MP1580A Portable 2.5G/10G Analyzer Operation Manual Vol. 1 Jitter/Wander Measurement

Fourth Edition

Read this manual before using the equipment. Keep this manual with the equipment.

ANRITSU CORPORATION

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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. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment.

Some or all of the following five symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.

Symbols used in manual



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



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



CAUTION A 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. Insure 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 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.

MP1580A Portable 2.5G/10G Analyzer Operation Manual Vol. 1 Jitter/Wander Measurement

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For Safety

WARNING 🖄

 ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

2. Measurement Categories

This instrument is designed for Measurement category I (CAT I). Don't use this instrument at the locations of measurement categories from CAT II to CAT IV.

In order to secure the safety of the user making measurements, IEC 61010 clarifies the range of use of instruments by classifying the location of measurement into measurement categories from I to IV.

The category outline is as follows:

Measurement category I (CAT I):

Secondary circuits of a device connected to an outlet via a power transformer etc.

Measurement category II (CAT II):

Primary circuits of a device with a power cord (portable tools, home appliance etc.) connected to an outlet.

Measurement category III (CAT III):

Primary circuits of a device (fixed equipment) to which power is directly supplied from the power distribution panel, and circuits from the distribution panel to outlets.

Measurement category IV (CAT IV):

All building service-line entrance circuits through the integrating wattmeter and primary circuit breaker (power distribution panel).



For Safety

WARNING 🛆

- 3. When supplying power to this equipment, connect the accessory 3-pin power cord to a grounded outlet. If a grounded outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.
- 4. 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 technicians 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.
- 5. 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.
- This equipment should be used in the correct position. 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. And also DO NOT use this equipment in the position where the power switch operation is difficult.



Repair







Falling Over

	— For Safety —
Battery Fluid	 7. DO NOT short the battery terminals and never attempt to disassemble it 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 it, ingest it, or get in your eyes. If it is accidentally in-
	medical help. If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.
	 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 acci- dentally, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

v

For Safety

CAUTION \triangle

 Before changing the fuses, ALWAYS remove the power cord from the poweroutlet and replace the blown fuses. ALWAYS use new fuses of the type and rating specified on the fuse marking on the rear panel of the cabinet.

Changing Fuse



T 6.3 A indicates a time-lag fuse.

There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

- 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.

Cleaning

	—— For Safety ———
Replacing Memory Back-up Battery	 This equipment uses a Poly-carbomonofluoride lithium battery to back-up the memory. This battery must be replaced by a service engineer 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.
Floppy Disk	Don't place in a dusty area. Clean the magnetic head periodically for normal operation. For details on cleaning the head, refer to paragraph E.5 "Cleaning the Floppy Disk Drive" in this manual.

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 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

- 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 will not accept liability for equipment faults due to unforeseen and unusual circumstances, nor for faults due to mishandling by the customer.

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 are needed to be broken/shredded so as not to be unlawfully used for military purpose.

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:





About MP1580A Operation Manuals

MP1580A Portable 2.5G/10G Analyzer Operation Manuals comprise of the following two documents. Use them properly according to the usage purpose.



This Operation Manual describes the followings.

This manual (MP1580A Portable 2.5G/10G Analyzer Operation Manual Vol. 1 Remote Control) mainly describes commands and operation procedures for remote control of MP1580A.

Screen Names

MP1580A has 4 major screens, namely, "Setup", "Test Menu", "Result" and "Analyze", and each major screen has its own subscreens (for details, see "Section 4 Screen Switching and Parameter Setting" of Vol. 1).

For example, if "Setup" is selected as the main screen and "Interface" as the subscreen, they are stated as the "Setup: Interface" screen in this manual.

Front Panel Keys

In this manual, (*****) indicate front panel keys.

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1.1 Product Outline

When installed with MU150018A 2.5G/10G Jitter Unit, MP1580A Portable 2.5G/10G Analyzer is capable of generating and evaluating Jitter/Wander of 2.5G/10G signal (appropriate Option is need to be mounted for wander generation/evaluation).

It can provide a high-performance jitter solution by using with MP1570A/ MP1570A1 equipped with MU150000A 2.5G/10G Unit, MU150001A/B Optical 2.5G/10G Tx (1.55) Unit and MU150017A/B Optical 2.5G/10G Rx (wide) Unit.

1.2 Product Features

The main features of MP1580A are as follows:

- Jitter and wander evaluation of 2488.32 MHz/9953.28 MHz signal can be performed.
- Portable size is easy to use for manufacture/maintenance
- Easy operation for measurement conditions by selecting from menu.
- Plug-in unit structure
- Remote control using the GPIB, RS-232C, and Ethernet is possible. The remote control commands conform to SCPI.
- A maximum of 10 setting conditions can be saved in the internal memory and can be retrieved easily.
- The tracking function enables automatic measurements for jitter tolerance, jitter sweep, frequency sweep and wander sweep by controlling MP1570A/MP1570A1 SONET/SDH/PDH/ATM Analyzer.

1.3 Equipment Configuration

1.3.1 Equipment Configuration with Standard Accessories

The standard configuration of MP1580A is shown in the table below.

Model	Name	Remarks
MP1580A	Portable 2.5G/10G Analyzer	

Standard accessories

Model	Name	Qty	Remarks
W1889AE	MP1580A Portable 2.5G/10G Analyzer Operation Manual Vol. 1 Jitter/Wander Measurement	1	
W1890AE	MP1580A Portable 2.5G/10G Analyzer Operation Manual Vol. 2 Remote Control	1	
J0017F	Power supply cord or	1	100 V, L-type
J0640A	Power supply cord		200 V, L-type
F0014	Fuse 6.3 A	2	Normal fusion at 6.3 A
	Protective cover	1	For front panel protection

1.3.2 Plug-in Unit Configuration

The plug-in units that can be installed on MP1580A are shown in the table below.

Model/Order No.	Name	Remarks
MU150018A	2.5G/10G Jitter Unit	

1.3.3 Application Software Configuration

Model	Name	Remarks
MX150002A	Wander (MTIE, TDEV) Measurement Application	
	Software	

Application Software Accessories

Model	Name	Qty	Remarks
W1892AE	MX150002A Wander (MTIE, TDEV) Measurement Application Software Operation Manual	1	Accessory for MX150002A

Note:

Make sure that all items on the configuration list are included.

Contact Anritsu or our dealers if you find missing or damaged parts.

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.

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2.1 Installation Site Environmental Conditions

MP1580A operates normally at ambient temperatures from 0 to 40 °C.

However, avoid using MP1580A at any of the following locations:

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

If MP1580A 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 MP1580A to dry out completely before turning the power on.

2.2 Distance Between Fan Ventilation Grills and Nearby Equipment

MP1580A 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 AC 100 to 120 V or AC 200 to 230 V and at a frequency of 47.5 to 63 Hz. It is not necessary to set the rating for 100 V or 200 V system.

The power consumption is 250 VA or less.

2.4 Grounding

When supplying power to this equipment, connect the accessory 3-core power cord to a 3-pole grounded power outlet.

If a grounded 3-pole outlet is not available, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground before supplying power to the equipment



WARNING 🖄

If power is supplied without grounding the equipment, there is a risk of severe or fatal electric shock. Connect the accessory 3-core power cord to a 3-pole grounded power outlet. Or, connect the ground wire of a conversion adapter or the frame ground on the rear panel of the equipment to ground.

2.5 Connecting the Peripherals

Connect any peripherals, including printer, after turning on the power to MP1580A. Turning the power on after connecting the peripherals may damage MP1580A.

Also be sure to first turn off the peripherals before turning off MP1580A.

2.6 Connecting the Test Devices

Before connecting MP1580A to a device to be measured, check their input and output signal levels. When a signal exceeding the rating is inputted; internal devices may be damaged, resulting in unit failure.

Also be sure not to connect the output connectors each other, or results in unit failure.

2.7 Installing MP1580A

Place MP1580A properly to prevent it from falling down.



2.8 Inserting and Removing Plug-in Unit

Inserting procedure:

2.8.1 Inserting Plug-in Unit

- (1) Turn off the Power switch of MP1580A.
- (2) Insert a plug-in unit in a slot on the right side panel.



- Slots are called as Slot 1, Slot 2, from the top one.
- See "2.9 Slots for Inserting Plug-in Units" for details on slot in which the plug-in unit is inserted. (When a plug-in unit is inserted into wrong slot, the unit is not detected as installed and does not function.)
- (3) Insert the plug-in unit to the end along the guide rail.
- (4) Tighten the left and right screws of the plug-in unit using a screwdriver.



CAUTION A

- When inserting a plug-in unit, make sure that the power switch is turned off. Inserting a plug-in unit while MP1580A is turned on may result in unit failure.
- After inserting the plug-in unit, tighten the screws on the right and left sides. The plug-in unit may malfunction if the screws are loose.
- Insert a unit into the specified slot. For the slot specifications, see "2.9 Slots for Inserting Plug-in Units".
- Do not touch the electric component installed sections of the plug-in units to prevent them from being damaged.
- Store any unused plug-in units in the provided cases.
- Attach a blank panel to the blank slot.

2.8.2 Removing Plug-in Unit

Removing procedure:

- (1) Turn off the Power switch of MP1580A.
- (2) Loosen the left and right screws of the plug-in unit.



(3) Push the ejectors at both ends of the plug-in unit outward to the direction of the arrows in the figure below.



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

CAUTION A

- When removing a plug-in unit, make sure that the power switch is turned off. Removal of a plug-in unit while MP1580A is turned on may result in unit failure.
- 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 slots where the plug-in units should be inserted are shown in the table below.

Unit	Slot 1	Slot 2
MU150018A 2.5G/10G Jitter Unit	O*1	

Slots for Inserting Plug-in Units

 \bigcirc Plug-in unit can be inserted.

- Plug-in unit cannot be inserted.

*1 Use both Slot 1 and Slot 2.

This section describes names and functions of parts on panels of MP1580A and the units to be installed on it.

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3.1 Panel Description of MP1580A



The names and functions of the front, rear and right side panels of MP1580A are described on the following pages.

3.1.1 Front Panel



(a)		Power switch of MP1580A
(b)	►O< RemotePanel Lock ● Local	Key to enable the local control (i.e., panel keys are enabled) while MP1580A is in the remote control status. In local control mode, this key switches between enable/disable for key inputs. When key input is disabled, the lamp on this key goes on.
(c)	C FDD Screen	Key to save the data displayed on the screen as a bitmap file in a floppy disk.
(d)		 Keys to move the cursor on screen and window. In the numeric input window, are used to increment/decrement the displayed value. The displayed value can be changed continuously by holding down one of these keys.
(e)	Set	Key to open the selection window, numeric input window and character string window at data setting. When these windows are already opened, the item on which the reverse cursor displayed is selected for setting.
(f)	Cancel	Key to cancel the selection window, numeric input window and character string window at data setting. The setting before opening the window is retained.
(g)	Start Stop	Key to start/stop measurement. A lamp on this key lights during measurement.
(h)	(OSet Up	Key to open the Setup main screen. While the Setup main screen is displayed, a lamp on this key lights.
(i)	(Test Meru	Key to open the Test Menu main screen. While the Test Menu main screen is displayed, a lamp on this key lights.
(j)	Result	Key to open the Result main screen. While the Result main screen is displayed, a lamp on this key lights.
(k)	Analyze	Key to open the Analyze main screen. While the Analyze main screen is displayed, a lamp on this key lights.
(1)	Contrast	Adjusts display brightness.
3.1.2 Rear Panel



(a)	Printer port	Port to c	Port to output the measured data results to an external printer. This is a Centronics					
		connecto	or.					
		• Prin	• Printer output for this port can be switched on the "Setup: System" screen.					
(b)	VGA output	Output c	Output connector for the screen display to an external monitor.					
(c)	RS-232C connector	RS-2320	RS-232C interface connector.					
		• This	s interface	e is switched i	n the "Setup: System" screen (when the RS-232C			
		opti	on 1s insta	lled.)				
	Pin positions $(1, 2, 3, 4, 5)$	NO	I/O		Name			
		1	I	DCD (CD)	Detect			
	6789	2	I	RXD (RD)	Receive Data			
		3	0	TXD (SD)	Send Data			
		4	0	DTR (ER)	Equipment			
		5	-	SG	Signal Ground			
		6	Ι	DSR (DR)	Data Set Ready			
		7	0	RTS (RS)	Request to Send			
		8	Ι	CTS (CS)	Clear to Send			
		9	Ι	RI (CI)	Call Indication			
		Term of	I/O in the	above table is	assumed to be seen from DTE (such as PC) side.			
(d)	Fuse holder	Holders	for AC p	ower fuses.	When replacing a blown fuse, be sure to use a new			
		fuse of the	fuse of the same rating.					
(e)	AC power inlet	Inlet for	AC powe	r supply. Use	the attached power supply cord.			
(f)	Fan	Cooling	fan. Do	not obstruct th	ese openings for airflow.			
(g)	GPIB connector	GPIB in	terface co	nnector.				
(0)		• Con	trol mode	e for this interf	ace can be switched in the "Setup: System" screen			
		(when the GIPB option is installed).						
(h)	Frame ground	Frame gr	ounding	terminal.				
		• When using a 2-pole power supply outlet, be sure to connect this terminal to						
		grou	ind potent	tial before supp	lying the power.			
(i)	Ethernet connector	Ethernet	interface	connector.				
()		• This	interface	is switched in	the "Setup: System" screen			
		(Whe	en the Eth	ernet option is	installed.)			
				1	,			

3.1.3 Right Side Panel



(a)	3.5 inch FDD	Floppy disk drive for saving or recalling the setup conditions, analysis graph data, measurement result and screen display.
		• The floppy disks used must be of MS-DOS 1.44 MB format.
		• 2HD disk can be used.
	[FD Eject button]	Push button for ejecting the floppy disk.
	[Access LED]	LED to be illuminated in green when the inserted floppy disk is being accessed.
(b)	DCS Input 120Ω	Clock/data input connector for synchronizing the transmission signal to an external clock. Input the clock, HDB3 data or 64 kHz +8 kHz AMI clock that conform to ITU-T G.703.
	Input frequency	2.048 MHz, 64 kHz+8 kHz
	Bit rate	2.048 Mbit/s
	Connector	3 pin Siemens 120 Ω balanced
(c)	DCS Input 100Ω	Clock input connector for synchronizing the transmission signal to an external clock. Input the AMI, B8ZS data or a clock that conform to ANSI T1.
	Input frequency	1.544 MHz
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100 Ω
(d)	DCS Input 75Ω	Clock/data input connector for synchronizing the SDH transmission signal to an external clock. Input a clock or HDB3 data that conform to ITU-T G.703.
	Input frequency	2.048 MHz
	Bit rate	2.048 Mbit/s
	Connector	BNC 75 Ω unbalanced
(e)	Plug-in unit insertion slots	Slots for inserting the plug-in units.
		• Slots are called as Slot 1, Slot 2, from the top one.
		• See "2.9 Slots for Inserting Plug-in Units" for unit and slot combination that can be installed.

3.2 Panel Description of MU150018A Jitter Unit



(a)	Wander Ref Input 75Ω	Input connector for the reference signal from an external signal source
		during wander measurement.
	Input frequency/level	1.544 MHz, 2.048 MHz (CLOCK); 1.125 Vop±34%,
		64 k +8 k; 3.0 Vop±24%
	Bit rate/level	2.048 Mbit/s (HDB3); 2.37 Vop±10%
	Connector	BNC 75 Ω
(b)	Wander Ref Input 100Ω	Input connector for the reference signal from an external signal source
		during wander measurement.
	Bit rate/level	1.544 Mbit/s; 3.0 Vop±24%
	Connector	Weco310 Compatible 100 Ω
(c)	Wander Ref Input 120Ω	Input connector for 2M reference signal from an external signal source
		during wander measurement.
	Bit rate/level	2.048 Mbit/s; 3.0 Vop±24%
	Connector	3-PoleCF 120 Ω
(d)	Wander Ref CLK Output 75Ω	Output connector for the reference signal for wander measurement during
		wander measurement.
	Output frequency/level	1.544 MHz, 2.048 MHz;1.125 Vop±0.3825 V, 5 MHz; 0.8 V (p-p)
	Connector	BNC 75 Ω
(e)	Ext. Ref. Input $5/10 \text{ M}$ 50 Ω	Input connector for 5 MHz/10 MHz reference signal from an external signal
		source when the clock is set to "Lock (5 M, 10 M)".
	Input frequency/level	5, 10 MHz; 0 to +10 dBm
	Connector	BNC 50 Ω
(f)	Demod Output 50Ω	Output connector for the analog signal of jitter-measurement phase-
		detection output.
	Output frequency/level	2 UI/20 UI 1 V (p-p)±0.2 V at fr=100 kHz
		1000 UI/4000 UI 1 V (p-p)±0.2 V at fr=10 Hz
	Connector	BNC 50Ω
(g)	Ext Mod Input 50Ω	Input connector for a modulation signal from an external equipment when
		the jitter generation mode is set to "External".
	Input frequency	0.1 Hz to 80 MHz
	Connector	BNC 50 Ω

Section 3 Panel Description

(h)	Ext CLK Input 50Ω	Input co Enableo "Setup:	onnector for d when "Ex System" sc	a jitter-added clock ternal" is selected f preen.	k signal from for jitter mod	an external device. ulation signal source	e in the
	Input frequency/level	155.52	MHz; 0.8 V	V(p-p) ±0.25 V (AC)			
	Connector	SMA 5	0 Ω				
(i)	Ref CLK Output 50Ω	Output without	connector t jitter or the	for the reference c e clock signal inputt	lock signal t ed from the I	that generated by t Ext Clock Input con	his unit nector.
	Output frequency/level	155.52	MHz; 0.8 V	V(p-p) ±0.25 V (AC)			
	Connector	SMA 5	0 Ω				
(j)	CLK Input 50Ω	Input co	onnector for	r a clock signal for j	itter measure	ement.	
	Input frequency/level	2488.32	2 MHz, 995	3.28 MHz; 0.8 V(p-r)+0.35 V, 0.	8 V(p-p) -0.25 V (A	C)
	Connector	SMA 5	0 Ω				
(k)	CLK Output 50 Ω	Output	connector f	or a clock signal aft	er adding jitt	er.	
	Output frequency/level	2488.32	2 MHz, 995	3.28 MHz; 0.8 V(p-	o)+ 0.35 V, 0.	8 V(p-p) -0.25 V (A	C)
	Connector	SMA 5	0Ω				
(1)	Ref CLK Input 50Ω	Input c an exte measur	onnector fo rnal referen ement refer	r an external refere ice signal. Enable ence-signal source i	nce signal fo d when "Ext n the "Setup:	or jitter measureme ernal" is selected fo Jitter/Wander" scro	nt using or jitter- een.
	Input frequency/level	155.52	MHz; 0.8 V	V(p-p) ±0.2 V (AC)	_		
	Connector	SMA 5	0 Ω				
(m)	RS-232C	Output during This co (MX15 Pin nur	connector wander mea onnector is 0001B) on a nbers and co	for the TIE data m surement. for using the war an external PC. orresponding signal	neasured by t nder measure names are sh	this unit to an exterement application s nown in the table be	rnal PC software low.
			Pin No.	Signal name	Pin No.	Signal name	
			1	CD	5	Ground	
			2	RD	6	DSR	
			3	TD	7	RTS	
			4	DTR	8	CTS]
					9	CI	J

Note:

A name plate indicating the serial No. and installed options are attached on top panel of the unit.

This section describes the screen configuration and parameter setting for MP1580A equipped with MU150018A 2.5/10G Jitter Unit.

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4.1 Basic Screen Operations

MP1580A provides four main screens: Setup, Test menu, Result and Analyze.

The main screens can be switched using $\bigcirc Set U_p$, $\bigcirc Test Meru$, or $\bigcirc Arealyze$ key on the front panel. For example, while the Setup main screen is being displayed, the $\bigcirc Set U_p$ key lamp is illuminated.



Use \bigcirc , \bigcirc , \bigcirc and \bigcirc keys on the front panel to move the screen cursor, set key to select or execute the item, and canal key to cancel the current selection.

4.2 Switching Sub-screens

The Setup, Test menu, Result, and Analyze main screens have their own sub-screens. Sub-screens can be switched in the steps described below.

(1) Using \bigcirc , \bigcirc , \bigcirc and \bigcirc keys, move the cursor to the sub-screen menu and click st.

Setup	Int	erface		L Tx&Rx _	05:09:19 01/Jan/2000
Bit rate	Γ	9953M	J		
Through jitter	Γ	OFF	J		
Clock	Γ	Ir	nternal	J	

(2) A window opens. Use and keys to select the sub-window to be displayed and click st key. Then the selected window appears.

4.3 Windows

4.3.1 Input window

A window that is invoked by moving the cursor to the associated item and clicking set key is called an input window.



4.3.2 Sub-windows

A window that is invoked by moving the cursor to the associated selection item on the menu selection window and clicking \boxed{st} key is called a sub-window.

Setup Memo	ry	05:28:14 01/Jan/2000
Measurement condition	<u>Analyze data</u> [Recall	Clear Clear all
2. Recall 3. Restore 4. Rename NO 5. Clear YES 7. Empty 8. Empty 9. Empty 10. Empty	1 2 3 5 6 7 8 9 10	
µnitial		Total Used 0% Free 100%

4.3.3 Entry to a window

There are three types for window entry:

- Selecting items
- Selecting numerical values
- Selecting character string

Sample selections are given below.

Selecting items

Select one of the available items displayed in the window.

Example: Selecting G.825 2M that is the Setup: Jitter tolerance default

- (1) Display Setup: Jitter tolerance.
- (2) Set 'Tolerance table' to 'User.'
- (3) Move the cursor to 'Default.'



(4) Click set to open the window. From this window, select the target item using and .

Setup	Jitter	toleran	се	
Bit rate Tolerance Defau	table [2488M User]	
G.958 G.958 G.825 G.825 G.813 Bell2 7 L	Type Z Type B 2M 21 2M 41 1.5M 01 53 21 1,00 1,00	No. 0.0 11 2.0 12 6.0 13 0.0 14 0.0 15 0.0 16	Freq.() 22, 46, 100, 220, 460, 1,000, 2,200,	12) 300.0 300.0 300.0 300.0 300.0 300.0 300.0 300.0

(5) Press st to open the Yes/No selection window. On this window, select 'Yes' and then click st to determine the set values.

Setup	Jit	ter t	oleran:	се	
Bit rate Tolerance Defau	table lt	E 2	2488M User]	
G.958 G.958 G.825 G.825 G.813 Bell2 7 F	Туре Туре 20 1.5М 53	A <u>z)</u> 10. 22. VO 7 ES ,000.	No. 0 11 0 12 0 13 0 14 0 15 0 16 0 17	F	req.(Hz) 22,000.0 46,000.0 100,000.0 220,000.0 460,000.0 ,000,000.0 ,200,000.0

Entering numerical values

This is enabled for an item that accepts successive numerical values. A window appears, allowing changing the numerical values in each digit, to set numerical values.

Example: Changing modulation frequency on Test menu: Manual screen

- (1) Display Test menu: Manual screen.
- (2) Set 'Mod. Select' to 'Jitter.'
- (3) Move the cursor to 'Mod. freq.'.



- (5) Using (<) and (>), move the cursor to the digit containing the value to be changed.
- (6) Using \bigcirc and \bigcirc , set the numerical value.

Note:

This sample allows entering numerical values and a frequency unit. Numerical values can be set in the range within Min and Max values.

(7) Click **Set** to determine the settings.

Selecting character string

This is enabled for an item that accepts a character string. A window opens, allowing selecting alphabetical characters, to set a character string.

Example: Entering a title to Peak Jitter screen

- (1) Display Setup: Memory screen.
- (2) Move the cursor to [Empty] and click *set* to open the character string window.



(3) Move the cursor using \bigcirc , \bigcirc , \bigcirc and \bigcirc to specify a character.

Setup	Memor	У		
<u>Measuremen</u>	<u>t condition</u>	Analy	/ze da	<u>ta</u>
1. [AAA 2. Empty		No. No	ame	Gı
3. <u>ABCD&</u> 4. 5. 012245	6700 ¢ 0 #%′/)	-@ ^/\~!		
6. ABCDEF ?. abcdef	o789 .⊅⊠#& (7 GHIJKLMNOPQRS ghijklmnopqrs	TUVWXYZ		
8. < >	BS Ovr	END		
10. Empty]	9		
Ini	tial	10		

- (4) Clicking set with the cursor positioned at
 or > causes the cursor to move to the right or left, and clicking set with the cursor positioned at 'BS' or 'Ins' causes backspacing or inserting operation.
- (5) After character string entry is completed, move the cursor to END and click
 Set
 Thus, the entered character string is determined.

4.4 One-shot Entry

For one-shot entry, clicking state causes the set values function to be determined.

Example: Displaying a marker on Analyze: Peak Jitter screen

- (1) Display Analyze: Peak Jitter screen.
- (2) Click \bigcirc Stat \bigcirc start the measurement.



(3) When the measurement is over, move the cursor to 'Marker' and click s. Then, the marker appears and the measured values at the marker position are displayed on the screen.



Section 5 Screen Description

This section describes the screens that can be displayed when MP1580A is equipped with MU150018A 2.5/10G Jitter Unit, and the screen functions/displays related to jitter/wander measurement.

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5.1 Setup Main Screen

The Setup main screen has the sub-screens listed below.



The screen names and functions are as follows:

Screen name	Description
Interface	Sets the basic parameters (bit rate, clock, through jitter, etc.) for the jitter
	measurement interface.
Jitter tolerance	Sets the measurement table and standard mask for automatic jitter tolerance
	measurement.
Jitter sweep	Sets the measurement table for automatic jitter sweep measurement.
Frequency sweep	Sets the measurement table and standard mask for automatic frequency
	sweep measurement.
Jitter transfer	Sets the measurement table and standard mask for automatic jitter transfer
	characteristic measurement.
Jitter/Wander	Sets the basic conditions for jitter/wander measurement.
Wander sweep	Sets the measurement table for automatic wander sweep measurement.
Print/Logging	Sets the conditions for automatic measurement printing and for logging dis-
	play.
System	Sets the timer, graph resolution, remote interface, etc.
Memory	Saves/reads the setting data and the analyze data.
Floppy disk	Saves data to or reads data from a floppy disk (FD).
Option/Revision	Displays unit options and the software revision.

The following sections describe the sub-screen functions and displays of the Setup main screen related to jitter/wander measurement.

5.1.1 Setup: Interface screen

The Setup: Interface screen allows setting the basic parameters (bit rate, clock, through jitter, etc.) for the jitter measurement interface.

	Setup	Interface	L Tx&Rx J	21:56:40 06/Jan/2000
(a) ——►	Bit rate	9953M		
(b) —	- Through jitter	[OFF]		
(c) —	- Clock	[Internal]	

	ltem	Description
(a)	Bit rate	Selects 9953 M or 2488 M as the bit rate for the transmit- ted and received signals.
(b)	Through jitter	Sets the through jitter to ON/OFF. This item cannot be set in Tx/Rx or Transfer mode. For details, see Section 6.1.3 "Measuring Recovery Data Clock's Jitter and Adding Jitter".
(c)	Clock	Specifies the reference clock for transmitted signals.

5.1.2 Setup: Jitter tolerance screen

The Setup: Jitter tolerance screen allows setting the standard table and mask for the automatic jitter tolerance measurement. When "Tolerance table" and "Mask table" are set to "User", the standard conditions can be changed.





Section 5 Screen Description

	Item	Description
(a)	Bit rate	Selects the setting condition table for automatic measurement, by specifying the bit rate.
(b)	Tolerance Table	Selects and displays the standard points for the jitter tolerance output table. The table shows the jitter modulation frequency at each measurement point.
(c)	Mask table	Selects the standard line. The table shows the jitter modulation fre- quency and amplitude at each measurement point.
(d)	[Switching between Tolerance table and Mask table]	Switches between Tolerance and Mask tables by one-shot input.
(e)	[Standard line graph]	Displays the standard line using a graph. A to F indicate points on the mask table.

For Tolerance table: User:

	ltem	Description
(b)	Tolerance table Default	Initializes the standard points. The setting can be changed when "Tolerance table" is set to "User".
	Tolerance table Freq.	Displays the jitter modulation frequency for each standard point.

For Mask table: User:	
-----------------------	--

	Item	Description
(c)	Mask table	Initializes the standard line.
	Default	The set value can be changed when "Mask table" is set to "User".
	Mask table	Changes the number of points on the standard line.
	Point	The set value can be changed when "Mask table" is set to "User".
	Mask table	Sets the frequency and jitter amplitude at each point on the standard
	Freq./UIPP	line.
		Clicking st with the cursor positioned here opens a numerical value
		input window.
		From this window, input a desired value.
		The set value can be changed when "Mask table" is set to "User".

5.1.3 Setup: Jitter sweep screen

The Setup: Jitter sweep screen allows setting the standard table for automatic jitter sweep measurement. When "Sweep table" is set to "User", the standard conditions can be changed.

[Setup	Jitter su	weep			28	0:19:19	03/Feb/2001
(a) (b)	-Bit rate -Sweep tab	248) Dle [G.958	BM Type A]					
	No. 1 2 3 4 5 6 7 8 9 10	Freq.(Hz) 10.0 13.0 46.0 220.0 460.0 1,000.0 2,200.0 5,000.0 10,000.0	UIP-P 622 163 75 34 16.30 7.50 3.40 1.50 1.50	No. 11 12 13 14 15 16 17 18 19 20	Freq.(Hz) 22,000.0 46,000.0 220,000.0 460,000.0 1,000,000.0 2,200,000.0 4,600,000.0 2,200,000.0 10,000,000.0 20,000,000.0	UIP-P 1.50 1.50 0.68 0.330 0.150 0.150 0.150 0.150 0.150		

_	ltem	Description
(a)	Bit rate	Selects the setting condition table for automatic measure- ment by specifying the bit rate.
(b)	Sweep table	Displays the jitter modulation frequency and amplitude at each measurement point.

For Sweep table: User:

	ltem	Description
(c)	Sweep table Default	Initializes the measurement points. The setting can be changed when "Sweep table" is set to "User".
	Sweep table UI _{p-p} /Freq.	When "Sweep table" is set to "User", the frequency and amplitude settings can be changed on the numerical value input window.

5.1.4 Setup: Frequency sweep screen

The Setup: Frequency sweep screen allows setting the measurement table and standard mask for automatic frequency sweep measurement. When "Mask table" is set to "User", the set conditions can be changed.



	ltem	Description			
(a)	Bit rate	Selects the setting condition table for automatic			
		measurement by specifying the bit rate.			
(b)	Mask table	Displays the standard points.			
(c)	[Graph]	Displays the standard line using a graph.			
		"A" to "D" indicate the points on the mask table.			

For Mask table: User:

	ltem	Description
(b)	Mask table Default	Initializes the standard points.
	Mask table UI _{p-p} /Freq.	When "Mask table" is set to "User", the UI_{P-P} and Freq. settings can be changed on the numerical value input window.

5.1.5 Setup: Jitter transfer screen

The Setup: Jitter transfer screen allows setting the measurement table and standard mask for automatic jitter transfer characteristic measurement. When "Transfer table" and "Mask table" are set to "User", the standard conditions can be changed.

For Table display:



For Mask display:



Section 5 Screen Description

	ltem	Description
(a)	Bit rate	Selects the setting condition table for automatic measurement by specifying the bit rate.
(b)	Transfer table	Selects the standard points. The table lists the jitter modulation frequency and jitter amplitude at each standard point.
(c)	Table/Mask	Switches between "Table" and "Mask" by one-shot input.
(d)	Mask table	Selects the standard line.
(e)	[Graph]	Displays the standard line using a graph. "A" to "D" indicate the points on the mask table.

For Transfer table: User:

	ltem	Description
(b)	Transfer table	When "Transfer table" is set to "User" and "User 2"
	Default	initializes the standard points.
	Transfer table	When "Transfer table" is set to "User" and "User 2" sets
	Freq./UIp-p	the jitter frequency and transmited jitter amplitude at
		each standard point.
		Clicking <i>set</i> with the cursor positioned here opens a
		numerical value input window. On this window, input
	a desired value.	
	Transfer table	When "Transfer table" is set to "User2", sets the
	Rx range	measurement range for each measurement point.

For Mask table: User:

	ltem	Description
(c)	 (c) Mask table Initializes the standard line. • This item is valid when "Mask table" is set to "U 	
	Mask table Point	Changes the number of standard points.This item is valid when "Mask table" is set to "User".
	Mask table Freq. dB	Sets the frequency and jitter gain at each point on the standard line. Click set with the cursor positioned here opens a numerical value input window. On this window, input a desired value. • This item is valid when "Mask table" is set to "User".

5.1.6 Setup: Jitter/Wander screen

The Setup: Jitter/Wander screen allows setting basic conditions for jitter/wander measurement.

When Option is installed, (e) to (f) appeared:



	ltem	Description		
(a)	Modulation source	Selects the jitter modulation signal source. InternalUsing the internal signal of MP1580A as the jitter modulation signal source. ExternalUsing an external signal as the jitter modulation signal source		
(b)	Reference input	Sets the reference clock input destination for jitter measurement. InternalUsing the internal signal of MP1580A as the reference clock. ExternalUsing an external signal as the reference clock.		
(c)	Reference output	Sets the wander reference output frequency.		
(d)	Reference input	Selects the reference signal to be input to the wander reference input.		
(e)	TDEV (Mask)	 Sets the mask standard for TDEV generation. When "User" is selected, the set value can be changed. This item can be displayed when Option 03 is installed. 		
(f)	[Standard value and graph display]	Displays the standard value and graph.		

5.1.7 Setup: Wander sweep screen

The Setup: Wander sweep screen allows setting the measurement table for automatic wander sweep measurement.

	Setup	Wander sweep	22:05:	41 05/Feb/2001
(a) (b)	Bit rate Sweep table Default	[9953M] User]		
(C)	No. Fre 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 10 -	q. (µHz) [U]p-p] 12.0 44790.0 21.0 44790.0 35.0 44790.0 60.0 44790.0 110.0 44790.0 180.0 44790.0 350.0 22780.0 350.0 22780.0 10.00 44890.0 100.0 7980.0 1,000.0 7980.0 1,600.0 4980.0	No. Freq.(uHz) UIP-p 11 2,500.0 4980.0 12 4,000.0 4980.0 13 7,000.0 4980.0 14 10,000.0 4980.0 15 16,000.0 4980.0 16 25,000.0 110.0 18 70,000.0 1110.0 19 130,000.0 630.0	

	ltem	Description
(a)	Bit rate	Selects the setting condition table for automatic measurement by specifying the bit rate.
(b)	Sweep table	Displays the wander modulation frequency and UI _{p-p} at each measurement point on the table.

When Sweep table: User:

	ltem	Description
(c)	Sweep table Default	Initializes the measurement points.
	Sweep table UI _{p-p} /Freq.	When "Sweep table" is set to "User", the UI _{p-p} and Freq. values can be changed on the numerical value input window.

5.1.8 Setup: System screen

The Setup: System screen allows setting the timer, buzzer, graph resolution, remote interface, etc..

	Fo	or Tracking [OFF]			
	Setup	System	1	5:05:49 11/Feb/2001	[] []
(a)►	Date&Time adjust	[15:05:49 11/Feb/2001]	Remote interface	[GPIB]	+(a)
(b) >	Graph resolution	[1min]	Address	[1] ┥	—(e)
(c)	Tracking	[OFF]			

	ltem	Description
(a)	Date & Time adjust	Sets the current Date & Time.
(b)	Graph resolution	Selects the interval time for Analyze: Frequency
		Graph/Analyze Peak Jitter screen.
(c)	Tracking	Sets the measuring object instrument used for
		automatic jitter measurement.
(d)	Remote interface	When "Tracking" is set to "OFF", selects the
		external interface for remote control of
		MP1580A. See "section 8.4 Remote control"
		for details
(e)	Address	When "Tracking" is set to "OFF", sets the inter-
		face address.

For Tracking [MP1570A]

	Setup	System	19:52:52 03/Feb/2001
	Date&Time adjust	[19:52:52 03/Feb/2001]	
	Graph resolution	[1min]	
	Tracking	MP1570A	
(g) ———	GPIB address	[1]	
(h) ——•	Tracking start		

	ltem	Description
(g)	GPIB address	Selects the MP1570A's GPIB address in the range of 1 to 30.
(h)	Tracking start	Start/stop button for tracking

Note:

After tracking has started, click set with the cursor positioned at at "Tracking start" to interrupt tracking. Clicking again (while tracking is interrupted and MP1570A is changing the settings) may cause error message "The GPIB connection was not established correctly" to appear.

5.1.9 Setup: Floppy screen

See "Section 8.1 Floppy disk" for details.

5.1.10 Setup: Memory screen

See "Section 8.2 Internal Memory" for details.

5.1.11 Setup: Option revision screen

See "Appendix B Options" for details.

5.2 Test Menu Main Screen

The Test Menu main screen has the sub-screens listed below.



* These sub-screens are used for tracking, and cannot be displayed during initial setting.

For tracking, see Sections 6.2 "Automatic Jitter Measurement" and 7.2 "Automatic Wander Measurement".

The screen names and functions are shown below:

Screen name	Description
Manual	Sets the conditions for manual jitter/wander measurements.
Jitter tolerance	Sets the conditions for automatic jitter tolerance measure-
	ment.
Jitter sweep	Sets the conditions for automatic jitter sweep measurement.
Frequency sweep	Sets the conditions for automatic frequency sweep measure-
	ment.
Jitter transfer	Sets the conditions for automatic jitter transfer characteristic
	measurement.
Wander	Sets the conditions for automatic wander measurement.
Wander sweep	Sets the conditions for automatic wander sweep measure-
	ment.

5.2.1 Test menu: Manual screen

The Test menu: Manual screen allows setting the conditions for manual jitter/wander measurements.

For manual measurement, this screen can be used to set the jitter/wander ON/OFF, jitter/wander amplitude, modulation-frequency, reference-clock frequency offset, etc. On the received side (Rx), this screen can be used to set the jitter/wander range and the filter for measuring the received jitter.



	Item	Description		
(a)	Mod. select	Selects jitter/wander sine-wave generation from "Clock output".		
(b)	Freq. offset	Sets the frequency offset.		
(c)	Rx Range	Switches the range for measuring the received Jit-ter/Wander.		
(d)	Filter	Selects the filter for measuring the received Jitter/Wander. The cur-off frequency is displayed on the right side.		
(e)	Hit threshold	Selects the hit threshold values.		
(f)	Correction	Sets the RMS offset.		
(g)	Meas. mode	Sets the measurement mode.* When the measurement mode is Repeat, wander is not measured.		

For Tx Mod Select: [OFF]

5.2 Test Menu Main Screen

	For ⁻	Tx Mod Select: [Jitter]			
	Test menu	Manual	Tx&Rx:9953M	15:43:02	26/Mar/2001
(a) (b) (c) (d)	Tx Mod. select Range Mod. freq. Amplitude Adjust □ Freq. offset	Jitter 80UI 100,000.0 Hz Manual 02.6 0 UIp-p 10.0]ppm	Wander generation Type	C	OFF]
	Rx Range Filter Hit threshold Correction Meas. mode	2UI HP2+LP (X2 - [0.000]2) Repeat [1]	, - 80M [s]		

	ltem	Description			
(a)	Tx Range	Selects the range for generating transmited jitter.			
(b)	Mod. freq.	Sets the modulation frequency.			
		This item is valid when "Jitter modulation source" is			
		"Internal".			
		This item cannot be set when "Mod. Select" is "OFF".			
(c)	Amplitude	Specifies the jitter amplitude setting method.			
		Manual The amplitude can be increased while adjusting			
		with "Adjust".			
		Auto The amplitude set at the numerical value input			
		window is used as is for jitter generation.			
		This item cannot be set when "Mod. Select" is "OFF".			
(d)	Adjust	Sets the jitter amplitude. When this is set to "ON", a			
		numerical value input window appears. On this window,			
		input a desired amplitude value.			
		• This item cannot be set when "Mod.Select" is "OFF".			
		• This is valid when "Jitter modulation source" is			

Section 5 Screen Description

For Tx Mod Select: Off,

Wander generation Type: TDEV, Transient, Signal OFF

Test menu	Manua	al		Tx&Rx:9953M	22:47:09	15/Jan/2000
Tx Mod. select	[OFF	:]	(Wander generation Type TDEV(Mask)	1997	ander(TDEV) ITU-T
Freq. offset	C	0.0]p	РM		(a)	
Rx Range Filter	[4008 [HP0+L	0UI] _P´]	10	- 20k		
Meas. mode	[Manu	jal]				

	ltem	Description	
(a)	Wander generation	Selects the wander to be output from the Wander Ref.	
	Туре	Output connector.	
		TDEV Adds noise like Gaussian distributi	
		form to the wander reference clock.	
		Transient Adds transient noise to the wander	
		reference clock.	
		Signal OFF Cuts off the wander reference clock.	
	TDEV (Mask)	Sets the mask standard for generating TDEV.	

5.2.2 Test menu: Jitter tolerance screen

The Test menu: Jitter tolerance screen allows setting the conditions for automatic jitter tolerance measurement.



	Item	Description	
(a)	Tolerance table	Selects the measurement points for jitter tolerance table.	
(b)	Point	Sets the start and end of 1 to 20 measurement points.	
(c)	Mask table	Sets the frequency offset.	
(d)	Freq. offset	Selects the standard line for jitter tolerance measurement.	
(e)	Detection	Sets the error judgment condition for jitter tolerance measurement. One of the following points is set as the limit point, and the point just before that causing an error is set as the result point. Default	
(f)	Waiting time	Sets the interval from ending the measurement at one point to starting the measurement at	
(-)		the next point.	
(g)	MP1570A condi-	Displays the connection status between MP1580A and MP1570A.	
	tions	A connection error or no tracking status is indicated with ""	
(h)	Tracking start	Start/stop button for tracking	
(i)	[Bar graph]	Displays the progress from the measurement start to the stop.	

	ltem	Description			
(e)	Error	Sets the error type. This item is valid when "Rx Detection" is "1 s error", "Count,"			
		"Rate", "Onset of errors" or "1 dB power penalty".			
	Unit	Sets the threshold value type.			
	• This item is valid when "Detection" is "1 s error".				
	Threshold	Sets the detection range.			
	• This is item valid when "Detection" is "1 s error", "Count", or "Rate".				
	Holdtime When "Detection" is "Count" or "Rate", sets the time for measuring errors af				
		jitter amplitude at each measurement point.			

For RX detection: except default condition

5.2.3 Test menu: Jitter sweep screen

The Test menu: Jitter sweep screen allows setting the conditions for automatic jitter sweep measurement. After starting the measurement by pressing $\bigcirc_{\text{Sup}}^{\text{Sub}}$, the measurement progress is displayed at a bar graph on the screen.



	ltem	Description		
(a)	Sweep table	Selects the measurement point for the jitter sweep measurement output table.		
(b)	Point	Sets the start and end of measurement points 1 to 20.		
(c)	Margin	Sets the margin for the jitter sweep standard value.		
		For example, when 80% margin is set for standard mask value 10 UI; 80% of 10 UI, that is, 8-UI jitter is set as a margin, and 18-UI jitter in total is loaded for judging pass/fail.		
(d)	Freq. offset	Sets the frequency offset.		
(e)	Detection	Sets the error judgment condition for jitter tolerance measurement. One of the following points is set as the limit point, and the point just before that causing an error is set as the result point. Default Point where errors occur continuously for two seconds or more. 1 s error Point where errors (equal to or more than the set count occur) or an error (equal to or more than the set rate) occurs, both at Holdtime=1 s. Count Point where errors (equal to or more than the set counts) occur during the set Holdtime. Rate Point where errors (equal to or more than the set rate) occur during the set Holdtime. On set of errors Point where 2 or more error seconds (ES) at Holdtime=30 s. 1 dB power penalty Point where 100 or more errors occur in 1		
		second.		
(f)	Waiting time	Sets the interval from ending the measurement at one point to starting the measurement at the next point.		
(g)	[Connection	Displays the connection status between MP1580A and MP1570A.		
(0)	status display]	A connection error or no tracking status is indicated with ""		
(h)	Tracking start	Start/stop button for tracking		
(i)	[Bar graph]	Displays the progress from the measurement start to the stop.		

5.2 Test Menu Main Screen

	Item	Description
(e) Error Sets the error type.		Sets the error type.
		• This item is valid when "Rx Detection" is "1 s error",
		"Count", "Rate", "Onset of errors", or "1 dB power
		penalty".
	Unit	Sets the threshold value type.
		• This item is valid when "Detection" is "1 s error".
	Threshold	Sets the detection range.
		• This is item valid when "Detection" is "1 s error",
		"Count" or "Rate".
	Holdtime	When "Detection" is "Count" or "Rate", sets the time for
		measuring errors after setting the jitter amplitude at each
		measurement point.

For R	X detection: exc	ept default condition

5.2.4 Test menu: Frequency sweep screen

The Test menu: Frequency sweep screen allows setting the conditions for automatic frequency sweep measurement. When the measurement is started by pressing $\bigcirc_{\text{Sbp}}^{\text{Set}}$, the measurement progress is displayed on a bar graph on the screen.



	ltem	Description	
(a)	Tx Mod. freq.	Sets the modulation frequency.	
(b)	Freq. offset	Sets the offset.	
(c)	Step	Sets the offset increment.	
(d)	Mask table	Selects the measurement points.	
(e)	Rx Detection	 Sets the error judgment condition for jitter tolerance measurement. One of the following points is set as the limit point, and the point just before that causing an error is set as the result point. Default	
		second.	
(f)	Waiting time	Sets the interval from ending the measurement at one point to	
(-)		starting the measurement at the next point.	
(g)	[Connection status	Displays the connection status between MP1580A and MP15/0A.	
(h)		A connection error or no tracking status is indicated with ""	
<u>(n)</u>	Tracking start		
(1)	[Bar graph]	Displays the progress from the measurement start to the stop.	

5.2 Test Menu Main Screen

	ltem	Description
(e)	Error	Sets the error type.
		• This item is valid when "Rx Detection" is "1 s error",
		"Count", "Rate", "Onset of errors" or "1 dB power pen-
		alty".
	Unit	Sets the threshold value type.
		• This item is valid when "Detection" is "1 s error".
	Threshold	Sets the detection range.
		• This is item valid when "Detection" is "1 s error",
		"Count", or "Rate".
	Holdtime	When "Detection" is "Count" or "Rate", sets the time for
		measuring errors after setting the jitter amplitude at each
		measurement point.

For Rx detection: except	default condition
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5.2.5 Test menu: Jitter transfer screen

The Test menu: Jitter transfer screen allows setting the transfer and mask tables for jitter transfer measurement. For jitter transfer measurement, perform calibration before measurement.



	ltem	Description
(a)	Measurement	Selects the measurement type from between Calibration
	type	and Measurement. The measurement starts after calibra-
		tion is over.
(b)	Loop back	When "Measurement type" is "Calibration", select the
		method for inputting the send signal from MP1580A to the
		receiver of MP1580A.
		Internal Looping back the signal in MP1580A.
		External Connecting a cable to the external connector.
(c)	Transfer table	Selects the output table measurement points for jitter trans-
		fer characteristic measurement.
(d)	Point	Sets the start and stop of measurement points.
(e)	Mask table	Selects the standard line for judging the jitter transfer char-
		acteristic.
(f)	Freq. offset	Sets the frequency offset.
(g)	Waiting time	Sets the interval from ending the measurement at one point
		to starting the measurement at the next point.

Note:

When "Measurement type" is "Calibration" and "Loop back" is "External", a message "Please ensure the loop back" appears.
5.2.6 Test menu: Wander screen

The Test menu: Wander screen allows setting the wander detection conditions.



	ltem	Description
(a)	Туре	Selects the type of wander or noise generation.
(b)	Mask	When "Type" is "Wander (TDEV)", selects the standard
		line for TDEV generation.
(c)	Observation time	Sets the measurement time.
	Maximum phase	When "Type" is "Transient", sets the margin for transient
	deviation	measurement.

5.2.7 Test menu: Wander sweep screen

The Test menu: Wander sweep screen allows setting the Wander sweep table.



	ltem	Description
(a)	Sweep table	Selects the measurement points for the wander sweep
		measurement output table.
(b)	Point	Sets the start and end of measurement points (1 to 20).
(c)	Margin	Sets the margin for the jitter sweep standard value.
		For example, when 80% margin is set for standard mask value 10
		UI; 80% of 10 UI, that is, 8 UI jitter is set as a margin, and 18 UI
		jitter in total is loaded for judging pass/fail.
(d)	Detection	Sets the error judgment condition for wander sweep measurement.
		One of the following points is set as the limit point, and the point
		just before that causing an error is set as the result point.
		CountPoint where errors equal to or more than
		the set count occur during the set Holdtime.
		RatePoint where errors equal to or more than
		the set rate occur during the set Holdtime.
(e)	Error	Sets the error type.
		• This item is valid when "Rx Detection" is "Count" or "Rate
		penalty".
(f)	Threshold	Sets the detection range.
		• This item is valid when "Detection" is "Count" or "Rate".
(g)	[Connection status	Displays the connection status between MP1580A and MP1570A.
	display]	A connection error or no tracking status is indicated with "".
(h)	Tracking start	Start/stop button for tracking
(i)	[Bar graph]	Displays the progress from the measurement start to the stop.

5.3 Result Main Screen

The Result main screen has the sub-screens listed below.



* The sub-screens that can be displayed from the Result main screen are limited by the sub-screen selected on the Test Menu main screen.

The screen names and functions are as follows:

Screen name	Description		
Manual	Displays the manual jitter/wander measurement result.		
Jitter tolerance	Displays the automatic jitter tolerance measurement result.		
Jitter sweep	Displays the automatic jitter sweep measurement result.		
Frequency sweep	Displays the automatic frequency sweep measurement result.		
Jitter transfer	Displays the automatic jitter transfer characteristic measurement result.		
Wander	Displays the automatic wander measurement result.		
Wander sweep	Displays the automatic wander sweep measurement result.		

5.3.1 Result: Manual screen

The Result: Manual screen displays the jitter/wander measurement result.

For Unit: Peak/RMS

When "Unit" is set to "Peak/RMS", UI_{p-p} (jitter amplitude peak-to-peak value) and UI_{rms} (jitter amplitude effective value) can be displayed.





	ltem	Description
(a)	[Measurement time	Displays the measurement start time or measurement elapsed time.
	display]	Start Displays the measurement start time.
		Elapsed Displays the measurement elapsed time.
(b)	Unit	Selects the jitter/wander measurement result display format.
(c)	Display data	Selects the measurement result display method.
		Current Displaying the measurement result from the start up to the current time
		Last Displaying the result at the end of measurement. This is use- ful for repeated measurement for a short period of time.
(d)	[Unlock of receive	Monitors the received signal and displays measurement result for Unlock.
	signal display]	O When no Unlock has occurred, this lamp lights in white.
		•When an Unlock has occurred, this lamp lights in red.
(e)	[Received signal	Displays the received-signal measurement result.
	measurement result	Peak to Peak Displaying the maximum amplitude detected from the
	display]	measurement start to the stop.
		+Peak Displaying the maximum amplitude on the positive side de-
		tected from the measurement start to the stop.
		-Peak Displaying the maximum amplitude on the negative side de-
		tected from the measurement start to the stop.
		RMS Displaying the maximum effective value of the phase shift
		detected from the measurement start to the stop.
		* When unlock occures on the current/repeat mode, the result is displayed
		by red characters and values until the end of measurement.

Resu	lt	Manual	Tx&Rx:9953M	15:52:2	21 26/Mar/200
	t L Peak/R olay data Monitor	MS]		Result	
a)	× lock lo Inlock × Inlock		Peak-Peak +Peak -Peak RMS		UIP-P UI+P UI-P UIrms

For Setup: Interface: Except Clock [Internal] condition

	ltem	Description
(a)	[Monitoring tra	s- Monitors and displays TX Clock loss and Unlock.
	mitted-signal Clo	O When neither Clock loss nor Unlock has occurred, this lamp lights in
	loss and Unlock]	white.
		 When either Clock loss or Unlock has occurred, this lamp lights in red.
		• When "Clock" is set to "Internal" on the Setup: Interface screen, none of the Tx Jitter label, Clock loss lamp, and Unlock lamp appears.

Section 5 Screen Description

For Unit: Hit

When "Unit" is set to "Hit", the number of times the jitter amplitude has exceeded the set threshold is displayed.

Result Manual Unit Hit	Tx&Rx:2488M Start]:://	05:54:47 07/Jan/2000 	
R× Unlock 0	Resu Count Second %F Second	1t	_(a)

	ltem	Description
(a)	[Received signal	Hit Count Total number of hits from the measure-
	measurement result	ment start to the stop.
	display]	Hit SecondSum of hit times from the measurement
		start to the stop.
		%F Second Ratio (%) of sum of non-hit times (sec-
		onds) to total times from the measure-
		ment start to the stop.

For Unit: Wander

When "Unit" is set to "Wander (DC-10 Hz)", "DC-0.01 Hz", and "0.01-10 Hz" for TIE measurement.

Note:

When setting Rx of meas. mode at Test menu: manual screen is Repeat, Wander is not measured.

"DC-0.01 Hz" and "0.01-10 Hz" measurement result will begin to display in 120 sec.

Result Manual	Tx&Rx:2488M	02:55:50 02/Jan/2000	
Unit L Wander(DC-10Hz) J	Start] 02:55:31 02/Jan/2	2000	
Monitor R× Unlock •	Resul Peak Peak Peak TIE	t 54 ns 4.6 ns 50 ns - 36 ns	(a)

	ltem	Description
(a)	[Received-signal meas- urement result display]	 Displays the received-signal measurement result. Peak to Peak Displaying the maximum amplitude detected from the measurement start to the stop. +Peak Displaying the maximum amplitude on the positive side detected from the measurement start to the stop. -Peak Displaying the maximum amplitude on the negative side detected from the measurement start to the stop. TIE Displaying the TIE value.

5.3.2 Result: Jitter tolerance screen

The Result: Jitter tolerance screen displays the automatic jitter tolerance measurement result. The jitter tolerance measurement result is displayed as numerical data together with the measured frequency. The pass/fail judgment result is displayed as "OK" or "NG."



	ltem	Description
(a)	Start	Displays the measurement start time
(b)	[Result]	 Displays the jitter tolerance value at each measurement point. OK The tolerance value satisfies the standard value. NG The tolerance value does not satisfy the standard value. No measured value exists. If the tolerance value exceeds the standard value, ">" appears.

5.3.3 Result: Jitter sweep screen

The Result: Jitter sweep screen displays the automatic jitter sweep measurement result as numerical data. The pass/fail judgment result is displayed as "OK" or "NG".



	ltem	Description
(a)	Start	Displays the measurement start time.
(b)	[Result]	Displays the jitter sweep value at each measurement point. OKThe sweep value satisfies the standard value. NGThe sweep value does not satisfy the standard value. No measured value exists.

5.3.4 Result: Frequency sweep screen

The Result: Frequency sweep screen displays the automatic frequency sweep measurement result. The measurement result is displayed as numerical data together with the ppm value. The pass/fail judgment result is displayed as "OK" or "NG".



	ltem	Description
(a)	Start	Displays the measurement start time.
(b)	[Result]	 Displays the frequency sweep measurement result value at each measurement point. OK The sweep value satisfies the standard value. NG The sweep value does not satisfy the standard value. No measured value exists. If the result exceeds the standard value, ">" appears.

5.3.5 Result: Jitter transfer screen

The Result: Jitter transfer screen displays the automatic jitter transfer measurement result as numerical data together with the measurement frequency.

The pass/fail judgment result is displayed as "OK" or "NG".



	ltem	Description
(a)	Start	Displays the measurement start time
(b)	[Result]	 Displays the jitter transfer characteristic value at each measurement point. OK The value satisfies the standard value. NG The value does not satisfy the standard value. No measured value exists. When Unlock has occurred, "Unlock" appears in red. If the result exceeds the standard value, ">" appears.

5.3.6 Result: Wander screen

The Result: Wander screen displays the TIE measurement result. "Data type" can be set to "Log" or "Linear". The measurement result can be saved as numerical data.



		U	J٧	ALIGH L	inca	uispiay								
R	esult	t l		′ ₩a	andei	r		T×&R:	x:995	63M		19:41	1:43 06,	/Feb/2001
										LE .	lapsed		00·	-00:03:24
	Data type [Linear]													
		-		_										
	No.	τ(s)	[T]	[E(ns)	No.	τ(s)	TI	E(ns)	No.	τ(s)	TIE(ns)	No.	τ(s)	TIE(ns)
	1	10	-	2.0	13	130	-	33	25	250		37	370	
	2	20	-	4.7	14	140	-	32	26	260		38	380	
	3	30	-	11	15	150	-	34	27	270		39	390	
	4	40	-	12	16	160	-	35	28	280		40	400	
	5	50	-	13	17	170	-	37	29	290		41	410	
	6	60	-	15	18	180	-	38	30	300		42	420	
	7	70	-	16	19	190	-	39	31	310		43	430	
	8	80	-	17	20	200	-	41	32	320		44	440	
	9	90	-	19	21	210			33	330		45	450	
	10	100	-	20	22	220			34	340		46	460	
	11	110	-	22	23	230			35	350		47	470	
	12	120	-	25	24	240			36	360		48	480	
	F F										•			· → -
I 1														

	ltem	Description			
(a)	Start/Elapsed	Displays the measurement start time or elapsed time.			
(b)	Data type *	Selects the data type of measurement result to be displayed.			
		Linear Displaying the measurement result with equal measurement			
		point interval of the measurement time.			
		Log Displaying the measurement result with measurement points of			
		the measurement time compressed.			
(c)	[Scroll]	Clicking set with the cursor positioned at one of the following scroll			
		symbols causes the measurement data display to be scrolled:			
		\vdash Scrolling to the first page.			
		\leftarrow Scrolling a half page forward.			
		\rightarrow Scrolling a half page backward.			
		\dashv Scrolling to the last page.			
(d)	[Result]	Displays the wander characteristic value at each measurement point.			
		No standard value exists.			
		• When Unlock has occurred, "Unlock" appears in red.			

5.3.7 Result: Wander sweep screen

The Result: Wander sweep screen displays the automatic wander sweep measurement result as numerical data together with the measurement frequency. The pass/fail judgment result is displayed as "OK" or "NG".



	ltem	Description
(a)	Start/Remain	Displays the measurement start time and remain time.
(b)	[Result]	Displays the wander sweep value at each measurement point. OK The value satisfies the standard value. NG The value does not satisfy the standard value. No measured value exists.

5.4 Analyze Main Screen

The Analyze main screen has sub-screens shown in the following.



* The sub-screens being displayed on the Analyze main screen are limited by the sub-screen selected from the Test Menu main screen.

The screen names and functions are as follows:

Screen name	Description
Logging	Displays the jitter measurement contents to be printed auto- matically.
Peak jitter	Displays the peak jitter measurement result on a graph.
Jitter tolerance	Displays the automatic jitter tolerance measurement result on a graph.
Jitter sweep	Displays the automatic jitter sweep measurement result on a graph.
Frequency sweep	Displays the automatic frequency sweep measurement result on a graph.
Jitter transfer	Displays the automatic jitter transfer characteristic measure- ment result on a graph.
Wander	Displays the automatic wander measurement result on a graph.
Wander sweep	Displays the automatic wander sweep measurement result on a graph.
Frequency graph	Displays the frequency data on a graph.
Frequency monitor	Displays the frequency monitor result as data.
Recall	Displays the data read from FD or internal memory.

5.4.1 Analyze: Peak jitter screen

The Analyze: Peak jitter screen displays on a graph the jitter amplitude for peak jitter measurement.



	ltem	Description
(a)	Title	Inputs the graph title. For input method, see "Section 4.3 Win- dows".
(b)	[Scroll]	Scrolls the graph.
		E Scrolling to the first page.
		\leftarrow Scrolling a half page forward.
		\rightarrow Scrolling a half page backward.
		H Scrolling to the last page.
(c)	Unlock	Monitors and Displays unlock signal.
(d)	[Scale]	Switches the vertical axis of the graph (UIp-p, UI+p, UI-p, UIrms, and
		jitter amplitude).
(e)	[Measurement time	Displays the measurement start date and time.
	display]	
(f)	Store	Saves the graph data in memory.
		See "Section 8.2.6 Saving analysis graph data".
(g)	Marker	Sets the marker ON/OFF.
		\square Indicates that the marker is set to OFF.
		Clicking $[st]$ sets the marker to ON.
		Image: Indicates that the marker is set to ON
		Clicking sets the marker to OFF.
(h)	$\leftarrow \rightarrow$	With the marker set On and the cursor positioned at $[\leftarrow]$ and $[\rightarrow]$,
		clicking set displays the numerical data at the measurement
		point.
(i)	[Detailed data dis-	Displays the detailed data at the measurement point indicated by
	play]	the marker.
(j)		Indicates memory-full.
(k)	[Interval]	Sets the interval on the horizontal axis of the graph.

Note:

- When starting or restarting a measurement, all data is deleted.
- When an Unlock has occurred, one memory amount appears in red on the graph.

5.4.2 Analyze: Jitter tolerance screen

The Analyze: Jitter tolerance screen displays the jitter tolerance automatic measurement result on a graph.



	Item	Description
(a)	Title	Inputs the graph title.
(b)	[Detection] [Error] [Unit] [Threshold] [Waiting time] [Tx Freq. offset]	Displays the measurement conditions set on the Test menu: Jitter tolerance screen.
(c)	[Scale]	Switches the vertical axis of the graph. The graph shows the range of 1 to 1000 UI _{p-p} .
(d)	[Graph]	Displays the measurement result and standard line. The measurement result satisfying the standard is plotted with "O", and that unsatisfying the standard is plotted with "×".
(e)	Store	Saves the graph data in memory. Click set and input the file name at the character string input window. • This item appears in 1-screen display mode.
(g)	Marker	Sets the marker ON/OFF. Sets the marker of OFF. Clicking Set sets the marker to ON. Indicates that the marker is set to ON Clicking Set sets the marker to OFF.
(h)	$\leftarrow \rightarrow$	With the marker set On and the cursor positioned at $[\leftarrow]$ and $[\rightarrow]$, clicking $\begin{tabular}{l} \end{tabular}$ displays the numerical data at the measurement point.
(h)	[Detailed data display]	Displays the detailed data at the measurement point indicated by the marker.

5.4.3 Analyze: Jitter sweep screen

The Analyze: Jitter sweep screen displays the automatic jitter sweep measurement result on a graph.



	ltem	Description
(a)	Margin (1) to (5)	Selects displaying or hiding of each graph data by one-shot input.
(b)	Graph clear	Delete all graph data and measurement result from the screen.
(c)	Title	Input the graph title.
(d)	[Detection][Error] [Unit][Threshold] [Margin] [Waiting time] [Tx Freq. offset]	Displays the measurement conditions set for the Test menu: Jitter sweep screen.
(e)	[Scale] [Scale: max] [Scale: min]	Switches the vertical axis of the graph. When MU150018A is installed, the display is as follows: The graph shows the range of 0.01 to 1000 UI _{p-p} . The graph shows the range of 0.001 to 1000 UI _{p-p} .
(f)	Store	Saves the graph data in memory. Clicking input window. On this window, input the data name and save the data in memory. • This item appears in 1-screen display mode.
(g)	Marker	Sets the marker ON/OFF. Sets the marker on off. Clicking Set sets the marker to ON. Indicates that the marker is set to ON Clicking Set sets the marker to OFF.
(h)	$\leftarrow \rightarrow$	With the marker set On and the cursor positioned at $[\leftarrow]$ and $[\rightarrow]$, clicking $[se]$ displays the numerical data at the measurement point.
(i)		Displays the detailed data at the measurement point indicated with the marker.
(j)	[Graph]	Displays the measurement result and sweep mask. When the error free occurs, the measurement points are displayed with " \bigcirc ". When the error occurs, the measurement point are displayed with " \times ".

5.4.4 Analyze: Frequency sweep screen

The Analyze: Frequency sweep screen displays the automatic frequency sweep measurement result on a graph.



	Item	Description
(a)	Offset mask	Selects displaying or hiding the offset mask line by one-shot input.
(b)	Title	Inputs the graph title.
(c)	[Mod. freq.][Freq. offset] [Waiting time] [Step] [Offset mask] [Unit] [Detection][Error] [Hold time][Threshold]	Displays the detection conditions set for the Test menu: Freq. sweep screen.
(d)	[Scale]	Switches the vertical axis of the graph. Displaying the range of 1 to 1000 UI _{p-p} .
(e)	Store	Saves the graph data in memory.This item appears in 1-screen display mode.
(f)	Marker	Sets the marker to ON/OFF. Indicates that the marker is set to OFF. Clicking St sets the marker to ON. Clicking St sets the marker is set to OFF.
(g)	$\leftarrow \rightarrow$	With the marker set ON and the cursor positioned at $[\leftarrow]$ and $[\rightarrow]$, clicking [Set] displays the numerical data at the measurement point.
(h)		Displays the detailed data at the measurement point indicated with the marker.
(i)	[Graph]	Displays the measurement result and standard line. When the error free occurs, the measurement points are displayed with "O". When the error occurs, the measurement point are displayed with "×".

5.4.5 Analyze: Jitter transfer screen

The Analyze: Jitter transfer screen displays the automatic jitter transfer characteristic measurement result on a graph.



	ltem	Description			
(a)	Title	Inputs the graph title.			
(b)	[Waiting time]	Displays the measurement conditions set for the Test			
	[Tx Freq. offset]	menu: Jitter transfer screen.			
(c)	[Scale]	Switches the vertical axis of the graph.			
		20Displaying the range of –80 to 10 dB.			
		10Displaying the range of -30 to 10 dB.			
		1Displaying the range of –3 to 1 dB.			
(d)	[Graph]	Displays the measurement result and standard line. The			
		measurement result satisfying the standard is plotted with			
		"O", and that unsatisfying the standard is plotted with			
		"×".			
(e)	Store	Saves the graph data in internal memory.			
		Clicking set with the cursor positioned here displays the			
		character string input window.			
		On this window, input the file name. This item appears			
		in 1-screen display mode.			
(f)	Marker	Sets the marker to ON/OFF.			
		Indicates that the marker is set to OFF.			
		Clicking sets the marker to ON.			
		Indicates that the marker is set to ON.			
		Clicking sets the marker to OFF.			
(g)	$\leftarrow \rightarrow$	With the marker set ON and the cursor positioned at $[\leftarrow]$			
(0)		and $[\rightarrow]$, clicking $[st]$ displays the numerical data at the			
		measurement point.			
(h)		Displays the set standard line and the marker value at			
		each measurement point.			

5.4.6 Analyze: Wander screen

The Analyze: Wander screen displays the wander measurement result on a graph.





	ltem	Description		
(a)	Title	Inputs the graph title.		
(b)	[Scale]	Switches the vertical axis of the graph.		
		"Scale: max" is 1E12.		
		"Scale: min" is 1E-12.		
(c)	[Graph]	Displays the wander measurement result.		
		The measurement points are plotted with "O".		
(d)	Scale type	Switches the Log/Linear graph by one-shot entry.		
(e)	Store	Saves the graph data in memory. For details, see "Section		
		8.2.6 Saving analysis graph data".		
(f)	Marker	Sets the marker to ON/OFF.		
		Indicates that the marker is set to OFF.		
		Clicking (st) sets the marker to ON.		
		Indicates that the marker is set to ON.		
		Clicking sets the marker to OFF.		
(g)	$\leftarrow \rightarrow$	With the marker set ON and the cursor positioned at $[\leftarrow]$ and		
		$[\rightarrow]$, clicking set displays the numerical data at the meas-		
		urement point.		
(h)		Displays the detailed data at the measurement point indicated		
		with the marker.		

5.4.7 Analyze: Wander sweep screen

The Analyze: Wander sweep screen displays the wander sweep measurement result on a graph.



		ltem	Description	
-	(a)	Title	Inputs the graph title.	
-	(b)	[Detection][Error] [Unit][Threshold] [Margin] [Waiting time] [Tx Freq. offset]	Displays the detection conditions set for the Test menu: Wander sweep screen.	
-	(c)	[UIp-p]	Switches between UI _{p-p} and ns by one-shot input.	
-	(d)	[Scale]	Switches the vertical axis of the graph. "Scale: max" is 1E6. "Scale: min" is 1E-6.	
_	(e)	Graph clear	Deletes all graph data and measurement results from the screen.	
	(f)	Margin (1) to (5)	Selects to display/hide each graph data by one-shot input.	
	(g)	Store	Saves the graph data in memory. For details, see "Section 8.2.6 Saving analysis graph data".	
_	(h)	Marker	Sets the marker to ON/OFF. □ Indicates that the marker is set to OFF. Clicking Set sets the marker to ON. ■ Indicates that the marker is set to ON. Clicking Set sets the marker to OFF.	
-	(i)	$\leftarrow \rightarrow$	With the marker set ON and the cursor positioned at $[\leftarrow]$ and $[\rightarrow]$, clicking \exists displays the numerical data at the measurement point.	
_	(j)		Displays the detailed data at the measurement point indicated with the marker.	
_	(k)	[Graph]	Displays the measurement result and sweep mask. When the error free occurs, the measurement points are displayed with "O". When the error occurs, the measurement point are displayed with "x".	

5.4.8 Analyze: Frequency graph screen

The Analyze: Frequency graph screen displays the fluctuation of the received signal's center frequency in ppm.



	ltem	Description				
(a)	Title	Inputs the graph title. See "Section 4.3 Input Windows".				
(b)	[Scale]	Switches the vertical axis of the graph.				
		1000 Displaying the range of -1000 to $+1000$ ppm.				
		100 Displaying the range of -100 to $+100$ ppm. 10 Displaying the range of -10 to $+10$ ppm.				
		10 Displaying the range of -10 to $+10$ ppm.				
(c)	[Scroll]	Clicking set with the cursor positioned at one of the				
		scroll symbols scrolls the measurement data display:				
		Scrolling to the first page.				
		\leftarrow Scrolling a half page forward.				
		\rightarrow Scrolling a half page backward.				
		⊢Scrolling to the last page.				
(d)	[Graph]	Displays the measurement result.				
(e)	Store	Saves the graph data in memory. For details, see "Section				
		8.2.6 Saving analysis graph data".				
(f)	Marker	Sets the marker to ON/OFF.				
		Indicates that the marker is set to OFF. Clicking				
		Set sets the marker to ON.				
		Indicates that the marker is set to ON. Clicking				
		Set sets the marker to OFF.				
(g)	$\leftarrow \rightarrow$	With the marker set ON and the cursor positioned at $[\leftarrow]$				
		and $[\rightarrow]$, clicking st displays the numerical data at the				
		measurement point.				
(h)		Displays the detailed data at the measurement point indi-				
		cated with the marker.				
(i)		Indicates memory-full.				
(j)	[Interval]	Sets the interval on the horizontal axis of the graph.				

5.4.9 Analyze: Frequency monitor screen

The Analyze: Frequency monitor screen displays the received signal frequency and ppm value. The gate time changes automatically according to the monitored bit rate. The monitor value is updated at each gate time.



	ltem	Description
(a)	Pause	Temporarily stops the frequency monitor value.
(b)	[Monitor result display]	Displays the frequency monitor value.

This section describes the jitter application that uses MP1580A and/or MP1570A equipped with the MU150018A 2.5/10G jitter unit.

- For screen switching and parameter setting procedures, see "Section 4 Screen Switching and Parameter Setting".
- For screen parameters and graphs used in this section, see "Section 5 Screen Description".

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6.1 Manual Jitter Generation and Measurement

MP1580A allows generating or measuring signals of bit rate 2488 M or 9953 M with jitter modulated. This section describes how to manually generate and measure jitter signals using examples.

6.1.1 Adding jitter to transmitted signal using internal signal source

This section describes an example for generating a signal of bit rate 2488 M or 9953 M with jitter modulation using the internal signal source of MP1580A.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for measurement in the Internal mode

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn ON the power switches of MP1580A and MP1570A.
- (3) Connect the MU150001A optical output connector to the input connector on the DUT via the optical attenuator using SM optical fiber cable.
- (4) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (5) Adjust the variable optical attenuator so that it gives an input level causing no errors in MP1570A.

Note:

Before making connections, check the input level (see (4) above).

Section 6 Jitter Application



Unit connection diagram

6.1 Manual Jitter Generation and Measurement

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. Because the internal signal source of MP1580A is to be used as the reference clock, set "Clock" to "Internal".

Setup	Interface	L Tx&Rx J	21:56:40 06/Jan/2000
Bit rate	9953M		
Through jitter	[OFF]		
Clock	[Internal	J	

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Setup Jit	ter/Wander		21:58:32	06/Jan/2000
Jitter Modulation source Reference input	[Internal] [Internal]	Wander Reference out Reference inp TDEV(Mask) [put [2MHz] ut [2MHz(Unba [ITU-T] G.811-1997	lanced)]]
	A0 = T3 = 11 T2 = T1 = 100 T0 = 0	3.0 1E6 0000 T 1000 E 0.00 V 0.10 1E0 1E-2		τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the jitter signal parameters. In the following screen, the amplitude and modulation frequency is set to 10 UI and 300 kHz, respectively.

Test menu	Manual	Tx&Rx:9953M	18:42:27	18/Oct/2001
Tx Mod. select Range Mod. freq. Amplitude Adjust ⊡ Freq. offset	Jitter 80UI 300,000.0Hz Manual 10.00UIF 0.0]ppn	Wander generation Type P-p	Ľ	OFF]
Rx Range Filter Hit threshold Meas. mode	20UI] HP1´+LP] 0.5]UI [Repeat][1	20k - 80M 9-p L][s]		

6.1.2 Adding jitter to transmitted signal using external input clock

This section describes an example for generating a jitter modulated that signal synchronized with an external clock.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for measurement with external input clock

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn ON the power switches of MP1580A and MP1570A.
- (3) Connect 155.52 MHz external clock to External Clock Input at MU150018A.
- (4) Connect the MU150001A optical output connector to the DUT input connector via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (6) Adjust the variable optical attenuator so that it gives an input level causing no errors in MP1570A.

Note:

Before making connections, check the input level (see (5) above).

6.1 Manual Jitter Generation and Measurement



External 155.52 MHz clock Unit connection diagram

Section 6 Jitter Application

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. Because an external signal is to be used as the reference clock, set "Clock" to "External".

Setup	Int	erface:		L Tx&Rx L	09:38:22 14/Jan/2000
Bit rate	Γ	9953M	ן		
Through jitter	Γ	OFF	ן		
Clock		E	kterna	1	

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Setup Jitter	/Wander		21:58:32 06/Jan/2000
Jitter Modulation source [I Reference input [I	Wande nternal] Refe nternal] Refe TDEV [r rence output rence input (Mask) G.811-19	2MHz] 2MHz(Unbalanced)] ITU-T] 997]
	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	1E6 Τ Ε Υ 1E0 1E-2 1E0	τ <u>1</u> τ <u>2</u> τ <u>3</u> 1E2 1E4 s

(3) From the Test menu: Manual screen, set the jitter signal parameters. In the following screen, the amplitude and modulation frequency is set to 10 UI and 300 kHz, respectively.

Test menu	Manual	Tx&Rx:9953M	18:42:27	18/Oct/2001
Tx Mod. select Range Mod. freq. Amplitude Adjust Freq. offset	Jitter 80UI 300,000.0]Hz Manual 10.00 UIP-P 0.0]ppm	Wander generation Туре	C	OFF]
Rx Range Filter Hit threshold [Meas. mode [20UI] HP1´+LP 20k 0.5]UI®-p Repeat][1][- 80M [s]		

6.1.3 Measuring Recovery Data Clock's Jitter and Adding Jitter (through jitter)

This section describes an example for measuring and passing through the recovery data clock and adding jitter to other DUT.

Connecting measurement system

Connect MP1580A and MP1570A to the data transmitted unit as shown in the figure below.



Example connection for through jitter measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn ON the power switches of MP1580A and MP1570A.
- (3) Connect the MU150001A optical output connector to the input connector on DUT-2 via the variable optical attenuator using SM optical fiber cable.
- (4) Check that the optical output level from DUT 1 is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (5) Adjust the variable optical attenuator so that it gives an input level higher by 1 dB than the level causing an error in MP1570A.

Note:

Before making connections, check the input level (see (3) and (4) above).

Section 6 Jitter Application



Unit connection diagram

Setting procedure

 From the Setup: Interface screen, set the basic parameters. Because the received jitter signal is to be passed through and added to the other DUT, set "Through jitter" to "On".



(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Setup Jit	ter/Wander		21;	:58:32	06/Jan/2000
Jitter Modulation source Reference input	[Internal] [Internal]	Wander Reference o Reference i TDEV(Mask) [utput [28 nput [20Hz ITU- G.811-1997	1Hz] z(Unbal −T]	lanced)]]
	ΑΘ = τ3 = 1 τ2 = τ1 = 10 τΘ =	3.0 1E6_ 10000 1000 E 30.00 V 0.10 1E0- 1E	Αθτ <u>θ</u>	τ <u>1</u> 1E2	τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the jitter signal parameters. In the following screen, the amplitude and modulation frequency is set to 10 UI and 300 kHz, respectively.

Test menu	Manual	Tx&Rx:9953M	18:42:27	18/Oct/2001
Tx Mod. select Range Mod. freq. Amplitude Adjust ⊡ Freq. offset	Jitter 80UI 300,000.0Hz Manual 10.00UIF 0.0]ppn	Wander generation Type D-p M	Ľ	OFF]
Rx Range Filter Hit threshold Meas. mode	20UI 2 HP1´+LP 2 0.5]UI [Repeat][1	20k - 80M a-p l][s]		

6.1.4 Jitter measurement

This section describes an example for measuring the jitter of a clock regenerated from the received data. For evaluating the DUT's jitter characteristic, MP1580A allows UI_{P-P}/UI_{rms} , Hit, peak jitter, and frequency measurements at the same time.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT, namely device under test (DUT) as shown in the figure below.



Example connection for regenerated clock measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn ON the power switches of MP1580A and MP1570A.
- (3) Check that the optical output level from DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.

Note:

Before making connections, check the input level (see (3) above).


Unit connection diagram

Section 6 Jitter Application

Setting procedure (1) From the Setup: Interface screen, set the basic parameters. Interface L T×&R× 」 21:56:40 06/Jan/2000 Setup Bit rate 9953M Ľ OFF] Through jitter E Clock Internal]

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Setup Jitter	/Wander		21:58:32	06/Jan/2000
Jitter Modulation source [I Reference input [I	Wander nternal] Refer nternal] Refer TDEV([rence output rence input (Mask) G.811-19	2MHz] 2MHz(Unba ITU-T] 997	lanced)]]
	A0 = 3.0 T3 = 10000 T2 = 1000 T1 = 100.00 T0 = 0.10	1E6 T E V 1E0 1E-2 1E0	τ <u>ι</u> ιΕ2	τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the received signal (Rx) parameters.

Test menu	Manual Tx&Rx:9953M	18:42:27	18/Oct/2001
Tx Mod. select Range Mod. freq. Amplitude Adjust □ Freq. offset [Wander generati Jitter Type 80UI 300,000.0Hz Manual 1 10.00UIP-P 0.0]ppm	on [OFF]
Rx Range Filter Hit threshold Meas. mode [20UI] HP1´+LP 20k - 80M 0.5]UI@-p Repeat][1][s]		

Starting measurement and displaying measurement result

According to the measurement items and/or graphs to be displayed, select the screen as described below.

To display the jitter measurement result, select the Result: Manual screen. According to the items to be displayed, set "Unit" for the screen as shown below. To display UI_{P-P} (jitter amplitude peak-to-peak value) and UIrms (jitter amplitude root mean square), set "Unit" to "Peak/RMS". Press Ot start the measurement and display the measurement result.

Result Manual	Tx&Rx:9953M Elapsed] 00-00:00:	18:43:0 00	7 18/Oct/2001
Unit L Peak/RMS J Display data [Current] Monitor J	Result	t]
R× Unlock 0	Peak-Peak +Peak -Peak RMS	9.61 4.89 4.72 2.99	U I P - P U I + P U I - P U I r m s

To display the number of times the jitter amplitude threshold is exceeded, set "Unit" to "Hit". The measurement result is displayed.

Result	Manual	Elapse	Tx&Rx:9953M dj 00	0-00:00:00]	18:44:29	18/0ct	/2001
Unit	lit						
Moni	Uurrent tor			Result			
		Cou	int		2999	988	
		Sec	ond			Ø	
R×		%F	Second	1	00.00	000	%
Unlock	0						

(2) To display a graph of the jitter amplitude obtained by peak jitter measurement, select the Analyze: Peak Jitter screen. Display the measurement result.



Note:

- When starting or restarting measurement, all data is cleared.
- When an Unlock has occurred, one memory segment appears in red on a graph.
- (3) To display the received signal frequency, select the Analyze: Frequency monitor screen. Display the measurement result, showing the measurement progress on a bar graph.



6.1 Manual Jitter Generation and Measurement



(4) To monitor the received signal frequency, select the Analyze: Frequency graph screen.

6.1.5 Generating jitter using MP1580A alone

This section describes an example for generating a jitter signal using MP1580A alone.

Connecting measurement system



Example connection for measurement in the Internal mode



Unit connection diagram

- (1) Turn ON the power switch of MP1580A.
- (2) Connect the MP1580A Clk Output connector to the DUT Clk Input connector as shown in the figure above.

6.1 Manual Jitter Generation and Measurement



Setting procedure

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.



(3) From the Test menu: Manual screen, set the jitter signal parameters. On the following screen, the amplitude and modulation frequency is set to 10 UI and 300 kHz, respectively.

Test menu	Manual	Tx&Rx:9953M	18:42:27	18/Oct/2001
Tx Mod. select Range Mod. freq. Amplitude Adjust □ Freq. offset [Jitter 80UI 300,000.0]Hz Manual 10.00 UIP- 0.0]ppm	Wander generation Type P	C	OFF]
Rx Range Filter Hit threshold [Meas. mode [20UI] HP1´+LP 20 0.5]UI0- Repeat][1]	k - 80M P [s]		

6.2 Automatic Jitter Measurement

Automatic jitter measurement can be done in tracking or non-tracking mode. When MP1580A and MP1570A are connected to each other through the GPIB interface, tracking mode allows automatic jitter measurement (measuring the jitter tolerance, jitter sweep, and frequency sweep), controlling MP1570A (device) with MP1580A (controller). Non-tracking mode allows automatic jitter measurement (measuring jitter transfer characteristic), without requiring GPIB connection.

6.2.1 Tracking

The flowchart shown below shows how to set tracking and starting measurement.



See the following pages for the steps to set the MP1570A (device) and MP1580A (controller).



(2) From the Setup: Measurement Condition screen, set "Mask Condition" to "OFF."

Mask condition [OFF	ן	Only highest ranking alarm is displayed.
PLM Detection Pattern HP LP	[[Lower ranking alarms and errors are masked. Auto] Auto]

- (3) From the Setup: System screen, set the GPIB address to "1." GPIB Interface Ε Control] Ε] 1 Address *..... Setting up MP1570A (Bit rate, Clock, and Mask condition) from MP1580A takes about 20 seconds to operate remote access. Setting MP1580A (controller) (1) Display the Setup: System screen and set the following values: (a) Tracking Set to "MP1570A". (b) GPIB address...... Set the same value as that set for MP1570A. System 19:52:52 03/Feb/2001 Setup Date&Time adjust [19:52:52 03/Feb/2001] Graph resolution [1min] MP1570A Tracking GPIB address [1] Tracking start
 - (2) From the Setup: System screen, click st with the cursor positioned at for "Tracking start". Then, the communication between MP1570A and MP1580A starts for initialization. Communication takes about 5 seconds. (The communication can be started or stopped also from the Test menu screen.)

(3) From any one of the subscreens of the Test menu main screen, check that tracking has been established. When tracking has been established, the screen is displayed as follows.

l	Test menu 🛛 Jit	tter tolerance	Tx&Rx:9953M	19:55:22 0	03/Feb/2001
	Tolerance Table Point Mask table	[G.825 2M [1] to [20] [G.825 2M]	MP1570A condit Config. S Bit rate Tx 9 Dy 0	ions iDH 1953M 1953M	
	Freq. offset	[0.0]ppm	Mapping Tx V	C4*16c-Bulk	
	Detection	[Default] Tracking start	: 🔲	
	Waiting time	Øs	Press <start></start>	key.	



When tracking has not been established, "-----" appears as shown below.

Test menu 🛛 🕽 🖬	tter tolerance	Tx&Rx:9953M 19:53:43 03/Feb/2001
Tolerance Table Point Mask table	[G.825 2M] 1] to [20] [G.825 2M]	MP1570A conditions Config Bit rate Tx
Freq. offset	[0.0]ppm	(Mapping Tx)
Detection	[Default	Tracking start
Waiting time	[0]s	Press <start> key.</start>

Establish a tracking before making a measurement.

(4) To quit tracking, move the cursor to D for "Tracking start" on the Setup: System screen or each Test menu screen and click (Str.).

6.2.2 Measuring jitter tolerance (tracking measurement)

This section describes an example of a data signal with jitter modulation to DUT and to measure the jitter tolerance point causing by an error.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT, namely device under test (DUT) as shown in the figure below.



- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Connect the GPIB ports on the rear side of MP1580A and MP1570A to each other using the GPIB cable as shown in the figure above.
- (3) Turn ON the power switches of MP1580A and MP1570A.
- (4) Connect the MU150001A optical output connector to the device under test (DUT) input connector via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the Optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (6) Make connection settings for the MP1580A and MP1570A necessary for automatic measurement (see "Section 6.2.1 Tracking").
- (7) From the Test menu screen, check that the MP1580A and MP1570A connections have been established.
- (8) Adjust the variable optical attenuator so that it gives an input level higher by 1 dB than the level causing an error in MP1570A.

Note:

Before making connections, check the input level (see (5) above).

6.2 Automatic Jitter Measurement



Unit connection diagram

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement:

Setup	Int	erface:		T×&R× _	19:56:17	03/Feb/2001
Bit rate	Γ	9953M]	l			
Through jitter	Γ	OFF]	l			
Clock	Γ	Inter	rnal	J		

Note:

After changing the bit rate, check the settings for the interface ("1.31 μ m Optical", "1.55 μ m Optical", or "Electrical") and "Bandwidth" from the Setup: Mapping screen for MP1570A. (See "Section 6.2.1 Tracking".)

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Setup Jitter/Wander		19:57:56 03/Feb/2001
Jitter Modulation source [Internal] Reference input [Internal]	Wander Reference output Reference input TDEV(Mask) [G.811-1	2MHz] 2MHz(Unbalanced)] ITU-T] 997]]
A0 = τ3 = τ2 = τ1 = τ0 =	$\begin{array}{c} 3.0 \\ 10000 \\ 1000 \\ 1000 \\ 0.00 \\ 0.10 \end{array}$	τ <u>τ</u> 2 τ <u>3</u> 1E2 1E4 s

(3) From the Setup: Jitter tolerance screen, set the measurement table and standard mask. Switching between "Tolerance table" and "Mask table" can be done by one-shot entry. When "User" is selected, the standard conditions can be changed.

Table display

Setup Jitter tole	erance	19:58:50	03/Feb/2001
Bit rate [9953 Tolerance table [G.823	зм] 5 2м]	Mask	
No. Freq.(Hz) 1 10.0 2 13.0 3 30.0 4 100.0 5 300.0 6 1,000.0 7 3,000.0 8 10,000.0 9 20,000.0 10 46,000.0	No. Freq.(Hz) 11 100,000.0 12 220,000.0 13 400,000.0 14 1,000,000.0 15 2,200,000.0 16 4,000,000.0 17 10,000,000.0 18 22,000,000.0 19 46,000,000.0 20 80,000,000.0		

6.2 Automatic Jitter Measurement



(4) From the Test menu: Jitter tolerance screen, set the conditions for jitter automatic tolerance measurement. Check the connection status between MP1580A and MP1570A by "MP1570A conditions" on the screen. (When the connections have not been established, "-----" appears.)

Γ	Test menu 🛛 📕 🛛	tter tolerance	Tx&Rx:9953M	19:55:22	03/Feb/2001
	Tolerance Table Point Mask table	[G.825 2M 1] to [20] G.825 2M]	MP1570A condi Config. Bit rate Tx Rx	tions SDH 9953M 9953M	
	Freq. offset	[0.0]ppm	Mapping Ïx	VC4*16c-Bulk	
	Detection	[Default] Tracking star	VC4*16c-Bulk t □	
	Waiting time	0 s	Press <start< th=""><th>> key.</th><th></th></start<>	> key.	

(5) Press Stat the measurement and display the measurement progress on a bar graph.

Displaying measurement result

According to the measurement items and/or graphs to be displayed, select the screen as described below.

(1) The jitter tolerance measurement result is displayed as numerical data together with the measurement frequency on the Result: Jitter tolerance screen. The pass/fail judgment result is displayed as "OK" or "NG".

Result Jitter tolerance Tx&Rx:9953M 20:13:46 03/Feb/2001
No. Freq. (Hz) Tolerance(UIp-p) No. Freq. (Hz) Tolerance(UIp-p) 1 10.0 2480 NG 1 10.0 2480 NG 1 10.0 2480 NG 1 10.0 2480 NG 10.0 2500 0 K 3 30.0 1068 NG 1068 NG 4 100.0 314 NG 5 300.0 103 NG 10

(2) After measurement, the "Revaluation" item appears on the Test menu screen. After changing the mask table, clicking st restarts the revaluation measurement.

Result Jitter tolerance Tx&Rx:9953M 20:13:46-03	/Feb/2001 /Feb/2001
No. Freq. (Hz) Tolerance(UIp-p) No. Freq. (Hz) Tolerance(I 1 10.0 2480 NG I Iolerance(I 2 13.0 2500 OK Iolerance(I Iolerance(I) 3 30.0 1068 NG Iolerance(I) Iolerance(I) 4 100.0 314 NG Iolerance(I) Iolerance(I) 5 300.0 103 NG Iolerance(I) Iolerance(I)	<u>Пр-р)</u>

(3) The numerical data at measurement points can be displayed on a graph on the Analyze: Jitter tolerance screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking set displays the result data at the measurement points.



6.2.3 Measuring automatic jitter sweep (tracking measurement)

This section describes jitter sweep measurement that allows precisely and speedily measuring presence or absence of errors, while adding the preset jitter value to the DUT.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT, namely device under test (DUT) as shown in the figure below.



Example connection for jitter sweep measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Connect the GPIB ports on the rear side of MP1580A and MP1570A to each other using the GPIB cable as shown in the figure above.
- (3) Turn ON the power switches of MP1580A and MP1570A.
- (4) Connect the MU150001A optical output connector to the input connector on device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the Optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (6) Make connection settings for the MP1580A and MP1570A necessary for automatic measurement. (See "Section 6.2.1 Tracking".)
- (7) From the Test menu screen, check that the MP1580A and MP1570A connections have been established.
- (8) Adjust the variable optical attenuator so that it gives an input level higher by 1 dB than the level causing an error in MP1570A.

Note:

Before making connections, check the input level (see (5) above).

Section 6 Jitter Application



Unit connection diagram

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement:

Setup	Int	terface		L Tx&Rx J	19:56:17	03/Feb/2001
Bit rate	Γ	9953M	J			
Through jitte	r [OFF	J			
Clock	Γ	Ir	iternal]		

Note:

After changing the bit rate, check the settings for the interface ("1.31 μ m Optical", "1.55 μ m Optical" or "Electrical") and "Bandwidth" from the Setup: Mapping screen for MP1570A. (See "Section 6.2.1 Tracking".)

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.



(3) From the Setup: Jitter sweep screen, set the measurement table.(When "User" is selected, the setting conditions can be changed.)

Setup	Jitter su	veep			28	0:19:19	03/Feb/2001
Bit rate Sweep tab	9953 91e [G.958	3М Гуре А]					
No.	Freq.(Hz)	∪Ір-р	No.	Freg.(Hz)	UIp-p]	
1 2 3 4 5 6 7 8 9 10	10.0 13.0 46.0 220.0 460.0 1,000.0 2,200.0 5,000.0 10,000.0	622 622 163 75 16.30 7.50 3.40 1.50 1.50	11 12 13 14 15 16 17 18 20	22,000.0 46,000.0 100,000.0 220,000.0 460,000.0 1,000,000.0 2,200,000.0 4,600,000.0 10,000,000.0 20,000,000.0	1.50 1.500 0.508 0.1508 0.1500 0.1500 0.1500 0.1500 0.150		

(4) From the Test menu: Jitter sweep screen, set the conditions for automatic jitter sweep measurement. Check the connection between MP1580A and MP1570A by "MP1570A conditions" on the screen. (When the connections have not been established, "-----" appears. In such a case, establish the connections by referring to "Section 6.2.1 Tracking".)

Test menu	Jitter sweep	Tx&Rx:9953M	20:20:26 03	7/Feb/2001
Sweep Table Point Margin	[G.825 2M [1] to [20] [0]%	MP1570A conditior Config. SDH Bit rate Tx 9953 Dv 0053	IS M	
Freq. offset	[0.0]ppm	Mapping Tx VC4-	139M	
Detection	[Default	Rx VC4-] Tracking start	139M	
Waiting time	[0]s	Press <start> ke</start>	у. — П	

(5) Press Start the measurement, and display the measurement progress on a bar graph on the Test menu: Jitter sweep screen.

Displaying measurement result

According to the measurement items and/or graphs to be displayed, select the screen as described below.

(1) The jitter sweep measurement result is displayed as numerical data together with the measurement frequency on the Result: Jitter sweep screen. The pass/fail judgment result is displayed as "OK" or "NG".

Res	sult	Jitte	r sweep	T :	x&Rx∶	9953M	20:21	:33 03/1	Feb/2001
						L Star	t] 20:21	:08 03/H	Feb/2001
				101+1				101+1	
	1 1	<u> </u>	010-0	NC	11	<u> </u>		Result	
	2	13.0	2490		12	220,000.0	1.50		
	3	30.0	1000	NG	13	400,000.0	1.50		
	4	100.0	300	OK	14	1,000,000.0	0.60		
	5	300.0	100	NG	15	2,200,000.0	0.270		
	6	1,000.0	30.00	OK	16	4,000,000.0	0.150		
	7	3,000.0	10.00	NG	17	10,000,000.0	0.150		
	8	10,000.0	3.00	ОК	18	22,000,000.0	0.150		
	9	20,000.0	1.50		19	46,000,000.0	0.150		
	10	46,000.0	1.50		20	80,000,000.0	0.150		

6.2 Automatic Jitter Measurement

(2) The jitter sweep automatic measurement result can be displayed on a graph on the Analyze: Jitter sweep screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking set displays the result data at the measurement point.



6.2.4 Measuring frequency sweep (tracking measurement)

This section describes frequency sweep measurement that allows precisely and speedily measuring presence or absence of errors, while adding the preset modulation frequency to the DUT.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for frequency sweep measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Connect the GPIB ports on the rear side of MP1580A and MP1570A to each other using the GPIB cable as shown in the figure above.
- (3) Turn ON the power switches of MP1580A and MP1570A.
- (4) Connect the MU150001A optical output connector to the input connector on device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the Optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (6) Make connection settings for the MP1580A and MP1570A necessary for automatic measurement. (See "Section 6.2.1 Tracking".)
- (7) From the Test menu screen, check the MP1580A and MP1570A connection status.
- (8) Adjust the variable optical attenuator so that it gives an input level higher by 1 dB than the level causing an error in MP1570A.

Note:

Before making connections, check the input level (see (4) above).



Unit connection diagram

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement:

Setup	I	nterface	;	L Tx&Rx J	19:5	56:17 03/Feb/2001
Bit rate	[[9953M	1]			
Through jitt	er (_ OFF	J			
Clock	[I	Internal	J		

Note:

After changing the bit rate, check the settings for the interface ("1.31 μ m Optical", "1.55 μ m Optical" or "Electrical") and "Bandwidth" from the Setup: Mapping screen for MP1570A. (See "Section 6.2.1 Tracking".)

(2) From the Setup: Jitter/Wander screen, set the jitter signal modulation source.

Set	tup Jitter/Wander			19:57:56	03/Feb/2001
Jit Mo Re	tter odulation source [Internal] oference input [Internal]	Wander Refer Refer TDEV([ence output ence input Mask) G.81	2MHz] 2MHz(Unbal ITU-T] 11-1997	anced)]]
	Α0 = τ3 = τ2 = τ1 = 1 τ0 =	3.0 10000 1000 00.00 0.10	1E6_ T E V 1E0_ 1E-2	τ <u>1</u> 1Εθ 1Ε2	τ2 τ3 1E4 s

(3) From the Setup: Frequency sweep screen, set Mask table. When "User" is selected, the standard conditions can be changed.



(4) From the Test menu: Frequency sweep screen, set the conditions for automatic frequency sweep measurement. Check the connection between MP1580A and MP1570A by "MP1570A conditions" on the screen. (When the connections have not been established, "-----" appears. In such a case, establish the connections by referring to "Section 6.2.1 Tracking".)

Test menu	Frequency sweep	Tx&Rx:9953M	20:33:30 03/Feb/2001
Mod. freq Freq. offset Step Mask table	2,000,000.0 Hz ±50ppm 25ppm G.825 2M	MP1570A condit Config. S Bit rate Tx 9 Mapping Tx V Rx 9	:ions DH 1953M 1953M 104*16c-Bulk 104*16c-Bulk
Detection	[Default]	
Waiting time	[0]s	Press <start< td=""><td>· key.</td></start<>	· key.

- (5) Press (Supplet to start the measurement and display the measurement progress on a bar graph on the screen.
- (6) After measurement, the "Revaluation" item appears on the Test menu screen. After changing the mask table, clicking set restarts the revaluation measurement.

Mask table

L G.825 2M L Revaluation

Displaying measurement result

According to the measurement items and/or graphs to be displayed, select the screen as described below.

(1) The frequency sweep measurement result is displayed as numerical data together with the ppm data on the Result: Frequency sweep screen. The pass/fail judgment result is displayed as "OK" or "NG".

Result Freque	ncy sweep	T×&R:	x:9953M	Start	20:35:54 20:34:35	03/Feb/2001 03/Feb/2001		
No. ppm UIp-p 1 - 50 > 4.00 OK 2 - 25 > 4.00 OK 3 0 > 4.00 OK 4 + 25 > 4.00 OK 5 + 50 > 4.00 OK	No. ppm	UIP-P	No. ppm	UIP-P	No. ppm	UIP-P		

(2) The automatic frequency sweep measurement result can be displayed on a graph on the Analyze: Frequency sweep screen. With "Marker" set to "On" and the cursor positioned at [←] and [→], clicking st displays the numerical data at the measurement points.

Analyz	e 🛛 🛛 🖌 Frequency sweep	Tx&Rx:9953M	20:37:	45 03/Feb/2001
Title	[Frequency sweep]		L	Store
Detec	tion: Default Event: 2 000 000 0 H-	+ 50/25eee Waiting	tina. Da 🗆	Marker 🔳
IIIIn-n	Freq 2,000,000.0 Hz;	.∸ J0/2JPPM – mark mask –	ιише∙ вз +Г 201-ррм 🔳 Г	· · ·
°*° °-		OTTSCE MUSK		Offset(ppm)
				- 50
1000-				
				UIP-P / 4.00
100-				Mask
				G.825 2M
10-				UIP-P a see
				0.300
1-	1			
				Result OK
0.1-				
-5	e	u U	+30	PPM

6.2.5 Measuring jitter transfer characteristic (non-tracking measurement)

For jitter transfer characteristic measurement, add the preset jitter modulation to the DUT and measure the characteristics of DUT that is attenuated by the jitter modulated. The measurement starts after calibration is over.

Connecting measurement system

For calibration

Start the measurement in the self-loop-back status, without connecting the device under test (DUT).



- Connect MP1580A and MP1570A as shown in the figure above. Connect the units as shown in page 6-42.
- (2) Turn ON the power switches of MP1580A and MP1570A.
- (3) Connect the optical output connector of MU150001A to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable, so that the optical output of MU150001A is within the range of Optical input range for MP1570A.
- (4) From the Setup and Test menu screens, set the calibration conditions. From the Test menu screen, check that "Measurement Type" is set to "Calibration".



For measurement

Connect MP1580A and MP1570A to the device under test (DUT).

Example connection for measurement

- After calibration, make connections as shown in the figure above. Connect the units as shown in page 6-42.
- (2) Connect the optical output of MU150001A to the input connector of DUT via the variable optical attenuator using SM optical fiber cable.
- (3) Check that the optical output level from the DUT is within the Optical input range for MP1570A and, if necessary, connect it to the Optical Input connector of MU150017A via the optical attenuator using SM optical fiber cable.
- (4) Adjust the variable optical attenuator so that it gives an input level higher by 1 dB than the level causing an error in MP1570A.
- (5) From the Setup and Test menu screens, set the measurement conditions as shown in "Setting Procedure". From the Test menu screen, check that "Measurement Type" is set to "Measurement".



Unit connection diagram

Setting procedure

- (1) For calibration, make connections in the self-loop-back status.
- (2) From the Setup: Interface screen, set the basic parameters.

Setup	I	nterface		L Tx&Rx J	19:56:17	03/Feb/2001
Bit rate	[9953M	J			
Through jitt	er [OFF	נ			
Clock	[. 1	nternal]		

(3) On the Setup: Jitter transfer screen, display "Transfer table" and "Mask table". When "User" is selected, the setting conditions can be changed.

	For Table dis	splay					
Setup	Jitter t	ransfer				20:39:39	03/Feb/2001
Bit rate Transfer	e [99 table [G.8	953M 825 2M]	Г	Mask		
No. 1 2 3 4 5 6 7 8 9 10	Freq.(Hz) 100.0 160.0 300.0 600.0 1,000.0 2,000.0 4,600.0 10,000.0 20,000.0 46,000.0	UIP-P 15.00 15.00 15.00 15.00 15.00 15.00 6.50 3.00 1.50 1.50	No. 11 12 13 14 15 16 17 18 19 20	Freq.(Hz) 100,000.0 220,000.0 400,000.0 1,000,000.0 2,200,000.0 4,000,000.0 10,000,000.0 22,000,000.0 46,000,000.0 80,000,000.0	UIP-P 1.50 1.50 0.60 0.270 0.150 0.150 0.150 0.150 0.150		



(4) From the Test menu: Jitter transfer screen, set "Transfer table" and "Mask table" for calibration. Since external connection loop-back is used in this case, set "Loopback" to "External". Press O start the calibration and display its progress on a bar graph.

Test menu 🔰 Jitter	transfer Tx&R	≀x:9953M	16:13:37 26/Mar/2001
Measurement type Loopback	[Calibration] [External]	Please ensure the	loopback.
Transfer table Point Mask table	[G.825 2M] [1] to [20] [Bell1377]	
Freq. offset	[0.0]ppm	1	
Waiting time	[0]s		
		Press <start> ke</start>	у. □

Note:

- "Ensure the following loopback." appears when "Measurement type" is set to "Calibration" and "Loop back" is set to "External". (See "Section 6.2.1 Tracking".)
- (5) After calibration is over, change the connections to those for measurement. (See page 6-40.)
- (6) After calibration has been completed, "Measurement type" changes to "Measurement" on the Test menu: Jitter transfer screen. Press Object to start the measurement, and then the measurement progress on a bar graph is displayed.

Test menu 🛛 Jitter	transfer	Tx&Rx:9953M	20:50:28	03/Feb/2001
Measurement type	[Measuremen]	t]		
Transfer table Point Mask table	[G.825 2M [1] to [] [Bell	20] 1377]		
Freq. offset	[0	.0]ppm		
Waiting time	[0]s			
		Press <start> ke</start>	″. ☐ □	

Note:

After changing the settings, always perform calibration.

(7) After the measurement is over, the "Revaluation" item appears on the Test menu screen. After changing the mask table, pressing Other restarts the revaluation measurement.

Displaying measurement result

According to the measurement items and/or graphs to be displayed, select the screen as described below.

(1) The jitter transfer characteristic measurement result is displayed as numerical data together with the measurement frequency on the Result: Jitter transfer screen. The pass/fail judgment result is displayed as "OK" or "NG". If an Unlock occurred during measurement, "Unlock" is displayed in red. Unlock time-out is displayed in white.

Result	Jitter trans	fer Tx&Rx:	9953M	Start	20:53:37	7 03/Feb/2001
No. 1 2 3 4 5 6 7 8 9	Freq. (Hz) UIP-p 100.0 15.00 100.0 15.00 300.0 15.00 1,000.0 15.00 2,000.0 15.00 4,600.0 5.00 10,000.0 3.00 20,000.0 1.50 10,000.0 1	Transfer(dB) - 0.91 OK - 0.91 OK - 0.91 OK - 0.91 OK - 0.91 OK - 0.91 OK - 0.90 OK - 0.88 OK - 0.85 OK - 0.85 OK	No. Fre	29. (Hz)	UIp-p 1	ransfer(dB)
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		I			

(2) The jitter transfer characteristic measurement result is displayed on the Analyze: Jitter transfer screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking st displays the numerical data at the measurement point.



Section 7 Wander Application

This section describes the wander application that uses MP1580A and MP1570A (or MP1590A/B) equipped with the MU150018A 2.5/10G jitter unit and with Options 02 and 03 necessary for wander measurement.

- For screen switching and parameter setting procedures, see "Section 4 Screen Switching and Parameter Setting".
- For screen parameters and graphs used in this section, see "Section 5 Screen Description".

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7.1 Manual Wander Generation and Measurement for MP1580A+MP1570A

7.1.1 Generating signal with sine wave wander added

This section describes how to add sine wave wander to a signal of bit rate 2488 M/9953 M.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for sine wave wander generation

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn ON the power switches for MP1580A and MP1570A.
- (3) Connect the optical output connector of MU150001A to the device under test unit (DUT) input connector via the variable optical attenuator using SM optical fiber cable.
- (4) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.



Unit connection diagram

Section 7 Wander Application

Setting procedure

From the Setup: Interface screen, set the basic parameters. Set "Through Jitter" to "OFF". It is not used for wander measurement. Because the MP1580A internal signal source is to be used as the reference clock, set "Clock" to "Internal".

Setup	Interface		L Tx&Rx _	21:56:40	06/Jan/2000
Bit rate	99531	1			
Through jitt	er [OFF	ן			
Clock	Ľ	Internal	J		

(2) From the Test menu: Manual screen set the wander signal parameters. In the following screen, the modulation frequency and amplitude are set to 200 μ Hz and 1500 UI_{p-p}, respectively.

Test menu		Manual			Tx&Rx:9953M	22:39:54	15/Jan/2000
Tx Mod. select	Ľ	Wander	ן		Wander generation Type	Ľ	OFF]
Mod. freq. Amplitude Adjust ⊡ Freq. offset	Ē	200. Manual 1500. 0.	.0]µH] .0][l .0]PF	łz JI₽- >m	P]		
Rx Range Filter	[4000UI HP0+LP1		10	- 20k		
Meas. mode	Ľ	Manual	ן				
7.1.2 Adding phase modulation to wander reference clock

This section describes how to add to the wander reference clock the three types of phase modulation: TDEV mask generation, Transient generation, and Signal OFF generation.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for TIE measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1570A.
- (3) Connect Ref. clock source to Wander Ref. Input and DCS Input.
- (4) Connect Wander Ref. Output to DUT Ref. Input.
- (5) Connect the optical output connector of MU150001A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (6) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.



Unit connection diagram

7.1 Manual Wander Generation and Measurement for MP1580A+MP1570A

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. Set "Through Jitter" to "OFF".

External signal source is used as the reference clock, set "Clock" to "external reference clock".

Setup		Int	erface		L Tx&Rx J	13:39:49	26/Oct/2001
Bit rate		Γ	9953M	נ			
Through jit	tter	Γ	OFF	J			
Clock		L	ock 2MH:	z(Unba	lanced)		

(2) From the Setup: Jitter/Wander screen, set the wander parameters.

Setup Jitter	r/Wander		21:58:32	06/Jan/2000
Jitter Modulation source [] Reference input []	(internal] Wande internal] Refe internal] Refe TDEV [er erence output rence input (Mask) G.811-1	2MHz] 2MHz(Unba ITU-T] 997	lanced)]]
	A0 = 3.0 T3 = 10000 T2 = 1000 T1 = 100.00 T0 = 0.10	$ \begin{array}{c} $	τ <u>ι</u> ι ε2	τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the noise to be added to the wander reference clock.

To add noise of Gaussian distribution form to the wander reference clock (TDEV mask), set "Type" to "TDEV" generates from the Wander reference output connector the TDEV output of the frequency set from the Setup: Jit-ter/Wander screen.

Test menu		Manual			Tx&Rx:9953M	22:	47:09	15/Jan/2000
Tx Mod. select	Ľ	OFF	נ		Wander generation Type TDEV(Mask) [G.(811-1997	W d	ander(TDEV) ITU-T
Freq. offset	Γ	0	.0]p	РM				
Rx Range Filter	E	4000UI HP0+LP′]	10	- 20k			
Meas. mode	Γ	Manual	נ					

To add transient phase variation to the wander reference clock, set "Type" to "Transient". Pressing $\bigcirc_{\text{Sup}}^{\text{Sut}}$ generates the transient signal from the Wander reference output connector.

Test menu		Manual			Tx&Rx:9953M	22:49:	37 15/Jan/2000
Tx Mod. select	C	OFF	ן		Wander generation Туре Maximum phase deviat	ion	Transient [1000]ns
Freq. offset	Ľ	0	.0]p	рm			
Rx Range Filter	E	4000UI HP0+LP′]	10	- 20k		
Meas. mode	Γ	Manual	ן				

To cut off the wander reference clock, set "Type" to "Signal OFF". Pressing $O_{\text{Mor}}^{\text{Stat}}$ cuts off the output from the Wander reference output connector.

Test menu		Manual			Tx&Rx:9953M	22:51:05 15/Jan/2000
Tx Mod. select	Ľ	OFF	נ		Wander generation Type	Signal OFF
Freq. offset	Ľ	0	.0]p	ΡM		
Rx Range Filter	E	4000UI HP0+LP′]	10	- 20k	
Meas. mode	Ľ	Manual	ן			

7.1.3 TIE manual measurement

This section describes how to measure residual wander for evaluating the DUT's characteristic.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT as shown in the figure below.



Example connection for TIE measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1570A.
- (3) Connect Ref. clock source to Wander Ref. Input, DCS Input, and DUT Ref. clock Input.
- (4) Connect the optical output connector of MU150001A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.



Unit connection diagram

7.1 Manual Wander Generation and Measurement for MP1580A+MP1570A

Setting procedure

 From the Setup: Interface screen, set the basic parameters. Set "Through Jitter" to "OFF" for it is not used for wander measurement.

External clock source is used as the reference clock, set "clock" to "2MHz (Unbalance)".

Setup	In	terface		L T×&R× _	13:39:49	26/Oct/2001
Bit rate	Ľ	9953M	נ			
Through jitt	er [OFF	ן			
Clock		Lock 2MH	z(Unba	alanced)		

(2) From the Setup: Jitter/Wander screen, set the wander parameters.



(3) From the Test menu: Manual screen, set the wander signal parameters.

Test menu	Manual		Tx&Rx:9953M	22:34:02	15/Jan/2000
Tx Mod. select	[OFF	ן	Wander generation Type	Ľ	OFF]
Freq. offset	C	0.0]ppm			
Rx Range Filter Hit threshold Correction Meas. mode	[2UI HP2+LP [1 [(X ² - [0. [Manual	.00 UI0-p 000 2)	- 80M		

Displaying measurement result

The TIE measurement result can be displayed on the Result: Manual screen. Pressing $\bigcirc_{\text{Met}}^{\text{Stat}}$ starts the measurement and displays the measurement result.

Note:

When setting Rx of meas. mode at Test menu: manual screen is Repeat, Wander is not measured.

Result Manual	Tx&Rx:2488M Start 02:55:31 02/Jap/2001	02:55:50 02/Jan/2000 0
Unit [Wander(DC-10Hz)]		
	<u> </u>	
Monitor	Result	
	Peak-Peak	54 ns
	+Peak	4.6 ns
	-Peak	50 ns
Unlock •	TIE -	36 ns

7.2 Automatic Wander Measurement for MP1580A+MP1570A

Automatic wander measurement can be done in tracking or non-tracking mode. When MP1580A and MP1570A are connected to each other through the GPIB interface, tracking mode allows automatic wander measurement, controlling MP1570A (device) with MP1580A (controller). Non-tracking mode allows wander automatic measurement without requiring GPIB connection.

7.2.1 Tracking

The flowchart shown below shows how to set tracking and starting measurement.



See the following pages for the steps to set the MP1570A (device) and MP1580A (controller).

Setting MP1570A (device)

(1) From the Setup: Mapping screen, set the following parameters:

- (a) Config...... Set to "SDH" or "Non-Frame pattern".
- (b) Bit rate Set the same value as the bit rate set for MU150018A.
- (c) Clock Set to "External".
- (d) Optical Select to "Optical" or "Electrical".
- (e) Bandwidth When "Optical" is set, select "Wide".



(2) From the Setup: Measurement Condition screen, set "Mask Condition" to "OFF".

Mask condition [OFF]	Only highest ranking alarm is displayed.
PLM Detection Pattern HP LP	[[Lower ranking alarms and errors are masked. Auto] Auto]

GPIB Interface	Γ	Control]	
Address	Γ	1]	

- 1) Bitrate (Setup : Mapping) Set to same bit rate of MP1580A
- 2) Clock (Setup : Mapping) Set to "External"
- Mask condition (Setup : Measurement condition) Set to "OFF"

Setting up MP1570A (Bit rate, Clock, and Mask condition) from

MP1580A takes about 20 seconds to operate remote access.

Two screens of the following are displayed at the tracking. Test menu : Manual Result : Error Alarm

Setting MP1580A (controller)

- (1) Display the Setup: System screen and set the following values:
 - (a) Tracking......Set to "MP1570A".
 - (b) GPIB address Set the same value as that set for MP1570A.

Setup	System	19:52:52 U3/Feb/2UU1
Date&Time	adjust [19:52:52	03/Feb/2001]
Graph reso	lution [1min]	
Tracking	MP1570A	
GPIB addr	ess [1]	
Tracking	start 🔲	

(2) From the Setup: System screen, click set with the cursor positioned at for "Tracking start". Then, the communication between MP1570A and MP1580A starts for initialization. Communication takes about 5 seconds. (The communication can be started or stopped also from the Test menu screen.)

(3) From any one of the subscreens of the Test menu main screen, check that tracking has been established. When tracking has been established, the screen is displayed as follows.

Test menu	Wander sweep	Tx&Rx:9953M 22:03:01 05/Feb/2001
Sweep Table Point Margin	User 1] to [20] 20]%	MP1570A conditions Config. SDH Bit rate Tx 9953M Dv 00520M
Freq. offset	[0.0]ppm	Mapping Tx VC4*16c-Bulk
Detection Error	Count]	Tracking start
Threshold	[1000]	
		Press <start> key.</start>

Note:



Test menu	Wander sweep	Tx&Rx:9953# 22:02:18 05/Feb/2001
Sweep Table Point Margin	[User [1] to [20] [20]%	MP1570A conditions Config Bit rate Tx Dx
Freq. offset	0.0 ppm	Mapping Tx
Detection Error	[]	Iracking start
Threshold	[1000]	
		Press <start> key.</start>

(4) To stop tracking, move the cursor to D for "Tracking start" on the Setup: system screen and click state.

7.2.2 Measuring wander sweep (tracking measurement)

This section describes wander sweep measurement that allows precisely and speedily measuring presence or absence of errors, while adding the preset wander to the DUT.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT, namely device under test (DUT) as shown in the figure below.



Example connection for wander sweep measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Connect the GPIB ports on the rear side of MP1580A and MP1570A to each other using the GPIB cable.
- (3) Turn ON the power switches for MP1580A and MP1570A.
- (4) Connect the optical output connector of MU150001A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.
- (6) Make connection settings for the MP1580A and MP1570A necessary for automatic measurement (see "Section 7.2.1 Tracking").
- (7) From the Test menu: Wander sweep screen, check the MP1580A and MP1570A connection status.



Unit connection diagram

7.2 Automatic Wander Measurement for MP1580A+MP1570A

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement:

Setup	Ιı	nterface		L Tx&Rx J	22:03:47	05/Feb/2001
Bit rate	Ľ	9953M	J			
Through jitt	er [OFF	J			
Clock	E	Ir	nternal]		

Note:

After changing the bit rate, check "Optical 1.31 µm", "Optical 1.55 µm", "Electrical", and "Bandwidth" for the MP1570A input/output.

(2) From the Setup: Jitter/Wander screen, set the wander parameters.



(3) From the Setup: Wander sweep screen, set the sweep table. When "Sweep table" is set to "User", the setting conditions can be changed.

Bit rate 9953M Sweep table User Default Ulp-p No. Freq.(µHz) Ulp-p 1 12.0 44790.0 11 2,500.0 4980.0 2 21.0 44790.0 11 2,500.0 4980.0 3 35.0 44790.0 11 2,500.0 4980.0 4 60.0 44790.0 13 7,000.0 4980.0 3 35.0 44790.0 14 10,000.0 4980.0 4 60.0 44790.0 15 16,000.0 4980.0 5 110.0 44790.0 15 16,000.0 4980.0 5 120.0 14790.0 15 16,000.0 4980.0 6 130.0 15 16,000.0 1950.0 1950.0 7 350.0 22780.0 17 40,000.0 1950.0 8 600.0 7980.0 19 130,000.0 630.0 9 1,000.0 7980.0 200 200,0000.0 630.0	Setup	Wander s	weep			22:05:41	05/Feb/2001
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Bit rate Sweep tab Defa No.l	[995: le [Us <u>olt</u> Freq.(μHz)	3M] er]		Freq.(uHz)		
	1 2 3 4 5 6 7 8 9 10	12.0 21.0 35.0 60.0 110.0 180.0 350.0 600.0 1,000.0 1,600.0	44790.0 44790.0 44790.0 44790.0 44790.0 22780.0 13290.0 7980.0 4980.0	11 12 13 14 15 16 17 18 19 20	2,500.0 4,000.0 7,000.0 10,000.0 16,000.0 25,000.0 40,000.0 70,000.0 130,000.0 200,000.0	4980.0 4980.0 4980.0 4980.0 3110.0 1950.0 1110.0 630.0 630.0	

(4) From the Test menu: Wader sweep screen, set the conditions for automatic wader sweep measurement. Check the connection between MP1580A and MP1570A by "MP1570A conditions" on the screen. (When the connections have not been established, "-----" appears. In such a case, establish the connections by referring to "Section 7.2.1 Tracking".)

Test menu	Wander sweep	Tx&Rx:9953M 22:09:37 05/Feb/2001
Sweep Table Point Margin	[User [1] to [20] [100]%	MP1570A conditions Config. SONET Bit rate Tx 9953M
Freq. offset	[0.0]ppm	Mapping Tx STS48c-Bulk
Detection Error	Count] B1]	xx SIS486-BUIK Tracking start 🔲
Threshold	[999]	
		Press (Start) key.

(5) Press (Step) to start the measurement. The measurement progress is displayed on a bar graph on the Test menu: Wander sweep screen.

Displaying measurement result

(1) The wander sweep measurement result is displayed as numerical data together with the measurement frequency on the Result: Wander sweep screen. The pass/fail judgment result is displayed as "OK" or "NG".

Res	ult	Wande	r sweep	T×&F	₹x:995	53M	15:06:12	07/Feb/200
						_Remain _		
Г	No	Enca (uHz)		100001+1	No	Enca (uHz)	UIDED	Decul+
- F	NO.	Freq. (Inz)		Result	<u> no.</u>	Freq. (IIIIZ)	<u>010-0</u>	Result
	1	12.0	44790.0	UK	11	2,500.0	4980.0	UK
	2	21.0	44790.0	I 0K	12	4,000.0	4980.0	OK
	3	35.0	44790.0	ОК	13	7,000.0	4980.0	I OK I
	4	60.0	44790.0	ОК	14	10,000.0	4980.0	OK
	5	110.0	44790.0	ОК	15	16,000.0	4980.0	I OK I
	6	180.0	44790.0	0К	16	25,000.0	3110.0	OK
	7	350.0	22780.0	ОК	17	40,000.0	1950.0	OK
	8	600.0	13290.0	ОК	18	70,000.0	1110.0	Г ОК Г
	9	1,000.0	7980.0	ОК	19	130,000.0	630.0	ок Г
	10	1,600.0	4980.0	ок і	20	200,000.0	630.0	Г ОК Г

(2) The wander sweep automatic measurement graph can be displayed on the Analyze: Wander sweep screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking set displays the numerical data at the measurement points.



7.2.3 TIE Automatic measurement (non-tracking measurement)

This section describes TIE automatic measurement that allows adding the preset TDEV to the DUT for measuring the wander.

Connecting measurement system

Connect MP1580A and MP1570A to the DUT, namely device under test (DUT) as shown in the figure below.



Example connection for TIE automatic measurement

- (1) Connect MP1580A and MP1570A as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1570A.
- (3) Connect Ref. clock source to Wander Ref. Input, DCS Input, and DUT Ref. Input.
- (4) Connect the optical output connector of MU150001A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (5) Check that the optical output level from the DUT is within the optical input range for MP1570A and, if necessary, connect it to the MU150017A Optical Input connector via the optical attenuator using SM optical fiber cable.



Unit connection diagram

7.2 Automatic Wander Measurement for MP1580A+MP1570A

Setting procedure

 From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement. External clock source is used as the reference clock, set "clock" to "2MHz (Unbalance)".

Setup	Int	erface:		L T×&R× _	13:39:49	26/Oct/2001
Bit rate	Ľ	9953M	ן			
Through jitt	er [OFF	ן			
Clock	L	ock 2MH:	(Unba	lanced)		

Note:

After changing the bit rate, check "Optical 1.31 μ m", "Optical 1.55 μ m", "Electrical" and "Bandwidth" for the MP1570A input/output.

(2) From the Setup: Jitter/Wander screen, set the wander parameters.

Setup	Jitter/Wander			22:04:37	05/Feb/2001
Jitter Modulation s Reference in	ource [Internal] put [Internal]	Wande Refe Refe TDEV [er erence output erence input V(Mask) G.811-1	2MHz] 2MHz(Unbal ITU-T] 997	.anced)]]
	A0 = T3 = 1 T2 = T1 = 10 T0 =	3.0 0000 1000 0.00 0.10	$\begin{bmatrix} 1 & 1 & E & E & E \\ T & 1 & E & E & E \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 1 $	τ <u>1</u> 1E2	τ2 τ3 1E4 s

(3) From the Test menu: Wander screen, set the wander detection conditions and measurement time.

Test menu	Wander	Tx&Rx:2488M	22:42:46 06/Jan/2000
Type TDEV(Mask) Observation time	[Wander(TDEV)] [ITU-T] [1200]s	G.811-1997]
		Press <start> ke</start>	×. ⊒ □

(4) Press (3th The measurement. The measurement progress is displayed on a bar graph on the Test menu: Wander screen.

Displaying measurement result

 The TIE value is displayed together with the measurement time on the Result: Wander screen. "Data Type" can be set to "Log" or "Linear". The measurement result can be saved as numerical data as is.

When Log display

Result Wa	nder	Tx&Rx:	9953M	19	9:40:00 06/	/Feb/2001
			LEI	apsed	00-	00:01:41
Data type [Log]						
		TECHNIN		TIECONN		TIECON
	10. US7 11		10. L\S7		NU. 1187	116(1187
	1.2	. 6.9	23 270			
2 0.15 - 0.1	14 (:2]	. 1.3	20 370			
3 0.20 0.0	12 10-	· 2.0	27 520			
4 0.25 - 0.1	16 14 -	- 3.0	28 720			
5 0.35 - 0.1	17 19 -	· 4.5∥	29 1.0E3			
6 0.50 - 0.1	18 27 -	- 8.1	30 1.2E3			
7 0.70 - 0.2	19 37 -	- 11				
8 1.0 - 0.1	20 52 -	- 13				
9 1.4 - 0.2	21 72 -	- 16				
10 1.9 - 0.3	- 22 I AA -	- 2ñ.				
11 2.7 - ñ.4						
12 - 3°7 8°6	24 198 -					
	64] IUU		I		I	→ [+
' '						

When Linear display

ΓF	esul1	t 📕		ý Wa	andei	r		T×&R:	x:995	53M		19:41	:43 06,	/Feb/200	1
										LE.	lapsed		00·	-00:03:2	4
Γ	Data	type [l	_ i I	near]											
		~ ~ ~ ~	-	• • • • • •		~ ~ ~ ~		· · · ·		~ ~ ~ ~			~ ~ ~ ~		-
	NO.	- (S)	Ι.	IE(NS)	NO.	(S)	ITF	(<u>ns</u>)	NO.	<u>(s)</u>	IIE(ns)	NO.	- ζ(S)	IIE(ns)	
	1	10	-	2.0	13	130	-	33	25	250		37	370		
	2	20	-	4.7	14	140	-	32	26	260		38	380		
	3	30	-	11	15	150	-	34	27	270		39	390		
	4	40	-	12	16	160	-	35	28	280		40	400		
	5	50	-	13	17	170	-	37	29	290		41	410		
	6	60	-	15	18	180	-	38	30	300		42	420		
	1 7	70	-	16	19	190	-	39	31	310		43	430		
	8	80	-	17	20	200	-	41	32	320		44	440		
	9	90	-	19	21	210			33	330		45	450		
	10	100	-	20	22	220			34	340		46	460		
	11	110	-	22	23	230			35	350		47	470		
	12	120	-	25	24	240			36	360		48	480		
	+ ←													→ -	
	• •													· ·	

(2) To display the TIE measurement result on a graph, select the Analyze: Wander screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking st displays the result data at the measurement points.

When Log display





When Linear display

7.3 Manual Wander Generation and Measurement for MP1580A+MP1590A/B

7.3.1 Adding phase modulation to wander reference clock

This section describes how to add to the wander reference clock the three types of phase modulation: TDEV mask generation, Transient generation, and Signal OFF generation.

Connecting measurement system

Connect MP1580A and MP1590A/B to the DUT as shown in the figure below.



Example connection for TIE measurement

- (1) Connect MP1580A and MP1590A/B as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1590A/B.
- (3) Connect Ref. clock source to DCS Input of MP1580A and CLK Source In of MP1590A/B.
- (4) Connect Wander Ref. Output to DUT Ref. Input.
- (5) Divide the Receive clock output of MU150123A/B or MU150100A or MU150101A by power divider, and connect one of power divider output to Clock Input of MU150125A and the other output to Clock Input of MP1580A.
- (6) Connect the optical output connector of MU150121A/B or MU150134A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (7) Check that the optical output level from the DUT is within the optical input range for MP1590A/B and, if necessary, connect it to the MU150123A/B Optical Input connector via the optical attenuator using SM optical fiber cable.



Ref. Clock

Unit connection diagram

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. Set "Through Jitter" to "OFF".

External signal source is used as the reference clock, set "Clock" .

Setup	I	nterface		L Tx&Rx _	13:39:49 26/Oct/2001
Bit rate	Ľ	9953M	ן		
Through jit [.]	ter [OFF	נ		
Clock		Lock 2MH	z(Unba	alanced)	

(2) From the Setup: Jitter/Wander screen, set the wander parameters.

Setup Jitte	r/Wander		21:58:32	06/Jan/2000
Jitter Modulation source [Reference input [Wa Internal] R Internal] R T [nder eference output [eference input [DEV(Mask) G.811-19	2MHz] 2MHz(Unba) ITU-T] 997	lanced)]]
	A0 = 3.0 T3 = 10000 T2 = 1000 T1 = 100.00 T0 = 0.10	$ \begin{array}{c} $	τ <u>1</u> 1E2	τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the noise to be added to the wander reference clock.

To add noise of Gaussian distribution form to the wander reference clock (TDEV mask), set "Type" to "TDEV" generates from the Wander reference output connector the TDEV output of the frequency set from the Setup: Jit-ter/Wander screen.

Test menu		Manual			Tx&Rx:9953M		22:47:0	19 15/Jan/2000
Tx Mod. select	Ľ	OFF	ן		Wander generat Type TDEV(Mask) [ion G.811-	1997	Wander(TDEV) ITU-T
Freq. offset	Γ	0.	.0]p	ΡM				
Rx Range Filter Meas. mode	E	4000UI HP0+LP′ Manual]]	10	- 20k			

7.3 Manual Wander Generation and Measurement for MP1580A+MP1590A/B

To add transient phase variation to the wander reference clock, set "Type" to "Transient". Pressing $\bigcirc_{\text{Sup}}^{\text{Sut}}$ generates the transient signal from the Wander reference output connector.

Test menu		Manual			Tx&Rx:9953M	22:49:3	37 15/Jan/2000
Tx Mod. select	Ľ	OFF	נ		Wander generation Type Maximum phase devia	tion	Transient [1000]ns
Freq. offset	Γ	0	.0]p	ÞW			
Rx Range Filter	E	4000UI HP0+LP′]	10	- 20k		
Meas. mode	Γ	Manual	ן				

To cut off the wander reference clock, set "Type" to "Signal OFF". Pressing $\bigcirc_{\text{Met}}^{\text{Set}}$ cuts off the output from the Wander reference output connector.

				1		1
Test menu		Manual			Tx&Rx:9953M	22:51:05 15/Jan/2000
Tx Mod. select	Ľ	OFF	נ		Wander generation Type	Signal OFF
Freq. offset	Ľ	0	.0]p	РM		
Rx Range Filter	E	4000UI HP0+LP´]	10	- 20k	
Meas. mode	Ľ	Manual	נ			

7.3.2 TIE manual measurement

This section describes how to measure residual wander for evaluating the DUT's characteristic.

Connecting measurement system

Connect MP1580A and MP1590A/B to the DUT as shown in the figure below.



Example connection for TIE measurement

- (1) Connect MP1580A and MP1590A/B as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1590A/B.
- (3) Connect Ref. clock source to Wander Ref. Input, DCS Input of MP1580A, and DUT Ref. clock Input.
- (4) Connect Wander Ref. Output of MP1580A to CLK Source In of MP1590A/B.
- (5) Divide the Receive clock output of MU150123A/B or MU150100A or MU150101A by power divider, and connect one of power divider output to Clock Input of MU150125A and the other output to Clock Input of MP1580A.
- (6) Connect the optical output connector of MU150121A/B or MU150134A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (7) Check that the optical output level from the DUT is within the optical input range for MP1590A/B and, if necessary, connect it to the MU150123A/B Optical Input connector via the optical attenuator using SM optical fiber cable.



7.3 Manual Wander Generation and Measurement for MP1580A+MP1590A/B

Ref. Clock

Unit connection diagram

Setting procedure

(1) From the Setup: Interface screen, set the basic parameters. Set "Through Jitter" to "OFF" for it is not used for wander measurement.

External clock source is used as the reference clock, set "clock".

Setup	Int	erface		L T×&R× _	13:39:49 26/Oct/2001
Bit rate	Γ	9953M	נ		
Through jitter	Γ	OFF	ן		
Clock	L	ock 2MH2.	(Unba	alanced)	

(2) From the Setup: Jitter/Wander screen, set the wander parameters.

I	Setup Jitter/	Wander		21:58:32	06/Jan/2000
	Jitter Modulation source [In Reference input [In	Wande iternal] Refe iternal] Refe TDEV [er erence output erence input (Mask) G.811-1	2MHz] 2MHz(Unbai ITU-T] 997	lanced)]]
		$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$ \begin{array}{c} $	τ <u>ι</u> 1Ε2	τ2 τ3 1E4 s

(3) From the Test menu: Manual screen, set the wander signal parameters.

[Test menu		Manual		Tx&Rx:9!	953M	22:34:02	<u>15/Jan/</u>	2000
	Tx Mod. select	Γ	OFF	J	Wander Type	generation	Ľ	OFF	נ
	Freq. offset	Ľ		0.0]ppm					
	Rx Range Filter Hit threshold Correction Meas. mode	[[[2UI HP2+LP 1 X ² - [0. Manual	4M .00 UI0-p 000 2)	- 80M				

Displaying measurement result

The TIE measurement result can be displayed on the Result: Manual screen. Pressing $\bigcirc_{\text{Met}}^{\text{Met}}$ starts the measurement and displays the measurement result.

Note:

When setting Rx of meas. mode at Test menu: manual screen is Repeat, Wander is not measured.

Result	Manual		T×&R×:2488M		02:55:50 02	/Jan/2000
			_Start _ 02:55:31	02/Jan/2000	3	
Unit L	Wander(DC-10Hz)					
	Monitor			Kesult		
			Posk-Pos	r	54	
			I Eak I Ea	ĸ	04	
			+Peak		4.F	i ns
			-Peak		50) ns
R×						
			TIE	-	36	i ns
Unl	ock	•				

7.4 Automatic Wander Measurement for MP1580A+MP1590A/B

Automatic wander measurement can be done in non-tracking mode. Non-tracking mode allows wander automatic measurement without requiring GPIB connection.

7.4.1 TIE Automatic measurement (non-tracking measurement)

This section describes TIE automatic measurement.

Connecting measurement system

Connect MP1580A and MP1590A/B to the DUT, namely device under test (DUT) as shown in the figure below.



Example connection for TIE automatic measurement

- (1) Connect MP1580A and MP1590A/B as shown in the diagram on the next page.
- (2) Turn On the power switches for MP1580A and MP1590A/B.
- (3) Connect Ref. clock source to Wander Ref. Input, DCS Input of MP1580A, and DUT Ref. Input.
- (4) Connect Wander Ref. Output of MP1580A to CLK Source In of MP1590A/B.
- (5) Divide the Receive clock output of MU150123A/B or MU150100A or MU150101A by power divider, and connect one of power divider output to Clock Input of MU150125A and the other output to Clock Input of MP1580A.
- (6) Connect the optical output connector of MU150121A/B or MU150134A to the input connector of device under test (DUT) via the variable optical attenuator using SM optical fiber cable.
- (7) Check that the optical output level from the DUT is within the optical input range for MP1590A/B and, if necessary, connect it to the MU150123A/B Optical Input connector via the optical attenuator using SM optical fiber cable.





Unit connection diagram

Setting procedure

 From the Setup: Interface screen, set the basic parameters. The following screen shows an example of using the 9953 M interface for measurement. External clock source is used as the reference clock, set "clock" to "Lock 10 MHz".

Setup	Interface	Tx&Rx	21:20:28 28/Jun/2005
Bit rate	[9953M	1	
Through jitt	er [OFF	1	
Clock	Lock Internal Lock 10MHz Lock 5MHz Lock 2MHz(Un Lock 2MHz(Ba Lock 2Mbit/s Lock 2Mbit/s Lock 1.5MHzit Lock 64k+8kH External	10MHz balanced) lanced) (Unbalanced) (Balanced) Balanced) /s(Balanced) z	

Note:

- After changing the bit rate, check "Optical 1.31 μ m", "Optical 1.55 μ m", "Electrical" and "Bandwidth" for the MP1590A/B input/output.
- (2) From the Setup: Jitter/Wander screen, set the wander parameters. The following screen shows an example of using the 10 MHz Wander Reference input for measurement. External clock source is used as the reference input, set "Wander Reference input" to "10 MHz".

Setup	Jitter/Wander		21:29:53 28/Jun/2005
Jitter Modulation Reference	source [Internal] input [Internal]	Wander Reference output Reference input TDEV(Mask) C G.811	5MHz 10MHz 10MHz 5MHz
	$\begin{array}{c} A0 = \\ \tau_3 = 10 \\ \tau_2 = 1 \\ \tau_1 = 100 \\ \tau_0 = 0 \end{array}$	3.0 1E6 000 000 .00 .10 1E0 1E-2 1	2MHz(Unbalanced) 2MHz(Balanced) 2Mbit/s(Unbalanced) 2Mbit/s(Balanced) 1.5MHz(Unbalanced) 1.5Mbit/s(Balanced) 64k+8kHz

7.4 Automatic Wander Measurement for MP1580A+MP1590A/B

(3) From the Setup: Jitter/Wander screen, set the wander parameters. The following screen shows an example of using the 5 MHz Wander Reference output for measurement. This reference output is used as the reference input of MP1590A/B, set "Wander Reference output" to "5 MHz".



(4) From the Setup of MP1590A/B: Signal screen, set the each parameters. The following screen shows an example of using the 9953 M interface and using the 5 MHz signal as reference clock input. The wander reference output of MP1580A is used as the reference input of MP1590A/B, set "Wander Reference input" to "Lock 5 MHz" and set "Bit rate" to "9953 M".

🔀 📄 kun/Stop 👂 Alarm	Error History H	I.Reset Log 🖩 😂 ? 🕅
📅 Setup S	gnal 🔽	
Interface Mapping Const	uction Guide	
Tx,Rx setting Tx&Rx	Meas.mode Out-of-Service]
Bit rate 9953M	<pre></pre>	B Laser <u>⊚</u> 550 mVp-p X2
Rx data input Single Reference clock input Reference clock output	Lock 1. 5Mbit/s(Balanced) Lock 64k+8kHz Lock 10MHz Lock 5MHz Lock 5MHz Jock 5MHz V	0 mV
Sync. output	Tx clock •	
		Link Err Trig

(5) From the Test menu: Wander screen, set the wander detection conditions and measurement time.

Test menu	Wander		Tx&Rx:2488M	22:42:46	06/Jan/2000
Туре	[Wander(TDEV)]			
TDEV(Mask)	E ITU-T	J	G.811-1997]	
Observation time	Ľ	1200]s			
			Press /Start) ka		

(6) Press Stat the measurement. The measurement progress is displayed on a bar graph on the Test menu: Wander screen.

Displaying measurement result

 The TIE value is displayed together with the measurement time on the Result: Wander screen. "Data Type" can be set to "Log" or "Linear". The measurement result can be saved as numerical data as is.

When Log display

[L(a)sed] 00 00.01147 Data type [Log] No. $\tau(s)$ TIE(ns) No. $\tau(s)$ TIE(ns) No. $\tau(s)$ TIE(ns) No. $\tau(s)$ TIE(ns) 1 0.10 0.0 13 5.2 - 0.9 25 270 270 3 3 5.2 - 0.9 25 270 3 3 7 0.1 14 7.2 - 1.3 26 370 3 3 0.20 0.0 15 10 - 2.0 27 520 4 0.25 - 0.1 16 14 - 3.0 28 720 4 0.25 - 0.1 17 19 - 4.5 29 1.0E3 6 0.50 - 0.1 18 27 - 8.1 30 1.2E3 11 8 1.0 - 0.2 21 72 - 16 1.2E3 13 9 1.4 - <t< th=""><th>Result</th><th>Wander</th><th>Tx&Rx:995</th><th>i3M IElapsedi</th><th>19:40:00 0 0</th><th>6/Feb/2001</th></t<>	Result	Wander	Tx&Rx:995	i3M IElapsedi	19:40:00 0 0	6/Feb/2001
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Data type [Log]))))No. 7(s)]]	TTE(ns)[No.]	τ(s) TIF(ns)	 No. 7(s)	
	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	- 0.9 25 - 1.3 26 - 2.0 27 - 3.0 28 - 4.5 29 - 8.1 30 - 11 - 13 - 16 - 20	270 370 520 720 1.0E3 1.2E3		

When Linear display

														/Eab / 200	1
Ľ	esuli	L .		m c	muer			TXαR.	(.99.	1011		19.41	1.43 80.	/FED/200	÷
L										LE	lapseoj		00.	-00.03.2	4
Data type [Linear]															
	No 1	$\mathcal{T}(\mathfrak{s})$	гтт	F(ns)	No 1	7(0)	TTF	(ns)	IN o	$\mathcal{T}(\mathfrak{s})$	TIF(ns)	INO I	$\tau(s)$	TTE(ns)	1
	1	10	<u> </u>	2 0	13	130		22	25	250		37	370		1
	- 5	20	I_	4.2	1 1 1	140	_	20	25	250		၂ ၁၀၂	200		
	5	20		- * . (15	140		24	57	200		201	200		
	3	30		15	1 1 6	150		34	56	270		39	390		
		40	-	12	1 분위	100	-	33	20	200		40	400		
	2	50	-	13	111	170	-	37	29	290		41	410		
	6	60	-	15	18	180	-	38	30	300		42	420		
	7	70	-	16	19	190	-	39	31	310		43	430		
	8	80	-	17	20	200	-	41	32	320		44	440		
	9	90	-	19	21	210			33	330		45	450		
	10	100	-	20	22	220			34	340		46	460		
	11	110	_	22	23	230			35	350		47	470		
	12	120	-	25	24	240			36	360		48	480		
	⊢ ←													→ ⊣	٢.
														· ·	

(2) To display the TIE measurement result on a graph, select the Analyze: Wander screen. With "Marker" set to "ON" and the cursor positioned at [←] and [→], clicking st displays the result data at the measurement points.

When Log display





When Linear display
This section describes MP1580A functions not mentioned in the previous sections.

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8.1 Floppy Disk

This section describes how to save or read measurement conditions or analysis graph data to or from a floppy disk.

8.1.1 Saving data to floppy disk

Setup	Floppy disk		13:49:45_11/Feb/2001
[Load]	SaveDeleteMakedir_	[Rename]	Format Reload
Save	Measurement condition		
Path \ Tatali 14	Analyze data(Logging)		1206604 Duto
	🔒 Analyze data(Peak jitter) 💡	e Free:	1300024 Byte
IESI_D .JU TEST & .JU	[] Analyze data(Frequency graph)		
I TRA .JA	1342 17:39 08/Feb/2001		
F_SWE .JA	L 2558 17:38 08/Feb/2001		
JISWE JA	L 3726 17:37 08/Feb/2001		
J_TOL .JA	L 1490 17:36 08/Feb/2001		
LOG .JA	L 131066 17:05 08/Feb/2001		
			ΙŤ

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Save" and click st.
- (3) On the displayed item selection window, move the cursor to the type of data to be saved and click set.
- (4) From the displayed character input window, input the name of the file to be saved.
- (5) After inputting the name, move the cursor to "END".
- (6) Clicking *st* closes the character input window and saves the data.

Notes:

- A file name may contain a maximum of 12 characters including the extension, which is automatically added.
- The file is saved in the directory displayed on the screen.
- When the window is closed without setting the file name from the character input window, the data is not saved.

When "Text form" is selected from the character input window, the analysis graph data is saved in the text format. Files saved in the text format cannot be read out by MP1580A. See an example of the analysis graph data file shown below.

Example of analysis graph data text file

- [1] "ANRITSU;MP1580A;01.00;A;A_JTLR","J-Tolerance No1","2488M",""↓
- [2] "G.825 2M","G.825 2M","-100.0(ppm)","99(s)","1s error;B1;Count;99999" "Date","Time","UI_{P-}p","UI₊p","UI₋p","UI_{rms}"↓
- [3] "SDH","2488M","VC4*16c-Bulk","156M","VC3-45M"
- [4] "Frequency(Hz)","Amplitude(UI_{p-p})","Amplitude(Mask)(UI_{p-p})",
 "Result",""↓
- $\begin{bmatrix} 5 \end{bmatrix} 10.0, 10.01, "", "OK", "", ""\downarrow \\ 13.0, 10.00, "", "OK", "", ""\downarrow \\ 30.0, 9.00, "", "OK", "", ""\downarrow \\ 100.0, 8.00, "", "OK", "", ""\downarrow \\ 300.0, 7.00, "", "OK", "", ""\downarrow \\ 1000.0, 6.00, "", "OK", "", ""\downarrow \\ 1000.0, 3.00, "", "OK", "", ""\downarrow \\ 2000.0, 2.06, "", "OK", "", ""\downarrow \\ 20000.0, 2.07, "", "OK", "", ""\downarrow$
- [6] 10.0,"",1.501,"",""↓ 13.0,"",1.501,"",""↓ 20000.0,"",0.152,"",""↓ 400000.0,"",0.152,"",""↓
- All items are delimited with comma (,).
- Symbols [↓] in (1), (2), (3), (4), (5), (6), ... indicate line-feed characters.
- (1) Management information
- (2) Date, time, jitter tolerance item, error count item, and measurement range item. These items are constant regardless of the settings for MP1580A.
- (3) Device information
- (4) Frequency, jitter amount, jitter amount (Mask table), and judgment result
- (5) Shows analysis data in the same order as in [4] above.
- (6) Shows Mask table data in the same order as in [4] above.

8.1.2 Reading data from floppy disk

Ľ	Setup		Floppy di	sk			13:52:52 11/	/Feb/2001
Г	Load	LS	ave _	Delete] [Makedir]	[Rename]	Format	Reload
	Measu Analy	rement ze data	condition	llaad.	151040 Puta	E.e.e.	1206624 Duto	
F			·· · · · · · · · · · · · · · · · · · ·	Usea.	151040 Byte	Free.	1300024 Byte	
Т	IESI_B	.၂೮೮	4931	13:46	11/Feb/2001			T
Т	TEST_A	.JCD	4931	13:45	11/Feb/2001			1
	J_TRA	.JAL	1342	17:39	08/Feb/2001			
I	F_SWE	.JAL	2558	17:38	08/Feb/2001			

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Load" and click set.
- (3) On the displayed item selection window, move the cursor to the type of data to be read and click [st].
- (4) Files saved on floppy disk are listed. Move the cursor to the file to be read and click set.
- (5) File reading starts.

8.1.3 Creating directory

Setup Flop	oy disk	13:55:14 11/Fe	ь/2001
Load Save	Delete Makedir	Rename Format Re	load
Makedir	· · · ·		
Pa+b \			
Tatale 1457004 Day		E	
IOTAL: 1457004 BY	te Used: ISI040 Byte	Free: 1300024 Byte	
IESI_B .JCU 4!	931 - 13:46 11/Feb/2001		T
TEST_A .JCD 4!	931 13:45 11/Feb/2001		1
J TRA JAL 1	342 17:39 08/Feb/2001		
	50 17.00 00/Fab/2001		
	JJO 17.JO 00/FED/2001		
J_SWE JAL 3	/20 17.37 08/FeD/2001		
J_TOL .JAL 14	490 17:36 08/Feb/2001		
LOG .JAL 131	366 17:05 08/Feb/2001		
		TECT	
		IESI	
		0122456700 ¢0#%'/_@	~73~1
		ABCDEFORIJKEMNUPURSIU	VWΛYZ
		abcdefghijklmnopqrstu	VWXYZ
		<pre> A BS Ins</pre>	END
		< / bo 1113	END

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Makedir" and click (set).
- (3) From the displayed character input window, input the directory name.
- (4) After inputting the directory name, move the cursor to "END" and click (st.). Then the directory is created.

8.1.4 Deleting file and directory

Setup	Floppy d	isk			14:02:17 11	/Feb/2001
Load Sa	ive	Delete	Makedir	Rename	Format	Reload
Delete –	-					
Path \						
Total: 145766	i4 Byte	llsed:	151040 Byte	Eree:	1306624 Byte	
TEST B TOD	/ 1031	13.46.1	1754572001		100002. 0,10	ΙT
123120 .000	4331	13.40 1.	1/100/2001			
TEST_A .JCD	4931	13:45 10	1/Feb/2001			1
J-TRA . DOG	1342	17:39 00	8/Feb/2001			
E SWE	2558	17:38 08	B/Feb/2001			
	2200	17.27 00	0/5-5/2001			
J_DWE	3720	17.37 00	8/FeD/2001			
7 7 01 7 41	1 1 0 0	10.00.00	D / E / O O O I			

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Delete" and click **Set**.
- (3) A file list appears. Move the cursor to the file or directory to be deleted and click set.
- (4) A Yes/No confirmation window appears. To delete the file or directory, select "Yes" and click (Set).
- When deleting a directory, all files included in the directory must have been deleted in advance.

8.1.5 Renaming file

Setup	Floppy	disk			14:04:08	11/Feb/2001
[Load]	[Save]	[Delete]	[Makedir]	Rename	Format	Reload
Rename						
Path \				_		
Total: 145	57664 Byte	Used:	151040 Byte	Free:	<u>1306624 By</u>	te
TEST_B .JCL) 4931	13:46 1	1/Feb/2001			Т
TESTLA .JCL	<u> </u>	13:45 1	1/Feb/2001			
J_TRA .JAL	1342	17:39 0	8/Feb/2001			
F_SWE .JAL	_ 2558	17:38 0	8/Feb/2001			
J_SWE .JAL	. 3726	17:37 0	8/Feb/2001			
J_TOL .JAL	1490	17:36 0	8/Feb/2001			
LOG .JAL	_ 131066	17:05 0	8/Feb/2001			
				<u>U_TRA</u>	.JAL	
				M1234 ABCDE	56789 .\$&#% FGHIJKLMNOP</td><td>^()-@_^{}~! QRSTUV₩XYZ</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>> BS Ovr</td><td>END</td></tr></tbody></table>	

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Rename" and click set
- (3) A cursor appears in the file display area. Move the cursor to the file to be renamed and click s_{st} .
- (4) A character input window appears. From this window, input a new file name.
- (5) After inputting the name, move the cursor to "END" and click set. Then, the file name is changed.

8.1.6 Formatting floppy disk

Setup Floppy	disk		14:05:57 11/Feb/200
[[Load] [Save]	[Delete] [Makedir]	[Rename]	Format Reload
Format			NO
Path \		_	YES
Total: 1457664 Byte	Used: 151040 Byte	Free:	13066 2.27 te
TEST_B .JCD 493	1 13:46 11/Feb/2001		
TIESILA JUU 493	1 13:45 11/Feb/2001		
J_IKA JAL 134	2 17:39 08/Feb/2001		
FLSWE JAL 255	3 17:38 08/Feb/2001		
J_SWE JAL 372	5 17:37 08/Feb/2001		
J_IUL .JAL 149	4 17:35 08/Feb/2001		
LOG .JAL 13100	0 17:05 08/FeD/2001		
			l
]

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Format" and click set.
- (3) A Yes/No confirmation window appears. To format the file, select "Yes" and click set. Floppy disk formatting starts.
- The format type is 1.44 MB.

8.1.7 Reloading floppy disk

Setup		Floppy (disk			14:08:48	11/Feb/2001
[Load		[Save]	LDelete	_ [Makedir] [Rename]	Format	Reload
Path Total	\ : 145	7664 Byte	Used:	: <u>151040 By</u>	te Free:	1306624 By	te
IESI_B	.JUD	4931	13:46	11/Feb/2001			
	.JUU Tái	4931	13.40	11/FeD/2001 00/Fab/2001			
F SWF	JAL	2558	17:38	00/Feb/2001			
J_SŴĒ	ĴĂĹ	3726	17:37	08/Feb/2001			
J_TOL	.JAL	1490	17:36	08/Feb/2001			
LOG	.JAL	131066	17:05	08/Feb/2001			
							Ţ
							11

- (1) Display the Setup: Floppy disk screen.
- (2) Move the cursor to "Reload" and click set. Selects the file, then Yes/No confirmation window appears. To reload the floppy disk, select "Yes" and click set.

8.2 Internal Memory

8.2.1 Saving measurement conditions

This section describes how to save the measurement conditions.

Example: Saving the measurement conditions under name "10G-JITTER" in memory No. 5.

Setup	Memory			14:	18:57 11/F	eb/2001
Measuremer	<u>it condition</u> <u>Ar</u>	nalyze dat	<u>a</u> [Recall:	Clear	[Clear al	τ
1. Empty 2. Empty 3. Empty 5. Empty 5. Empty 6. UØG_J 7. 012349 9. ABCDE 10. abcde < 2	No. 1 2 3 56789 .\$&#%´()-@_^{ 6HIJKLMNOPQRSTUVWX fghijklmnopqrstuvwx > BS Ovr</td><td>Name</td><td>Graph</td><td><u>Start</u> Total</td><td>time Used Free</td><td>Use 0% 100%</td></tr></tbody></table>					

- (1) Display the Setup: Memory screen.
- (2) Check that "5." of "Measurement condition" shows "Empty", meaning data empty.
- (3) Move the cursor to "5." of "Measurement condition" and click \boxed{st} .
- (4) An item selection window opens. Check that this window shows "Store" and click st.
- (5) A character input window opens. From this window, input character string "10G-JITTER".
- (6) After inputting the character string, move the cursor to "END".
- (7) Clicking st closes the character input window and saves the measurement conditions under name "10G-JITTER " in memory No. 5.
- If the character input window is closed without setting any character string, "Memory*" (*: 1 to 10) is assigned as the initial name.

8.2.2 Reading measurement conditions

This section describes how to read the saved measurement conditions.

Setup Memo	ry	14:23:25 11/Feb/2001
Measurement condition	<u>Analyze data</u> [Recal]	T [Clear Clear all
1. Empty 2. Empty 3. Empty 4. Empty 5. 10G_JITTER 6. Recall 7. Restore 8. Rename 9. Clear 10. Empty	No. Name Graph 1 2 2 3 3 5 4 5 5 6 7 8 8 9 9 10	Start time Use
		Total Used 0% Free 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to the memory No. of "Measurement condition" to be read and click st.
- (3) An item selection window opens. On this window, move the cursor to "Recall".
- (4) Clicking s_{eff} reads the measurement conditions.

8.2.3 Overwriting measurement conditions

This section describes how to save the measurement conditions by overwriting.

Setup	nory	14:21:37 11/Feb/2001
<u>Measurement condition</u>	<u>n Analyze data</u> [Recall	. [Clear Clear all
1. [Empty 2. Empty 3. Empty 4. Empty 5. 10G_JITTER 6. Recall 7. Restore 8. Rename 9. Clear 10. Empty Y	No. Name Graph 1 2 2 3 3 4 5 5 6 8 7 9 9 10	Start time Use
		Total Used 0% Free 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to the memory No. of "Measurement condition" to save data by overwriting and click [st].
- (3) An item selection window opens. Move the cursor to "Restore" and click [Set].
- (4) A Yes/No confirmation window appears. From this window, select "Yes" and click st. Then, the measurement conditions are saved by overwriting.

8.2.4 Renaming measurement conditions file

This section describes how to rename the saved measurement conditions file.

Setup Memory	У	14:25:06 11/F	eb/2001
Measurement condition	<u>Analyze data</u> [Recall	- [Clear Clear al	τ.
1. Empty 2. Empty 3. Empty 4. Empty 5. 10G_JITTER 6. Recall 7. Restore 8. Rename 9. Clear 10. Empty	No. Name Graph 1 2 2 3 3 3 4 5 5 6 7 8 9 10	Start time	Use
µnn Llat	· · · ·	Total Used Free	0% 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to the memory No. of "Measurement condition" to be renamed and click *set*.
- (3) An item selection window opens. Move the cursor to "Rename" and click
- (4) A character input window appears. From this window, input a new file name.
- (5) After inputting the name, move the cursor to "END".
- (6) Clicking st closes the character input window and saves the measurement conditions file under the new name.

8.2.5 Deleting measurement conditions

This section describes how to delete the saved measurement conditions file.

Setup	Memory			14:	26:40 11/F	eb/2001
Measurement	t condition r	<u>Analyze da</u>	<u>ta</u> [Recall	- Clear	[Clear al	τ
1. Compty 2. Empty 3. Empty 4. Empty 5. 106_01 6. Recall 7. Restor 8. Rename 9. <u>Clear</u> 10.		No. Name 1 2 3 4 5 6 7 8 9 10	Graph	Start	time	Use
LTTT .				Total	Used Free	0% 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to the memory No. of "Measurement condition" to be deleted and click *st*.
- (3) An item selection window opens. Move the cursor to "Clear" and click s_{tf} .
- (4) A Yes/No confirmation window opens. From this screen, select "Yes" and click set. The measurement conditions file is deleted.

8.2.6 Saving analysis graph data

This section describes how to save the analysis graph data, using an example of saving the displayed analysis graph data under name "J-TOLERANCE".



- (1) Display the Analyze: Jitter tolerance screen.
- (2) Move the cursor to "Store" and click [set].
- (3) A memory save window appears. From this window, input character string" J-TOLERANCE".
- (4) After inputting the file name, move the cursor to "END".
- (5) Clicking st causes the character input window to be closed and the analysis graph data to be saved.

Notes:

- A maximum of 10 files can be saved. When 10 files have been saved, no additional files can be saved.
- If the memory save window is closed without setting any file name, "Memory" is assigned as the initial file name.
- If there remains insufficient memory when saving a file, the file cannot be saved.

8.2.7 Reading analysis graph data

This section describes how to read analysis data from memory and display it on the screen.

Setup	Memory		14:39:54 11/Feb/2001
Measurement	condition	<u>Analyze data</u> Recal	l Clear Clear all
1. Empty 2. Empty 3. Empty 4. Empty 5. Empty 6. Empty 7. Empty 8. Empty 9. Empty 10. Empty		No. Name <u>Graph</u> 1 <u>J_TOL</u> Jitter tole 2 3 4 5 6 7 8 9 10	Start time Use 14:37:46 11/Feb/2001 < 1%
µпіт 			Total Used < 1% Free 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to "Recall" and click [set].
- (3) A memory save window appears. On this window, move the cursor to the memory No. to be read and click set.
- (4) When the Analyze screen is invoked, it shows the read analysis data.

8.2.8 Deleting analysis graph data

This section describes how to delete the saved analysis data.

Setup Me	MOFY	14:42:41 11/Feb/2001
<u>Measurement conditio</u>	<u>n Analyze data</u> Re	call <u>Clear</u> Clear all
1. Empty 2. Empty 3. Empty 4. Empty 5. Empty 6. Empty 7. Empty 8. Empty 9. Empty 10. Empty	No. Name <u>Graph</u> 1 U_TOL 2 Jitter t 3 YES 4 5 6 7 8 9 10	Start time Use ole 14:37:46 11/Feb/2001 < 1%
µnrtiat		Total Used < 1% Free 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to "Clear" and click st.
- (3) A memory list appears. Move the cursor to the memory No. to be deleted and click st.
- (4) A Yes/No selection window appears. From this window, select "Yes" and click set. Then, the data is deleted.

8.2.9 Deleting all analysis graph data

This section describes how to delete all of the saved analysis data.

Setup Memo	ry	15	:00:52 11/Feb/2001
Measurement condition1. [Empty2. Empty3. Empty4. Empty5. Empty6. Empty7. Empty8. Empty9. Empty9. Empty10. [Empty	Analyze data No. Name 1 J_TOL Jit 2 3 4 5 6 7 8 9 10	Recall Clear Graph Star ter tole 14:37:46 1	Clear all NO t time YES Use I/Feb/2001 < 1%
		Total	Used < 1% Free 100%

- (1) Display the Setup: Memory screen.
- (2) Move the cursor to "Clear All" and click st.
- (3) A Yes/No selection window appears. From this window, select "Yes" and click sel. Then, all data is deleted.

8.3 Outputting to Printer

This section describes how to automatically print the measurement result. The following steps should be carried out before starting the measurement:

- (1) With the MP1580A power turned ON, connect the printer to the printer port.
- (2) Display the Setup: Print/Logging screen.
- (3) Move the cursor to "Print", click set, and check that "Print" is set to "ON". Print details can be selected or set by setting (b) to (g) to ON or OFF.
- (4) After the measurement is over, the measurement result is printed out automatically.

(\mathbf{a})	Setup Print/Loggi	ng			22:44:05 06/Jan/2000
(a)	Print Logging	E	ON OFF]	
(b) (c)	Manual test Intermediate data	Γ	OFF	ן	
(d) (e) (f)	Print items Measuring condition Paper saving Jitter hit occurrence Last data		ON ON ON ON		
(g)	Auto test Theasuring condition	Γ	ON	נ	

- (a) Print Sets automatic printing to ON/OFF.
- (b) Intermediate data...... Sets conditions for intermediate data printing at the specified intervals during measurement.
 - OFF Prints no intermediate data.

Individual..... Prints measurement value within the printing time.

Accumulate...... Prints measurement value accumulated from the measurement start.

- When setting to "Individual" or "Accumulate", also set the print-out period.
- (c) Measurement condition...... Set the conditions for printing measurement conditions at the start of manual measurement.

- (d) Paper saving Sets paper saving function to ON/OFF.
 - To save print paper, printing can be stopped when an error occurs continuously for 10 s. When continuous error occurrence stops, printing restarts.
- (e) Jitter Hit occurrenceSets printing to ON/OFF for hit occurrence.
- (f) Last dataSet printing to ON/OFF for measurement result data when the measurement is completed.
- (g) Measurement conditionSets conditions for printing measurement conditions at the start of automatic measurement.

Note:

Starting screen copy during printing may prevent normal printing.

8.4 Remote Control

MP1580A Jitter Analyzer allows automatic measurement by connecting an external controller. The connection interface can be selected from among GPIB, RS-232C, and Ethernet. For details of the remote control, refer to the separate "MP1580A Jitter Analyzer Operation Manual Vol. 2 Remote Control".

8.4.1 Setting GPIB interface

When MP1580A is equipped with a GPIB option, possible to set GPIB functions in the following steps:

- (1) Display the Setup: System screen.
- (2) Move the cursor to "Remote Interface" and click st to set GPIB.
- (3) Move the cursor to "Address" and click **Set**. From the invoked numerical value input window, input the interface address.

Setup	S	ystem		1	5:05:49 11,	/Feb/2001
Date&Time	adjust	[15:05:49	11/Feb/2001]	Remote interface	[GPIB] ⊸ (a)
Graph reso	lution	[1min]		Address	[1] ┥	(b)
Tracking		[OFF]				

(a) Remote Interface

Selects the Remote control interface.

GPIB Select when using the GPIB interface for remote control.

(b) Address Select the MP1580A's GPIB address.

8.4.2 Setting RS-232C interface

When MP1580A is equipped with a RS-232C option, possible to set RS-232C functions in the following steps:

- (1) Display the Setup: System screen.
- (2) Move the cursor to "Remote Interface" and click **set** to set RS-232C.
- (3) Using arrow keys \bigcirc , \bigcirc , \bigcirc and/or \bigcirc and $\mathbb{S}t$, set items (a) to (f).

Setup	System		15	:06:12 11/	Feb/2001
Date&Time adjust	[15:06:12	11/Feb/2001]	Remote interface	[RS-232C	(a)
Graph resolution	[1min]		Speed	[9600	
Tracking	[OFF]		unaracter length Parity Stop bit Flow control	None None Ibit X-ON/X-OF	(c) (d) (f)

- (a) Remote Interface Selects the Remote control interface.
 - RS-232C..... Select when using the RS-232C interface for remote control.
- (b) Speed..... Set the baud rate.
- (c) Character length Set the bit length.
- (d) Parity..... Set parity.
- (e) Stop bit Set the stop bit length.
- (f) Flow control..... Set flow control.

8.4.3 Setting Ethernet interface

When MP1580A is equipped with an Ethernet option, possible to set Ethernet functions in the following steps:

- (1) Display the Setup: System screen.
- (2) Move the cursor to "Remote Interface" and click **set** to set Ethernet.
- (3) Using arrow keys \bigcirc , \bigcirc , \bigcirc and/or \bigcirc and \mathbb{S} , set items (a) to (f).

atus atus	+	2.15.22 16/4
<u>etup</u> 378		(a)
Date&Time adjust [1	3:15:33 16/Aug/2001] Remote interface	L Ethernet
Graph resolution [15min] IP address	[172.016.095.100] (b)
Tracking [OFF] Subnet mask Gateway address Port number MAC address	[255.255.255.000 [172.016.095.001] 15800 00009189A889

(a) Remote Interface......Selects the Remote control interface.

Ethernet.....Select when using the Ethernet interface for remote control.

- (b) IP address.....Set the MP1580A's IP address
- (c) Subnet mask.....Set the subnet mask address
- (d) Gateway addressSet the gateway address

8.5 VGA Output

MP1580A allows outputting the screen being displayed to an external monitor from the VGA port. The procedures are as follows:

- (1) With the MP1580A power turned OFF, connect the D-Sub 15-pin monitor cable to the MP1580A.
- (2) Turn the MP1580A power ON.
- (3) Check the screen displayed on the external monitor.

8.6 Disabling Key Operations

MP1580A allows locking the panel keys by one-touch operation. The procedures are as follows:



8.7 Setting Clock

The procedure to set the MP1580A Clock is as follows:

- (1) Display the Setup: System screen.
- (2) Move the cursor to "Date & Time adjust" and click **Set**.
- (3) Use the up/down/left/right panel keys to set the time, day, month, and year values.
- (4) Click st to set the time and date.



(a) Set the time, day, month, and year in "Date & Time Adjust".

8.8 Copying Screen

MP1580A allows saving the displayed screen to a floppy disk in the bitmap format.

The procedures are as follows:

- (1) Insert a floppy disk to floppy disk drive (FDD). For disk format, etc., see "Section 8.1 Floppy disk".
- (2) Display the screen to be saved, and press or to save the screen data to the floppy disk.

Screen Copy key	Anritsu MP1580A Meta 2000 Material Control Operation	

- While saving the data, the *main lamp* lights.
- (3) When data saving has been completed, the Imp goes OFF. The saved screen's filename becomes "DMPxxxxxx", where "xxxxxx" is automatically assigned number.

Note:

Starting screen copy during printing may prevent the normal printing.

8.9 Logging

This section gives the procedures for displaying the automatically print measurement data. These procedures must be carried out before starting the measurement.

Example: Displaying logging data of jitter tolerance measurement.

- (1) Display the Setup: Print/Logging screen.
- (2) Set "Logging" to "ON".

Setup Print/Loggi	ng	15:15:18 11/Feb/2001
Print Logging	[OFF] ON	
Manual test Intermediate data	[Accumulate] [1] [min]]
Print items Measuring condition Paper saving Jitter hit occurrence Last data	[0FF] 0N] 0N] 0N]	
Auto test Measuring condition	[ON]	

- (3) Perform a jitter tolerance measurement.
 - For jitter tolerance measurement, see "Section 6.2.2 Measuring jitter tolerance".
- (4) Display the Analyze: Logging screen to display the automatically printed jitter tolerance measurement contents.

8.10 Contrast

When adjusting the MP1580A screen contrast, use $\bigcirc^{Contrast}$ knob.

Portable 2:50/100 Antelyza	
Local	
	Contrast adjusting knob

Section 9 Performance Test

This section describes the procedures for testing the performance of MP1580A. If the tests described in this section show that any of the rated values are not satisfied, there may exist any troubles. In such a case, please contact Anritsu or one of our agencies.

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	9.3.2	Test procedure	9-7

9.1 Clock Output Level

9.1.1 Connection

- (1) Turn the MP1580A power switch Off.
- (2) Mount the 2.5G/10G Jitter unit.
- (3) Connect Clock Output and Ref. Clock output as shown in the figure below.
- (4) When the connection completes, turn the MP1580A power switch On.



Clock output performance test

9.1.2 Test procedure

The procedures for the clock output performance test are as follows:

- (1) Display the Setup: Interface screen.
- (2) Set "Bit rate" to "9953M", "Through Jitter" to "Off," and "Clock" to "Internal".
- (3) Display the Test menu: Manual screen.
- (4) Set "Tx Jitter" to "Off".
- (5) Check the specification as shown in the table 1.
- (6) From the Setup: Interface screen, change "Bit rate" setting and repeat steps (1) to (5) above.

Section 9 Performance Test

	Bit rate	Nominal frequency	Min. (V (p-p))	Max. (V (p-p))	
Cton dond	2488 M	2488.32 MHz	0.55	1.15	
Standard	9953 M	9953.28 MHz	0.55	1.15	

Table 1 Bit Rates and Nominal Frequencies

9.2 Jitter Measurement Sensitivity Test

9.2.1 Connection

- (1) Turn the MP1580A power switch Off.
- (2) Mount the 2.5G/10G Jitter unit.
- (3) Connect the Clock Output connector and the Clock Input connector using a cable by self-loopback, as shown in the figure below.
- (4) When the connection completes, turn the MP1580A power switch On.



Jitter measurement sensitivity performance test

9.2.2 Test procedure

The procedures for the jitter measurement sensitivity performance test are as follows:

- (1) Display the Setup: Interface screen.
- (2) Set "Bit rate" as shown on Table 2, "Though jitter" to "Off", and "Clock" to "Internal".
- (3) Next, display the Test menu: Manual screen.
- (4) Setup TX and RX as shown on Table 2.
- (5) Display the Result: Manual screen.
- (6) Check the RX jitter peak-to-peak value satisfies the specific values shown on Table 2.
- (7) Next, display the Test menu: Manual screen.
- (8) Check the RX jitter RMS value satisfies the specific values shown on Table 3.
- (9) From the Setup: Interface screen, change "Bit rate" to repeat from (3) to (9).

Interface	ТХ			TX RX		Specification	
Bit rate	Range	Amplitude	Frequency	Range	Filter	Min. (Ul _{p-p})	Max. (Ul _{p-p})
2488	0.5UI	0.38	300k	2UI	HP1+LP	0.253	0.506
	20UI	1.75	100k	2UI	HP1+LP	1.525	1.97
	20UI	12.25	100k	20UI	HP1+LP	10.827	13.642
	1000UI	500	30	1000UI	HP0+LP'	379.291	569.391
9953	0.5UI	0.38	300k	2UI	HP1'+LP	0.253	0.506
	80UI	1.75	100k	2UI	HP1'+LP	1.518	1.963
	80UI	12.25	100k	20UI	HP1'+LP	10.781	13.596
	4000UI	2000	30	4000UI	HP0+LP'	1517.316	2277.416

Table 2 Allowable range for jitter measurement accuracy performance test (UI_{p-p})

Table 3 Allowable range for jitter measurement accuracy performance test (UIrms)

Interface	тх			F	RΧ	Speci	fication
Bit Rate	Range	Amplitude	Frequency	Range	Filter	Min. (Ulrms)	Max. (Ulrms)
2488	0.5UI	0.38	300k	2UI	HP+LP	0.099	0.169
	20UI	1.75	100k	2UI	HP+LP	0.545	0.683
	20UI	12.25	100k	20UI	HP+LP	3.939	4.661
9953	0.5UI	0.38	300k	2UI	HP+LP	0.097	0.171
	80UI	1.75	100k	2UI	HP+LP	0.543-	0.685
	80UI	12.25	100k	20UI	HP+LP	3.929	4.671

9.3 Demodulation Output Signal Sensitivity Test

9.3.1 Connection

- (1) Turn the MP1580A power switch OFF.
- (2) Mount the 2.5G/10G Jitter unit.
- (3) Connect the Clock Output connector to the Clock Input connector using a cable by self-loopback, as shown in the figure below.
- (4) Connect Demod.out to an oscilloscope using a 50 Ω BNC cable.
- (5) When the connection completes, turn the MP1580A power switch ON.



9.3.2 Test procedure

The procedures for the demodulation output signal sensitivity performance test are as follows:

- (1) Display the Setup: Interface screen.
- (2) Set "Bit rate" as shown on Table 4, "Though jitter" to "Off", and "Clock" to "Internal".
- (3) Next, display the Test menu: Manual screen.
- (4) Setup TX and RX as shown on Table 4.
- (5) Using an oscilloscope, check the demodulation output satisfies the specification values.
- (6) From the Setup: Interface screen, change "Bit rate" to repeat from (2) to (5).

Section 9 Performance Test

Interface	ТХ			RX		Specification	
Bit rate	Range	Amplitude	Frequency	Range	Filter	Min. (V _(p-p))	Max. (V _(p-p))
2488	20UI	2	100k	2UI	HP1+LP	0.8	1.2
	20UI	20	100k	20UI	HP1+LP	0.8	1.2
	1000UI	1000	10	1000UI	LP'	0.8	1.2
9953	80UI	2	100k	2UI	HP1'+LP	0.8	1.2
	80UI	20	100k	20UI	HP1'+LP	0.8	1.2
	4000UI	4000	10	4000UI	LP'	0.8	1.2

 Table 4
 Allowable range for de-modulation output sensitivity performance test

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	"Install (Application program)" screen	G-1

Appendix

Section No.	ltem	Specifications			
1	Model/Type	MP1580A (Main Unit)			
1.1	Electric Performance				
	DCS input	2 M, 1.5 M, 64 K + 8 K (2 M) = 2.048 MHz + 50 nnm 2.048 Mbit/s + 50 nnm			
1.1.1.1	riequency	$(2 \text{ M}) = 2.048 \text{ MHz} \pm 50 \text{ ppm}, 2.048 \text{ Moto's} \pm 50 \text{ ppm}$ $(1.5 \text{ M}) = 1.544 \text{ MHz} \pm 50 \text{ ppm} = 1.544 \text{ Mbit/s} \pm 50 \text{ ppm}$			
		(64 k) 64 kHz +8 kHz ±50 ppm			
1.1.1.2	Interface	(2 M) ITU-T G.703 Table10, HDB3 (2 M)			
		(1.5 M) B8ZS, AMI (1.5 M) ANSI T1.403			
1.1.1.3	Connectors	BNC75 Ω (2 MHz, 2 Mbit/s)			
		SIEMENS 120 22 Balanced (2 MHZ, 2 Mbit/s, 64K +8 KHZ,) BANTAM 100 O Balanced (1 5 MHz, 1 5 Mbit/s)			
		DAMIANI 100 32 Dalaheed (1.5 Mill, 1.5 Moles)			
1.2	Environmental conditions				
1.2.1	Power supply	85 to 132 Vac 170 to 250 Vac (Automatic switching between 100 Vac and 200			
		Vac systems) 47.5 Hz to 63 Hz			
1.2.2	Operating	0 to 40°C (Except for FDD operation)			
	Temperature range				
	~				
1.2.3	Storage	$-20 \text{ to } 60^{\circ}\text{C}$			
	Temperature range				
1.3	Mechanical conditions				
1.3.1	Dimensions	100 mm (H) \times 320 mm (W) \times 350 mm (D) except projections			
1.3.2	Mass	8 kg or less (except units)			
2	Model/Type Electrical Performance	MU150018A (Unit)			
2.1					
	[Jitter occurrence]				
2.1.1	Clock output	(Jitter = ON)			
2.1.1.1	Frequency	2488.32 MHz ±100 ppm, 9953.28 MHz ±100 ppm			
2.1.1.2	Level Termination/connector	0.8 V(p-p) + 0.35 V, 0.8 V(p-p) - 0.25 V			
2.1.1.3	Ter mination/connector	50 52/5WIA			
2.1.2	Internal	0.1 Hz to 80 MHz			
	Modulation signal				
2.1.2.1	Frequency range	0.1 Hz to $1 Hz/0.1 Hz$ Step 1 Hz to $0.0 \text{ Hz}/1 \text{ Hz}$ Step			
		100 Hz to $99 Hz/$ 10 Hz Step			
		1 kHz to 9.9 kHz / 0.1 kHz Step			
		10k Hz to 99 kHz/ 1 kHz Step			
		100 kHz to 990 kHz/ 10 kHz Step			
		I MHz to 9.9 MHz/ 0.1 MHz Step			
		Frequency accuracy: +100 nnm			
2.1.3	Ext. Mod. Input	External modulation signal input			
2.1.3.1	Frequency range	0.1 Hz to 80 MHz			
2.1.3.2	waveform	Sine wave			

Section No.	ltem	Specifications
2.1.3.3	Sensitivity	For 2488.32 MHz
		0.5 UI Range: $0.5 \text{ UI}_{p-p} \pm 0.075 \text{ UI}$
		/ 2 V(p-p) at fr=300 kHz
		20 UI Kange: 20 Ulp-p ± 3 Ul / 2 V(p-p) at fr=20 kHz
		1000 UI Range: 1000 UI _{p-p} ± 150 UI
		/ 2 V(p-p) at fr=10 Hz
		For 9953.28 MHz
		0.5 UI Range: $0.5 \text{ UI}_{\text{P-P}} \pm 0.075 \text{ UI}$
		/ 0.5 V(p-p) at tr=300 kHz
		/ 2 V(n-n) at fr=20 kHz
		4000 UI Range: 4000 UI _{p-p} \pm 600 UI
		/ 2 V(p-p) at fr=10 Hz
2.1.3.4	Termination/connector	50 Ω/BNC
2.1.4	Ref clock Output	
2.1.4.1	Frequency	155.52 MHz ±100 ppm
2.1.4.2	Level	0.8 V(p-p) ±0.25 V
2.1.4.3	Termination/connector	AC 50 Ω/SMA
2.1.5	Wander Ref Clock	
2151	Frequency	1 544 MHz 2 048 MHz 5 MHz
2.1.5.2	Level	1.125 V _{op} ±0.3825 V: 1.544 MHz, 2.048 MHz
		0.8 V(p-p) ±0.25 V: 5 MHz
2.1.5.3	Termination/connector	75 Ω/BNC
2.1.6	External Clock Input	
2.1.6.1	Frequency	155.52 MHz ±100 ppm
2.1.6.2	Level	0.8 V(p-p) ±0.25 V
2.1.6.3	Termination/connector	AC 50 Ω/SMA
2.1.7	Jitter modulation	
2.1./.1	Range	$0.5 \text{ UI}(0.000 \text{ to } 0.505 \text{ UI}_{\text{m}} \text{ s/} 0.001 \text{ UI}_{\text{m}} \text{ step})$
		$20 \text{ UI } (0.00 \text{ to } 20.20 \text{ UI}_{\text{p-p}}/0.01 \text{ UI}_{\text{p-p}} \text{ step})$
		1000 UI (0 to $1010 \text{ UI}_{p-p}/1 \text{ UI}_{p-p} \text{ step})$
		AUTO (for automatic measurement only)
		For 9953.28 MHz
		$0.5 \text{ UI} (0.000 \text{ to } 0.505 \text{ UI}_{p-p}/0.001 \text{ UI}_{p-p} \text{ step})$
		80 UI (0.00 to 80.80 UIp-p/0.05 UIp-p step) 4000 LIL (0 to 4040 LIL $\pi/2 \text{ LIL}$ a step)
		AUTO (for automatic measurement only)

Section No.	ltem	Specifications				
Section No. 2.1.7.2	Item Modulation value	Specifications Conforming to ITU-T O.172 [Bit Rate : 2488.32 Mbit/s] (Cd)(0) OUI Range (Cd)(0) OUI Range A2' A1 42 42 42 42 42 43 43 43 43 43 43 43 43 43 43 43 43 4000 UI Range 4000 UI Range 400 VI Range 4000 VI Range 4000 VI Range 4000				
		$\begin{array}{c} \begin{array}{c} \begin{array}{c} A2' \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$				

Section No.	ltem	Specifications								
2.1.7.3	Accuracy	 For 2488.32 MHz 0.5 UI Range: (±Q% of setting) ±0.02 UI_{p-p} 20 UI Range: (±Q% of setting) ±0.02 UI_{p-p*1} 1000 UI Range: (±Q% of setting) ±4.8 UI_{p-p} For 9953.28 MHz 0.5 UI Range: (±Q% of setting) ±0.02 UI_{p-p} 80 UI Range: (±Q% of setting) ±0.02 UI_{p-p*2} 4000 UI Range: (±Q% of setting) ±10 UI_{p-p} *1: Less than 10% of the setting range, ±0.18 UI_{p-p} is added. *2: Less than 5% of the setting range, ±0.18 UI_{p-p} is added. 10 to 5% of the setting range, ±0.18 UI_{p-p} is added. 								
		Bit rate (Mbit/s)Variable error QFrequency Range(Hz) $\pm 12\%$ 0.1 to 5 k2488.32 $\pm 8\%$ $\pm 12\%$ 500 k to 2 M $\pm 12\%$ 2 M to 20 M								
		9953.28	0.1 to 20 k 20 k to 500 k 500 k to 2 M 2 M to 80 M							
2.1.8 2.1.8.1 2.1.8.2 2.1.8.3 2.1.9 2.1.9.1	[Jitter measurement] Clock Input Frequency Level Termination/connector Demod. Output Sensitivity	2488.32 MHz ±100 ppm, 9953.28 MHz ±25 ppm 0.8 V(p-p) +0.35 V, 0.8 V(p-p) -0.25 V 50 Ω/SMA 2 UI Range: 1 V(p-p) ±0.2 V/2 UI _{P-p} at fr=100 kHz 20 UI Range: 1 V(p-p) ±0.2 V/20 UI _{P-p} at fr=100 kHz 1000 UI Range: 1 V(p-p) ±0.2 V/1000 UI _{P-p} (for 2488 M) at fr=10 Hz								
2.1.9.2 2.1.10 2.1.10.1 2.1.10.2 2.1.10.3	Termination/connector Ref .Clock Input Frequency Level Termination/connector	50 Ω/BNC (Demod. Output) 155.52 MHz ±100 ppm 0.8 V(p-p) ±0.2 V AC 50 Ω/SMA								
2.1.11 2.1.11.1 2.1.11.2	Manual jitter measurement Unit Range	UIp-p, UI+p, UI-p/UIrms UIp-p measurement 2 UI Range (0.000 to 2.020 UIp-p/0.001 UIp-p step) 20 UI Range (0.00 to 20.20 UIp-p/0.01 UIp-p step) 1000 UI Range (0 to 1010 UIp-p/1 UIp-p step) 4000 UI Range (0 to 4040 UIp-p/2 UIp-p step) UIrms measurement 2 UI Range (0.000 to 0.714 UIrms/0.001 UIrms step) 20 UI Range (0.00 to 7.14 UIrms/0.01 UIrms step)								
Section No.	ltem			Sp	ecifica	tions				
--	--	--	------------------	---------------------------	-------------------------------------	------------------	------------------	----------------------	--------	----------------------
2.1.11.3 2.1.11.4 2.1.11.5 2.1.11.6	Correction Measurement mode Measurement interval Filter	0 to 0.714 No compensation at 20 UI Repeat, Single, Manual 0.5 to 99.5 s/0.5 s step Conforming to ITU-T O.172 LP, HP1+LP, HP1'+LP, HP2+LP, HP+LP, HP'+LP, HP0+LP LP'*, HP0+LP'* (* For 1000/4000 UI Range only)								
		Bit Rate I	HP0 H	P1 HI	P1' H	P2 H	IP' I	IP I	LP L	P'
		(Mbit/s) ((Hz) (Hz)	lz) (H	iz) (F	IZ) (I	Hz) (H	$\frac{dz}{dz}$ (H	Hz) (H	<u>Iz)</u>
		9953.28	10 5 10 10	K 20	- 1) K 4	M 50	- 12 OK 12	2 K = 20 2 K = 80	M = 3	$\frac{\kappa}{0 k}$
2.1.11.7	Measurement range	Jitter measurement amount (UIp-p) 7 05	F	20 L 2 1 F1' Moo	JI Range 2 UI Rang dulation f	ge	F2 F2' y (Hz)	F3	F4	
						•				
		Bit Rate	Range	F1	F1'	F2	F2'	F3	F4]
		(Mbit/s)		(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	
		2488 32	2	-	100	-	100 K	1 M	20 M	_
		2100.32	20	10	-	10 K	-	1 M	20 M	
		9953.28	2	-	100	-	400 K	4 M	80 M	
			20	10	-	40 K	-	4 M	80 M	
		Jitter measurement amount (UIp-p)	4000	40	000 UI Ra	ange II Range				
									→	
		F1 F1' F2 F2' F3 Modulation frequency (Hz)								
		Bit R	ate Ra	nge F	71 F	'1' I	F2 F	'2' I	F3	
		(Mbi	t/s)	(H	Iz) (H	Hz) (I	Hz) (I	Hz) (H	Hz)	
		2488	.32 10	00	-	1	- 1.	2.1 5	K	
		i —		-						

Section No.	ltem				S	pecifica	tions			
2.1.11.8	Measurement accuracy	[UIp-	-p, UI+p, I	JI-p]						
		2 UI	2 UI Range: ±R% ±W UIp-p							
		20 U	20 UI Range: ±R% ±W UIp-p							
		1000	1000 UI Range: ±R% ±W UIp-p							
		4000	UI Range	$\pm K\% \pm 1$	w Ulp-p					
		Note	: The mo	easureme	ent freque	ncy range	is limited	by Rx Ra	ange and I	HPF.
					W Structu	red signal	(With MU	50017A)		
			Bit rate (Mbit/s)	HP1	+LP	HP1	'+LP	HP2-	⊦LP	
			(MIDIUS)	2 UI 20 UI 2 UI 20 UI			20 UI	2 UI	20 UI	
			2488.32	0.1	2.0	-	-	0.05	1.0	
			9953.28	-	-	0.15	3.0	0.05	1.0	
				HP0)'+LP	HP0	+LP'			
				1000/4	4000UI	Cont	ainer			
			2488.32	3	30	VC4	-16C			
		9953.28 120 VC4-64C								
						Info:	2 ²³ -1			
		*+10	$^{\circ}$ C to +40°	°C wit	th input le	evel 248	88 M : −1	2 to -9	dBm	
		** /	additional	0.01 UL	"/dB at 2/	995 /188 Mbit	03 M∶−1 's with inn	0 to -8	dBm 12 dBm	
			additional	0.01 Ulp-	p/dB at 2- p/dB at 99	953 Mbit/	s with inp	ut level<- ut level<-	-12 dBm	
		-			F		r			
		UIn	ms							
		2U	JI Range:±	R% ±Y U	UIrms					
		20	UI Range	:±R% ±Y	UIrms					
				W Clock signal						_
				HP	1+LP	HP	1'+LP	HF	2+LP	_
			2499.22	2 UI	20 UI	2 UI	20 UI	2 UI	20 UI	_
			<u>2488.32</u> 9953.28	0.05	0.5	- 0.05	- 0.5	0.03	0.3	_
		*+10	°C to +40°	°C 0:	with inpu	t level 2	488.32 M	: -12to	-9 dBm	
		** ;	additional	0 002 111	rms/dB at	9 2488 32	Mbit/s wi	$\frac{1}{1000}$	$-\delta$ ubiii evel<-12	dBm
			additional	0.002 UI 0.002 UI	rms/dB at	t 9953.28	Mbit/s wi	th input le	evel < -10	dBm
		Frequ	uency erro	r [R]				1		
				HP	0+LP'					
				1000/	/4000UI					
			2488.32		20					
			9953.28		80					
2 1 12	TT: 4					_				
2.1.12	Hit measurement	Cour	its the num	her of the	mes for iii	tter evee	ding the g	et jitter er	nnlitude +	hreshold
2.1.12.1	Hit second	Sum	of seconds	s hits occ	urred		ung me so	l' jiuei al	iipiituue t	mesholu
2.1.12.3	% F second	Ratio	of second	ls (no hit	s occurred	l) to the n	neasureme	nt period		
								-		

Section No.	ltem	Specifications				
2.1.12.4	Hit threshold	2 UI Range: 0.05 to 1 UIo-p/0.01 UIo-p step 20 UI Range: 0.5 to 10 UIo-p/0.1 UIo-p step Threshold error: Nominal 5% Sets a hit threshold that is 70% or under of ±Peak value, and performs meas- urement. (With 20 UI range > 2 UIp-p)				
2.1.12.5 2.1.12.6	Jitter signal half-width Display range	100 ns or more Hit count, Hit second: 0 to 9999999 to 9.9E15, >9.9E15 Hit free second : 0.0000 to 100.0000%				
2.1.13	Jitter tolerance measurement					
2.1.14.1 2.1.14.2	Number of points Display	Maximum 20 Graph display Numerical-value display: Pass/fail judgment for mask				
2.1.14.3	Mask selection	2488.32 M: G958 TypeA, G.958A TypeB, G.825 2 M, G.825 1.5 M, G.813, 9953.28 M: Bell253 (SONET) or User				
2.1.14.4	Error judgment	1 s error : Onset of errors : Hold Time = 30 s 1dB Power Penalty : 100 or more errors, observed during 1 second Count : 1 > 99999 Rate : >1E-3, >1E-4, >1E-5, >1E-6, >1E-7, >1E-8, >1E-9, >1E-10, >1E-11 Default : The judgment condition is that any errors and/or alarms occur for continuous two seconds				
2.1.14.5	Hold Time	Sets the period of time for error measurement at each measurement point. $1.0 \pm 0.0 \text{ s/Str}$				
2.1.14.6	Waiting Time	Changes the measurement point, and sets the time interval from jitter-free state to starting next jitter generation.				
2.1.14.7	Set frequency range	Bit rate (Mbit/s)Set frequency range (Hz)2488.320.1 to 20 M9953.280.1 to 80 M				
2.1.15	Jitter transfer measurement	Measures the jitter transfer for the measured device.				
2.1.15.1	Number of points	Maximum 20				
2.1.15.2	Display	Graph display				
2.1.15.3	Level bandwidth selection	10 Hz				
2.1.15.4	Frequency range selection	Bit Rate (Mbit/s) Measurement range (Hz) 2488.32 100 to 20 M 9953.28 100 to 80 M				
2.1.15.5	Transfer Mask	2488.32 M: G.958 TypeA, G.958 TypeB, Bell253, ANSI T1.105.03 TypeA ANSI T1.105.03 TypeB or User 9953.28 M: Bell1377 or User				
2.1.16	Frequency variation	(Jitter = ON/OFF)				

Section No.	ltem			Spe	cificatior	าร			
2.1.16.1 2.1.16.2 2.1.16.3	Frequency Variable range/step Accuracy	2488.32 MHz, ±100.0 ppm / 0 ±0.1 ppm (Cali	2488.32 MHz, 9953.28 MHz ±100.0 ppm / 0.1 ppm (Mod. Select Jitter =ON/OFF) ±0.1 ppm (Calibration within 60 minutes after power ON, at 23 ±5°C)						
2.1.17 2.1.17.1	Clock mode Termination/connector	For 5 MHz or 2 75 Ω/BNC	For 5 MHz or 10 MHz, use Ext5/10M Ref Input of MU150018A. 75 Q/BNC						
2.1.17.2	Termination/connector	For 155.52 MH 75 Ω/BNC	Iz, use Ez	xternal Clock	K Input of]	MU150018	A.		
2.1.18 2.1.18.1	[Wander generation] Wander signal output Frequency	(Wander =ON/ No output for 7 2488.32 MHz :	(Wander =ON/OFF) No output for Through and Ext. 2488.32 MHz ±100 ppm, 9953.28 MHz ±100 ppm						
2.1.19 2.1.19.1	Wander modulation signal Frequency range	Auto/Manual 10 µHz to 10 F	Iz, sine w	/ave					
		10 μHz to 99.9 μHz/0.1 μHz step 100 μHz to 999 μHz/1 μHz step 1.00 mHz to 9.99 mHz/0.01 mHz step 10.0 mHz to 99.9 mHz/0.1 mHz step 100 mHz to 999 mHz/1 mHz step 1.00 Hz to 10.00 Hz/0.01 Hz step							
2.1.19.2	Amplitude	0 to 400,000 UI/1 UI _{P-P} step Can be switched to display in ns							
			Modu	J F Ilation frequ	iency (Hz	2)			
		Bit Rate (MHz)	F0 (Hz)	F1 (Hz)	F2 (Hz)	A0 (UIp-p)	A1 (UIp-p)	Step (UIp-p)	
		2488.32	10 μ	400 m	10	400,000	16,000	1	
		$ \begin{array}{c} \text{Error } (\\ \pm 8\% \\ \pm 12\% \\ \pm 15\% \\ \end{array} $	2 2	Freq. R 10 μHz to 0 0.125 Hz 1 Hz to	ange 0.125 Hz to 1 Hz 10 Hz		10,000		
2.1.19.3	Phase Modulation	Adds phase m ditions (valid v	odulation when Opt	to Wander ion 03 is inst	Ref. Outp talled).	ut, accordi	ng to the s	elected con-	

Section No.	ltem	Specifications
2.1.19.4	Selection items	OFF : Wander (TDEV) : Transients : Signal OFF:
2.1.20	[Wander measurement] Wander measurement signal input	Valid only when OPT-02 is installed Wander measurement signal input
2.1.20.1	Frequency	2488.32 MHz ± 100 ppm, 9953.28 MHz ± 100 ppm
2.1.21 2.1.21.1	Wander Ref Input Frequency	Wander measurement reference signal input 2.048 Mbit/s ±50 ppm (HDB3) or 2.048 MHz ±50 ppm (Clock) 1.544 Mbit/s ±50 ppm (AMI/B8ZS) or 1.544 MHz ±50 ppm (Clock)
2.1.21.2	Level	64 k +8 kHz ±50 ppm, 5 MHz ±50 ppm, 10 MHz ±50 ppm Unbalance: 1.544 MHz, 2.048 MHz (Clock); 1.125 V ₀ -p±34% G.703 2.048 Mbit/s (HDB3) ; 2.37 V ₀ -p±10% G.703
2.1.21.3	Load/connector	$\begin{array}{llllllllllllllllllllllllllllllllllll$
2.1.22	-	
2.1.23 2.1.23.1	RS-232C Connector	For wander measurement data output D-SUB 9 pin
2.1.24 2.1.24.1	Manual Wander measurement Evaluation mode	P-P, +P, -P, TIE
2.1.24.2 2.1.24.3 2.1.24.4	Meas. Mode Meas. Internal Upper-limit frequency	Single, Manual 1 to 99/step1 (s, min, h, day) 10 Hz ±10% (-3 dB point): except for transient measurement
2.1.24.5 2.1.24.6 2.1.24.7	Filter characteristic Ripple Maximum attenuation	-20 dB/dec ±0.2 dB (1 to 10 Hz, for 0.1 Hz as reference) <-30 dB
2.1.24.8	Sampling period	25 ms, 1 s, 10 s (selected by MX150001C)
2.1.24.9	Measurement range	P-P 0.0 to 2E10 ns +P, -P 0.0 to 1E10 ns TIE 0.0 to ±1E10 ns
2.1.24.10 2.1.24.11	Measurement time Resolution	1 s to 99 days 0.1 ns

Section No.	ltem	Specifications						
2.1.24.12	Accuracy	・TIE ±0.5%±Z0 (τ)						
		$Z0(\tau)$ (ns)	Observation time τ (s)					
		2.5+0.0275 τ	0.05≤τ≤1000					
		29+0.001 τ	τ>1000					
2.1.24.13	Filter selection	DC to 0.01 Hz, DC to 10 Hz 0.01 Hz to 10 Hz						
2.1.24.14	Filter characteristic	-20 dB/dec						
2.1.25	Automatic wander measurement	 TIE,MTIE*,TDEV*, * MTIE or TDEV measurement requires MTIE and TDEV application software of MX150002A, that runs on an external PC. Calculates MTIE and TDEV based on the measured TIE data, and displays the result. 						
2.1.25.1	Graph result display item							
2.1.26 2.1.26.1 2.1.26.2 2.1.26.3	Frequency measurement Frequency Resolution Accuracy	2488.32 MHz ±1000 ppm, 9953.28 MHz ±1000 ppm 0.1 ppm ±0.1 ppm (Calibration within 60 minutes after power ON, at 23 ±5°C) Except for Lock5M or Lock10M [Hz] Display up to nominal frequency x 10 ⁻⁷ [ppm] 0.0 to ±1000.0 [ppm]						
2.1.26.4	Range							
2.2.1 2.2.1.1	General Controlled devices	Device controlled through GPIB interface by using MP1580A equipped with MU150018A unit as the controller. MP1570A SONET/SDH/PDH/ATM Analyzer						
2.3.1	Environmental conditions Operating	0 to 40°C						
2.3.1.1	temperature range							
2.3.1.2	Storage temperature range	-20 to 60°C						
2.3.2 2.3.2.1 2.3.2.2	Mechanical conditions Dimensions Mass	45 mm (H) \times 255 mm (W) \times 167.6 mm (D), without projections 2.5 kg or less						

Model or Order No.	ltem	Remarks
MP1580A-01	RS-232C	Option 01 for MP1580A
MP1580A-02	GPIB	Option 02 for MP1580A
MP1580A-03	ETHERNET	Option 03 for MP1580A
MP1580A-04	VGA output	Option 04 for MP1580A
MU150018A-02	Wander measurement	Option 02 for MU150018A 2488M/9953M Wander Measurement
MU150018A-03	Wander reference output Phase modulation	Option 03 for MU150018A Wander Generation

The table below shows the optional items that are available for MP1580A. These items must be installed at our plant.

Model or Order No.	Name	Remarks
MX150002A	Wander (MTIE, TDEV) Measurement Application Software	for MU150018A
J0126B	Coaxial cable with BNC plug at both ends, 2 m	75 Ω, for MP1580A
J0776D	Coaxial cable, 2 m	50 Ω , for MP1580A
J0162A	Balanced cable 3 pins at both ends (with F plug), 1 m	120 Ω , for MP1580A/MU150018A
J0162B	Balanced cable 3 pins at both ends (with F plug), 2 m	120 Ω , for MP1580A/MU150018A
J0845A	Balanced cable 3 pins BANTAM at both ends	100 Ω for MP1580A/MU150018A
	Coaxial cable with SMA connector at both ends, 1 m	50 Ω, for MU10018A
J0006	GPIB cable, 0.5 m	for MP1580A
J0007	GPIB cable, 1 m	for MP1580A
J0008	GPIB cable, 2 m	for MP1580A
J1074	Semi-Rigid cable Tx	Standard accessories
J1075	Semi-Rigid cable Rx	Standard accessories
J0166A	RS-232C cable 2 m	
B0490	Joint plate	for MP1580A on MP1570A
B0491	Carrying case	for MP1580A
B0492	Soft case	for MP1580A

The table below shows the peripheral parts for MP1580A.

Initial Value/Setting Lists are shown in this appendix.

Initial Value List of Setup: Interface

Interface	L T×&R× _	07:25:39 05/Jan/2000
[9953M]		
[OFF]		
[Internal]	
	Interface [9953M] [OFF] [Internal	Interface [Tx&Rx] [9953M] [0FF] [Internal]

Initial Value List of Setup: Jitter tolerance

Setup Jitter tol	erance	07:26:40	05/Jan/2000
Bit rate [995 Tolerance table [G.82	зм 5 2м]	Mask	
No. Freq.(Hz) 1 10.0 2 13.0 3 30.0 4 100.0 5 300.0 6 1,000.0 7 3,000.0 8 10,000.0 9 20,000.0 10 46,000.0	No. Freq.(Hz) 11 100,000.0 12 220,000.0 13 400,000.0 14 1,000,000.0 15 2,200,000.0 16 4,000,000.0 17 10,000,000.0 18 22,000,000.0 19 46,000,000.0 20 80,000,000.0		

Appendix D Initial Values



Initial Value List of Setup: Jitter sweep

Initial Value List of Setup: Frequency sweep



Initial Value List of Setup: Jitter transfer

Setup	Jitter t	ransfer				07:28:12	05/Jan/2000
Bit rati Transfe	e [99 rtable [G.9	953M] 825 2M]		Г	Mask		
No. 1 2 3 4 5 6 7 8 9 10	Freq.(Hz) 100.0 160.0 300.0 600.0 1,000.0 2,000.0 4,600.0 10,000.0 20,000.0 46,000.0	UIP-P 15.00 15.00 15.00 15.00 15.00 6.50 3.00 1.50 1.50	<u>No.</u> 11 12 13 14 15 16 17 18 19 20	Freq.(Hz) 100,000.0 220,000.0 400,000.0 1,000,000.0 2,200,000.0 4,000,000.0 10,000,000.0 22,000,000.0 46,000,000.0 80,000,000.0	UIP-P 1.50 1.50 0.60 0.270 0.150 0.150 0.150 0.150 0.150 0.150		



Initial Setting List of Setup: Jitter/Wander

Initial Value List of Setup: Wander sweep

Setup Wander sweep	07:29:23	05/Jan/2000
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	UIP-P 4980.0 4980.0 4980.0 4980.0 4980.0 3110.0 1950.0 1110.0 630.0 630.0	

Initial Setting List of Setup: Print/Logging

Setup	Print/Loggi	ng			07:33:33 05/Jan/2000
Print Logging		E	OFF ON]	
Manual te Intermed	st iate data	Γ	OFF	ן	
Print it Measuri Paper s Jitter Last da	ems ng condition aving hit occurrence ta		OFF ON ON ON		
Auto test Measurin	g condition	Ľ	ON	נ	

Appendix D Initial Values

Initial Setting List of Setup: System

Setup	System		07	:34:10 05/Jan/2000
Date&Time ad	ljust [07:34:10	05/Jan/2000] R	emote interface	[RS-232C]
Graph resolu	ution [15min]		Speed Character length	[9600]
Tracking	[OFF]		unaracter lengtn Parity Stop bit Flow control	None 1bit [X-ON/X-OFF]

Initial Setting List of Test menu: Manual

Test menu	Manual		Tx&Rx:9953M	07:37:20	05/Jan/2000
Tx Mod. select	[OFF	ן	Wander generation Type	Ľ	OFF]
Freq. offset	C	0.0]ppm			
Rx Range Filter Hit threshold Correction Meas. mode	[20] HP1+LF [1] Г(X ² - [0. [Repeat	1 1.00 000 2) 1] [1	0k - 80M p][s]		

Initial Setting List of Test menu: Jitter tolerance

Test menu 🛛 🛛 🕽	tter tolerance	Tx&Rx:9953M	07:38:05 05/Jan/2000
Tolerance Table Point Mask table	G.825 2M 1] to [20] G.825 2M	MP1570A condition Config Bit rate Tx	s
Freq. offset	[0.0]ppm	Mapping Tx	
Detection	[Default] Tracking start [
Waiting time	[0]s	Press <start> ke</start>	у. П

Test menu	Jitter sweep	Tx&Rx:9953M	07:38:50	05/Jan/2000
Sweep Table Point Margin	[G.825 2M [1] to [20] [0]%	MP1570A condition Config Bit rate Tx	s 	
Freq. offset	[0.0]ppm	Mapping Ix		
Detection	[Default] Tracking start []	
Waiting time	[0]s	Press <start> ke</start>	у. — П	

Initial Setting List of Test menu: Jitter sweep

Initial Setting List of Test menu: Frequency sweep

Test menu	Frequency sweep	T×&R×:9953M	07:40:14 05/Jan/2000
Mod. freq Freq. offset Step Mask table	2.0]Hz ±100ppm 4ppm G.825 2M	MP1570A condition Config Bit rate Tx Rx Mapping Tx	ns
Detection	[Default] Tracking start	
Waiting time	[0]s	Press <start> k</start>	ey.

Initial Setting List of Test menu: Jitter transfer

Test menu 🔰 Jitter	transfer 🛛 🗛 🕹	Rx:9953M	07:40:57 05/Jan/2000
Measurement type Loopback	[Calibration] [External]	Ensure the follo	wing loopback.
Transfer table Point Mask table	[G.825 2M] [1] to [20] [Bell1377	J	
Freq. offset	[0.0]pp	m	
Waiting time	[0]s		
		Press <start> ki</start>	∍y. □

Appendix D Initial Values

Initial Setting List of Test menu: Wander

Test menu	Wander sweep	Tx&Rx:9953M 07:42:13 05/Jan/2000
Sweep Table Point Margin	[User [1] to [20] [0]%	MP1570A conditions Config Bit rate Tx By
Freq. offset	[0.0]ppm	Mapping Tx
Detection Error	[]	Tracking start
Threshold	[1]	
		Press <start> key.</start>

Initial Setting List of Test menu: Wander sweep

Test menu	Wand	er		Tx&Rx:9953M	07:52:57	05/Jan/2000
Туре	Ľ	OFF	ן			
Observation time	Ľ		1200]s			
				Press <start> ke;</start>	∕. ⊢⊓	

E.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 operating the equipment at dusty place, or before long-term 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 screwdriver.

E.2 Storage

Precautions on storage

Avoid storing MP1580A in any of the following locations:

- Where the temperature falls out of the -20 to $+60^{\circ}$ C range.
- Where the humidity falls out of 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 MP1580A is to be stored for a long time, take the precautions mentioned above. We recommend you to store the equipment in a place that satisfies the following conditions:

- Temperature5 to 30°C
- Humidity 40 to 75%

E.3 Transportation

Pay attention to the following points when transporting MP1580A:

- Cover the front panel of MP1580A with a protective cover.
- Insert cushioning materials which were 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 MP1580A.
- (2) Wrap MP1580A in a plastic bag.
- (3) Prepare a corrugated cardboard box, wooden box or aluminum case that is larger than MP1580A 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 MP1580A 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.

E.4 Mounting MP1570A/MP1570A1 on MP1580A

Precautions for mounting MP1570A/MP1570A1 on MP1580A. Follow the below direction.

- (1) Accessories
 - A. Holding plates $\times 4$
 - B. $\phi 5 \text{ mm} \times 47 \text{ mm}$ screws (spring washer flat washers) $\times 2$
 - C. $\phi 5 \text{ mm} \times 37 \text{ mm}$ screws (spring washer flat washers) $\times 2$
 - D. $\phi 4 \text{ mm} \times 37 \text{ mm}$ screws (spring washer flat washers) $\times 2$
 - E. $\phi 4 \text{ mm} \times 27 \text{ mm}$ screws (spring washer flat washers) $\times 2$



- (2) Mounting MP1570A/MP1570A1 on MP1580A
 - 1. Place MP1570A/MP1570A1 on MP1580A.
 - 2. Remove the MP1570A's/MP1570A1's 4 side screws at bottom.
 - 3. Remove the MP1580A's/MP1570A1's 4 side screws at upper side.
 - 4. At the left side, place the holding plates, and use C screws for MP1570A/MP1570A1 and E screws 5.for MP1580A to fasten.
 - 5. At the right side, place the holding plates, and use B screws for MP1570A/MP1570A1 and D screws for MP1580A to fasten.

Note:

When the MP1570A/MP1570A1 is mounted on the MP1580A, do not try to carry the both MP1570A/MP1570A1 and MP1580A.

E.5 Cleaning the Floppy Disk Drive

Dust may cause the floppy disk drive to malfunction. Therefore, it is necessary to periodically clean the floppy disk drive. Use a commercially available cleaning disk for the cleaning.

No particular disk is recommended by Anritsu. If you have any questions regarding the purchase of a cleaning disk, please feel free to contact Anritsu Corpolation or your nearest service representative.

If the floppy disk does not work properly even after cleaning, there is a possibility of its failure. In this case please contact Anritsu Corporation or your nearest service representative for repairs.

The revision numbers of option and software installed on MP1580A can be displayed on the "Setup: Option/Revision" screen. Here are the details of the display.



Installed on MP1580A.

- (a) Model type..... Displays the model name.
- (b) Serial numbers Displays serial number of MP1580A.
- (c) Software revision...... Displays the revision numbers of the software
- (d) Mainframe option Displays the numbers and functions of optional items.
- (e) Slot 1, Slot 2 Displays the models, names and options of the plug-in units installed in MP1580A.

G.1 Installing the Application Software "Install (Application program)" screen

Install the application software on the "Install (Application program)" screen.

First, insert a floppy disk into the drive.

Turn on the power switch of MP1580A while pressing both \bigcirc and \bigcirc_{Arabas} to display the "Install" screen.

This screen displays the startup conditions of installation and guidance massages. Follow the instruction to install the application

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