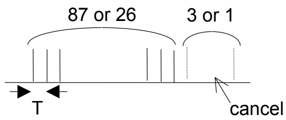
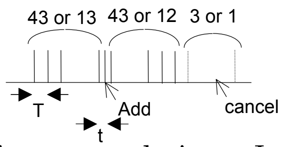
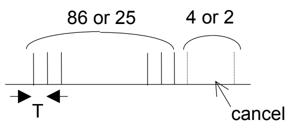
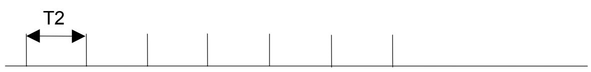
	Item	Specifications
(8)	Justification	STS-PTR, VT-PTR, C, C1/C2 NDF, +PJC, -PJC, Cons., C, C1/C2 Count : 0 to 999999, 1.0E06 to 9.9E15, 9.9E15 Rate : 1.0E-15 to 9.9E-01, 1.0E-00<1.0E-15 ppm : -1000ppm to +1000ppm/step0.1ppm <overflow (ppm except for NDF & Cons.)
(9)	K1,K2 monitor	Monitored in plain language or in units of bit.
(10)	Pointer monitor	STS-PTR, VT-PTR
	Graph	Pointer value, Pointer Inc/Dec Resolution:1s,1,15,60min
(11)	OH monitor	TOH 9*9byte, Specified payload, STS3 POH, STS1 POH,VT POH
(12)	Path trace	J0, J1, J2 (with or without CRC7)
	Display	ASCII data Judgement whether CRC7 error exists Displays 'TIM' if conflict with send data is detected.
	Data updating	3 seconds
(13)	Tandem monitor	
	Display	For Z5(type1) : Displays 82 bytes of LAPD message structure. Displays in ASCII for TCT/ISId/TSId. Judges the presence of CRC16 error. For Z5(type2), Z6 : Displays b7, b8 in 76 frames. Judges the presence of CRC7 error.
	Data updating	3 seconds
(14)	Signaling	
	monitor	Displays the signalling of selected single 8-multi or 64-multi channel.
	Alarm	8-multi:HG AIS,HG REC,1.5M BAIS 64-multi: AIS,BAIS,1.5M BAIS

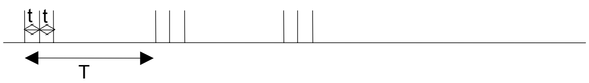
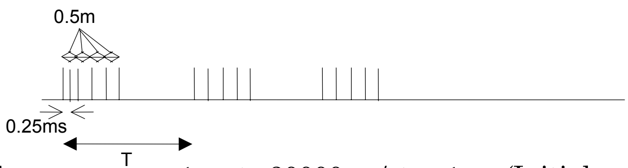
	Item	Specifications
1.5.14	Simultaneous measurement	Measures the error and alarm of VT6(7ch), VT2(21ch), VT1.5(28ch) of TUG3 or VC-3 simultaneously.
	Error	BIP-2,REI-V
	Alarm	AIS-V,LOP-V,LOM-V,RDI-V,RFI-V
	Measurement	Error/alarm second:0-9999s<overflow
	Display	Displays the error and alarm
	History	Can be set.
1.5.15	Trouble search	
	Measurement time	250ms/route
	Wait time	0.5, 1, 2, 5 seconds
	Display	Displays the data for all channels on TUG-3 or STS1SPE level.
1.5.16	APS test	
(1)	Switch time	
	Trigger	B1,B2,B3,BIP-2,REI-L,REI-P,REI-V,AIS-L,AIS-P,LOP-P, RDI-P,AIS-V,LOM-V,LOP-V,RDI-V,RFI-V, Bit, External
	Measurement range	2s
	Resolution	1ms
(2)	sequence generation	
	Depth	2-64word repeat/8000frame('Repeat' can be set for each K1/K2.)
(3)	sequence capture	
	Depth	64word repeat/8000frame(Displays 'Repeat' for each K1/K2.)
	Trigger	Same as the Switch time
	Trigger point	1-64sequence
1.5.17	OH test	
(1)	OH change	TOH/POH 1byte,K1/K2,RTOH,MTOH,TOH,POH (Excluding B1, B2, B3, BIP-2)
	Timing	A-pattern :1-64frame,B-pattern :1-64frame Alternative A=1-8000, B-1-8000 times
(2)	PTR 64frame	STS-PTR, VT-PTR
	Timing	Single, repeat(2-64)
	Setting	PTR,NDF,+PJC,-PJC
(3)	OH BERT	TOH/POH 1byte,D1-D3,D4-D12 (Excluding B1, B2, B3, BIP-2)
	Pattern	2^{11}-1,2^{15}-1(INV)
(4)	OH add/drop	TOH/POH 1byte,D1-D3,D4-D12 (Excluding the add of B1, B2, B3, BIP-2)
(5)	OH capture	TOH/POH1byte,H1/H2,K1/K2
	Depth	1023byte
	Trigger	error/alarm, K1/K2 conflict/no conflict (16-bit mask possible), NDF, +PJC, -PJC, 3cons, Manual
	Trigger point	1-1023 can be set.
	Display	HEX for 1 byte, binary for H1/H2, K1/K2
1.5.18	CID pattern measurement	Consecutive-0 signal 0-100byte LOS,LOF,OOF,PN7 error

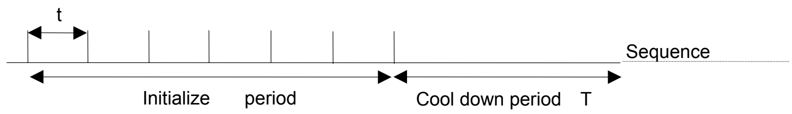
	Item	Specifications
1.5.19	Error performance check	Automatically generates the parameter detection pattern for error performance measurement.
15.20	Delay measurement	
	Measurement Period	0.5, 1, 2, 5, 10s
	Measurement range	0 to 999 μs, 1.0 to 999.9ms, 1.0 to 10.0s,>Timeout
	Accuracy	±5 μs when period=0.5/s, ±50 μs when 2/5/10s

	Item	Specifications
1.5.21	Frame memory	(Option13)
	Memory size	64frame
	Configuration	A frame(1 to 64)×(1 to 8000frame) B frame(0 to 64-A)×(1 to 8000frame)
	Payload pattern	All0 , all1, Playback (Transmits the captured data.)
	Parity	Automatically calculates B1 and B2. Concatenation B3 addition On/Off (but pointer fixed)
	Error addition	FAS, Bit all,B1,B2,B3,REI-L
1.5.22	Frame capture	(Option13)
	Memory size	64frame
	Trigger	error/alarm, K1/K2 conflict/no conflict (16-bit masking allowed), NDF, +PJC, -PJC, 3cons, Manual External
	Trigger point	1-64
	Display	HEX display

	Item	Specifications
1.5.23	Pointer sequence	STS-PTR/VT-PTR (Setting range depends on the corresponding mapping.)
(1)	Single of opposite polarity	 T1: STS PTR,VT PTR (TU3) 1ms to 60000ms/step 1ms(Initial setting30000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 60000ms/step 1ms(Initial setting30000ms)
(2)	Regular with double	 Adjustment polarity : +Just or -Just T1: STS PTR,VT PTR (TU3) 2m to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) VT PTR (VT6, VT2, VT1.5) 8ms to 60000ms/step T2ms (T1>T2)(Initial setting30000ms) T2: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1000ms) T3: STS PTR,VT PTR (TU3) 0.5ms VT PTR (VT6, VT2, VT1.5) 2ms
(3)	Regular with missing	 Adjustment polarity : +Just or -Just T1: STS PTR,VT PTR (TU3) 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) VT PTR (VT6, VT2, VT1.5) 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1000ms)
(4)	Double of opposite polarity	 T1: 4ms to 60000ms/step 1ms (Initial setting30000ms) T3: STS PTR,VT PTR (TU3) 0.5ms VT PTR (VT6, VT2, VT1.5) 2ms

	Item	Specifications
(5)	87-3/26-1 Normal	 87-3 for STS PTR and VT PTR (TU3) 26-1 for C11 and C12 Adjustment polarity : +Just or -Just T: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1200ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1200ms)
(6)	87-3/26-1 Add	 Adjustment polarity : +Just or -Just Interval : 1 in N (N=1 to 10) T: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1200ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step T2ms (Initial setting1200ms) t: STS PTR,VT PTR (TU3) 0.5ms VT PTR (VT6, VT2, VT1.5) 2ms
(7)	87-3/26-1 Cancel	 Adjustment polarity : +Just or -Just Interval : 1 in N (N=1 to 10) T: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1200ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1200ms)
(8)	Continuous pattern Normal	 Adjustment polarity : +Just or -Just T2: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1000ms)

	Item	Specifications
(9)	Continuous pattern Add	 Adjustment polarity : +Just or -Just T1: STS PTR,VT PTR (TU3) 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) VT PTR (VT6, VT2, VT1.5) 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1000ms) T3: STS PTR,VT PTR (TU3) 0.5ms VT PTR (VT6, VT2, VT1.5) 2ms
(10)	Continuous pattern Cancel	 Adjustment polarity : +Just or -Just T1: STS PTR,VT PTR (TU3) 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) VT PTR (VT6, VT2, VT1.5) 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: STS PTR,VT PTR (TU3) 1ms to 30000ms/step 1ms (Initial setting1000ms) VT PTR (VT6, VT2, VT1.5) 4ms to 30000ms/step 1ms (Initial setting1000ms)
(11)	Single pointer adjustment	 Adjustment polarity : +Just or -Just T: 1ms to 30000ms/step 1ms (Initial setting30000ms)
(12)	Maximum rate pointer burst	 Adjustment polarity : +Just or -Just T: 1ms to 30000ms/step 1ms (Initial setting30000ms) t: 0.5ms
(13)	Phase transient pointer burst	 T: 1ms to 30000ms/step 1ms (Initial setting30000ms)

	Item	Specifications
(14)	Initialize period	 Adjustment polarity : Same as the measurement sequence t: 1ms to 30000ms/step 1ms (Initial setting1000ms) T: 1s to 99s/step1s
(15)	Cool down period	T: 1s to 99s/step1s

	Item	Specifications
1.5.24	B2 measurement	Displays the measured results of B2 error for each channel (for each STS unit for STS192). channels for STS3, 12 channels for STS12, 48 channels for STS48 and 64 channels for STS192.
1.6	Graphics	Error/Alarm
	Bar resolution	1s/1/15/60min
	Max. memory size	(at the time of 'all error') 1s/bar...3min 1min/bar...3h 15min/bar...1.875day(45h) 60min/bar...7.5day(180h)
	Max. graph display	1s/bar...1.2h(72min) 1min/bar...3days 15min/bar...1.6days 60min/bar...99days
1.7	DSn function	According to the specifications of MP0121A, MP0122A and MP0122B
1.8	ATM function	According to the specifications of MP0123A

	Item	Specifications
2	Printer	Measurement results can be printed with both built-in and external printers. (when either Option 01 or 02 is installed)
3	Internal memory Set memory Graphic memory	 10 types, Initial Max. 15 types (Memory used is displayed in %.)
4	Others	FDD, Clock, Buzzer (3 types of sound) RS-232C (when Option 01 is installed) GP-1B (when Option 02 is installed) Ethernet (when Option 03 is installed) VGA output (when Option 04 is installed)
5	Environmental performance Power Operational temperature range allowed Storage temperature range allowed	 AC85 to 132V AC170 to 250V(Auto Switching for 100V and 200V series) 47.5Hz to 63Hz 0 to 40℃ (not applicable during FDD operation) -20 to 60℃
6	Mechanical performance Dimensions Weight	 177mm(H),320mm(W),350mm(D) (protrusion excluded) 10 kg or less (excluding the unit weight)

A.2 Specifications of the MP0121A

	Item	Specifications
1	Output	HDB3/CMI output
1.1	Bit rate	HDB3 ....2.048Mbit/s, 8.448Mbit/s, 34.368Mbit/s
		CMI 139.264Mbit/s, 155.520Mbit/s
1.2	Accuracy	2M, 8M, 34M, 139M .... ±7ppm
		156M ....According to MP1570A specifications
1.3	Interface	2.048Mbit/s ....ITU-T G.703 Table6 Fig15
		8.448Mbit/s ....ITU-T G.703 Table7 Fig16
		34.368Mbit/s ....ITU-T G.703 Table8 Fig17
		139.264Mbit/s ....ITU-T G.703 Table9 Fig19, Fig20
		155.520Mbit/s ....ITU-T G.703 Table11 Fig24, Fig25
1.4	Connector	BNC75Ω unbalanced type
		Siemens 3-pin 120Ω balanced type
1.5	Code	2.048Mbit/s ....HDB3 balanced/unbalanced
		8.448Mbit/s ....HDB3 unbalanced
		34.368Mbit/s ....HDB3 unbalanced
		139.264Mbit/s ....CMI unbalanced
		155.520Mbit/s ....CMI unbalanced
2	HDB3/CMI input	
2.1	Bit rate	2.048Mbit/s, 8.448Mbit/s, 34.368Mbit/s,
		139.264Mbit/s, 155.520Mbit/s .... ±100ppm
2.2	Interface	<balanced>
		2M ....$3V_{op}$±0.3V+cable loss 0 - 6dB
		when monitored:$0.3V_{op}$±0.03V+cable loss 0 - 6dB
		<unbalanced>
		2M, 8M ....$2.37V_{op}$±0.237V+cable loss0 to 6dB
		when monitored:$0.237V_{op}$±0.0237V+cable loss0 to 6dB
		34M ....$1V_{op}$±0.1V+cable loss0 to 12dB
		when monitored:$0.1V_{op}$±0.01V+cable loss0 to 12dB
		139M, 156M ....$1V_{pp}$±0.1V+cable loss0 to 12dB
		when monitored:$0.1V_{pp}$±0.01V+cable loss0 to 12dB
2.3	Connector	BNC75Ω unbalanced
		Siemens 3-pin120Ω balanced
2.4	Code	2.048Mbit/s ....HDB3 balanced/unbalanced
		8.448Mbit/s ....HDB3 unbalanced
		34.368Mbit/s ....HDB3 unbalanced
		139.264Mbit/s ....CMI unbalanced
		155.520Mbit/s ....CMI unbalanced
3	Error output	Outputs a 1RZ pulse per 1 bit error.
3.1	Level	TTL
3.2	Connector	BNC75Ω

	Item	Specifications
4	PDH measurement	
4.1	Send clock	Built-in, external, lock (when Jitter unit is installed) receive
4.2	Frame Format	Nonframe ... 2M, 8M, 34M, 139M Frame . ..... 2M (30ch or 31ch, with/without CRC4) : G.704 8M : G.742 34M, 139M : G.751
4.3	MUX/DEMUX (Option 06)	139M – 34M – 8M – 2M – 64k 139M – 34M – 8M – 2M 139M – 34M – 8M 139M – 34M 34M – 8M – 2M – 64k 34M – 8M – 2M 34M – 8M 8M – 2M – 64k 8M – 2M 2M – 64k
4.4	Test pattern	PRBS..........2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, Invert ON/OFF Word.....................16 bit program all 0, all 1
4.5	Error addition	Type Nonframe (139M, 34M, 8M, 2M) ....: Bit all, Code 139MFrame ....Bit139M, Code, FAS, Bit info 34MFrame ....Bit34M, Code, FAS, Bit info 8MFrame ....Bit8M, Code, FAS, Bit info 2MFrame ....Bit2M, Code, FAS, Bit info, E Bit (Can be added to tributary when MUX is ON.) Timing Except FAS ....single Rate ($1*10^{-3}$, $1*10^{-4}$, $1*10^{-5}$, $1*10^{-6}$, $1*10^{-7}$) FAS ....n frames in 16 frames (n=1-4), all

	Item	Specifications
4.6	Alarm addition	Type Nonframe (139M, 34M, 8M, 2M) ....LOS, AIS 139M, 34M, 8MFrame ....LOS, LOF, AIS, RDI 2MFrame .... LOS, LOF, AIS, RDI, RDI(MF) (Can be added to tributary when MUX is ON.) Timing .... all
4.7	Error measurement	 Nonframe (139M, 34M, 8M, 2M) ....Code, Bit* 139M, 34M, 8MFrame .... FAS, Code, Bit* 2MFrame .... FAS, Code, CRC4, EBit, Bit* (Tributary error can be detected when DEMUX is ON.) Display range .. Count: 0 to 999999, 1.0E06 to 9.9E15, >9.9E15 Rate: 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15 *Bit: only when the mode is out-of-service
4.8	Alarm measurement	 Nonframe (139M, 34M, 8M, 2M) ....Power fail, LOS, AIS, Sync. loss* 139M, 34M, 8Mframe .... Power fail, LOS, LOF, AIS, RDI, Sync. loss* 2Mframe .... Power fail, LOS, LOF, AIS, RDI, RDI(MF), MF loss, Sync. loss* (Tributary alarm can be detected when DEMUX is ON.) Display range ..... 0 to 999999, 1.0E06 to 9.9E15, >9.9E15s *Syne. Loss: Only when the mode is out-of-service

	Item	Specifications
4.9	Error analysis	Selects G.821, M.2100 or G.826
4.9.1	G.821	Item under evaluation FAS(in-service) Type ....EC, ES, EFS, SES, US, DM, Code ES %ES, %ES(ANNEX.D), %EFS, %SES, %US, %DM Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15 0.0000 to 100.0000%
4.9.2	M.2100	Type ....Tx ES E Bit, Rx ES FAS, Tx SES E Bit, Rx SES FAS, US Display range ......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
4.9.3	G.826	Item under evaluation CRC(when 2M CRC4 is on), FAS(when 2M CRC4 is off) Type ....ES, SES, BBE, SDP, US, ESR, SESR, BBER Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
5	Monitor	FAS 139M, FAS 34M, FAS 8M, FW 2M, NFW 2M, MFW 2M, Info byte
6	Trouble search	Automatically searches for errors and alarms on all routes for the specified mapping and displays the existence of trouble, type and route. Measurement time 250 ms/route Waiting time ....0.5, 1, 2, 5 seconds Display ....Displays 'NO Trouble' if no trouble exists. Displays trouble type and route if a trouble exists.
7	Delay	Measures the delay of the device under test Measurement cycle ..... 0.5, 1 second Measurement range ..... 0-1.00 second, time-out Display accuracy ..... within ±5 μs 0 to 999 μs, 1.0 to 999.9ms, 1.0s, time-out
8	Others	
8.1	Dimensions, Mass	21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg
8.2	Operating temperature	According to MP1570A specifications

A.3 Specifications of the MP0122A and MP0122B

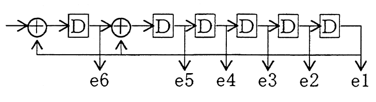
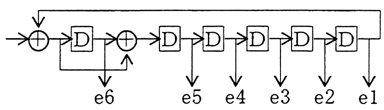
	Item	Specifications
1	Output	B3ZS, AMI/B8ZS Output Optical output (when MP0122B is installed)
1.1	Bit rate	AMI/B8ZS ....1.544Mbit/s B3ZS ....44.736Mbit/s, 51.84Mbit/s Optical ....51.84 Mbit/s (when MP0122B is installed)
1.2	Accuracy	1.5M, 45M ....±7ppm 52M ....according to MP1570A specifications
1.3	Interface	Electrical output ....according to ANSI T1.102 Optical according to MP1570A specifications
1.4	Connector	BNC75Ω unbalanced BANTAM 100Ω balanced FC-PC(SM) when MP0122B is installed
1.5	Code	1.544Mbit/s ....AMI/B8ZS balanced 44.736Mbit/s ....B3ZS unbalanced 51.84Mbit/s ....B3ZS unbalanced
2	Input	B3ZS, AMI/B8ZS Optical input (when MP0122B is installed)
2.1	Bit rate	AMI/B8ZS ....1.544Mbit/s B3ZS ....44.736Mbit/s, 51.84Mbit/s Optical ....51.84Mbit/s (when MP0122B is installed)
2.2	Interface	Balanced 1.5M .... 3Vop, -6dB to 2dB When monitored: $0.3V_{op} \pm 0.03V$ But after passing through 655FeetABAM cable Unbalanced 45M, 52M ...... $0.91V_{op}$, -6dB to 6dB+0 to 900Feet728 cable When monitored :0.091Vop, -6dB to 6dB +0 to 450Feet 728 cable Optical According to MP1570A Specifications
2.3	Connector	BNC75Ω unbalanced BANTAM 100Ω balanced FC-PC(SM) (when MP0122B is installed)
2.4	Code	1.544Mbit/s ....AMI/B8ZS balanced 44.736Mbit/s ....B3ZS unbalanced 51.84Mbit/s ....B3ZS unbalanced
3	Error output	1RZ pulse output per 1 bit error
3.1	Level	TTL
3.2	Connector	BNC75Ω
4	Monitor output	According to MP1570A specifications

	Item	Specifications
5	PDH measurement	
5.1	Send clock	Internal, external, lock, receive
5.2	Frame format	Nonframe .... 1.5M, 45M Frame .... 1.5M (D4, ESF, Japan ESF Note1) 45M (M13, C bit)
5.3	MUX/DEMUX (Option)	45M — 1.5M — 64k (Option07) 45M — 1.5M (Option07) 45M — 2M — 64k (Option08) 45M — 2M (Option08)
5.4	Test pattern	PRBS.....2^{11}-1,2^{15}-1,2^{20}-1,2^{20}-1 zero suppress,2^{23}-1, Invert ON/OFF Word.................... 16bit program all 0, all 1, 3in24
5.5	Error addition	Type 1.5M Nonframe .... Bit 1.5M, Code 1.5M DS1(D4) .... Bit 1.5M, Code, Bit info 1.5M DS1(ESF) .... Bit 1.5M, Code, Bit info, CRC6 1.5M Japan(ESF) .... Bit 1.5M, Code, Bit info, CRC6 45M Nonframe .... Bit 45M, Code, 45M DS3(M13) .... Bit 45M, Code, Bit info, FAS45M, Parity 45M DS3(CBi) .... Bit 45M, Code, Bit info, FAS45M, Parity, C Parity, REI 52M .... Code, Bit 52M Timing : Except FAS Single, Rate($1*10^{-n}$,n=3 to 9 The case of Parity, c Bit,CRC-6 and REI n=4 to 9),All However, CRC-6 single error of 1.5M Japan ESF frame cannot be added. FAS .... n frames in 16 frames (n=1-4), all
5.6	Alarm addition	Type 1.5M Nonframe .... LOS, AIS1.5M 1.5M DS1(D4) .... LOS, LOF1.5M, AIS1.5M 1.5M DS1(ESF) .... LOS, LOF1.5M, AIS1.5M, RDI1.5M 1.5M Japan(ESF) .... LOS, LOF1.5M, AIS1.5M, RDI1.5M 45M Nonframe .... LOS 45M DS3(M13, C Bit) ... LOS, LOF45M, AIS45M, RDI45M 52M .... LOS Timing : All

	Item	Specifications
5.7	Error measurement	 1.5M Nonframe ....Code, Bit* 1.5M DS1(D4) ....Code, FAS1.5M, Bit* 1.5M DS1(ESF) ....Code, FAS1.5M, CRC6, Bit* 1.5M Japan(ESF) ....Code, FAS1.5M, CRC6, Bit* 45M Nonframe ....Code, Bit* 45M DS3(M13) ....Code, FAS45M, Parity, Bit* 45M DS3(C Bit).........Code, FAS45M, Parity, C Bit, REI, Bit* Display range Count: 0 to 999999, 1.0E06 to 9.9E15, >9.9E15 Rate: 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15 *Bit: only when out-of-service
5.8	Alarm measurement	 1.5M Nonframe ....Power fail, LOS, AIS1.5M, Sync. loss* 1.5M DS1(D4) ....: Power fail, LOS, LOF1.5M, AIS1.5M, Sync. loss* 1.5M DS1(ESF).........Power fail, LOS, LOF1.5M, AIS1.5M, RDI1.5M, Sync. loss* 1.5M Japan(ESF) .....Power fail, LOS, LOF1.5M, AIS1.5M, RDI1.5M, Sync. loss* 45M Nonframe ....Power fail, LOS, Sync. loss* 45M DS3(M13, C Bit) ... Power fail, LOS, LOF45M, AIS45M, RDI45M, Sync. loss* Display range 0 to 999999, 1.0E06 to 9.9E15, >9.9E15 seconds *Sync. Loss: only when out-of-service

	Item	Specifications
5.9	Error analysis	Selects G.821, M.2100 or G.826
5.9.1	G.821	Type............EC, ES, EFS, SES, US, DM, Code ES %ES, %ES(ANNEX.D), %EFS, %SES, %US, %DM Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15 0.0000 to 100.0000%
5.9.2	M.2100	Type ....Tx ES E Bit, Rx ES FAS, Tx SES E Bit, Rx SES FAS, US Display range ......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
5.9.3	G.826	Item under evaluation : Bit (when out-of-service), FAS1.5M (when in-service, DS1(D4)) CRC6 (when in-service, DS1(ESF)), FAS45M (when in-service, DS3(M13, C Bit)) Type ....ES, SES, ESR, SESR, BBER, UR, BBE, SDP Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
6	Trouble search	Automatically searches for errors and alarms on all routes for the specified mapping and displays the existence of trouble, type and route. Measurement time 250 ms/route Waiting time ....0.5, 1, 2, 5 seconds Display ..... Displays 'NO Trouble' if no trouble exists. Displays trouble type and route if a trouble exists.
7	Delay	Measures the delay of the device under test Measurement cycle 0.5, 1 second Measurement range 0 to 1.00 second, time-out Display accuracy ..... within ±5 μs 0 to 999 μs, 1.0 to 999.9ms, 1.0s, time-out
8	Others	
8.1	Dimensions, Mass	MP0122A .....21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg MP0122B .....21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg
8.2	Operating temperature	According to MP1570A specifications

Note 1 1.5M Japan ESF frame differs from DS1 ESF frame in the following respects:

	Japan ESF	DS1 ESF
1.5RDI occurrence, detection pattern	1111 1111 1111 1111 repetition in DL bit	1111 1111 0000 0000 repetition in DL bit
CRC-6 operation		

⊕ .... XOR

D .... Shift register

Appendix B Options

The table below shows the optional items that are available for MP1570A. These items other than optical connectors must be installed at our plant.

Model or Order No.	Item	Remarks
MP1570A-01	RS-232C	Option 01
MP1570A-02	GPIB	Option 02
MP1570A-03	ETHERNET	Option 03
MP1570A-04	VGA Output	Option 04
MP1570A-06	MUX/DEMUX	Option 06 2/8/34/139M MUX/DEMUX
MP1570A-07	MUX–DEMUX	Option 07 1.5/45M MUX/DEMUX
MP1570A-08	DS3 (45M) -2M	Option 08
MP1570A-09	Japan Mapping	Option 09 VC11 Signalling
MP1570A-10	SDH	Option 10 - Either option10 or option11 is installed as the standard.
MP1570A-11	SONET	Option 11
MP1570A-13	Frame Memory/Capture	Option 13 156M/622M
MP1570A-14	IP-Over-SDH/SONET	Option 14 156M/622M/2.5G/10G Frame Memory option required.
MP1570A-15	IP-Over-ATM	Option 15 156M/622M MP0123A required.
MP1570A-22	K1/K2 Overwrite through	Option 22 52M/156M/622M/2.5G/10G

Model or Order No.	Item	Remarks
MP0124A-01	Wander	Option 01 2/8/34/139M 156/622M RMS measurement
MP0124A-02	RMS meas	Option 02 2/8/34/139M 156/622M Wander measurement
MP0125A-01	Wander	Option 01 1/5/45/52M 156/622M RMS measurement
MP0125A-02	Wander	Option 02 1/5/45/52M 156/622M Wander measurement
MP0126A-01	RMS meas	Option 01 2/8/34/139M 1.5/45/52M 156/622M RMS measurement
MP0126A-02	Wander	Option 02 2/8/34/139M 1.5/45/52M 156/622M wander measurement
MP0128A-01	1550 nm band LD module with built-in EA modulator	Option 01
MP0129A-01	1550 nm band LD module with built-in EA modulator	Option 01
MP0130A-01	RMS meas	Option 01 2448M RMS measurement

Model or Order No.	Item	Remarks
MP0111A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0111A
MP0111A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0111A
MP0111A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0111A
MP0111A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0111A
MP0112A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0112A
MP0112A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0112A
MP0112A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0112A
MP0112A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0112A
MP0113A-38	Replaceable ST optical connector	Option 38 3 pairs for MP0113A
MP0113A-39	Replaceable DIN optical connector	Option 39 3 pairs for MP0113A
MP0113A-40	Replaceable SC optical connector	Option 40 3 pairs for MP0113A
MP0113A-43	Replaceable HMS-10/A optical connector	Option 43 3 pairs for MP0113A
MP0122B-38	Replaceable ST optical connector	Option 38 2 pairs for MP0122B
MP0122B-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0122B
MP0122B-40	Replaceable SC optical connector	Option 40 2 pairs for MP0122B
MP0122B-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0122B

Model or Order No.	Item	Remarks
MP0127A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0127A
MP0127A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0127A
MP0127A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0127A
MP0127A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0127A
MU150008A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150008A
MU150008A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150008A
MU150008A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150008A
MU150008A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150008A
MP0128A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0128A
MP0128A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0128A
MP0128A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0128A
MP0128A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0128A
MU150009A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150009A
MU150009A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150009A
MU150009A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150009A
MU150009A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150009A

Model or Order No.	Item	Remarks
MP0129A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0129A
MP0129A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0129A
MP0129A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0129A
MP0129A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0129A
MU150010A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150010A
MU150010A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150010A
MU150010A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150010A
MU150010A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150010A
MU150000A-01	Frame Memory/Capture (2.5G/10G)	Option 01 for MU150000A
MU150001A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150001A
MU150001A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150001A
MU150001A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150001A
MU150001A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150001A
MU150002A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150002A
MU150002A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150002A
MU150002A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150002A
MU150002A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150002A

Model or Order No.	Item	Remarks
MU150017A-38	Replaceable ST optical connector	Option 38 1 pair for MU150017A
MU150017A-39	Replaceable DIN optical connector	Option 39 1 pair for MU150017A
MU150017A-40	Replaceable SC optical connector	Option 40 1 pair for MU150017A
MU150017A-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150017A
MU150017B-38	Replaceable ST optical connector	Option 38 1 pair for MU150017B
MU150017B-39	Replaceable DIN optical connector	Option 39 1 pair for MU150017B
MU150017B-40	Replaceable SC optical connector	Option 40 1 pair for MU150017B
MU150017B-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150017B

Appendix C　Accessories

The table below shows the accessories for MP1570A.

Model or Order No.	Item	Remarks
MX150001A	Application software for wander (MTIE, TDEV) measurement	for MP0124A, MP0125A, MP0126A-02
J0126B	Coaxial cable with BNC plug at both ends, 2 m	75Ω for MP1570A, MP0105A
J0776D	Coaxial cable, 2 m	50Ω, for MP1570A
J0162A	Balanced cable 3 pins at both ends (with F plug), 1 m	120Ω, for MP1570A
J0162B	Balanced cable pins at both ends (with F plug), 2 m	120Ω, for MP1570A
J0845A	Balanced cable, 3 pins at both ends BANTAM	100Ω, for MP1570A
J0796A	Replaceable ST optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796B	Replaceable DIN optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796C	Replaceable SC optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796D	Replaceable HMS-10/A optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796E	Replaceable FC optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0635A	Optical fiber cable, 1m	SM, FC-SPC connector at both ends
J0635B	Optical fiber cable, 2m	SM, FC-SPC connector at both ends
J0635C	Optical fiber cable, 3m	SM, FC-SPC connector at both ends
J0747B	Fixed attenuator (10dB)	
J0747C	Fixed attenuator (15dB)	
JO747D	Fixed attenuator (20dB)	

Model or Order No.	Item	Remarks
MZ8012A	Connector cleaning set	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0322B	Coaxial cable SMA connector at both ends, 1 m	50Ω for MP0108A
J0008	GPIB cable, 2 m	
B0336C	Carrying case	
B0322	Soft case	

Appendix D Initial Values

D.1 Initial Values of OH Preset Data

OH Preset Data are set to the following initial values.

(Open the 'Setup : OH Preset Data' screen, move the cursor to '□ Default' and press Set . The initial values are set.)

OH preset data are set to the initial values by moving the cursor to '□ Default' and pressing Set on the 'Setup : OH preset data' screen.

TOH ....Bit rate: 52M

1	2	3
A1 [F6]	A2 [28]	J0 [00]
B1 --	E1 [00]	F1 [00]
D1 [00]	D2 [00]	D3 [00]
H1 --	H2 --	H3 --
B2 --	K1 --	K2 --
D4 [00]	D5 [00]	D6 [00]
D7 [00]	D8 [00]	D9 [00]
D10 [00]	D11 [00]	D12 [00]
S1 [00]	M1 [00]	E2 [00]

TOH ....Bit rate: 156M

1	2	3	4	5	6	7	8	9
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	J0 [00]	X18 [AA]	X19 [AA]
B1 --	X22 [00]	X23 [00]	E1 [00]	X25 [00]	X26 [00]	F1 [00]	X28 [00]	X29 [00]
D1 [00]	X32 [00]	X33 [00]	D2 [00]	X35 [00]	X36 [00]	D3 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	K1 --	X55 [00]	X56 [00]	K2 --	X58 [00]	X59 [00]
D4 [00]	X62 [00]	X63 [00]	D5 [00]	X65 [00]	X66 [00]	D6 [00]	X68 [00]	X69 [00]
D7 [00]	X72 [00]	X73 [00]	D8 [00]	X75 [00]	X76 [00]	D9 [00]	X78 [00]	X79 [00]
D10 [00]	X82 [00]	X83 [00]	D11 [00]	X85 [00]	X86 [00]	D12 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	M1 [00]	E2 [00]	X98 [00]	X99 [00]

TOH ....Bit rate: 622M

TOH(#1)

1	5	9	13	17	21	25	29	33
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	J0 [01]	X18 [AA]	X19 [AA]
B1 --	X22 [00]	X23 [00]	E1 [00]	X25 [00]	X26 [00]	F1 [00]	X28 [00]	X29 [00]
D1 [00]	X32 [00]	X33 [00]	D2 [00]	X35 [00]	X36 [00]	D3 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	K1 --	X55 [00]	X56 [00]	K2 --	X58 [00]	X59 [00]
D4 [00]	X62 [00]	X63 [00]	D5 [00]	X65 [00]	X66 [00]	D6 [00]	X68 [00]	X69 [00]
D7 [00]	X72 [00]	X73 [00]	D8 [00]	X75 [00]	X76 [00]	D9 [00]	X78 [00]	X79 [00]
D10 [00]	X82 [00]	X83 [00]	D11 [00]	X85 [00]	X86 [00]	D12 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	E2 [00]	X98 [00]	X99 [00]

TOH(#2)

2	6	10	14	18	22	26	30	34
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [02]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

TOH(#3)

3	7	11	15	19	23	27	31	35
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [03]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	M1 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

TOH(#4)

4	8	12	16	20	24	28	32	36
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [04]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

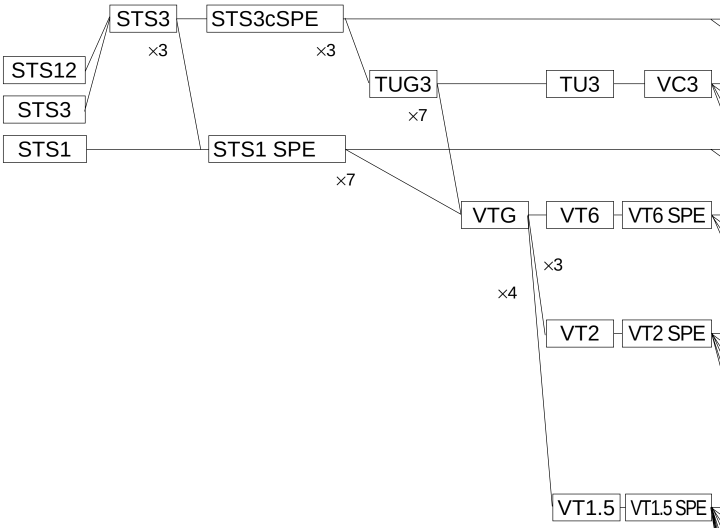
POH

POH STS3	POH STS1	POH VT
J1 [00]	J1 [00]	V5 [**]
B3 --	B3 --	J2 [00]
C2 [01]	C2 [01]	Z6 [00]
G1 [00]	G1 [00]	Z7 [00]
F2 [00]	F2 [00]	
H4 [00]	H4 [00]	
Z3 [00]	Z3 [00]	
Z4 [00]	Z4 [00]	
Z5 [00]	Z5 [00]	

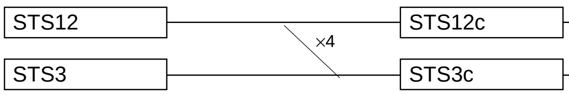
D.2 Initial Values of Signal Labels (C2, V5(b5-b7))

The initial values of signal levels (C2, V5(b5-b7)) depend on the mapping.

The initial values are shown below.



Mapping	via STS3cSPE: STS3 C2	via STS3cSPE: STS1 (TU3) C2	via STS3cSPE: VT V5 b5-b7	via STS1SPE: STS3 C2	via STS1SPE: STS1 C2	via STS1SPE: VT V5 b5-b7
139M(Async.)	12	--	--	--	--	--
Bulk	FE	--	--	--	--	--
34M(Async.)	02	04	--	--	--	--
34M(Sync.)	02	04	--	--	--	--
45M(Async.)	02	04	--	--	04	--
Bulk	02	FE	--	--	FE	--
6M(Async.)	02	01	04	--	02	04
6M(Bitsync.F)	02	01	06	--	02	06
mc	02	01	0C	--	02	0C
Bulk	02	01	0C	--	02	0C
2M(Async.)	02	01	04	--	02	04
2M(Bitsync.F)	02	01	06	--	02	06
2M(Bitsync.L)	03	03	06	--	03	06
2M(Bytesync.F)	02	01	08	--	02	08
2M(Bytesync.L)	03	03	08	--	03	08
Bulk	02	01	FE	--	02	FE
1.5M(Async.)	02	01	04	--	02	04
1.5M(Bitsync.F)	02	01	06	--	02	06
1.5M(Bitsync.L)	03	03	06	--	03	06
1.5M(Bytesync.F)	02	01	08	--	02	08
1.5M(Bytesync.L)	03	03	08	--	03	08
Bulk	02	01	FE	--	02	FE
Byte(Data)	02	01	08	--	02	08
Byte(Voice)	02	01	08	--	02	08
384k(Data)	02	01	02	--	02	02
384k(Voice)	02	01	02	--	02	02



Mapping						
Bulk	FE	--	--	--	--	--
Bulk	FE	--	--	--	--	--

D.3 Initial Values of the Test Patterns

The initial values of the test patterns are shown below.

(The test patterns are automatically changed to the initial values if you set the DEMUX, the lowest stage of Mapping, or Bit rate on the receiver section.

Test pattern	DEMUX	Mapping	Bit rate
PRBS20z Invert:OFF	1.5M	STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-1.5M *1 STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-1.5M *1 STS1SPE-VTG-VT1.5-VT1.5SPE-1.5M *1 STS1SPE-VTG-VT1.5-VT1.5SPE-Byte *1 STS1SPE-VTG-VT2-VT1.5SPE-1.5M *1 STS1SPE-VTG-VT2-VT1.5SPE-Byte *1	1.5M
PRBS23 Invert:ON	34M	STS3cSPE-139M STS3cSPE -Bulk STS3cSPE-TUG3-TU3-VC3-34M STS3cSPE-TUG3-TU3-VC3-45M STS3cSPE-TUG3-TU3-VC3-Bulk STS1-45M STS1-Bulk STS3c-Bulk STS12c-Bulk STS48c-Bulk STS192c-Bulk VC2-6M	139M 45M 34M
PRBS15 Invert:ON	8M 2M	STS3cSPE-TUG3-VTG-VT6-VT6SPE-Bulk STS3cSPE-TUG3-VTG-VT6-VT6SPE-mc STS3cSPE-TUG3-VTG-VT2-VT2SPE-2M STS3cSPE-TUG3-VTG-VT2-VT2SPE-Bulk STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-Bulk STS1SPE-VTG-VT6-VT6SPE-Bulk STS1SPE-VTG-VT6-VT6SPE-mc STS1SPE-VTG-VT2-VT2SPE-2M STS1SPE-VTG-VT2-VT2SPE-Bulk STS1SPE-VTG-VT2-VT1.5SPE-Bulk STS3cSPE-TUG3-VTG-VT2-VT1.5SPE-384k STS3cSPE-TUG3-VTG-VT1.5-VT1.5SPE-384k STS1SPE-VTG-VT2-VT1.5SPE-384k STS1SPE-VTG-VT1.5-VT1.5SPE-384k	8M 2M
PRBS11 Invert:OFF	64k	---	--
PRBS7 Invert:OFF	---	CID *2	
PRBS23 Invert:ON	---	Non frame	

The priorities are : DEMUX > Mapping

DEMUX > Bit rate

NOTE

*1 PRBS15, the same as VT1.5SPE Bulk, is set as the initial value if the 1.5/45/52M unit is not installed.

*2 Only ‘PRBS7’ can be selected when the ‘CID pattern’ is selected. Then, 'Invert ON' cannot be selected.

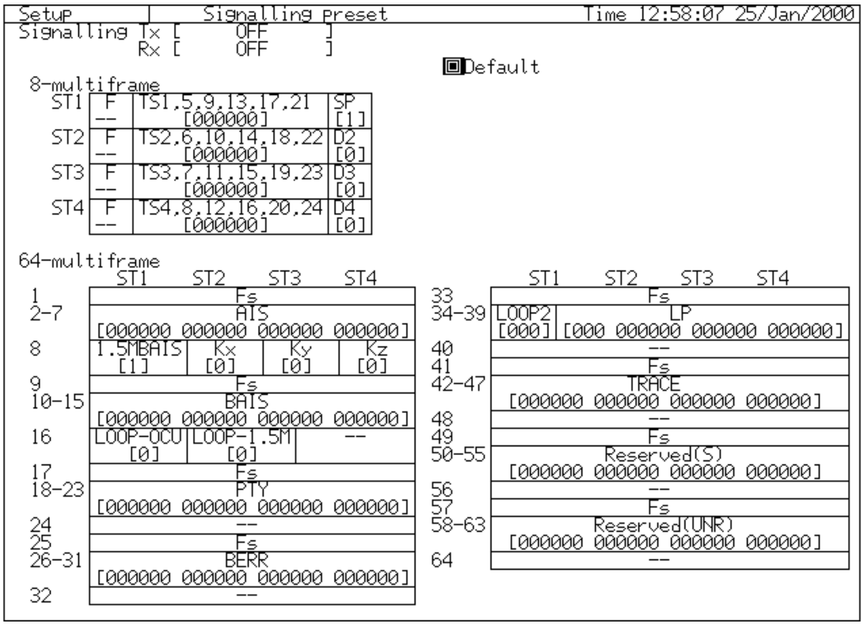
D.4 Initial Values of Signalling Preset Data

Signalling preset data are set to the initial values by the following procedure.

(1) Open the ‘Setup : Signalling’ screen.

(2) Move the cursor to ‘▣ Default’ and press Set.

The initial values are shown below.



D.5 Initial Values of Tandem Connection Data

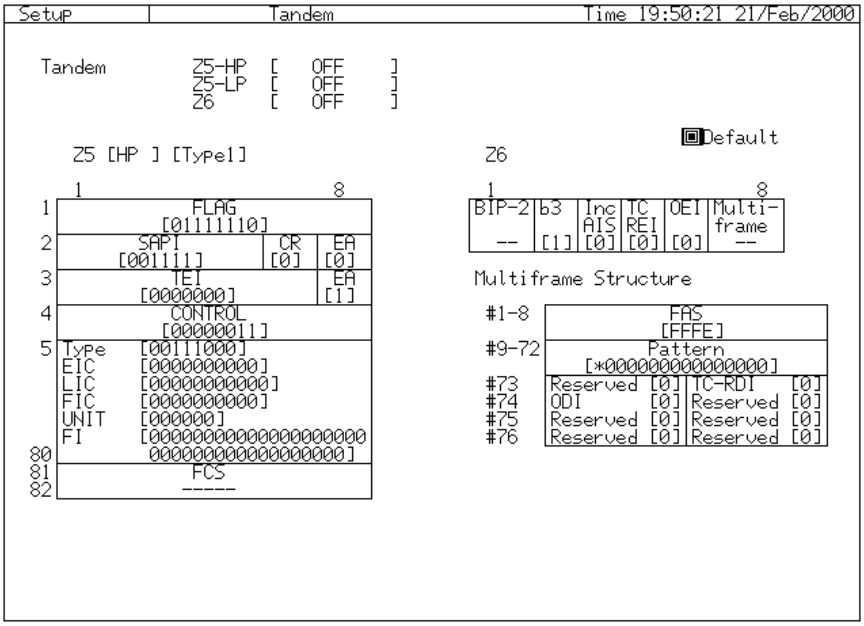
Tandem connection data are set to the initial values by the following procedure.

(1) Open the 'Setup : Tandem' screen.

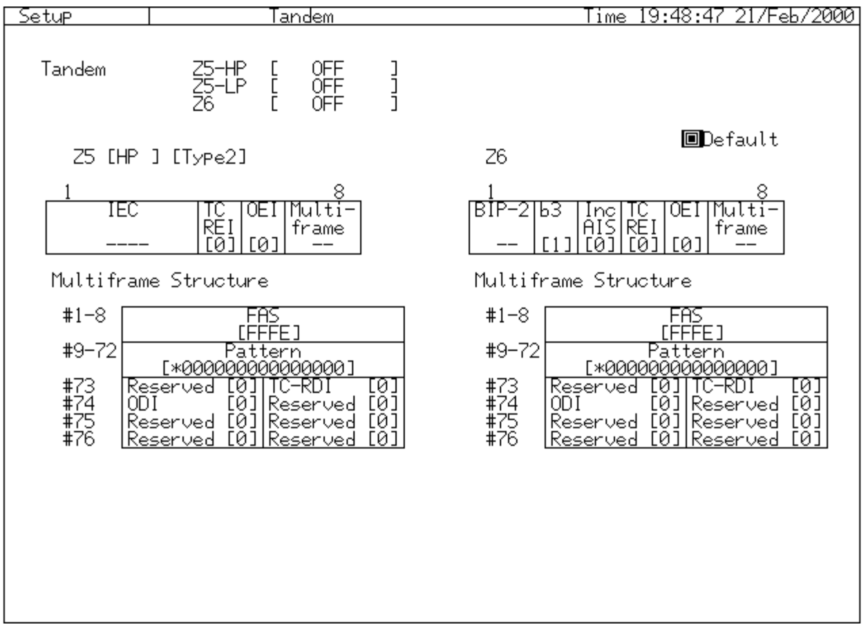
(2) Moving the cursor to '▣ Default' and press Set

The initial values are shown below.

Type 1



Type 2



D.6 Initial Values of Frame Memory Data

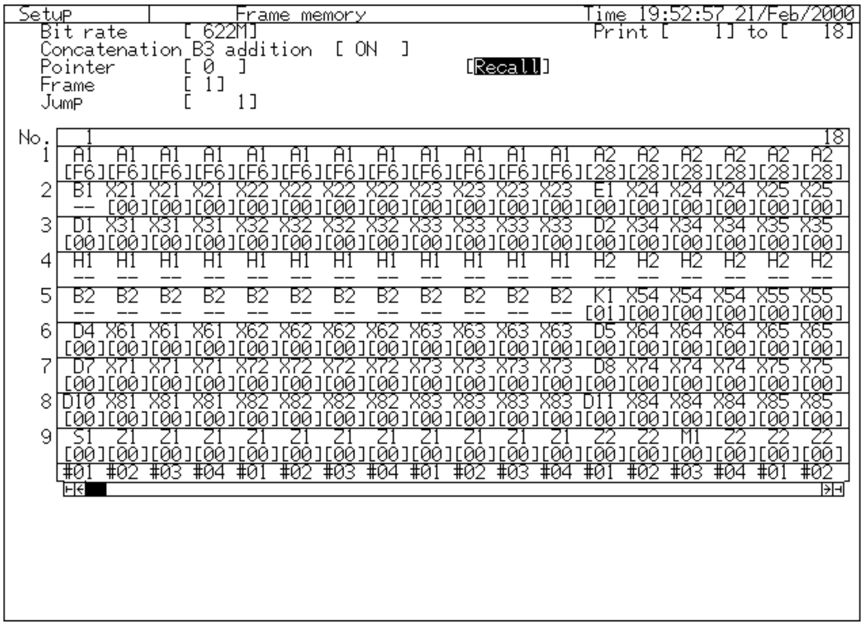
Frame memory data are set to the initial values by the following procedure.

(1) Open the ‘Setup : Frame memory’ screen.

(2) Moving the cursor to ‘Recall” and press Set .

(3) A ‘Yes/No’ dialog is displayed. Move the cursor to ‘Yes’ and press Set .

The initial values are shown below.



- When the MP1570A is turned on, Frame Memory Data are set to as follows.

  Frame Memory #1 ....is set to the default values of OH preset data #1.

  Frame Memory #2~final frame ....are not set.

- Contents of the frame memory are not maintained when the MP1570A is turned off.

D.7 Initial Values of OH Change Data

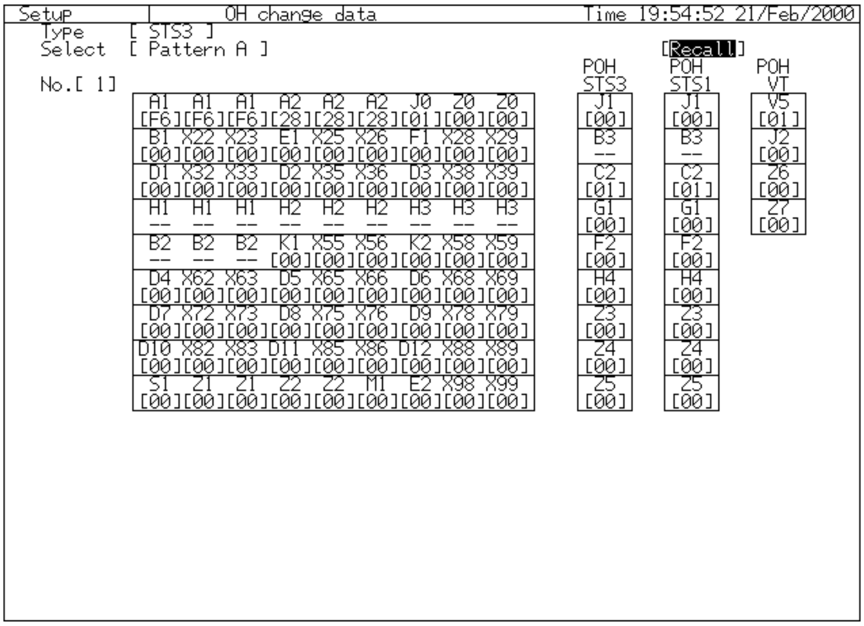
OH change data are set to the initial values by the following procedure.

(1) Open the 'Setup : OH change data' screen.

(2) Moving the cursor to 'Recall" and press Set .

(3) A 'Yes/No' dialog is displayed. Move the cursor to 'Yes' and press Set .

The initial values are shown below.



- The initial values of OH Preset Data are the same as the default values.

D.8 Initial Values of PTR 64 Frame Data

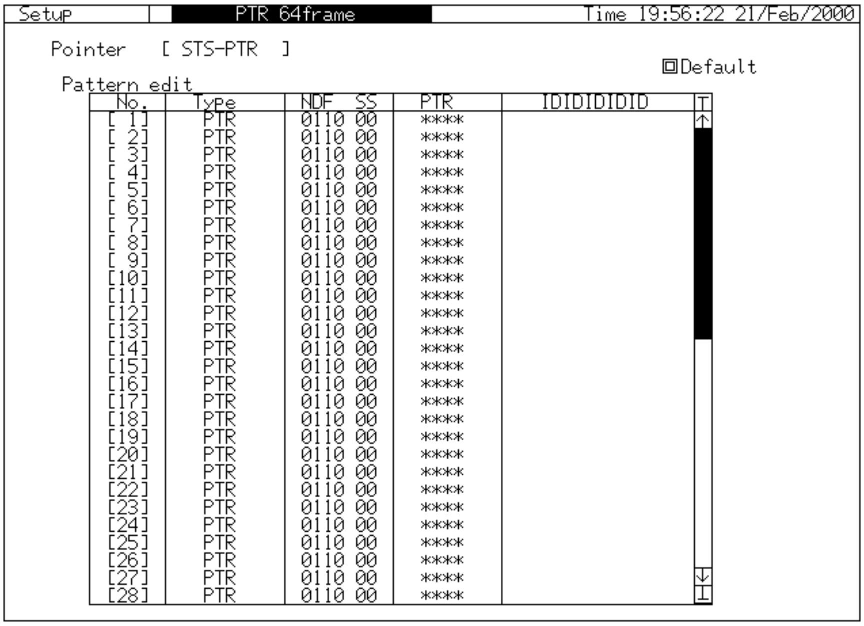
PTR 64 frame data are set to the initial values by the following procedure.

(1) Open the 'Setup : PTR 64frame' screen.

(2) Move the cursor to '□ Default' and press Set .

The initial values are shown below.

STS Pointer


Setup | PTR 64frame | Time 19:56:22 21/Feb/2000

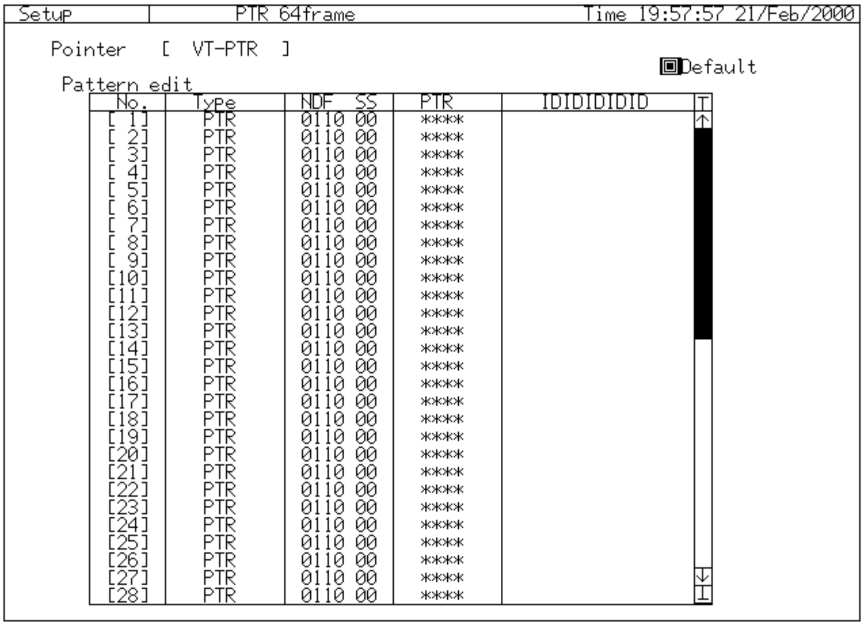
Pointer [STS-PTR]

□Default

Pattern edit

No.	Type	NDF SS	PTR	IDIDIDIDID
[1]	PTR	0110 00	****	
[2]	PTR	0110 00	****	
[3]	PTR	0110 00	****	
[4]	PTR	0110 00	****	
[5]	PTR	0110 00	****	
[6]	PTR	0110 00	****	
[7]	PTR	0110 00	****	
[8]	PTR	0110 00	****	
[9]	PTR	0110 00	****	
[10]	PTR	0110 00	****	
[11]	PTR	0110 00	****	
[12]	PTR	0110 00	****	
[13]	PTR	0110 00	****	
[14]	PTR	0110 00	****	
[15]	PTR	0110 00	****	
[16]	PTR	0110 00	****	
[17]	PTR	0110 00	****	
[18]	PTR	0110 00	****	
[19]	PTR	0110 00	****	
[20]	PTR	0110 00	****	
[21]	PTR	0110 00	****	
[22]	PTR	0110 00	****	
[23]	PTR	0110 00	****	
[24]	PTR	0110 00	****	
[25]	PTR	0110 00	****	
[26]	PTR	0110 00	****	
[27]	PTR	0110 00	****	
[28]	PTR	0110 00	****	

VT Pointer


Setup | PTR 64frame | Time 19:57:57 21/Feb/2000

Pointer [VT-PTR]

□Default

Pattern edit

No.	Type	NDF SS	PTR	IDIDIDIDID
[1]	PTR	0110 00	****	
[2]	PTR	0110 00	****	
[3]	PTR	0110 00	****	
[4]	PTR	0110 00	****	
[5]	PTR	0110 00	****	
[6]	PTR	0110 00	****	
[7]	PTR	0110 00	****	
[8]	PTR	0110 00	****	
[9]	PTR	0110 00	****	
[10]	PTR	0110 00	****	
[11]	PTR	0110 00	****	
[12]	PTR	0110 00	****	
[13]	PTR	0110 00	****	
[14]	PTR	0110 00	****	
[15]	PTR	0110 00	****	
[16]	PTR	0110 00	****	
[17]	PTR	0110 00	****	
[18]	PTR	0110 00	****	
[19]	PTR	0110 00	****	
[20]	PTR	0110 00	****	
[21]	PTR	0110 00	****	
[22]	PTR	0110 00	****	
[23]	PTR	0110 00	****	
[24]	PTR	0110 00	****	
[25]	PTR	0110 00	****	
[26]	PTR	0110 00	****	
[27]	PTR	0110 00	****	
[28]	PTR	0110 00	****	

D.9 Initial Values of APS Programmable Data

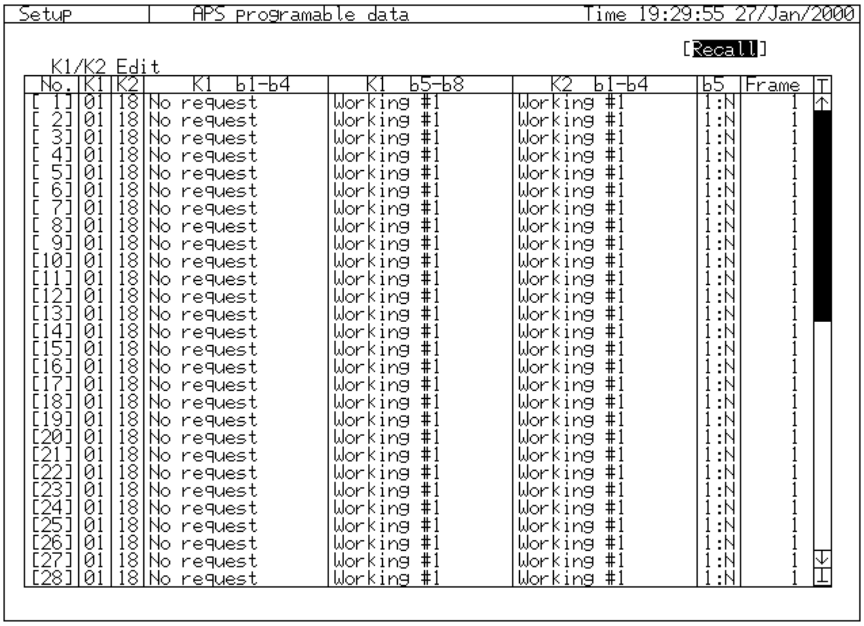
APS programmable data are set to the initial values by the following procedure.

(1) Open the 'Setup : AOS program data' screen.

(2) Moving the cursor to 'Recall" and press [Set].

(3) A 'Yes/No' dialog is displayed. Move the cursor to 'Yes' and press [Set].

The initial values are shown below.



Setup | APS Programable data | Time 19:29:55 27/Jan/2000

[Recall]

K1/K2 Edit

No.	K1	K2	K1 b1-b4	K1 b5-b8	K2 b1-b4	b5	Frame
[1]	01	18	No request	Working #1	Working #1	1:N	1
[2]	01	18	No request	Working #1	Working #1	1:N	1
[3]	01	18	No request	Working #1	Working #1	1:N	1
[4]	01	18	No request	Working #1	Working #1	1:N	1
[5]	01	18	No request	Working #1	Working #1	1:N	1
[6]	01	18	No request	Working #1	Working #1	1:N	1
[7]	01	18	No request	Working #1	Working #1	1:N	1
[8]	01	18	No request	Working #1	Working #1	1:N	1
[9]	01	18	No request	Working #1	Working #1	1:N	1
[10]	01	18	No request	Working #1	Working #1	1:N	1
[11]	01	18	No request	Working #1	Working #1	1:N	1
[12]	01	18	No request	Working #1	Working #1	1:N	1
[13]	01	18	No request	Working #1	Working #1	1:N	1
[14]	01	18	No request	Working #1	Working #1	1:N	1
[15]	01	18	No request	Working #1	Working #1	1:N	1
[16]	01	18	No request	Working #1	Working #1	1:N	1
[17]	01	18	No request	Working #1	Working #1	1:N	1
[18]	01	18	No request	Working #1	Working #1	1:N	1
[19]	01	18	No request	Working #1	Working #1	1:N	1
[20]	01	18	No request	Working #1	Working #1	1:N	1
[21]	01	18	No request	Working #1	Working #1	1:N	1
[22]	01	18	No request	Working #1	Working #1	1:N	1
[23]	01	18	No request	Working #1	Working #1	1:N	1
[24]	01	18	No request	Working #1	Working #1	1:N	1
[25]	01	18	No request	Working #1	Working #1	1:N	1
[26]	01	18	No request	Working #1	Working #1	1:N	1
[27]	01	18	No request	Working #1	Working #1	1:N	1
[28]	01	18	No request	Working #1	Working #1	1:N	1

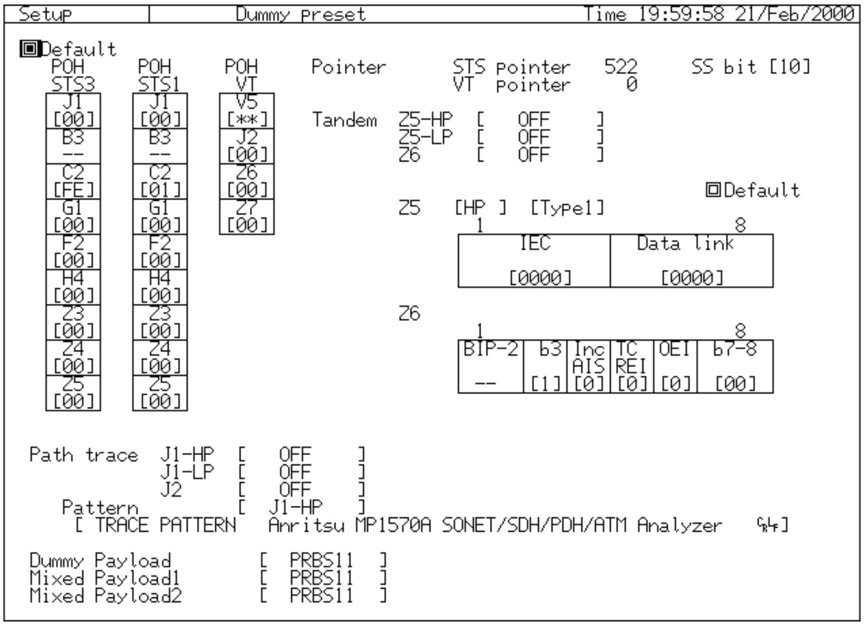
D.10 Initial Values of Dummy Preset Data

Dummy preset data are set to the initial values by the following procedure.

(1) Open the 'Setup : Dummy preset' screen.

(2) Move the cursor to '◻ Default' and press Set.

The initial values are shown below.



Appendix E Alarm Detection and Removal Conditions

E.1 PDH Alarm Detection and Removal Conditions

Alarm	Detecting conditions	Removing conditions	Remarks
LOS	during signal loss	during signal detection	
LOF(2M)	3 frames	(1) Normal frame alignment (2) TS0(b2) of frame without frame alignment signal is "1". (3) Normal frame alignment	Removed in (1) to (3) sequence.
LOF (others)	4 frames	3 frames	
AIS(2M)	2 diframes with 2 or less "0" per diframe	2 diframes with 3 or more "0" per diframe	1diframe : 512bits
AIS(others)	2 diframes with 4 or less "0" per diframe	2 diframes with 5 or more "0" per diframe	
MF loss	2 multi-frames	1 multi-frame	
RDI(2M)	4 frames	2 frames	TS0(b3) of the frame that is not on FAS
RDI(MF)	3 frames	2 frames	Frame0 の TS16(b6)
RDI (others)	4 frames	2 frames	Remote Alarm bit
Sync loss	10^3 bits or more per 10^4	30 bits	64k PRBS
	$5*10^2$ bits or more per 10^4		64k Word
	10^4 bits or more per 10^5		2M, 8M, 34M, 139M PRBS
	$5*10^3$ bits or more per 10^5		2M, 8M, 34M, 139M Word

E.2 Alarm Detection and Removal Conditions of SDH

The alarm detection and removal conditions of SDH can arbitrarily be set (up to 15 frames for each frame). The initial values of the alarm detection and removal conditions are shown below.

Alarm		Detection conditions	Removal conditions	Remarks
LOS		during signal loss	during signal detection	Can not be changed
OOF		5 frames 4 frames (2.5G Unit)	2 frames	Can not be changed
LOF		3 ms	3 ms	
AIS-L		5 frames	5 frames	
RDI-L		5 frames	5 frames	
AIS-P		3 frames	3 frames	
LOP-P		8 frames	——	with SSbit/ without SSbit
RDI-P		10 frames	10 frames	
AIS-V		3 frames	3 frames	
LOP-V		8 frames	——	*1 with SSbit/ without SSbit
RDI-V		10 frames	10 frames	*1
PLM-P *2		5 frames	5 frames	*1
UNEQ-P		1 frame	1 frame	
PLM-V *2		5 frames	5 frames	*1
UNEQ-V		1 frame	1 frame	*1
RFI-V		1 frame	1 frame	*1
LOM-V		5 frames	1 frame	*1
STS	HP-VCAIS	5 frames	1 frame	*3
	ISF	5 frames	1 frame	*3
	FAS	1 frame	2 frames	*3
	IUC AIS	1 frame	2 frames	*3
	TC-RDI	1 frame	5 frames	*3
	ODI	5 frames	5 frames	*3
VT	VC-AIS	5 frames	1 frame	*3
	FAS	1 frame	2 frames	*3
	IUS AIS	5 frames	5 frames	*4
	TC-RDI	5 frames	5 frames	*4
	ODI	5 frames	5 frames	*4

Note

*1 ..... Multi-frame when multi-frame is structured.

*2 ..... The detection pattern of PLM-P/V is automatically set in the initial state (see 'D.2 Initial Vaules of Signal Labels'). If you would like to set an arbitray pattern, set the 'PLM detection pattern' to 'Manual' on the 'Setup : Measurement condition' screen.

*3 ..... The measurement of the tandem connection is turned off in the initial state.

*4 ..... The alarm detection and removal conditions are set to thress times respectivily. These conditions can not be changed.

Appendix F Performance Measurement

F.1 Measurement Items

In the performance measurement, data for each item is calculated every one second (every one minute for DM) during the period from the start of measurement (including start of 'Repeat') to the end of measurement (including end of 'Repeat') to obtain the total data.

The measurement items are as follows:

<table>
<tr><th colspan="3" rowspan="2">Type of measurement</th><th colspan="2" rowspan="2">G.821</th><th colspan="2" rowspan="2">M.2100</th><th colspan="2">G.826</th></tr>
<tr><th>Near-end</th><th>Far-end</th></tr>
<tr><td colspan="3">Measurement data
Measurement</td><td>EC AnD%ES
ES %ES
EFS %EFS
SES %SES
US %US
DM %DM</td><td>Code
ES</td><td>Rx ES
Rx SES
US</td><td>Tx ES
Tx SES</td><td colspan="2">ES
SES
ESR
SESR
BBER
BBE
SDP
US</td></tr>
<tr><td rowspan="2">2M
8M
34M
139M
1.5M
45M</td><td colspan="2">In-service</td><td>FAS</td><td>Code</td><td>Same as G.826</td><td>E-bit</td><td colspan="2">FAS, CRC-4, Parity, or CRC-6</td></tr>
<tr><td colspan="2">Out-of-service</td><td>Bit</td><td>Code</td><td>Bit</td><td></td><td colspan="2">Bit</td></tr>
<tr><td rowspan="3">52M
156M
622M</td><td colspan="2">For Bulk</td><td colspan="4"></td><td rowspan="3">B1
B2
B3

BIP-2</td><td rowspan="3">REI-L
REI-P
REI-V</td></tr>
<tr><td rowspan="2">For others</td><td>In-service</td><td>FAS</td><td rowspan="2"></td><td>Same as G.826</td><td>E-bit</td></tr>
<tr><td>Out-of-service</td><td>Bit</td><td>Bit</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Type of measurement</th><th colspan="2">M.2101</th></tr>
<tr><td colspan="3">Measurement data
Measurement</td><td>Rx ES
Rx SES
US</td><td>Tx ES
Tx SES</td></tr>
<tr><td rowspan="2">2M
8M
34M
139M
1.5M
45M</td><td colspan="2">In-service</td><td rowspan="2" colspan="2"></td></tr>
<tr><td colspan="2">Out-of-service</td></tr>
<tr><td rowspan="3">52M
156M
622M</td><td colspan="2">For Bulk</td><td rowspan="3">B2
B3

BIP-2</td><td rowspan="3">REI-L
REI-P
REI-V</td></tr>
<tr><td rowspan="2">For others</td><td>In-service</td></tr>
<tr><td>Out-of-service</td></tr>
</table>

<table>
<tr><th colspan="3">Type of measurement</th><th colspan="2">M.2110</th><th colspan="2">M.2120</th></tr>
<tr><td colspan="3">Measurement Data
Measurement</td><td>Rx 2-hour
Rx 24-hour
Rx 7day
ES
SES
US</td><td>Tx 2-hour
Tx 24-hour
Tx 7day
ES
SES</td><td>Rx TR1-ES
Rx TR1-SES
Rx TR2-ES
Rx TR2-SES
ES
SES
US</td><td>Tx TR1-ES
Tx TR1-SES
Tx TR2-ES
Tx TR2-SES
ES
SES</td></tr>
<tr><td rowspan="2">2M
8M
34M
139M
1.5M
45M</td><td colspan="2">In-service</td><td>Same as G.826</td><td>E-bit</td><td>Same as G.826</td><td>E-bit</td></tr>
<tr><td colspan="2">Out-of-service</td><td>Bit</td><td></td><td>Bit</td><td></td></tr>
<tr><td rowspan="3">52M
156M
622M</td><td colspan="2">For Bulk</td><td rowspan="3">B2
B3

BIP-2</td><td rowspan="3">REI-L
REI-P
REI-V</td><td rowspan="3">B2
B3

BIP-2</td><td rowspan="3">REI-L
REI-P
REI-V</td></tr>
<tr><td rowspan="2">For others</td><td>In-service</td></tr>
<tr><td>Out-of-service</td></tr>
</table>

NOTES

- PM measurement is not performed if the measurement item cannot be measured.
- If 'Tributary' can be measured in FAS, FAS errors having the selected bit rate are regarded as the object of measurement.
- Parity becomes the object of measurement when 45M is on.
- CRC-4 becomes the object of measurement when CRC is on for 2M.
- CRC-6 becomes the object of measurement when ESF is on for 1.5M.

Word definitions

- S_{Total} ......Total measurement time excluding the power loss time.
- S_{Avail} ......Effective measurement time obtained by the formula below.

  $S_{Avail} = S_{Total} - S_{Unavail}$
- $S_{Unavail}$ ..Non operating time

F.2 G. 821 Measurement Data

F.2.1 Measurement range

EC ES EFS SES US DM Code ES	.... 0~999999, 1.0E06~9.9E15, >9.9E15
%ES AnD%ES %EFS %SES %US %DM	.... 0.0000~100.0000 %

F.2.2 In-service (FAS)

Item	Definition
EC(Error Count)	FAS error count within the measurement period
ES(Error Seconds)	Sum total of seconds when one or more FAS errors occurred within the S_{avail} period.
EFS (Error Free Seconds)	Sum total of seconds when no FAS errors occurred within the S_{avail} period. EFS = S_{Avail}−ES
SES (Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{avail} period. - > 10^{-3} FAS error - LOS - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.)
US (Unavailable Seconds)	Sum of total of non-operating time - If SES continues for ten seconds, the first second is the start of US. If other than SES continues for ten seconds, the first but one is the end of US. - If a measurement session is completed during US evaluation, and if the next measurement session is started, the evaluation counter is reset upon start of the next measurement session.
DM(Degraded Minutes)	Total period when more than 10^{-6}. FAS errors occurred provided that an accumulated measurement time of 60seconds is considered excluding the time of SES within the S_{avail} period. - If the measurement time does not attain a value of 60 seconds when the measurement is completed, 1 is added if the error rate for that period is greater than 10^{-6}.
Code ES	Sum total of seconds during which code errors occurred within the S_{avail} period.
%ES	Rate of seconds during which FAS errors occurred within the S_{Avail} period. %ES = (ES / S_{Avail}) × 100
AnD%ES	In accordance with ITU-T G.821 Annex D, %ES is converted in terms of 64 kb/s: $ESa = \sum_{i=1}^{i=j} (n / N)\, i$ AnD%ES = (Esa / S_{Avail}) × 100 j = S_{Avail} n: Number of errors occurring during the i-th second within the S_{avail} period N: Error measurement object bits per second as converted in terms of 64 kb/s

Item	Definition
%EFS	Rate of error seconds when no FAS errors occurred within the S_{avail} period. %EFS = 100–%ES
%SES	Rate of error seconds when SES occurred within the S_{avail} period. %SES = (SES / S_{Avail}) × 100
%US	Rate of US within the S_{total} period. %US = (US / S_{Total}) × 100
%DM	Rate of DM within the S_{avail} period. M_{Avail} = [S_{Avail} / 60]$_{INT}$　Fractions of []INT are rounded-up. %DM = (DM / M_{Avail}) × 100

- Performance measurement cannot be performed in the in-service mode if 'Frame' is off.

F.2.3 Out-of-service(DSn : Bits)

Item	Definition
EC(Error Count)	Bit error count within the measurement period.
ES(Error Seconds)	Sum total of seconds when one or more bit errors occurred within the S_{avail} period.
EFS (Error Free Seconds)	Sum total of seconds when no FAS errors occurred within the S_{avail} period. EFS = S_{Avail}–ES
SES (Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{avail} period. - $> 10^{-3}$ bit error - LOS - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.)
US (Unavailable Seconds)	Sum of total of non-operating time - If SES continues for ten seconds, the first second is the start of US. If other than SES continues for ten seconds, the first but one is the end of US. - If a measurement session is completed during US evaluation, and if the next measurement session is started, the evaluation counter is reset upon start of the next measurement session.
DM(Degraded Minutes)	Total of periods when more than 10^{-6} bit errors occurred provided that an accumulated measurement time of 60 seconds is considered excluding the time of SES within the S_{avail} period. - If the measurement time does not attain a value of 60 seconds when the measurement is completed, 1 is added if the error rate for that period is greater than 10^{-6}.
Code ES	Sum total of seconds during which code errors occurred within the S_{avail} period.
%ES	Rate of seconds during which FAS errors occurred within the S_{Avail} period. %ES = (ES / S_{avail}) × 100

Item	Definition
AnD%ES	In accordance with ITU-T G.821 Annex D, %ES is converted in terms of 64 kb/s: $ESa = \sum_{i=1}^{i=j} (n / N)\, i$ $AnD\%ES = (Esa / S_{Avail}) \times 100$ $j = S_{Avail}$ n: Number of errors occurring during the i-th second within the S_{Avail} period. N: Error measurement object bits per second as converted in terms of 64 kb/s
%EFS	Rate of error seconds when no bit errors occurred within the S_{Avail} period. %EFS = 100–%ES
%SES	Rate of error seconds when SES occurred within the S_{avail} period. $\%SES = (SES / S_{Avail}) \times 100$
%US	Rate of US within the S_{total} period. $\%US = (US / S_{Total}) \times 100$
%DM	Rate of DM within the S_{Avail} period. $M_{Avail} = [S_{Avail} / 60]_{INT}$ Fractions of []INT are rounded-up. $\%DM = (DM / M_{Avail}) \times 100$

Reference ..... Number of errors equivalent to 10^{-3}

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	64*N	64*N	—
1.5M	1,544	1,536	8
2M	2,048	1,920 / 1,984*1	28
8M	8,448	8,192	99
34M	34,368	33,792	223
45M	44,736	44,210	230
139M	139,264	137,472	568

*1...... 30ch / 31ch

The values in the table are calculated as follows:

Frame-off bit: (Number of bits per second)×1E-3

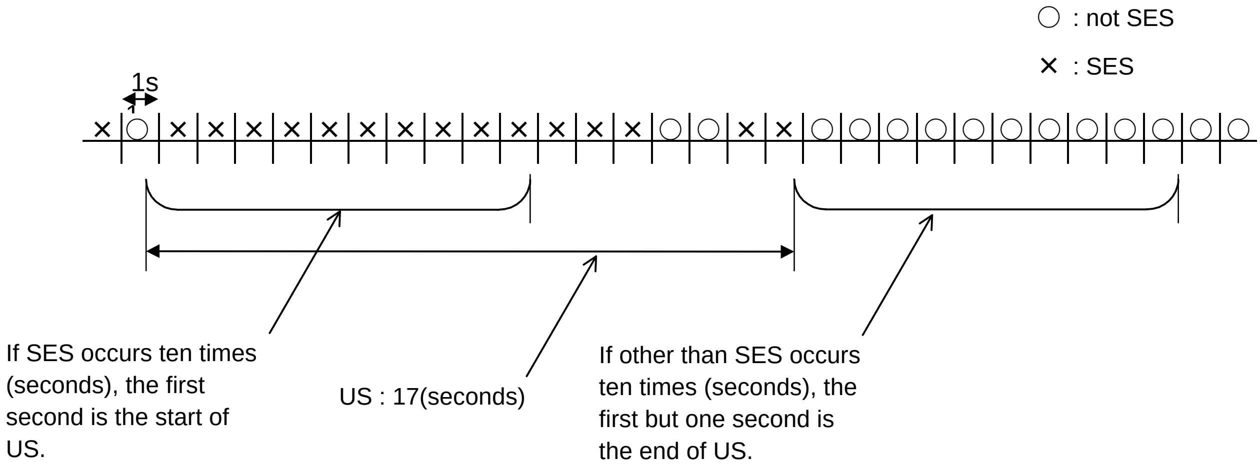
Frame-on bit:

$$(\text{Number of bits per second}) \times \frac{(\text{Number of bits in test signal in a frame})}{(\text{Total number of bits in a frame})} \times 1\text{E-}3$$

Frame-on frame :

$$(\text{Number of bits per second}) \times \frac{(\text{Number of frame error bits in a frame})}{(\text{Total number of bits in a frame})} \times 1\text{E-}3$$

Reference ..... Calculation of US



Number of errors equivalent to 10^{-6}

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	4.0*N	4.0*N	—
1.5M	92.7	92.2	0.5
2M	122.9	115.2 / 119.0*1	1.7
8M	506.9	491.5	6.0
34M	2,062.1	2,027.5	13.4
45M	2,684.2	2,652.6	13.8
139M	8-355.8	8,248-3	34-3

*1: 30ch / 31ch

*2: In the table above, an error value exceeding 122 (122.9, for example) is regarded as DM=1.

*3: For a threshold of less than 60 seconds, the value given above is multiplied by S/60. (S = the time)

The values in the table are calculated as follows:

Frame-off bit: (Number of bits per second)×1E-3

Frame-on bit:

$$(\text{Number of bits per second}) \times \frac{(\text{Number of bits in test signal in a frame})}{(\text{Total number of bits in a frame})} \times 1E\text{-}6$$

Frame-on frame：

$$(\text{Number of bits per second}) \times \frac{(\text{Number of frame error bits in a frame})}{(\text{Total number of bits in a frame})} \times 1E\text{-}6$$

Number of bits for which a measurement is performed per second converted to 64 kb/s basis (N)

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	1*N	1*N	—
1.5M	25	24	0.13*2
2M	32	30 / 31*1	0.44*2
8M	132	128	2
34M	537	528	4
45M	699	691	4
139M	2,176	2,148	9

*1: 30ch / 31ch

*2: Regarded as 1ES if only one error exists.

(n/N)i : when 0<n<N ...(n/N) i =n/N

(n/N)i : when n≥N ...(n/N)i =1

The above formula is in accordance with ITU-T G.821 ANNEX D.

The values in the table are 'number of errors equivalent to 10^{-3}' divided by 64.

F.3 M.2100 Measurement Data

F.3.1 Measurement range

Rx ES Tx ES Rx SES Tx SES US	0~999999,1.0E06~9.9E15,>9.9E15
Test	: Acceptable, Degraded, Unacceptable

F.3.2 In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds	Sum total of seconds when the following states occurred within the S_{Avail} period: - LOS - AIS (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - One or more FAS errors (CRC-4: OFF for 2M, 8M-34M, 139M) - One or more CRC-4 errors (CRC-4: ON for 2M)
Tx ES (Transmit Error Seconds)	Sum total of seconds when one or more Ebit errors occurred within the S_{Avail} period.
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period. - LOS - AIS (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - 8 or more FAS errors (other than ESF for 1.5M) - 380 or more CRC-6 errors (ESF for 1.5M) - 28 or more FAS errors (CRC-4: OFF for 2M) - 805 or more CRC-4 errors (CRC-4: ON for 2M) - 41 or more FAS errors (8M) - 52 or more FAS errors (34M) - 2444 or more Parity error (45M) - 69 or more FAS error (139M)
Tx SES (Transmit Severely Errored Second)	Sum total of seconds when 805 or more Ebit errors occurred within the S_{Avail} period.
US(Unavailable Seconds)	Same as G.821

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'DSn frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.3.3 Out-of-service(DSn : Bit)

Item	Definition
Rx ES (Receive Error Seconds	Sum total of seconds when the following states occurred within the S_{Avail} period: - LOS - AIS (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - One or more bit errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period. - LOS - AIS (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - Bit error 10^{-3} or more
US(Unavailable Seconds)	Same as G.821

F.3.4 Test

Judgement results are given for ES, SES and US according to the set threshold (S1 and S2).

Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	≤	Measured results		

- The priority is in order of Unacceptable > Degraded > Acceptable.

Test display is available for both Rx and Tx. The worst state in ES, SES and US is displayed for Rx, and the worst result in ES and SES is shown for Tx. These are not displayed when the thresholds for Rx and Tx are set at Off.

F.4 G.826 Measurement Data

F.4.1 Measurement range

ES
SES
BBE
SDP
US
.... 0~999999, 1.0E06~9, 9E15, > 9E15

ESR
SESR
BBER
.... 1.0E-15~1.0E+00, < 1.0E-15

- 0.0E-00 when S_{Avail} is 0.

F.4.2 DSn : In-service (FAS, CRC-4, Parity, CRC6)

Item	Definition
ES (Error Seconds)	Sum total of seconds when the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more FAS errors in one block (2M CRC: OFF, 8M-34M, 139M) - One or more Parity errors in one block (45M) - One or more FAS errors or CRC-4 errors in one block (2M CRC: ON) - One or more CRC-6 errors in one block (ESF for 1.5M) SDP: - LOS - AIS (when DEMUX is on, frame losses for stages higher than that of the object of measurement are detected) - LOF (when DEMUX is on, frame losses for stages higher than that of the object of measurement are detected)
SES (Severely Error Seconds)	Sum total of seconds when the following states occurred: - EB is ≥30% - One or more SDP
BBE (Background Block Error)	Sum total of time within the S_{Avail} period except SES - EB is ≥30% - One or more SDP
ESR (Error Second Ratio)	Rate of ES within the S_{Avail} period $ESR = ES / S_{Avail}$
SESR (Severely Errored Second Ratio)	Rate of SES within the S_{avail} period $SESR = SES / S_{Avail}$

Item	Definition
BBER (Background Block Error Ratio)	Rate of BBE to the total blocks (excluding SES) within the S_{Avail} period $$BBER = \frac{\text{(Number of EBs within a period equivalent to the } S_{Avail} \text{ period from which SES is subtracted)}}{(S_{Avail} - SES) \times B\ No}$$ B No : Number of blocks per second
SDP (Severely Disturbed Period)	Sum total of seconds when SDP occurred - LOS - AIS (when DEMUX is on, AIS for stages higher than that of the object of measurement are detected) - LOF (when DEMUX is on, LOF for stages higher than that of the object of measurement are detected)
US (Unavailable Seconds)	Sum total of non-operating time - If SES continues ten seconds, the first second is the start of US. - If other than SES continues for ten seconds, the first but one second is the end of US. - If a measurement is completed and the next measurement is started during US judgement, the judgement counter is reset when the new measurement is started.

F.4.3 DSn : Out-of-service (DSn : Bit)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more bit errors in one block SDP: - Consecutive occurrence (4 times or for more than 1 ms) of EB with LOS or bit errors of 10^{-2} or more. 1.5M, 2M and 8M : consecutive 4 34M, 45M and 139M : 1 ms
SES BBE ESR SESR BBER SDP US	Same as the case of In-service

F.4.4 SONET : B1

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more B1 errors in one block SDP: - LOS, LOF occurrence
SES (Severely Error Seconds)	Sum total of seconds during which the following states occurred: - EB is ≥30% - One or more SDP
BBE (Background Block Error)	- Sum total of EB count within the S_{Avail} period except SES
ESR (Error Second Ratio)	Rate of ES within the S_{Avail} period ESR = ES / S_{Avail}
SESR (Severely Errored Second Ratio)	Rate of SES within the S_{Avail} period SESR = SES / S_{Avail}
BBER (Background Block Error Ratio)	Rate of BBE to the total blocks (excluding SES) within the S_{Avail} period $\text{BBER} = \dfrac{\text{(Number of EB within a period equivalent to the } S_{Avail} \text{ period from which SES is subtracted)}}{(S_{Avail} - \text{SES}) \times \text{B No}}$ B No : Number of blocks per second
SDP (Severely Disturbed Period)	Sum total of seconds when SDP occurred - LOS, LOF
US (Unavailable Seconds)	Sum total of non-operating time - If SES continues for ten seconds, the first second is the start of US. - If other than SES continues for ten seconds, the first but one second is the end of US. - If a measurement is completed and the next measurement is started during US judgement, the judgement counter is reset when the new measurement is started.

F.4.5 SONET : B2

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B2 errors in one block SDP: LOS, LOF or AIS-L occurrence
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.6 SONET : B3

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, AIS-P or LOP-P
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.7 SONET : B3 (TU3)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, AIS-P, LOP-P, AIS-V or LOP-V
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.8 SONET : BIP-2

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more BIP-2 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, AIS-P, LOP-P, AIS-V, LOP-V or LOM-V
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.9 SONET : REI-L

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, or RDI-L
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.10 SONET : REI-P

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, RDI-L, AIS-P, LOP-P, or RDI-P
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.11 SONET : REI-V (TU3)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, RDI-L, AIS-P, LOP-P, RDI-P, AIS-V, LOP-V or RDI-V
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.12 SONET : REI-V (VT6, VT2, VT1.5)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, AIS-L, RDI-L, AIS-P, LOP-P, RDI-P, AIS-V, LOP-V, LOM-V or RDI-V
SES BBE ESR SESR BBER SDP US	Same as B1

Reference .... Block size

SONET

Type	Mapping	Block number/second	≥30%EB
STS3cSPE	—	8,000	2,400
STS1SPE	—	8,000	2,400
VT6SPE	—	2,000	600
VT2SPE	Locked	8,000	2,400
	Except Locked	2,000	600
VT1.5SPE	Locked	8,000	2,400
	Except Locked	2,000	600

DSn

Error measurement	Bit number/block	Block number/second	≥30%EB	SDP Block number
139M error	11,712(4 frames)	11,890	3,568	12
45M error	4,760(7 frames)	9,398	2,820	8
34M error	6,144(4 frames)	5,593	5,593	6
8M error	3,392(4 frames)	2,490	748	4
2M error	2,048(8 frames)	1,000	300	4
1.5M error	4,632(4 frames)	333	100	4

Bit error number corresponding to 10^{-2}

Bit rate	Frame : OFF	Frame : ON
139Mbit/s	118	117
45Mbit/s	48	48
34Mbit/s	62	61
8Mbit/s	34	34
2Mbit/s	21	20
1.5Mbit/s	47	47
N*64kbit/s	N*64/100	N*64/100

←Integer after round-off

F. 5 M.2101 Measurement Data

F.5.1 Measurement range

Rx ES
Tx ES .... 0~999999, 1.0E06~9.9E15, > 9.9E15
Rx SES
Tx SES
US

Test .... Acceptable, Degraded, Unacceptable

F.5.2 Section

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - One or more B2 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - One or more REI-L errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOF - AIS-L - 2500 or more B2 errors （STS1, STS3） - 1000 or more B2 errors （STS12）
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L
US (Unavailable Seconds)	Same as M.2100

F.5.3 STS-path

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - One or more B3 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - 2400 or more B3 errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - 2400 or more B3 errors
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - RDI-P - One or more REI-P errors
US (Unavailable Seconds)	Same as M.2100

F.5.4 VT-path (VC3)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - AIS-V - LOP-V - One or more B3 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - AIS-P - LOP-P - RDI-P - RDI-V - One or more REI-V errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - AIS-V - LOP-V - 2400 or more B3 errors
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - AIS-P - LOP-P - RDI-P - RDI-V
US (Unavailable Seconds)	Same as M.2100

F.5.5 VT-path (VT1.5SPE, VT2SPE, VT6SPE)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - AIS-V - LOP-V - LOM-V - One or more BIP-2 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - AIS-P - LOP-P - RDI-P - AIS-V - LOP-V - LOM-V - RDI-V - One or more REI-V errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - AIS-P - LOP-P - AIS-V - LOP-V - LOM-V - 2400 or more BIP-2 errors

Item	Definition
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - AIS-L - RDI-L - AIS-P - LOP-P - RDI-P - AIS-V - LOP-V - LOM-V - RDI-V
US (Unavailable Seconds)	Same as M.2100

- All the layers to be measured are measured at the same time.

F.5.6 Test

Judgement results are given for ES, SES and US according to the set thresholds (S1 and S2).

Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	≤	Measured results		

- The priority is in order of Unacceptable > Degraded > Acceptable.

Test display is available for both Rx and Tx. The worst state in ES, SES and US is displayed for Rx, and the worst result in ES and SES is shown for Tx. These are not displayed when the thresholds for Rx and Tx are set at Off.

F.6 M.2110 Measurement Data

F.6.1 Measurement Range

Rx 2hour
Tx 2hour
Rx 24 hour
Tx 24 hour
Rx 7day
Tx 7day

Acceptable, Degraded, Unacceptable

Rx ES
Rx SES
Tx ES
Tx SES
US

.... 0~999999, 1.0E06~9.9E15, > 9.9E15

F.6.2 In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2100
Tx ES (Transmit Error Seconds)	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
Tx SES (Transmit Severely Errored Second)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'DSn frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.6.3 Out-of-service(DSn : Bit)

Item	Definition
Rx ES (Receive Error Seconds	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

F.6.4 Section

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 6.5 STS-path

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.6.6 VT-path (STS1SPE)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 6.7 VT-path (VT1.5SPE, VT2SPE, VT6SPE)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

- All the layers to be measured are measured at the same time.

F.6.8 Calculating Threshold

Measurement threshold is defined as follows.

DSn

RPO = A×P0×TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below.

Bit rate	ES(%)	SES(%)
1.5M,2M	2.75	0.1
8M	2.57	0.1
34M,45M	3.75	0.1
139M	8.75	0.1

TP : Measurement item (Unit : s)

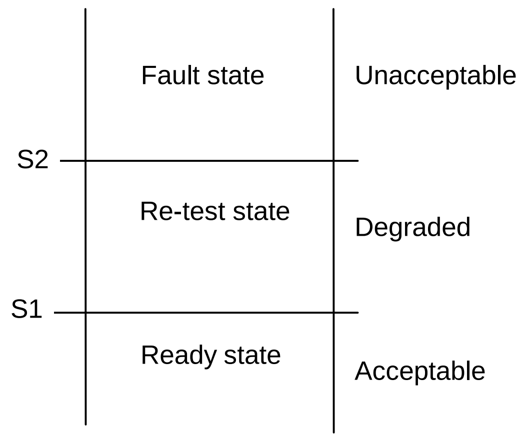
(example : 2hour : 2×60×60)

BISO = RPO/2

$D = 2\sqrt{BISO}$

S1 = RPO/2 − D

S2 = RPO/2 ＋ D



SONET Section, STS-Path

APO = A × P0 × TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below

Mapping	ES(%)	SES(%)
STS1SPE	3.75	0.1
STS3cSPE	8	0.1

TP : Measurement item (unit : s)

(example : 2hour : 2 × 60 × 60)

BISO = APO/10

D = $2\sqrt{\text{BISO}}$

S1 = APO/2 – D

S2 = APO/2 + D

SONET VT-Path

APO = A × P0 × TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below.

Mapping	ES(%)	SES(%)
VT1.5/2SPE	2	0.1
VT6SPE	2.5	0.1
VC3	3.75	0.1

TP : Measurement item (unit : s)

(example : 2hour : 2 × 60 × 60)

BISO = APO/2

D = $2\sqrt{\text{BISO}}$

S1 = APO/2 – D

S2 = APO/2 + D

F.7　M.2120　Measurement Data

F.7.1　Measurement Range

Rx TR1-ES
Tx TR1-ES
Rx TR1-SES
Tx TR1-SES......... Acceptable, Degraded, Unacceptable
Rx TR2-ES
Tx TR2-ES
Rx TR2-SES
Tx TR2-SES

Rx ES
Tx ES
Rx SES .... 0~999999, 1.0E06~9.9E15, > 9.9E15
Tx SES
US

F.7.2　In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2100
Tx ES (Transmit Error Seconds)	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
Tx SES (Transmit Severely Errored Second)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'DSn frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.7.3 Out-of-service(DSn : Bit)

Item	Definition
Rx ES (Receive Error Seconds	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

F.7.4 Section

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 7.5 STS-path

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.7.6 VT-path (STS1SPE)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 7.7 VT-path (VT1.5SPE, VT2SPE, VT6SPE)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

- All the layers to be measured are measured at the same time.

F.7.8 Calculating Threshold

Measurement threshold is defined as follows.

DSn

TR1 15min

Path Allocation	ES	SES
0.2~2.5	120	15
3~4	120	15
4.5~7	120	15
7.5~10	120	15
10.5~11	120	15
11.5~13	150	15
13.5~15.5	150	15
16~18.5	150	15
19~20	180	15
20.5~21.5	180	15
22~24.5	180	15
25~27	180	15
27.5~30	180	15
30.5~33	180	15
33.5~36	180	15
36.5~40	180	15
40~63	180	15

TR2 24hour

RPO = A×P0×TP

where

A : Allocation(0.5% to 63%)

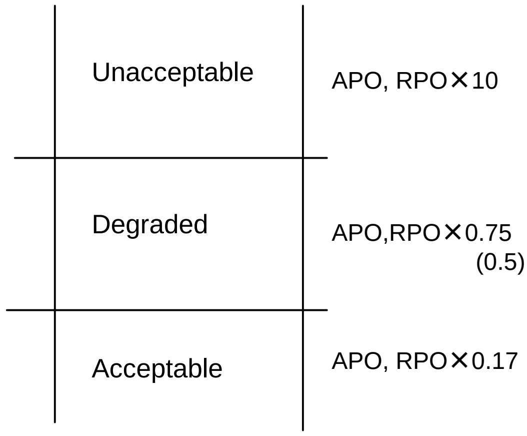
P0 : is fixed accroding to table shown below.

Bit rate	ES(%)	SES(%)
1.5M,2M	2.75	0.1
8M	2.57	0.1
34M,45M	3.75	0.1
139M	8.75	0.1

TP : Measurement item (unit : s)

ES = RPO × set value

SES = RPO × set value



SONET

TR1 15min

Section, STS-path

Bitrate	ES	SES
STS1,STS3	50	10
STS12	50	10
STS48	70	10
STS192	70	10

VT-path

Mapping	ES	SES
VT1.5/2SPE	120	15
VT6SPE	120	15
STS1SPE	150	15
STS3cSPE	150	15

TR2 24hour

APO = A×P0×TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below.

Mapping	ES(%)	SES(%)
VT1.5/2SPE	2	0.1
VT6SPE	2.5	0.1
STS1SPE	3.75	0.1
STS3cSPE	8	0.1

TP : Measurement item (unit : s)

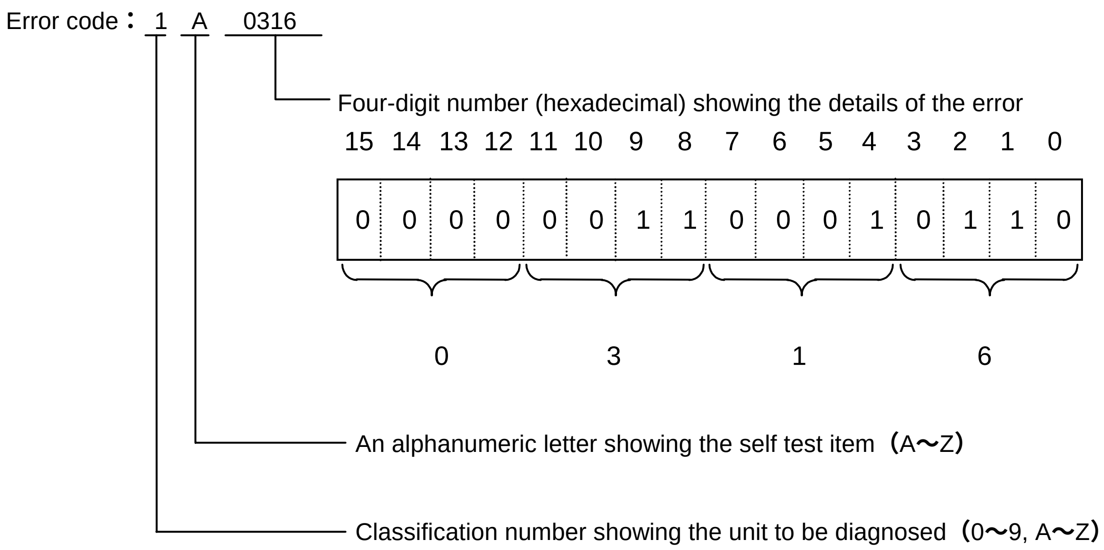
ES = RPO × set value

SES = RPO × set value

Appendix G Self Test Error Codes

G.1 About Error Codes

If an error is detected in self test, an error code corresponding to the type of error is displayed. The error code consists of two alphanumeric characters and a 4-digit number (hexadecimal).



0, 1	:	MP0121A 2/8/34/139/156M(CMI) unit
2, 3	:	MP0122A/B 1.5/45/52M unit
4	:	MP0124A 2/8/34/139M 156/622M Jitter unit
5	:	MP0125A 1.5/45/52M 156/622M Jitter unit
6, 7	:	MP0126A 2/8/34/139M 1.5/45/52M 156M/622M Jitter unit
8, 9	:	MP0123A ATM unit
A	:	MP0127A, MP0128A, MP0129A 2.5G unit
F, G	:	MU150008A, MU150009A, MU150010A 2.5G unit
B	:	MP0130A 2.5G Jitter unit
C	:	MP0131A Add/Drop unit
D	:	MU150000A 2.5G/10G unit
E	:	MU150001A/B/C/D, MU150002A/B, MU150017A/B, MU150021A/B/C/D, MU150022A/B 10G unit
H	:	MU150005A 2/8/34/139M 156/622M Jitter unit
I	:	MU150006A 1.5/45/52M Jitter unit
J,K	:	MU150007A 2/8/34/139M 1.5/45/52M 156/622M Jitter unit
L	:	MU150011A 2.5G Jitter unit
M～V	:	Reserved
W	:	MP0111A, MP0112A
X	:	MP0113A(1.31)，MP0113A(1.55)
Y	:	MP0109A, MP0110A
Z	:	MP0105A, MP0108A

G.2 Error Details

The tables below list the displayed messages, and the details of the error for each bit.

- In the tables where two messages are listed, the message listed above is the one for SDH, and the message listed below is the one for SONET.

Example

Message for SDH

Message for SONET

0E	Signal (156M<->VC2) Signal (156M<->VT6SPE)		An error or alarm was detected unde
		b0	BRate = 156M, Mapping = VT6SPE (VTG# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = VT6SPE-(VTG# = 2, Pattern = PRBS15

(1) MP0121A 2/8/34/139M Unit

‘ 0A - 0B’ Checks on Signals 1

Char.	Message	Bit	Error Details
0A	Signal (2/8/34/139M:Unbalanced)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Pattern = PRBS11, Frame = OFF
		b1	BRate = 8M, Pattern = PRBS15, Frame = OFF
		b2	BRate = 34M, Pattern = PRBS20, Frame = OFF
		b3	BRate = 139M, Pattern = PRBS23, Frame = OFF
		b4	BRate = 2M, Pattern = PRBS11, Frame = ON
		b5	BRate = 8M, Pattern = PRBS15, Frame = ON
		b6	BRate = 34M, Pattern = PRBS20, Frame = ON
		b7	BRate = 139M, Pattern = PRBS23, Frame = ON
0B	Signal (2M:Balanced)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Pattern = "11101001001101001", Frame = ON

'0C - 0E' Checks on Signals 2 #1

Char.	Message	Bit	Error Details
0C	Signal (622M<->STS3cSPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping:STS3cSPE (Bulk), STS3# = 1 to 4 Pattern = PRBS23
0D	Signal (156M<->VC4, VC3) Signal (156M<-STS3cSPE, STS1SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = STS3cSPE (Bulk), STS3# = 1 Pattern = PRBS20
		b1	BRate = 156M, Mapping = 139M (Async.), STS3# = 1, Frame = OFF Pattern = PRBS15
		b2	BRate = 156M, Mapping = 139M (Async.), STS3# = 1, Frame = ON Pattern = "1010101010101010"
		b3	BRate = 156M, Mapping = VC3 (Bulk), STS3# = 1, TUG3# = 1 Pattern = PRBS23
		b4	BRate = 156M, Mapping = 34M (Async.), STS3# = 1, TUG3# = 2 Pattern = PRBS15
		b5	BRate = 156M, Mapping = 34M (Sync.), STS3# = 1, TUG3# = 3 Pattern = PRBS11

0E	Signal (156M<->VC2) Signal (156M<->VT6SPE)	 b0 b1 b2 b3 b4 b5 b6 b7 b8 b9 b10 b11 b12	An error or alarm was detected under the following conditions: BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 1 VTG# = 1, Pattern = PRBS11 BRate = 156M, Mapping = VT6SPE-6M (Async.), STS3# = 1, TUG3# = 1 VTG# = 2, Pattern = PRBS15 BRate = 156M, Mapping = VT6SPE-6M (Bitsync.), STS3# = 1, TUG3# = 1 VTG# = 3, Pattern = PRBS20 BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 2 VTG# = 5, Pattern = "1010101010101010" BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 3 VTG# = 6, Pattern = "1010101010101010" BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 3 VTG# = 7, Pattern = "1010101010101010" BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 1 mc# = 7, Pattern = PRBS11 BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 2 mc# = 6, Pattern = PRBS15 BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 3 mc# = 5, Pattern = PRBS20 BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 2, VTG# = 4 mc# = 4, Pattern = PRBS23 BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 2, VTG# = 5 mc# = 3, Pattern = "1010101010101010" BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 3, VTG# = 6 mc# = 2, Pattern = "1010101010101010" BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 3, VTG# = 7 mc# = 1, Pattern = "1010101010101010"

‘0F - 0I’ Checks on Signals 2 #2

Char.	Message	Bit	Error Details
0F	Signal (156M<->VC12)		An error or alarm was detected under the following conditions:
	Signal (156M<->VT2SPE)	b0	BRate = 156M, Mapping = VT2SPE (Bulk), STS3# = 1, TUG3# = 1 VTG# = 1, VT2# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 2M (Async.), STS3# = 1, TUG3# = 2 VTG# = 2, VT2# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 2M (Async.), STS3# = 1, TUG3# = 2 VTG# = 3, VT2# = 1, Pattern = PRBS15
		b3	BRate = 156M, Mapping = 2M (BitF), STS3# = 1, TUG3# = 3 VTG# = 4, VT2# = 2, Pattern = PRBS20
		b4	BRate = 156M, Mapping = 2M (BitL), STS3# = 1, STS1SPE# = 1 VTG# = 5, VT2# = 2, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 2M (ByteF), STS3# = 1, STS1SPE# = 2 VTG# = 6, VT2# = 3, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = 2M (ByteL), STS3# = 1, STS1SPE# = 3 VTG# = 7, VT2# = 3, Pattern = PRBS11
0G	Signal (156M<->VC11)		An error or alarm was detected under the following conditions:
	Signal (156M<->VT1.5SPE)	b0	BRate = 156M, Mapping = VT1.5SPE (Bulk), STS3# = 1, TUG3# = 1 VTG# = 1, VT2# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 1.5M (Async.), STS3# = 1, TUG3# = 2 VTG# = 2, VT2# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 1.5M (Async.), STS3# = 1, TUG3# = 2 VTG# = 3, VT2# = 1, Pattern = PRBS15
		b3	BRate = 156M, Mapping = 1.5M (BitF), STS3# = 1, TUG3# = 3 VTG# = 4, VT2# = 2, Pattern = PRBS20
		b4	BRate = 156M, Mapping = 1.5M (BitL), STS3# = 1, STS1SPE# = 1 VTG# = 5, VT2# = 2, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 1.5M (ByteF), STS3# = 1, STS1SPE# = 2 VTG# = 6, VT2# = 3, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = 1.5M (ByteL), STS3# = 1, STS1SPE# = 3 VTG# = 7, VT2# = 3, Pattern = PRBS11
0H	Signal (156M CMI<->VC4) Signal (156M CMI<->STS3cSPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M CMI, Mapping = STS3cSPE (Bulk), STS3# = 1 Pattern = PRBS23
0I	Signal (Concatenation Mapping 622M, 156M)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Concatenation Mapping = STS12-STS12c Pattern = PRBS23

'0J - 0N' Checks on Signals 2 #3

Char.	Message	Bit	Error Details
0J	Signal (Dummy 622M)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 2, TUG3# = 1, VTG# = 1, VT2# = 1, Pattern = PRBS15
		b1	BRate = 622M, Mapping = STS3cSPE (Bulk), Pattern = PRBS15, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 3, TUG3# = 3, VTG# = 7, VT2# = 3, Pattern = PRBS15
0K	Signal (Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT2 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23
		b1	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT2 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT2 (Bulk), Pattern = PRBS23
		b2	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT2 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT2 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT2 (Bulk), Pattern = PRBS23
		b4	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT2 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT2 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23

0L	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M
0M	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Pattern = PRBS23
		b1	BRate = 156M, Pattern = PRBS23
0N	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping = STS3cSPE (Bulk), Pattern = PRBS11,

(2) MP0121A/MP0122B 1.5/45/52M Unit

'2A - 2B' Checks on Signals

Char.	Message	Bit	Error Details
2A	Signal (1.5M)		An error or alarm was detected under the following conditions:
		b0	Code = AMI, Frame = OFF, DSX = 0ft, Pattern = PRBS11
		b1	Code = B8ZS, Frame = OFF, DSX = 655ft, Pattern = PRBS15
		b2	Framed (1.5M) = D4, Code = AMI, Frame = ON, DSX = 0ft Pattern = PRBS20
		b3	Framed (1.5M) = ESF, Code = B8ZS, Frame = ON, DSX = 655ft Pattern = PRBS20z
2B	Signal (45M)		An error or alarm was detected under the following conditions:
		b0	Frame = OFF, DSX = 0ft, Pattern = PRBS20z
		b1	Framed (45M) = M13, Frame = ON, DSX = 450ft, Pattern = PRBS23
		b2	Framed (45M) = C-bit, Frame = ON, DSX = 900ft Pattern = "1010101010101010"

'2C - 2E' Checks on Signals 2 #1

Char.	Message	Bit	Error Details
2C	Signal (622M<->VC3)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping:VC3 (Bulk), STS3# = 1 to 4, TUG3# = 1
	Signal (622M<-STS1SPE)		Pattern = PRBS23
2D	Signal (156M<->VC3)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VC3 (Bulk), STS3# = 1, TUG3# = 1 to 3
	Signal (156M<-STS1SPE)		Pattern = PRBS20
		b1	BRate = 156M, Mapping = 45M (Async.), STS3# = 1, STS1SPE# = 1 to 3
			Frame = OFF, Pattern = PRBS20z
2E	Signal (156M<->VC2)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 1
	Signal (156M<->VT6SPE)		VTG# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = VT6SPE-6M (Async.), STS3# = 1, TUG3# = 1
			VTG# = 2, Pattern = PRBS15
		b2	BRate = 156M, Mapping = VT6SPE-6M (Bitsync.), STS3# = 1, TUG3# = 1
			VTG# = 3, Pattern = PRBS20
		b3	BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 2
			VTG# = 5, Pattern = "1010101010101010"
		b4	BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 3
			VTG# = 6, Pattern = "1010101010101010"
		b5	BRate = 156M, Mapping = VT6SPE (Bulk), STS3# = 1, TUG3# = 3
			VTG# = 7, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 1
			mc# = 7, Pattern = PRBS11
		b7	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 2
			mc# = 6, Pattern = PRBS15
		b8	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 1, VTG# = 3
			mc# = 5, Pattern = PRBS20
		b9	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 2, VTG# = 4
			mc# = 4, Pattern = PRBS23
		b10	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 2, VTG# = 5
			mc# = 3, Pattern = "1010101010101010"
		b11	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 3, VTG# = 6
			mc# = 2, Pattern = "1010101010101010"
		b12	BRate = 156M, Mapping = VT6SPE (mc), STS3# = 1, STS1SPE# = 3, VTG# = 7
			mc# = 1, Pattern = "1010101010101010"

'2F - 2H' Checks on Signals 2 #2

Char.	Message	Bit	Error Details
2F	Signal (156M<->VC11)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VT1.5SPE (Bulk), STS3# = 1, TUG3# = 1
	Signal (156M<->VT1.5SPE)		VTG# = 1, VT1.5# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 1.5M (Async.), STS3# = 1, TUG3# = 2
			VTG# = 2, VT1.5# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 1.5M (BitF), STS3# = 1, TUG3# = 3
			VTG# = 3, VT1.5# = 2, Pattern = PRBS20
		b3	BRate = 156M, Mapping = 1.5M (BitL), STS3# = 1, STS1SPE# = 1
			VTG# = 4, VT1.5# = 2, Pattern = PRBS20z
		b4	BRate = 156M, Mapping = 1.5M (ByteF), STS3# = 1, STS1SPE# = 2
			VTG# = 5, VT1.5# = 3, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 1.5M (ByteL), STS3# = 1, STS1SPE# = 3
			VTG# = 6, VT1.5# = 4, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = VT1.5SPE (Bulk), STS3# = 1, TUG3# = 1
			VTG# = 7, VT2# = 1, Pattern = PRBS11
		b7	BRate = 156M, Mapping = 1.5M (Async.), STS3# = 1, TUG3# = 2
			VTG# = 6, VT2# = 1, Pattern = PRBS15
		b8	BRate = 156M, Mapping = 1.5M (BitF), STS3# = 1, TUG3# = 3
			VTG# = 5, VT2# = 2, Pattern = PRBS20
		b9	BRate = 156M, Mapping = 1.5M (BitL), STS3# = 1, STS1SPE# = 1
			VTG# = 4, VT2# = 2, Pattern = PRBS20z
		b10	BRate = 156M, Mapping = 1.5M (ByteF), STS3# = 1, STS1SPE# = 2
			VTG# = 3, VT2# = 3, Pattern = PRBS23
		b11	BRate = 156M, Mapping = 1.5M (ByteL), STS3# = 1, STS1SPE# = 3
			VTG# = 2, VT2# = 3, Pattern = "1010101010101010"
2G	Signal (156M<->VT1.5SPE		An error or alarm was detected under the following conditions:
	Japan mapping)	b0	BRate = 156M, Mapping = 384k (Data), STS3# = 1, TUG3# = 1
			VTG# = 4, VT1.5# = 1, 384k# = 1, Pattern = PRBS11
	Signal (156M<->VT1.5SPE	b1	BRate = 156M, Mapping = 384k (Data), STS3# = 1, STS1SPE# = 1
	Japan mapping)		VTG# = 5, VT2# = 1, 384k# = 2, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 384k (Voice), STS3# = 1, STS1SPE# = 1
			VTG# = 1, VT1.5# = 1, 384k# = 3, Pattern = PRBS20
		b3	BRate = 156M, Mapping = 384k (Voice), STS3# = 1, STS1SPE# = 1
			VTG# = 1, VT2# = 1, 384k# = 4, Pattern = "1010101010101010"
		b4	BRate = 156M, Mapping = Byte (Data), STS3# = 1, TUG3# = 1
			VTG# = 4, VT1.5# = 1, Byte# = 1, Pattern = PRBS11
		b5	BRate = 156M, Mapping = Byte (Data), STS3# = 1, STS1SPE# = 1
			VTG# = 5, VT2# = 1, Byte# = 2, Pattern = PRBS15
		b6	BRate = 156M, Mapping = Byte (Voice), STS3# = 1, STS1SPE# = 1
			VTG# = 1, VT1.5# = 1, Byte# = 3, Pattern = PRBS20
		b7	BRate = 156M, Mapping = Byte (Voice), STS3# = 1, STS1SPE# = 1
			VTG# = 1, VT2# = 1, Byte# = 4, Pattern = "1010101010101010"

2H	Signal (52M B3ZS<->VC3)		An error or alarm was detected under the following conditions:
		b0	BRate = 52M B3ZS, Mapping = VC3 (Bulk), STS1SPE# = 1
	Signal		Pattern = PRBS23, DSX = 0ft
	(52M B3ZS<->STS1SPE)	b1	BRate = 52M B3ZS, Mapping = VC3 (Bulk), STS1SPE# = 1
			Pattern = PRBS15, DSX = 450ft
		b2	BRate = 52M B3ZS, Mapping = VC3 (Bulk), STS1SPE# = 1
			Pattern = PRBS11, DSX = 900ft

'2I - 2M' Checks on Signals 2 #3

Char.	Message	Bit	Error Details
2I	Signal (Dummy		An error or alarm was detected under the following conditions:
	622M)	b0	BRate = 622M,
			Dummy ch Mapping (Tx) = STS3cSPE-VT1.5SPE (Bulk)
			(STS3# = 1, TUG3# = 1, VT1.5# = 1),
			Dummy ch Mapping (Rx) = STS3cSPE-VT1.5SPE (Bulk)
			STS3# = 2, TUG3# = 1, VTG# = 1, VT1.5# = 1,
			Pattern = PRBS15
		b1	BRate = 622M, Mapping = STS3cSPE (Bulk), Pattern = PRBS15,
			Dummy ch Mapping (Tx) = STS3cSPE-VT1.5SPE (Bulk)
			(STS3# = 1, TUG3# = 1, VT1.5# = 1),
			Dummy ch Mapping (Rx) = STS3cSPE-VT1.5SPE (Bulk)
			STS3# = 3, TUG3# = 3, VTG# = 7, VT1.5# = 3,
			Pattern = PRBS15
2J	Signal (Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Pattern = PRBS23
		b1	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
			Pattern = PRBS23
		b2	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Pattern = PRBS23
		b3	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
			Pattern = PRBS23
		b4	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Pattern = PRBS23
		b5	BRate = 622M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Pattern = PRBS23
2K	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M
2L	Signal (Non-frame)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Pattern = PRBS23
		b1	BRate = 156M, Pattern = PRBS23
		b2	BRate = 52MB3ZS, Pattern = PRBS23
2M	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping = STS1SPE (Bulk), Pattern = PRBS11,

MP0122B Unit

'3H' Checks on 52M (1.31um) Interface of MP0122B

Char.	Message	Bit	Error Details
3H	Signal (1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	Alarm = OFF
		b1	Alarm = LOS

(3)　MP0124A　2/8/34/139M 156/622M Jitter Unit

'4A'　Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
4A	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

'4B'　Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
4B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

'4C'　Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
4C	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range:20UI, Mod.freq:1kHz, Ampl.:10UIpp
		b1	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b5	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b6	BRate = 139M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b7	BRate = 139M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

'4D'　Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
4D	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	Brate = 156M CMI, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 156M CMI, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
	Jitter	b2	BRate = 156M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
	(SONET:RX Measure)	b3	BRate = 156M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

'4G' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
4G	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

'4H' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
4H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(4)　MP0125A　1.5/45/52M 156/622M Jitter Unit

'5A'　Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
5A	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'5B'　Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
5B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'5C'　Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
5C	Jitter (1.5/45M:RX Measure)		Jitter measurement error is abnormal under the following conditions:
		b0	BRate = 1.5M, Range:20UI, Mod.freq:0.1kHz, Ampl.:10UIpp
		b1	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'5D'　Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
5D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b1	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp

'5G'　Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
5G	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

'5H'　Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
5H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 52M B3ZS
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(5) MP0126A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit

'6A' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
6A	Jitter		Jitter tolerance is abnormal under the following conditions:
	(2/8/34/139M:Tolerance)	b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

'6B' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
6B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp時

'6C' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
6C	Jitter		Jitter measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range:20UI, Mod.freq:1kHz, Ampl.:10UIpp
		b1	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b5	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b6	BRate = 139M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b7	BRate = 139M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

'6D' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
6D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 156M CMI, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 156M CMI, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

‘6G’ Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
6G	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

‘6H’ Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
6H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

‘7A’ Checks on Jitter tolerance in transmitting side1

Char.	Message	Bit	Error Details
7A	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

‘7B’ Checks on Jitter tolerance in transmitting side2

Char.	Message	Bit	Error Details
7B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

‘7C’ Checks on Jitter measurement error in receiving side1

Char.	Message	Bit	Error Details
7C	Jitter (1.5/45M:RX Measure)		Jitter measurement error is abnormal under the following conditions:
		b0	BRate = 1.5M, Range:20UI, Mod.freq:0.1kHz, Ampl.:10UIpp
		b1	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

‘7D’ Checks on Jitter measurement error in receiving side2

Char.	Message	Bit	Error Details
7D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b1	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp

‘7G’ Checks on frequency measurement error1

Char.	Message	Bit	Error Details
7G	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

‘7H’ Checks on frequency measurement error2

Char.	Message	Bit	Error Details
7H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 52M B3ZS
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(6) 2.5G Unit (MP0127A/MP0128A/MP0129A)

'AA' Checks on Signals1 (Optical 1.31)

Char.	Message	Bit	Error Details
AA	Signal (2488M 1.31 Optical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC3 (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31

'AF' Checks on Signals (Electrical 1)

Char.	Message	Bit	Error Details
AF	Signal (2488M Electrical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical

'AG' Checks on Signals (Optical 1.55)

Char.	Message	Bit	Error Details
AG	Signal (2488M 1.55 Optical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55

'AL' Checks on Signals (Electrical 2)

Char.	Message	Bit	Error Details
AL	Signal (2488M Electrical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical

(7) 2.5G unit (MU150008A/MU150009A/MU150010A)

'FA - FB' Checks on Signals1 (Optical 1.31)

Char.	Message	Bit	Error Details
FA	Signal (2488M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31
FB	Signal (2488M 1.31 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STS48-STS48c Pattern = PRBS31, 2.5G Interface = Optical Wave length = 1.31
		b1	BRate = 2488M, Concatenation Mapping = STS48-STS12c 1to4 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31
		b2	BRate = 2488M, Concatenation Mapping = STS48-STS3c 1to16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31

‘FC - FF’ Checks on Signals 2

Char.	Message	Bit	Error Details
FC	Signal (2488M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M,
			Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Pattern = PRBS23
		b1	BRate = 2488M,
			Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
			Pattern = PRBS23
		b2	BRate = 2488M,
			Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Pattern = PRBS23
			BRate = 2488M,
		b3	Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT2 (Bulk),
			Pattern = PRBS23
			BRate = 2488M,
			Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
		b4	Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk),
			Pattern = PRBS23
			BRate = 2488M,
			Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk),
		b5	Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk)
			Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk),
			Pattern = PRBS23
FD	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FE	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FF	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = STS3cSPE (Bulk), Pattern = PRBS11,

'FK - FM' Checks on Signals (Electrical 1)

Char.	Message	Bit	Error Details
FK	Signal (2488M Electrical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical
FL	Signal (2488M Electrical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STS48-STS48c Pattern = PRBS31, 2.5G Interface = Electrical Wave length = 1.31
		b1	BRate = 2488M, Concatenation Mapping = STS48-STS12c 1to4 Pattern = PRBS23, 2.5G Interface = Electrical Wave length = 1.31
		b2	BRate = 2488M, Concatenation Mapping = STS48-STS3c 1to16 Pattern = PRBS23, 2.5G Interface = Electrical Wave length = 1.31
FM	Signal (2488M 1.31 Dummy)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 2, TUG3# = 1, VTG# = 1, VT2# = 1, Pattern = PRBS15
		b1	BRate = 2488M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 16, TUG3# = 3, VTG# = 7, VT2# = 3, Pattern = PRBS15

‘FN - FO’ Checks on Signals (Optical 1.55)

Char.	Message	Bit	Error Details
FN	Signal (2488M 1.55 Optical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC3 (Bulk), STS3# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55
FO	Signal (2488M 1.55 Optical Concatenation)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Concatenation Mapping = STS48-STS48c Pattern = PRBS31, 2.5G Interface = Optical Wave length = 1.55
		b1	BRate = 2488M, Concatenation Mapping = STS48-STS12c 1to4 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55
		b2	BRate = 2488M, Concatenation Mapping = STS48-STS3c 1to16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55

‘FP - FR’ Checks on Signals 2

Char.	Message	Bit	Error Details
FP	Signal (CID)	b0	An error or alarm was detected under the following conditions: BRate = 2488M
FQ	Signal (Nonframe)	b0	An error or alarm was detected under the following conditions: BRate = 2488M
FR	Signal (OH test)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = STS3cSPE (Bulk), Pattern = PRBS11,

(8) MP0130A 2.5G Jitter Unit

'BA' Checks on Jitter tolerance in transmitting side

Char.	Message	Bit	Error Details
BA	Jitter (Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 2488M, Mod.freq:20kHz, Ampl.:2UIpp
		b1	BRate = 2488M, Mod.freq = 20MHz, Ampl. = 0.2UIpp

'BB' Checks on Jitter measurement error in receiving side

Char.	Message	Bit	Error Details
BB	Jitter (RX Measure)		Measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 2488M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'BD' Checks on frequency measurement error

Char.	Message	Bit	Error Details
BD	Frequency		The frequency is abnormal under the following conditions:
		b0	BRate = 2488M

(9) MP0123A ATM Unit

'8A - 8B' Checks on Signals 1

Char.	Message	Bit	Error Details
8A	Signal (156/622M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 156M, Mapping = ATM User PRG, Header = UNI Pattern = Single PRBS9
		b2	BRate = 156M, Mapping = AAL1, Header = UNI Pattern = Cross PRBS9
		b3	BRate = 156M, Mapping = AAL2, Header = UNI Pattern = Single PRBS7
		b4	BRate = 156M, Mapping = AAL3/4, Header = UNI Pattern = Cross PRBS15
		b5	BRate = 156M, Mapping = AAL5, Header = UNI Pattern = Word16
		b6	BRate = 156M, Mapping = ATM O.191, Header = NNI
		b7	BRate = 156M, Mapping = ATM User PRG, Header = NNI Pattern = Edit pattern
		b8	BRate = 156M, Mapping = AAL1, Header = NNI Pattern = Time stamp
		b9	BRate = 156M, Mapping = AAL2, Header = NNI Pattern = Word8
		b10	BRate = 156M, Mapping = AAL3/4, Header = NNI Pattern = Word16
		b11	BRate = 156M, Mapping = AAL5, Header = NNI Pattern = Edit pattern
8B	Signal (52M B3ZS:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 52MB3ZS, Mapping = ATM O.191, Header = UNI
		b1	BRate = 52MB3ZS, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 52MB3ZS, Mapping = AAL1, Header = UNI Pattern = Single PRBS9
		b3	BRate = 52MB3ZS, Mapping = AAL2, Header = NNI Pattern = Time stamp
		b4	BRate = 52MB3ZS, Mapping = AAL3/4, Header = NNI Pattern = Edit pattern
		b5	BRate = 52MB3ZS, Mapping = AAL5, Header = NNI Pattern = Word16

'8C - 8D' Checks on Signals 2

Char.	Message	Bit	Error Details
8C	Signal (34/139M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 139M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 139M, Mapping = ATM User PRG, Header = UNI Pattern = Time stamp
		b2	BRate = 139M, Mapping = AAL1, Header = UNI Pattern = Word16
		b3	BRate = 139M, Mapping = AAL2, Header = UNI Pattern = Edit pattern
		b4	BRate = 139M, Mapping = AAL3/4, Header = UNI Pattern = Single PRBS9
		b5	BRate = 139M, Mapping = AAL5, Header = UNI Pattern = Cross PRBS9
		b6	BRate = 34M, Mapping = ATM O.191, Header = NNI
		b7	BRate = 34M, Mapping = ATM User PRG, Header = NNI Pattern = Cross PRBS15
		b8	BRate = 34M, Mapping = AAL1, Header = NNI Pattern = Edit pattern
		b9	BRate = 34M, Mapping = AAL2, Header = NNI Pattern = Edit pattern
		b10	BRate = 34M, Mapping = AAL3/4, Header = NNI Pattern = Time stamp
		b11	BRate = 34M, Mapping = AAL5, Header = NNI Pattern = Single PRBS9
8D	Signal (2M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 2M, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 2M, Mapping = AAL1, Header = UNI Pattern = Cross PRBS15
		b3	BRate = 2M, Mapping = AAL2, Header = NNI Pattern = Word8
		b4	BRate = 2M, Mapping = AAL3/4, Header = NNI Pattern = Cross PRBS9
		b5	BRate = 2M, Mapping = AAL5, Header = NNI Pattern = Cross PRBS15

‘8E - 8F’ Checks on Signals 3

Char.	Message	Bit	Error Details
8E	Signal (45M/45MPLCP:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 45M, PLCP = OFF, Mapping = ATM O.191, Header = UNI
		b1	BRate = 45M, PLCP = OFF, Mapping = ATM User PRG, Header = UNI Pattern = Single PRBS9
		b2	BRate = 45M, PLCP = OFF, Mapping = AAL1, Header = UNI Pattern = Cross PRBS23
		b3	BRate = 45M, PLCP = OFF, Mapping = AAL2, Header = UNI Pattern = Time stamp
		b4	BRate = 45M, PLCP = OFF, Mapping = AAL3/4, Header = UNI Pattern = Cross PRBS9
		b5	BRate = 45M, PLCP = OFF, Mapping = AAL5, Header = UNI Pattern = Word16
		b6	BRate = 45M, PLCP = ON, Mapping = ATM O.191, Header = NNI
		b7	BRate = 45M, PLCP = ON, Mapping = ATM User PRG, Header = NNI Pattern = Edit pattern
		b8	BRate = 45M, PLCP = ON, Mapping = AAL1, Header = NNI Pattern = Cross PRBS9
		b9	BRate = 45M, PLCP = ON, Mapping = AAL2, Header = NNI Pattern = Word8
		b10	BRate = 45M, PLCP = ON, Mapping = AAL3/4, Header = NNI Pattern = Cross PRBS15
		b11	BRate = 45M, PLCP = ON, Mapping = AAL5, Header = NNI Pattern = Cross PRBS23
8F	Signal (1.5M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 1.5M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 1.5M, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 1.5M, Mapping = AAL1, Header = UNI Pattern = Time stamp
		b3	BRate = 1.5M, Mapping = AAL2, Header = NNI Pattern = Edit pattern
		b4	BRate = 1.5M, Mapping = AAL3/4, Header = NNI Pattern = Word16
		b5	BRate = 1.5M, Mapping = AAL5, Header = NNI Pattern = Single PRBS9

(10) MP0131A Add/Drop Unit

'CA'

Char.	Message	Bit	Error Details
CA	Add/Drop		PN error is abnormal under the following conditions.
		b0	BRate = 156M, Mapping = STS3cSPE-139M (Async.)
		b1	BRate = 156M, Mapping = STS3cSPE-45M (Async.), Drop DSX = 450ft
		b2	BRate = 156M, Mapping = STS1SPE-45M (Async.), Drop DSX = 450ft
		b3	BRate = 156M, Mapping = STS3cSPE-34M (Async.)
		b4	BRate = 156M, Mapping = STS3cSPE-2M (Async.) Interface = Unbalanced
		b5	BRate = 156M, Mapping = STS3cSPE-2M (Async.) Interface = Balanced
		b6	Brate = 156M, Mapping = STS3cSPE-1.5M (Async.), Code = AMI Drop DSX = 655ft
		b7	BRate = 156M, Mapping = STS3cSPE-1.5M (Async.), Code = B8ZS Drop DSX = 655ft

(11) MP150000A 2.5G/10G Unit

'DA - DB' Checks on Signals

Char.	Message	Bit	Error Details
DA	Signal (9953M)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 64 Pattern = PRBS23
DB	Signal (9953M Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Concatenation Mapping = STS192-STS192c Pattern = PRBS31
		b1	BRate = 9953M, Concatenation Mapping = STS192-STS48c 1to4 Pattern = PRBS23
		b2	BRate = 9953M, Concatenation Mapping = STS192-STS12c 1to16 Pattern = PRBS23
		b3	BRate = 9953M, Concatenation Mapping = STS192-STS3c 1to64 Pattern = PRBS23

'DC - DD' Checks on Signals

Char.	Message	Bit	Error Details
DC	Signal (2488M Electrical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1to16 Pattern = PRBS23
DD	Signal (2488M Electrical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPE*16c Pattern = PRBS31
		b1	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPE*4c 1to4 Pattern = PRBS23
		b2	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPEc 1to16 Pattern = PRBS23

'DE' Checks on Signals (Dummy Electrical)

Char.	Message	Bit	Error Details
DE	Signal (9953/2488M Dummy)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 2, TUG3# = 1, VTG# = 1, VT2# = 1, Pattern = PRBS15
		b1	BRate = 9953M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 64, TUG3# = 3, VTG# = 7, VT2# = 3, Pattern = PRBS15
		b3	BRate = 2488M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 2, TUG3# = 1, VTG# = 1, VT2# = 1, Pattern = PRBS15
		b4	BRate = 2488M, Dummy ch Mapping (Tx) = STS3cSPE-VT2SPE (Bulk) (STS3# = 1, TUG3# = 1, VT2#1), Dummy ch Mapping (Rx) = STS3cSPE-VT2SPE (Bulk) STS3# = 16, TUG3# = 3, VTG# = 7, VT2# = 3, Pattern = PRBS15

'DF - DJ' Checks on Signals 2

Char.	Message	Bit	Error Details
DF	Signal (9953M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23
		b1	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Pattern = PRBS23
		b2	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Pattern = PRBS23
		b4	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 9953M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23

DG	Signal (2488M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23
		b1	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-VT6 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Pattern = PRBS23
		b2	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT1.5 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Pattern = PRBS23
		b4	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 2488M, Main CH Mapping = STS3cSPE-TUG3 (#3)-VT1.5 (Bulk), Mixed CH Mapping (Tx) = STS3cSPE-TU3 (Bulk), STS3cSPE-VT6 (Bulk) Mixed CH Mapping (Rx) = STS3cSPE-TUG3 (#2)-VT6 (Bulk), Pattern = PRBS23
DH	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M
		b1	BRate = 2488M
DI	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Pattern = PRBS23, Wave Length = 1.31um
		b1	BRate = 2488M, Pattern = PRBS23, Wave Length = 1.31um
DJ	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = STS3cSPE (Bulk), Pattern = PRBS11,
		b1	BRate = 2488M, Mapping = STS3cSPE (Bulk), Pattern = PRBS11,

(12) MU150001A/B, MU150002A, MU150017A/B Optical 10G Unit

‘EA - EB’ Checks on Signals (Optical 10G/1.55)

Char.	Message	Bit	Error Details
EA	Signal (9953M 1.55 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 64
			Pattern = PRBS23, Wave length = 1.55
EB	Signal (9953M 1.55 Optical		An error or alarm was detected under the following conditions:
	Concatenation)	b0	BRate = 9953M, Concatenation Mapping = STS192-STS192c
			Pattern = PRBS31, Wave length = 1.55
		b1	BRate = 9953M, Concatenation Mapping = STS192-STS48c 1to4
			Pattern = PRBS23, Wave length = 1.55
		b2	BRate = 9953M, Concatenation Mapping = STS192-STS12c 1to16
			Pattern = PRBS23, Wave length = 1.55
		b3	BRate = 9953M, Concatenation Mapping = STS192-STS3c 1to64
			Pattern = PRBS23, Wave length = 1.55

‘EC - ED’ Checks on Signals2 (Optical 2.5G/1.55)

Char.	Message	Bit	Error Details
EC	Signal (2488M 1.55 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = STS3cSPE (Bulk), STS3# = 1 to 16
			Pattern = PRBS23, Wave length = 1.55
ED	Signal (2488M 1.55 Optical		An error or alarm was detected under the following conditions:
	Concatenation)	b0	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPE*16c
			Pattern = PRBS31, Wave length = 1.55
		b1	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPE*4c 1to4
			Pattern = PRBS23, Wave length = 1.55 BRate
		b2	= 2488M, Concatenation Mapping = STS48-STS3cSPEc 1to16
			Pattern = PRBS23, Wave length = 1.55

‘EG - EH’ Checks on Signals3 (Optical 2.5G/ 1.31)

Char.	Message	Bit	Error Details
EG	Signal (2488M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC3 (Bulk), STS3# = 1 to 16
			Pattern = PRBS23, Wave length = 1.31
EH	Signal (2488M 1.31 Optical		An error or alarm was detected under the following conditions:
	Concatenation)	b0	BRate = 2488M, Concatenation Mapping = STS48-STS3cSPE*16c
			Pattern = PRBS31, Wave length = 1.31 BRate
		b1	= 2488M, Concatenation Mapping = STS48-STS3cSPE*4c 1to4
			Pattern = PRBS23, Wave length = 1.31 BRate
			= 2488M, Concatenation Mapping = STS48-STS3cSPEc 1to16
		b2	Pattern = PRBS23, Wave length = 1.31

'EK - EL' Checks on Signals4 (Optical 10G/1.31)

Char.	Message	Bit	Error Details
EK	Signal (9953M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = VC4 (Bulk), AUG# = 1 to 64 Pattern = PRBS23, Wave length = 1.31
EL	Signal (9953M 1.31 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Concatenation Mapping = STM64C-VC4*64c Pattern = PRBS31, Wave length = 1.31
		b1	BRate = 9953M, Concatenation Mapping = STM64C-VC4*16c 1to4 Pattern = PRBS23, Wave length = 1.31
		b2	BRate = 9953M, Concatenation Mapping = STM64C-VC4*4c 1to16 Pattern = PRBS23, Wave length = 1.31
		b3	BRate = 9953M, Concatenation Mapping = STM64C-VC4c 1to64 Pattern = PRBS23, Wave length = 1.31

(13) MU150005A 2/8/34/139M 156/622M Jitter Unit

'HA' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
HA	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

'HB' Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
HB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

'HC' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
HC	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 2M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 2M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b8	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b11	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b12	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b13	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b14	BRate = 139M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b15	BRate = 139M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'HD' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
HD	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 156M CMI, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 156M CMI, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
	Jitter	b2	BRate = 156M CMI, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
	(SONET:RX Measure)	b3	BRate = 156M CMI, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'HG' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
HG	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

'HH' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
HH	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

'HI' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HI	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:Peak)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 400UI, Data
		b3	BRate = 2M, Range = 2UI, Data
		b4	BRate = 2M, Range = 20UI, Data
		b5	BRate = 2M, Range = 2UI, Clock
		b6	BRate = 2M, Range = 20UI, Clock
		b7	BRate = 2M, Range = 400UI, Clock
		b8	BRate = 2M, Range = 2UI, Clock
		b9	BRate = 2M, Range = 20UI, Clock

‘HJ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HJ	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:Peak)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 400UI, Data
		b3	BRate = 8M, Range = 2UI, Data
		b4	BRate = 8M, Range = 20UI, Data
		b5	BRate = 8M, Range = 2UI, Clock
		b6	BRate = 8M, Range = 20UI, Clock
		b7	BRate = 8M, Range = 400UI, Clock
		b8	BRate = 8M, Range = 2UI, Clock
		b9	BRate = 8M, Range = 20UI, Clock

‘HK’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HK	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:Peak)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 400UI, Data
		b3	BRate = 34M, Range = 2UI, Data
		b4	BRate = 34M, Range = 20UI, Data
		b5	BRate = 34M, Range = 2UI, Clock
		b6	BRate = 34M, Range = 20UI, Clock
		b7	BRate = 34M, Range = 400UI, Clock
		b8	BRate = 34M, Range = 2UI, Clock
		b9	BRate = 34M, Range = 20UI, Clock

‘HL’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HL	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:Peak)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 400UI, Data
		b3	BRate = 139M, Range = 2UI, Data
		b4	BRate = 139M, Range = 20UI, Data
		b5	BRate = 139M, Range = 2UI, Clock
		b6	BRate = 139M, Range = 20UI, Clock
		b7	BRate = 139M, Range = 400UI, Clock
		b8	BRate = 139M, Range = 2UI, Clock
		b9	BRate = 139M, Range = 20UI, Clock

'HM' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HM	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:RMS)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 2UI, Clock
		b3	BRate = 2M, Range = 20UI, Clock

'HN' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HN	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:RMS)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 2UI, Clock
		b3	BRate = 8M, Range = 20UI, Clock

'HO' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HO	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:RMS)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 2UI, Clock
		b3	BRate = 34M, Range = 20UI, Clock

'HP' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HP	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:RMS)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 2UI, Clock
		b3	BRate = 139M, Range = 20UI, Clock

'HQ' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HQ	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:Peak)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 400UI, Data
	(SONET:Rx Intrinsic:Peak)	b3	BRate = 156M CMI, Range = 2UI, Data
		b4	BRate = 156M CMI, Range = 20UI, Data
		b5	BRate = 156M CMI, Range = 2UI, Clock
		b6	BRate = 156M CMI, Range = 20UI, Clock
		b7	BRate = 156M CMI, Range = 400UI, Clock
		b8	BRate = 156M CMI, Range = 2UI, Clock
		b9	BRate = 156M CMI, Range = 20UI, Clock

‘HR’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HR	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 2UI, Clock
	(SONET:Rx Intrinsic:RMS)	b3	BRate = 156M CMI, Range = 20UI, Clock

(14) MU150006A 1.5/45/52M 156/622M Jitter Unit

'IA' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
IA	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'IB' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
IB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'IC' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
IC	Jitter		Jitter tolerance is abnormal under the following conditions:
	(1.5/45M:RX Measure)	b0	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b1	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 1.5M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'ID' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
ID	Jitter		Jitter tolerance is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
	(SONET:RX Measure)	b1	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'IG' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
IG	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

'IH' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
IH	Frequency (SDH)		The frequency is abnormal under the following conditions:
	Frequency (SONET)	b0	BRate = 52M B3ZS
		b1	BRate = 156M
		b2	BRate = 622M

'II' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
II	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:Peak)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 400UI, Data
		b3	BRate = 1.5M, Range = 2UI, Data
		b4	BRate = 1.5M, Range = 20UI, Data
		b5	BRate = 1.5M, Range = 2UI, Clock
		b6	BRate = 1.5M, Range = 20UI, Clock
		b7	BRate = 1.5M, Range = 400UI, Clock
		b8	BRate = 1.5M, Range = 2UI, Clock
		b9	BRate = 1.5M, Range = 20UI, Clock

'IJ' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
IJ	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:Peak)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 400UI, Data
		b3	BRate = 45M, Range = 2UI, Data
		b4	BRate = 45M, Range = 20UI, Data
		b5	BRate = 45M, Range = 2UI, Clock
		b6	BRate = 45M, Range = 20UI, Clock
		b7	BRate = 45M, Range = 400UI, Clock
		b8	BRate = 45M, Range = 2UI, Clock
		b9	BRate = 45M, Range = 20UI, Clock

'IK' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IK	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:RMS)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 2UI, Clock
		b3	BRate = 1.5M, Range = 20UI, Clock

‘IL’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IL	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:RMS)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 2UI, Clock
		b3	BRate = 45M, Range = 20UI, Clock

‘IM’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
IM	Jitter		The measurement error is abnormal under the following conditions:
	(SDH::Rx Intrinsic:Peak)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 400UI, Data
		b3	BRate = 52M B3ZS, Range = 2UI, Data
		b4	BRate = 52M B3ZS, Range = 20UI, Data
		b5	BRate = 52M B3ZS, Range = 2UI, Clock
		b6	BRate = 52M B3ZS, Range = 20UI, Clock
		b7	BRate = 52M B3ZS, Range = 400UI, Clock
		b8	BRate = 52M B3ZS, Range = 2UI, Clock
		b9	BRate = 52M B3ZS, Range = 20UI, Clock

‘IN’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IN	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 2UI, Clock
		b3	BRate = 52M B3ZS, Range = 20UI, Clock

(15) MP150007A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit

'JA' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
JA	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

'JB' Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
JB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

'JC' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
JC	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 2M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 2M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b8	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b11	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b12	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b13	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b14	BRate = 139M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b15	BRate = 139M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'JD' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
JD	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 156M CMI, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 156M CMI, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
	Jitter	b2	BRate = 156M CMI, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
	(SONET:RX Measure)	b3	BRate = 156M CMI, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'JG' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
JG	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

'JH' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
JH	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

'JI' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JI	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:Peak)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 400UI, Data
		b3	BRate = 2M, Range = 2UI, Data
		b4	BRate = 2M, Range = 20UI, Data
		b5	BRate = 2M, Range = 2UI, Clock
		b6	BRate = 2M, Range = 20UI, Clock
		b7	BRate = 2M, Range = 400UI, Clock
		b8	BRate = 2M, Range = 2UI, Clock
		b9	BRate = 2M, Range = 20UI, Clock

'JJ' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JJ	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:Peak)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 400UI, Data
		b3	BRate = 8M, Range = 2UI, Data
		b4	BRate = 8M, Range = 20UI, Data
		b5	BRate = 8M, Range = 2UI, Clock
		b6	BRate = 8M, Range = 20UI, Clock
		b7	BRate = 8M, Range = 400UI, Clock
		b8	BRate = 8M, Range = 2UI, Clock
		b9	BRate = 8M, Range = 20UI, Clock

'JK' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JK	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:Peak)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 400UI, Data
		b3	BRate = 34M, Range = 2UI, Data
		b4	BRate = 34M, Range = 20UI, Data
		b5	BRate = 34M, Range = 2UI, Clock
		b6	BRate = 34M, Range = 20UI, Clock
		b7	BRate = 34M, Range = 400UI, Clock
		b8	BRate = 34M, Range = 2UI, Clock
		b9	BRate = 34M, Range = 20UI, Clock

'JL' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JL	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:Peak)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 400UI, Data
		b3	BRate = 139M, Range = 2UI, Data
		b4	BRate = 139M, Range = 20UI, Data
		b5	BRate = 139M, Range = 2UI, Clock
		b6	BRate = 139M, Range = 20UI, Clock
		b7	BRate = 139M, Range = 400UI, Clock
		b8	BRate = 139M, Range = 2UI, Clock
		b9	BRate = 139M, Range = 20UI, Clock

'JM' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JM	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:RMS)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 2UI, Clock
		b3	BRate = 2M, Range = 20UI, Clock

'JN' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JN	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:RMS)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 2UI, Clock
		b3	BRate = 8M, Range = 20UI, Clock

'JO' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JO	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:RMS)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 2UI, Clock
		b3	BRate = 34M, Range = 20UI, Clock

'JP' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JP	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:RMS)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 2UI, Clock
		b3	BRate = 139M, Range = 20UI, Clock

'JQ' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JQ	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:Peak)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 400UI, Data
	(SONET:Rx Intrinsic:Peak)	b3	BRate = 156M CMI, Range = 2UI, Data
		b4	BRate = 156M CMI, Range = 20UI, Data
		b5	BRate = 156M CMI, Range = 2UI, Clock
		b6	BRate = 156M CMI, Range = 20UI, Clock
		b7	BRate = 156M CMI, Range = 400UI, Clock
		b8	BRate = 156M CMI, Range = 2UI, Clock
		b9	BRate = 156M CMI, Range = 20UI, Clock

'JR' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JR	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 2UI, Clock
	(SONET:Rx Intrinsic:RMS)	b3	BRate = 156M CMI, Range = 20UI, Clock

'KA' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
KA	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'KB' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
KB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'KC' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
KC	Jitter		Jitter tolerance is abnormal under the following conditions:
	(1.5/45M:RX Measure)	b0	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b1	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 1.5M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'KD' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
KD	Jitter		Jitter tolerance is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
	(SONET:RX Measure)	b1	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'KG' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
KG	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

'KH' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
KH	Frequency (SDH)		The frequency is abnormal under the following conditions:
	Frequency (SONET)	b0	BRate = 52M B3ZS
		b1	BRate = 156M
		b2	BRate = 622M

'KI' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KI	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:Peak)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 400UI, Data
		b3	BRate = 1.5M, Range = 2UI, Data
		b4	BRate = 1.5M, Range = 20UI, Data
		b5	BRate = 1.5M, Range = 2UI, Clock
		b6	BRate = 1.5M, Range = 20UI, Clock
		b7	BRate = 1.5M, Range = 400UI, Clock
		b8	BRate = 1.5M, Range = 2UI, Clock
		b9	BRate = 1.5M, Range = 20UI, Clock

'KJ' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KJ	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:Peak)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 400UI, Data
		b3	BRate = 45M, Range = 2UI, Data
		b4	BRate = 45M, Range = 20UI, Data
		b5	BRate = 45M, Range = 2UI, Clock
		b6	BRate = 45M, Range = 20UI, Clock
		b7	BRate = 45M, Range = 400UI, Clock
		b8	BRate = 45M, Range = 2UI, Clock
		b9	BRate = 45M, Range = 20UI, Clock

'KK' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KK	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:RMS)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 2UI, Clock
		b3	BRate = 1.5M, Range = 20UI, Clock

'KL' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KL	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:RMS)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 2UI, Clock
		b3	BRate = 45M, Range = 20UI, Clock

'KM' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KM	Jitter		The measurement error is abnormal under the following conditions:
	(SDH::Rx Intrinsic:Peak)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 400UI, Data
		b3	BRate = 52M B3ZS, Range = 2UI, Data
		b4	BRate = 52M B3ZS, Range = 20UI, Data
		b5	BRate = 52M B3ZS, Range = 2UI, Clock
		b6	BRate = 52M B3ZS, Range = 20UI, Clock
		b7	BRate = 52M B3ZS, Range = 400UI, Clock
		b8	BRate = 52M B3ZS, Range = 2UI, Clock
		b9	BRate = 52M B3ZS, Range = 20UI, Clock

'KN' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KN	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 2UI, Clock
		b3	BRate = 52M B3ZS, Range = 20UI, Clock

(16) MU150011A 2.5M Jitter Unit

'LA' Checks on Jitter tolerance in transmitting side

Char.	Message	Bit	Error Details
LA	Jitter (Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 2488M, Mod.freq:20kHz, Ampl.:2UIpp
		b1	BRate = 2488M, Mod.freq = 20MHz, Ampl. = 0.2UIpp

'LB' Checks on Jitter measurement error in receiving side

Char.	Message	Bit	Error Details
LB	Jitter (RX Measure)		Measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 32UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 2488M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'LD' Checks on frequency measurement error

Char.	Message	Bit	Error Details
LD	Frequency		The frequency is abnormal under the following conditions:
		b0	BRate = 2488M

'LE' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
LE	Jitter (Rx Intrinsic:Peak)		The measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 2UI, Data
		b1	BRate = 2488M, Range = 32UI, Data
		b2	BRate = 2488M, Range = 2UI, Data
		b3	BRate = 2488M, Range = 32UI, Data
		b4	BRate = 2488M, Range = 2UI, Clock
		b5	BRate = 2488M, Range = 32UI, Clock
		b6	BRate = 2488M, Range = 2UI, Clock
		b7	BRate = 2488M, Range = 32UI, Clock

'LF' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
LF	Jitter (Rx Intrinsic:RMS)		The measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 2UI, Data
		b1	BRate = 2488M, Range = 32UI, Data
		b2	BRate = 2488M, Range = 2UI, Clock
		b3	BRate = 2488M, Range = 32UI, Clock

(17) MP0109A Unit

'YA' MP0109A 622M Interface

Char.	Message	Bit	Error Details
YA	Interface(MP0109A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'YC' MP0109A 156M Interface

Char.	Message	Bit	Error Details
YC	Interface(MP0109A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(18) MP0110A Unit

'YE' MP0110A 622M Interface

Char.	Message	Bit	Error Details
YE	Interface(MP0110A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'YG' MP0110A 156M Interface

Char.	Message	Bit	Error Details
YG	Interface(MP0110A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(19) MP0104A Unit

'ZA' MP0104A 156M Interface

Char.	Message	Bit	Error Details
ZA	Interface(MP0104A:156M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

(20)　MP0104B Unit

'ZC'　MP0104B　156M Interface

Char.	Message	Bit	Error Details
ZC	Interface(MP0104B:156M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

'ZE'　MP0104B 622M Interface

Char.	Message	Bit	Error Details
ZE	Interface(MP0104B:622M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

(21)　MP0105A Unit

'ZG'　MP0105A　156M Interface

Char.	Message	Bit	Error Details
ZG	Interface(MP0105A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(22)　MP0106B Unit

'ZI'　MP0106B 156M Interface

Char.	Message	Bit	Error Details
Z I	Interface(MP0106B:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'ZK'　MP0106B 622M Interface

Char.	Message	Bit	Error Details
ZK	Interface(MP0106B:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(23) MP0108A Unit

'ZM' MP0108A 622M Interface

Char.	Message	Bit	Error Details
ZM	Interface(MP0108A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'ZN' MP0108A 156M Interface

Char.	Message	Bit	Error Details
ZN	Interface(MP0108A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(24) MP0111A Unit

'WA' MP0111A 622M Interface

Char.	Message	Bit	Error Details
WA	Interface(MP0111A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WC' Optical power of MP0111A 622M Interface

Char.	Message	Bit	Error Details
WC	Jitter(MP0111A:622M Power)	b0	Optical power is abnormal under the following condition. BRate:622M

'WD' Optical power of MP0111A 156M Interface

Char.	Message	Bit	Error Details
WD	Interface(MP0111A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WF' Optical power of MP0111A 156M Interface

Char.	Message	Bit	Error Details
WF	Jitter(MP0111A:156M Power)	b0	Optical power is abnormal under the following condition. BRate:156M

(25)　MP0112A Unit

'WG'　MP0112A 622M Interface

Char.	Message	Bit	Error Details
WG	Interface(MP0112A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WI'　Optical power of MP0112A 622M Interface

Char.	Message	Bit	Error Details
W I	Jitter(MP0112A:622M Power)	b0	Optical power is abnormal under the following condition. BRate:622M

'WJ'　MP0112A 156M Interface

Char.	Message	Bit	Error Details
WJ	Interface(MP0112A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WL'　MP0112A 156M Interface　Checks on Optical Power

Char.	Message	Bit	Error Details
WL	Jitter(MP0112A:156M Power)	b0	Optical power is abnormal under the following condition. BRate:156M

(26)　MP0113A Unit(1.31)

'XA'　MP0113A 622M(1.31) Interface

Char.	Message	Bit	Error Details
XA	Interface(MP0113A:622M 1.31)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'XD'　MP0113A 156M(1.31) Interface

Char.	Message	Bit	Error Details
XD	Interface(MP0113A:156M 1.31)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(27) MP0113A Unit(1.55)

'XG' MP0113A 622M(1.55) Interface

Char.	Message	Bit	Error Details
XG	Interface(MP0113A:622M 1.55)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'XJ' MP0113A 156M(1.55) Interface

Char.	Message	Bit	Error Details
XJ	Interface(MP0113A:156M 1.55)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

Appendix H Daily Maintenance, Storage and Transportation

H.1 Daily Maintenance

Stained outer surfaces

Wipe the stained outer surface using a cloth moistened in diluted neutral detergent. Wipe the surface in the same way after using that a dusty place, or before long-time storage. Do not use thinner or benzene as they may remove the surface paint.

Stained display screen

Wipe the stained display screen with a soft dry cloth. For a severely stained screen, use a cloth moistened in diluted neutral detergent. Do not use thinner or benzene.

Loose screws

Tighten loose screws with a suitable tool.

H.2 Storage

Precautions on storage

Avoid storing MP1570A in any of the following locations:

- Where the temperature does not fall in the -20 to +60 °C range
- Where the humidity does not fall in the 20 to 75% range.
- Where it is exposed to direct sunlight.
- Where it is exposed to dust.
- Where condensation may occur due to high humidity.
- Where it is exposed to corrosive gases.

Recommended storage conditions

If MP1570A is to be stored for a long time, take the precautions mentioned above. We recommend that you to store it in a place that satisfies the following conditions:

- Temperature ..... 5 to 30 °C
- Humidity ..... 40 to 75%

H.3　Transportation

Pay due attention to the following points when transporting MP1570A:

- Cover the front panel of MP1570A with a protective cover.
- Insert cushioning material which was removed when you unpacked MP1570A into the box.

If you do not have any such cushioning materials, do the following steps:

(1) Apply a protective cover to the front of MP1570A.

(2) Wrap MP1570A in a plastic bag.

(3) Prepare a corrugated cardboard box, wooden box or aluminum case that is larger than MP1570A by 10 to 15 cm in each dimension, and put the cushioning materials at the bottom of the box up to a thickness of 10 to 15 cm.

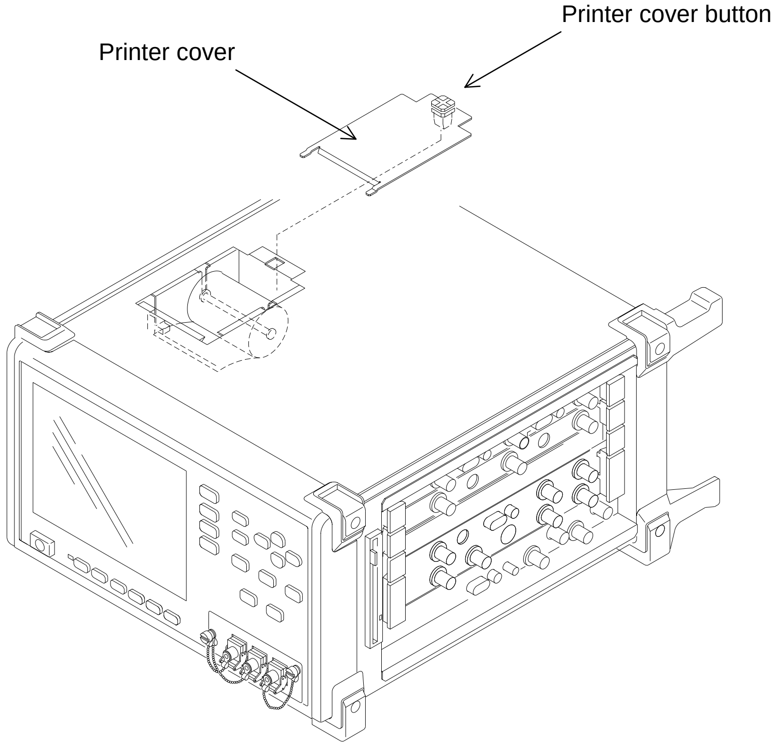
(4) Put MP1570A wrapped in a plastic bag into the box, and insert the cushioning materials around it.

(5) Seal the box with a string, tape or band.

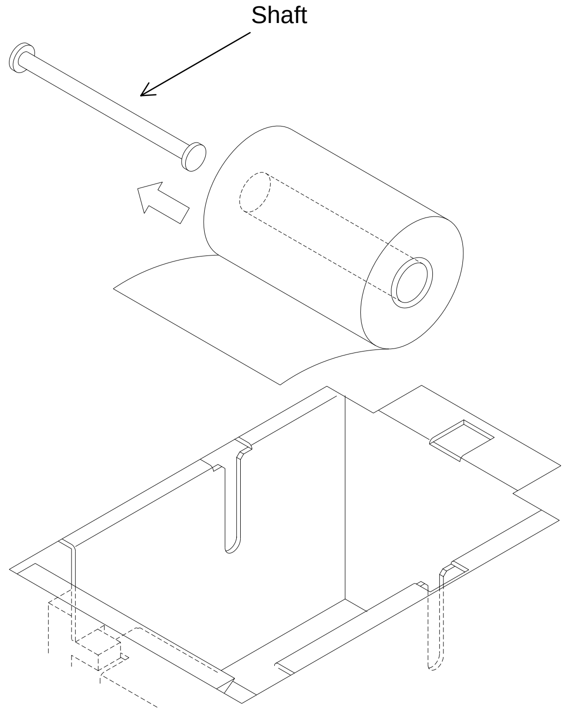
Appendix I　Setting the Built-in Printer Paper

Here are the steps to load the printer paper in the built-in printer of MP1570A.

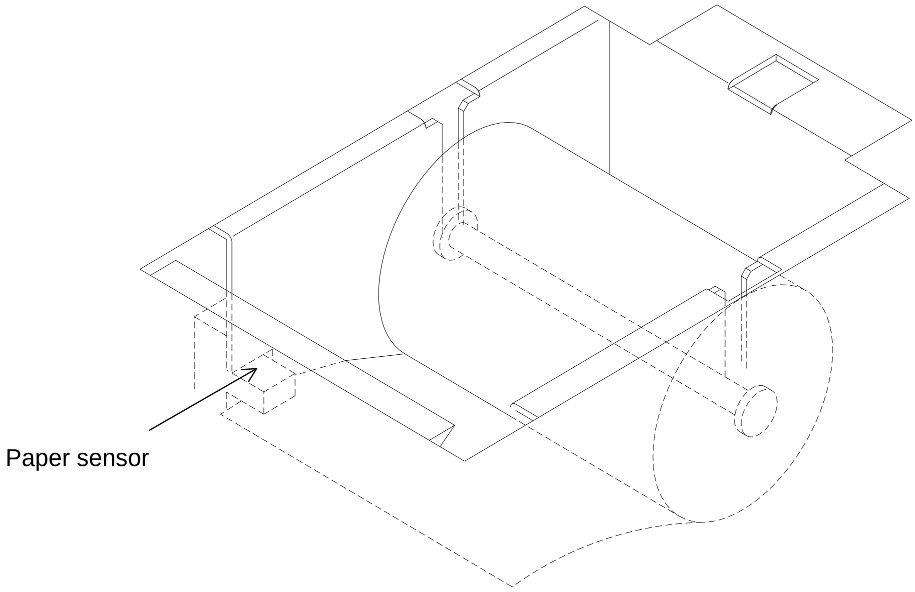
(1) Remove the printer cover by turning the printer cover button on the top of MP1570A clockwise or counter-clockwise.



(2) Remove the roll shaft and insert it through the new paper roll as shown in the figure below.



(3) Set the paper roll shaft, putting the paper end into the paper sensor.



(4) Make sure that the paper roll is properly loaded.

(5) You can feed paper by pressing (Feed) on the front panel.

Note

Always use the specified printer paper in accordance with '1.3.1 Equipment configuration with standard accessories'.

Use of other printer paper can cause the following troubles:

- Poor print quality due to low sensitivity
- Printer head wear due to the rough paper surface
- Abnormal printing noise
- Printer head corrosion or damage
- Print discoloring due to poor print preservation

Appendix J Mounting the Protective Cap of the Optical Connector

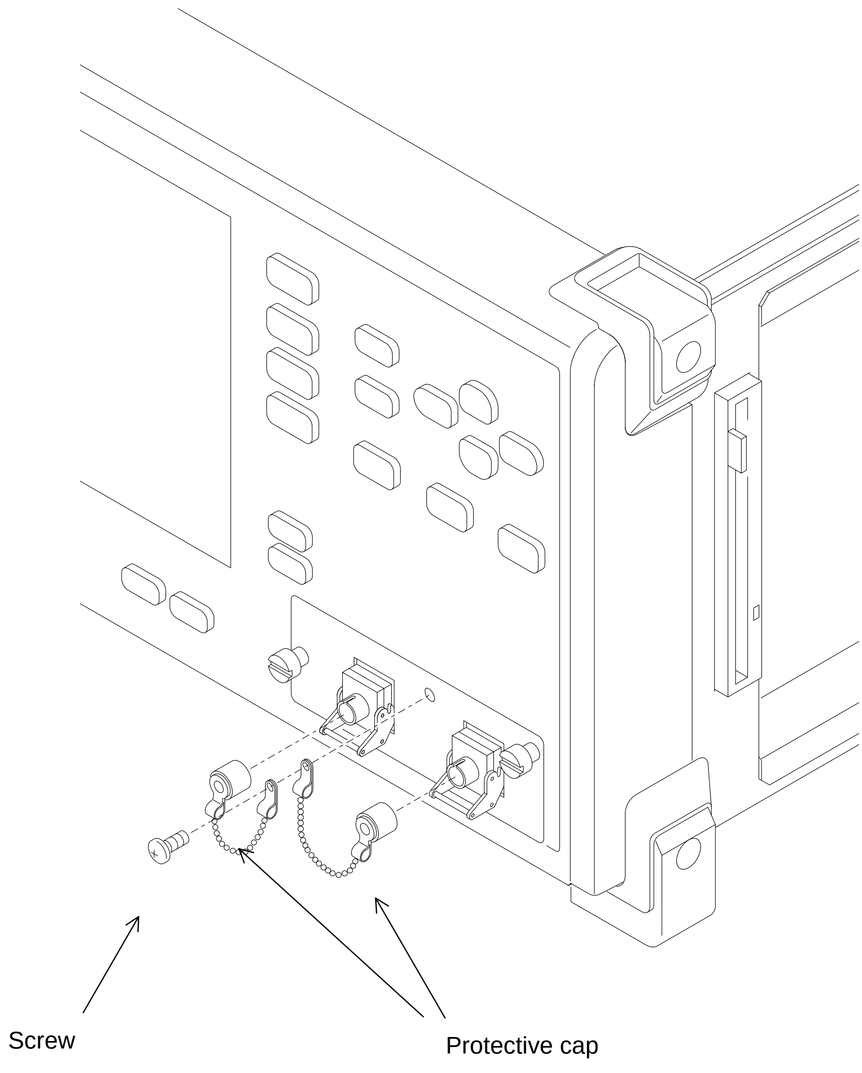
The optical interface units, MP0111A, MP0112A and MP0113A include replaceable optical connectors with protective caps as accessory parts. On replacing the optical connector, replace the cap as well.

J.1 Procedure for Mounting the Protective Cap of MP0111A and MP0112A.

(1) Check that the power switch of MP1570A is turned off.

(2) Remove the screws fixing the protective cap using a 2.5-mm Phillips screwdriver. Remove the protective caps.

(3) Fix the new protective caps with the removed screws.

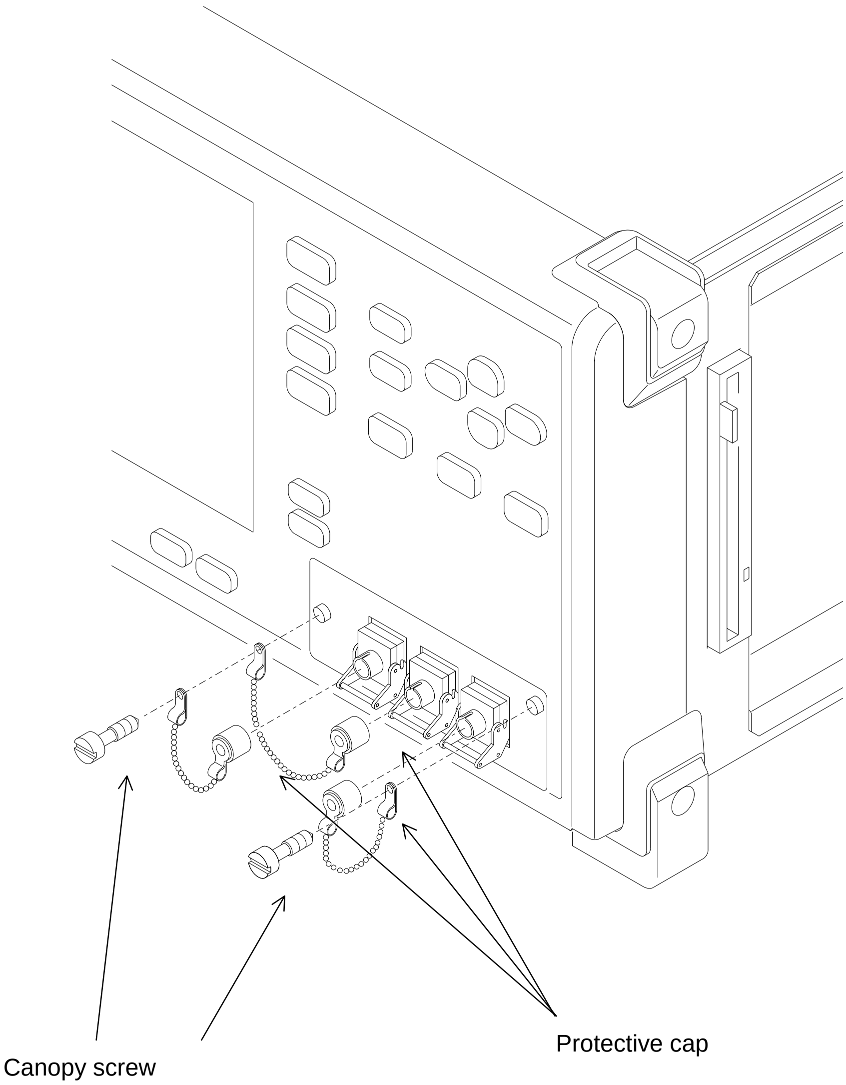


J.2　Procedure for Mounting the Protective Cap of MP0113A

(1) Check that the power switch of MP1570A is turned off.

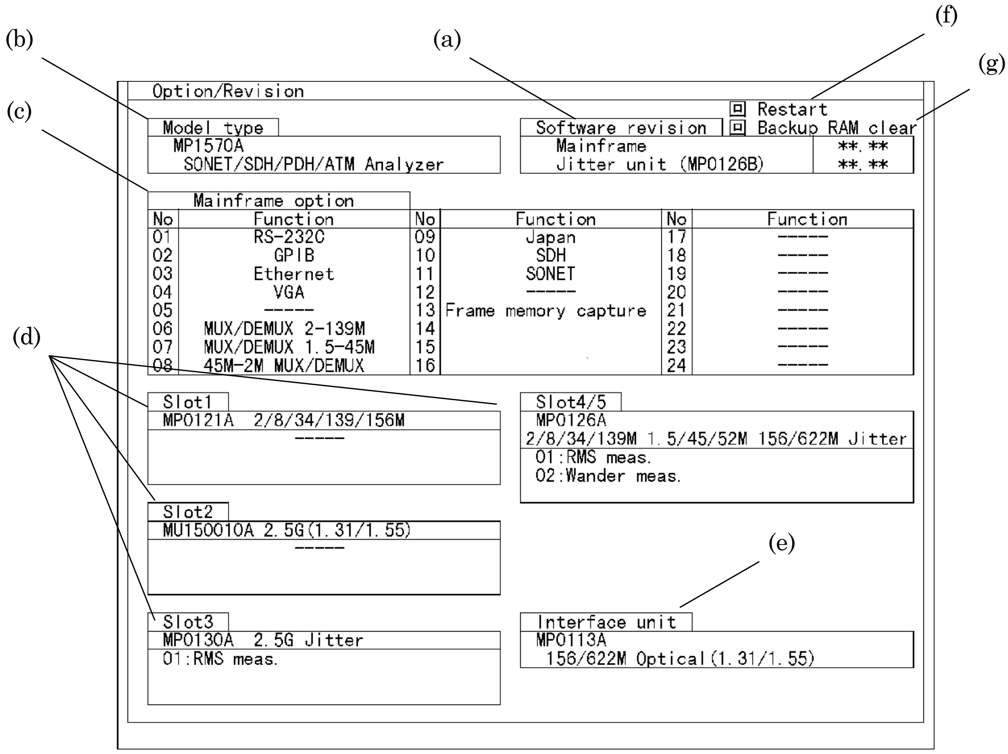
(2) Remove the canopy screws fixing the MP0113A to MP1570A.

(3) Mount the new protective caps and fix them with the screws removed in (2).



Appendix K Revision Numbers of Optional Items and Software

The revision numbers of optional items and software installed on MP1570A are displayed on the 'Option/Revision' screen. The 'Option/Revision' screen appears when you turn on the power switch while pressing Local. Here are the details of the display.



(a) Software revision ..... displays the revision numbers of the software installed on MP1570A.

(b) Model type ..... displays the model name

(c) Mainframe option ..... displays the numbers and functions of optional items

(d) Slot, Slot2, Slot3, Slot4/5 ..... displays the model name, serial number, and options of the plug-in units installed in MP1570A.

(e) Interface unit ..... displays the unit name and serial number of the interface unit installed on the front panel of MP1570A

(f) ☐ Restart ..... The screen setting is reset and an ordinary screen appears if you move the cursor here and press Set.

(g) ◻ Backup RAM clear ..... On/Off for deleting the measurement conditions stored in memory.

◻ ..... Not delete

■ ..... Delete

- When this button is set to "■", all the initial values are set as the measurement conditions by and moving the cursor to "◻ Restart" and pressing Set .

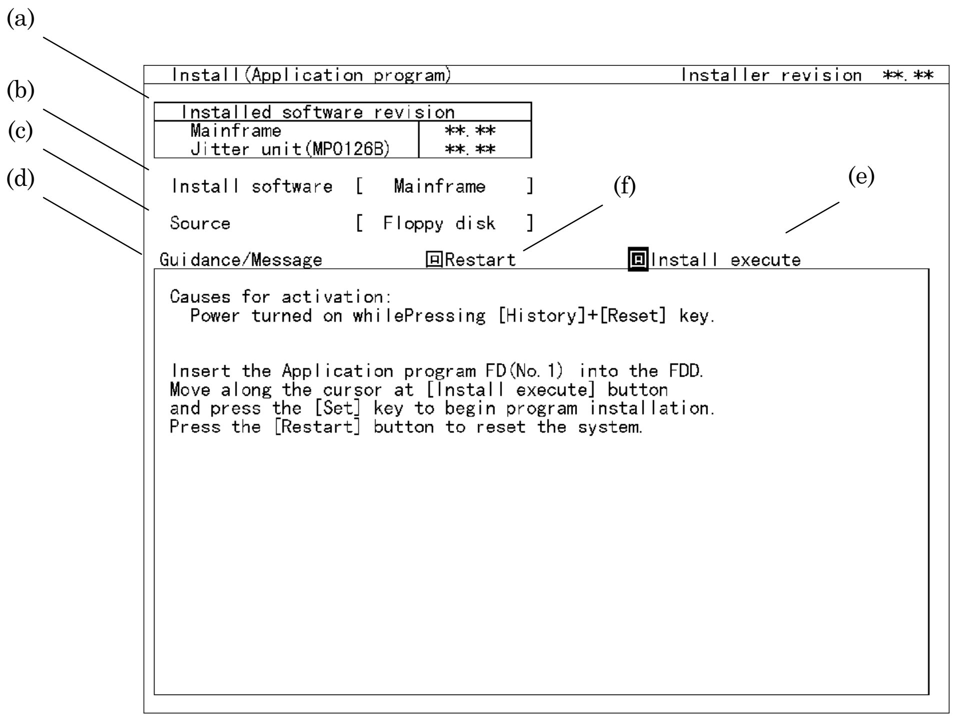
L.1 Installing the Application Software

'Install (Application program)' screen

You can install the application software on the 'Install' screen.

The 'Install' screen appears if you turn on the power switch of MP1570A while pressing (●History) and (Reset).

The 'Install' screen displays the startup conditions of the installation and the guidance message as follows:



(a) Installed Software revision .... Revision information of the installed software. This is updated after the installation.

(b) Install software .... Sets the application to be installed.

(c) Source .... Sets the installation steps.

(d) Guidance Message .... Guidance message related to the installation

(e) Install Execute .... The reversed cursor is displayed here on completion of disk arrangement and installation.

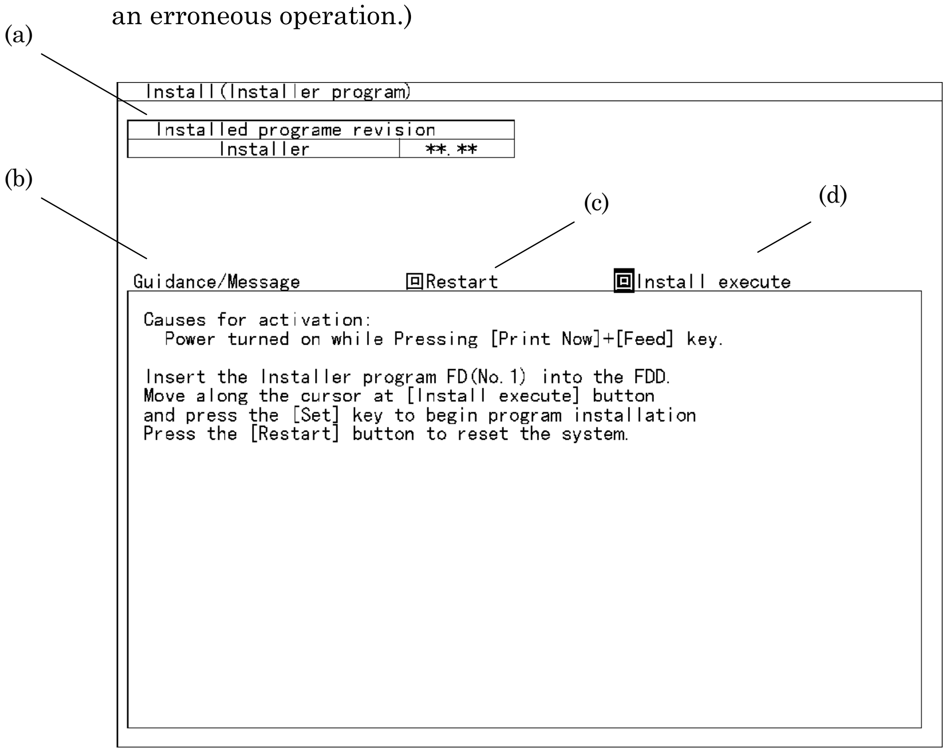
(f) Restart .... Resets to display the ordinary screen when (Set) is pressed.

L.2 Upgrading the Installer

'Install (Installer Program)' screen

You can upgrade the installer on the 'Install (Install Program)' screen. The 'Install (Install Program)' screen appears when you turn on the power switch of MP1570A while pressing (Print Now) and (Feed).

The 'Install (Install Program)' screen displays the revision number of the installer on the upper-right corner. (The upgrading (installation) of the installer is usually prohibited. The field shown in green to prevent an erroneous operation.)



(a) Installed Program revision ....Displays the revision information. This is updated after the installation.

(b) Guidance / Message ....Displays a guidance message for installation

(c) Restart ....Resets the screen to open the 'Install' screen when (Set) is pressed. Install the software for MP1570A.

(d) Install Execute ....The reversed cursor is displayed here on completion of disk arrangement and installation.