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

16th Edition

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

ANRITSU CORPORATION

Document No.: M-W1719AE-16.0

Safety Symbols

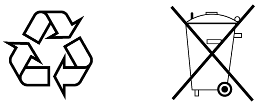
To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols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

Symbols used in manual

DANGER ⚠	This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.
WARNING ⚠	This indicates a hazardous procedure that could result in serious injury or death if not performed properly.
CAUTION ⚠	This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

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

⃠	This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.
○	This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.
△	This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.
□	This indicates a note. The contents are described in the box.
	These indicate that the marked part should be recycled.

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

7 February 2000 (First Edition)
14 December 2007 (16th Edition)

Printed in Japan

For Safety

WARNING ⚠

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

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

For Safety

WARNING ⚠

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

Electric Shock

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

Repair

WARNING ⚠

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

Calibration

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

Falling Over

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

For Safety

WARNING ⚠

Battery Fluid

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

LCD

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

For Safety

CAUTION ⚠

Fuse Replacement

CAUTION ⚠

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

   10A indicate a normal fusing type fuse.

Cleaning

2. Keep the power supply and cooling fan free of dust.
   - Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire.
   - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

Check Terminal

⚠

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

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

For Safety

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

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

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

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

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

For Safety

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

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

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

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

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

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

CAUTION ⚠

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

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

For Safety

WARNING ⚠

Laser Safety

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

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

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

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

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

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

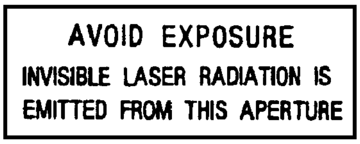
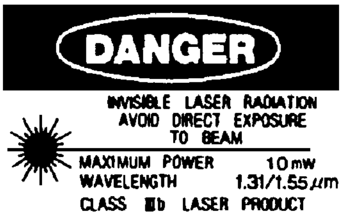
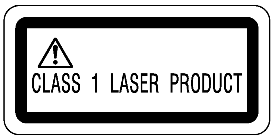
*: Indicates the possible optical output power when each and every reasonably foreseeable single-fault condition is included.

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

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

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

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

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

For Safety

Laser Radiation Markings

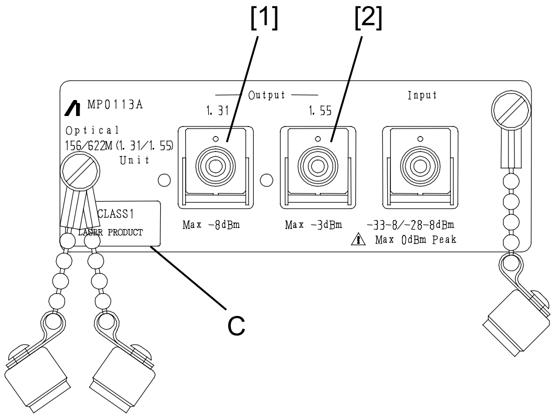


Fig. 1 Locations of Laser Beam Apertures and Affixed Labels

CAUTION ⚠

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

Please, attach it to the place, shown above.

For Safety

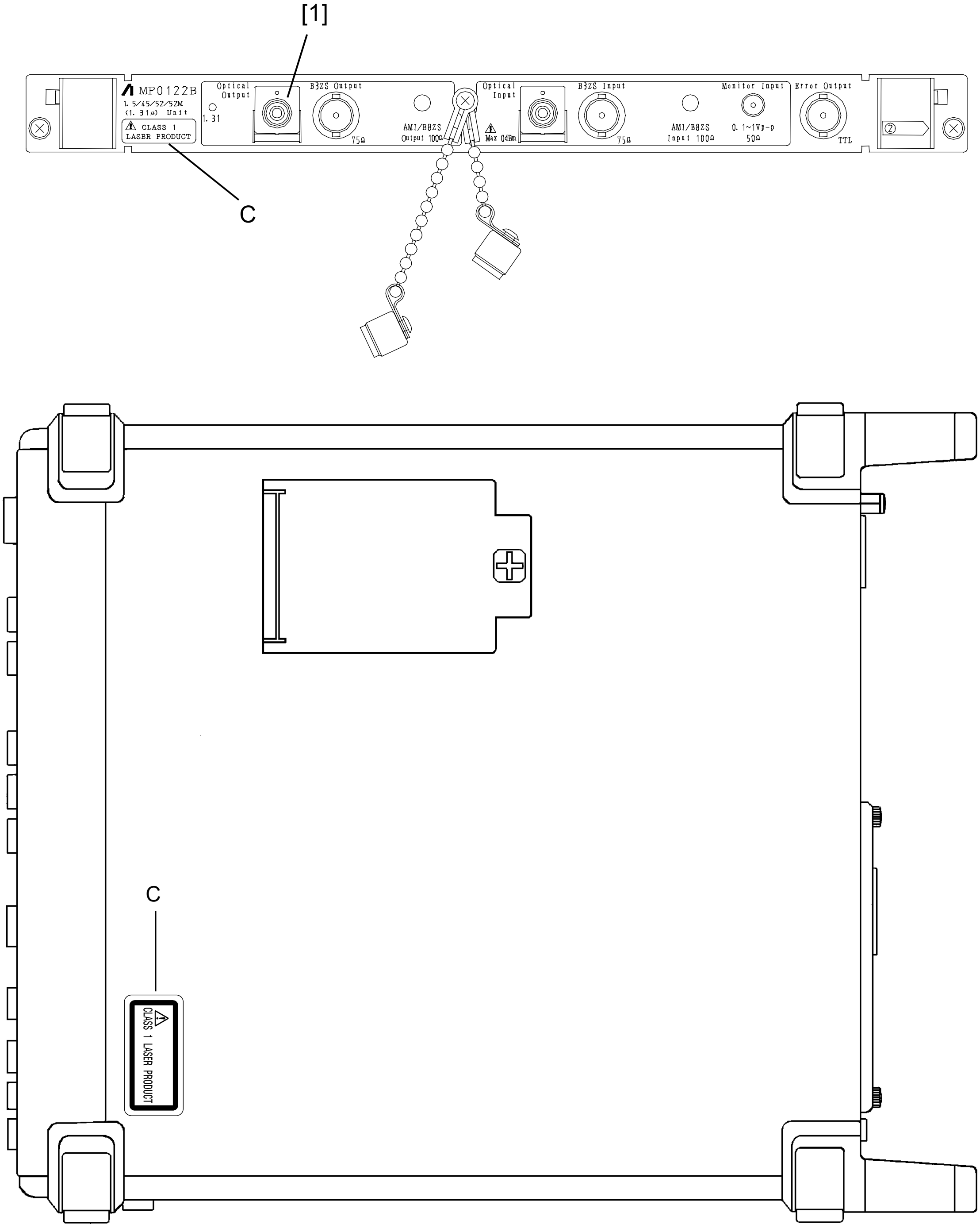


Fig. 2 MP0122B Front Panel of Unit and Top Panel of MP1570A (Products shipping besides U.S.A.)

CAUTION ⚠

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

For Safety

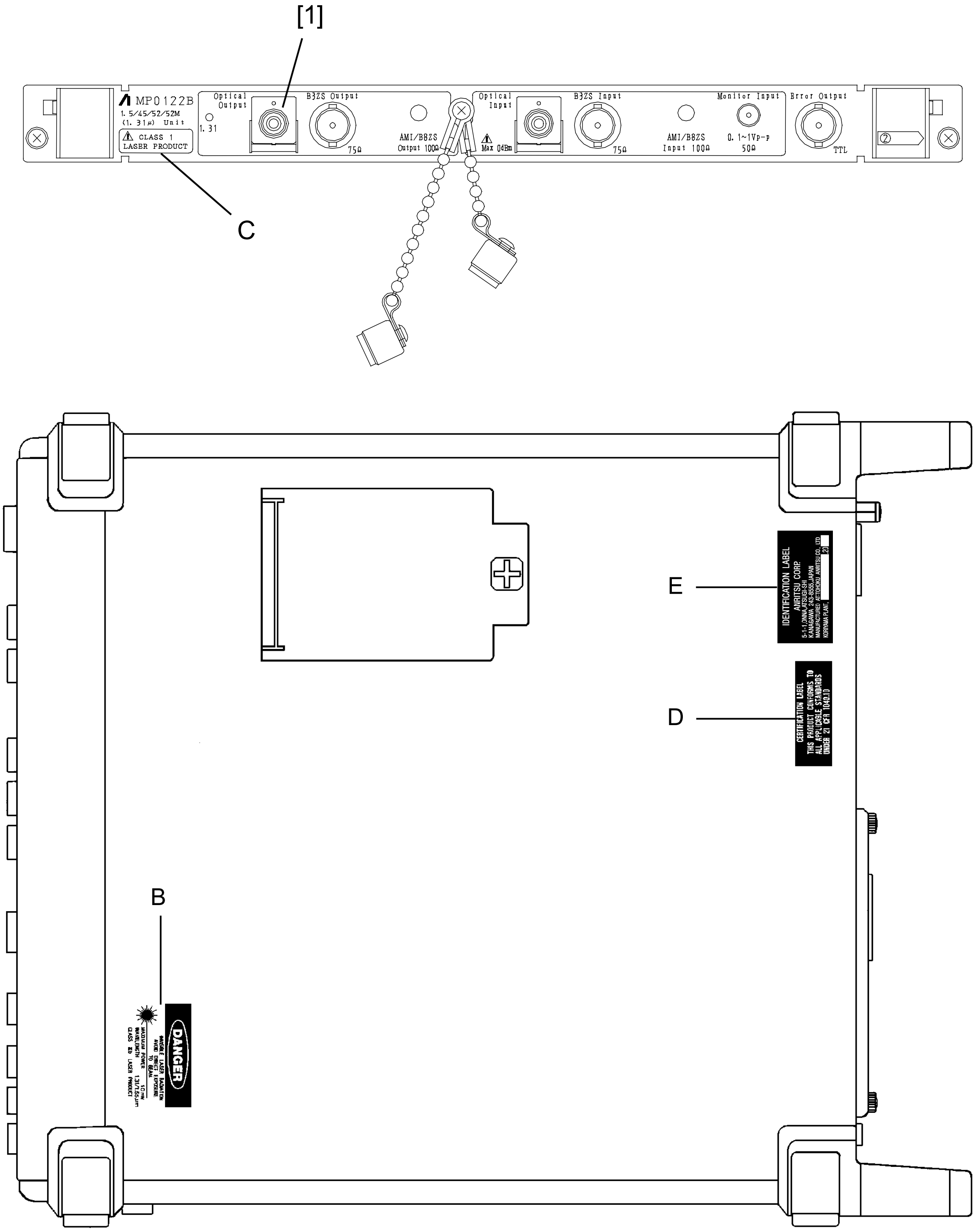


Fig. 3 MP0122B Front Panel of Unit and Top Panel of MP1570A (Products shipping to U.S.A.)

CAUTION ⚠

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

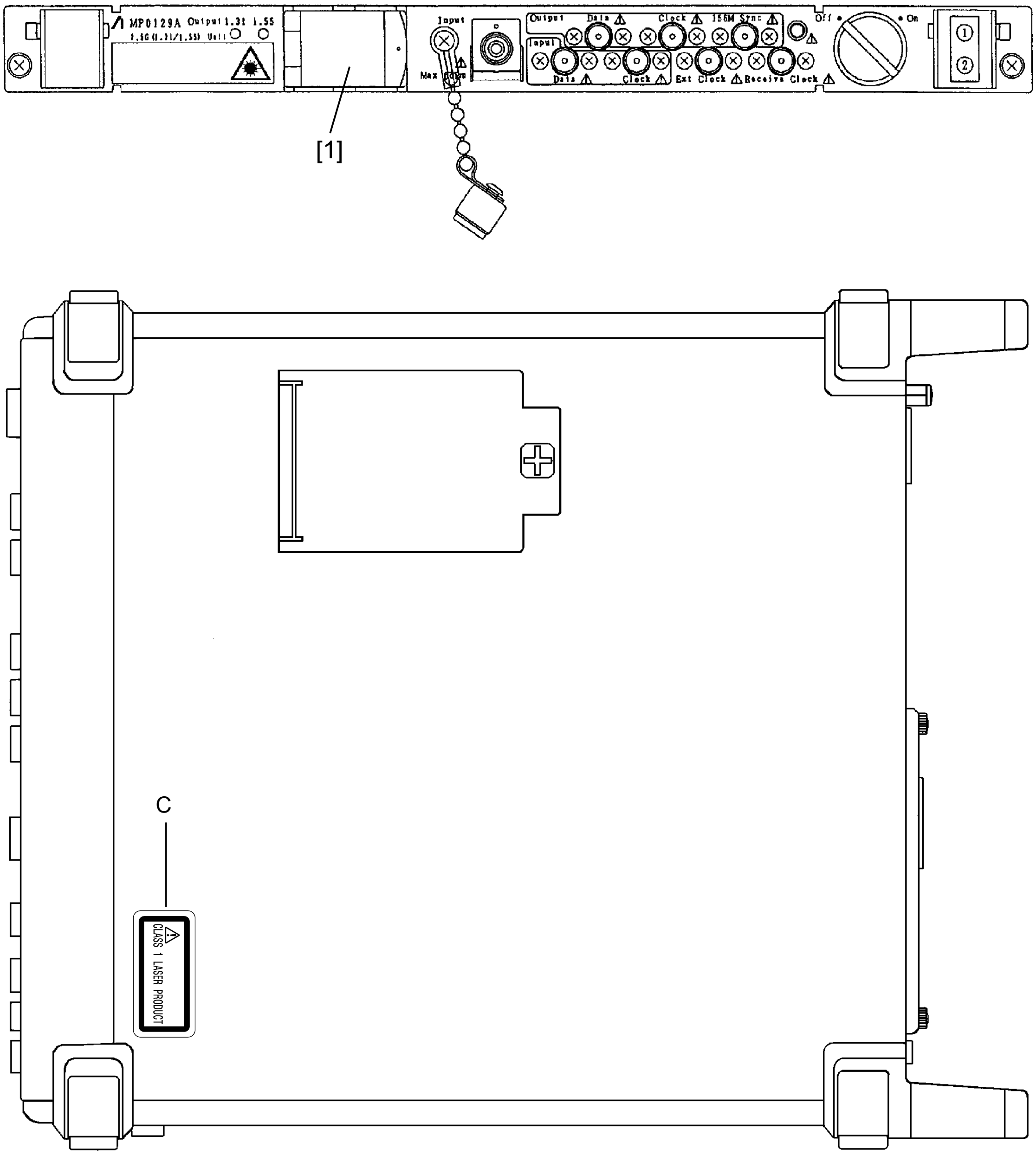


Fig. 4 MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A Front Panel of Unit and Top Panel of MP1570A (Products shipping besides U.S.A.)

CAUTION ⚠

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

Please, attach it to the place, shown above.

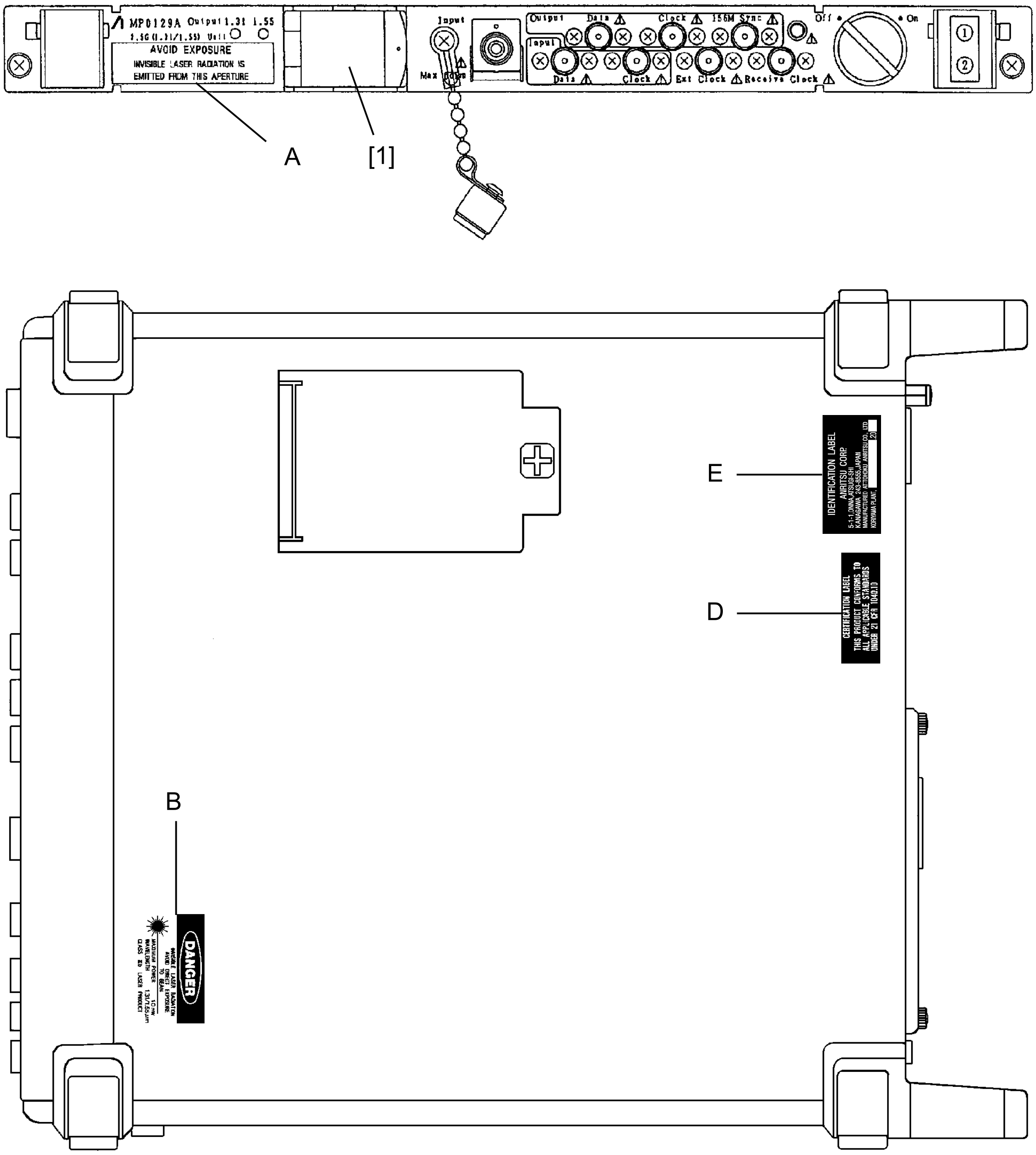


Fig. 5 MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A
Front Panel of Unit and Top Panel of MP1570A
(Products shipping to U.S.A.)

CAUTION ⚠

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

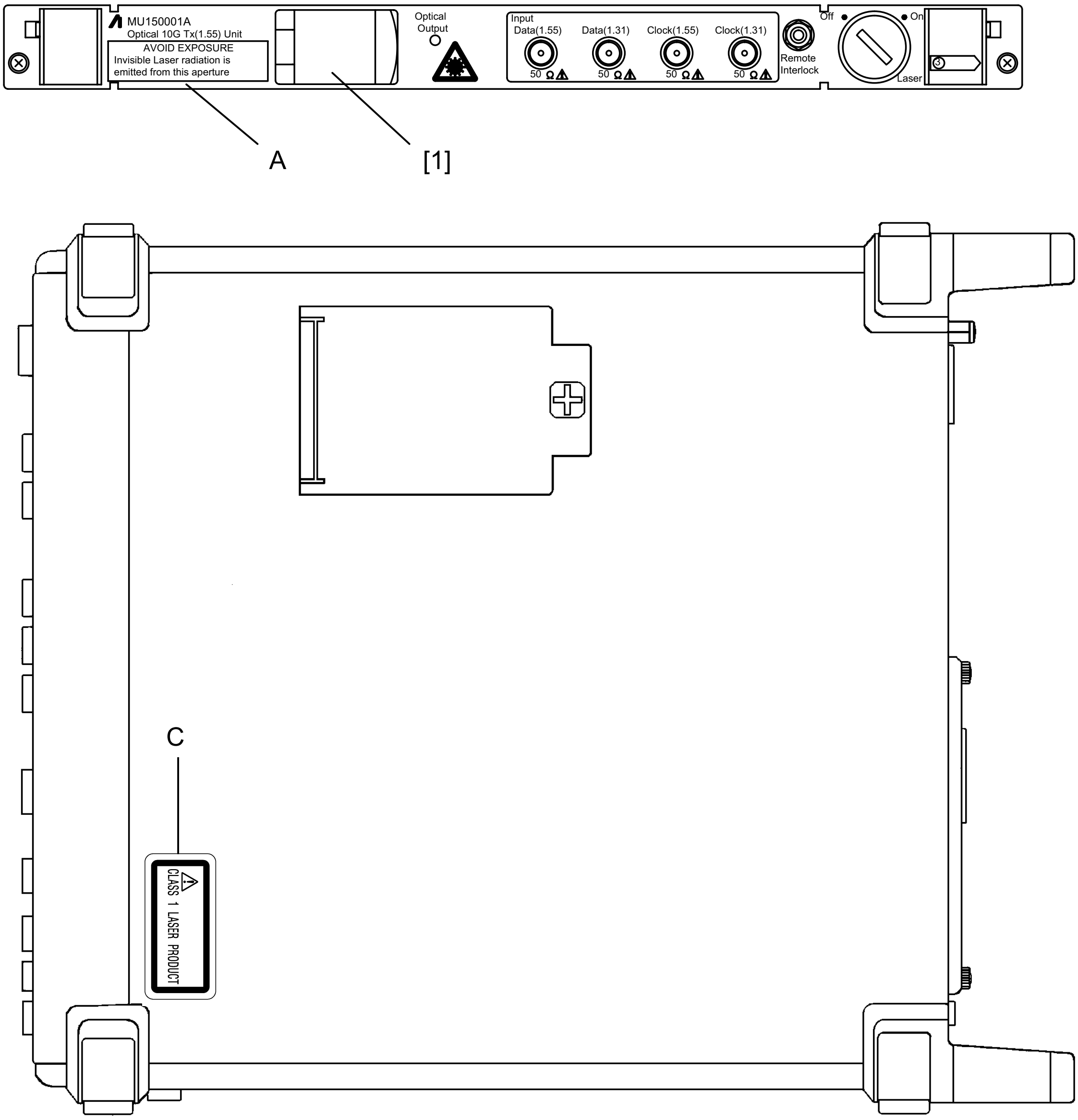


Fig. 6　MU150001A/B, MU150031A/C, MU150061A/B

Front Panel of Unit and Top Panel of MP1570A

(Products shipping besides U.S.A.)

CAUTION ⚠

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

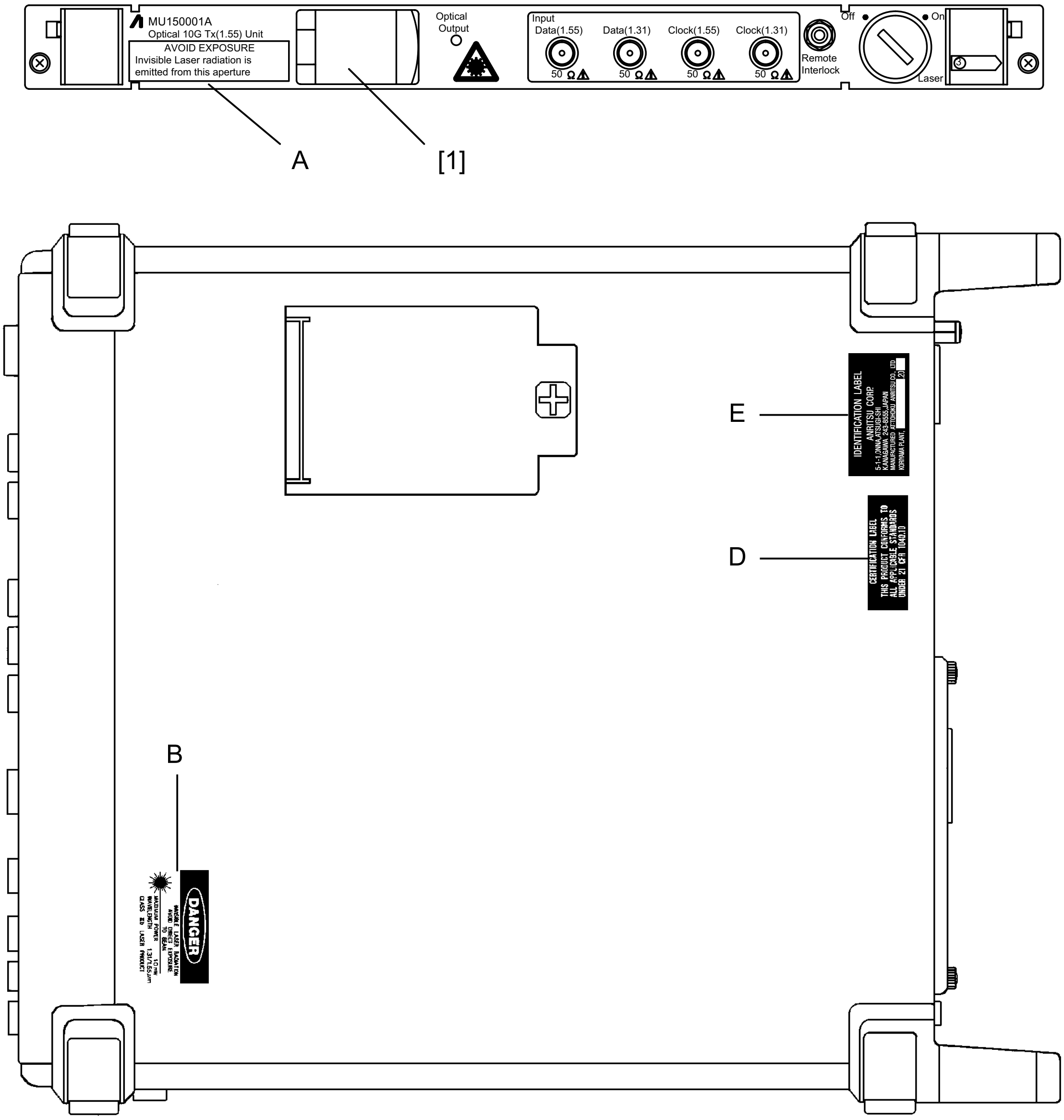


Fig. 7 MU150001A/B, MU150031A/C, MU150061A/B
Front Panel of Unit and Top Panel of MP1570A
(Products shipping to U.S.A.)

CAUTION ⚠

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

Security Measure Functions

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

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

Handling

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

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

For Safety

CAUTION ⚠

Replacing Memory Back-up Battery	This equipment uses a Poly-carbomonofluoride lithium battery to backup the memory. This battery must be replaced by service personnel when it has reached the end of its useful life; contact the Anritsu sales section or your nearest representative. Note: The battery used in this equipment has a maximum useful life of 7 years. It should be replaced before this period has elapsed.
	Make sure that the output level from the MP0111A, MP0112A, MP0113A, MP0122B, MP0127A, MP0128A, MP0129A, MU150001A, MU150001B, MU150008A, MU150009A, MU150010A, MU150031A/C or MU150061A does not exceed the maximum rated input level when connecting.
	The laser output is mainly controlled by the key switch of the laser On/Off. Before turning the equipment on, be sure to set the Laser On/Off key switch to OFF.
	Before making the connections, make sure that the input level does not exceed the absolute maximum rating level of the equipment. The input device may be damaged when the input level exceeds the maximum rating of MP0127A, MP0128A, MP0129A, MU150002A, MU150008A, MU150009A and MU150017A/B in particular. Before performing a self loop-back test, always insert the attached 15-dB optical attenuator between the input and output connectors for the MP0127A, MP0128A, MP0129A, MU150008A, MU150009A and MU150010A. For the MU150002A or MU150017A/B, use the 10-dB or 5-dB attenuator, respectively. The input device will be damaged if the direct output is connected by using the optical cable only.
Floppy Disk	Do not place in a dusty area. Clean the magnetic head periodically to ensure normal operation. Refer to the section on cleaning the head later in this manual.
Use in a residential environment	This instrument is designed for an industrial environment. In a residential environment this instrument may cause radio interference in which case the user may be required to take adequate measures.

Equipment Certificate

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

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within one year after shipment due to a manufacturing fault, under the condition that this warranty is void when:

- The fault is outside the scope of the warranty conditions described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster including fire, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

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

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Anritsu Corporation Contact

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

Notes On Export Management

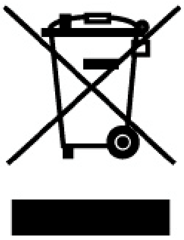
This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

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

Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2002/96/EC (the “WEEE Directive”) in European Union.



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

CE Conformity Marking

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

CE marking

1. Product Model

Model: MP1570A SONET/SDH/PDH/ATM ANALYZER

2. Applied Directive

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

3. Applied Standards

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

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

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

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

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

4. Authorized representative

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

C-tick Conformity Marking

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

C-tick marking

N274

1. Product Model

Model: MP1570A SONET/SDH/PDH/ATM ANALYZER

2. Applied Standards

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

About MP1570A Operation Manuals

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

Organization of MP1570A Operation Manuals

- Vol. 1
  - Basic Operation SDH Edition (this manual)

    Describes the basic operation of MP1570A, PDH measurement and SDH measurements up to 622M (STM 4). (The contents of this manual are basically the same as those of 'Basic Operation SONET Edition').
  - Basic Operation SONET Edition

    Describes the basic operation of MP1570A, DSn measurement and SONET measurement of up to 622M (STS12). (The contents of this manual are basically the same as those of 'Basic Operation SDH Edition'.).
- Vol. 2
  - Remote Control

    Describes the remote control and program examples using the GPIB and RS-232C interfaces. (MP1570A is compatible with SPCI).
- Vol. 3
  - ATM Measurement

    Describes the contents of screens, operation procedures and remote control for the generation and analysis of the ATM signal.
- Vol. 4
  - 2.5G/10G Measurement

    Describes the contents of screens, operation procedures and remote control for the generation and analysis of 2.5G (STM16) and 10G (STM64) signals.
- Vol. 5
  - Add/Drop Measurement

    Describes the contents of screens, operation procedures and remote control for the generation and analysis of Add/Drop.
- Vol. 6
  - Jitter/Wander Measurement

    Describes the contents of screens, operation procedures and remote control for the generation and analysis of Jitter (TX)/Frequency offset and Jitter (RX).
- Vol. 7
  - 2.5G Jitter/Wander Measurement

    Describes the contents of screens, operation procedures and remote control for the generation and analysis of 2.5G Jitter (TX)/Frequency offset and Jitter (RX).

Using This Operation Manual

This Operation Manual describes the following.

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

(1) Basic functions of MP1570A

(2) TX and RX measurement of PDH signal.

(3) TX and RX measurements of SDH signal up to 622M (STM-4)

- This manual is meant for SDH, therefore, the user interfaces and screen displays for SDH are used in this manual.
- This manual describes the measurements of PDH and SDH signals up to 622M (STM-4). The measurement examples are based on the plug-in units and interface units listed in the table below. (For 2.5G (STM-16) and 10G (STM-64) measurements, see the Operation Manual for MP1570A, Vol. 5, 2.5G/10G Operation Manual).

Plug-in unit

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

Interface unit

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

Using This Operation Manual

Screen Names

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

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

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Section 6 Other Setting about the Measurement

Section 7 Measurement and Analysis

Section 8 Other Functions

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Section 1 General

1.1 Product Outline

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

1.2 Features

The main features of MP1570A are as follows:

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

1.3 Equipment Configuration

1.3.1 Equipment Configuration with Standard Accessories

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

Main unit (MP1570A)

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

Standard accessories

Model	Name	Qty	Remarks
Z0169	Printer paper	1	5 roles
W1719AE	MP1570A Operation Manual Vol. 1 Basic Operation SDH Edition	1	
W1721AE	MP1570A Operation Manual Vol. 2 Remote Control	1	
	MP1570A 10G Measurement	1	
	Power supply cord 2.6m or Power supply cord 2.5m	1	
B0329G	Protective cover	1	For front panel
Z0486	Side cover	1	For side panel

1.3.2 Plug-in Unit Configuration

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

Model/ Order No.	Name	Remarks
MP0121A	2/8/34/139/156M Unit	
MP0122A	1.5/45/52M Unit	
MP0122B	1.5/45/52/52M(1.31) Unit	Optical 1.31 μ m
MP0123A	ATM Unit	
MP0124A	2/8/34/139M 156/622M Jitter Unit	
MU150005A	2/8/34/139M 156/622M Jitter Unit	
MP0125A	1.5/45/52M 156/622M Jitter Unit	
MU150006A	1.5/45/52M 156/622M Jitter Unit	
MP0126A	2/8/34/139M 1.5/45/52M 156/622M Jitter Unit	
MU150007A	2/8/34/139M 1.5/45/52M 156/622M Jitter Unit	
MP0127A	2.5G(1.31) Unit	Optical 1.31 μ m
MU150008A	2.5G(1.31) Unit	Optical 1.31 μ m
MP0128A	2.5G(1.55) Unit	Optical 1.55 μ m
MU150009A	2.5G(1.55) Unit	Optical 1.55 μ m
MP0129A	2.5G(1.31/1.55) Unit	Optical 1.31/1.55 μ m
MU150010A	2.5G(1.31/1.55) Unit	Optical 1.31/1.55 μ m
MP0130A	2.5G Jitter Unit	
MU150011A	2.5G Jitter Unit	
MP0131A	Add/Drop Unit	
MU150000A	2.5G/10G Unit	
MU150001A	Optical 10G Tx (1.55) Unit	Optical 1.55 μ m transmitter
MU150001B	Optical 10G Tx (1.55) Unit	Optical 1.55 μ m transmitter (for long span transmission)
MU150002A	Optical 10G Rx (Narrow) Unit	(Narrow band clock recovery) Optical receiver

Model/ Order No.	Name	Remarks
MU150017A	Optical 10G Rx (Wide) Unit	(Wide band clock recovery) Optical receiver
MU150017B	Optical 2.5G/10G Rx (Wide) Unit	(Wide band clock recovery) Optical receiver
MU150031A	Optical 10G(1.55) High Power Tx Unit	Optical 1.55 μm transmitter High Power Output
MU150031C	Optical 2.5G(1.55)/10G(1.55) High Power Tx Unit	Optical 1.55 μm transmitter High Power Output
MU150061A	Optical 10G(1.31) Tx Unit	Optical 1.31 μm transmitter
MU150061B	Optical 2.5(1.31)/10G(1.31) Tx Unit	Optical 1.31 μm transmitter

Plug-in Unit Accessories

Model	Name	Qty	Remarks
W1722AE	MP1570A Operation Manual Vol.3　ATM Measurement	1	Accessory for MP0123A
W1723AE	MP1570A Operation Manual Vol.4　2.5G/10G Measurement	1	Accessory for MP0127A/ MP0128A/ MP0129A/ MU150000A/ MU150001A/ MU150001B/ MU150002A/ MU150008A/ MU150009A/ MU150010A/ MU1500017A/ MU150017B
W1724AE	MP1570A Operation Manual Vol.5　Add/Drop Measurement	1	Accessory for MP0131A
W1725AE	MP1570A Operation Manual Vol.6　Jitter Measurement	1	Accessory for MP0124A/ MP0125A/MP0126A/ MU150005A/MU150006A/ MU150007A
W1726AE	MP1570A Operation Manual Vol.7　2.5G Jitter Measurement	1	Accessory for MP0130A/ MU150011A

1.3.3　Interface Unit Configuration

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

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

1.3.4 Application Software Configuration

Model	Name	Remarks
MX150001A	Wander (MTIE, TDEV) Measurement Application Software	for MP0124A/ MP0125A/ MP0126A-02
MX150001B	Wander (MTIE, TDEV) Measurement Application Software	for MU150005A/ MU150006A/ MU150007A-02

Application Software Accessories

Model	Name	Qty	Remarks
W1323AE	MX150001A Wander (MTIE, TDEV) Application Software Operation Manual	1	Accessory for MX150001A
W1763AE	MX150001B Wander (MTIE, TDEV) Application Software Operation Manual	1	Accessory for MX150001B

Note

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

Section 2 Preparations Before Use

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

2.1 Installation Site Environmental Conditions

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

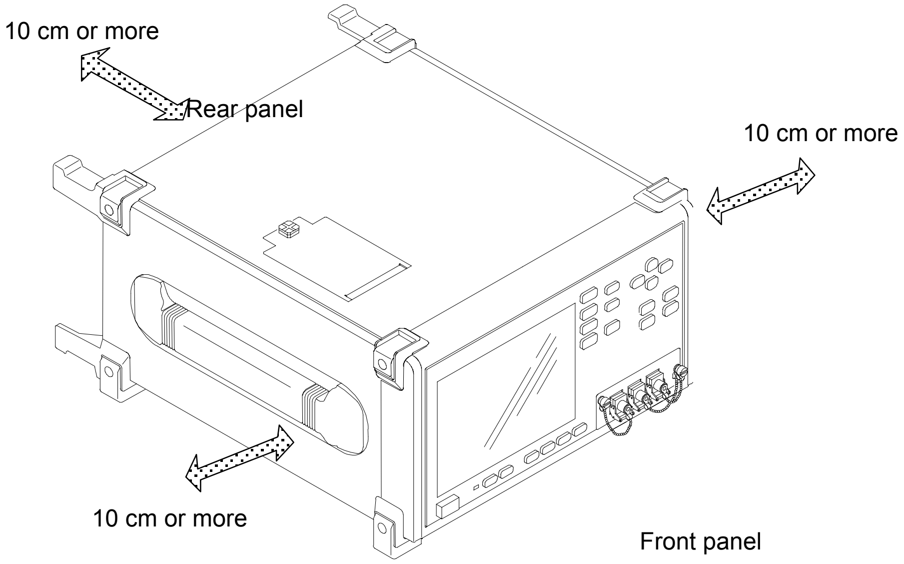
- Where there are strong vibrations
- Where there is high humidity or dust
- Where there is exposure to sunlight
- Where there is exposure to corrosive gasses
- Where there are large temperature fluctuations

CAUTION ⚠

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

2.2 Distance Between Fan Ventilation Grills and Nearby Equipment

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



2.3　Power Voltage

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

2.4　Connecting the Power Cord

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

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

WARNING ⚠

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

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

CAUTION ⚠

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

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

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

2.5 Connecting the Peripherals

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

2.6 Connecting Other Devices

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

CAUTION ⚠

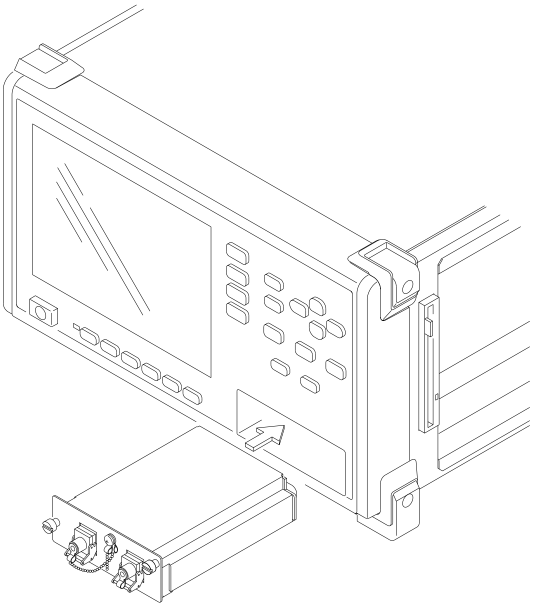
Errors and alarms may occur for the MP1570A mainframe and interface unit by ESD.

2.7 Inserting and Removing an Interface Unit

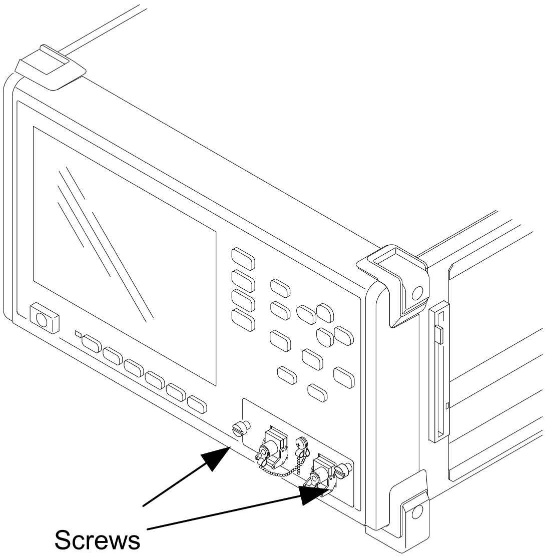
2.7.1 Inserting an Interface Unit

(1) Turn off the power switch to MP1570A.

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



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



CAUTION ⚠

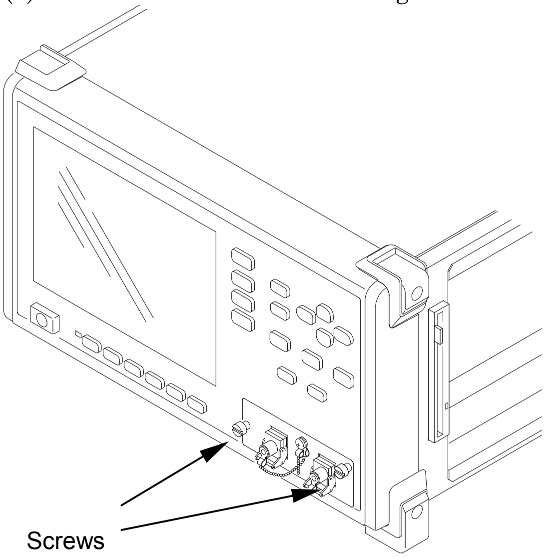
Before replacing the interface unit, make sure that the power switch of MP1570A is turned off. If an interface unit is plugged in while MP1570A is turned on, it may cause a malfunction.

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

2.7.2 Removing an Interface Unit

(1) Turn off the power to MP1570A.

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



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

CAUTION ⚠

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

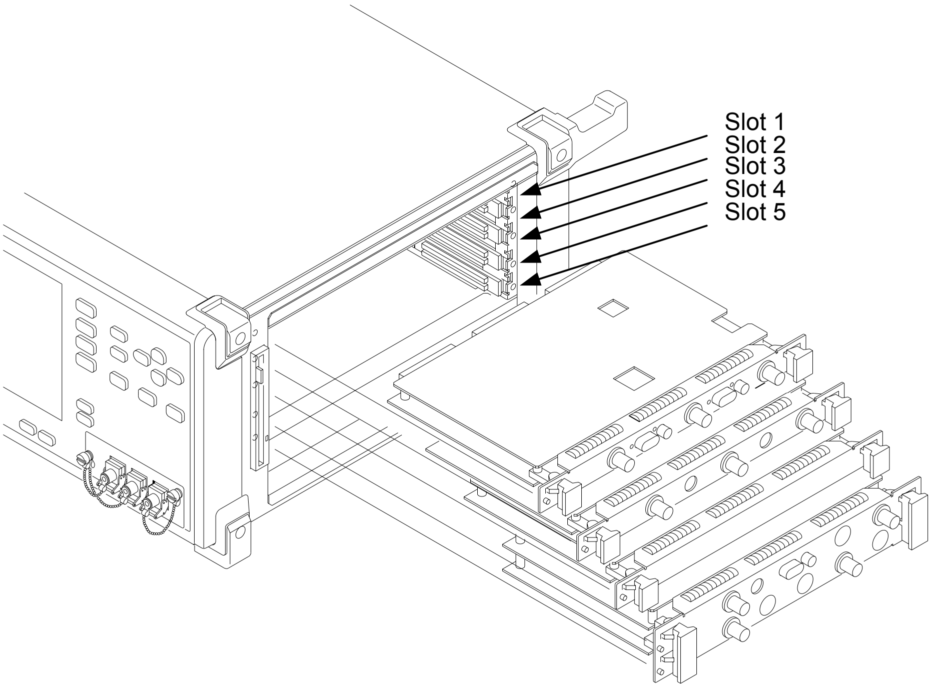
If no interface unit is to be mounted, cover the slot with a blank panel.

2.8 Inserting and Removing the Plug-in Unit

2.8.1 Inserting the Plug-in Unit

(1) Turn off the power to MP1570A.

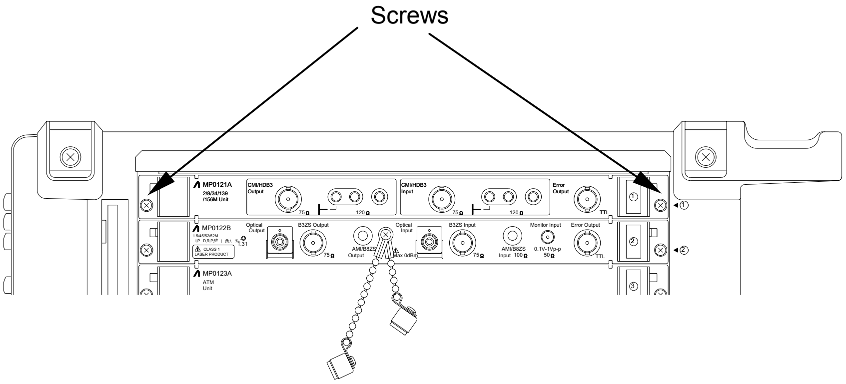
(2) Insert the plug-in unit into one of the slots on the right.



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

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

(4) Then, tighten the screws on the right and left sides of the plug-in unit using a 3 mm screwdriver.



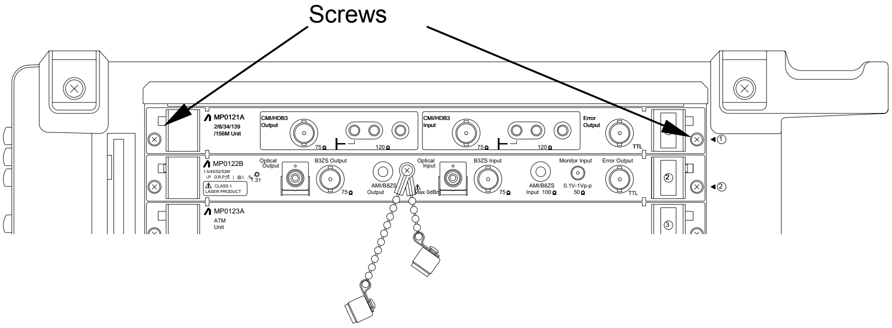
CAUTION ⚠

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

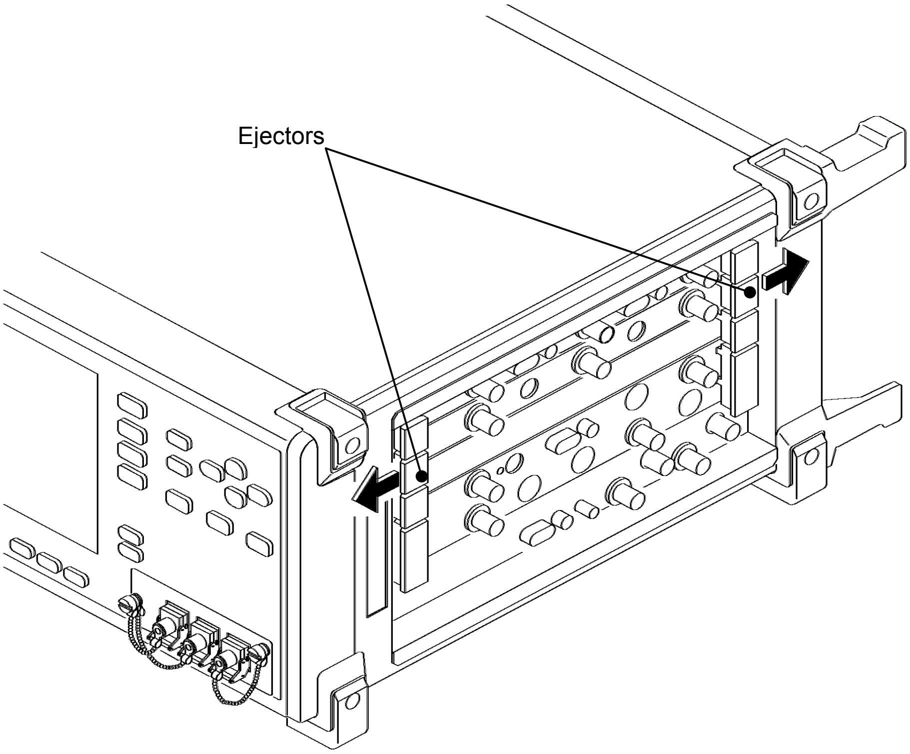
2.8.2 Removing the Plug-in Unit

(1) Turn off the power switch of MP1570A.

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



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



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

CAUTION ⚠

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

2.9 Slots for Inserting Plug-in Units

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

Slots where plug-in units are to be inserted

Unit	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5
MP0121A 2/8/34/139/156M Unit	○	－	－	－	－
MP0122A 1.5/45/52M Unit	○*2	○	－	－	－
MP0122B 1.5/45/52/52M(1.31) Unit	○*2	○	－	－	－
MP0123A ATM Unit	－	－	○	－	－
MP0124A 2/8/34/139M 156/622M Jitter Unit	－	－	－	○*1	
MP0125A 1.5/45/52M 156/622M Jitter Unit	－	－	－	○*1	
MP0126A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit	－	－	－	○*1	
MP0127A 2.5G(1.31) Unit	○	○	－	－	－
MP0128A 2.5G(1.55) Unit	○	○	－	－	－
MP0129A 2.5G(1.31/1.55) Unit	○	○	－	－	－
MP0130A 2.5G Jitter Unit	－	－	○	－	－
MP0131A Add/Drop Unit	○	○	－	－	－
MU150000A 2.5G/10G Unit	－	－	－	○*1	
MU150001A Optical 10G Tx(1.55) Unit	－	－	○	－	－
MU150001B Optical 10G Tx(1.55) Unit	－	－	○	－	－
MU150002A Optical 10G Rx(Narrow) Unit	－	○	－	－	－
MU150008A 2.5G(1.31) Unit	－	○	－	－	－
MU150009A 2.5G(1.55) Unit	－	○	－	－	－
MU150010A 2.5G(1.31/1.55) Unit	－	○	－	－	－
MU150017A Optical 10G Rx(Wide) Unit	－	○	－	－	－
MU150017B Optical 2.5G/10G Rx(Wide) Unit	－	○	－	－	－
MU150031A Optical 10G(1.55) High Power Tx Unit	－	－	○	－	－
MU150031C Optical 2.5G(1.55)/10G(1.55) High Power Tx Unit	－	－	○	－	－
MU150061A Optical 10G(1.31) Tx Unit	－	－	○	－	－
MU150061B Optical 2.5G(1.31)/10G(1.31) Tx Unit	－	－	○	－	－

○ .... Plug-in unit can be inserted.

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

- A blank panel can be inserted into all slots.

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

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

Note:

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

NOTE

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

- For the unit combinations when using the MP0123A ATM unit, see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 3 ATM Operation Manual'.
- For the unit combinations when using the 2.5G unit (MP0127A, MP0128A, MP0129A, MU150008A, MU150009A or MU150010A), see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 4 2.5G/10G Operation Manual'.
- For the unit combinations when using the MP0131A Add/Drop unit, see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 5 Add/Drop Operation Manual'.
- For the unit combinations when using the Jitter unit (MP0124A, MP0125A, MP0126A, MP0130A), see the 'MP1570A SONET/SDH/PDH/ATM Analyzer Operation Manual Vol. 6 Jitter Operation Manual'.

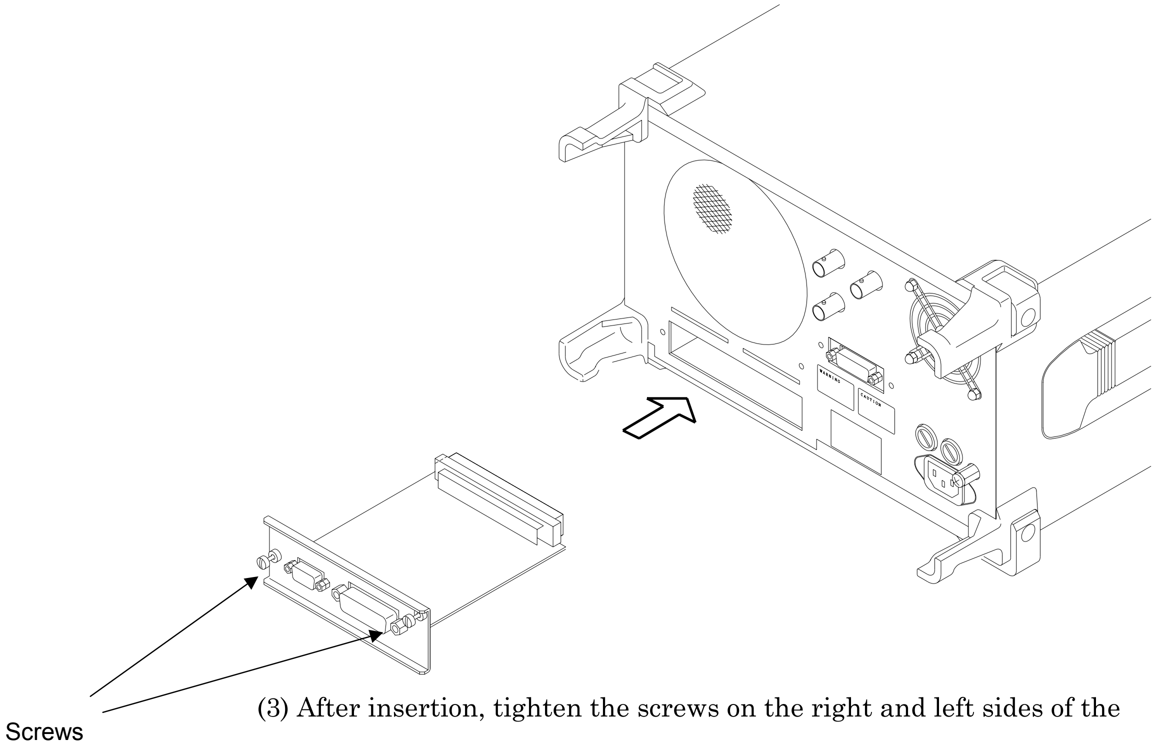
2.10 Inserting and Removing the GPIB/232C Board, Video Output Board and Ethernet Board

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

2.10.1 Inserting the Boards

(1) Turn off the power switch of MP1570A.

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



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

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

CAUTION ⚠

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

2.10.2 Removing the Board

(1) Turn off the power switch of MP1570A.

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

(3) Carefully remove the board.

CAUTION ⚠

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

2.11 Units and Optional Items Required for Tx and Rx Signals

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

2.11.1 In the case of PDH

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

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

○ ....Unit that must be installed.

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

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

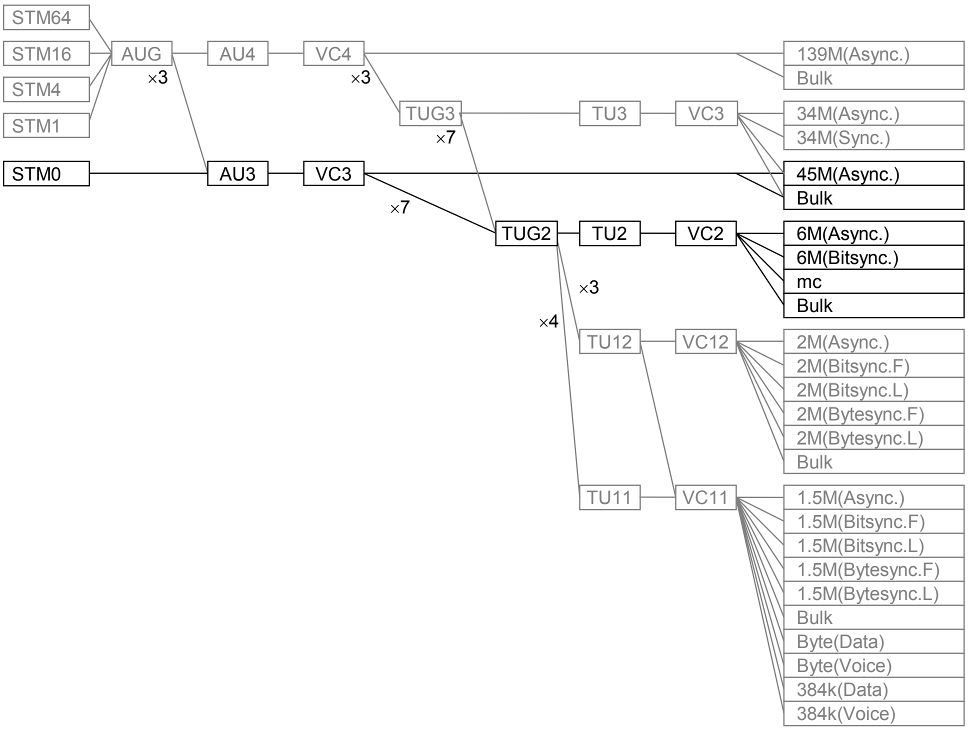
○ ....Unit and option that must be installed.

2.11.2 In the case of SDH

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

(1) STM-0

(1/4)



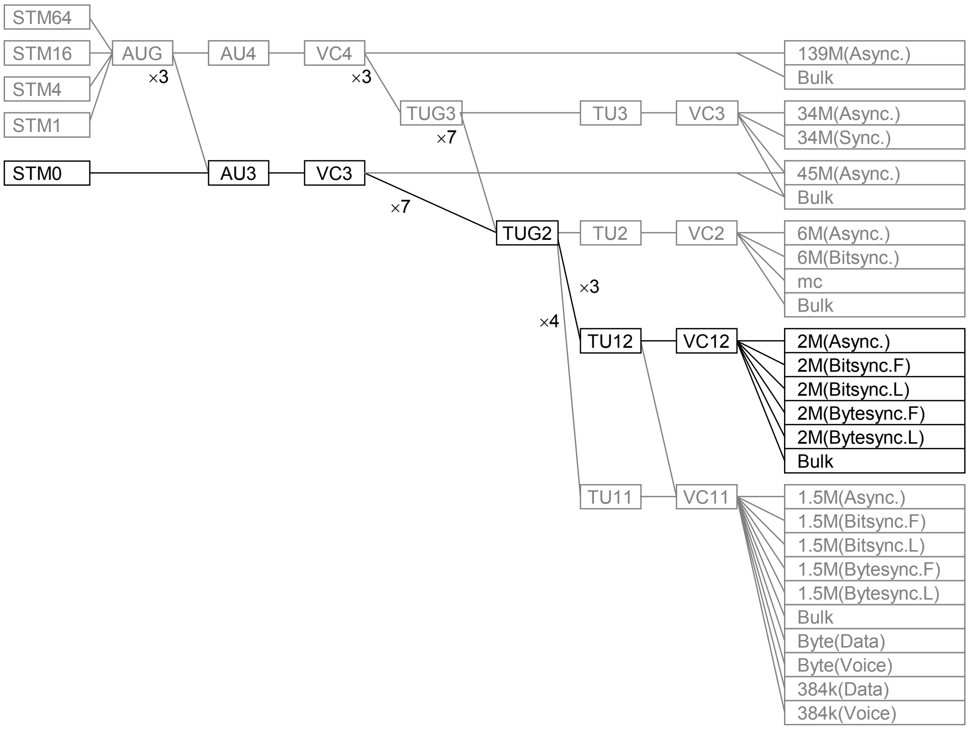
Mapping	Interface	Plug-in unit		
		MP0121A	MP0122A	MP0122B
STM0-AU3-VC3-45M(Async.) STM0-AU3-VC3-Bulk STM0-AU3-VC3-TUG2-TU2-VC2-6M(Async.) STM0-AU3-VC3-TUG2-TU2-VC2-6M(Bitsync.) STM0-AU3-VC3-TUG2-TU2-VC2-mc STM0-AU3-VC3-TUG2-TU2-VC2-Bulk	optical	—	—	○
	Electrical B3ZS	—	○ *1	

○ .... Unit that must be installed.

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

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

(2/4)



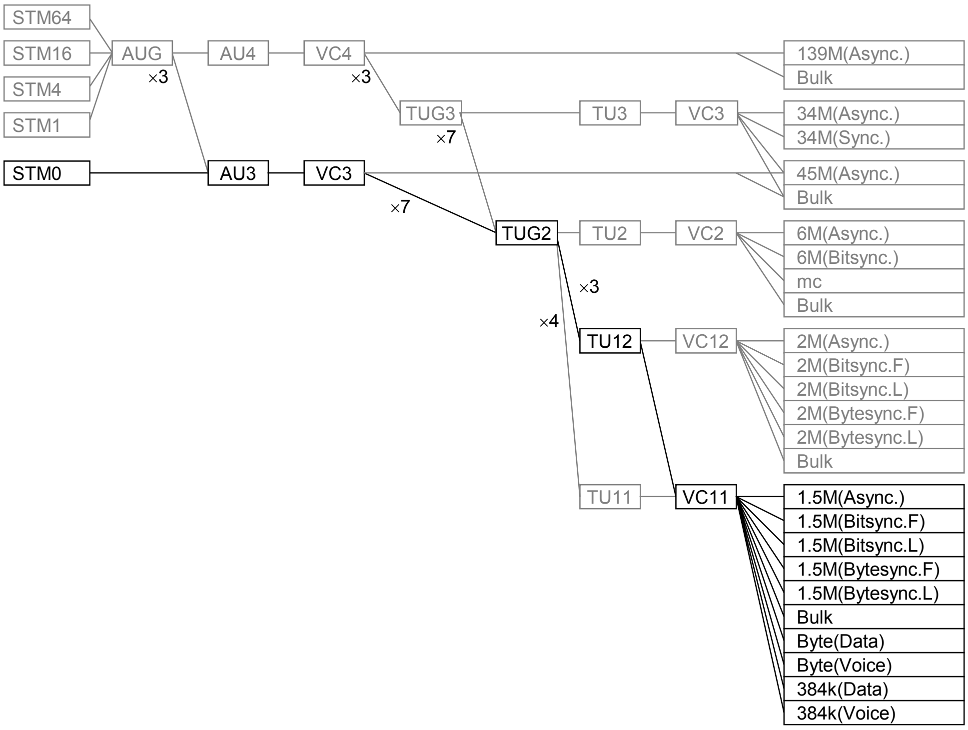
Mapping	Interface	Plug-in unit		
		MP0121A	MP0122A	MP0122B
STM0-AU3-VC3-TUG2-TU12-VC12-2M(Async.) STM0-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.F) STM0-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.L) STM0-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.F) STM0-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.L) STM0-AU3-VC3-TUG2-TU12-VC12-Bulk	optical	○	—	○
	Electric B3ZS	○	○ *1	

○ ....Unit that must be installed.

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

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

(3/4)



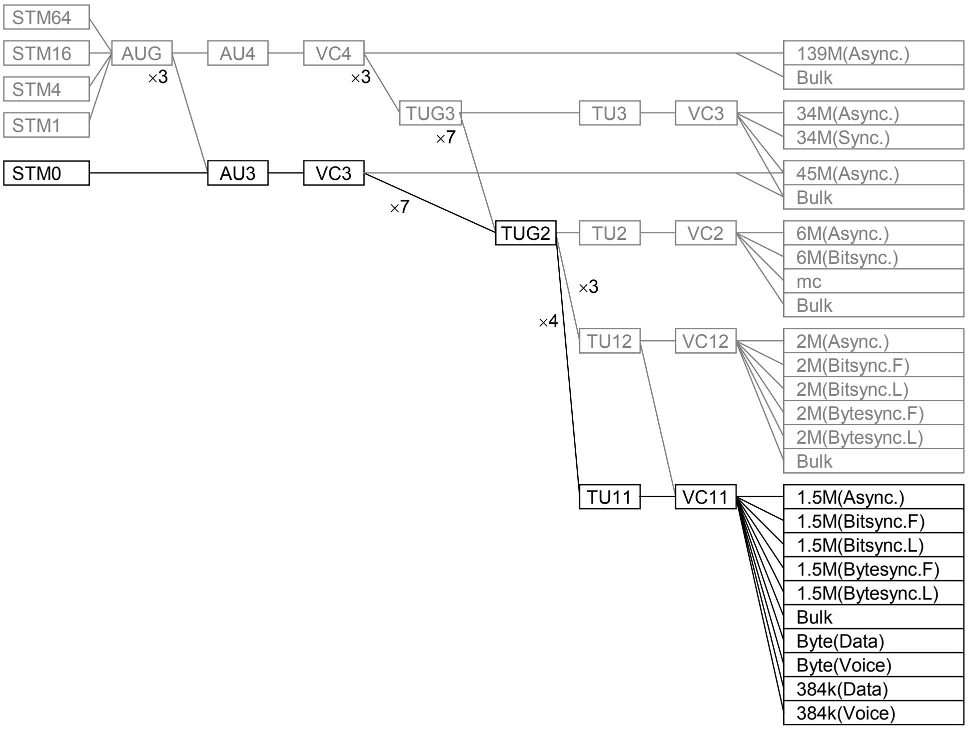
Mapping	Interface	Plug-in unit			option -09
		MP0121A	MP0122A	MP0122B	
STM0-AU3-VC3-TUG2-TU12-VC11-1.5M(Async.) STM0-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM0-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM0-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM0-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM0-AU3-VC3-TUG2-TU12-VC11-Bulk	optical	—	—	○	—
	Electric B3ZS	—	○ *1		—
STM0-AU3-VC3-TUG2-TU12-VC11-Byte(Data) STM0-AU3-VC3-TUG2-TU12-VC11-Byte(Voice) STM0-AU3-VC3-TUG2-TU12-VC11-384k(Data) STM0-AU3-VC3-TUG2-TU12-VC11-384k(Voice)	optical	—	—	○	○
	Electric B3ZS	—	○ *1		○

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

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

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

(4/4)



Mapping	Interface	Plug-in unit			option -09
		MP0121A	MP0122A	MP0122B	
STM0-AU3-VC3-TUG2-TU11-VC11-1.5M(Async.) STM0-AU3-VC3-TUG2-TU11-VC11-1.5M(Bitsync.F) STM0-AU3-VC3-TUG2-TU11-VC11-1.5M(Bitsync.L) STM0-AU3-VC3-TUG2-TU11-VC11-1.5M(Bytesync.F) STM0-AU3-VC3-TUG2-TU11-VC11-1.5M(Bytesync.L) STM0-AU3-VC3-TUG2-TU11-VC11-Bulk	optical	—	—	○	—
	Electric B3ZS	—	○ *1		—
STM0-AU3-VC3-TUG2-TU11-VC11-Byte(Data) STM0-AU3-VC3-TUG2-TU11-VC11-Byte(Voice) STM0-AU3-VC3-TUG2-TU11-VC11-384k(Data) STM0-AU3-VC3-TUG2-TU11-VC11-384k(Voice)	optical	—	—	○	○
	Electric B3ZS	—	○ *1		○

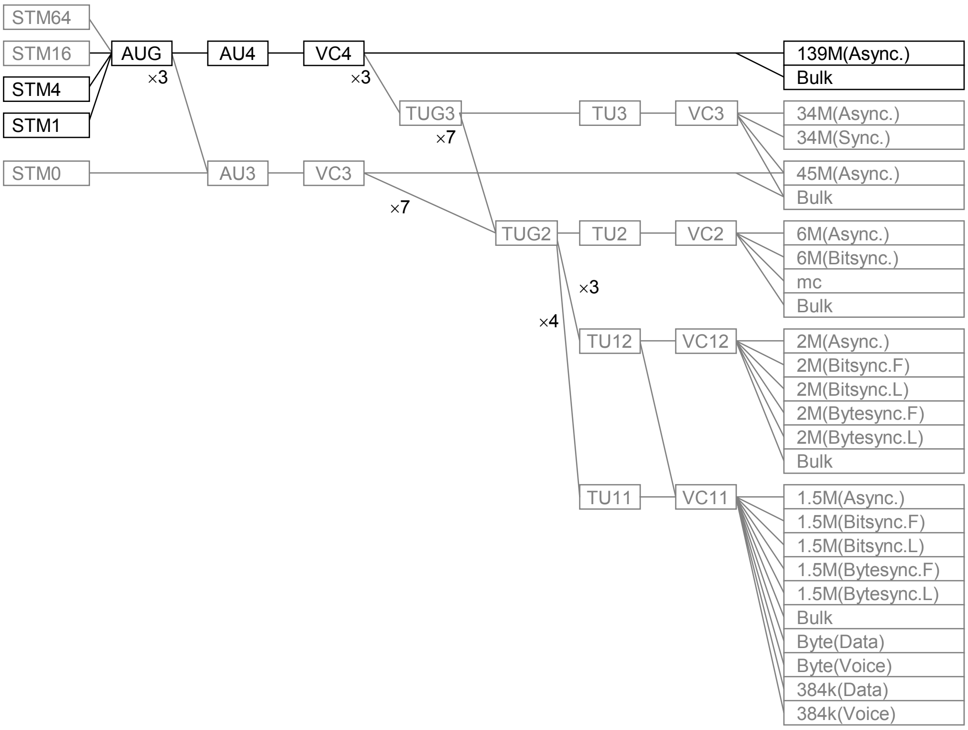
○ ....Unit and option that must be installed.

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

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

(2) STM-1 / STM-4

(1/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-139M(Async.) STM4-AUG-AU4-VC4-Bulk	optical	○	—	—	—	○
	NRZ	○	—	—	○	—
STM1-AUG-AU4-VC4-139M(Async.) STM1-AUG-AU4-VC4-Bulk	optical	○	—	—	—	○
	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ ..... Unit that must be installed.

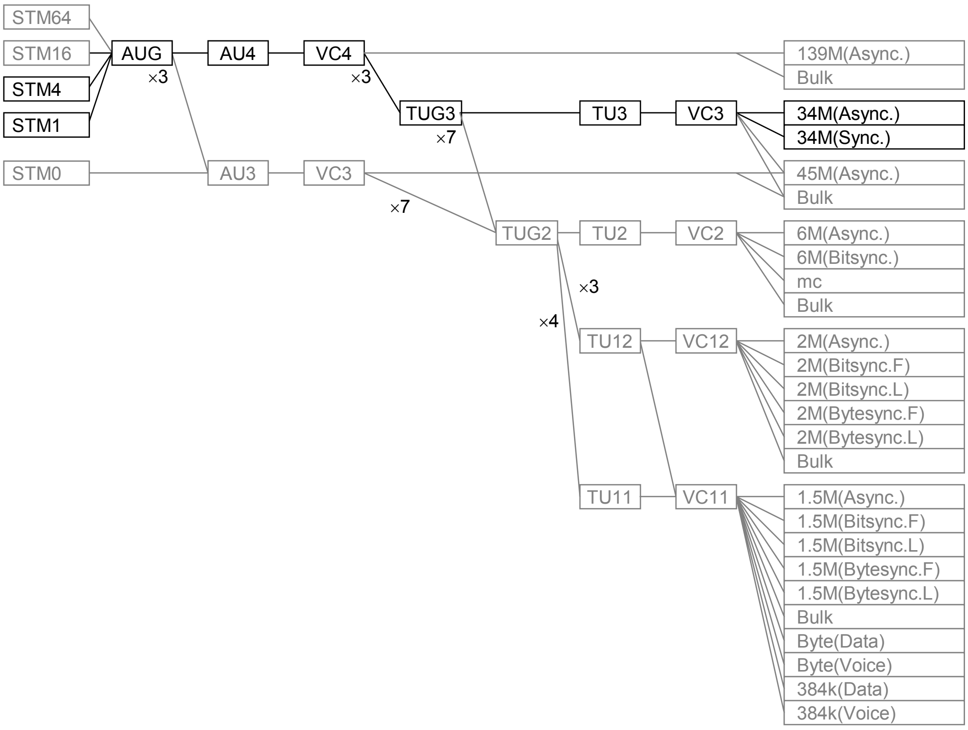
— ..... Unit that need not be installed.

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

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

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

(2/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Async.)	optical	○	—	—	—	○
STM4-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Sync.)	NRZ	○	—	—	○	—
STM1-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Async.)	optical	○	—	—	—	○
STM1-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Sync.)	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ ...... Unit that must be installed.

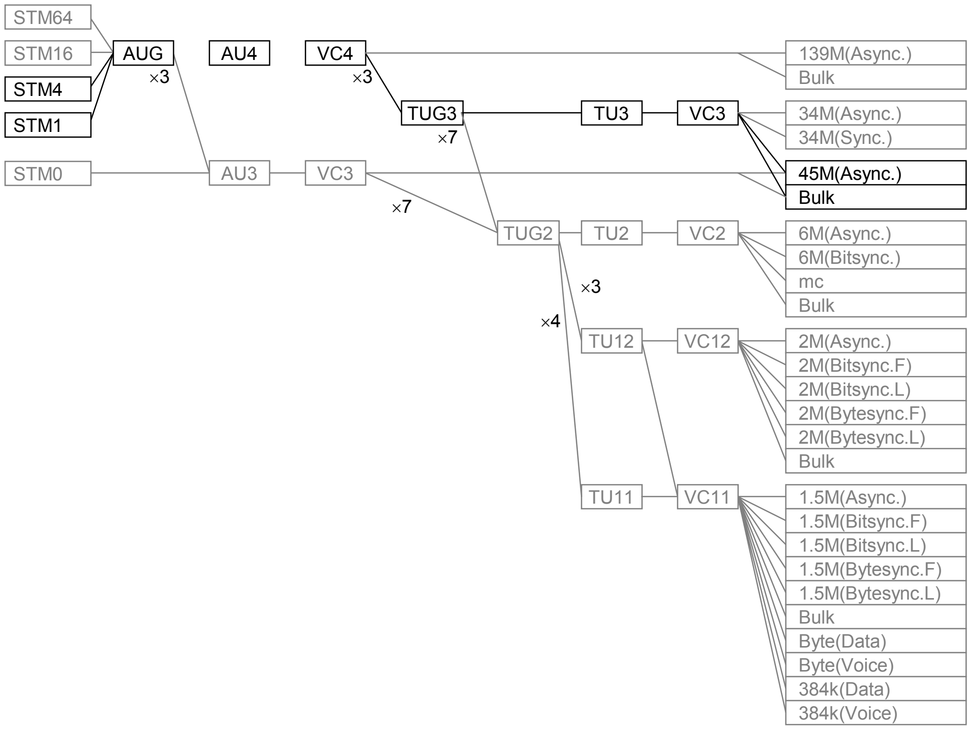
— ...... Unit that need not be installed.

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

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

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

(3/16)



Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-TUG3-TU3-VC3-45M(Async.)	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STM4-AUG-AU4-VC4-TUG3-TU3-VC3-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STM1-AUG-AU4-VC4-TUG3-TU3-VC3-45M(Async.)	optical	—	○	—	—	○
	CMI	○	○	—	—	—
		—	○	○	—	—
	NRZ	—	○	—	○	—
STM1-AUG-AU4-VC4-TUG3-TU3-VC3-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ ..... Unit that must be installed.

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

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

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

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

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

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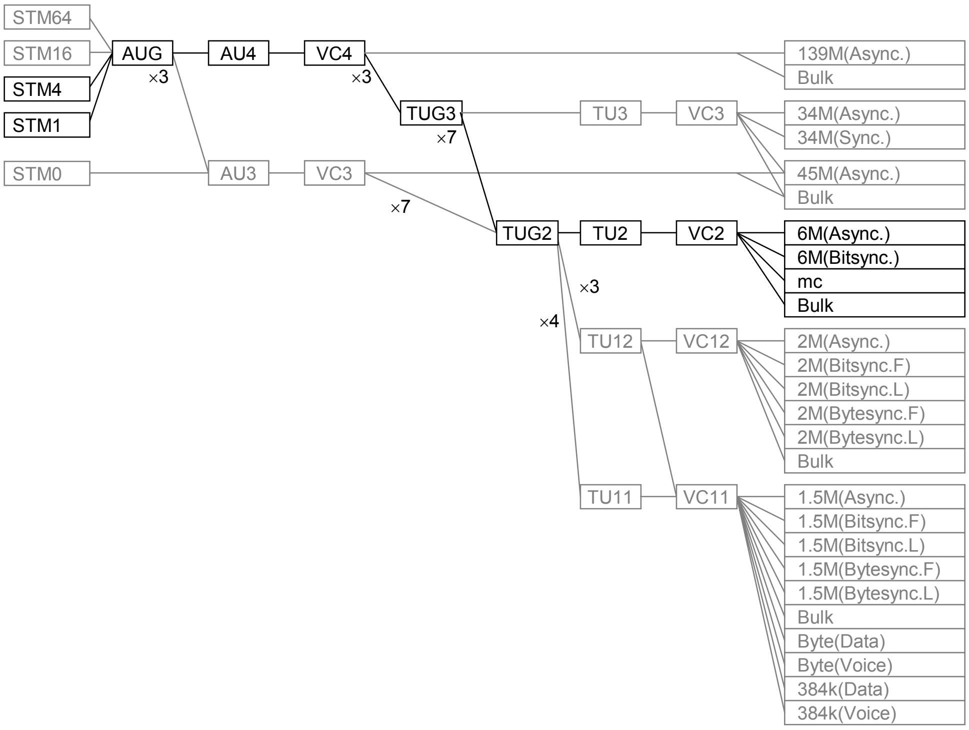

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STM4-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-6M(Async.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-6M(Bitsync.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-mc STM4-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STM1-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-6M(Async.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-6M(Bitsync.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-mc STM1-AUG-AU4-VC4-TUG3-TUG2-TU2-VC2-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ ...... Unit that must be installed.

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

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

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

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

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

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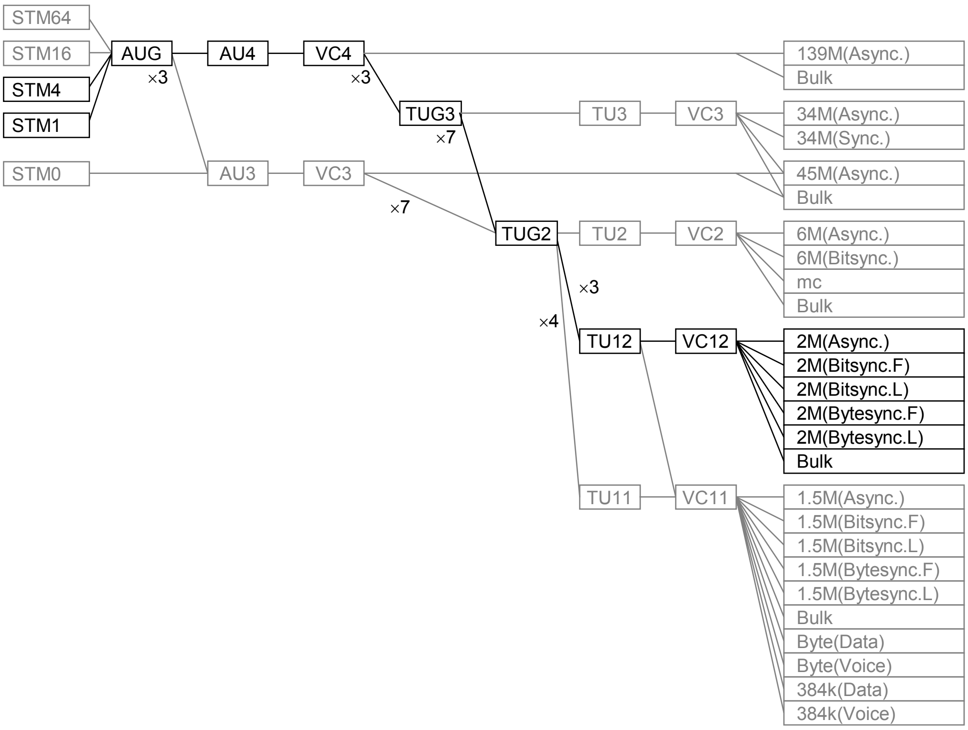

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	MP0122A/ MP0122B *1	MP0105A	MP0108A	MP0111A/ MP0112A/ MP0113A *2
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Async.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bitsync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bitsync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-Bulk	optical	○	—	—	—	○
	NRZ	○	—	—	○	—
STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Async.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bitsync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bitsync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-Bulk	optical	○	—	—	—	○
	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

○ .... Unit that must be installed.

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

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

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

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

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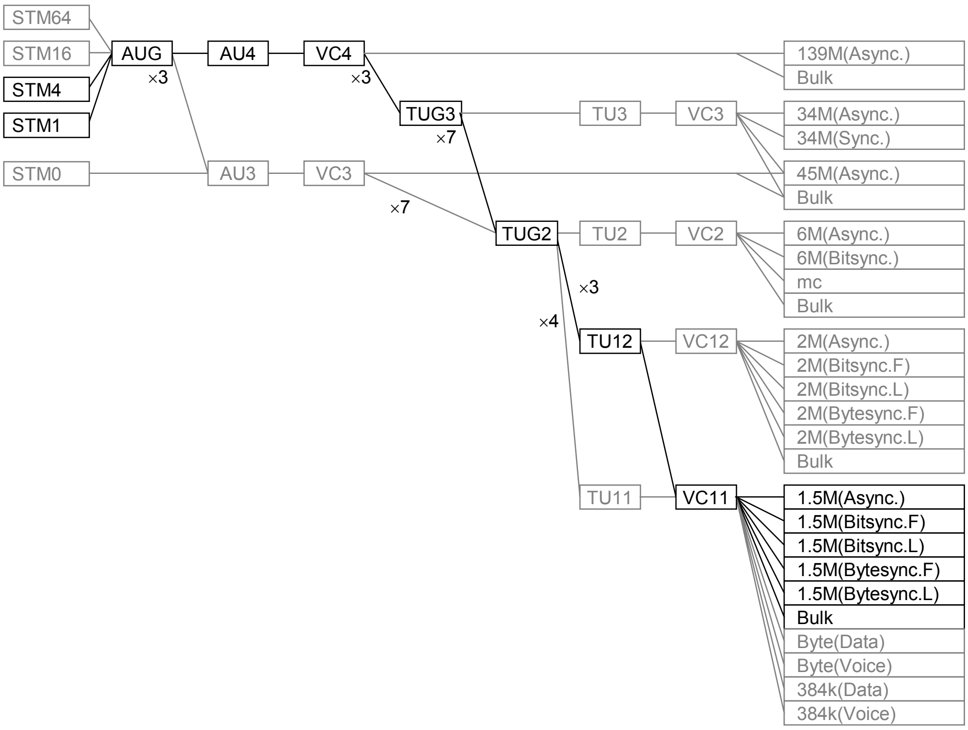

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Async.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Bulk	optical	○ *4		—	—	○
	NRZ	○ *4		—	○	—
STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Async.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Bulk	optical	○ *4		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *4		—	○	—

○ ....Unit that must be installed.

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

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

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

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

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

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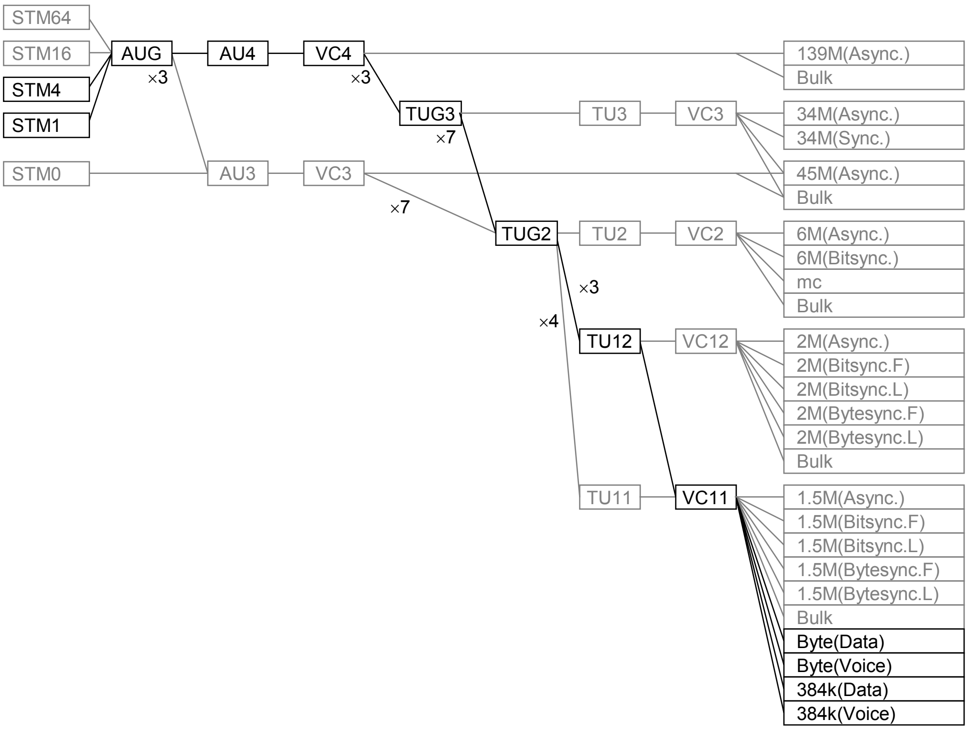

Mapping	Interface	Plug-in unit		Interface unit			Option-09
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Voice) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Voice)	optical	○ *3		—	—	○	○
	NRZ	○ *3		—	○	—	○
STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Voice) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Voice)	optical	○ *3		—	—	○	○
	CMI	○		—	—	—	○
		—		○	○	—	○
	NRZ	○ *3		—	○	—	○

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

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

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

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

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

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

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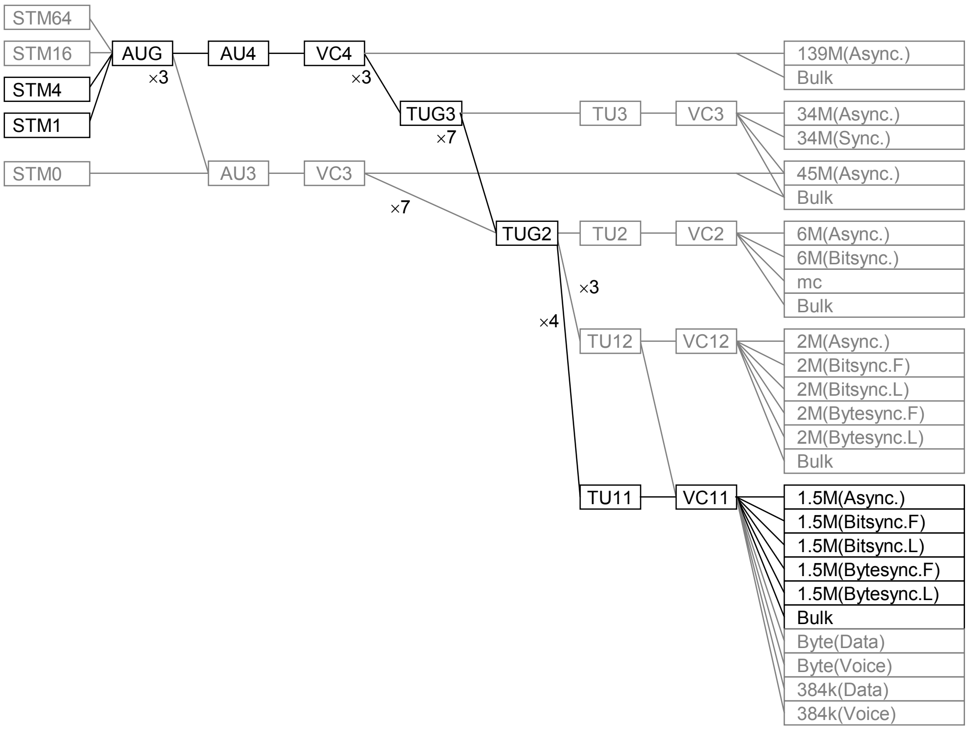

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Async.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bitsync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bitsync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bytesync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bytesync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Bulk	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Async.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bitsync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bitsync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bytesync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-1.5M(Bytesync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Bulk	optical	—	○	—	—	○
	CMI	—	○	○	—	—
	NRZ	—	○	—	○	—

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

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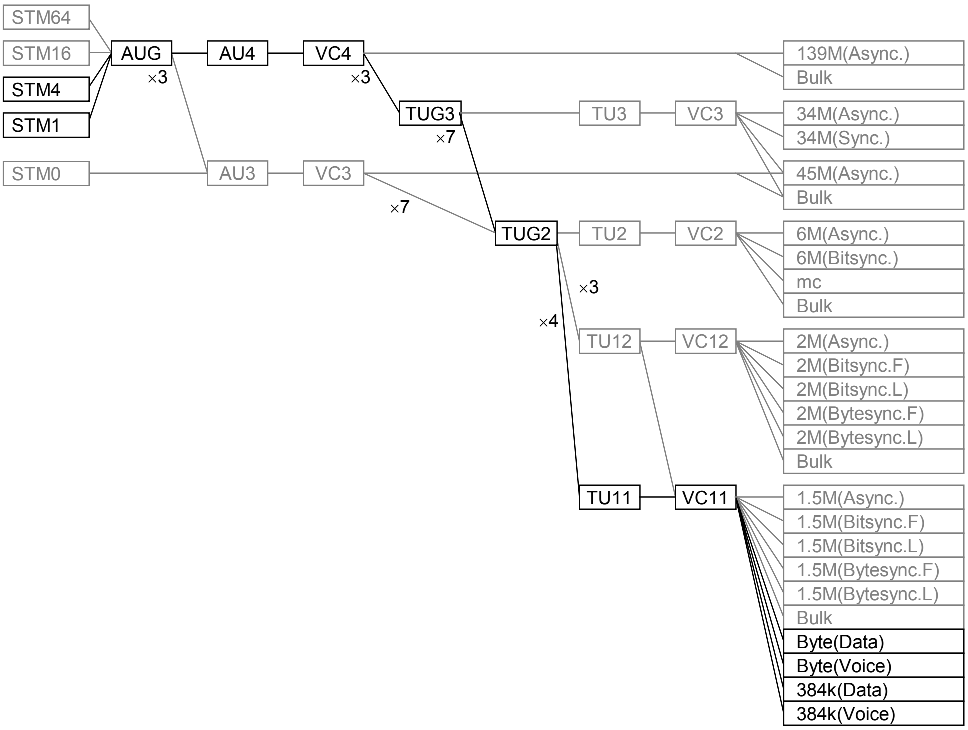

Mapping	Interface	Plug-in unit		Interface unit			Option-09
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	
STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Byte(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Byte(Voice) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-384k(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-384k(Voice)	optical	—	○	—	—	○	○
	NRZ	—	○	—	—	—	○
STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Byte(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-Byte(Voice) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-384k(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU11-VC11-384k(Voice)	optical	—	○	—	—	○	○
	CMI	—	○	○	—	—	○
	NRZ	—	○	—	○	—	○

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

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

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

*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

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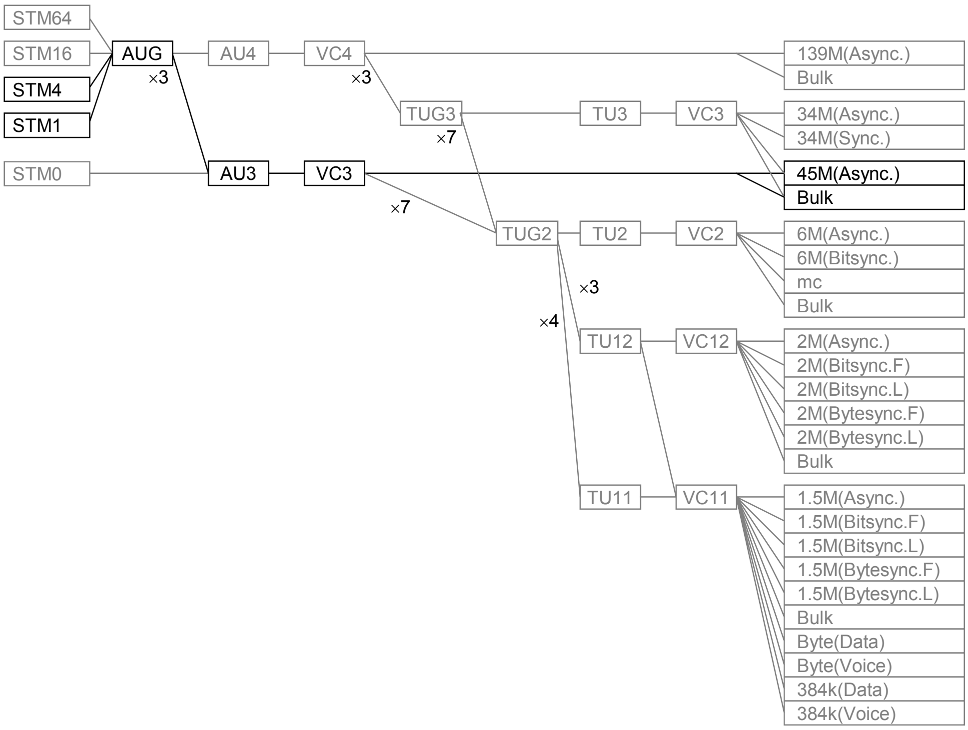

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU3-VC3-45M(Async.)	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STM4-AUG-AU3-VC3-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STM1-AUG-AU3-VC3-45M(Async.)	optical	—	○	—	—	○
	CMI	○	○	—	—	—
		—	○	○	—	—
	NRZ	—	○	—	○	—
STM1-AUG-AU3-VC3-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

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

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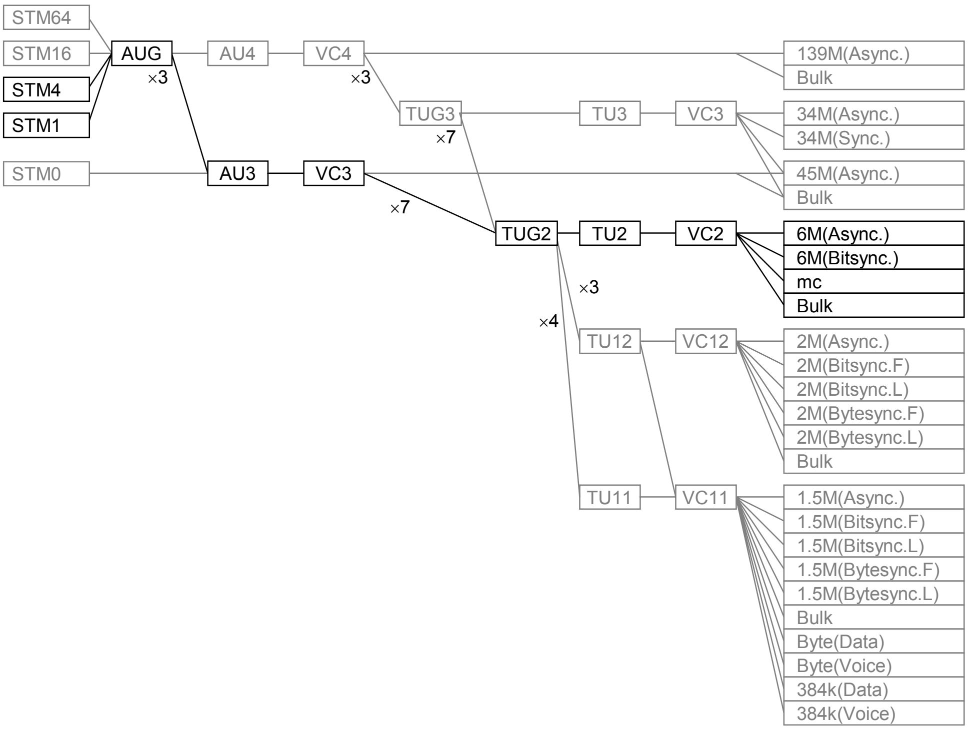

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU3-VC3-TUG2-TU2-VC2-6M(Async.) STM4-AUG-AU3-VC3-TUG2-TU2-VC2-6M(Bitsync.) STM4-AUG-AU3-VC3-TUG2-TU2-VC2-mc STM4-AUG-AU3-VC3-TUG2-TU2-VC2-Bulk	optical	○ *3		—	—	○
	NRZ	○ *3		—	○	—
STM1-AUG-AU3-VC3-TUG2-TU2-VC2-6M(Async.) STM1-AUG-AU3-VC3-TUG2-TU2-VC2-6M(Bitsync.) STM1-AUG-AU3-VC3-TUG2-TU2-VC2-mc STM1-AUG-AU3-VC3-TUG2-TU2-VC2-Bulk	optical	○ *3		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *3		—	○	—

○ ....Unit that must be installed.

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

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

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

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

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

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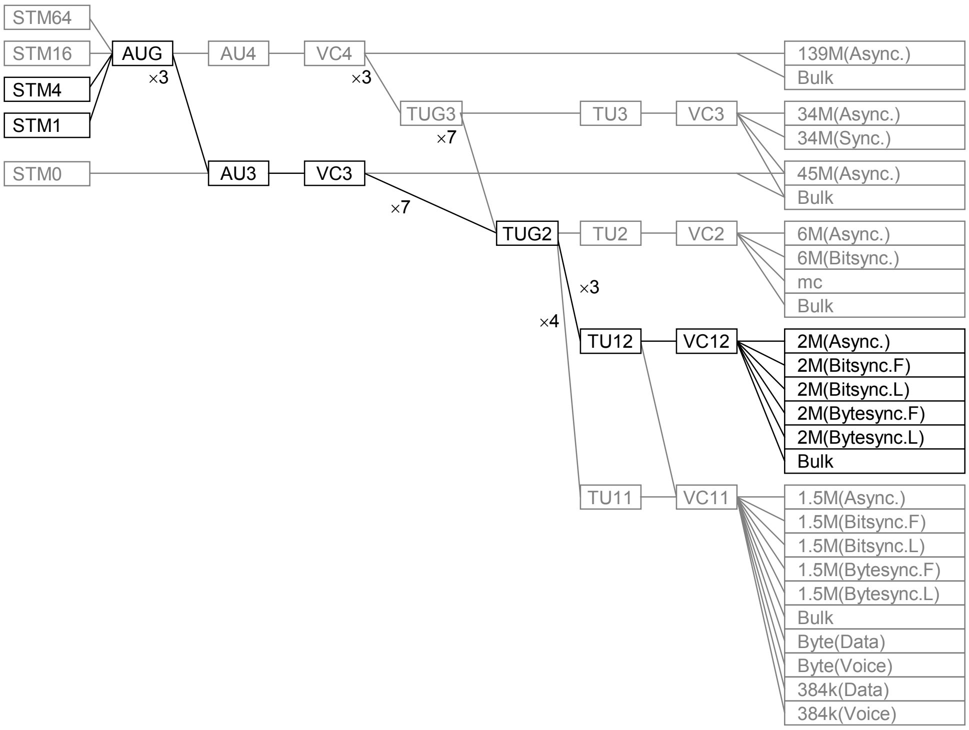

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Async.) STM4-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.F) STM4-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.L) STM4-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.F) STM4-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.L) STM4-AUG-AU3-VC3-TUG2-TU12-VC12-Bulk	optical	○	—	—	—	○
	NRZ	○	—	—	○	—
STM1-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Async.) STM1-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.F) STM1-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bitsync.L) STM1-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.F) STM1-AUG-AU3-VC3-TUG2-TU12-VC12-2M(Bytesync.L) STM1-AUG-AU3-VC3-TUG2-TU12-VC12-Bulk	optical	○	—	—	—	○
	CMI	○	—	—	—	—
	NRZ	○	—	—	○	—

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

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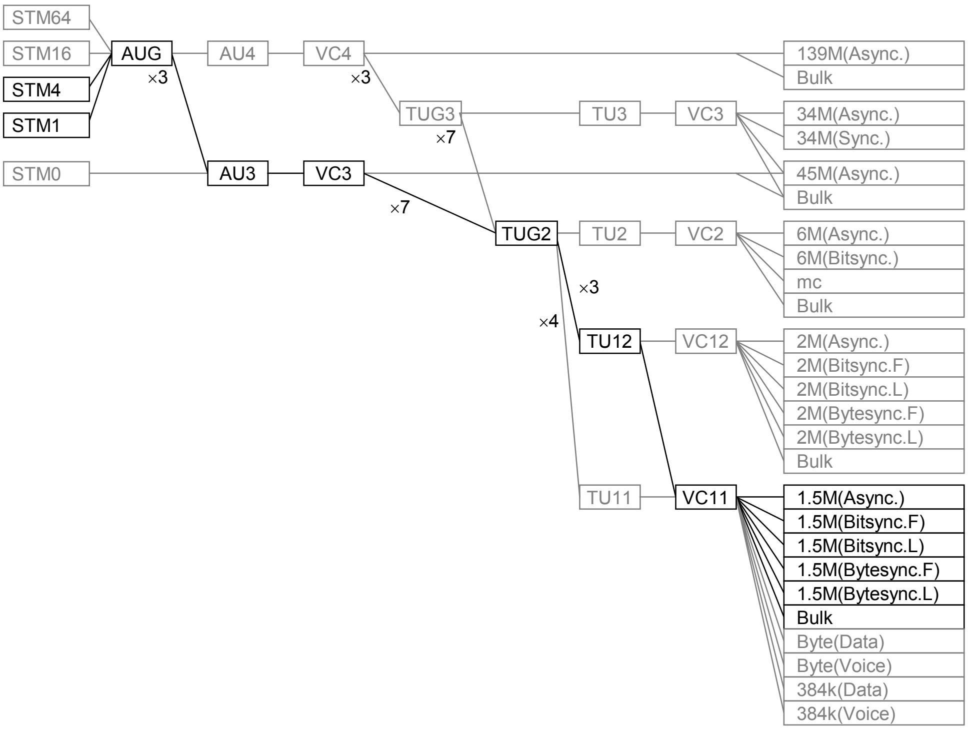

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Async.) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-Bulk	optical	○ *4		—	—	○
	NRZ	○ *4		—	○	—
STM1-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Async.) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-Bulk	optical	○ *4		—	—	○
	CMI	○	—	—	—	—
		—	○	○	—	—
	NRZ	○ *4		—	○	—

○ ....Unit that must be installed.

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

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

*2 ....An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

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

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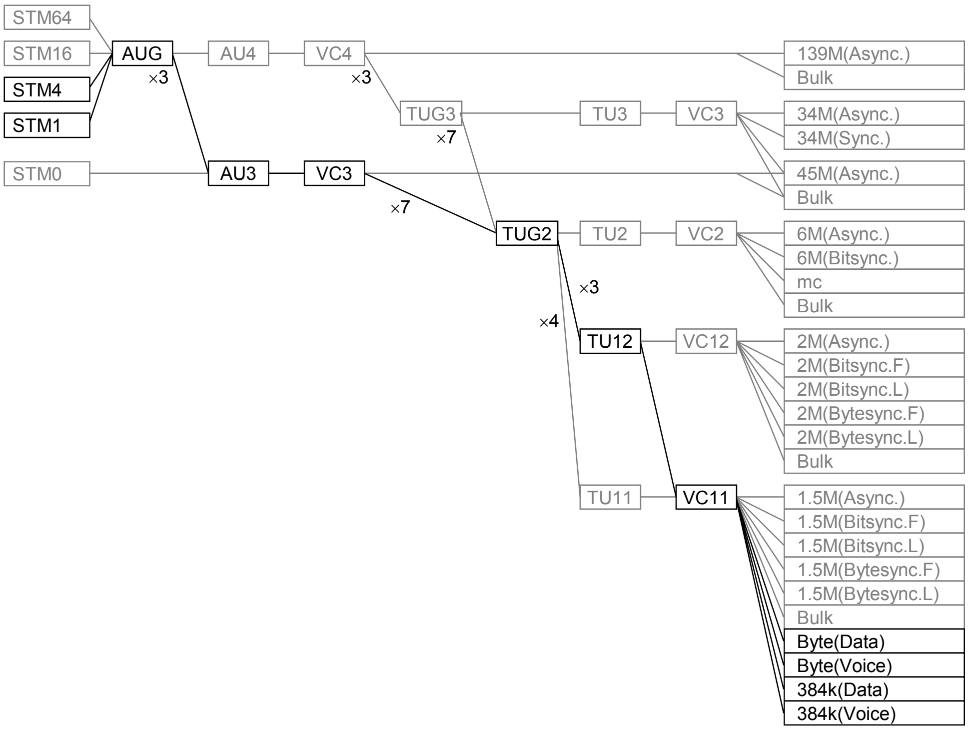

Mapping	Interface	Plug-in unit		Interface unit			Option
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	-09
STM4-AUG-AU3-VC3-TUG2-TU12-VC11-Byte(Data) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-Byte(Voice) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-384k(Data) STM4-AUG-AU3-VC3-TUG2-TU12-VC11-384k(Voice)	optical	○ *3		—	—	○	○
	NRZ	○ *3		—	○	—	○
STM1-AUG-AU3-VC3-TUG2-TU12-VC11-Byte(Data) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-Byte(Voice) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-384k(Data) STM1-AUG-AU3-VC3-TUG2-TU12-VC11-384k(Voice)	optical	○ *3		—	—	○	○
	CMI	○	—	—	—	—	○
		—	○	○	—	—	○
	NRZ	○ *3		—	○	—	○

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

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

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

*2 .... An optical interface unit must be installed according to the optical wavelength.
MP0111A: For 1.31 μm wavelength
MP0112A: For 1.55 μm wavelength
MP0113A: For 1.31/1.55 μm wavelength

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

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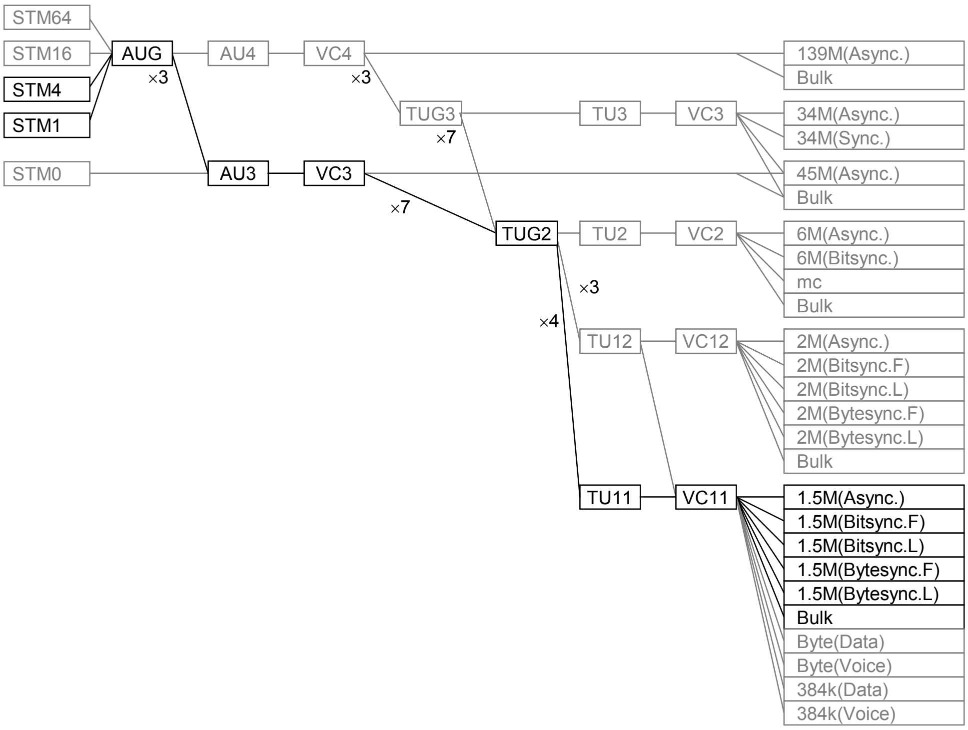

Mapping	Interface	Plug-in unit		Interface unit		
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Async.) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Bulk	optical	—	○	—	—	○
	NRZ	—	○	—	○	—
STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Async.) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bitsync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.F) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-1.5M(Bytesync.L) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Bulk	optical	—	○	—	—	○
	CMI	—	○	○	—	—
	NRZ	—	○	—	○	—

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

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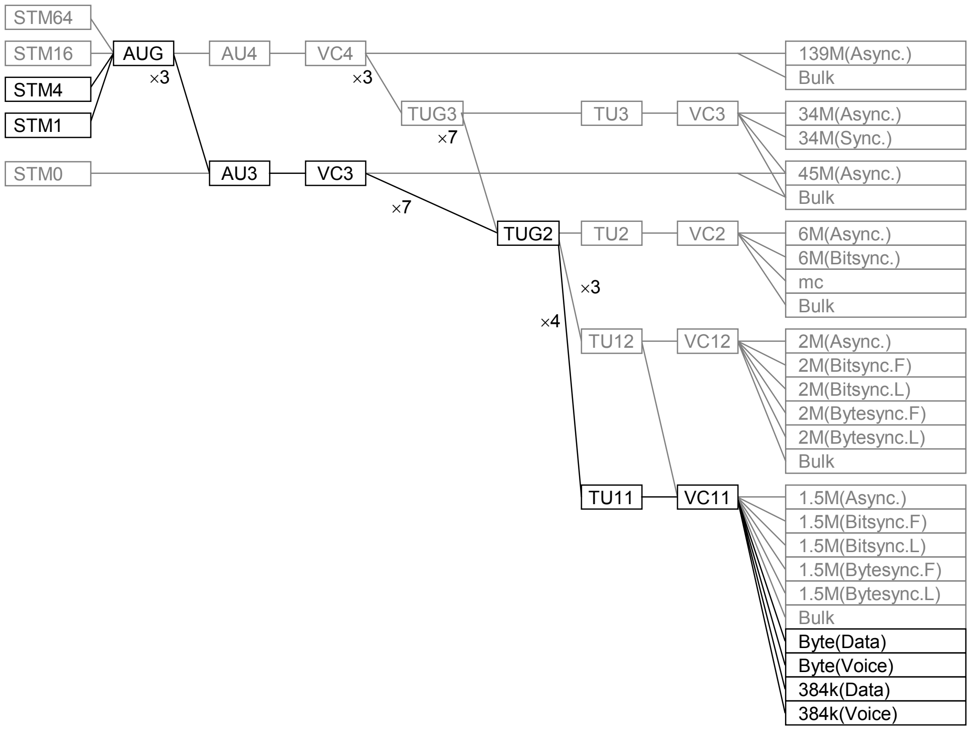


Mapping	Interface	Plug-in unit		Interface unit			Option
		MP0121A	*1 MP0122A/ MP0122B	MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A	-09
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Voice)	optical	—	○	—	—	○	○
STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Data) STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Voice)	NRZ	—	○	—	○	—	○
STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-Byte(Voice) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Data) STM1-AUG-AU4-VC4-TUG3-TUG2-TU12-VC11-384k(Voice)	optical	—	○	—	—	○	○
	CMI	—	○	○	—	—	○
	NRZ	—	○	—	○	—	○

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

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

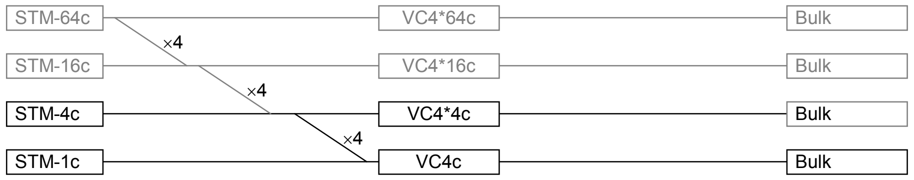
*1 .... Either MP0122A or MP0122B must be installed.

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

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

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

(3) Concatenation mapping



Mapping	Interface	Interface unit		
		MP0105A	MP0108A	*2 MP0111A/ MP0112A/ MP0113A
STM4-VC4*4c-Bulk	optical	—	—	○
STM4-VC4c-Bulk	NRZ	—	○	—
STM1-VC4c-Bulk	optical	—	—	○
	CMI	○	—	—
	NRZ	—	○	—

○ .... Unit that must be installed.

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

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

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

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

(4) CID Pattern and Non-frame Pattern

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

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

○ ....Unit that must be installed.

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

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

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

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

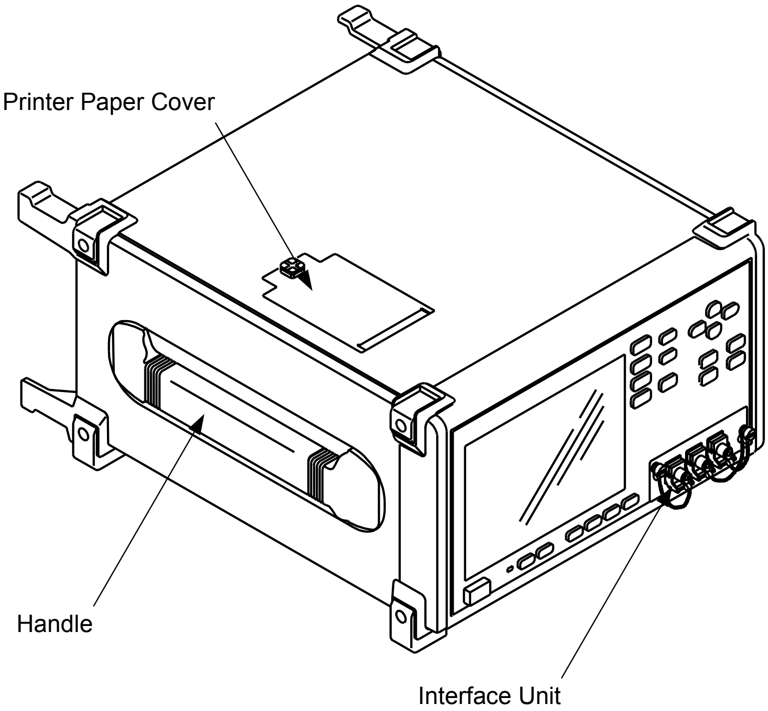
*3 Any one of MP0121A, MP0122A and MP0122B must be installed.

Section 3 Panel Description

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

3.1 Description of MP1570A Panel

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



Handle

For carrying the MP1570A unit.

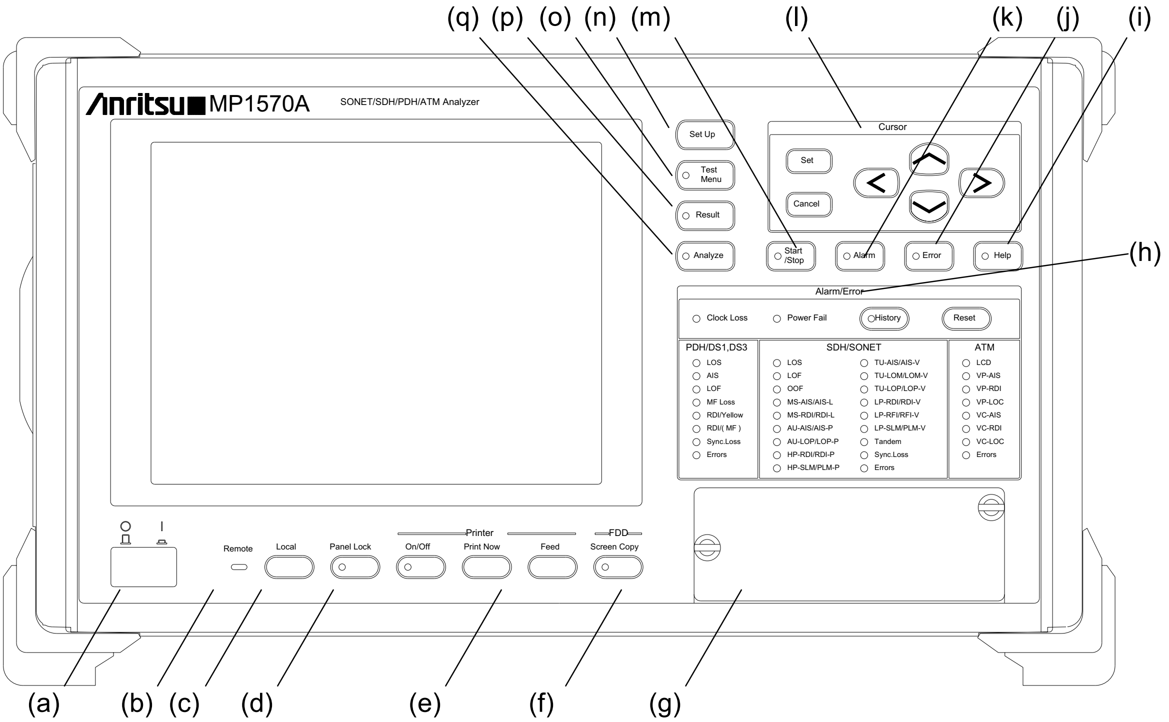
Printer Paper Cover

Remove the cover for supplying the printer paper.

Interface Unit

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

3.1.1 Front Panel



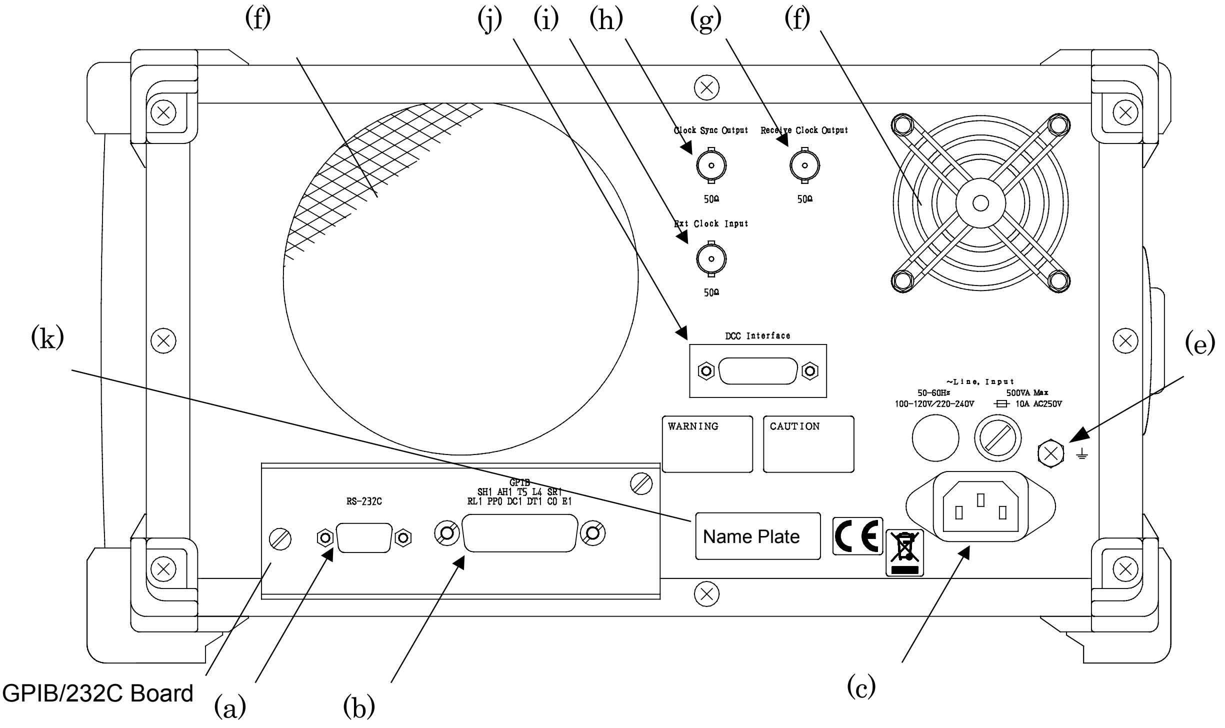
(a)	O I	Switch used to turn MP1570A on or off.
(b)	Remote	Lamp that goes on when MP1570A is in remote mode (i.e. when this unit is being controlled through the GPIB , RS-232C, or Ethernet interface).
(c)	Local	Key that is effective when MP1570A is in remote mode. Used for seeing it to local control mode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

(e)	Printer	
	●On/Off	Key used to turn the built-in printer on or off. When the built-in printer is on, the key top lamp goes on.
	Print Now	Key used to print displayed data on the built-in printer or external printer. - Printing using an external printer is possible in Printer mode when the GPIB or RS-232C option is installed. - Printing is not possible with the built-in printer if the ●On/Off lamp of the printer is off.
	Feed	Key to feed forms on the built-in printer. Hold it down for feeding.
(f)	FDD Screen Copy ●	Key to save the data displayed on the screen in the floppy disk.
(g)	Interface unit insertion slot	Slot for inserting an interface unit. Remove the blank panel to insert an interface unit.
(h)	Alarm/Error	Lamps for indicating receiver alarms, errors, clock loss and power loss state on the front panel. - The 'Errors' lamps indicate the total errors detected. - The 'Tandem' lamps indicate the errors related to the tandem connection detected. - The Clock Loss lamp indicates the clock loss of external clock pulses or indicates the clock loss or clock unlock state of DCS input pulses (75, 100 or 120Ω).
	●History	Key used to select current display mode or history display mode. The ●History lamp is on while the history display mode is active. - In the current display mode, the currently sensed states are indicated by the corresponding lamps. - In the history display mode, all sensed states recorded after the measurement is started (including Repeat start) are indicated by the corresponding lamps.
	Reset	This key is used to reset the history data that turned on the lamp, and to create new history data. It is usable only in history display mode.

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

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

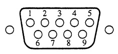
3.1.2 Rear Panel



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

Pin positions .....

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



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

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

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

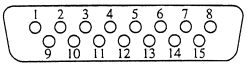
Output Level ..... ECL(AC)

Connector BNC50Ω

(j)	DCC Interface	These are input connectors for inputting the data entered from D1 to D3 and from D4 to D12 of the transmission SDH, and output connectors for outputting the data outputted from D1 to D3 and from D4 to D12. - Switching from D1 to D3 and from D4 to D12 is carried out by selecting DCC on the Setup : OH Preset DATA screen. - It's used as an input/output connector when OH Add/Drop is performed in OH test. Data for performing Add/Drop is set on the 'Test menu : Manual' screen.

Pin positions .....

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



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

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

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

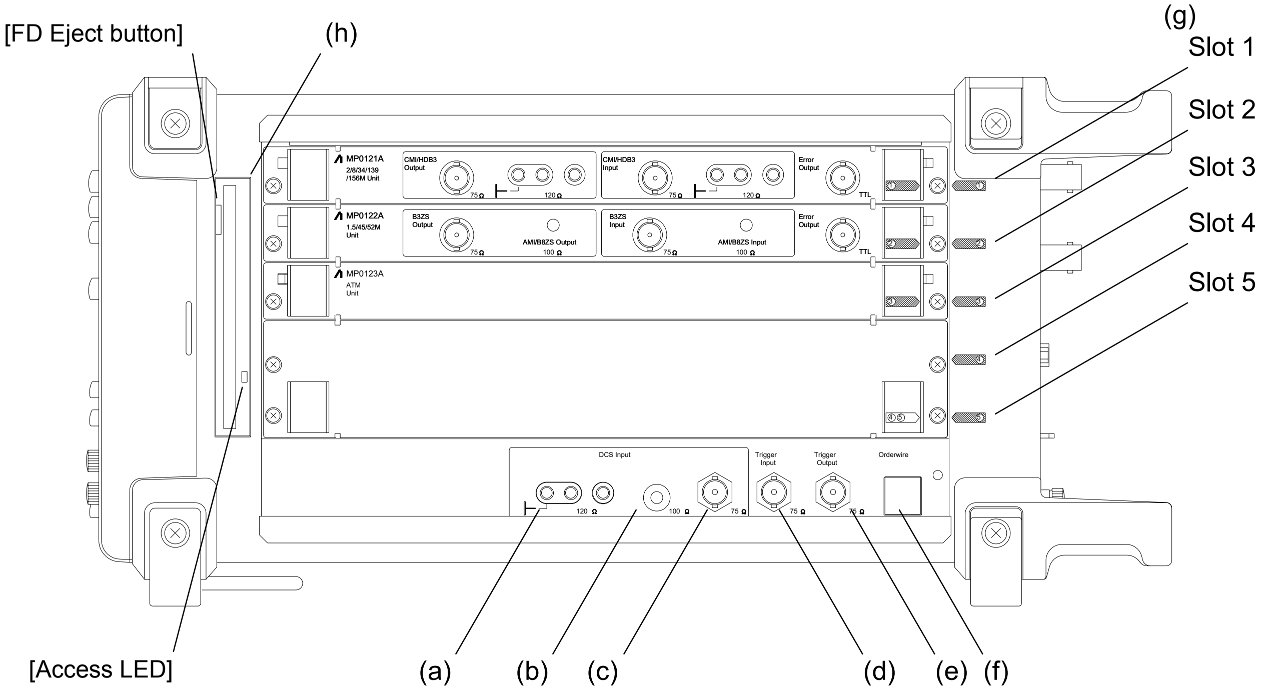
Level V.11

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

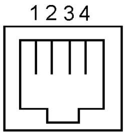
(k)	Name plate	Indicates the serial number and the installed option numbers.

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

3.1.3 Right Side Panel



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

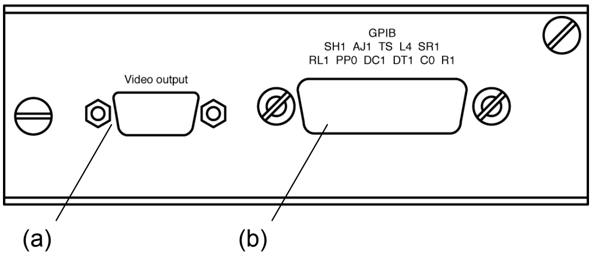
(d)	Trigger Input 50Ω	Trigger input connector used when the APS test and the fame capture are performed.
	Level	TTL
	Connector	BNC50Ω
(e)	Trigger Output 75Ω	Connector that outputs clock synchronizing the error, alarm, synchronized frame, and SDH signal detected in the receiving side.
	Level	TTL
	Connector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

CAUTION ⚠

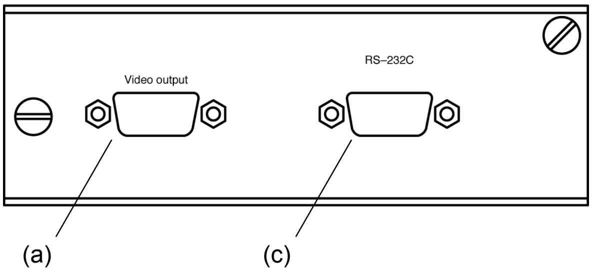
Do not eject the floppy disk while the access lamp is on. If a floppy disk is ejected during access, data on the floppy disk may be destroyed

3.2 Description of Video Output Board Panel

Video Output Board (GPIB)



Video Output Board (RS-232C)

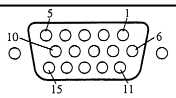


(a) Video output Signal output connector to display the MP1570A screen on an external CRT display (for video output option).

Signals are always outputted when the Video output board is inserted.

The table below shows the pin layout.

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

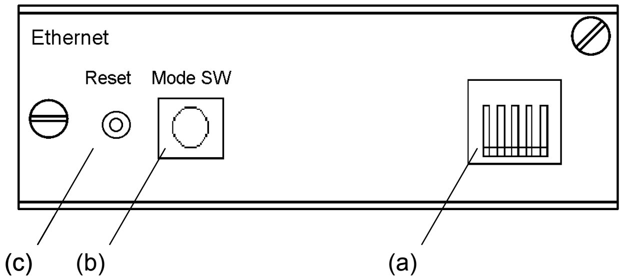


Connector ..... Multiple D-SUB high-density 15 pins

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

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

3.3 Description of Ethernet Board Panel

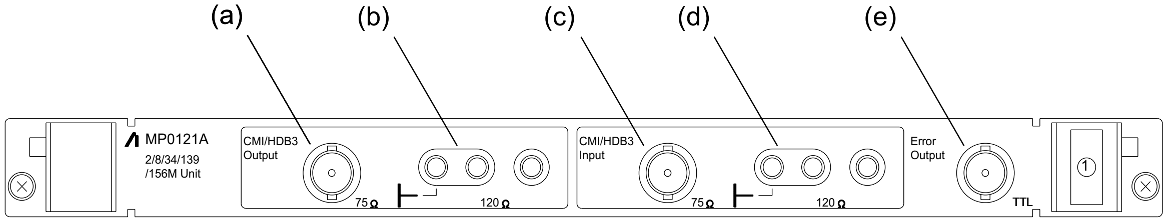


(a)	Ethernet connector.	Ethernet interface connector.
(b)	Mode SW	Sets the mode of the Ethernet board.
(c)	Reset	Used to reset the Ethernet board.

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

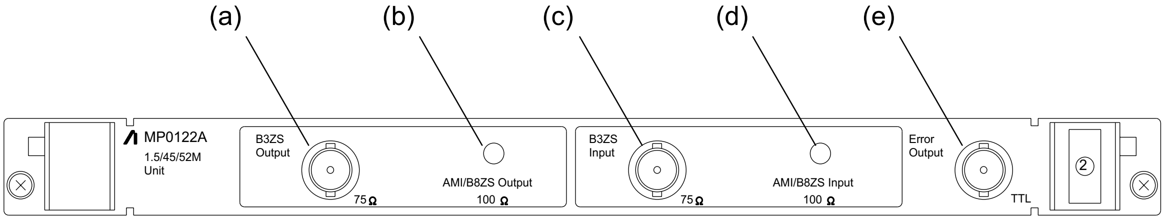
3.4 Description of Plug-in Unit Panel

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



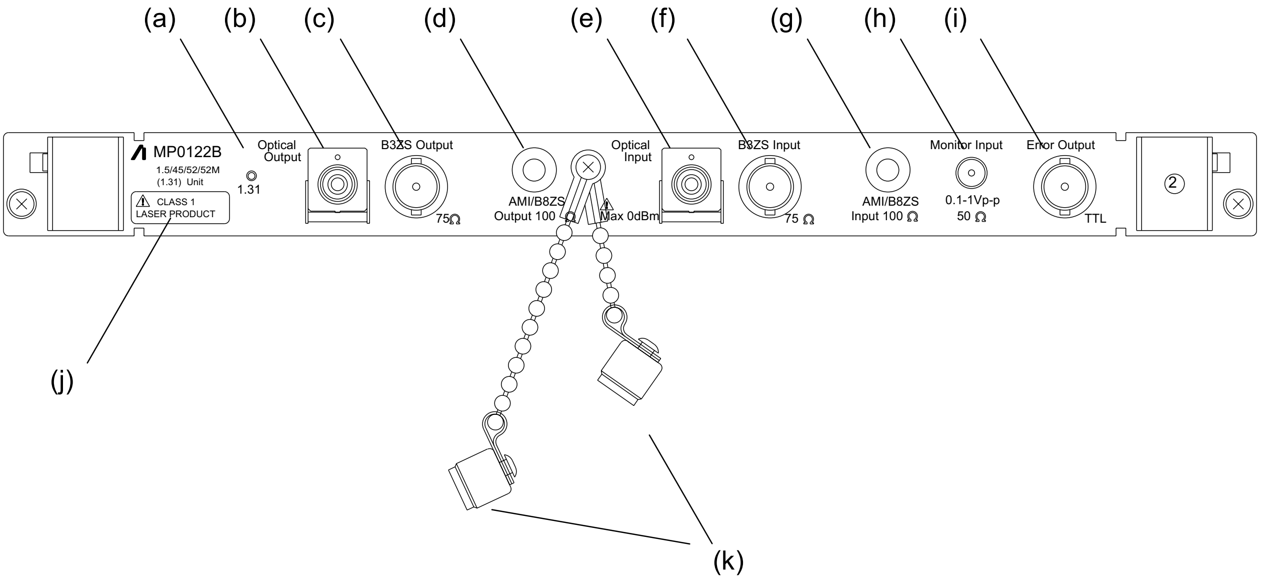
(a)	CMI/HDB3 Output 75Ω	Connector for outputting 2M/8M/34M/139M/156M signals.
	Bit rate	2.048 Mbit/s 8.448 Mbit/s 34.368 Mbit/s 139.264 Mbit/s 155.520 Mbit/s
	Connector	BNC75Ω
(b)	CMI/HDB3 Output 120Ω ..	Connector for outputting 2M signal.
	Bit rate	2.048 Mbit/s
	Connector	3pin Siemens 120Ω
(c)	CMI/HDB3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

3.4.2 MP0122A 1.5/45/52M Unit

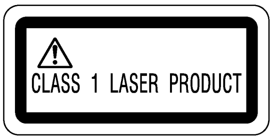


(a)	B3ZS Output 75 Ω	Connector for outputting 45M/52M signals.
	Bit rate	44.736 Mbit/s 51.84 Mbit/s
	Connector	BNC75 Ω
(b)	AMI/B8ZS Output 100 Ω	Connector for outputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100 Ω
(c)	B3ZS Input 75 Ω	Connector for inputting 45M/52M signals.
	Bit rate	44.736 Mbit/s 51.84 Mbit/s
	Connector	BNC75 Ω
(d)	AMI/B8ZS Input 100 Ω	Connector for inputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100 Ω
(e)	Error Output	Pulse output connector for test pattern error detection during 1.5/45/52M (B3ZS) mapping.
	Level	TTL
	Connector	BNC

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

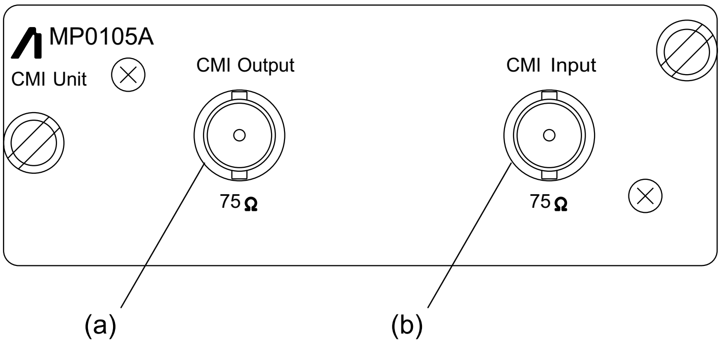


(a)	[Lamp]	Illuminated when an optical signal is outputted.
(b)	Optical Output	Connector for outputting 52M optical signal.
	Bit rate	51.84 Mbit/s
	Optical wavelength	1.31 μ m
	Level	-11.5dBm ± 3.5dB
	Connector	FC-PC(SM) connector
(c)	B3ZS Output 75 Ω	Connector for outputting 45M/52M signals.
	Bit rate	44.736 51.84 Mbit/s
	Connector	BNC75 Ω
(d)	AMI/B8ZS Output 100 Ω	Connector for outputting 1.5M signal.
	Bit rate	1.544 Mbit/s
	Connector	BANTAM 100 Ω

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

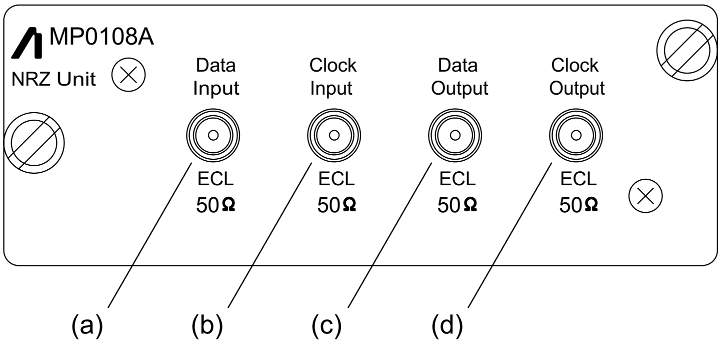
3.5 Description of the Interface Unit Panel

3.5.1 MP0105A CMI Unit



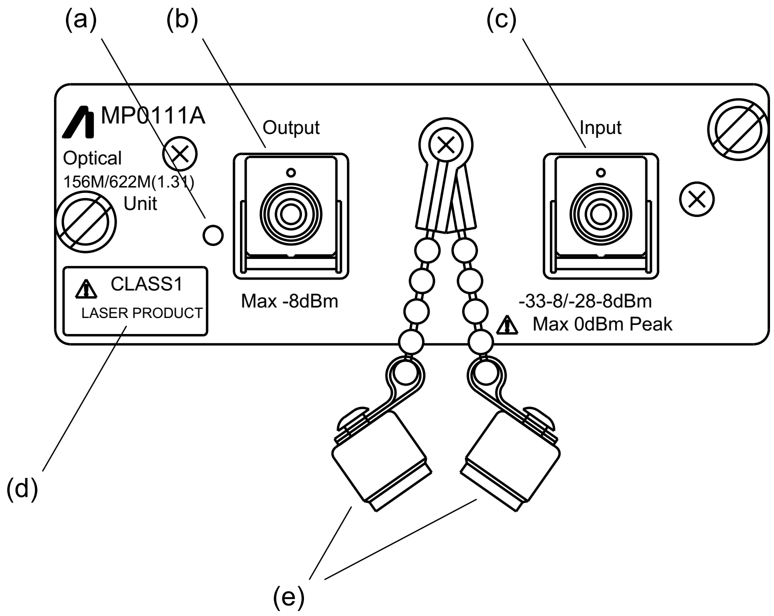
(a)	CMI Output 75Ω	A CMI signal output connector
	Bit rate	155.52 Mbit/s
	Interface	ITU-T G.703 Table 11, Fig 24, Fig 25
	Connector	BNC 75ΩUnbalanced
(b)	CMI Input 75Ω	A CMI signal input connector
	Bit rate	155.52 Mbit/s
	Interface	1Vpp±0.1V+cable loss : when monitor is off 0.1Vpp±0. 01V+ cable loss : when monitor is on
	Cable loss	0～12.7dB
	Connector	BNC 75Ωunbalanced - The monitor can be turned on or off using Monitor on the 'Setup : Mapping' screen.

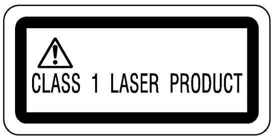
3.5.2 MP0108A NRZ Unit



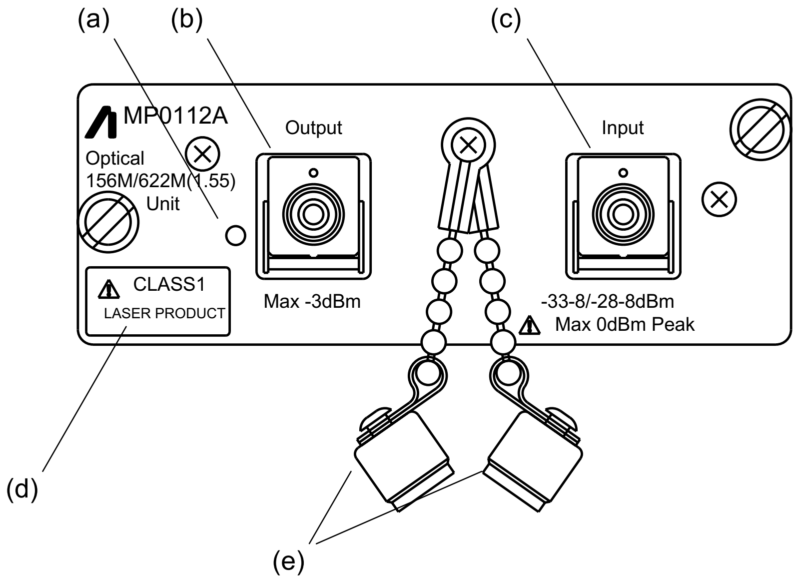
(a)	Data Input 50Ω	A SDH measurement signal (data) input connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Level	ECL (terminated in 50Ω, -2 V)
	Code	NRZ
	Connector	SMA 50Ω
(b)	Clock Input 50Ω	A SDH measurement signal (clock) input connector.
	Level	ECL (terminated in 50Ω, -2 V)
	Code	NRZ
	Connector.....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

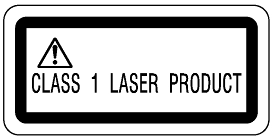
3.5.3 MP0111A Optical 156M/622M (1.31) Unit



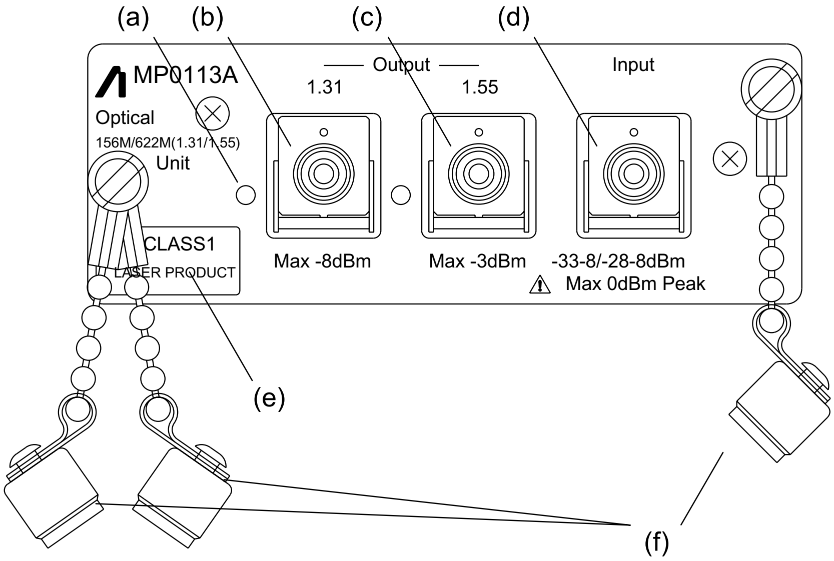
(a)	[Lamp]	Illuminated when an optical signal is outputted.
(b)	Output	A 156M/622M optical signal output connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Emitted beam wavelength band	1.31μm
	Level	-11.5dBm±3.5dB
	Connector	FC-PC(SM) Connector
(c)	Input -33～-8/-28～-8dBm...... ⚠ Max 0dBm Peak	A 156M/622M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

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

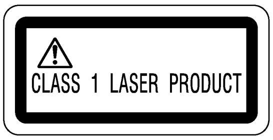


(a)	[Lamp]	Illuminated when an optical signal is output
(b)	Output .... Max -8dBm	A 156M/622M optical signal output connector.
	Bit rate	155.52 Mbit/s 622.08 Mbit/s
	Emitted beam wavelength band	1.55μm
	Level	-5dBm±2dB
	Connector	FC-PC(SM)Connector
(c)	Input -33～-8/-28～-8dBm...... ⚠ Max 0dBm Peak	A 156M/622M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

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



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

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

Section 4 Screen Description and Parameter Setting

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

4.1 Main Screen

4.1.1 Main Screen Configurations

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

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

4.1.2 Main Screen Selection

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

Displaying the 'Setup' Main Screen

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

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

Displaying the 'Test menu' Main Screen

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

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

Displaying the ‘Result’ Main Screen

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

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

Displaying the ‘Analyze’ Main Screen

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

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

4.1.3 Main Screen Layout

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

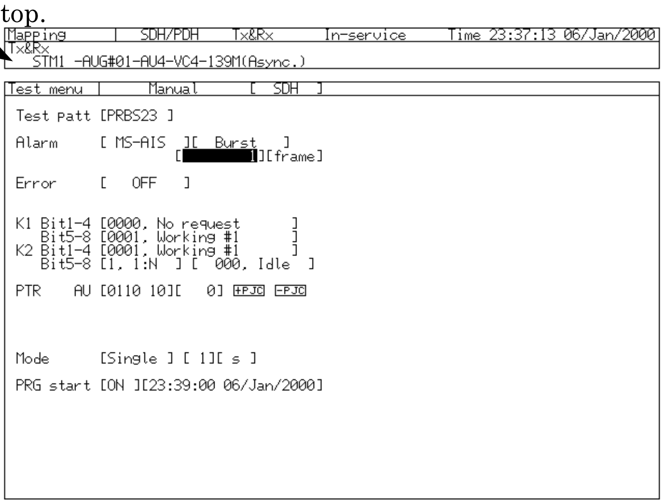
Single-screen Display

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

```
Setup      |           Mapping          [Tx&Rx]     Time 17:45:13 22/Jan/2000
  Config.[      SDH/PDH      ]   Meas. mode[Out-of-service]

  Bit rate        [     156M CMI     ]

  Mapping  [STM1-AUG-AU4-VC4-139M(Async.)                                   ]

  MUX/DEMUX       [         8M       ]
  Frame           [       OFF        ]

  Clock           [         External          ]
  Monitor mode    [       OFF        ]
```

Mapping Route and Channel Information

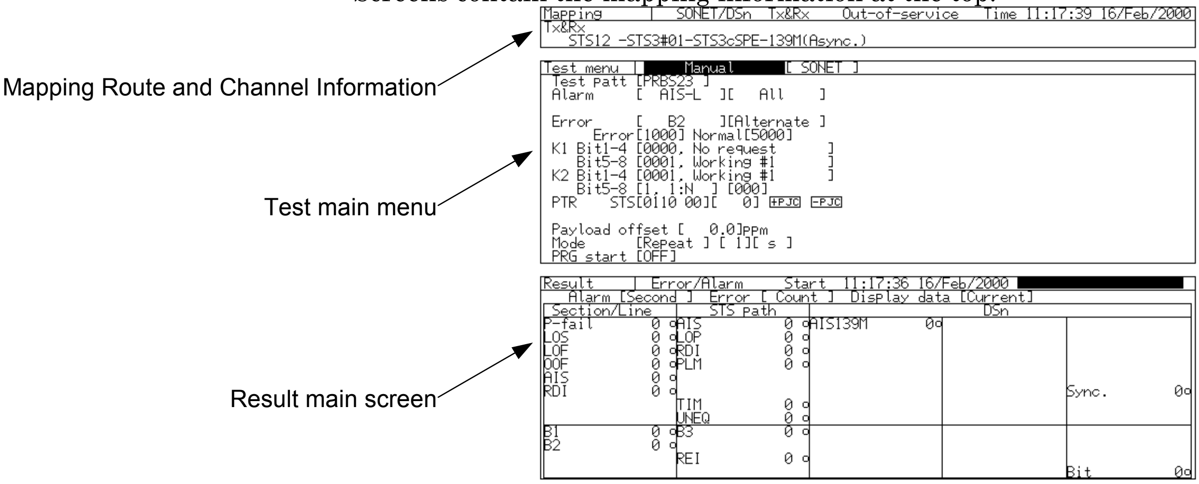
- Screens other than Setup contain the mapping information at the top.



```
Mapping      |    SDH/PDH     Tx&Rx        In-service      Time 23:37:13 06/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-139M(Async.)

Test menu  |       Manual       [  SDH  ]
 Test patt [PRBS23 ]

 Alarm      [ MS-AIS  ][  Burst    ]
                      [          1][frame]

 Error      [    OFF    ]

 K1 Bit1-4 [0000, No request       ]
    Bit5-8 [0001, Working #1       ]
 K2 Bit1-4 [0001, Working #1       ]
    Bit5-8 [1, 1:N   ] [  000, Idle   ]

 PTR    AU [0110 10][    0] +PJC  -PJC

 Mode       [Single ] [ 1][ s ]

 PRG start [ON ][23:39:00 06/Jan/2000]
```

Two-division Display

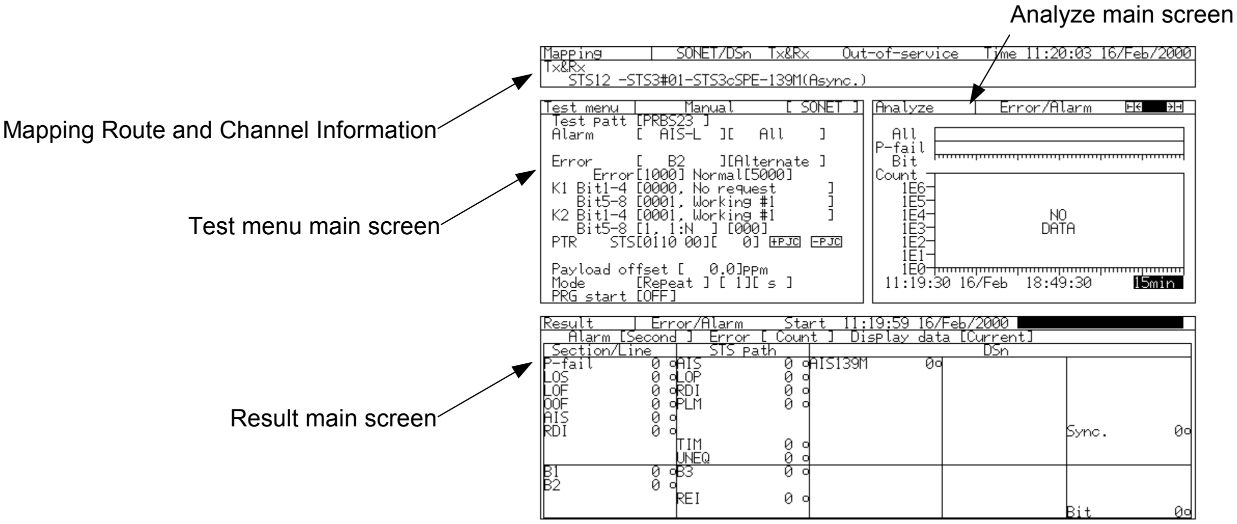
- MP1570A can simultaneously display two screens from the Test menu, Result and Analyze main screens. (Setup main screen cannot be displayed simultaneously with the other screens.)
- The lamps of Test Menu, Result, and Analyze show the displayed screen.
- Screens contain the mapping information at the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



```
Mapping        |   SONET/DSn  Tx&Rx    Out-of-service   Time 11:17:39 16/Feb/2000
Tx&Rx
   STS12 -STS3#01-STS3cSPE-139M(Async.)

Test menu  |      Manual       [ SONET ]
 Test patt [PRBS23 ]
 Alarm      [  AIS-L  ][   All    ]

 Error      [   B2    ][Alternate ]
      Error[1000] Normal[5000]
 K1 Bit1-4 [0000, No request       ]
    Bit5-8 [0001, Working #1       ]
 K2 Bit1-4 [0001, Working #1       ]
    Bit5-8 [1, 1:N  ] [000]
 PTR    STS[0110 00][   0] +PJC -PJC

 Payload offset [   0.0]ppm
 Mode       [Repeat ] [ 1][ s ]
 PRG start [OFF]

Result     |  Error/Alarm     Start  11:17:36 16/Feb/2000
   Alarm [Second ]  Error [ Count ]  Display data [Current]
 Section/Line    |    STS path    |                 DSn
P-fail        0 |AIS          0 |AIS139M       0 |
LOS           0 |LOP          0 |
LOF           0 |RDI          0 |
OOF           0 |PLM          0 |
AIS           0 |
RDI           0 |                                                 Sync.       0
                |TIM          0 |
                |UNEQ         0 |
B1            0 |B3           0 |
B2            0 |
                |REI          0 |                                 Bit         0
```

Three-division Display

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



```
Mapping        |   SONET/DSn  Tx&Rx    Out-of-service   Time 11:20:03 16/Feb/2000
Tx&Rx
   STS12 -STS3#01-STS3cSPE-139M(Async.)

Test menu  |    Manual     [ SONET ]   Analyze       |   Error/Alarm
 Test patt [PRBS23 ]
 Alarm      [  AIS-L  ][   All    ]         All
                                         P-fail
 Error      [   B2    ][Alternate ]         Bit
      Error[1000] Normal[5000]           Count
 K1 Bit1-4 [0000, No request       ]       1E6
    Bit5-8 [0001, Working #1       ]       1E5
 K2 Bit1-4 [0001, Working #1       ]       1E4        NO
    Bit5-8 [1, 1:N  ] [000]                1E3        DATA
 PTR    STS[0110 00][   0] +PJC -PJC       1E2
                                           1E1
 Payload offset [   0.0]ppm                1E0
 Mode       [Repeat ] [ 1][ s ]          11:19:30 16/Feb  18:49:30     15min
 PRG start [OFF]

Result     |  Error/Alarm     Start  11:19:59 16/Feb/2000
   Alarm [Second ]  Error [ Count ]  Display data [Current]
 Section/Line    |    STS path    |                 DSn
P-fail        0 |AIS          0 |AIS139M       0 |
LOS           0 |LOP          0 |
LOF           0 |RDI          0 |
OOF           0 |PLM          0 |
AIS           0 |
RDI           0 |                                                 Sync.       0
                |TIM          0 |
                |UNEQ         0 |
B1            0 |B3           0 |
B2            0 |
                |REI          0 |                                 Bit         0
```

4.2 Subscreens

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

4.2.1 Subscreens of ‘Setup’ Main Screen

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

4.2.2 Subscreens of ‘Test menu’ Main Screen

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

4.2.3 Subscreens of ‘Result’ Main Screen

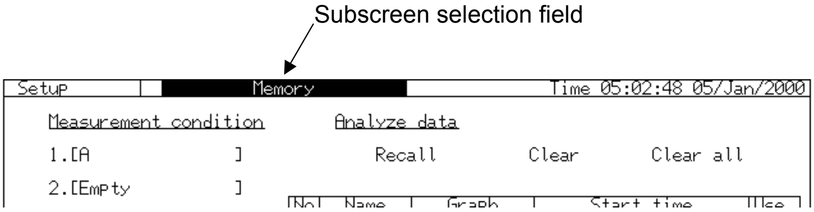
Display	Description
Trouble search	Displays the trouble search measurement results.
Error / Alarm	Displays the error and alarm measurement results.
Justification	Displays the justification measurement results.
Zoom	Zooms up the error and alarm measurement results.
Performance	Displays the performance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

4.2.4 Subscreens of 'Analyze' Main Screen

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

4.2.5 Selecting a Subscreen

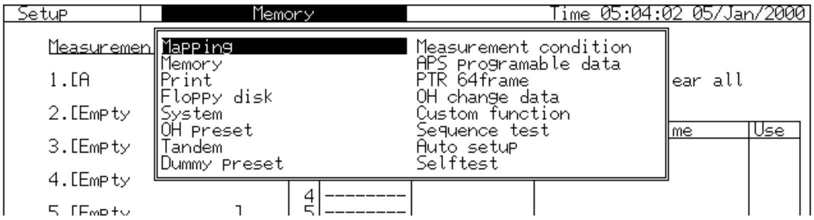
(1) Move the cursor to the subscreen selection field on the main screen (on the right panel of the main screen).


Subscreen selection field

1.[A]
2.[Empty]

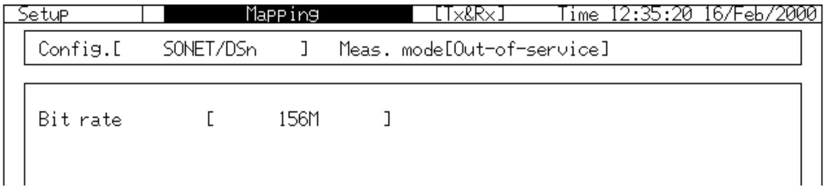
(2) Press Set, and the subscreen selection window is displayed.

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



1.[A
2.[Empty
3.[Empty
4.[Empty
4 ---------

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



Config.[SONET/DSn] Meas. mode[Out-of-service]

Bit rate [156M]

4.3 Setting Parameters through Windows

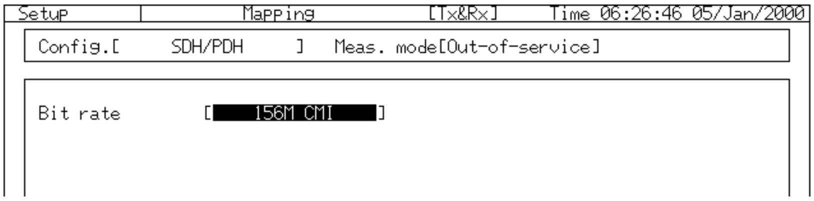
Measurement conditions displayed on the screen are set through windows or one-shot entry as described in 4.4, depending on the contents of the entry. The windows include item selection, numeric entry and character entry windows as follows:

4.3.1 Setting through Item Selection Window

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

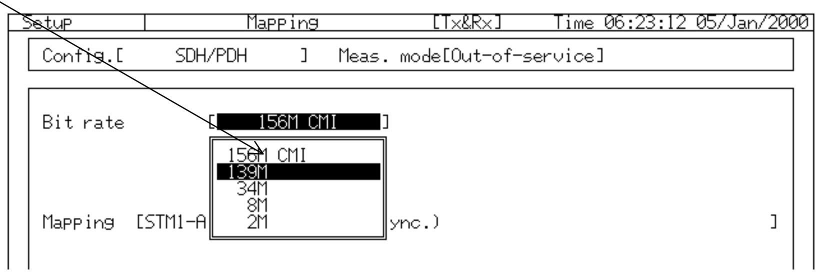
Example ... Setting the bit rate to ‘139M’ on the ‘Setup : Mapping’ screen.

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



```
Setup          Mapping          [Tx&Rx]     Time 06:26:46 05/Jan/2000
Config.[     SDH/PDH      ]   Meas. mode[Out-of-service]

Bit rate          [    156M CMI     ]
```

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



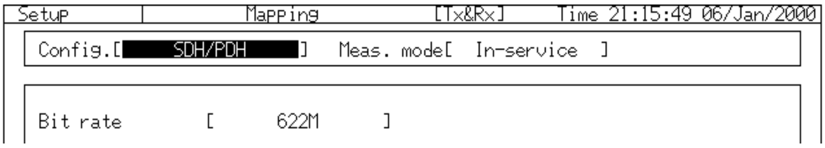
```
Setup          Mapping          [Tx&Rx]     Time 06:23:12 05/Jan/2000
Config.[     SDH/PDH      ]   Meas. mode[Out-of-service]

Bit rate          [    156M CMI     ]
                   156M CMI
                   139M
                    34M
                     8M
Mapping  [STM1-A     2M            ync.)                           ]
```

4.3.2 'Yes/No' Dialog Box

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

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

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

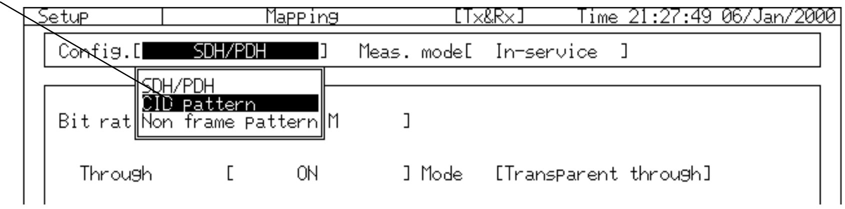


Setup Mapping [Tx&Rx] Time 21:15:49 06/Jan/2000

Config.[SDH/PDH] Meas. mode[In-service]

Bit rate [622M]

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



Item Selection Window

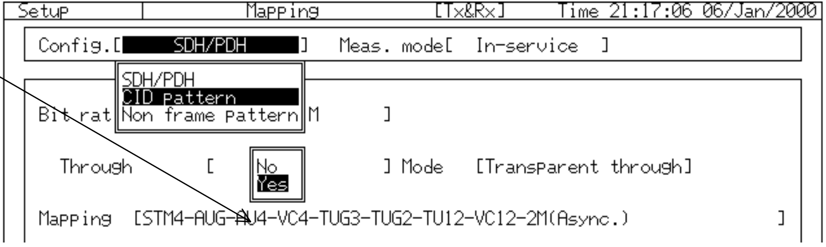
Setup Mapping [Tx&Rx] Time 21:27:49 06/Jan/2000

Config.[SDH/PDH] Meas. mode[In-service]

Bit rat M]

Through [ON] Mode [Transparent through]

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



'Yes/No' Dialog Box

Setup Mapping [Tx&Rx] Time 21:17:06 06/Jan/2000

Config.[SDH/PDH] Meas. mode[In-service]

Bit rat M]

Through [ ] Mode [Transparent through]

Mapping [STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Async.)]

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

4.3.3 Setting through Numeric Entry Window

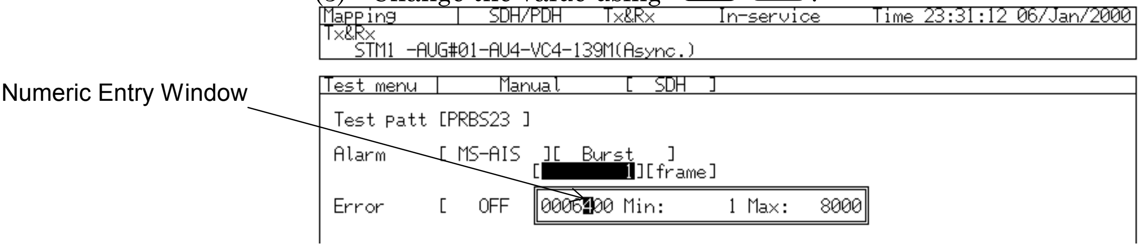
The numeric entry window is displayed for setting the measurement conditions by numeric entry. The operation procedure in this window is as follows:

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

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

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

(3) Change the value using ∧ ∨.



Numeric Entry Window

```
Mapping    | SDH/PDH    Tx&Rx     In-service     Time 23:31:12 06/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-139M(Async.)

Test menu |       Manual       [  SDH  ]
 Test patt [PRBS23 ]
 Alarm     [ MS-AIS  ][  Burst    ]
                     [        ][frame]
 Error     [   OFF   00006400 Min:       1 Max:   8000
```

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

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

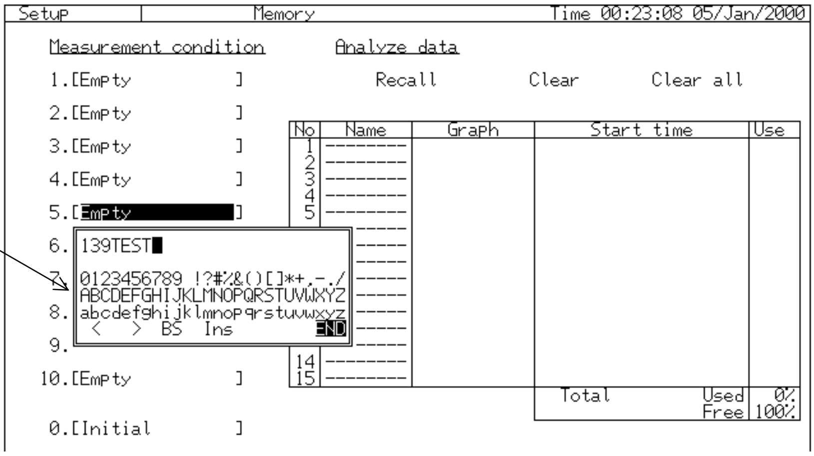
```
Mapping    | SDH/PDH    Tx&Rx     In-service     Time 23:35:20 06/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-139M(Async.)

Test menu |       Manual       [  SDH  ]
 Test patt [PRBS23 ]
 Alarm     [ MS-AIS  ][  Burst    ]
                     [     6,400][frame]
 Error     [   OFF   ]
```

4.3.4 Setting through Character Entry Window

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

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

Character Entry Window



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

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

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

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

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

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

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

NOTE

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

The character entry window has the following function characters.

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

4.4 One-shot Entry

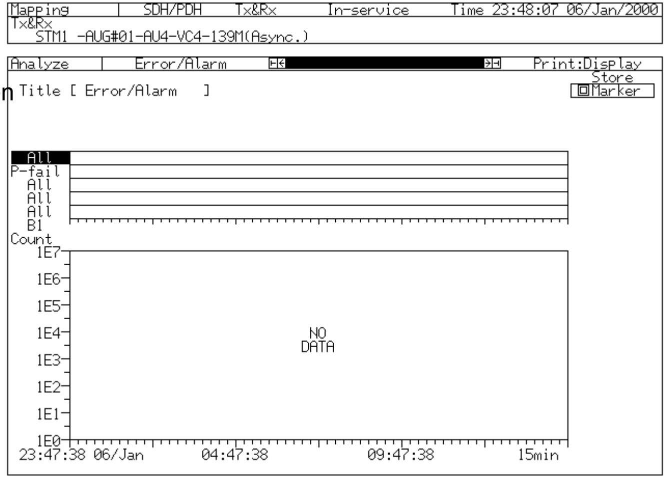
One-shot entry allows an entry to be completed when Set is pressed without any window for setting. Here is an example.

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

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

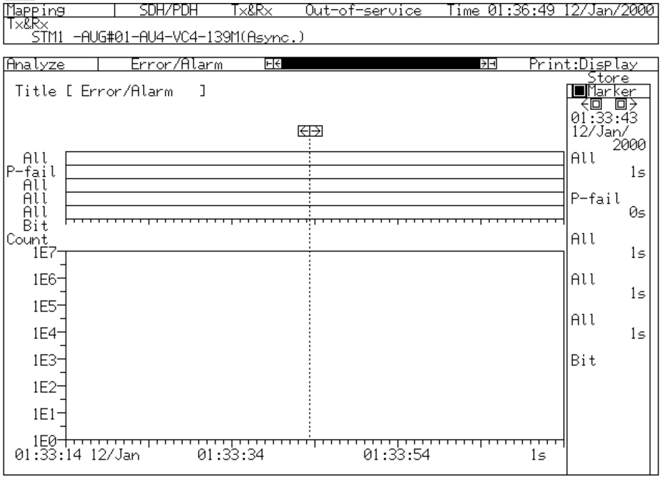
(1) Move the cursor to ' ■ Marker' and press Set . It changes into '□ Marker' to turn off the marker.

'Analyze : Error/Alarm' screen without Maker



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

'Analyze : Error/Alarm' screen with Maker



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

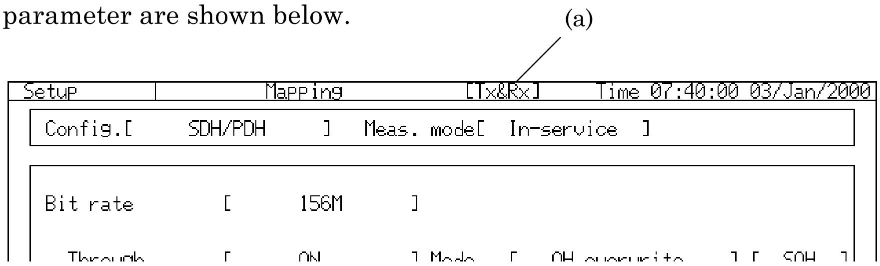
Section 5 Basic Setting and Application Examples of Connection

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

5.1 Setting Basic Parameters

'Setup : Mapping' screen

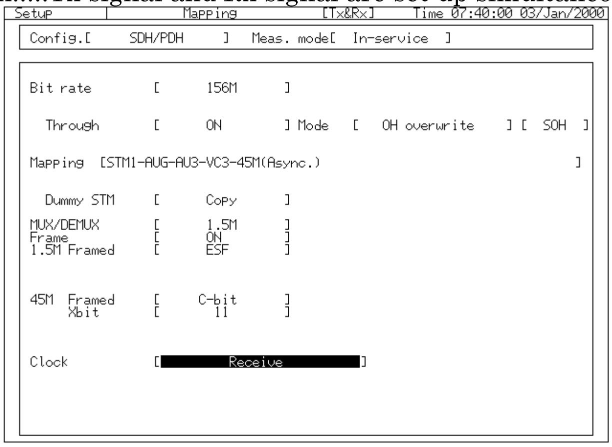
When the MP1570A and the equipment to be tested are connected, basic parameters, such as a signal type, an interface, and a frame structure, are set on the 'Setup : Mapping' screen. The explanations for each parameter are shown below.



```
Setup              Mapping              [Tx&Rx]      Time 07:40:00 03/Jan/2000
 Config.[     SDH/PDH      ]   Meas. mode[   In-service   ]

 Bit rate          [       156M        ]

   Through         [       ON          ] Mode   [   OH overwrite     ] [  SOH  ]
```

(a) [Operation mode] ..... Sets the Tx and RX operation mode

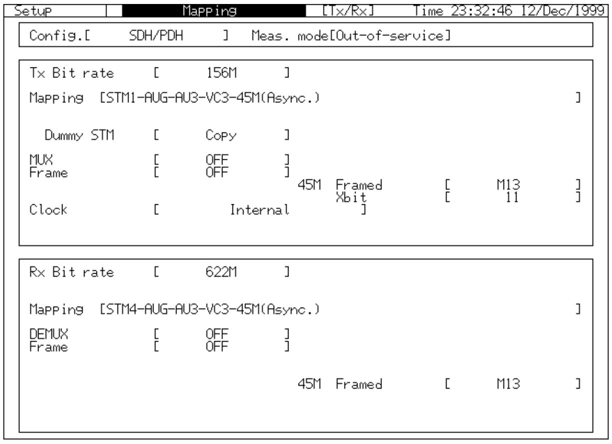
Tx&Rx.....Tx signal and Rx signal are set up simultaneously.



```
Setup              Mapping              [Tx&Rx]      Time 07:40:00 03/Jan/2000
 Config.[     SDH/PDH      ]   Meas. mode[   In-service   ]

 Bit rate          [       156M        ]

   Through         [       ON          ] Mode   [   OH overwrite     ] [  SOH  ]

 Mapping   [STM1-AUG-AU3-VC3-45M(Async.)                                       ]

   Dummy STM       [       Copy        ]

 MUX/DEMUX         [       1.5M        ]
 Frame             [       ON          ]
 1.5M Framed       [       ESF         ]

 45M  Framed       [      C-bit        ]
      Xbit         [       11          ]

 Clock             [      Receive      ]
```

Display Example of the "Tx&Rx" Mode

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

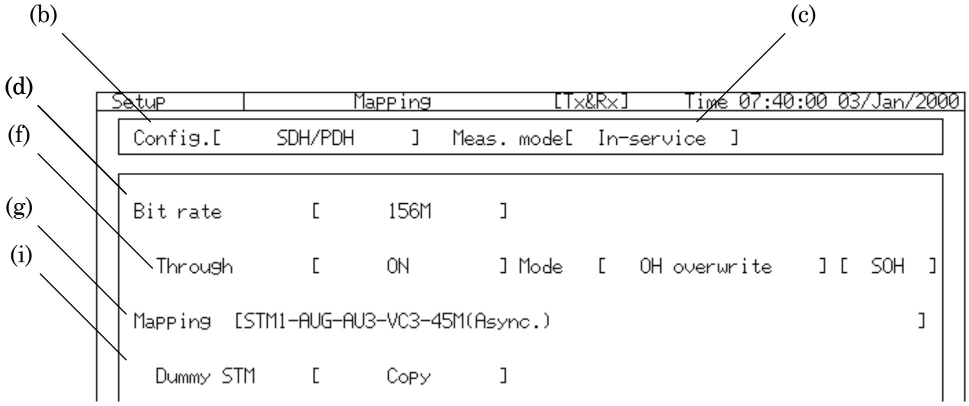


```
Setup              Mapping              [Tx/Rx]      Time 23:32:46 12/Dec/1999
 Config.[     SDH/PDH      ]   Meas. mode[Out-of-service]

 Tx Bit rate       [       156M        ]
 Mapping   [STM1-AUG-AU3-VC3-45M(Async.)                                       ]

   Dummy STM       [       Copy        ]
 MUX               [       OFF         ]
 Frame             [       OFF         ]
                                          45M  Framed         [       M13        ]
                                               Xbit           [        11        ]
 Clock             [          Internal          ]

 Rx Bit rate       [       622M        ]

 Mapping   [STM4-AUG-AU3-VC3-45M(Async.)                                       ]
 DEMUX             [       OFF         ]
 Frame             [       OFF         ]

                                          45M  Framed         [       M13        ]
```

Display Example of the "Tx/Rx" Mode

- Parameters for Tx and Rx are displayed separately.

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



```
Setup          Mapping          [Tx&Rx]    Time 07:40:00 03/Jan/2000
Config.[    SDH/PDH     ]  Meas. mode[  In-service  ]

Bit rate        [      156M      ]

 Through        [      ON        ] Mode  [   OH overwrite    ] [  SOH  ]

Mapping  [STM1-AUG-AU3-VC3-45M(Async.)                          ]

 Dummy STM      [      Copy      ]
```

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

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

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

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

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

- "In-service" is valid for Tx&Rx only.

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

Note

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

156M CMI .....Select "156M CMI" when using 156M CMI interface of the MP0121A.

156M .....Select "156M" when using 156M interface of the interface unit.

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

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

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

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

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

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

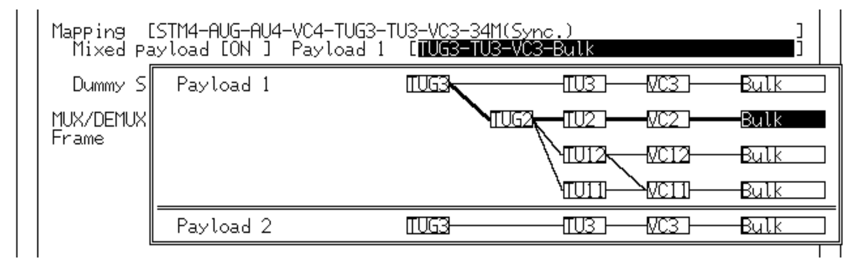
POH 1 byte overwrite.... Converts the any 1 byte within POH of the received signal to the preset data, and sends it.

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

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

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

(h) Mixed payload .....On the mapping including TU3 or AU3, MP1570A allows the setting of mapping for TU3 or AU3 channels without the measurement channel which is different from that of the measurement channel. See “6.7 Editing Dummy Channel” for the details.

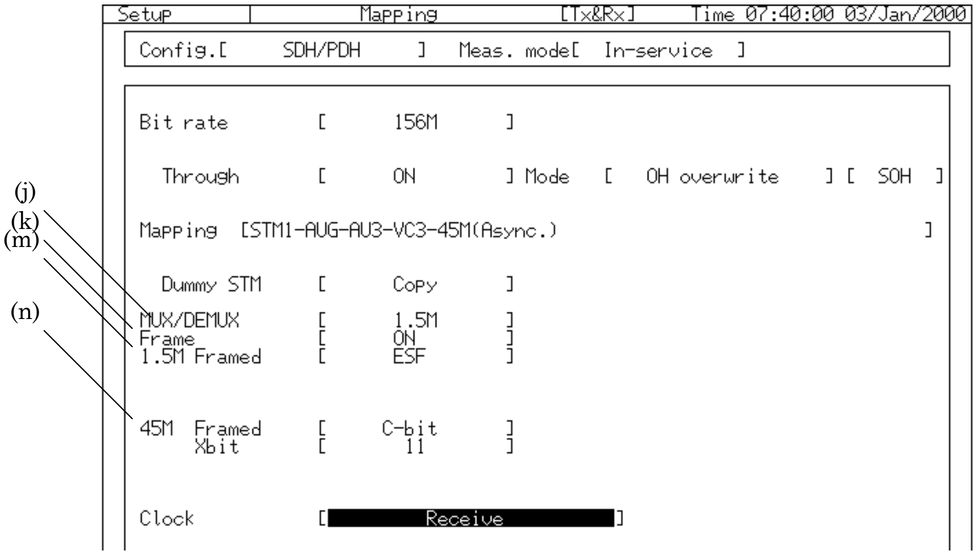


```
Mapping  [STM4-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Sync.)                    ]
  Mixed Payload [ON ]  Payload 1  [TUG3-TU3-VC3-Bulk                    ]
```

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

Copy ..... Inserts the same pattern as that of STM1 with measurement channel.

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

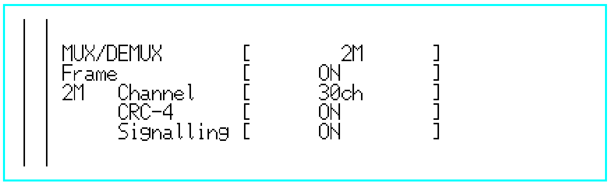


```
Setup          Mapping          [Tx&Rx]   Time 07:40:00 03/Jan/2000
 Config.[     SDH/PDH      ]   Meas. mode[  In-service  ]

 Bit rate          [      156M       ]

   Through         [      ON         ] Mode   [  OH overwrite    ] [  SOH  ]

 Mapping  [STM1-AUG-AU3-VC3-45M(Async.)                               ]

   Dummy STM       [      Copy       ]
 MUX/DEMUX         [      1.5M       ]
 Frame             [      ON         ]
 1.5M Framed       [      ESF        ]


 45M  Framed       [     C-bit       ]
      Xbit         [      11         ]


 Clock             [     Receive      ]
```

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

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

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



```
MUX/DEMUX       [      2M      ]
Frame           [    ON        ]
2M   Channel    [    30ch      ]
     CRC-4      [    ON        ]
     Signalling [    ON        ]
```

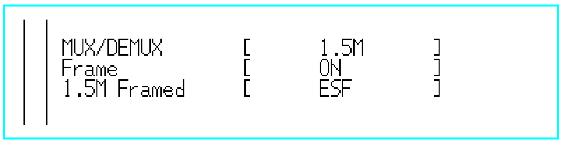
Channel .....Selects the number of channels (30 or 31) of the 2M frame.

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

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

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

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

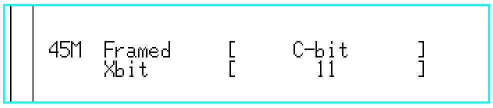


```
MUX/DEMUX      [     1.5M     ]
Frame          [     ON       ]
1.5M Framed    [     ESF      ]
```

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

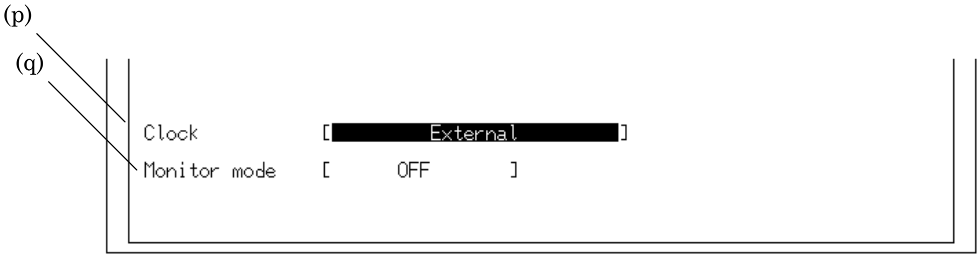
Code ....Set the 1.5M signal code.

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



```
45M  Framed    [     C-bit     ]
     Xbit      [      11       ]
```

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



```
Clock          [       External       ]
Monitor mode   [      OFF       ]
```

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

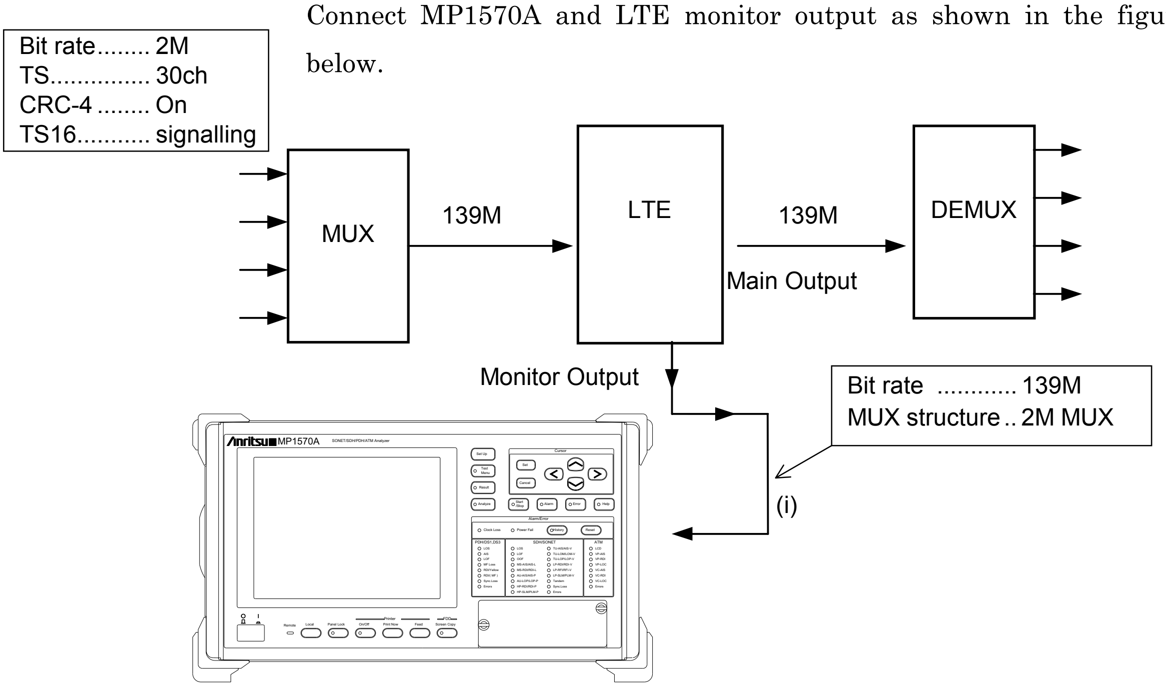
(q) Monitor mode ......Set it to “ON” when connecting the MP1570A to the monitoring point of the equipment to be tested.

5.2 PDH Monitoring

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

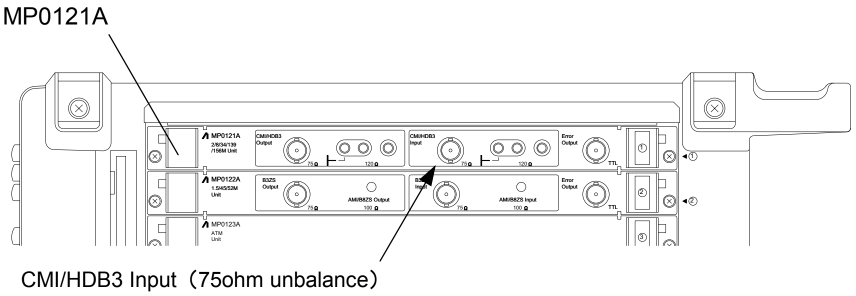
5.2.1 Connection

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



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

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



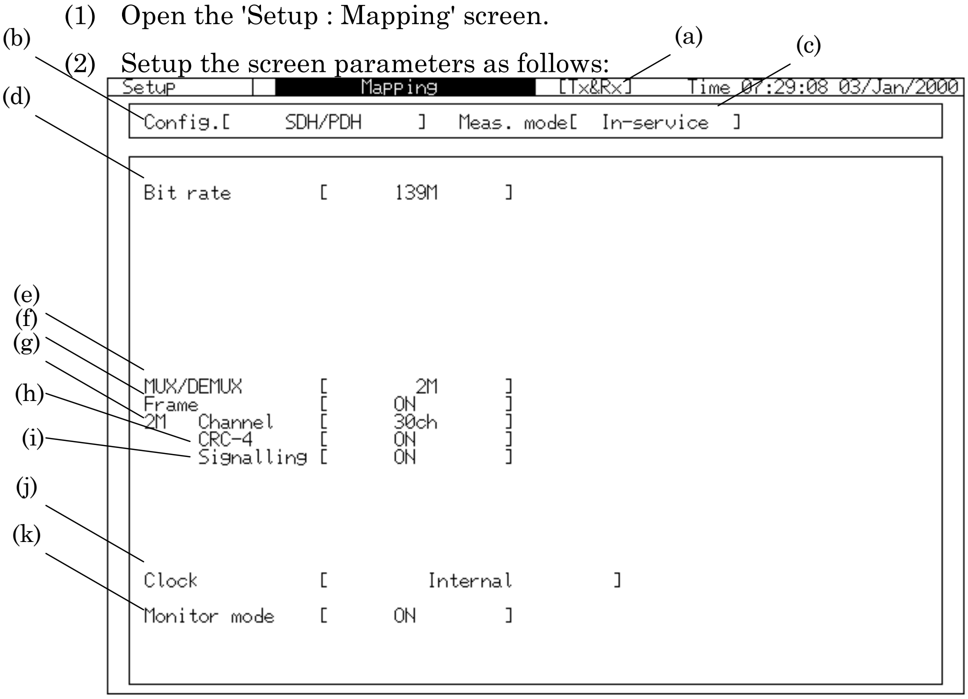
(iii) Turn on the power switch of MP1570A after verifying the connection in (ii).

5.2.2 Initial Setting *'Setup : Mapping' screen*

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

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

(2) Setup the screen parameters as follows:



```
Setup   |   Mapping   |  [Tx&Rx]   Time 07:29:08 03/Jan/2000
Config.[    SDH/PDH     ]  Meas. mode[  In-service  ]

Bit rate        [      139M      ]

MUX/DEMUX       [        2M      ]
Frame           [      ON        ]
2M   Channel    [      30ch      ]
     CRC-4      [      ON        ]
     Signalling [      ON        ]

Clock           [         Internal          ]
Monitor mode    [      ON        ]
```

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

(b) Config. .... Select the ‘SDH/PDH’ configuration.

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

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

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

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

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

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

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

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

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

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

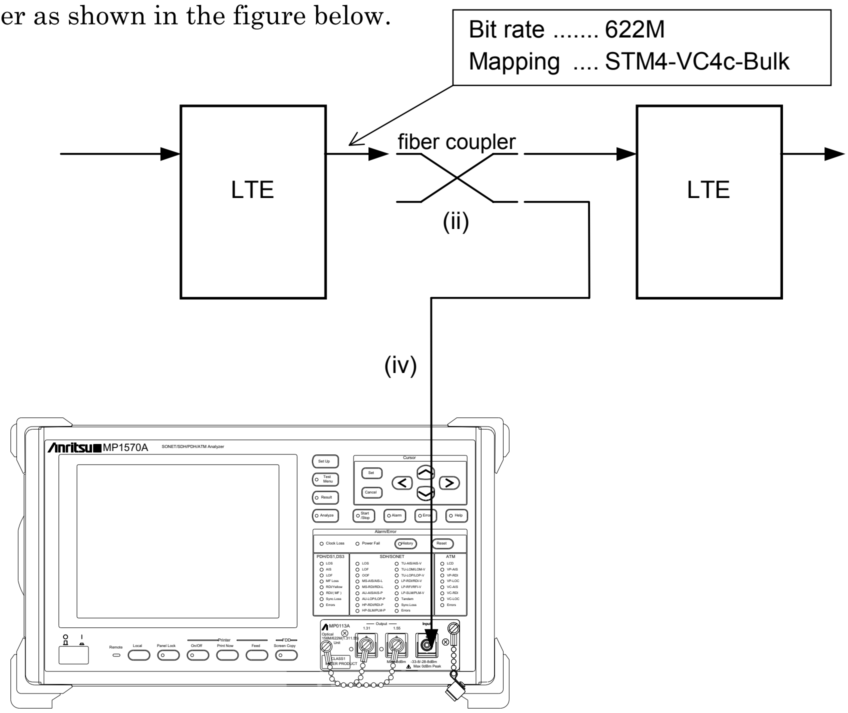
(k) Monitor mode ... Turn on the monitor mode in this example, because the unit is connected to the LTE monitor point which outputs the signal after attenuation by 20 dB.

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

In the following example, the SDH signal of STM4-VC4c-Bulk concatenation mapping is measured in the in-service mode.

5.3.1 Connection

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



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

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

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

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

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

CAUTION ⚠

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

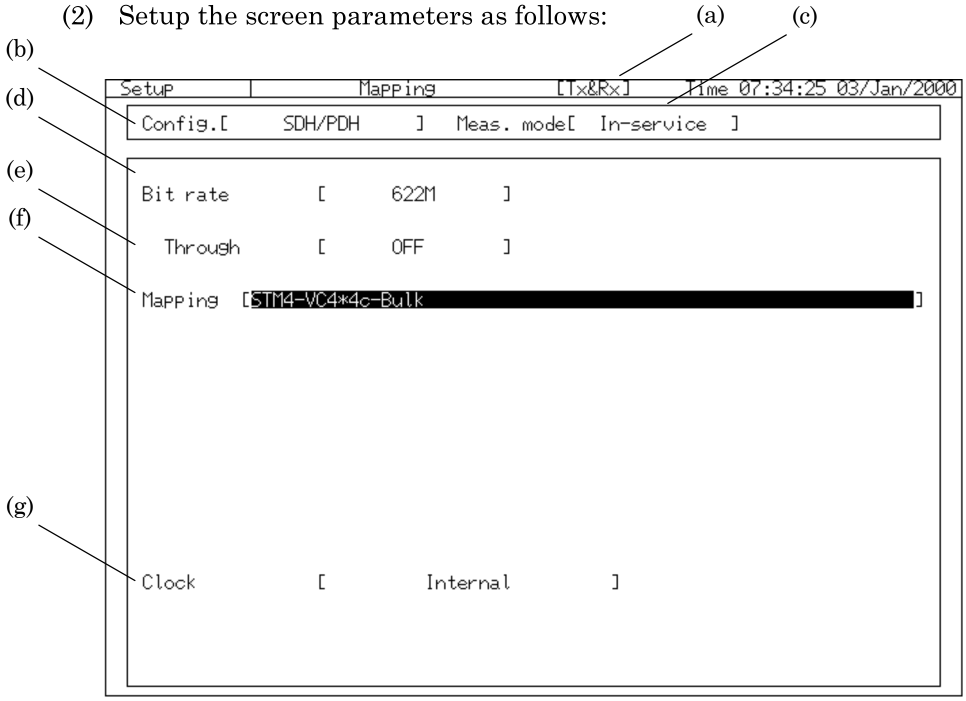
5.3.2 Initial Setting

'Setup : Mapping' screen

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

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

(2) Setup the screen parameters as follows:



```
Setup      |      Mapping          [Tx&Rx]   Time 07:34:25 03/Jan/2000
Config.[     SDH/PDH      ]   Meas. mode[  In-service   ]

Bit rate         [      622M       ]

  Through        [      OFF        ]

Mapping   [STM4-VC4*4c-Bulk                                         ]

Clock            [         Internal         ]
```

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

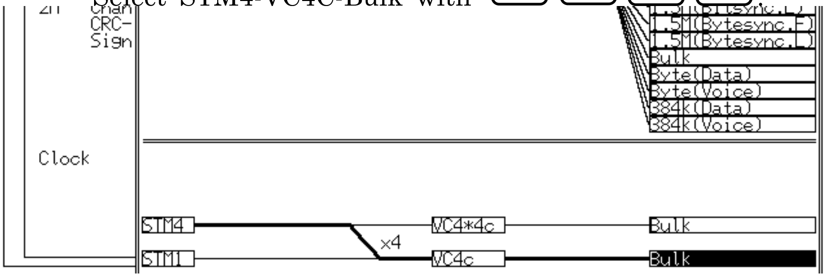
(b) Config. .... Select the 'SDH/PDH' configuration.

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

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

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

(f) Mapping ....The mapping selection window below is displayed if you move the cursor here and press Set . Select ‘STM4-VC4C-Bulk’ with ∧ ∨ < >



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

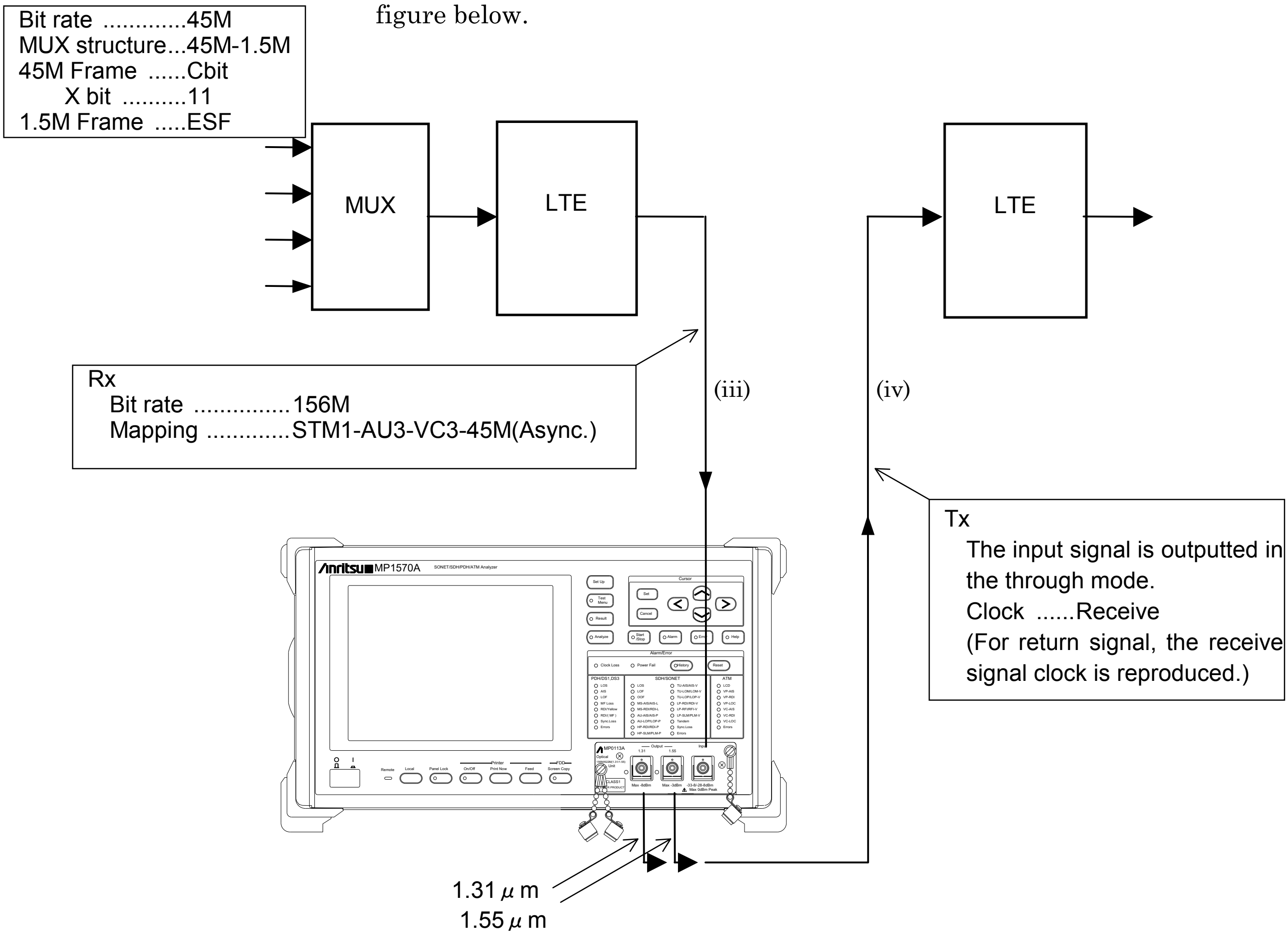
(g) Clock .... No setting is required, because no signal is sent.

5.4 SDH Monitoring (Through-mode monitoring)

Here is the measurement procedure of the SDH signal of STM1-AU3-VC3-45M(Async.) measured in the through mode.

5.4.1 Connection

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



Bit rate 45M
MUX structure...45M-1.5M
45M Frame ......Cbit
X bit 11
1.5M Frame .....ESF

Rx
Bit rate 156M
Mapping ....STM1-AU3-VC3-45M(Async.)

Tx
The input signal is outputted in the through mode.
Clock ......Receive
(For return signal, the receive signal clock is reproduced.)

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

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

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

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

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

CAUTION ⚠

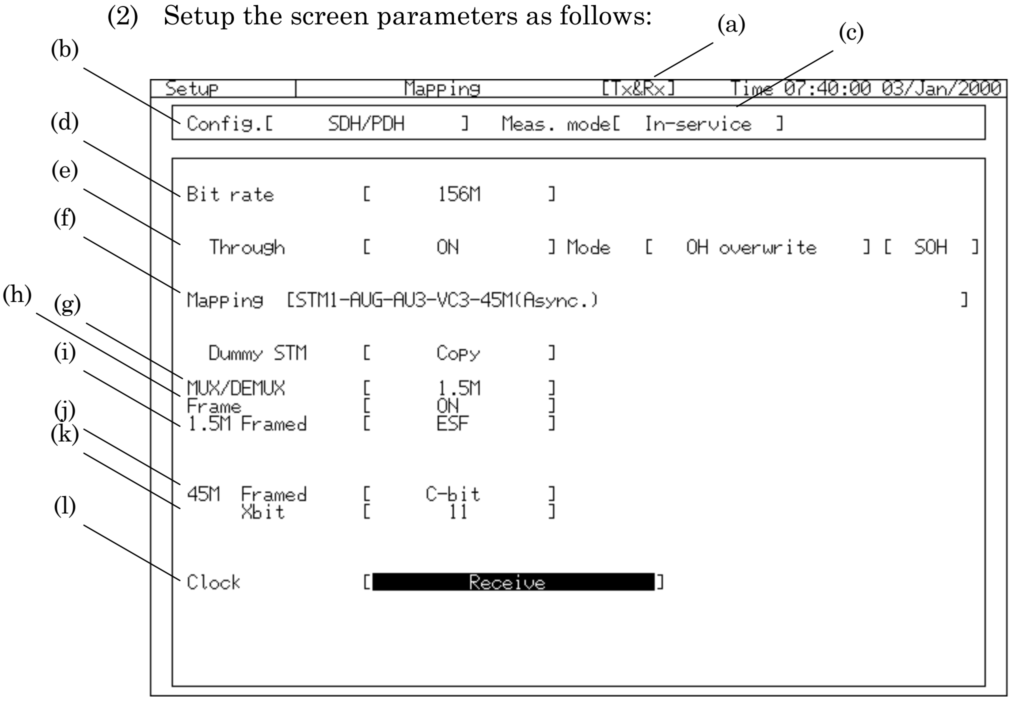
- Remember that the input level of the optical signal to the optical interface unit or MP0122B must not exceed the absolute maximum rating (0 dBm at peak power). Excessive input level can damage the internal devices and circuit.
- In through mode measurement, make sure before making the connections that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

5.4.2 Initial Setting *'Setup : Mapping' screen*

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

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

(2) Setup the screen parameters as follows:



```
Setup   |        Mapping          [Tx&Rx]     Time 07:40:00 03/Jan/2000
Config.[    SDH/PDH     ]  Meas. mode[  In-service  ]

Bit rate        [      156M       ]

  Through       [      ON         ] Mode   [   OH overwrite    ] [  SOH  ]

Mapping  [STM1-AUG-AU3-VC3-45M(Async.)                                   ]

  Dummy STM     [      Copy       ]
MUX/DEMUX       [      1.5M       ]
Frame           [      ON         ]
1.5M Framed     [      ESF        ]

45M  Framed     [     C-bit       ]
     Xbit       [       11        ]

Clock           [       Receive          ]
```

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

(b) Config. .... Select the 'SDH/PDH' configuration.

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

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

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

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

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

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

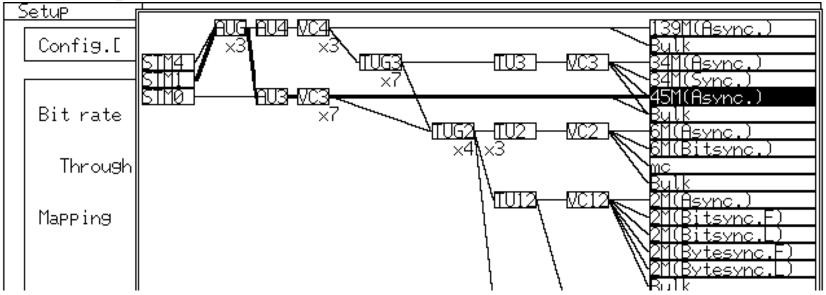
SOH 1 byte overwrite ......Converts the any 1 byte within SOH of the received signal to the preset data, and sends it.

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

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

(f) Mapping ....Set the mapping to ‘STM1-AU3-VC3-45M(Async.)’

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



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

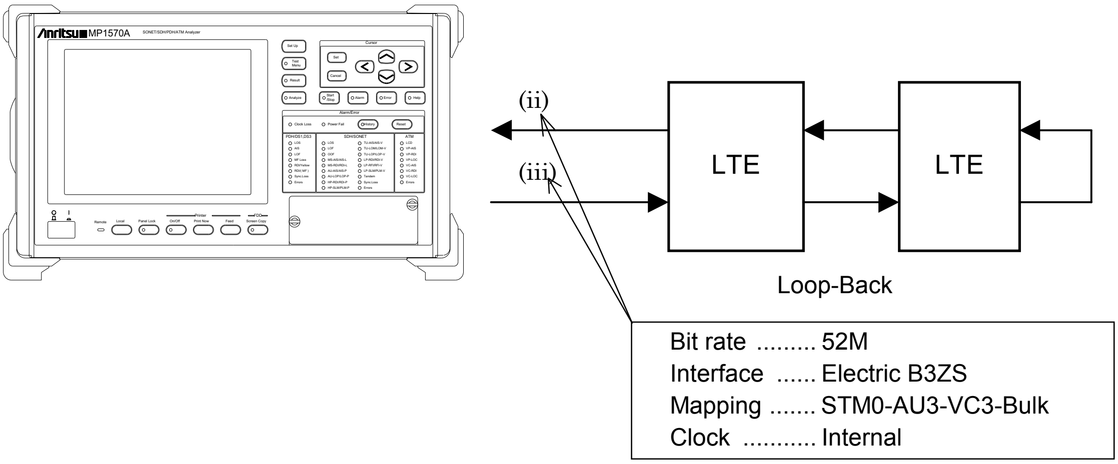
(g) MUX/DEMUX .. Set it to ‘1.5M’.
(h) Frame .... Turn on the ‘PDH (DSn) frame’.
(i) 1.5 Framed .... Set the 1.5M frame to ‘ESF’.
(j) 45M Framed ..... Set the 45M frame to ‘Cbit’.
(k) Xbit .... Set the Xbit to ‘11’.
(l) Clock .... Set the transmitting signal clock source to 'Receive' (while using the clock reproduced from the receive signal.)

5.5 Loop-Back Test

Here is the procedure for receiving/sending the mapping 'STM0-AU3-VC3-Bulk' signal and testing it through the measurement system containing a loop back.

5.5.1 Connection

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

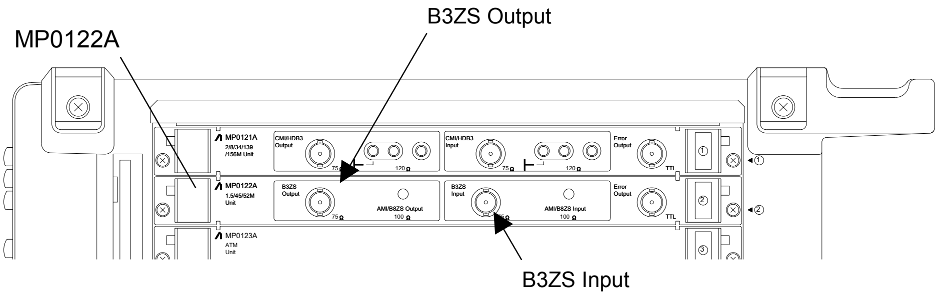


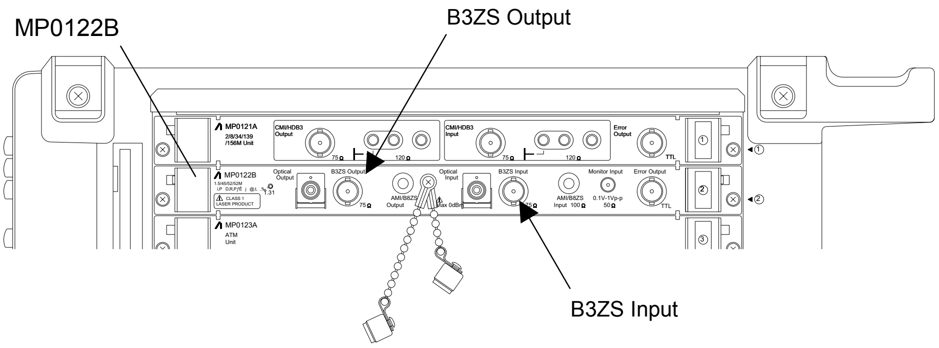
Bit rate 52M
Interface ...... Electric B3ZS
Mapping STM0-AU3-VC3-Bulk
Clock .... Internal

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

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

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





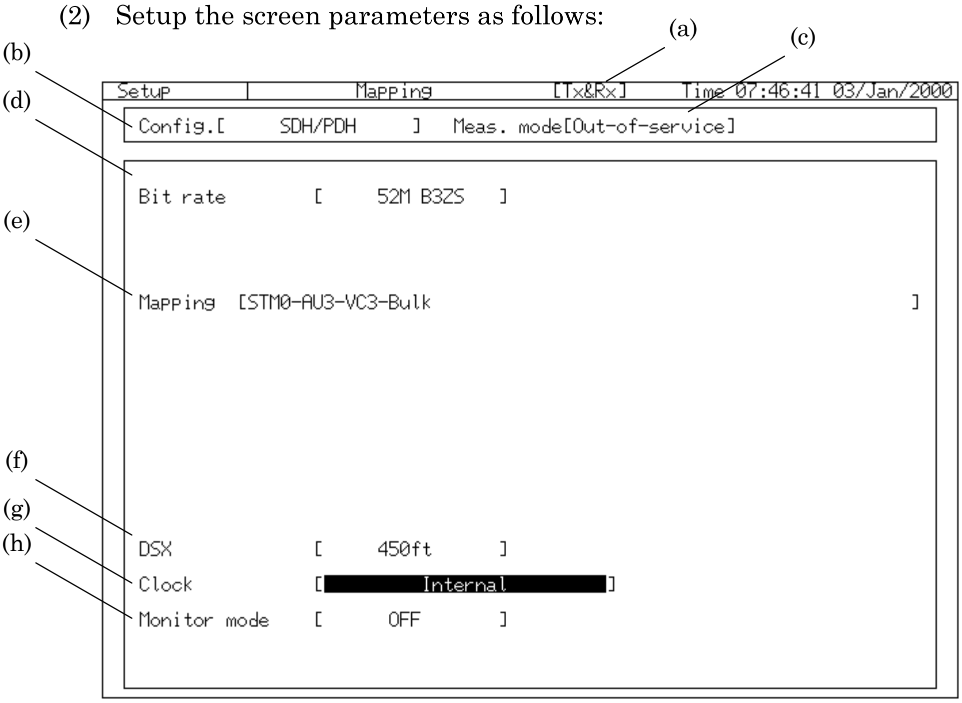
(iv) Turn on the power switch of MP1570A after performing the connections in steps (ii) and (iii).

5.5.2 Initial Setting

'Setup : Mapping' screen

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

(2) Setup the screen parameters as follows:



Config.[SDH/PDH] Meas. mode[Out-of-service]

Bit rate [52M B3ZS]

Mapping [STM0-AU3-VC3-Bulk]

DSX [450ft]

Clock [Internal]

Monitor mode [OFF]

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

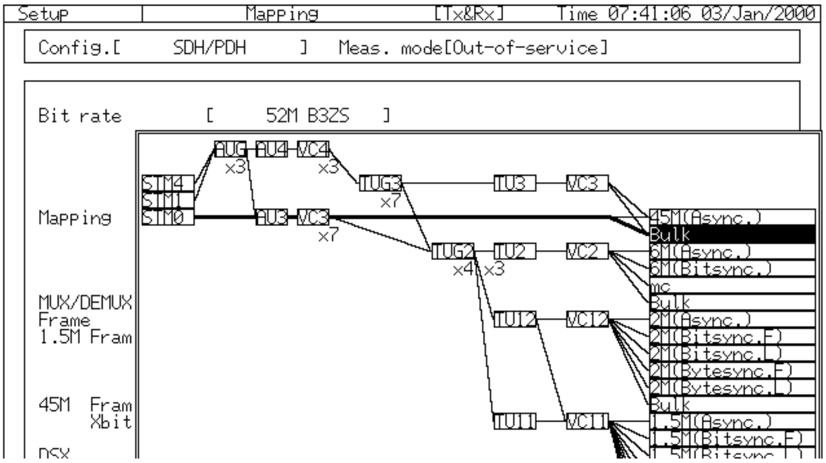
(b) Config. .... Select the ‘SDH/PDH’ configuration.

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

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

(e) Mapping ... Set the mapping to ‘STM0-AU3-VC3-Bulk’

- The mapping selection window is displayed if you move the cursor to 'Mapping' and press Set. Select AU3-VC3-Bulk with ∧ ∨ < >.



```
Setup        Mapping        [Tx&Rx]     Time 07:41:06 03/Jan/2000
Config.[     SDH/PDH     ]   Meas. mode[Out-of-service]
Bit rate         [     52M B3ZS    ]
Mapping
MUX/DEMUX
Frame
1.5M Fram
45M  Fram
     Xbit
DSX
```

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

(f) DSX ... Set the DSX.

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

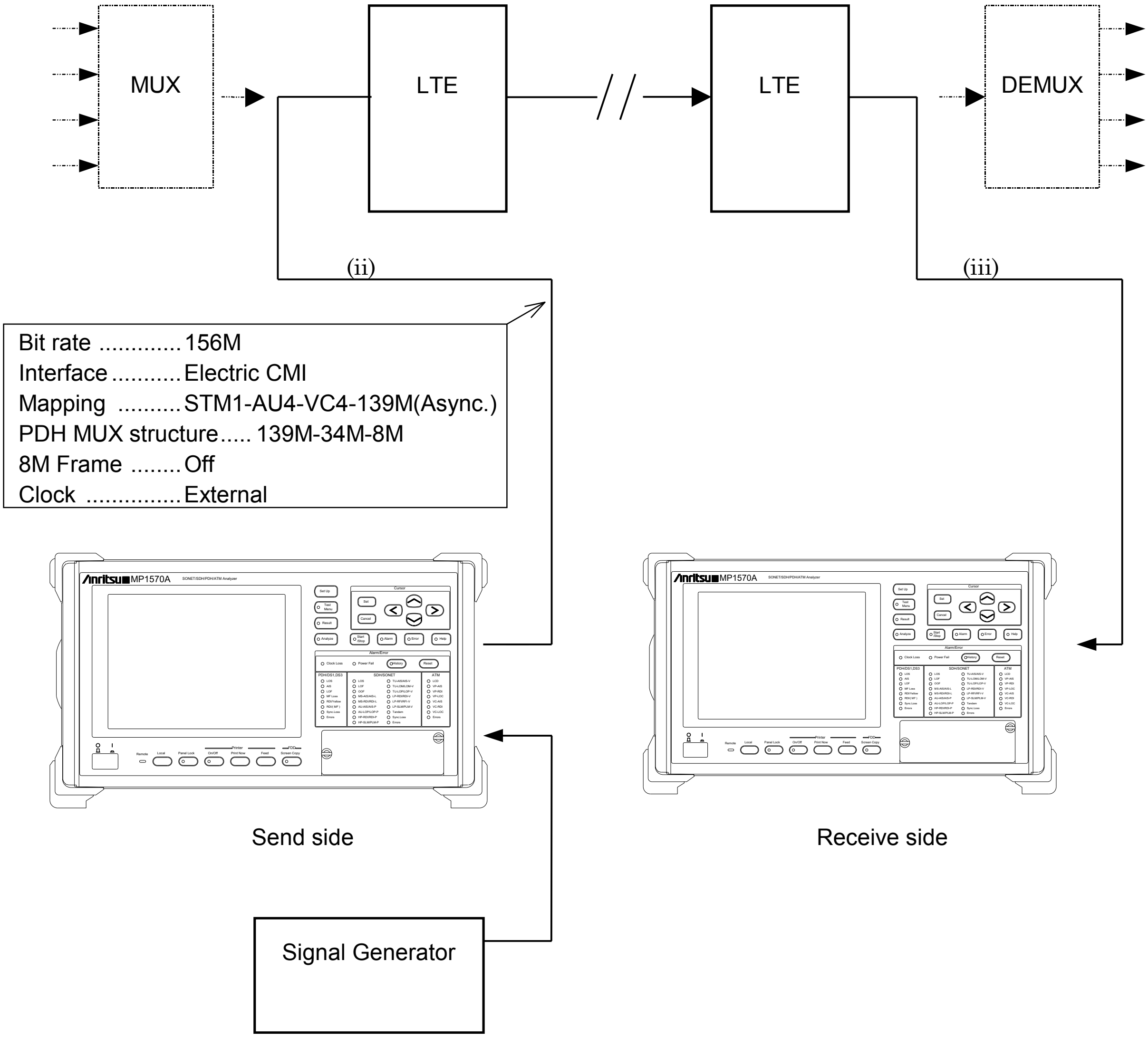
(h) Monitor mode ...Turn off the monitor mode because it is connected to the main output of LTE.

5.6 End-to-End Measurement

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

5.6.1 Connection

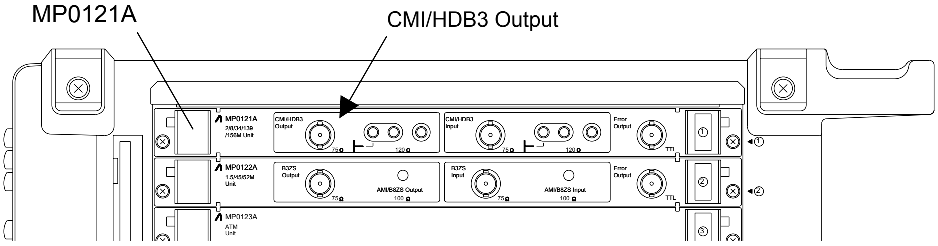
Connect MP1570A and the line as shown in the figure below.



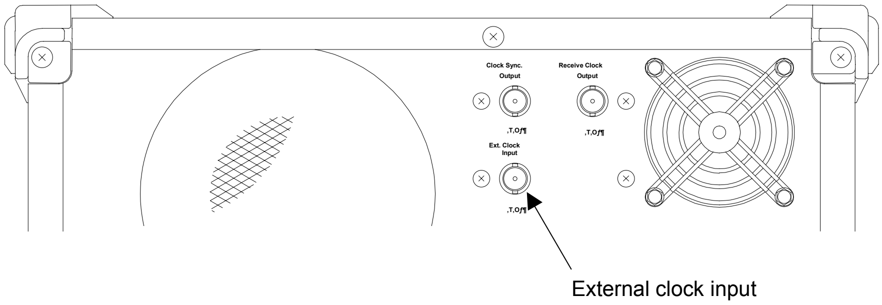
Bit rate 156M
Interface ....Electric CMI
Mapping ....STM1-AU4-VC4-139M(Async.)
PDH MUX structure..... 139M-34M-8M
8M Frame ....Off
Clock ....External

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

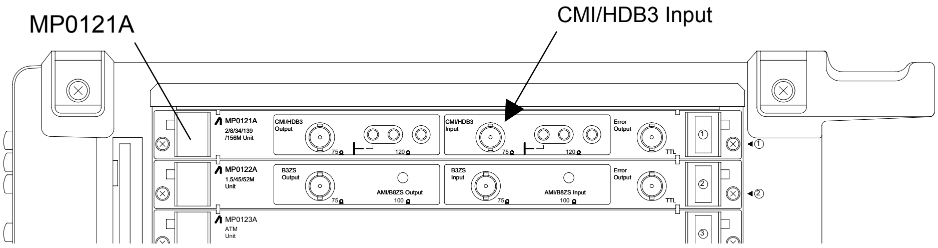
(ii) Connect the CM1/HDB3 output connector of MP0121A of MP1570A at the transmitting side to the input connector of LTE at the transmitting side, with the BNC (75 ohm unbalance) cable.



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



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



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

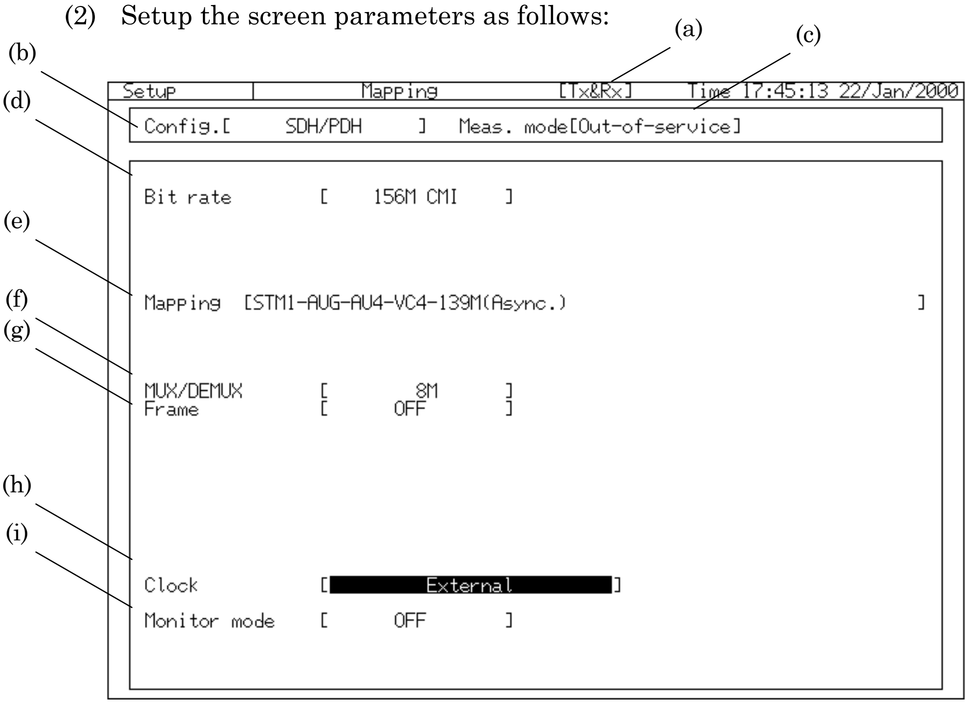
5.6.2 Initial Setting

'Setup : Mapping' screen

Set MP1570A at the transmitting and receiving sides as follows.

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

(2) Setup the screen parameters as follows:



```
Setup |           Mapping           [Tx&Rx]    Time 17:45:13 22/Jan/2000
Config.[     SDH/PDH     ]   Meas. mode[Out-of-service]

Bit rate        [    156M CMI     ]

Mapping  [STM1-AUG-AU4-VC4-139M(Async.)                                  ]

MUX/DEMUX       [       8M        ]
Frame           [      OFF        ]

Clock           [      External                  ]
Monitor mode    [      OFF        ]
```

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

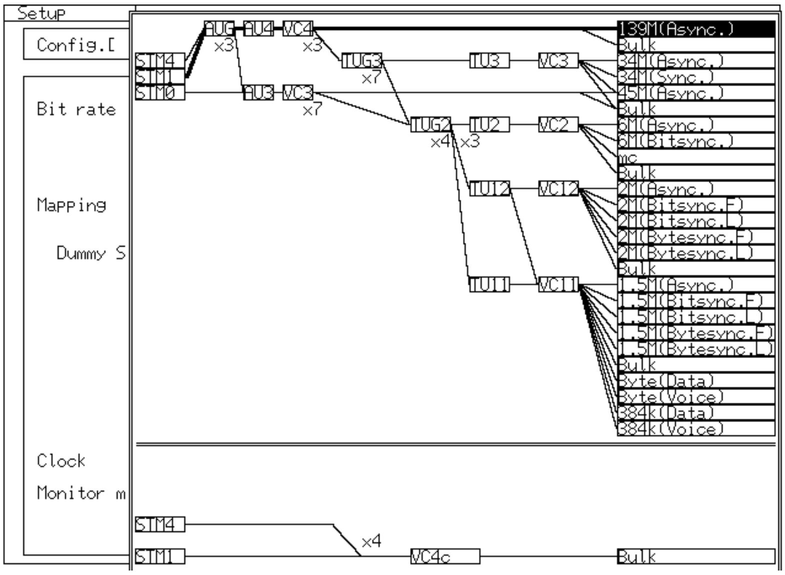
(b) Config. .... Select the ‘SDH/PDH’ configuration.

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

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

(e) Mapping . Set the mapping to ‘STM1-AU4-VC4-139M(Async.)’

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



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

(f) MUX/DEMUX .... Set the MUX structure of the PDH signal.

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

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

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

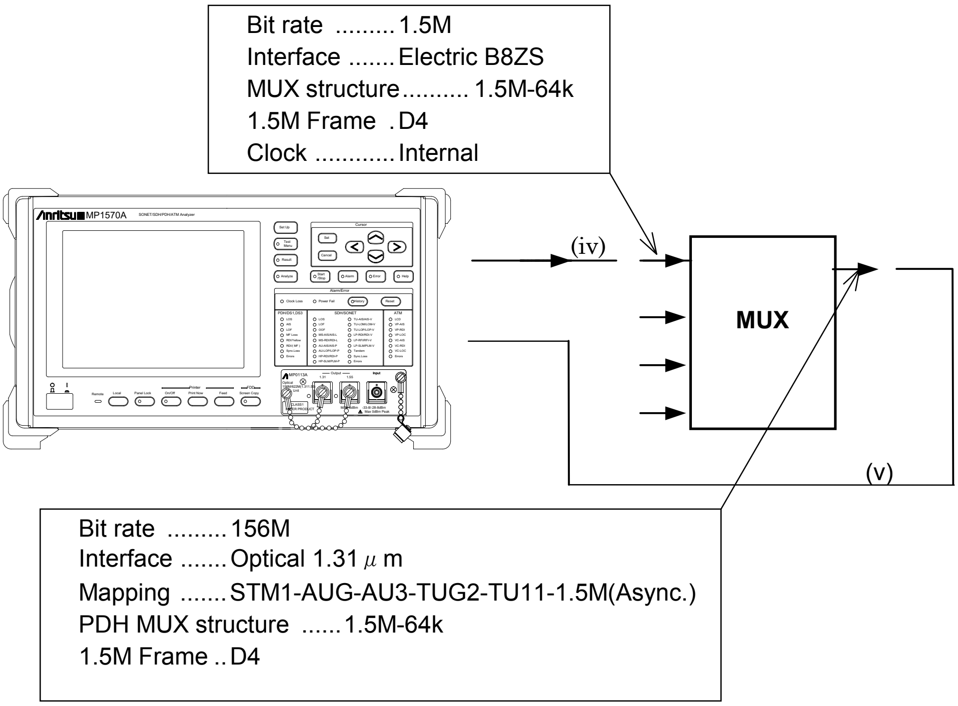
(i) Monitor mode .... Turn off the monitor mode on connecting with the main output of LTE.

5.7 MUX Evaluation Test

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

5.7.1 Connection

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



Bit rate 1.5M
Interface .... Electric B8ZS
MUX structure.......... 1.5M-64k
1.5M Frame . D4
Clock .... Internal

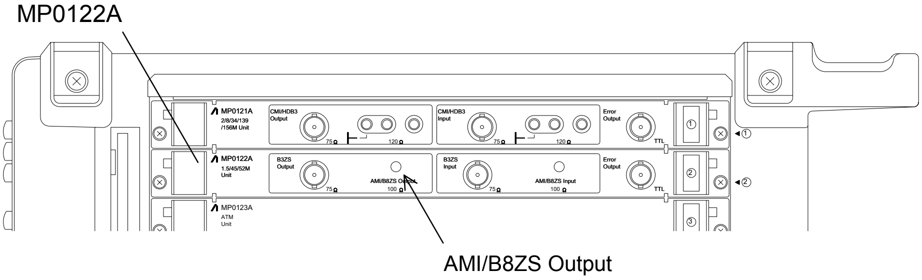
Bit rate 156M
Interface .... Optical 1.31 μ m
Mapping .... STM1-AUG-AU3-TUG2-TU11-1.5M(Async.)
PDH MUX structure 1.5M-64k
1.5M Frame .. D4

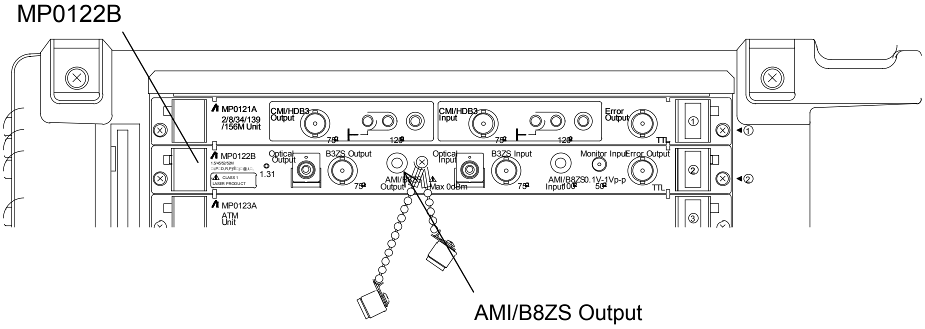
(i) Turn off the power switch of MP1570A.

(ii) Install MP0122A or MP0122B on MP1570A.

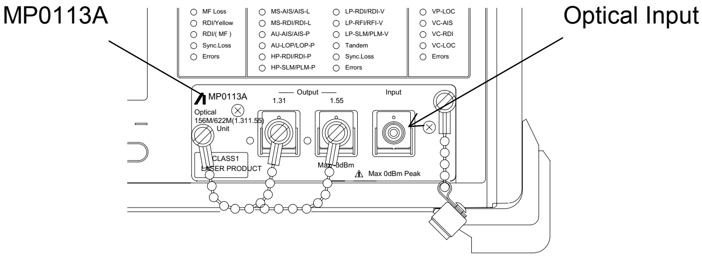
(iii) Install MP0111A, MP0112A, or MP0113A optical interface unit on MP1570A.

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





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

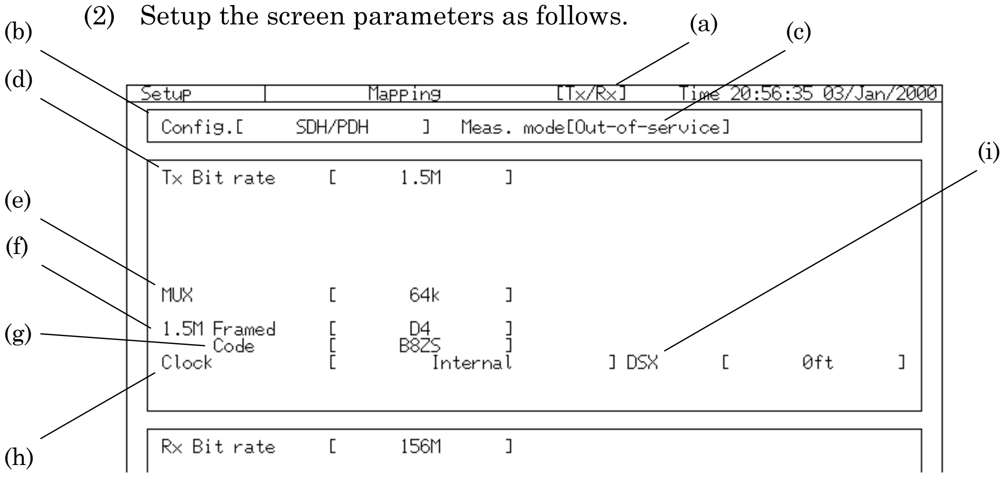


(vi) After the connection, turn on the power switch of MP1570A.

5.7.2 Initial Setting *'Setup : Mapping' screen*

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

(2) Setup the screen parameters as follows.



```
Setup          Mapping          [Tx/Rx]     Time 20:56:35 03/Jan/2000
 Config.[    SDH/PDH     ]   Meas. mode[Out-of-service]

 Tx Bit rate     [      1.5M      ]



 MUX             [       64k      ]
 1.5M Framed     [      D4        ]
      Code       [     B8ZS       ]
 Clock           [         Internal        ] DSX      [       0ft      ]


 Rx Bit rate     [      156M      ]
```

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

(b) Config. .... Select the 'SDH/PDH' configuration.

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

Tx side setting

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

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

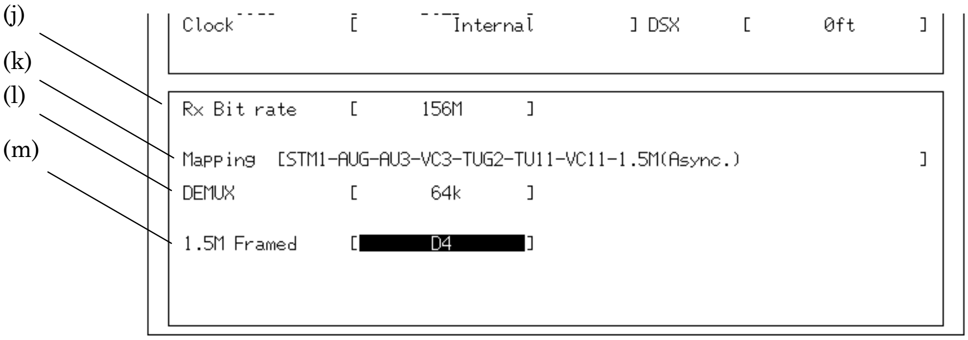
- It is displayed when MUX/DEMUX option item is installed.

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

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

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

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



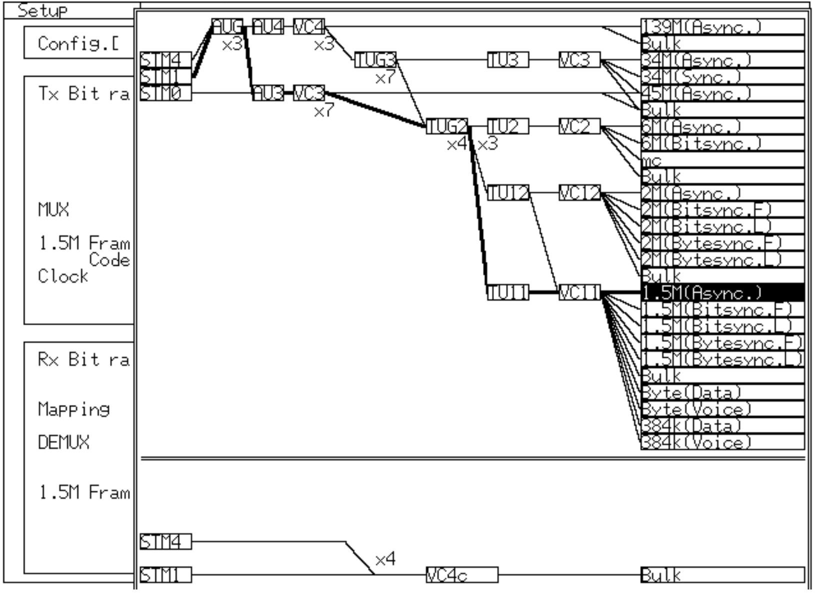
```
Clock         [      Internal        ] DSX      [      0ft      ]

Rx Bit rate    [      156M      ]

Mapping  [STM1-AUG-AU3-VC3-TUG2-TU11-VC11-1.5M(Async.)              ]
DEMUX          [      64k       ]

1.5M Framed    [      D4        ]
```

Rx (receive) side setting

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

(k) Mapping .... Set the mapping to ‘STM1-AUG-AU3-TUG2-TU11-1.5M(Async.)’

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



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

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

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

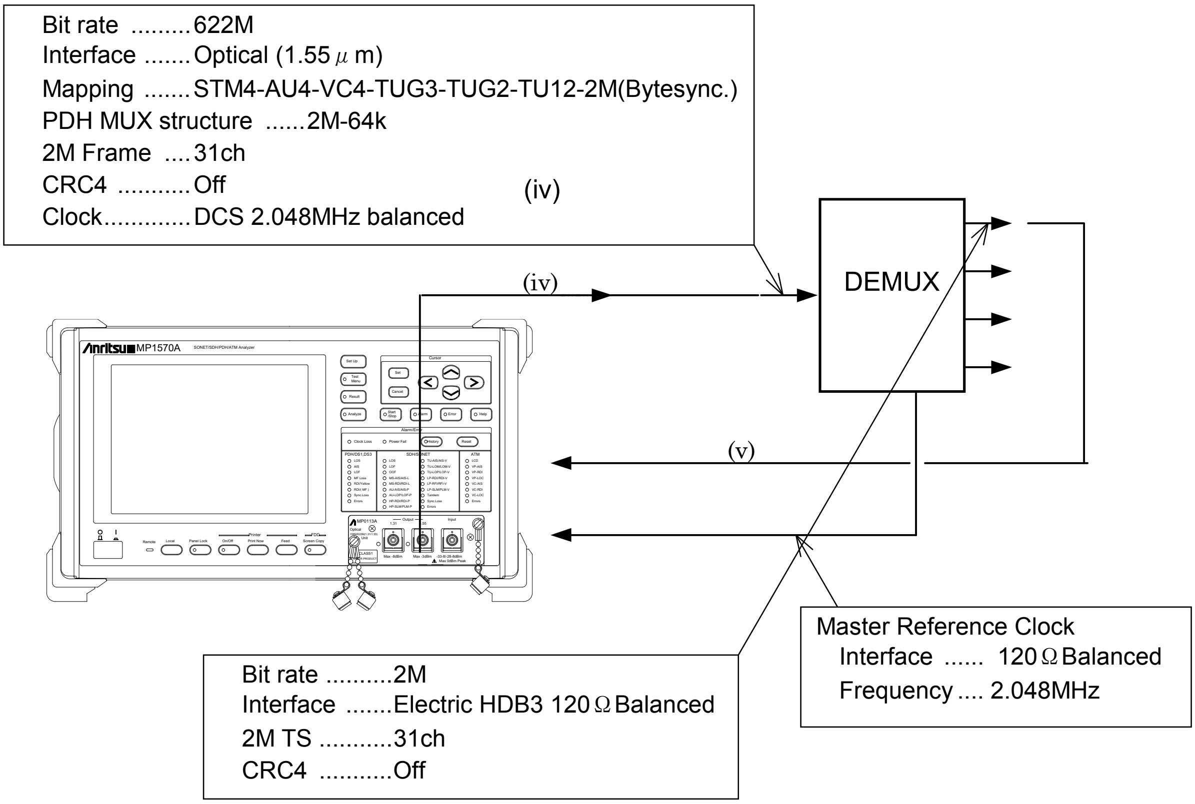
(m) 1.5M Frame ...... Set 1.5M Frame to ‘D4’.

5.8 DEMUX Evaluation Test

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

5.8.1 Connection

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



Bit rate 622M
Interface ....Optical (1.55 μ m)
Mapping ....STM4-AU4-VC4-TUG3-TUG2-TU12-2M(Bytesync.)
PDH MUX structure 2M-64k
2M Frame 31ch
CRC4 ....Off
Clock.............DCS 2.048MHz balanced

Master Reference Clock
Interface ...... 120Ω Balanced
Frequency 2.048MHz

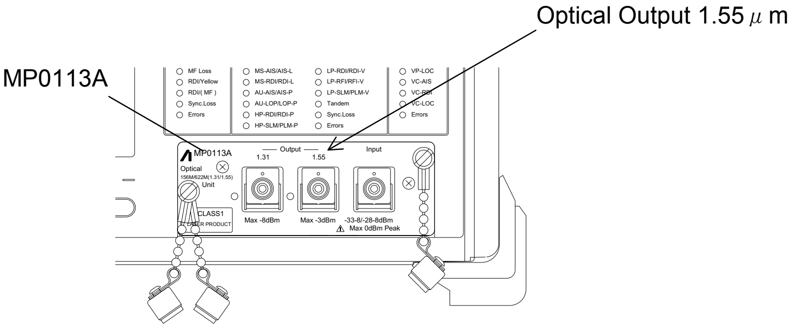
Bit rate 2M
Interface ....Electric HDB3 120Ω Balanced
2M TS 31ch
CRC4 ....Off

(i) Turn off the power switch of MP1570A.

(ii) Install MP0121 on MP1570A.

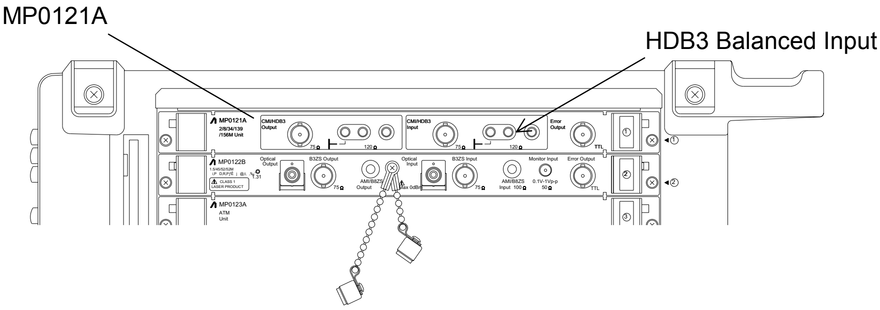
(iii) Install MP0112A or MP0113A optical interface unit on MP1570A.

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



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

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



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

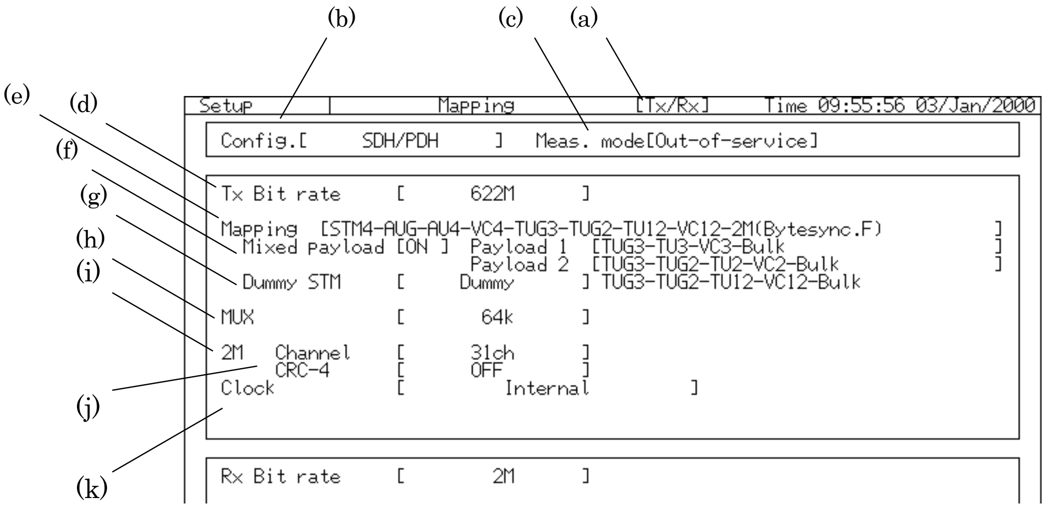
5.8.2 Initial Setting

'Setup : Mapping' screen

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

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

(2) Setup the screen parameters as follows:



```
Setup     |          Mapping          [Tx/Rx]      Time 09:55:56 03/Jan/2000
 Config.[     SDH/PDH      ]   Meas. mode[Out-of-service]

 Tx Bit rate      [      622M      ]

 Mapping  [STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.F)          ]
   Mixed payload [ON ]  Payload 1  [TUG3-TU3-VC3-Bulk                    ]
                        Payload 2  [TUG3-TUG2-TU2-VC2-Bulk               ]
   Dummy STM      [     Dummy      ] TUG3-TUG2-TU12-VC12-Bulk

 MUX              [       64k      ]

 2M   Channel     [      31ch      ]
      CRC-4       [      OFF       ]
 Clock            [         Internal         ]

 Rx Bit rate      [        2M      ]
```

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

(b) Config. .... Select the 'SDH/PDH' configuration.

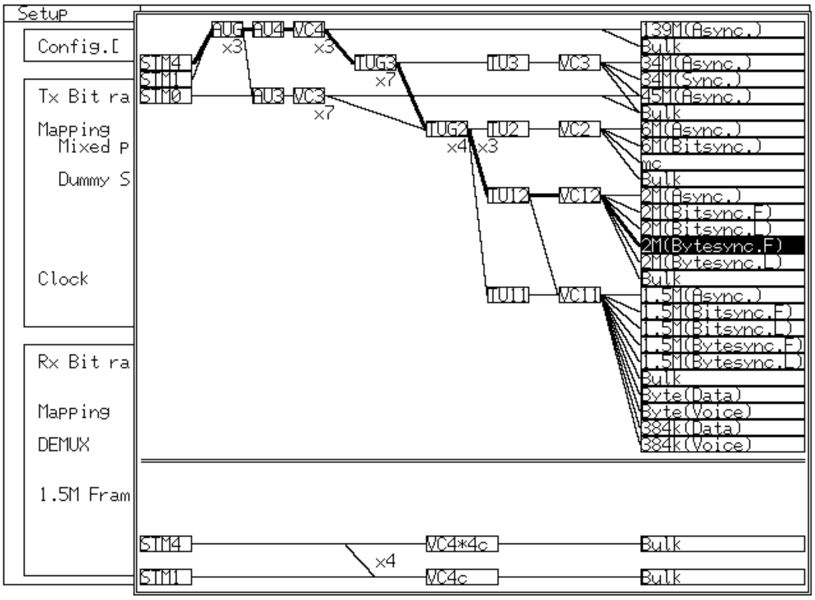
(c) Meas. Mode ...... Select the 'Out-of-service' measuring mode.

Tx side setting

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

(e) Mapping .... Set the mapping to 'STM4-AU4-VC4-TUG3-TUG2-TU12-2M(Bytesync.)'

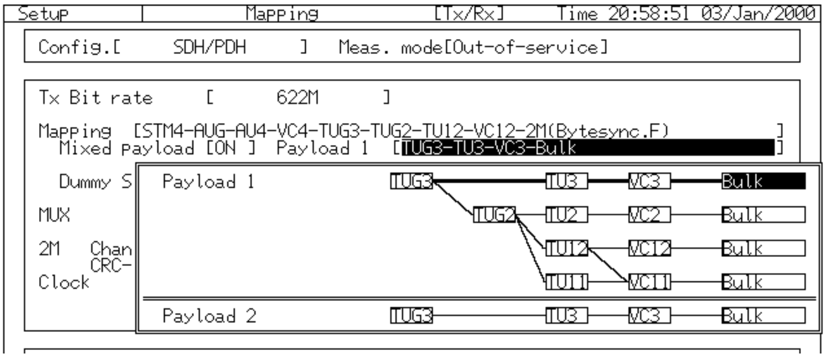
- The mapping selection window is displayed if you move the cursor to 'Mapping' and press Set. Select the mapping with ∧ ∨ < >, and press Set.



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

(f) Mixed payload .... Select 'ON' and press Set when you specify a different mapping (PDH signal) to TUG3(AU3) of the rest of two channels of the main channel set in (e).

The mixed payload mapping edition screen is displayed. Set Payload 1 and Payload 2 mappings. See '6.7 Editing Dummy Channel' for the details.



```
Setup          Mapping              [Tx/Rx]     Time 20:58:51 03/Jan/2000
Config.[      SDH/PDH      ]   Meas. mode[Out-of-service]
Tx Bit rate      [      622M       ]
Mapping  [STM4-AUG-AU4-VC4-TUG3-TUG2-TU12-VC12-2M(Bytesync.F)          ]
  Mixed payload [ON ]  Payload 1  [TUG3-TU3-VC3-Bulk                    ]
```

- When the main channel does not pass through TUG3 or VC3-TU2, (AU4-VC4-139M(Async.)/Bulk and AU3-VC3-45M(Async.)/Bulk), the Mixed payload is not displayed.

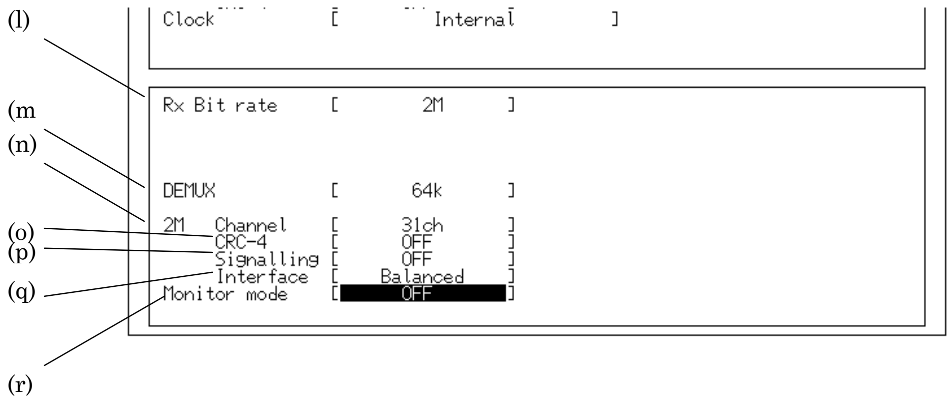
(g) Dummy STM-1 .... Set the payload data of SDH frame (including POH) of channels other than the main channel of the mapping set in step (e). See '6.7.2 Setting Dummy STM' for the details.

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

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

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

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



```
Clock          [        Internal        ]

Rx Bit rate    [        2M      ]


DEMUX          [       64k      ]
2M   Channel   [       31ch     ]
     CRC-4     [       OFF      ]
     Signalling[       OFF      ]
     Interface [    Balanced    ]
Monitor mode   [       OFF      ]
```

Rx side setting

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

(m) DEMUX .... Set the DEMUX structure of the PDH signal. In this example, set it to '64k'.

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

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

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

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

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

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

Section 6 Other Settings about the Measurement

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

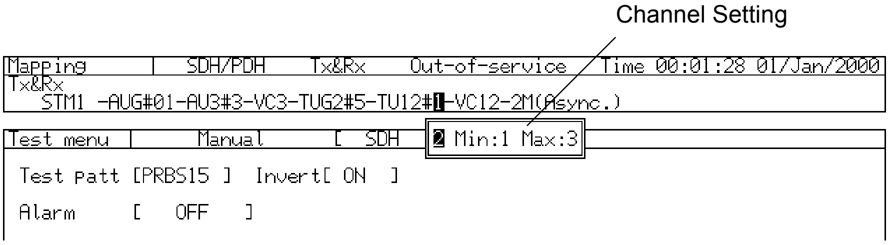
***** ***** in this manual represent front panel keys.

6.1 Setting the Measurement Channel *'Mapping' screen*

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

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

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



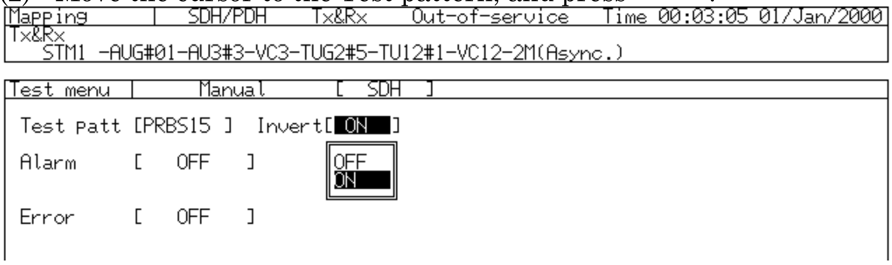
```
Mapping    |  SDH/PDH   Tx&Rx   Out-of-service   Time 00:01:28 01/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU3#3-VC3-TUG2#5-TU12#1-VC12-2M(Async.)
Test menu |      Manual       [  SDH  | 2 Min:1 Max:3 |

 Test patt [PRBS15 ]  Invert[ ON  ]

 Alarm     [   OFF   ]
```

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

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

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

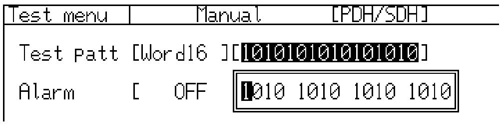
(2) Move the cursor to the Test pattern, and press Set.



```
Mapping      | SDH/PDH   Tx&Rx   Out-of-service   Time 00:03:05 01/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU3#3-VC3-TUG2#5-TU12#1-VC12-2M(Async.)

Test menu |      Manual       [  SDH  ]
 Test patt [PRBS15 ]  Invert[ ON  ]
 Alarm     [   OFF   ]        OFF
                              ON
 Error     [   OFF   ]
```

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

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



```
Test menu |      Manual      [PDH/SDH]
 Test patt [Word16 ][1010101010101010]
 Alarm     [   OFF  1010 1010 1010 1010
```

Note

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

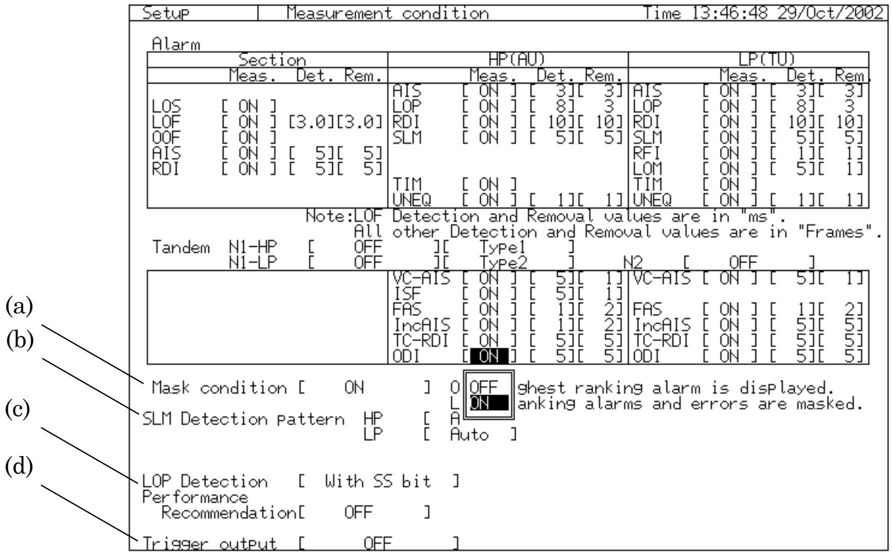
6.3 Setting of Trigger Output and Alarm Detection/Removal Condition

'Setup : Measurement condition' screen

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

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

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



```
Setup        | Measurement condition                  Time 13:46:48 29/Oct/2002

 Alarm
          Section            |          HP(AU)           |          LP(TU)
          Meas.   Det. Rem.  |       Meas.  Det.  Rem.   |       Meas.  Det.  Rem.
                             |AIS    [ ON ] [  3][  3]   |AIS    [ ON ] [  3][  3]
 LOS    [ ON ]               |LOP    [ ON ] [  8]   3    |LOP    [ ON ] [  8]   3
 LOF    [ ON ] [3.0][3.0]    |RDI    [ ON ] [ 10][ 10]   |RDI    [ ON ] [ 10][ 10]
 OOF    [ ON ]               |SLM    [ ON ] [  5][  5]   |SLM    [ ON ] [  5][  5]
 AIS    [ ON ] [  5][  5]    |                           |RFI    [ ON ] [  1][  1]
 RDI    [ ON ] [  5][  5]    |                           |LOM    [ ON ] [  5][  1]
                             |TIM    [ ON ]              |TIM    [ ON ]
                             |UNEQ   [ ON ] [  1][  1]   |UNEQ   [ ON ] [  1][  1]
                    Note:LOF Detection and Removal values are in "ms".
                         All other Detection and Removal values are in "Frames".
 Tandem  N1-HP  [   OFF     ][   Type1     ]
         N1-LP  [   OFF     ][   Type2     ]      N2   [   OFF     ]
                             |VC-AIS [ ON ] [  5][  1]   |VC-AIS [ ON ] [  5][  1]
                             |ISF    [ ON ] [  5][  1]   |
                             |FAS    [ ON ] [  1][  2]   |FAS    [ ON ] [  1][  2]
                             |IncAIS [ ON ] [  1][  2]   |IncAIS [ ON ] [  5][  5]
                             |TC-RDI [ ON ] [  5][  5]   |TC-RDI [ ON ] [  5][  5]
                             |ODI    [ ON ] [  5][  5]   |ODI    [ ON ] [  5][  5]

 Mask condition [   ON      ]  O|OFF|ghest ranking alarm is displayed.
                               L|ON |anking alarms and errors are masked.
SLM Detection pattern  HP   [  A
                       LP   [  Auto  ]


LOP Detection    [  With SS bit  ]
Performance
  Recommendation[    OFF     ]

Trigger output  [      OFF      ]
```

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

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

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

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

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

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

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

Note:

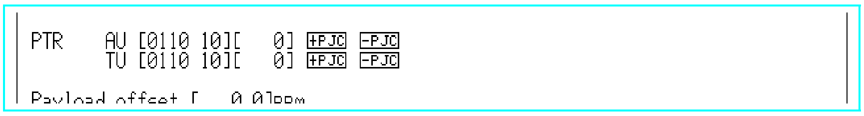
If the setting of the detection removal condition is changed, the measurement is restarted from that changed time.

6.4 Editing SDH Overhead

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

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

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

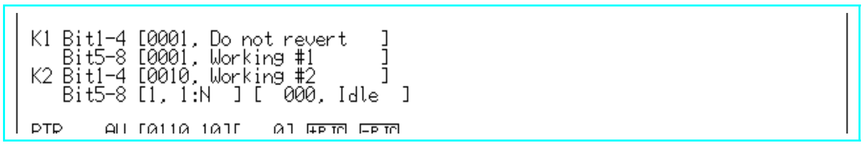


```
PTR    AU [0110 10][   0] +PJC -PJC
       TU [0110 10][   0] +PJC -PJC

Payload offset [   0.0]ppm
```

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

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

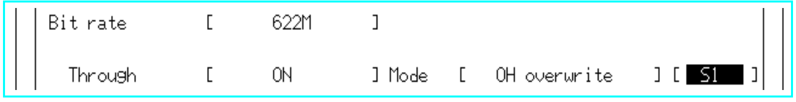
The K1 byte and K2 byte can be set on the 'Test menu : Manual' screen, as binary numbers or in plain language.



```
K1 Bit1-4 [0001, Do not revert   ]
   Bit5-8 [0001, Working #1      ]
K2 Bit1-4 [0010, Working #2      ]
   Bit5-8 [1, 1:N  ] [  000, Idle  ]

PTR    AU [0110 10][   0] +PJC -PJC
```

6.4.3 S1 Byte

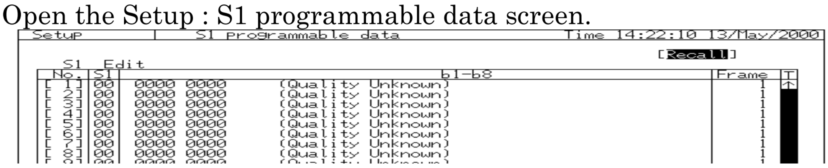
When the through mode is On and the mode is set to "OH overwrite S1", S1 bytes that are set on the 'S1 programmable data' or 'OH preset' screen can be outputted.



```
Bit rate        [      622M      ]

  Through       [      ON        ] Mode  [  OH overwrite    ] [ S1   ]
```

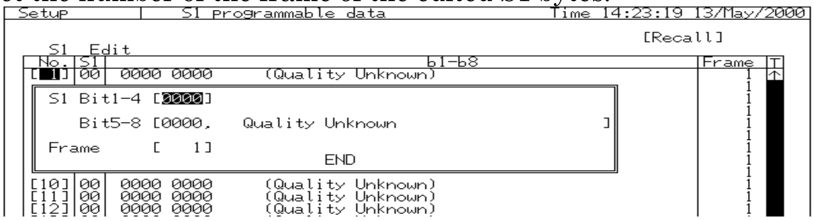
Here is the procedure for editing S1 programmable data and outputting S1 data.

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



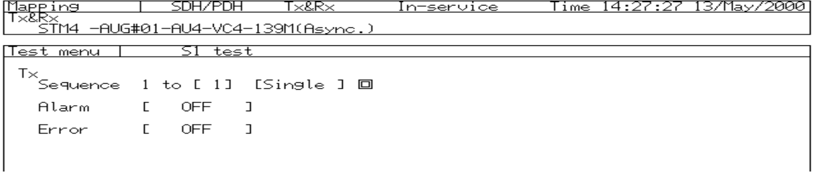
```
Setup          |     S1 programmable data                     Time 14:22:10 13/May/2000

                                                                          [Recall]
   S1   Edit
  No. |S1|                            b1-b8                                |Frame |T
 [ 1]|00|   0000 0000       (Quality Unknown)                                   1 |↑
 [ 2]|00|   0000 0000       (Quality Unknown)                                   1
 [ 3]|00|   0000 0000       (Quality Unknown)                                   1
 [ 4]|00|   0000 0000       (Quality Unknown)                                   1
 [ 5]|00|   0000 0000       (Quality Unknown)                                   1
 [ 6]|00|   0000 0000       (Quality Unknown)                                   1
 [ 7]|00|   0000 0000       (Quality Unknown)                                   1
 [ 8]|00|   0000 0000       (Quality Unknown)                                   1
```

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



```
Setup          |     S1 programmable data                     Time 14:23:19 13/May/2000

                                                                          [Recall]
   S1   Edit
  No. |S1|                            b1-b8                                |Frame |T
 [ 1]|00|   0000 0000       (Quality Unknown)                                   1 |↑
   S1 Bit1-4 [0000]                                                             1
                                                                                1
      Bit5-8 [0000,    Quality Unknown                            ]             1
                                                                                1
   Frame      [    1]                                                           1
                              END                                               1
                                                                                1
 [10]|00|   0000 0000       (Quality Unknown)                                   1
 [11]|00|   0000 0000       (Quality Unknown)                                   1
 [12]|00|   0000 0000       (Quality Unknown)                                   1
```

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



```
Mapping        |    SDH/PDH     Tx&Rx        In-service        Time 14:27:27 13/May/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-139M(Async.)

Test menu  |        S1 test

 Tx
   Sequence   1  to [ 1]  [Single ] ☐
   Alarm      [    OFF    ]
   Error      [    OFF    ]
```

6.4.4 Other Overheads

'Setup : OH preset' screen

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

(1) When bit rate is 52M:

SOH

	1	2	3
1	A1	A2	J0
2	B1	E1	F1
3	D1	D2	D3
4	H1	H2	H3
5	B2	K1	K2
6	D4	D5	D6
7	D7	D8	D9
8	D10	D11	D12
9	S1	M1	E2

POH

VC4	VC3	VC2/
J1	J1	V5
B3	B3	J2
C2	C2	N2
G1	G1	K4
F2	F2	
H4	H4	
F3	F3	
K3	K3	
N1	N1	

(2) When bit rate is 156M:

SOH

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

POH

VC4	VC3	VC2/
J1	J1	V5
B3	B3	J2
C2	C2	N2
G1	G1	K4
F2	F2	
H4	H4	
F3	F3	
K3	K3	
N1	N1	

(3) When bit rate is 622M:

SOH#1

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

POH

VC4	VC3	VC2/1
J1	J1	V5
B3	B3	J2
C2	C2	N2
G1	G1	K4
F2	F2	
H4	H4	
F3	F3	
K3	K3	
N1	N1	

SOH#2

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

SOH#3

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

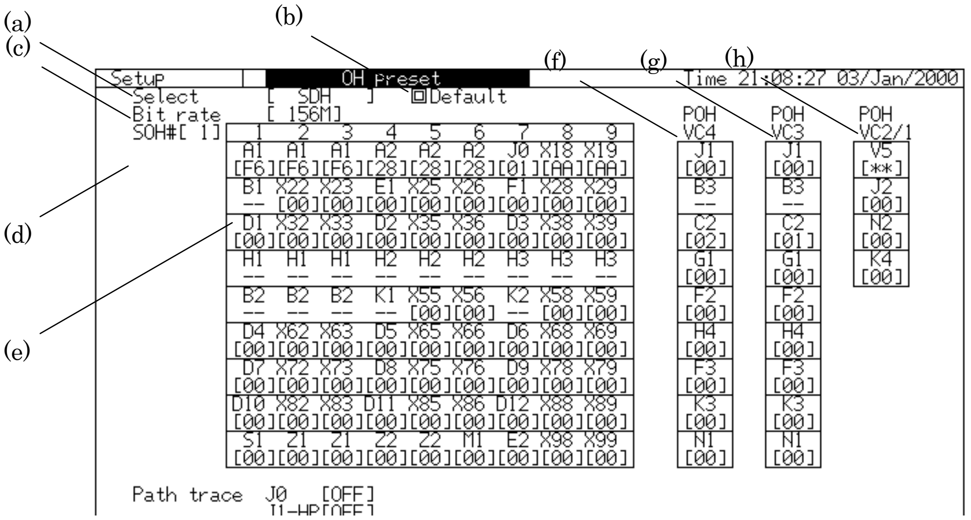
SOH#4

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

6.4.5 Editing the Overhead *'Setup : OH preset data' screen*

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

(2) Setup the screen parameters as follows.



Setup | OH preset | Time 21:08:27 03/Jan/2000

Select [SDH] ▣Default
Bit rate [156M]
SOH#[1]

1	2	3	4	5	6	7	8	9
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	J0 [01]	X18 [AA]	X19 [AA]
B1 --	X22 [00]	X23 [00]	E1 [00]	X25 [00]	X26 [00]	F1 [00]	X28 [00]	X29 [00]
D1 [00]	X32 [00]	X33 [00]	D2 [00]	X35 [00]	X36 [00]	D3 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	K1 --	X55 [00]	X56 [00]	K2 --	X58 [00]	X59 [00]
D4 [00]	X62 [00]	X63 [00]	D5 [00]	X65 [00]	X66 [00]	D6 [00]	X68 [00]	X69 [00]
D7 [00]	X72 [00]	X73 [00]	D8 [00]	X75 [00]	X76 [00]	D9 [00]	X78 [00]	X79 [00]
D10 [00]	X82 [00]	X83 [00]	D11 [00]	X85 [00]	X86 [00]	D12 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	M1 [00]	E2 [00]	X98 [00]	X99 [00]

POH VC4	POH VC3	POH VC2/1
J1 [00]	J1 [00]	V5 [**]
B3 --	B3 --	J2 [00]
C2 [02]	C2 [01]	N2 [00]
G1 [00]	G1 [00]	K4 [00]
F2 [00]	F2 [00]	
H4 [00]	H4 [00]	
F3 [00]	F3 [00]	
K3 [00]	K3 [00]	
N1 [00]	N1 [00]	

Path trace J0 [OFF]
J1-HP[OFF]

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

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

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

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

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

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

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

(f) POH VC4 .... The area to set VC4 POH data. The setting procedure is the same as that for SOH data in (e). You can also set C2 byte data in plain language.

(g) POH VC3 .... The area to set VC3 POH data. The setting procedure is the same as that in (e). You can also set C2 byte data in plain language.

(h) POH VC2/1 .... The area to set VC2/1 POH data. The setting procedure is the same as that shown in (e).

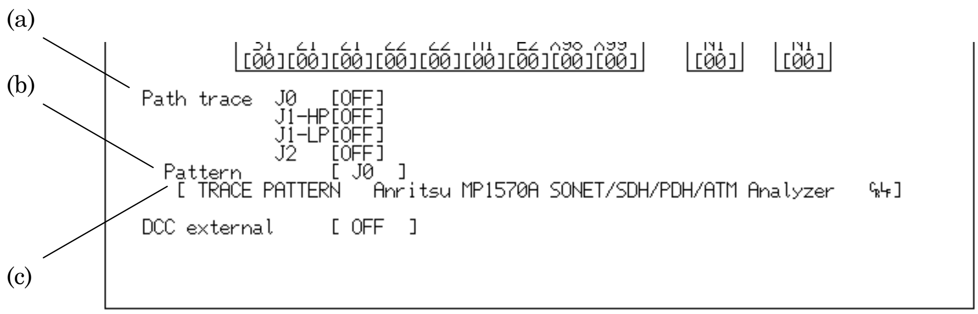
- You cannot set BIP-2 bit of V5.
- The default values on mapping are sent if you select '**'.

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

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

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

(2) Setup the screen parameters as follows.



```
[00][00][00][00][00][00][00][00][00]    [00]    [00]
Path trace  J0   [OFF]
            J1-HP[OFF]
            J1-LP[OFF]
            J2   [OFF]
 Pattern         [ J0  ]
  [ TRACE PATTERN   Anritsu MP1570A SONET/SDH/PDH/ATM Analyzer   ␍␊]

DCC external     [ OFF   ]
```

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

(J1-HP is J1 of VC4, and J1-LP is J1 of VC3.)

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

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

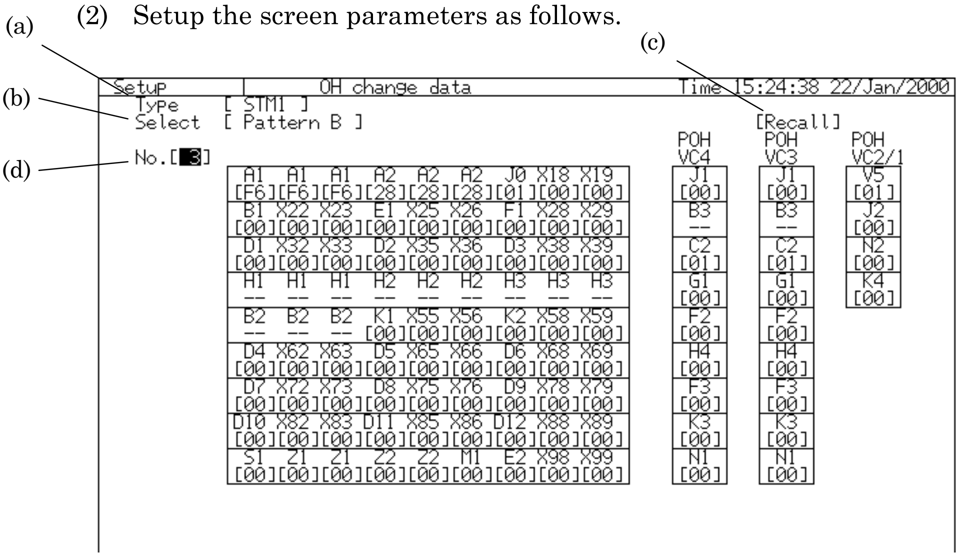
(c) [Path trace data input] ..... Inserts into the byte data preset in (b). Move the cursor there and press Set, and the character input window opens. Input the desired character string.

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

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

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

(2) Setup the screen parameters as follows.



```
Setup   |        OH change data                         Time 15:24:38 22/Jan/2000
  Type     [ STM1 ]
  Select   [ Pattern B ]                                     [Recall]
                                                     POH      POH      POH
  No.[ 3]                                            VC4      VC3      VC2/1
       A1   A1   A1   A2   A2   A2   J0  X18  X19     J1       J1       V5
      [F6][F6][F6][28][28][28][01][00][00]          [00]     [00]     [01]
       B1  X22  X23   E1  X25  X26   F1  X28  X29     B3       B3       J2
      [00][00][00][00][00][00][00][00][00]           --       --      [00]
       D1  X32  X33   D2  X35  X36   D3  X38  X39     C2       C2       N2
      [00][00][00][00][00][00][00][00][00]          [01]     [01]     [00]
       H1   H1   H1   H2   H2   H2   H3   H3   H3     G1       G1       K4
       --   --   --   --   --   --   --   --   --   [00]     [00]     [00]
       B2   B2   B2   K1  X55  X56   K2  X58  X59     F2       F2
       --   --   --  [00][00][00][00][00][00]       [00]     [00]
       D4  X62  X63   D5  X65  X66   D6  X68  X69     H4       H4
      [00][00][00][00][00][00][00][00][00]          [00]     [00]
       D7  X72  X73   D8  X75  X76   D9  X78  X79     F3       F3
      [00][00][00][00][00][00][00][00][00]          [00]     [00]
      D10  X82  X83  D11  X85  X86  D12  X88  X89     K3       K3
      [00][00][00][00][00][00][00][00][00]          [00]     [00]
       S1   Z1   Z1   Z2   Z2   M1   E2  X98  X99     N1       N1
      [00][00][00][00][00][00][00][00][00]          [00]     [00]
```

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

- STM1 can be set when MP0121A is installed.
- STM0 can be set when MP0122A or MP0122B is installed.

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

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

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

(d) No. ....Specifies the SOH (STM1) No. to be edited on the 'Setup : OH preset' screen.

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

6.6.1 Setting the Orderwire

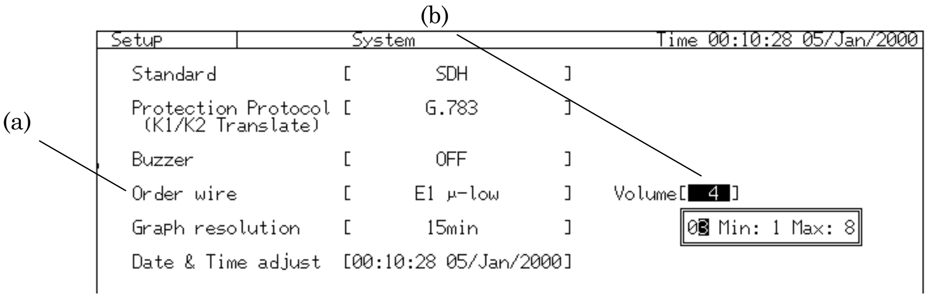
The MP1570A can do the order wire using E1 byte and E2 byte that are used for SOH sound signal of SDH.

Here is the procedure for setting the order wire.

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

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

(3) Setup the screen parameters as follows.



```
Setup              System                          Time 00:10:28 05/Jan/2000
  Standard            [      SDH      ]
  Protection Protocol [     G.783     ]
   (K1/K2 Translate)
  Buzzer              [      OFF      ]
  Order wire          [    E1 µ-low   ]   Volume[  4 ]
  Graph resolution    [     15min     ]          03 Min: 1 Max: 8
  Date & Time adjust  [00:10:28 05/Jan/2000]
```

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

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

Note

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

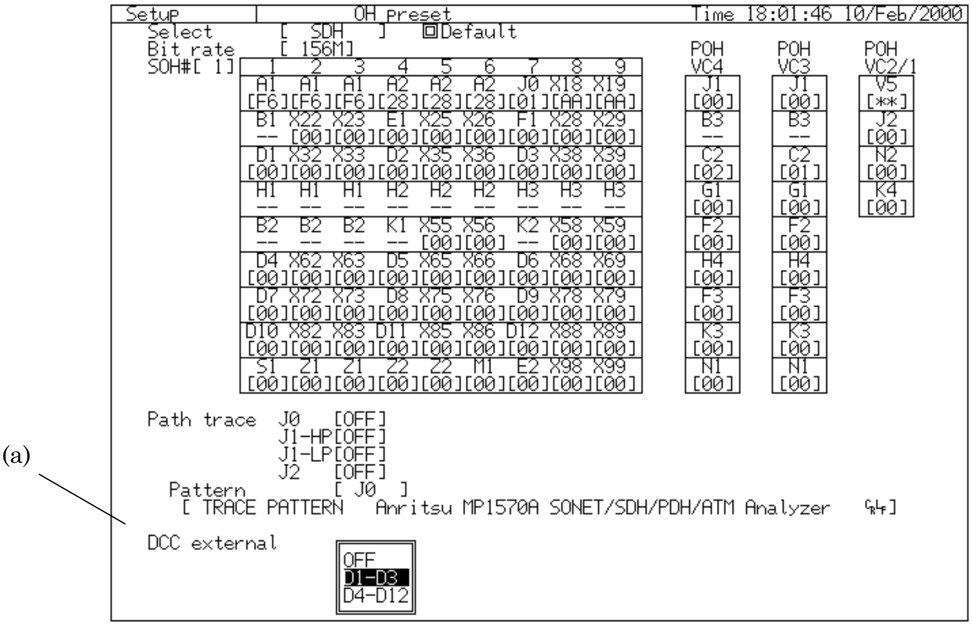
6.6.2 Setting the DCC Interface

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

(1) Open the ‘Setup : System’ screen.

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

(3) Setup the screen parameters as follows.



```
Setup     |            OH preset                        Time 18:01:46 10/Feb/2000
   Select       [  SDH   ]   ▣Default
   Bit rate     [ 156M]                                  POH     POH     POH
   SOH#[ 1]  1    2    3    4    5    6    7    8    9    VC4     VC3     VC2/1
             A1   A1   A1   A2   A2   A2   J0  X18  X19    J1      J1      V5
           [F6][F6][F6][28][28][28][01][AA][AA]          [00]    [00]    [**]
             B1  X22  X23   E1  X25  X26   F1  X28  X29    B3      B3      J2
             --  [00][00][00][00][00][00][00][00]          --      --    [00]
             D1  X32  X33   D2  X35  X36   D3  X38  X39    C2      C2      N2
           [00][00][00][00][00][00][00][00][00]          [02]    [01]    [00]
             H1   H1   H1   H2   H2   H2   H3   H3   H3    G1      G1      K4
             --   --   --   --   --   --   --   --   --   [00]    [00]    [00]
             B2   B2   B2   K1  X55  X56   K2  X58  X59    F2      F2
             --   --   --   -- [00][00]   --  [00][00]   [00]    [00]
             D4  X62  X63   D5  X65  X66   D6  X68  X69    H4      H4
           [00][00][00][00][00][00][00][00][00]          [00]    [00]
             D7  X72  X73   D8  X75  X76   D9  X78  X79    F3      F3
           [00][00][00][00][00][00][00][00][00]          [00]    [00]
            D10  X82  X83  D11  X85  X86  D12  X88  X89    K3      K3
           [00][00][00][00][00][00][00][00][00]          [00]    [00]
             S1   Z1   Z1   Z2   Z2   M1   E2  X98  X99    N1      N1
           [00][00][00][00][00][00][00][00][00]          [00]    [00]

   Path trace  J0    [OFF]
               J1-HP[OFF]
               J1-LP[OFF]
               J2    [OFF]
    Pattern          [ J0  ]
     [ TRACE PATTERN   Anritsu MP1570A SONET/SDH/PDH/ATM Analyzer   %4]

   DCC external
                     OFF
                     D1-D3
                     D4-D12
```

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

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

Note

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

6.7 Editing Dummy Channel

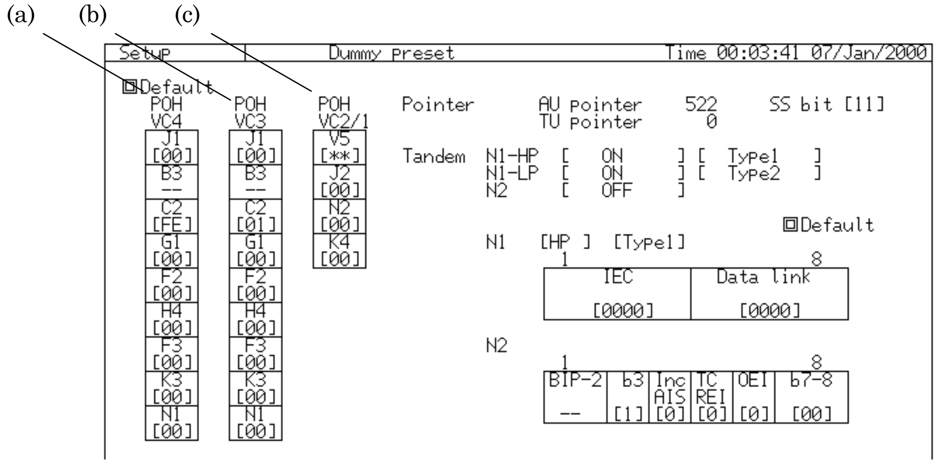
This section describes the setting of channels other than the SDH signal measurement channel. Edit the dummy channel of MP1570A in 2 ways according to the type as follows:

- AU and TU (dummies of main channel) without measurement channels in STM1 containing the measurement channel
- All AU and TU (dummies of STM) in STM1 without measurement channels

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

Setting Path Overhead

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



```
Setup        Dummy Preset                     Time 00:03:41 07/Jan/2000
☐Default
POH    POH    POH      Pointer     AU Pointer   522    SS bit [11]
VC4    VC3    VC2/1                TU Pointer     0
J1     J1     V5
[00]   [00]   [**]     Tandem  N1-HP [  ON  ] [ Type1 ]
B3     B3     J2               N1-LP [  ON  ] [ Type2 ]
--     --     [00]             N2    [  OFF ]
C2     C2     N2
[FE]   [01]   [00]                                  ☐Default
G1     G1     K4               N1  [HP ]  [Type1]
[00]   [00]   [00]                 1                  8
F2     F2                          IEC       Data link
[00]   [00]
H4     H4                          [0000]    [0000]
[00]   [00]
F3     F3                      N2
[00]   [00]                        1                  8
K3     K3                          BIP-2  b3  Inc TC  OEI  b7-8
[00]   [00]                                   AIS REI
N1     N1                          --    [1]  [0] [0] [0]  [00]
[00]   [00]
```

(a) POH VC4 .... Sets the POH of VC4. The setting method is the same as the editing method for the overhead of measurement channel.

(b) POH VC3 .... Sets the POH of VC3. The setting method is the same as the editing method for the overhead of measurement channel.

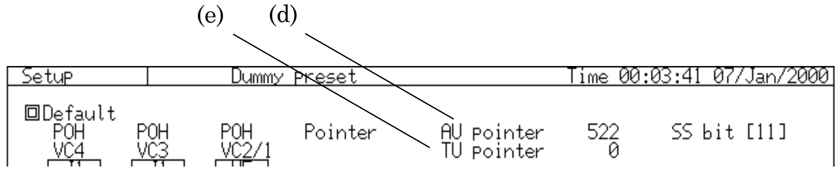
(c) POH VC2/1 .... Sets the POH of VC2/VC1. The setting method is the same as the editing method for the overhead of measurement channel.

Note

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

Setting AU Pointer and TU Pointer

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



```
Setup          Dummy Preset                    Time 00:03:41 07/Jan/2000
 ▣Default
   POH      POH      POH      Pointer          AU pointer   522    SS bit [11]
   VC4      VC3      VC2/1                     TU pointer     0
```

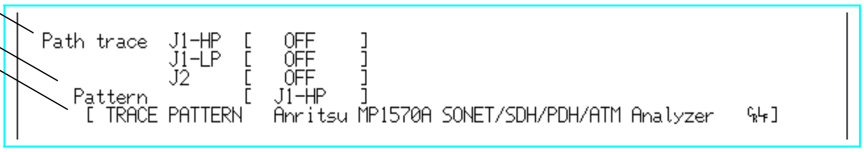
(d) Sets the SS bit value for the AU pointer. Move the cursor to SS bit and press Set. The numerical input window appears. Set it as a binary number.

(e) Sets the SS bit value for the TU pointer. The setting method is the same as that for the SS bit of AU pointer.

- The NDF bit is fixed at '0110' (binary number) for all channels.
- AU pointer value is fixed at '522' (decimal number) for all channels.
- TU pointer value is fixed at '0' (decimal number) for all channels.

Setting the Path Trace

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



```
Path trace  J1-HP  [   OFF    ]
            J1-LP  [   OFF    ]
            J2     [   OFF    ]
   Pattern         [  J1-HP   ]
    [ TRACE PATTERN   Anritsu MP1570A SONET/SDH/PDH/ATM Analyzer   CRLF]
```

(f) Select the path trace type to be set. ('J1-HP' is J1 of VC4, and 'J1-LP' is J1 of VC3.)

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

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

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

Note

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

Setting the Mixed Payload

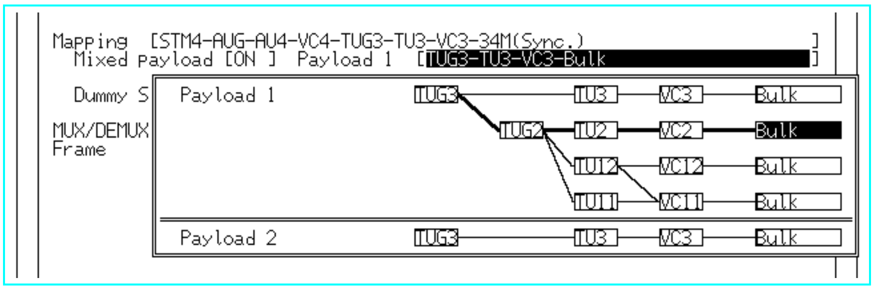
On the mapping including TU3 or AU3, MP1570A allows the setting of mapping for TU3 or AU3 channels without the measurement channel which is different from that of the measurement channel. Here is the setting procedure.

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

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

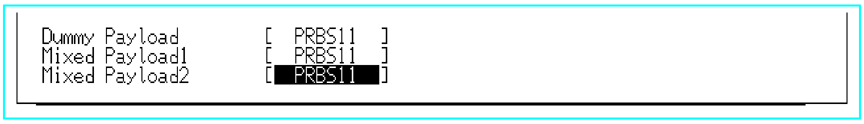
(3) The item selection window opens. Choose Yes and press Set .

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



Mapping [STM4-AUG-AU4-VC4-TUG3-TU3-VC3-34M(Sync.)]
Mixed Payload [ON] Payload 1 [TUG3-TU3-VC3-Bulk]

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



Dummy Payload [PRBS11]
Mixed Payload1 [PRBS11]
Mixed Payload2 [PRBS11]

Note

If the Mixed payload is not set, the same mapping as that of the measurement channel is set for TU3 or AU3 with measurement channel.

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

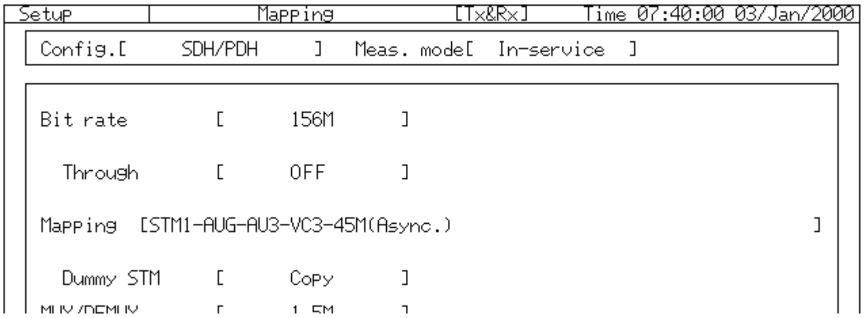
Dummy STM selects either Copy or Dummy as follows:

- Copy .... Inserts the same pattern as that of STM1 with measurement channel.
- Dummy ..... The mapping includes Bulk mapping of the layer with measurement channel. The pattern inserted into the payload includes the pattern set by Dummy on the 'Setup : Dummy preset' screen.

Here is the setting procedure.

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

(2) Move the cursor to 'Dummy STM' and select 'Copy' or 'Dummy'.



```
Setup              Mapping              [Tx&Rx]     Time 07:40:00 03/Jan/2000
 Config.[      SDH/PDH      ]  Meas. mode[  In-service  ]

 Bit rate         [       156M       ]

   Through        [       OFF        ]

 Mapping  [STM1-AUG-AU3-VC3-45M(Async.)                              ]

   Dummy STM      [       Copy       ]
```

Note

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

6.8 Setting the Tandem Connection

This section describes the tandem connection.

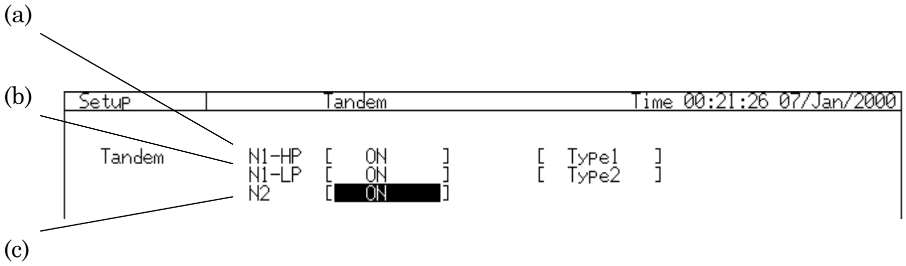
6.8.1 Setting the Type

'Setup : Tandem' screen

The 'Setup : Tandem' screen allows the setting of whether N1 byte or N2 is to be are used as tandem connection, along with the setting of the type. Here is the setting procedure.

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

(2) Setup the screen parameters.



```
Setup   |          Tandem                 Time 00:21:26 07/Jan/2000

  Tandem        N1-HP  [   ON    ]        [  Type1   ]
                N1-LP  [   ON    ]        [  Type2   ]
                N2     [   ON    ]
```

(a) N1-HP .... Specifies whether tandem connection uses N1 ....byte of high order path of the measurement channel. ....When set at 'ON', select 'Type 1' or 'Type 2'.

(b) N1-LP .... Specifies whether tandem connection uses N1 ....byte of low order path of the measurement channel.

(c) N2 .... Specifies whether tandem connection uses N2 ....byte of the measurement channel.

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

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

N1-HP (Type1)

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

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

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

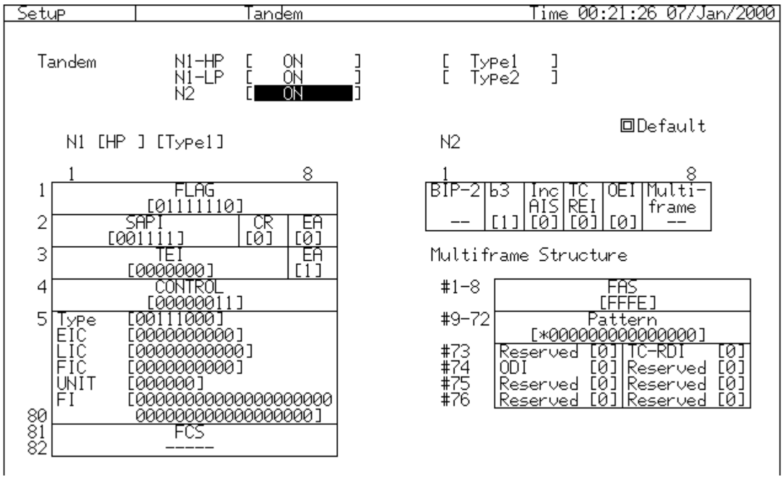
N1-HP (Type2)
N1-LP

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

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

Here is the setting procedure.

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



```
Setup            Tandem                      Time 00:21:26 07/Jan/2000

  Tandem      N1-HP  [   ON     ]      [  Type1   ]
              N1-LP  [   ON     ]      [  Type2   ]
              N2     [   ON     ]
                                                        ☐Default
    N1 [HP ] [Type1]                   N2

     1                8                1                       8
  1            FLAG                    BIP-2  b3  Inc  TC   OEI  Multi-
           [01111110]                             AIS  REI       frame
  2      SAPI         CR    EA          --   [1]  [0]  [0]  [0]   --
      [001111]       [0]   [0]
  3        TEI              EA         Multiframe Structure
        [0000000]          [1]
  4          CONTROL                    #1-8              FAS
           [00000011]                                   [FFFE]
  5 Type     [00111000]                 #9-72           Pattern
    EIC      [0000000000]                         [*000000000000000]
    LIC      [00000000000]              #73   Reserved [0] TC-RDI   [0]
    FIC      [0000000000]               #74   ODI      [0] Reserved [0]
    UNIT     [000000]                   #75   Reserved [0] Reserved [0]
    FI       [00000000000000000000      #76   Reserved [0] Reserved [0]
 80           000000000000000000]
 81            FCS
 82           -----
```

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

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

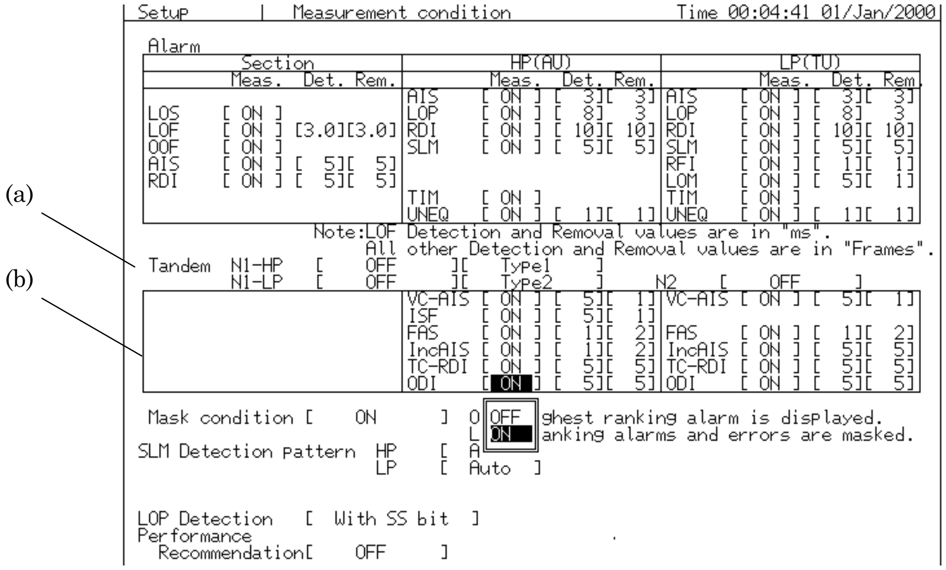
- ☐ Default .... If you move the cursor here and press Set , the tandem connection setting is initialized.

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

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

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

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



```
Setup        |  Measurement condition               Time 00:04:41 01/Jan/2000
  Alarm
               Section          |          HP(AU)           |          LP(TU)
           Meas.   Det. Rem.    |       Meas.   Det. Rem.   |       Meas.   Det. Rem.
                                |AIS     [ ON ] [   3][   3]|AIS     [ ON ] [   3][   3]
  LOS      [ ON ]               |LOP     [ ON ] [   8]    3 |LOP     [ ON ] [   8]    3
  LOF      [ ON ] [3.0][3.0]    |RDI     [ ON ] [  10][  10]|RDI     [ ON ] [  10][  10]
  OOF      [ ON ]               |SLM     [ ON ] [   5][   5]|SLM     [ ON ] [   5][   5]
  AIS      [ ON ] [   5][   5]  |                           |RFI     [ ON ] [   1][   1]
  RDI      [ ON ] [   5][   5]  |                           |LOM     [ ON ] [   5][   1]
                                |TIM     [ ON ]             |TIM     [ ON ]
                                |UNEQ    [ ON ] [   1][   1]|UNEQ    [ ON ] [   1][   1]
                      Note:LOF Detection and Removal values are in "ms".
                           All other Detection and Removal values are in "Frames".
  Tandem   N1-HP   [     OFF       ][   Type1      ]
           N1-LP   [     OFF       ][   Type2      ]      N2     [     OFF       ]
                                |VC-AIS  [ ON ] [   5][   1]|VC-AIS  [ ON ] [   5][   1]
                                |ISF     [ ON ] [   5][   1]|
                                |FAS     [ ON ] [   1][   2]|FAS     [ ON ] [   1][   2]
                                |IncAIS  [ ON ] [   1][   2]|IncAIS  [ ON ] [   5][   5]
                                |TC-RDI  [ ON ] [   5][   5]|TC-RDI  [ ON ] [   5][   5]
                                |ODI     [ ON ] [   5][   5]|ODI     [ ON ] [   5][   5]

  Mask condition [    ON       ]  O|OFF |ghest ranking alarm is displayed.
                                  L|ON  |anking alarms and errors are masked.
 SLM Detection pattern  HP     [  A
                        LP     [  Auto  ]


 LOP Detection   [  With SS bit  ]
 Performance
   Recommendation[    OFF      ]
```

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

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

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

Note

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

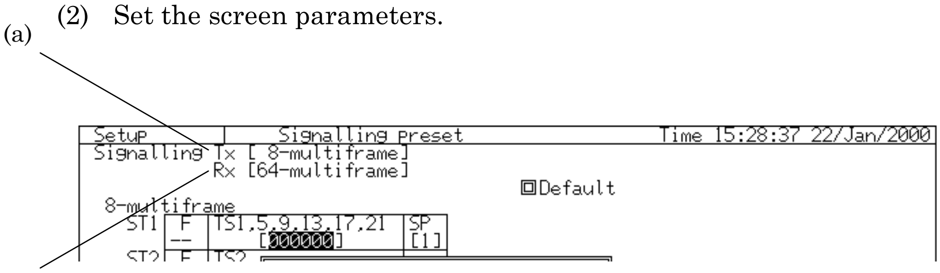
6.9 Editting the Signalling *'Setup : Signaliing preset' screen*

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

6.9.1 Selecting the Signalling Pattern

(1) Open the ‘Setup : Signalling preset’ screen.

(2) Set the screen parameters.



```
Setup        Signalling preset            Time 15:28:37 22/Jan/2000
Signalling Tx [ 8-multiframe]
           Rx [64-multiframe]
                                         ▣Default
 8-multiframe
    ST1 | F  | TS1,5,9,13,17,21 | SP
        | -- |    [000000]      | [1]
    ST2 | F  | TS2
```

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

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

6.9.2 Editing the Signalling Bits

The bits meshed on the figure below can be preset.

8-Multiframe Setting

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

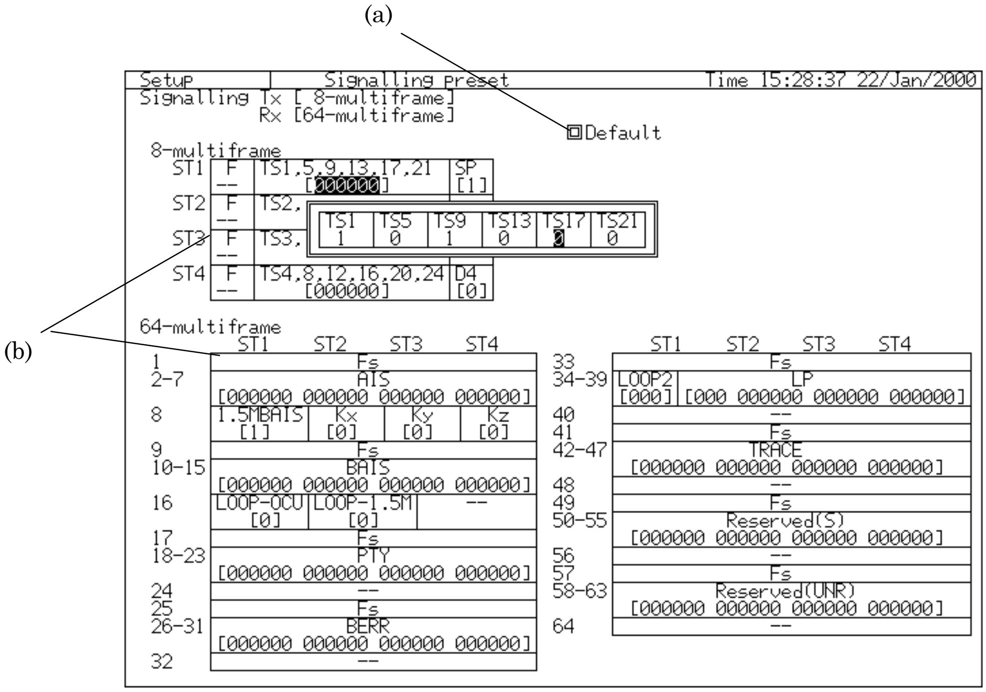
64-Multiframe Setting

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

Here is the setting procedure.

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

(2) Setup the screen parameters.



```
Setup          Signalling preset          Time 15:28:37 22/Jan/2000
Signalling Tx [ 8-multiframe]
           Rx [64-multiframe]
                                           ☐Default
 8-multiframe
  ST1  F  TS1,5,9,13,17,21  SP
       --    [000000]       [1]
  ST2  F  TS2,
       --      TS1  TS5  TS9  TS13  TS17  TS21
  ST3  F  TS3,  1    0    1    0     0     0
       --
  ST4  F  TS4,8,12,16,20,24 D4
       --    [000000]       [0]

64-multiframe
         ST1      ST2      ST3      ST4              ST1      ST2      ST3      ST4
 1                Fs                         33                Fs
 2-7              AIS                        34-39 LOOP2       LP
       [000000 000000 000000 000000]               [000] [000 000000 000000 000000]
 8     1.5MBAIS   Kx       Ky       Kz       40                --
         [1]      [0]      [0]      [0]      41                Fs
 9                Fs                         42-47            TRACE
 10-15            BAIS                             [000000 000000 000000 000000]
       [000000 000000 000000 000000]         48                --
 16    LOOP-OCU LOOP-1.5M  --                49                Fs
         [0]      [0]                        50-55           Reserved(S)
 17               Fs                               [000000 000000 000000 000000]
 18-23            PTY                        56                --
       [000000 000000 000000 000000]         57                Fs
 24               --                         58-63           Reserved(UNR)
 25               Fs                               [000000 000000 000000 000000]
 26-31            BERR                       64                --
       [000000 000000 000000 000000]
 32               --
```

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

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

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

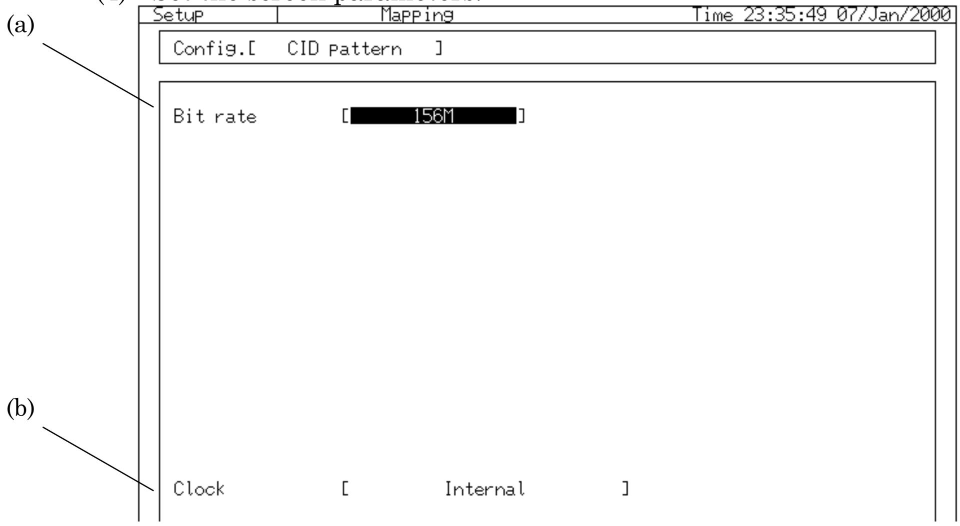
Here is the measuring procedure for CID pattern.

(1) Open 'Setup : Mapping' screen.

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

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

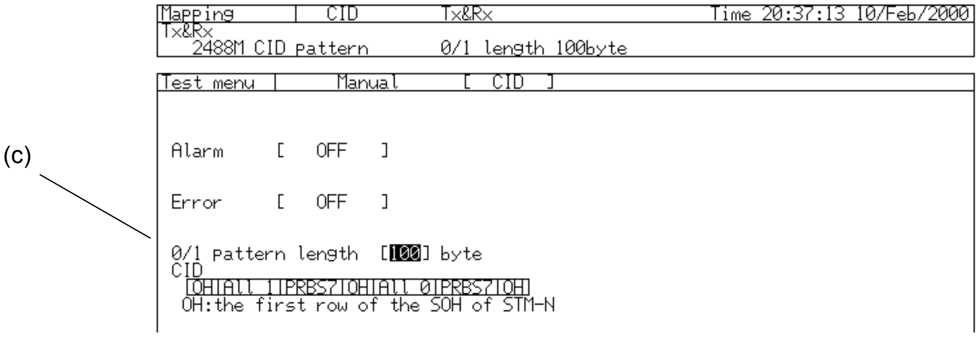
(4) Set the screen parameters.



```
Setup       |         Mapping                  Time 23:35:49 07/Jan/2000
  Config.[   CID pattern    ]

  Bit rate          [     156M     ]

  Clock             [         Internal         ]
```

(a) Bitrate	Sets the bit rate.
(b) Clock	Selects the send clock.

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



```
Mapping      |    CID          Tx&Rx                Time 20:37:13 10/Feb/2000
Tx&Rx
   2488M CID pattern        0/1 length 100byte

Test menu |       Manual       [  CID  ]

 Alarm      [    OFF    ]

 Error      [    OFF    ]

 0/1 pattern length  [100] byte
 CID
  |OH|All 1|PRBS7|OH|All 0|PRBS7|OH|
  OH:the first row of the SOH of STM-N
```

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

Note

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

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

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

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

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

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

(3) Set 'Frame' to OFF.

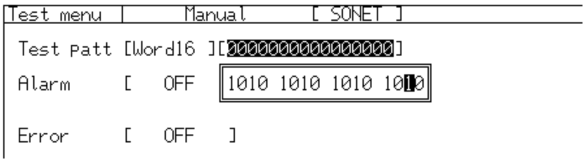
- Refer to '5.1 Setting Basic Parameters' for other parameters on this screen.

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

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

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

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



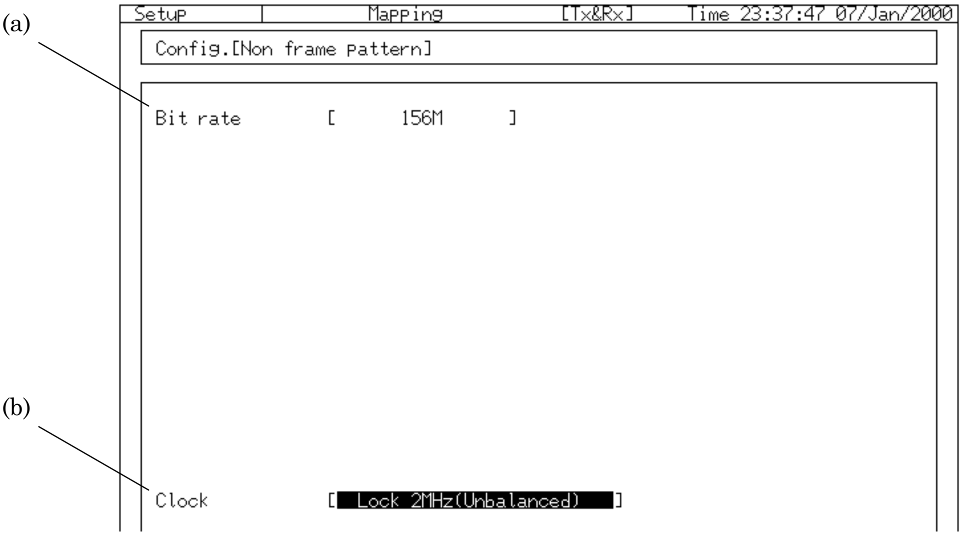
```
Test menu          Manual        [ SONET ]

Test patt [Word16 ][0000000000000000]
Alarm     [   OFF   1010 1010 1010 1010

Error     [   OFF   ]
```

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

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

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

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



Setup | Mapping [Tx&Rx] Time 23:37:47 07/Jan/2000

Config.[Non frame pattern]

Bit rate [156M]

Clock [Lock 2MHz(Unbalanced)]

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

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

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

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

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

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

Note

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

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

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

6.12.1 Adding Alarm

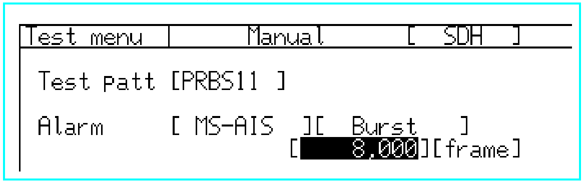
(1) Open the 'Test menu : Manual' screen.

(2) Set the screen parameters as follows.

```
Mapping     |  SDH/PDH    Tx&Rx      In-service     Time 23:37:13 06/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-139M(Async.)

Test menu |        Manual       [  SDH  ]

 Test patt [PRBS23 ]

 Alarm     [ MS-AIS  ][  Burst    ]
                     [          1][frame]

 Error     [   OFF   ]

 K1 Bit1-4 [0000, No request       ]
```

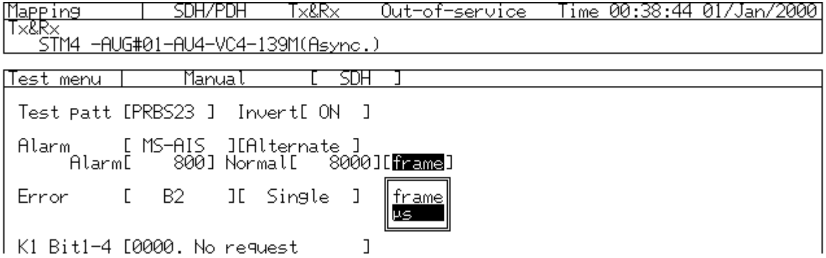
(a) [Alarm timing] .... When the bit rate is 2M, 8M, 34M, 139M, 1.5M, or 45M (PDH/DSn), 'All' is always set. When the bit rate is 52M, 156M, or 622M (SDH), select 'Single', 'Burst' 'Alternate' or 'All' as the alarm timing.

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



```
Test menu |      Manual      [  SDH  ]

 Test patt [PRBS11 ]

 Alarm     [ MS-AIS  ][  Burst    ]
                     [     8,000][frame]
```

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



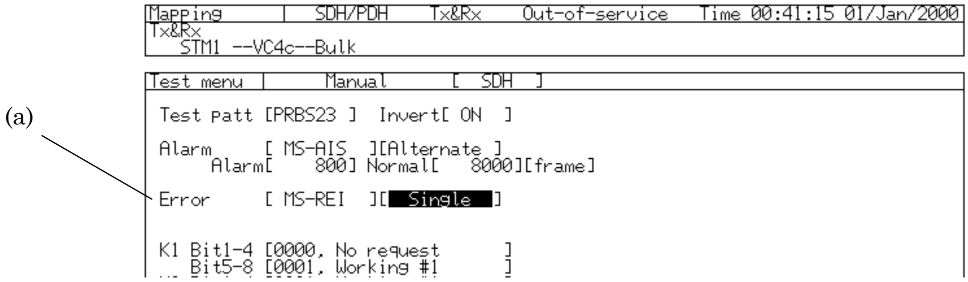
```
Mapping     |  SDH/PDH    Tx&Rx    Out-of-service   Time 00:38:44 01/Jan/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-139M(Async.)

Test menu |        Manual       [  SDH  ]

 Test patt [PRBS23 ]  Invert[ ON   ]

 Alarm     [ MS-AIS  ][Alternate ]
      Alarm[     800] Normal[   8000][frame]

 Error     [   B2    ][  Single   ]

 K1 Bit1-4 [0000, No request       ]
```

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

6.12.2 Adding Error

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

(2) Set the screen parameters as follows.



```
Mapping     |   SDH/PDH    Tx&Rx    Out-of-service   Time 00:41:15 01/Jan/2000
Tx&Rx
   STM1 --VC4c--Bulk

Test menu |       Manual       [  SDH  ]

 Test patt [PRBS23 ]  Invert[ ON   ]

 Alarm      [ MS-AIS  ][Alternate ]
      Alarm[    800] Normal[   8000][frame]

 Error      [ MS-REI  ][  Single  ]


 K1 Bit1-4 [0000, No request       ]
    Bit5-8 [0001, Working #1       ]
```

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

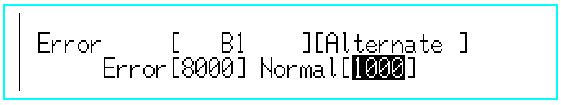
- If 'Bit all' is selected, the error is added to the all Tx signals.
- If 'Bit info' is selected, the error is added to the payload of the measurement channel.

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

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

```
Error     [   B1    ][  Burst    ]
                  Bit [64000]
```

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



```
Error     [   B1    ][Alternate ]
     Error[8000] Normal[1000]
```

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

```
Error     [   B1    ][Prog. rate]
                     [1.0E-08]

K1 Bit1-4 [0000, No r 1.0E-08  Min:0.1E-10  Max:1.0E-04
   Bit5-8 [0001, Work
```

Note

The error timing depends on the error to be added.

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

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

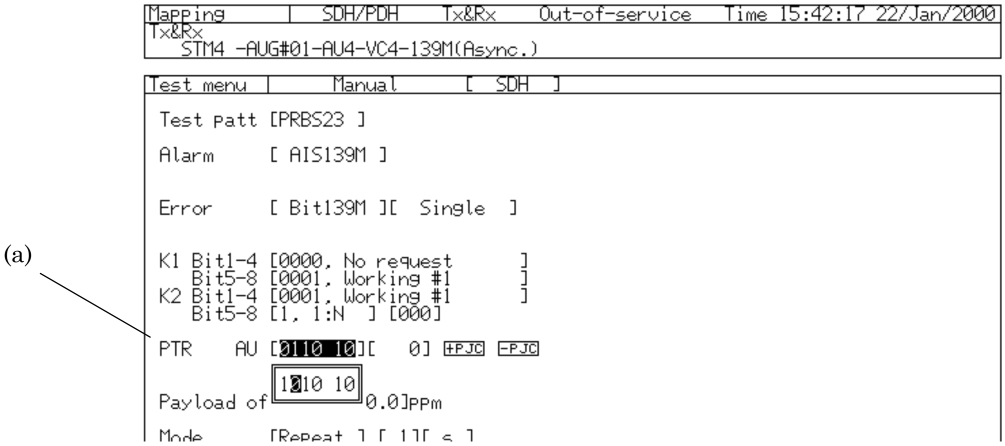
This section describes the procedure to set AU pointer value and TU pointer value of the Tx signal of the measurement channel, and to offset the payload by C bit.

6.13.1 Setting and Changing Pointer Value

AU pointer value and TU pointer value of the Tx SDH signal are set on the 'Test menu : Manual' screen. Pointer value by NDF is set as well.

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

(2) Set the screen parameters as follows.



```
Mapping    | SDH/PDH    Tx&Rx    Out-of-service    Time 15:42:17 22/Jan/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-139M(Async.)

Test menu |        Manual        [  SDH  ]

 Test patt [PRBS23 ]

 Alarm     [ AIS139M ]

 Error     [ Bit139M ][  Single  ]

 K1 Bit1-4 [0000, No request      ]
    Bit5-8 [0001, Working #1      ]
 K2 Bit1-4 [0001, Working #1      ]
    Bit5-8 [1, 1:N  ] [000]

 PTR    AU [0110 10][   0]
            1010 10
 Payload of            0.0]ppm

 Mode      [Repeat ] [ 1][ s ]
```

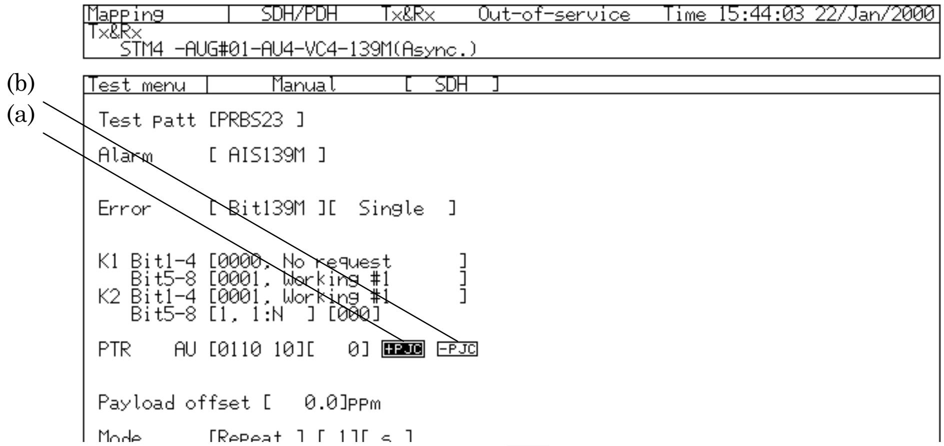
(a) AU pointer value and TU pointer value can be set in decimal numbers, respectively. After entering values, NDF is generated and pointer value is changed by pressing Set .

6.13.2 Changing Pointer by Justification

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

(1) Open the ‘Test menu : Manual’ screen.

(2) Set the screen parameters as follows.



```
Mapping     |  SDH/PDH    Tx&Rx    Out-of-service    Time 15:44:03 22/Jan/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-139M(Async.)

Test menu |        Manual        [  SDH  ]

 Test patt [PRBS23 ]

 Alarm      [ AIS139M ]

 Error      [ Bit139M ][  Single  ]

 K1 Bit1-4 [0000, No request        ]
    Bit5-8 [0001, Working #1        ]
 K2 Bit1-4 [0001, Working #1        ]
    Bit5-8 [1, 1:N   ] [000]

 PTR    AU [0110 10][   0] +PJC -PJC

 Payload offset [   0.0]ppm

 Mode       [Repeat ] [ 1][ s ]
```

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

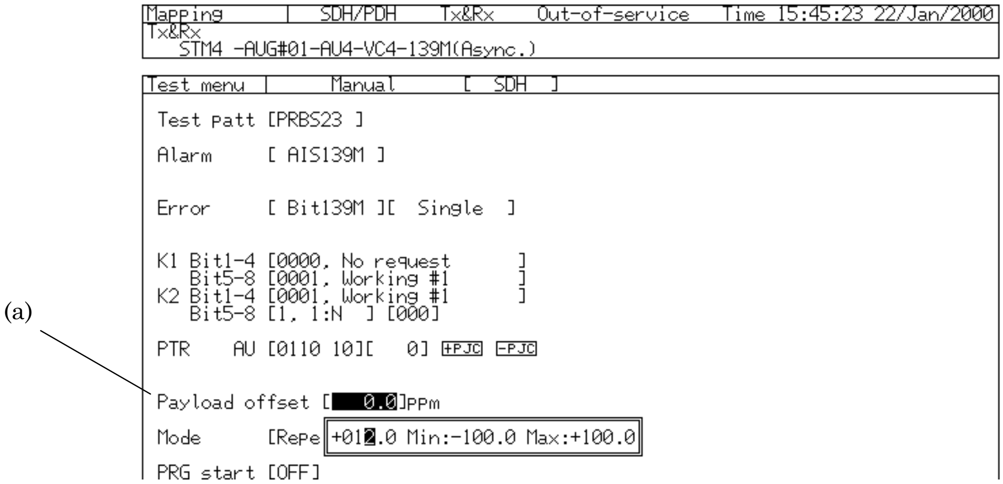
(b) Move the cursor and press Set. D bit is inverted and negative justification is generated.

6.13.3 Offsetting Payload by C bit

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

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

(2) Set the screen parameters as follows.



```
Mapping      | SDH/PDH    Tx&Rx    Out-of-service   Time 15:45:23 22/Jan/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-139M(Async.)

Test menu |       Manual      [  SDH  ]

 Test patt [PRBS23 ]

 Alarm     [ AIS139M ]

 Error     [ Bit139M ][  Single   ]

 K1 Bit1-4 [0000, No request      ]
    Bit5-8 [0001, Working #1      ]
 K2 Bit1-4 [0001, Working #1      ]
    Bit5-8 [1, 1:N   ] [000]

 PTR    AU [0110 10][    0] +PJC  -PJC

 Payload offset [    0.0]ppm

 Mode      [Repe +012.0 Min:-100.0 Max:+100.0

 PRG start [OFF]
```

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

Section 7   Measurement and Analysis

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

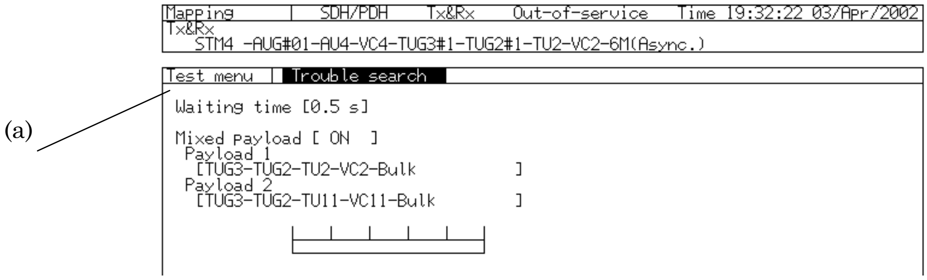
.

7.1 Continuity Test of All Channels by Trouble Search Function

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

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

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



```
Mapping      |  SDH/PDH    Tx&Rx    Out-of-service    Time 19:32:22 03/Apr/2002
Tx&Rx
   STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU2-VC2-6M(Async.)

Test menu  | Trouble search
 Waiting time [0.5 s]

 Mixed payload [ ON  ]
  Payload 1
   [TUG3-TUG2-TU2-VC2-Bulk          ]
  Payload 2
   [TUG3-TUG2-TU11-VC11-Bulk        ]
```

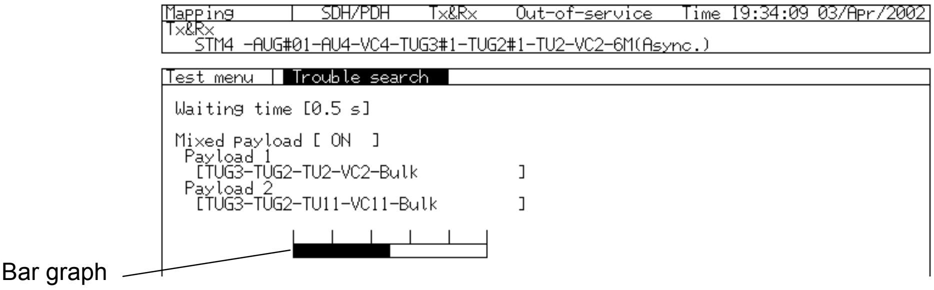
(2) Setup the screen parameters as follows:

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

(b) Mixed payload.....independently sets the different mapping for that of the other two remaining channels of TUG3 or AU3 to be measured. When set to 'Off', sets the same payload as that of the measurement channel.

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

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



```
Mapping      |  SDH/PDH    Tx&Rx    Out-of-service    Time 19:34:09 03/Apr/2002
Tx&Rx
   STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU2-VC2-6M(Async.)

Test menu  | Trouble search
 Waiting time [0.5 s]

 Mixed payload [ ON  ]
  Payload 1
   [TUG3-TUG2-TU2-VC2-Bulk          ]
  Payload 2
   [TUG3-TUG2-TU11-VC11-Bulk        ]
```

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

Note

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

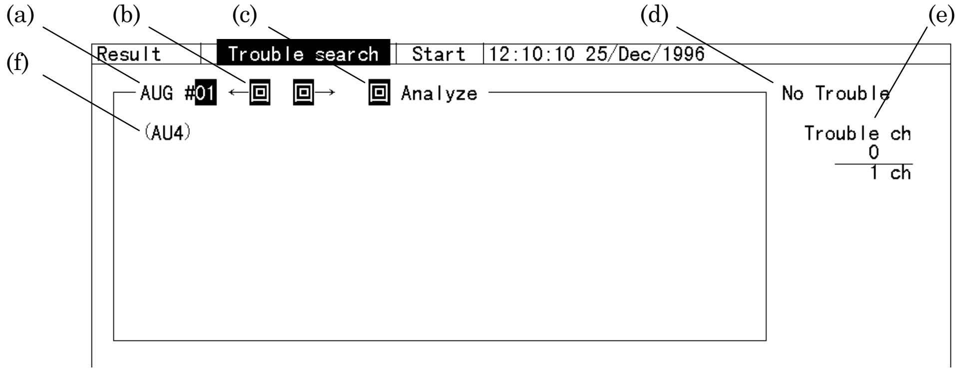
- If there is a mapping of the transmitting side that corresponds to the mapping of the receiving side, only the mapping is searched.
- If there is not a mapping of the transmitting side that corresponds to the mapping of the receiving side, the mapping set in the receiving side is searched.
- If the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

7.1.2 Displaying Search Result *'Result : Trouble search' screen*

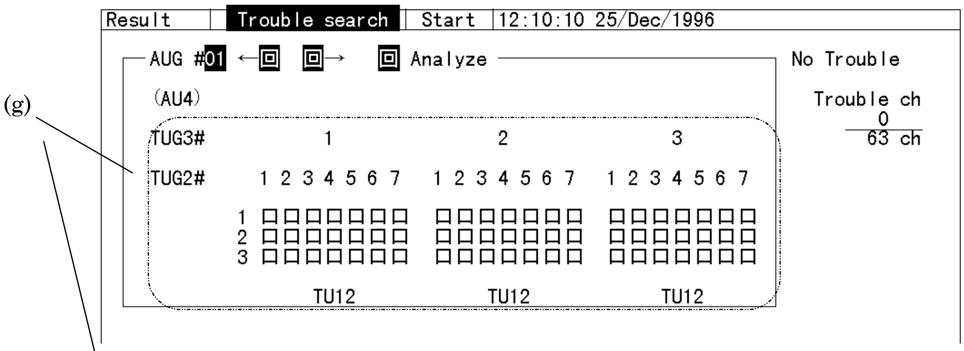
(1) Open the 'Result : Trouble search' screen. (The 'Result : Trouble search' screen appears if you press **Result** while the 'Test menu : Trouble search' screen is open.)

(2) The screen displays the trouble search measurement results. The measured results are for all channels on each mapping route. Here are three examples: measurement results for AU4-VC4 route, AU4-TUG3-TUG2-TU12-VC12 route, and for the Mixed Payload with #1-TU11-VC11/#2-TU2-VC2/#3-TU3-VC3 route.

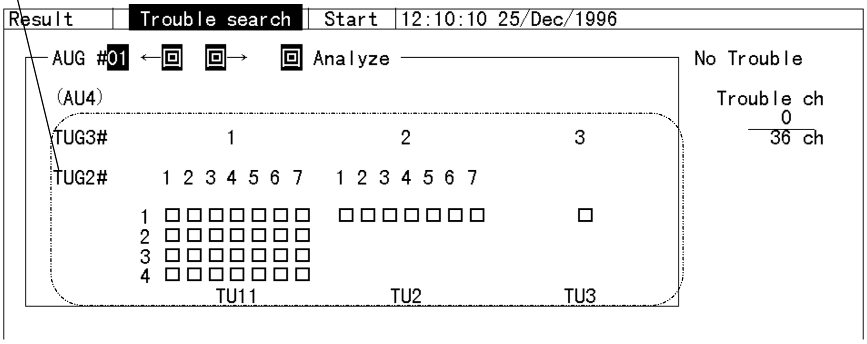
AU4-VC4 route



for AU4-TUG3-TUG2-TU12-VC12 route



for Mixed Payload ; #1-TU11-VC11/#2-TU2-VC2/#3-TU3-VC3 route below TUG3t



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

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

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

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

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

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

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

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

(f) (AU4) ..... Illuminated in red when an error excluding LOS, LOF and AIS ,or an alarm occurs in Section/HP(AU).

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

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

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

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

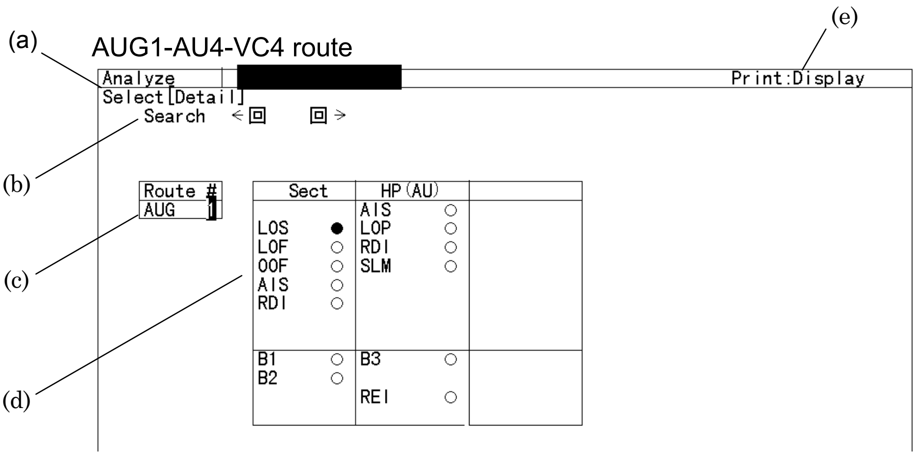
7.1.3 Analysis of the Search Results *'Analyze : Trouble search' screen*

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

Detecting Error and Alarm Data for Each Channel

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

Here is an example of display for the AUG1-AU4-VC4 route.


AUG1-AU4-VC4 route

Sect		HP(AU)		
		AIS	○	
LOS	●	LOP	○	
LOF	○	RDI	○	
OOF	○	SLM	○	
AIS	○			
RDI	○			
B1	○	B3	○	
B2	○			
		REI	○	

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

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

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

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

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

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

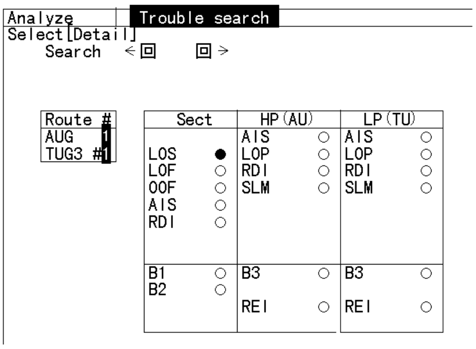
(d) Trouble content ..... displays the trouble contents for the current route.

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

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

- The displayed trouble contents differs according to the mapping. The figure on previous page shows the display for the AUG1-AU4-VC4 route. Here are more display examples.

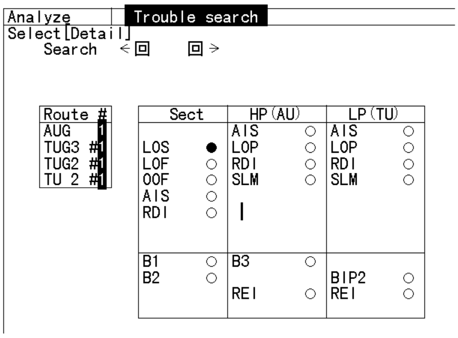
AUG#-AU4-VC4-TUG3#-TU3 route



Route #	
AUG	1
TUG3 #	1

Sect	HP(AU)	LP(TU)
LOS ● LOF ○ OOF ○ AIS ○ RDI ○	AIS ○ LOP ○ RDI ○ SLM ○	AIS ○ LOP ○ RDI ○ SLM ○
B1 ○ B2 ○	B3 ○ REI ○	B3 ○ REI ○

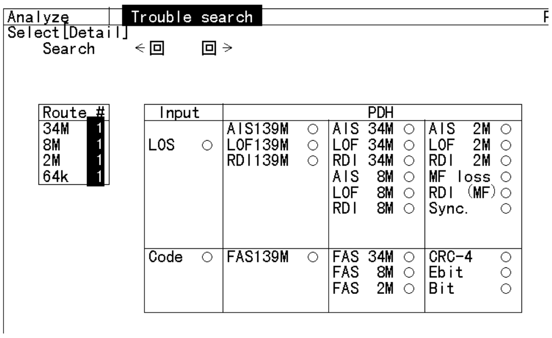
AUG#-AU3-VC3#-TU2#-TU2/TU12/TU11 route



Route #	
AUG	1
TUG3 #	1
TUG2 #	1
TU 2 #	1

Sect	HP(AU)	LP(TU)
LOS ● LOF ○ OOF ○ AIS ○ RDI ○	AIS ○ LOP ○ RDI ○ SLM ○	AIS ○ LOP ○ RDI ○ SLM ○
B1 ○ B2 ○	B3 ○ REI ○	BIP2 ○ REI ○

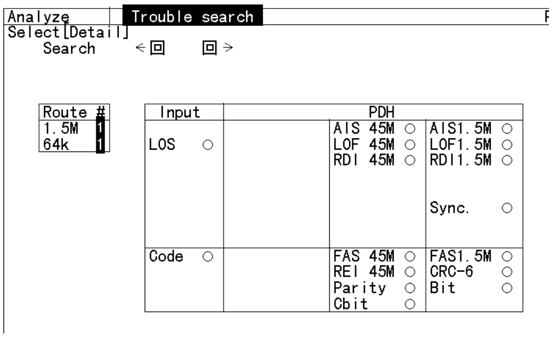
PDH: 139M, 34M, 8M, 2M



Route #	
34M	1
8M	1
2M	1
64k	1

Input	PDH		
LOS ○	AIS139M ○ LOF139M ○ RDI139M ○	AIS 34M ○ LOF 34M ○ RDI 34M ○ AIS 8M ○ LOF 8M ○ RDI 8M ○	AIS 2M ○ LOF 2M ○ RDI 2M ○ MF loss ○ RDI (MF) ○ Sync. ○
Code ○	FAS139M ○	FAS 34M ○ FAS 8M ○ FAS 2M ○	CRC-4 ○ Ebit ○ Bit ○

PDH: 45M, 1.5M



Route #	
1.5M	1
64k	1

Input	PDH		
LOS ○		AIS 45M ○ LOF 45M ○ RDI 45M ○	AIS1.5M ○ LOF1.5M ○ RDI1.5M ○ Sync. ○
Code ○		FAS 45M ○ REI 45M ○ Parity ○ Cbit ○	FAS1.5M ○ CRC-6 ○ Bit ○

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

Display	Trouble for the currently displayed route
After	Trouble for the route that comes after the currently displayed route
Before	Trouble for the route that comes before the currently displayed route
All	Trouble for all the routes

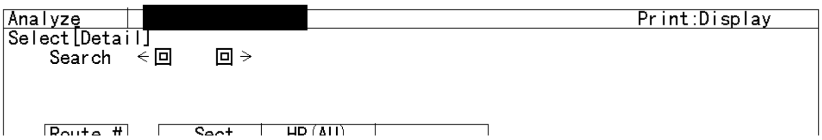
Displaying NG Paths (paths for which errors and alarms were detected)

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

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

(2) Move the cursor to ‘Select’ and press Set.

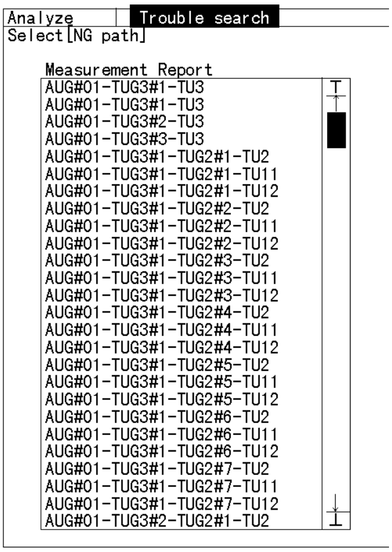
(3) ‘Item selection window’ is displayed. Select ‘NG path’ with ∧ ∨ and press Set to display the NG paths.



```
Analyze                                                  Print:Display
Select[Detail]
    Search  <回    回>

   Route #    Sect    HP(All)
```

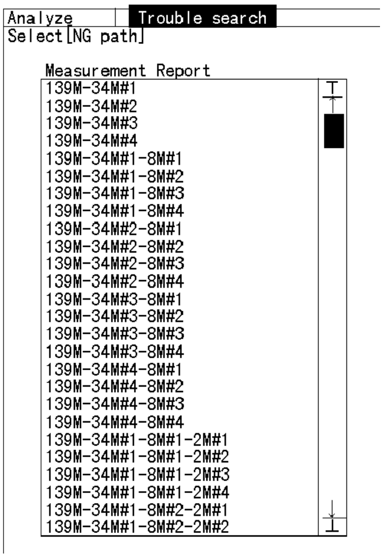
– Examples of routes of NG paths are displayed below.

Simultaneous SDH measurement



```
Analyze        Trouble search
Select[NG path]

  Measurement Report
  AUG#01-TUG3#1-TU3
  AUG#01-TUG3#1-TU3
  AUG#01-TUG3#2-TU3
  AUG#01-TUG3#3-TU3
  AUG#01-TUG3#1-TUG2#1-TU2
  AUG#01-TUG3#1-TUG2#1-TU11
  AUG#01-TUG3#1-TUG2#1-TU12
  AUG#01-TUG3#1-TUG2#2-TU2
  AUG#01-TUG3#1-TUG2#2-TU11
  AUG#01-TUG3#1-TUG2#2-TU12
  AUG#01-TUG3#1-TUG2#3-TU2
  AUG#01-TUG3#1-TUG2#3-TU11
  AUG#01-TUG3#1-TUG2#3-TU12
  AUG#01-TUG3#1-TUG2#4-TU2
  AUG#01-TUG3#1-TUG2#4-TU11
  AUG#01-TUG3#1-TUG2#4-TU12
  AUG#01-TUG3#1-TUG2#5-TU2
  AUG#01-TUG3#1-TUG2#5-TU11
  AUG#01-TUG3#1-TUG2#5-TU12
  AUG#01-TUG3#1-TUG2#6-TU2
  AUG#01-TUG3#1-TUG2#6-TU11
  AUG#01-TUG3#1-TUG2#6-TU12
  AUG#01-TUG3#1-TUG2#7-TU2
  AUG#01-TUG3#1-TUG2#7-TU11
  AUG#01-TUG3#1-TUG2#7-TU12
  AUG#01-TUG3#2-TUG2#1-TU2
```

Simultaneous PDH measurement



```
Analyze        Trouble search
Select[NG path]

  Measurement Report
  139M-34M#1
  139M-34M#2
  139M-34M#3
  139M-34M#4
  139M-34M#1-8M#1
  139M-34M#1-8M#2
  139M-34M#1-8M#3
  139M-34M#1-8M#4
  139M-34M#2-8M#1
  139M-34M#2-8M#2
  139M-34M#2-8M#3
  139M-34M#2-8M#4
  139M-34M#3-8M#1
  139M-34M#3-8M#2
  139M-34M#3-8M#3
  139M-34M#3-8M#4
  139M-34M#4-8M#1
  139M-34M#4-8M#2
  139M-34M#4-8M#3
  139M-34M#4-8M#4
  139M-34M#1-8M#1-2M#1
  139M-34M#1-8M#1-2M#2
  139M-34M#1-8M#1-2M#3
  139M-34M#1-8M#1-2M#4
  139M-34M#1-8M#2-2M#1
  139M-34M#1-8M#2-2M#2
```

7.2 Manual Measurement (Measurement of One Channel on a Mapping Route)

Manual measurement allows the following measurements of one channel on a mapping route.

Error and alarm measurement

Justification measurement

Performance measurement

The start of manual measurement clears all previously measured results.

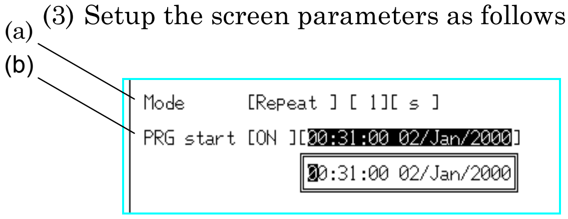
Here is the procedure of manual measurement, along with the steps for displaying and analyzing the measured results.

7.2.1 Setting and Starting the Measurement *'Test menu : Manual' screen*

(1) Connect the MP1570A and the equipment to be examined as described in the 'Section 5' and 'Section 6'.

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

(3) Setup the screen parameters as follows:



```
Mode      [Repeat ] [ 1][ s ]
PRG start [ON ][00:31:00 02/Jan/2000]
               00:31:00 02/Jan/2000
```

(a) Mode ..... sets the measurement mode as follows:

Single ..... Single measurement

Repeat ..... Repeated measurement

Manual ..... Once the measurement is started, it continues until you press ● Start /Stop .

- Measurement time is set on 'Single' or 'Repeat' mode.

(b) PRG start ..... Automatically starts a measurement at the measurement start time if this is set at ON (programming start). Input the measurement start time.

(4) Start measurement by pressing ● Start /Stop after the setting in step (3).

Note

- Press ● Start /Stop to stop the measurement.
- If you change the alarm detection and removal conditions, the system clock, and the graph resolution during the measurement, data is discarded, and a measurement is started from the beginning.

7.2.2 Display and Analysis of the Error and Alarm Measurement Results

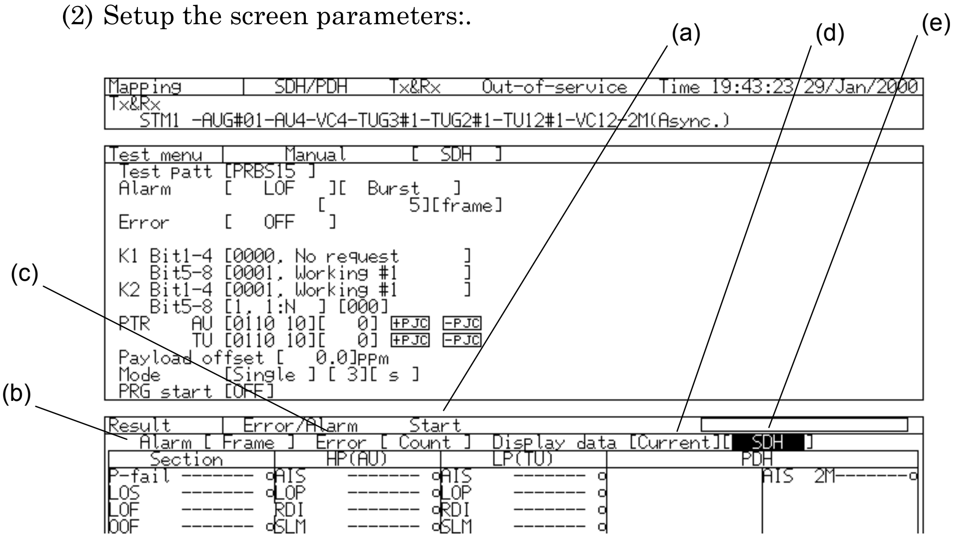
Here is the procedure for displaying and analyzing the error and alarm measurement results obtained by manual measurement explained in '7.2.1 Setting and Starting the Measurement'.

Displaying the Error and Alarm Measurement Results

'Result : Error/Alarm' screen

(1) Open the 'Result : Error/Alarm' screen.

(2) Setup the screen parameters:.



```
Mapping      |   SDH/PDH    Tx&Rx     Out-of-service   Time 19:43:23 29/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC12-2M(Async.)

Test menu  |       Manual       [  SDH   ]
 Test patt [PRBS15 ]
 Alarm     [   LOF   ][  Burst    ]
                     [         5][frame]
 Error     [   OFF   ]

 K1 Bit1-4 [0000, No request       ]
    Bit5-8 [0001, Working #1       ]
 K2 Bit1-4 [0001, Working #1       ]
    Bit5-8 [1, 1:N  ] [000]
 PTR    AU [0110 10][    0] +PJC -PJC
        TU [0110 10][    0] +PJC -PJC
 Payload offset [   0.0]ppm
 Mode      [Single ] [ 3][ s ]
 PRG start [OFF]

Result     |  Error/Alarm     Start
   Alarm [ Frame ]  Error [ Count ]  Display data [Current][ SDH  ]
    Section      |     HP(AU)      |     LP(TU)      |               PDH
P-fail -------- o AIS   -------- o AIS   -------- o              AIS  2M--------o
LOS    -------- o LOP   -------- o LOP   -------- o
LOF    --------   RDI   -------- o RDI   -------- o
OOF    -------- o SLM   -------- o SLM   -------- o
```

(a) [Measurement time display] ..... selects the display pattern of measurement time as follows:

Start.............displays the time at which the measurement was started.

Elapsed........displays the elapsed time after a measurement is started.

- The bar graph shows the measurement progress.

(b) Alarm ..... selects the display pattern of alarm measurement results.

Second .... displays the number of seconds for which the alarm is to be generated.

Frame .... displays the frame at which the alarm has occurred.

(c) Error ..... selects the display pattern of error measurement results.

Count........... displays the generated error count.

Rate .... Converts and displays the generated error into rate.

(d) Display data ..... selects the display pattern of measured results.

Current........ displays the measured results from measurement start to the present time.

Last............. displays the measured results on completion of measurement. This is useful for repeated short-time measurements.

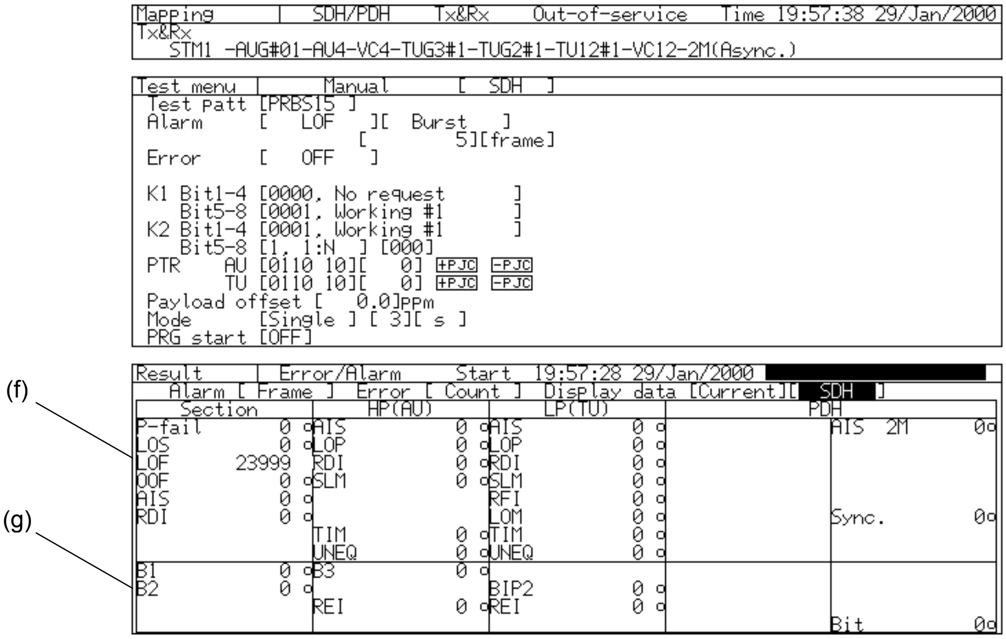
(e) [Display type] ..... selects the display type when on the two- or three- division display.

SDH .... displays the measured results regarding PDH and SDH frame.

TC/Sig.......... displays the measured results regarding the tandem connection and signalling.

(3) After the setting, start the measurement by pressing ● Start /Stop .

(4) Measured results are displayed as shown in the examples below.



```
Mapping        |  SDH/PDH    Tx&Rx    Out-of-service   Time 19:57:38 29/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC12-2M(Async.)

Test menu  |      Manual       [  SDH  ]
 Test patt [PRBS15 ]
 Alarm     [   LOF   ][  Burst   ]
                      [        5][frame]
 Error     [   OFF   ]

 K1 Bit1-4 [0000, No request       ]
    Bit5-8 [0001, Working #1       ]
 K2 Bit1-4 [0001, Working #1       ]
    Bit5-8 [1, 1:N  ] [000]
 PTR    AU [0110 10][   0] +PJC -PJC
        TU [0110 10][   0] +PJC -PJC
 Payload offset [   0.0]ppm
 Mode      [Single ] [ 3][ s ]
 PRG start [OFF]

Result     |  Error/Alarm     Start  19:57:28 29/Jan/2000
   Alarm [ Frame ]  Error [ Count ]  Display data [Current][ SDH  ]
     Section      |      HP(AU)       |      LP(TU)       |            PDH
P-fail        0 ○|AIS             0 ○|AIS             0 ○|            |AIS  2M      0○
LOS           0 ○|LOP             0 ○|LOP             0 ○|            |
LOF       23999  |RDI             0 ○|RDI             0 ○|            |
OOF           0 ○|SLM             0 ○|SLM             0 ○|            |
AIS           0 ○|                   |RFI             0 ○|            |
RDI           0 ○|                   |LOM             0 ○|            |Sync.        0○
                 |TIM             0 ○|TIM             0 ○|            |
                 |UNEQ            0 ○|UNEQ            0 ○|            |
B1            0 ○|B3              0 ○|                   |            |
B2            0 ○|                   |BIP2            0 ○|            |
                 |REI             0 ○|REI             0 ○|            |
                 |                   |                   |            |Bit          0○
```

(f) [Alarm measurement results] ..... displays the alarm measurement results in accordance with the setting in (b).

(g) [Error measurement results] ..... displays the error measurement results in accordance with the setting in (c).

● (illuminated in red) ..... Appears when an error occurs regardless of measurement start and stop.

History Display of the Errors and Alarms

The detected errors and alarms detected during the measurement can be memorized (History display). Here is the setting procedure.

(1) press ●History during the measurement.

(2) If errors and alarms are detected after the measurement starts or pressing ●History, the lump on the front panel are turned on. In addition, '●' is illuminated in red on the screen

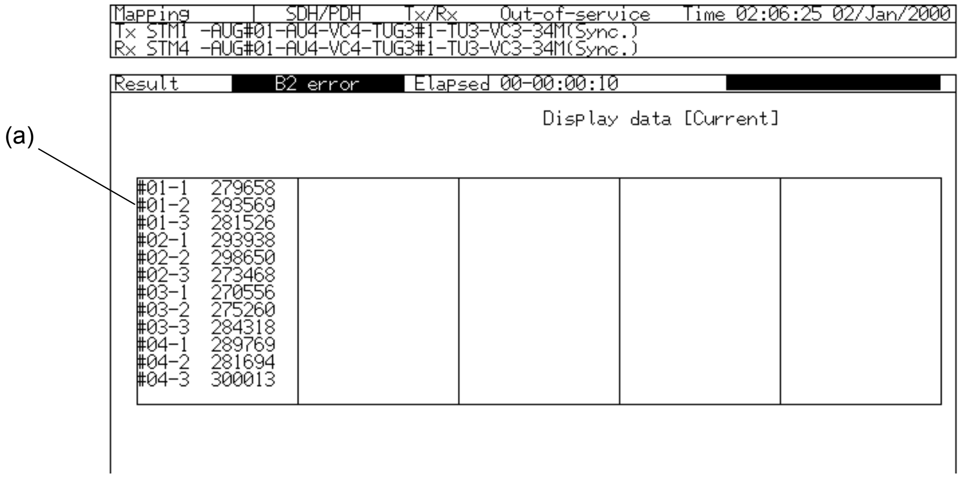
– Press Reset to clear the data.

Display of the B2 Error Measurement Results *'Result : B2 error' screen*

B2 error of each byte can be displayed simultaneously. Here is the procedure for displaying the B2 error measurement results,

(1) Open the 'Result : B2 Error' screen.

(2) B2 error of each byte is displayed.



```
Mapping       |  SDH/PDH    Tx/Rx     Out-of-service   Time 02:06:25 02/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)

Result          B2 error       Elapsed 00-00:00:10

                                         Display data [Current]

#01-1   279658
#01-2   293569
#01-3   281526
#02-1   293938
#02-2   298650
#02-3   273468
#03-1   270556
#03-2   275260
#03-3   284318
#04-1   289769
#04-2   281694
#04-3   300013
```

(a) #xx-y ….. 'xx' represents AUG under the measurement.
'y' represents the B2 byte channel. '1' is the first byte.

Note

B2 error measurement results are displayed in count. It can not be display in rate.

Displaying the Error and Alarm of TU Channel

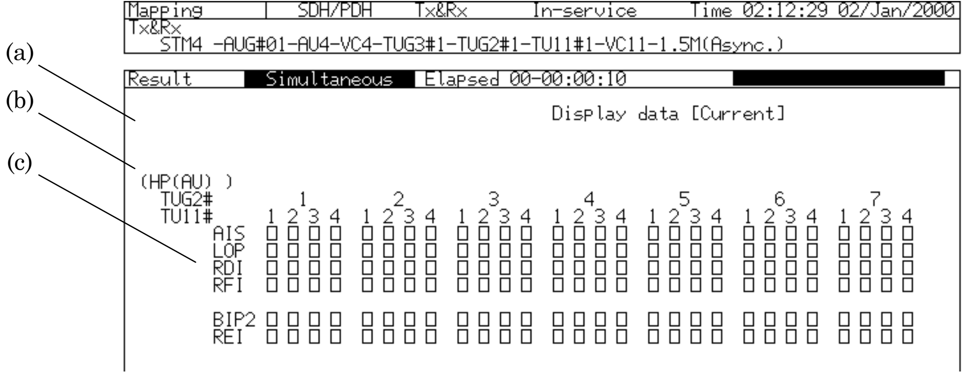
'Result : Simultaneous' screen

The errors and alarms of VC3, VC2 (7ch), VC12 (21ch), and VC11 (28ch) mapped to the specified TUG3 or VC3 can be detected and displayed. Here is the procedure for performing this measurement.

(1) Open the 'Result : Simultaneous' screen.

(2) The screen displays the measured results as shown in the examples below. In each case, the measured results for all channels mapped to the measurement channel TUG3 or VC3 are displayed.

Example : TUG2-TU11



```
Mapping        SDH/PDH    Tx&Rx       In-service      Time 02:12:29 02/Jan/2000
Tx&Rx
   STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU11#1-VC11-1.5M(Async.)

Result      Simultaneous   Elapsed 00-00:00:10

                                        Display data [Current]

(HP(AU) )
  TUG2#          1          2          3          4          5          6          7
  TU11#      1 2 3 4    1 2 3 4    1 2 3 4    1 2 3 4    1 2 3 4    1 2 3 4    1 2 3 4
      AIS    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □
      LOP    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □
      RDI    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □
      RFI    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □

      BIP2   □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □
      REI    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □    □ □ □ □
```

(a) (Section)..........Illuminated in red when an error or alarm occurs in the section.

(b) (HP(AU)).........Illuminated in red when an error or alarm occurs in HP(AU).

- This screen displays whether the section and HP(AU) have an error or alarm. The 'Result : Error/Alarm' screen displays the error and alarm details.

(c) [TU measured results display area] ..... displays the measured results of all channels (The display mode differs according to the selected mapping route.).

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

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

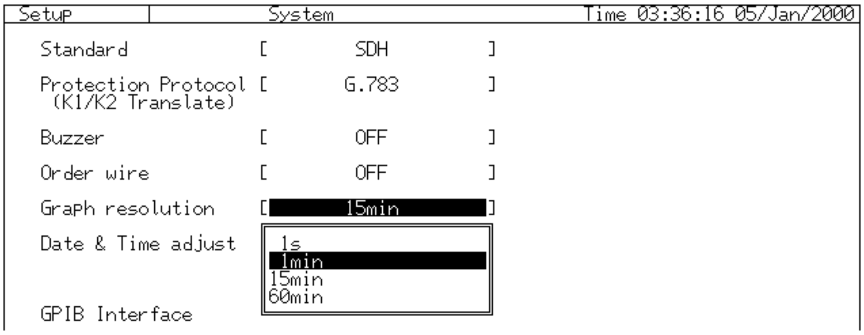
Analysis of the Error and Alarm Measurement Results

'Analyze : Error Alarm' screen

The measurement results obtained by the manual measurement can be displayed on a bar graph. By displaying the graph, time the error and alarm occur and their frequency can be analyzed. Here is the procedure for graph display of error and alarm measurement results.

(1) Firstly, open the 'Setup : System' screen to set graph resolution.

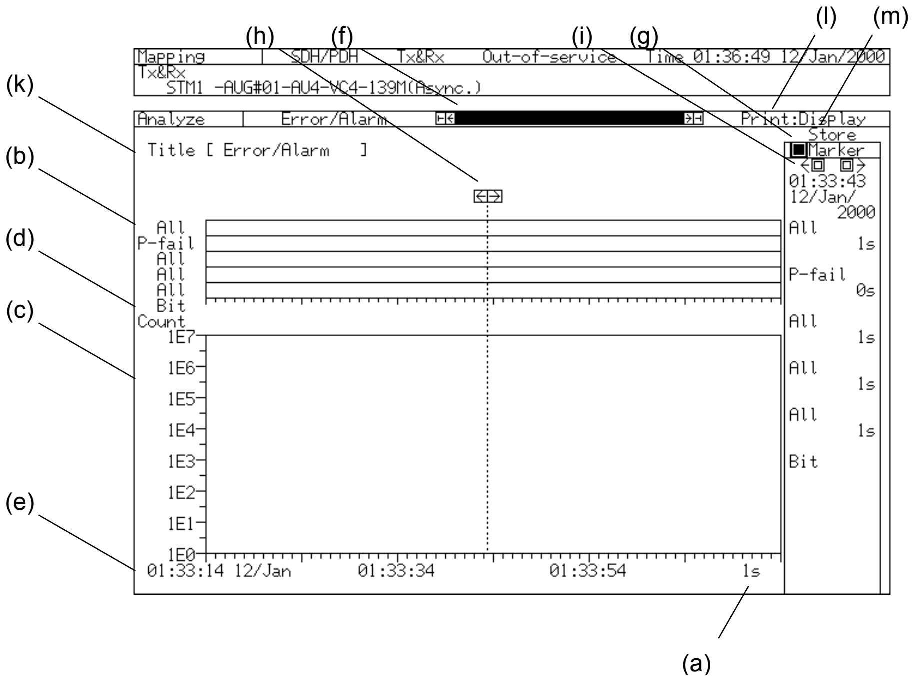
(2) Select the graph resolution from '1s', '1min', '15min', and '60min'.



```
Setup    |          System                    Time 03:36:16 05/Jan/2000
   Standard               [        SDH          ]
   Protection Protocol    [       G.783         ]
    (K1/K2 Translate)
   Buzzer                 [        OFF          ]
   Order wire             [        OFF          ]
   Graph resolution       [       15min         ]
   Date & Time adjust      1s
                           1min
                           15min
                           60min
   GPIB Interface
```

(3) Open the 'Analyze : Error Alarm' screen ('Analyze : Error Alarm' screen appears if you press Alarm while Manual is selected on the Test menu main screen.).

(4) Setup the screen parameters as follows:



```
Mapping  | SDH/PDH    Tx&Rx    Out-of-service    Time 01:36:49 12/Jan/2000
Tx&Rx
  STM1 -AUG#01-AU4-VC4-139M(Async.)

Analyze  |   Error/Alarm                               Print:Display
                                                        Store
 Title [ Error/Alarm   ]                               Marker
                                                       01:33:43
                                                       12/Jan/
                                                          2000
    All                                                All
P-fail                                                      1s
   All                                                 P-fail
   All                                                      0s
   All                                                 All
   Bit                                                      1s
Count                                                  All
  1E7                                                       1s
  1E6                                                  All
  1E5                                                       1s
  1E4                                                  Bit
  1E3
  1E2
  1E1
  1E0
 01:33:14 12/Jan     01:33:34      01:33:54       1s
```

Setting the graph

(a) [Abscissa scale] ..... selects the abscissa scale from 1s, 1min, 15min, and 60min.

(b) [Alarm] ..... selects the alarm to be displayed.

- Move the cursor to the left-hand side of the graph and press Set . The window for alarm selection is opened. Select the alarm to be displayed on the window.
- Up to five alarms can be simultaneously displayed on single-screen display. Up to two alarms can be displayed on two- and three-division screens .
- displays the logical sum of all alarms that have occurred, if you select All under Alarm.

(c) [Error] ..... selects the error to be displayed.

- displays no other error simultaneously.

(d) [Error display mode] ..... selects the error display mode.

Count ..... displays the generated error count.

Rate ..... displays the generated error rate converted from the error count.

(e) [Graph top time display] ..... displays the time at the top of the graph on the screen. You can scroll the graph by changing the time.

(f) [Graph scroll] ..... scrolls the graph horizontally if you move the cursor here and press Set .

⇤................scrolls the screen to the top page.

←................scrolls the screen to a half page before.

→................scrolls the screen to a half page after.

⇥................scrolls the screen to the last page.

Setting the Maker

(g) Marker ..... displays the On/Off of the Marker. This function is only available for single-screen display.

☐ .....indicates that the Marker is set to Off. You can turn it On by pressing Set .

▣ ..... indicates that the Marker is set to On. You can turn it Off by pressing Set .

(h) [Moving maker] ..... Move the cursor here and press Set to move the cursor.

← .... Moves the maker to left.

→ .... Moves the maker to right.

- Set the marker to on or off in step (i)

(i) [Search] ..... Searches for the errors and alarms. This function is enabled only when the marker is displayed.

←☐ ..... Moves the marker to the previous errors or to the time at which an alarm occurred.

→ ..... Moves the marker to the subsequent errors or to the time at which an alarm occurred.

(j) [Time and detailed data for marker position] ..... displays the time and detailed data of errors and alarms at the marker position.

- Counts only the alarm items and displays them as alarm measurement results, if 'Count' is selected in (g).
- displays only the error items which have been converted into the error rate as the error measurement results if 'Rate' is selected in (g).

Setting on storing analyzed data

(k) Title ..... Assigns a title to the screen currently displayed. This function is only available on a single display screen.

- If you press Set, the character input window is opened. Input the title.

(l) Print ..... selects the contents to be printed. (Press Print Now to start the printing.)

Display ..... Data is displayed on the screen
All ..... Data from the start of measurement
Before ..... Data before the currently displayed data
After ..... Data after the currently displayed data

(m) Store ..... stores the graph data in the memory. This is only available for single-screen display. If you press Set, the character input window is opened. Input a name and save it in the memory.

Note

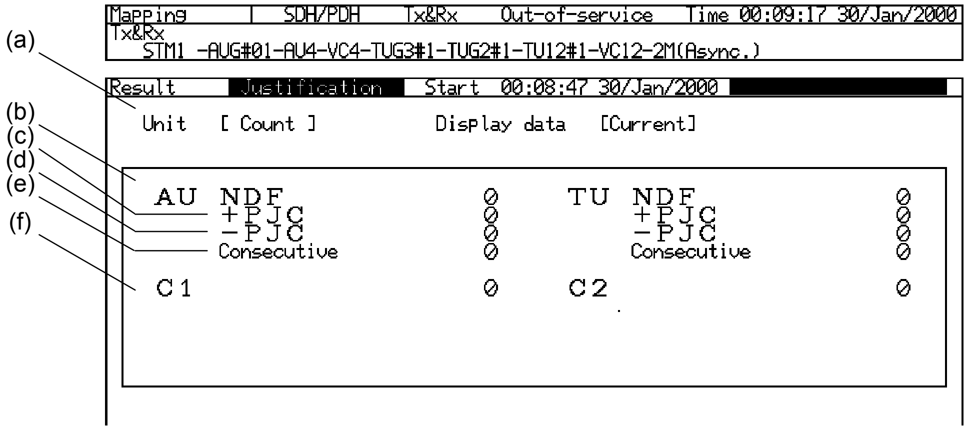
The 'Log memory full' condition will suspend Error/Alarm graph creation. In particular, if the graph resolution is set at '1s', the graph creation for a screen may be stopped halfway.

7.2.3 Displaying the Justification Count *'Result : Justification' screen*

The type of the pointer change detected during the measurement and the counting result can be displayed. Here is the procedure for displaying them.

(1) Open the 'Result : Justification' screen in the state of having performed the manual measurement.

(2) The type of the AU pointer change and Tu pointer change and the counting result, which are detected from the measurement start, are displayed.



```
Mapping    | SDH/PDH   Tx&Rx   Out-of-service   Time 00:09:17 30/Jan/2000
Tx&Rx
  STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC12-2M(Async.)

Result   Justification   Start  00:08:47 30/Jan/2000
  Unit   [ Count ]          Display data   [Current]

   AU  NDF              0     TU  NDF              0
       +PJC             0         +PJC             0
       -PJC             0         -PJC             0
       Consecutive      0         Consecutive      0
   C1                   0     C2                   0
```

(a) Unit ..... selects the display mode of measured results for the generated justification.

Count.... displays the justification count.

Rate ...... displays the justification rate converted from the justification count.

ppm....... displays the generated justification in ppm.

(b) NDF.......... displays the pointer change or rate caused by NDF.

(c) +PJC .... displays the positive pointer justification count or rate.

(d) -PJC .... displays the negative pointer justification count or rate.

(e) Consecutive .... displays the pointer change or rate caused by three pointers that had the same pointer.

(f) C ..... displays the bit count or rate of information bit based on the justification of the C bit in the mapping of VC4-139M and VC3-45M (Async.)

C1 ..... displays the bit count or rate of information bit based on the justification of the C bit in the mapping of VC3-34(Async.), VC2-6M(Async.), VC12-2M(Async.), and VC11-1.5M(Async.).

C2 ..... displays the fixed stuff bit count or rate based on the justification of the C bit in the mapping of VC3-34(Async.), VC2-6M(Async.), VC12-2M(Async.), and VC11-1.5M(Async.).

7.3 Display of Performance Measurement Results *'Result : Performance' screen*

The MP1570A can evaluate a line in accordance with the standard of the performance measurement stipulated by ITU-T.

(a)

(a) Performance Recommendation …..Select the standard of the performance measurement.

7.3.2 Measurement

After selecting the standard of the performance measurement, set parameters on the 'Result : Performance' screen and start a measurement by pressing • Start /Stop. And the measurement results are shown according to the selected standard.

- Supplement -

On Performance measurement, the MP1570A handles the error measurement results (related to MS-REI) only at concatenation mapping (involving VC4-Bulk) for the specified bit rate.

The related measurements are as follows:

When you select G.821 for performance:

When you select G.821 for performance on the 'Setup : Measurement condition' screen, the following performance measurement results are displayed

EC .... Error Count

ES .... Ratio between Error seconds and effective measurement time

Annex-D %ES....... Ratio between ES of ITU-T G.821 Annex-D and effective measurement time

EFS .... Ratio of error free seconds to effective measurement time

SES .... Ratio of severe error seconds to effective measurement time

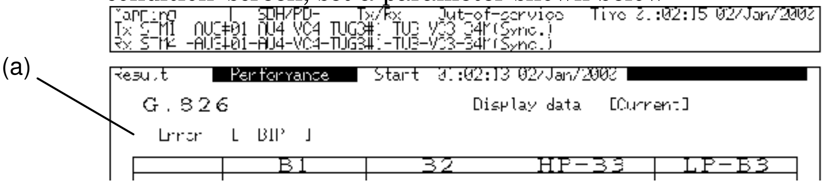
US .... Ratio of unavailable seconds to effective measurement time

DM .... Ratio of degraded minutes to effective measurement time

Code ES ... Code error seconds

When you select G.826 for Performance:

(1) When you select G.826 for performance on the 'Setup : Measurement condition' screen, set a parameter shown below



```
Mapping        |  SDH/PDH    Tx/Rx    Out-of-service   Time 0 :02:15 02/Jan/2000
Tx STM1  AUG#01 AU4 VC4 TUG3#1 TU3 VC3 34M(Sync.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)

Result     Performance    Start  0 :02:13 02/Jan/2000
  G.826                               Display data   [Current]
   Error   [  BIP  ]
          |    B1    |    B2    |   HP-B3   |  LP-B3
```

(a) Error ….. Specify the type of the error to be measured.

BIP ….. measures the SDH parity operation error.

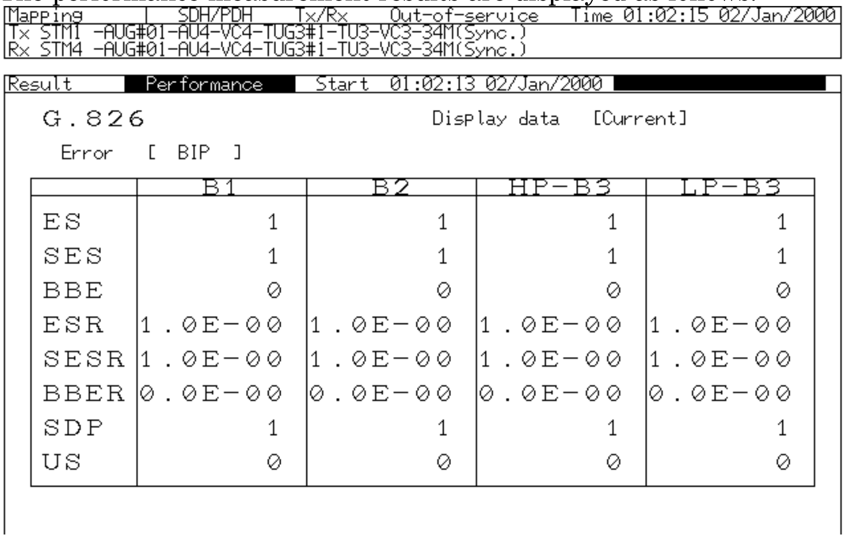
REI ….. measures the REI error.

FAS/CRC …..

Parity ….. measures the parity operation error of the 45M frame

Bit ….. measures the information error.

(2) The performance measurement results are displayed as follows:



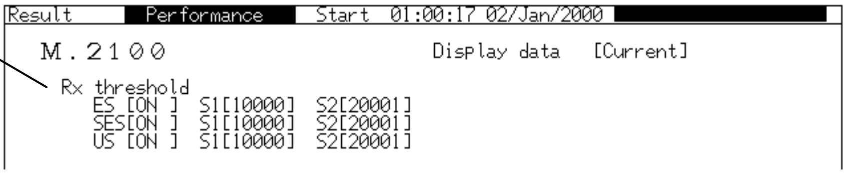
```
Mapping        |  SDH/PDH    Tx/Rx    Out-of-service   Time 01:02:15 02/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)

Result     Performance    Start  01:02:13 02/Jan/2000
  G.826                               Display data   [Current]
   Error   [  BIP  ]
```

	B1	B2	HP-B3	LP-B3
ES	1	1	1	1
SES	1	1	1	1
BBE	0	0	0	0
ESR	1.0E-00	1.0E-00	1.0E-00	1.0E-00
SESR	1.0E-00	1.0E-00	1.0E-00	1.0E-00
BBER	0.0E-00	0.0E-00	0.0E-00	0.0E-00
SDP	1	1	1	1
US	0	0	0	0

EC………..	Error Count
SES………	Ratio of Severe Error Seconds to effective measurement time
BBE………	Background Block Error count
ESR………	Error Second Ratio
SESR…….	Severe Error Second Ratio
BBER…….	Background Block Error Second Ratio
SDP………	Severely Disturbed Period count
US………..	Ratio of Unavailable Seconds to effective measurement time

When you select M.2100 for performance:

(1) When you select M.2100 for performance on the 'Setup : Measurement condition' screen, set the threshold for judging the received signal and transmitted signal



(a)

```
Result    Performance   Start  01:00:17 02/Jan/2000
 M.2100                         Display data   [Current]
   Rx threshold
     ES [ON ]  S1[10000]  S2[20001]
     SES[ON ]  S1[10000]  S2[20001]
     US [ON ]  S1[10000]  S2[20001]
```

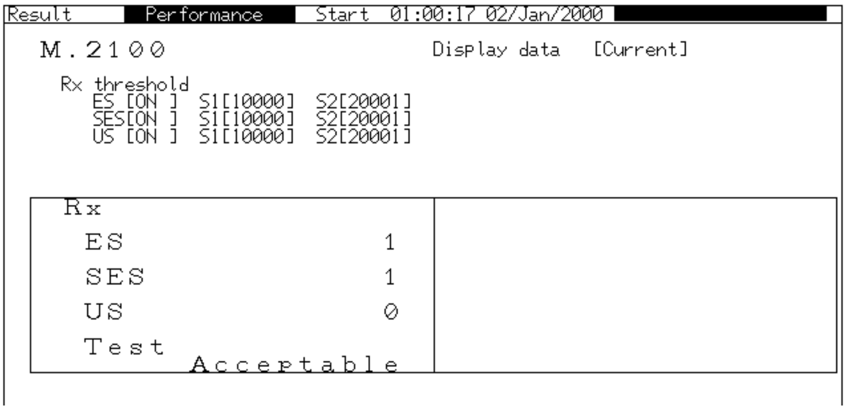
(a) Rx threshold ..... sets the threshold for judging the received signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(b) Tx threshold ..... sets the threshold for judging the transmitted signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(2) The performance measurement results are displayed as follows:



```
Result    Performance   Start  01:00:17 02/Jan/2000
 M.2100                         Display data   [Current]
   Rx threshold
     ES [ON ]  S1[10000]  S2[20001]
     SES[ON ]  S1[10000]  S2[20001]
     US [ON ]  S1[10000]  S2[20001]

   Rx
     ES                    1
     SES                   1
     US                    0
     Test
           Acceptable
```

EC .... Error Count

SES.......... Severe Errored Seconds

US........... Unavailable Seconds

Test .... Judgement results against the thresholds set in (a) and (b)

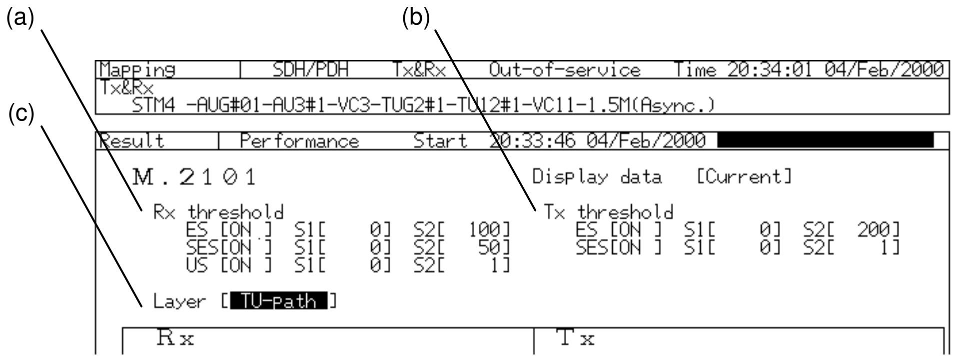
Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	≤	Measured results		

- The display priority is Unacceptable > Degraded > Acceptable.

When you select M.2101 for performance:

(1) Set the parameters as shown below when you select M.2101 for performance on the 'Setup : Measurement condition' screen.



```
Mapping    | SDH/PDH   Tx&Rx   Out-of-service   Time 20:34:01 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Result   | Performance     Start  20:33:46 04/Feb/2000

  M.2101                                    Display data   [Current]
    Rx threshold                              Tx threshold
       ES [ON ]  S1[     0]  S2[   100]          ES [ON ]  S1[     0]  S2[   200]
       SES[ON ]  S1[     0]  S2[    50]          SES[ON ]  S1[     0]  S2[     1]
       US [ON ]  S1[     0]  S2[     1]

    Layer [ TU-path ]

   Rx                                     Tx
```

(a) Rx threshold ..... sets the threshold for judging the received signal.

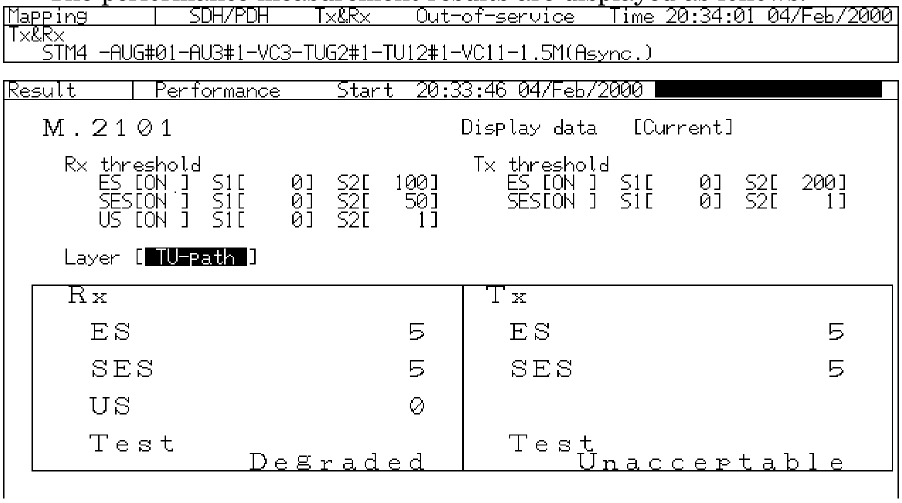
If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(b) Tx threshold ..... sets the threshold for judging the transmitted signal.

If you set this at OFF, the performance results of the item are not judged. No judgement is performed if you set all parameters at OFF.

(c) Layer ..... selects the measured item range from Section, AU-path and TU-path.

The performance measurement results are displayed as follows:



```
Mapping       | SDH/PDH     Tx&Rx    Out-of-service    Time 20:34:01 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Result     | Performance     Start  20:33:46 04/Feb/2000

  M.2101                                   Display data   [Current]

    Rx threshold                           Tx threshold
       ES [ON ]  S1[     0]  S2[   100]       ES [ON ]  S1[     0]  S2[   200]
       SES[ON ]  S1[     0]  S2[    50]       SES[ON ]  S1[     0]  S2[     1]
       US [ON ]  S1[     0]  S2[     1]

    Layer [ TU-path ]

   Rx                                  Tx
     ES                      5           ES                      5
     SES                     5           SES                     5
     US                      0
     Test                                Test
                   Degraded                   Unacceptable
```

EC ....Error Count

SES.......Severe Error Seconds

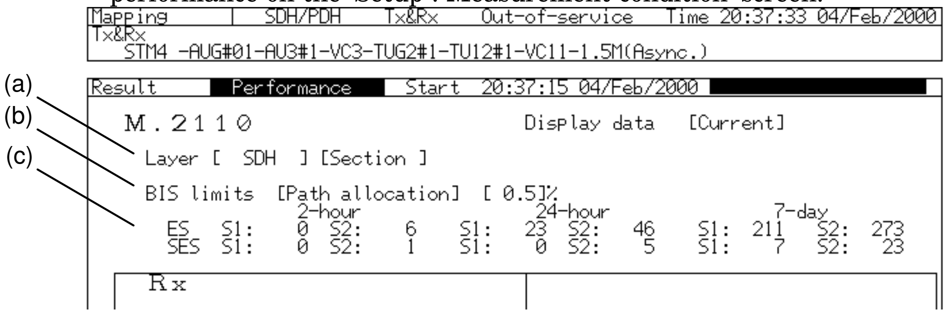
US ....Unavailable Seconds

Test ......Judgement results for the thresholds set in (a) and (b)

- The display priority is Unacceptable > Degraded > Acceptable.

When you select M.2110 for Performance:

(1) Set the parameters as shown below when you select M.2110 for performance on the 'Setup : Measurement condition' screen.



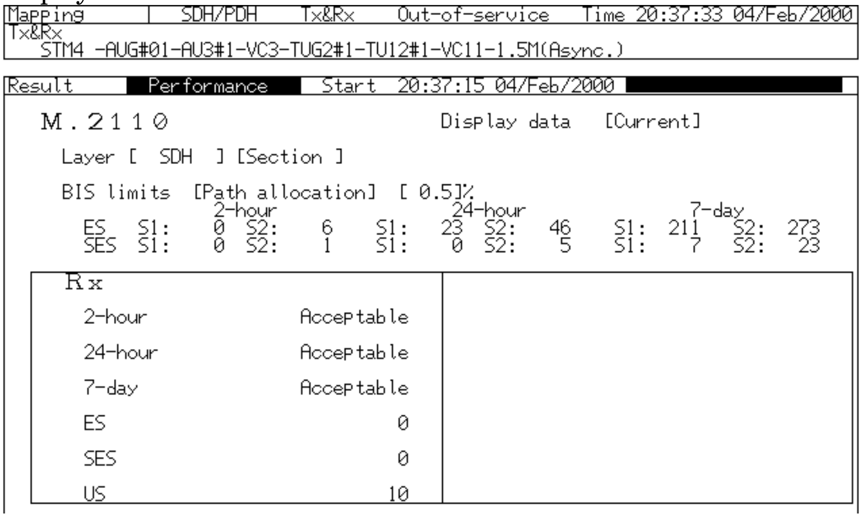
```
Mapping       | SDH/PDH     Tx&Rx    Out-of-service    Time 20:37:33 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Result     | Performance     Start  20:37:15 04/Feb/2000

  M.2110                                   Display data   [Current]
    Layer [  SDH  ] [Section ]
    BIS limits  [Path allocation]  [ 0.5]%
                  2-hour                24-hour                 7-day
      ES   S1:     0  S2:    6     S1:    23  S2:    46     S1:  211   S2:  273
      SES  S1:     0  S2:    1     S1:     0  S2:     5     S1:    7   S2:   23
   Rx
```

(a) Layer ..... sets the measured item range of M.2110.

(b) BIS limits ..... sets the BIS limits for M.2110.

(c) 2-hour, 24-hour, 7-day ..... ES and SES settings are displayed in the order of 2 hours, 24 hours, and 7 days.

(2) Performance measured results for received and transmitted signals are displayed as follows:



```
Mapping      SDH/PDH    Tx&Rx    Out-of-service    Time 20:37:33 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Result       Performance       Start   20:37:15 04/Feb/2000

  M.2110                                   Display data    [Current]

    Layer [  SDH   ] [Section ]

    BIS limits  [Path allocation]  [ 0.5]%
                     2-hour                    24-hour                   7-day
      ES   S1:      0  S2:      6     S1:     23  S2:     46     S1:  211   S2:  273
      SES  S1:      0  S2:      1     S1:      0  S2:      5     S1:    7   S2:   23

     Rx
      2-hour                   Acceptable
      24-hour                  Acceptable
      7-day                    Acceptable
      ES                                0
      SES                               0
      US                               10
```

2-hour, 24-hour, 7-day ..... ES and SES judgement results are displayed for 2 hours, 24 hours, and 7 days.

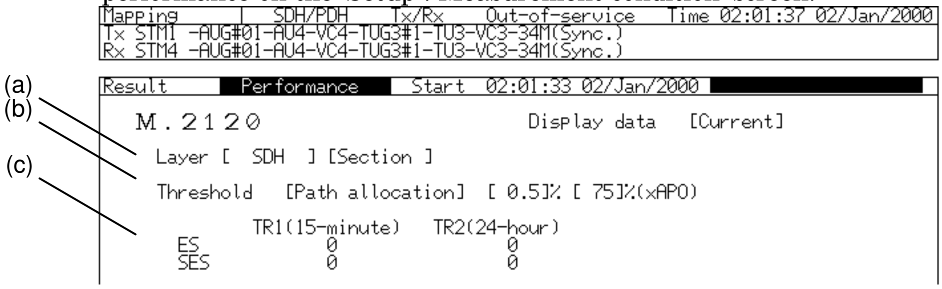
ES .... Error Seconds

SES .... Severe Error Seconds

US........... Unavailable Seconds

When you select M.2120 for Performance:

(1) Set the parameters as shown below when you select M.2101 for performance on the 'Setup : Measurement condition' screen.



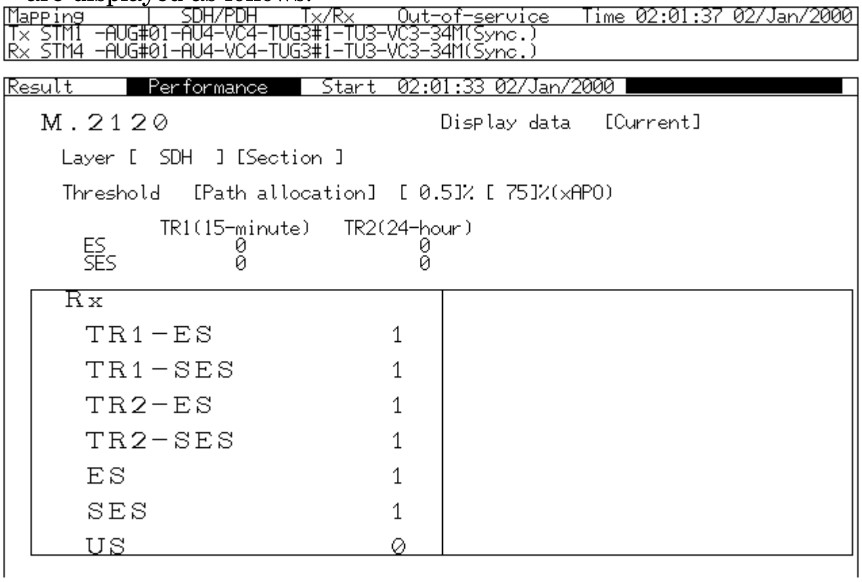
```
Mapping      |  SDH/PDH    Tx/Rx    Out-of-service    Time 02:01:37 02/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)

Result      Performance     Start  02:01:33 02/Jan/2000

 M.2120                              Display data   [Current]
   Layer [  SDH   ] [Section ]
   Threshold   [Path allocation]  [ 0.5]% [ 75]%(xAPO)
               TR1(15-minute)    TR2(24-hour)
    ES              0                 0
    SES             0                 0
```

(a)Layer ..... sets the measured item range of M.2120.

(b)Threshold ..... sets the threshold for M.2120.

(c) TR1(15-minutes), TR2(24-hour) ..... displays the ES and SES of TR1 and TR2 if the threshold is user.

(2) Performance measurement results for received and transmitted signals are displayed as follows:



```
Mapping      |  SDH/PDH    Tx/Rx    Out-of-service    Time 02:01:37 02/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Sync.)

Result      Performance     Start  02:01:33 02/Jan/2000

 M.2120                              Display data   [Current]
   Layer [  SDH   ] [Section ]
   Threshold   [Path allocation]  [ 0.5]% [ 75]%(xAPO)
               TR1(15-minute)    TR2(24-hour)
    ES              0                 0
    SES             0                 0

 Rx
   TR1-ES            1
   TR1-SES           1
   TR2-ES            1
   TR2-SES           1
   ES                1
   SES               1
   US                0
```

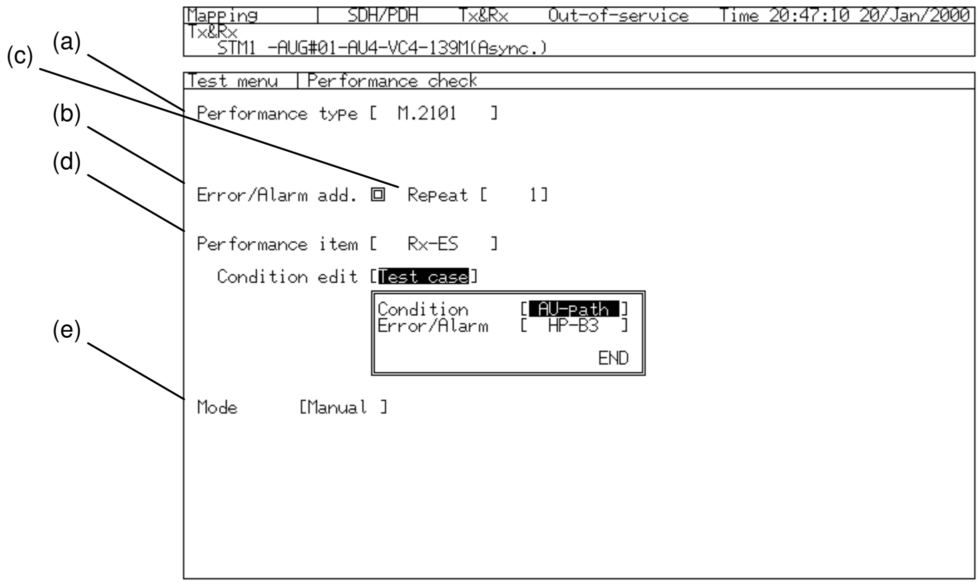
TR1-ES	TR1 Error Seconds
TR1 SES	TR1 Severe Error Seconds
TR2-ES	TR2 Error Seconds
TR2 SES	TR2 Severe Error Seconds
ES.............	Error Seconds
US	Unavailable Seconds

7.3.3 Error Performance Check

The MP1570A can generate errors and alarms exceeding the threshold of each performance measurement parameter. Here is the procedure for measurement.

(1) Open the 'Test menu : Performance check' screen.

(2) Set up the screen parameters.



```
Mapping     | SDH/PDH    Tx&Rx    Out-of-service    Time 20:47:10 20/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-139M(Async.)

Test menu  | Performance check
 Performance type [  M.2101    ]

 Error/Alarm add. ☐  Repeat [    1]

 Performance item [   Rx-ES    ]
   Condition edit [Test case]
                   Condition      [ AU-path ]
                   Error/Alarm    [  HP-B3  ]
                                         END

 Mode       [Manual ]
```

(a) Performance type .....selects a performance measurement standard.

(b) Error/Alarm add. ☐ .....The errors and alarms begin to be inserted by moving the cursor here and pressing Set.

☐ .....indicates that the error and alarms are not inserted.

▣ ..... indicates that the error and alarms are being inserted.

(c) Repeat ....sets the number of repeating the errors and alarms.

(d) Performance item .....selects a performance parameter for performing the performance check.

(e) Mode .....displays the measurement mode. When the error performance check is executed, it is fixed to 'Manual'.

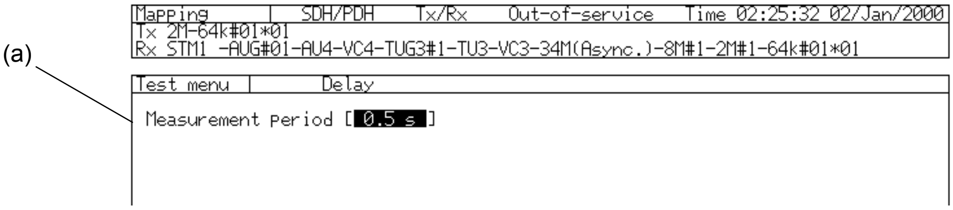
7.4 Delay Measurement

MP1570A is a measurement route with send and receive performance as described in '5.4 Loop back Test', '5.6 MUX Evaluation Test' and '5.7 DEMUX Evaluation Test'. The measurement functions include the delay measurement (i.e. the measurement of time required to receive a signal after it is sent.). Here is the procedure for measurement.

7.4.1 Setting and Starting the Measurement *'Test menu : Delay' screen*

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

(2) Setup the screen parameters as follows:



```
Mapping       |  SDH/PDH    Tx/Rx    Out-of-service   Time 02:25:32 02/Jan/2000
Tx 2M-64k#01*01
Rx STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-34M(Async.)-8M#1-2M#1-64k#01*01

Test menu |        Delay
 Measurement Period [ 0.5 s ]
```

(a) Measurement period ..... sets the cycle of measurement.

(3) Start the measurement by pressing ● Start /Stop .

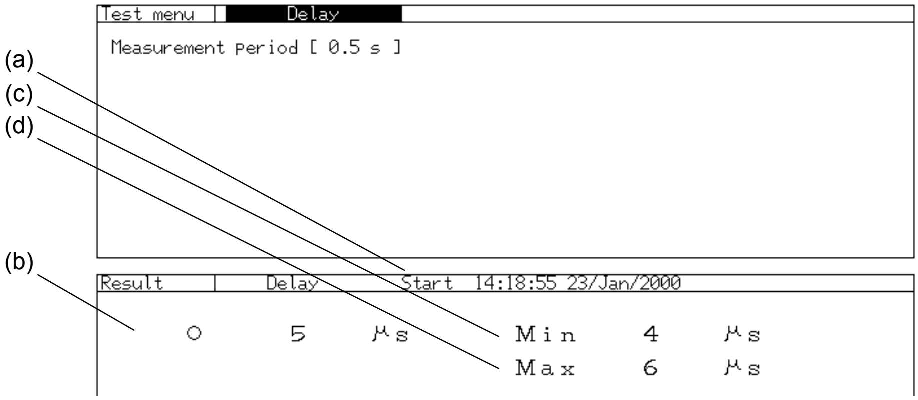
Note

The time required to receive a signal after it is sent by MP1570A is measured using Delay Measurement. We recommend that you check device to be examined is connected properly before the measurement.

7.4.2 Displaying the Measured Results *'Result : Delay' screen*

(1) Open the 'Result : Delay' screen. ('Result : Delay' screen appears if you press ● Result while the 'Test menu : Delay' screen is displayed.)

(2) The delay measurement results are displayed.



```
Test menu |        Delay
 Measurement Period [ 0.5 s ]

Result    |      Delay        Start  14:18:55 23/Jan/2000
          0       5      μs      Min     4      μs
                                 Max     6      μs
```

(a) [Measurement time] selects the display mode of measurement time.

Start .... displays the time at which the measurement was started.

Elapsed .... displays the elapsed time after the measurement was started.

(b) [Measured results] ... displays the latest measured results.

● .... Displayed at every measurement cycle.

Timeout................ Displayed when a measurement could not be performed within the measurement cycle.

(c) Min .... Minimum delay value after the measurement start is displayed.

(d) Max .... Maximum delay value after the measurement start is displayed.

Note

- The delay measurement shows the following errors for send and PDH

	Send	Receive
PDH	± 1μs	± 1μs
SDH-VC4 Bulk/139M	± 1μs	± 1μs
SDH-VC3 Bulk/45M/34M	± 1μs	± 1μs
SDH-VC2 Bulk/mc/6M	± 1μs	± 1μs
SDH-VC12/VC11	±10μs	±10μs

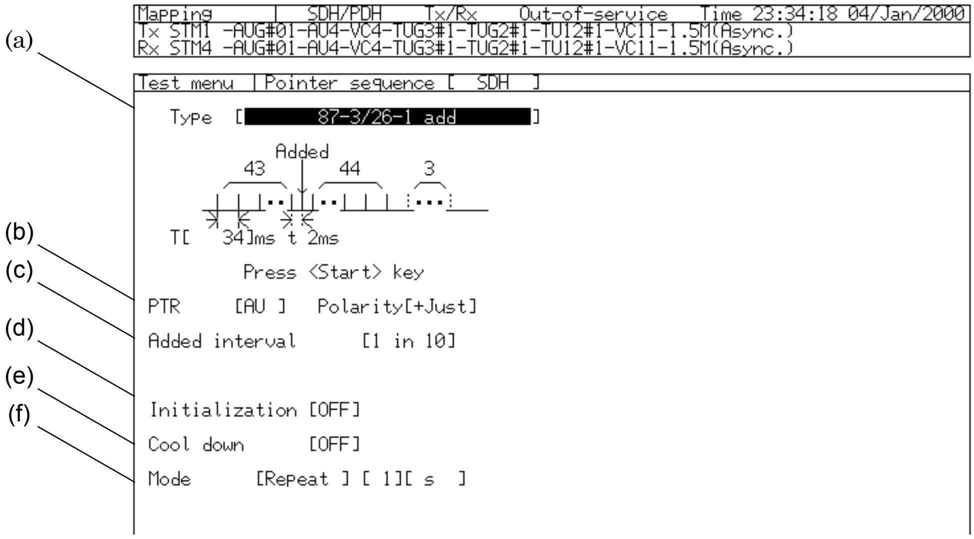
- The definite error is the sum of send and receive errors. If you send a PDH 2M signal and receive it with SDH VC12-2M, for example, the sum of send error, ±μs and receive error, ±10 μs becomes the definite error, ±11 μs.
- Approximate ±120 μs may occur if you measure at 64k × N using the MUX/DEMUX function.

7.5 Pointer Sequence Test *'Test menu : Pointer sequence' screen*

MP1570A allows specific pointer sequence tests by applying the justification to the signal to be transmitted. Here is the procedure for the test.

(1) Open the 'Test menu : Pointer sequence' screen.

(2) Setup the screen parameters:



```
Mapping      |   SDH/PDH    Tx/Rx    Out-of-service   Time 23:34:18 04/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu  |Pointer sequence [  SDH  ]

   Type  [      87-3/26-1 add       ]

   T[   34]ms  t  2ms

           Press <Start> key

 PTR      [AU ]   Polarity[+Just]
 Added interval       [1 in 10]


 Initialization [OFF]
 Cool down      [OFF]
 Mode      [Repeat ] [ 1][ s  ]
```

(a) Type ..... selects the pointer sequence type from the table below.

Regular with double	ITU-T G.783 :	Regular Pointers Plus One Double Pointer
Single of opposite polarity	ITU-T G.783 :	Single Pointers of Opposite Polarity
Regular with missing	ITU-T G.783 :	Regular Pointers with One Missing Pointer
Double of opposite polarity	ITU-T G.783 :	Double Pointers of Opposite Polarity
87-3/26-1 Normal	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Normal)
87-3/26-1 Add	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Add)
87-3/26-1 Cancel	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (87-3/26-1Pattern : Cancel)
Continuous pattern : normal	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Normal)
Continuous pattern : Add	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Add)

	Continuous pattern : Cancel	ITU-T G.783 :	Periodic Pointer Adjustment test Sequence (Continuous Pattern : Cancel)
*1	G.783:Single pointer adjustment	ITU-T G.783:	Periodic Pointer Adjustment test Sequence
*2	G.783:Muxmam Rate pointer burst	ITU-T G.783:	Periodic Pointer Adjustment test Sequence
*2	G.783:Phase transient pointer burst	ITU-T G.783:	Periodic Pointer Adjustment test Sequence

*1 .... Effective only for SONET mode.

*2 .... Effective only for 45M mapping

(b) PTR.................. selects the pointer to be tested.

AU ....AU pointer is tested.

TU...................TU pointer is tested.

(c) Added Interval ....sets the added point intervals.

(d) Initialization.. sets the time of initialization at the beginning of the sequence. Some sequences need no setting.

(e) Cool down....... sets the cool-down time at the beginning of the sequence. Some sequences need no setting.

(f) Mode .... Measurement mode similar to that set on the 'Test menu : Manual' screen.

Single ....Single measurement

Repeat ....Repeated measurement

Manual............Once the measurement is started, it continues until you press ● Start /Stop .

- sets the measurement time if you select 'Single' or 'Repeat'.

(3) MP1570A allows specific pointer sequence tests by applying the justification to the signal to be transmitted. Start the measurement by pressing ● Start /Stop after setting the parameters in (2).

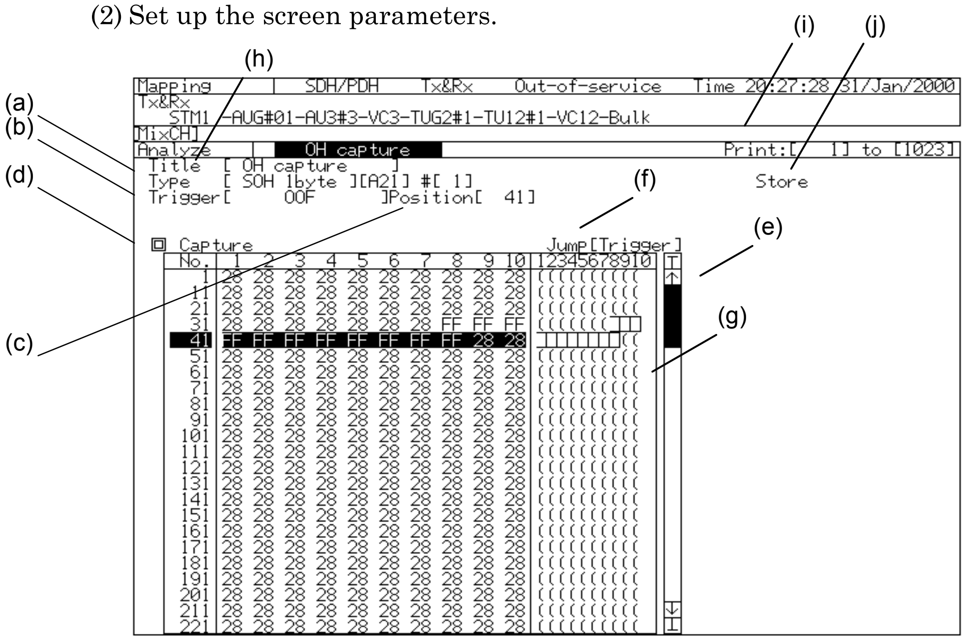
7.6 Capturing Overheads *"Analyze : OH capture" screen*

MP1570A can take in 1,023 frames of SDH overhead(<-n) bytes arbitrarily to the internal memory, and display them. Here is the procedure for capturing, analyzing, and storing the data.

Setup and Start of a Capture

(1) Open 'Analyze : OH capture screen.

(2) Set up the screen parameters.



Mapping | SDH/PDH Tx&Rx Out-of-service Time 20:27:28 31/Jan/2000

Tx&Rx

STM1 -AUG#01-AU3#3-VC3-TUG2#1-TU12#1-VC12-Bulk

[MixCH]

Analyze | OH capture Print:[1] to [1023]

Title [OH capture]

Type [SOH 1byte][A21] #[1]

Trigger[OOF]Position[41]

Store

▣ Capture

No.	1	2	3	4	5	6	7	8	9	10
1	28	28	28	28	28	28	28	28	28	28
11	28	28	28	28	28	28	28	28	28	28
21	28	28	28	28	28	28	28	28	28	28
31	28	28	28	28	28	28	28	FF	FF	FF
41	FF	FF	FF	FF	FF	FF	FF	FF	28	28
51	28	28	28	28	28	28	28	28	28	28
61	28	28	28	28	28	28	28	28	28	28
71	28	28	28	28	28	28	28	28	28	28
81	28	28	28	28	28	28	28	28	28	28
91	28	28	28	28	28	28	28	28	28	28
101	28	28	28	28	28	28	28	28	28	28
111	28	28	28	28	28	28	28	28	28	28
121	28	28	28	28	28	28	28	28	28	28
131	28	28	28	28	28	28	28	28	28	28
141	28	28	28	28	28	28	28	28	28	28
151	28	28	28	28	28	28	28	28	28	28
161	28	28	28	28	28	28	28	28	28	28
171	28	28	28	28	28	28	28	28	28	28
181	28	28	28	28	28	28	28	28	28	28
191	28	28	28	28	28	28	28	28	28	28
201	28	28	28	28	28	28	28	28	28	28
211	28	28	28	28	28	28	28	28	28	28
221	28	28	28	28	28	28	28	28	28	28

(a) Type ….. selects an overhead to be captured.

- When selecting SOH 1 byte or POH 1 byte, specify a byte and a channel to be captured.

(b) Trigger ….. selects the type of trigger to capture the data.

- When 'Manual' is selected, ▣ is displayed next to the "Position". Move the cursor here and press Set. And it is triggered off.

(c) Position …..specifies the frame number to be triggered off.

(d) Capture …..Move the cursor here and press Set. A capturing begins.

■ …..indicates that the capturing has begun and it is waiting a trigger. 'Waiting for trigger' is displayed.

▣ …..indicates that the capturing has finished.

- In the example shown above, the overhead bytes are captured in the position of frame No.41, using "OOF" as a trigger. Therefore, 1,023 frames are captured continuously, from 40 frames before "OOF" is detected.

Analyzing the Captured Data

(e) [Data scroll] ….. scrolls the data upwards and downwards.

T........................ Moves to the top of the data.
↑........................ Moves 5 lines upwards.
↓........................ Moves 5 lines downwards.
⊥........................ Moves to the bottom of the data.

(f) Jump ….. scrolls the screen to the specified capture data position.

Trigger ….. scrolls the screen to number specified as the trigger position.

Number …..scrolls the screen to the number specified by the numerical input window displayed in right-hand side.

(g) [ASCII display] …..In Single screen display, the captured data can be displayed in ASCII.

Storing and Printing the Captured Data

(h) Title …..A title can be attached to the screen currently displayed. Move the cursor here and press Set, and a character input window appears. Input a title.

- This function is effective when the single screen is displayed.

(i) Print …..Select contents to be printed.

- Specify the range to print, by frame number.
- See "8.5 Printing" for the details of printing.

(j) Store …..stores the Graph data in the internal memory. Press Set, and a character input window opens. Input a name and store the data.

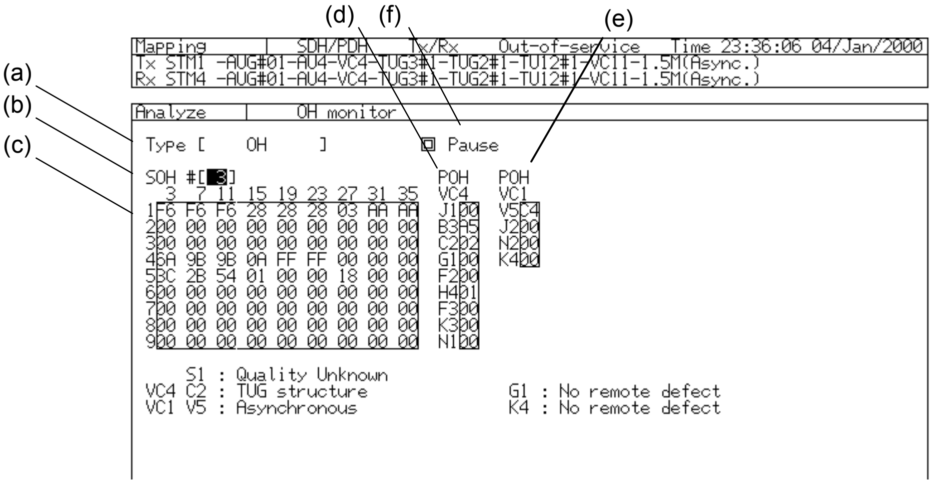
7.7 Monitor *'Analyze : OH monitor' screen*

7.7.1 Monitoring Overheads

Here is the procedure for monitoring the SOH and POH of the SDH signal.

(1) Open the 'Analyze : OH monitor' screen

(2) Setup the screen parameters as follows:



```
Mapping     |   SDH/PDH     Tx/Rx     Out-of-service    Time 23:36:06 04/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Analyze    |      OH monitor

 Type [     OH       ]           ☐ Pause

 SOH #[3]                          POH    POH
   3  7  11 15 19 23 27 31 35      VC4    VC1
 1F6 F6 F6 28 28 28 03 AA AA       J100   V5C4
 200 00 00 00 00 00 00 00 00       B3A5   J200
 300 00 00 00 00 00 00 00 00       C202   N200
 46A 9B 9B 0A FF FF 00 00 00       G100   K400
 5BC 2B 54 01 00 00 18 00 00       F200
 600 00 00 00 00 00 00 00 00       H401
 700 00 00 00 00 00 00 00 00       F300
 800 00 00 00 00 00 00 00 00       K300
 900 00 00 00 00 00 00 00 00       N100

     S1 : Quality Unknown
 VC4 C2 : TUG structure                    G1 : No remote defect
 VC1 V5 : Asynchronous                     K4 : No remote defect
```

(a) Type..............Set the monitor type to 'OH'.

(b) SOH#............sets SOH# if the receive signal bit rate is 622M or more.

(3) The overhead monitor results are displayed.

(c) displays the SOH monitor results.

(d) displays the POH monitor results.

(e) displays S1, VC4 C2, VC3C2... S1 and C2 in plain language.

(f) Pause............sets the display updating to on or off of.

☐...............updates the display. This function is turned off if you move the cursor here and press Set.

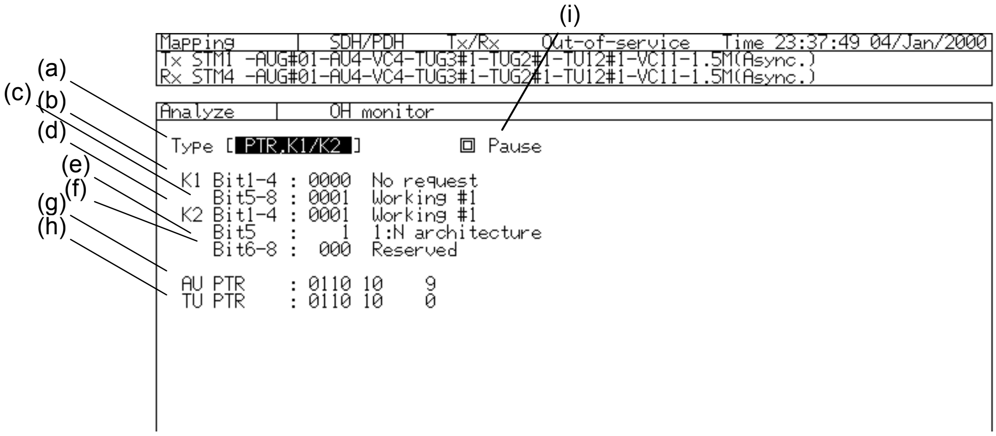
■...............does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.2 Monitoring the Pointer and K1/K2 Bytes

Here is the procedure for monitoring the pointer, K1 byte and K2 byte of SDH. This function is available only while SDH signal is being received.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



```
Mapping        |   SDH/PDH    Tx/Rx     Out-of-service   Time 23:37:49 04/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Analyze      |     OH monitor

 Type [ PTR.K1/K2 ]           ▣ Pause

  K1 Bit1-4 : 0000  No request
     Bit5-8 : 0001  Working #1
  K2 Bit1-4 : 0001  Working #1
     Bit5   :    1  1:N architecture
     Bit6-8 :  000  Reserved

  AU PTR    : 0110 10    9
  TU PTR    : 0110 10    0
```

(a) Type .... Set the monitor type to 'PTR, K1/K2'.

(3) The monitoring results of pointer, K1 byte and K2 byte are displayed.

(b) K1 Bit1-4....... displays Bit1-4 of K1 byte.

(c) Bit5-8............. displays Bit5-8 of K1 byte.

(d) K2 Bit1-4....... displays Bit1-4 of K2 byte.

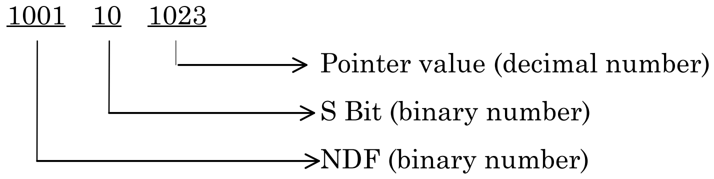
(e) Bit5................ displays Bit5 of K2 byte.

(f) Bit6-8............. displays Bit6-8 of K2 byte.

(g) AU PTR......... displays the AU pointer.

(h) TU PTR......... displays the TU pointer.

- AU and TU pointers are displayed as follows:



(i) Pause .... sets the display updating to on or off of.

▣ .... updates the display. This function is turned off if you move the cursor here and press Set.

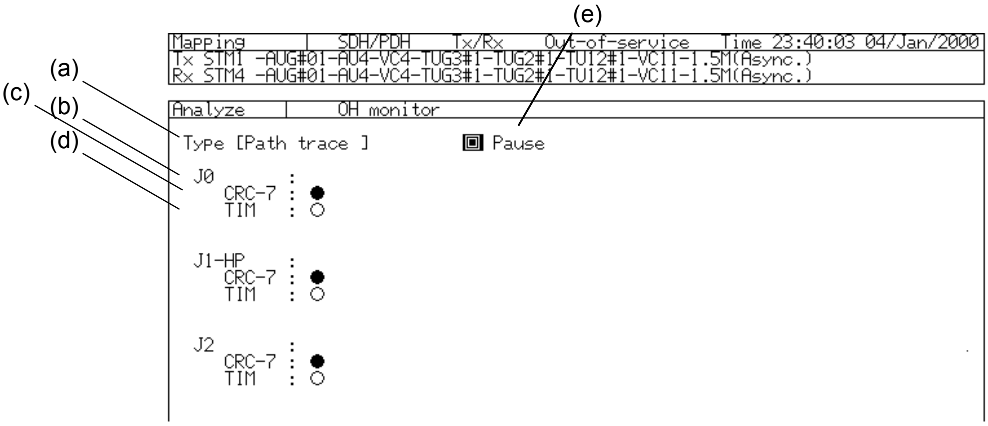
■ .... does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.3 Monitoring the Path Trace

Here is the procedure for monitoring the SDH path trace. This function is available only while SDH signal is being received.

(1) Open the 'Analyze : OH monitor' screen.

(3) Setup the screen parameters as follows:



```
Mapping       |  SDH/PDH    Tx/Rx     Out-of-service    Time 23:40:03 04/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Analyze      |     OH monitor
Type [Path trace ]            ▣ Pause
 J0           :
    CRC-7     : ●
    TIM       : ○

 J1-HP        :
    CRC-7     : ●
    TIM       : ○

 J2           :
    CRC-7     : ●
    TIM       : ○
```

(a) Type .... Set the monitor type to 'Path trace'.

(3) The monitoring results of J0 byte, J1 byte and J2 byte are displayed.

(b) The path trace of each byte displays 64 characters.

(c) CRC-7 .... Calculates CRC-7 that is regarded as being included and displays whether or not an error exists.

● (illuminated in red) : CRC-7 error exists.

○ (illuminated in white) : CRC-7 error does not exist.

(d) TIM ..... displays whether or not an TIM exists. When TIM errors detected by the MP1570a does not coincide with the path trace data set up on the 'Setup : OH preset' screen, it is regarded as an error.

● (illuminated in red) .....TIM error exists.

○ (illuminated in white) .....TIM error does not exist.

(e) Pause .... sets the display updating function to on or off.

☐............... updates the display. This function is turned off if you move the cursor here and press Set.

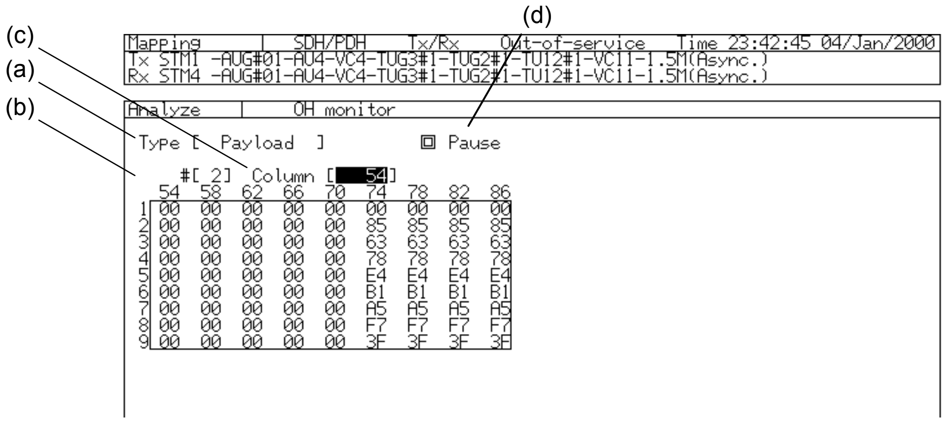
▣............... does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.4 Monitoring the Payload

Here is the procedure for monitoring SDH payload.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



```
Mapping       |   SDH/PDH    Tx/Rx    Out-of-service   Time 23:42:45 04/Jan/2000
Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Rx STM4 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Analyze       |      OH monitor

 Type [  Payload  ]            ☐ Pause

      #[ 2]  Column [   54]
   54   58   62   66   70   74   78   82   86
 1 00   00   00   00   00   00   00   00   00
 2 00   00   00   00   00   85   85   85   85
 3 00   00   00   00   00   63   63   63   63
 4 00   00   00   00   00   78   78   78   78
 5 00   00   00   00   00   E4   E4   E4   E4
 6 00   00   00   00   00   B1   B1   B1   B1
 7 00   00   00   00   00   A5   A5   A5   A5
 8 00   00   00   00   00   F7   F7   F7   F7
 9 00   00   00   00   00   3F   3F   3F   3F
```

(a) Type.............Set the monitor type to 'Payload'.

(b) SOH#...........sets SOH# if the bit rate of receive signal is 622M or more.

(c) Column .....specifies the top column position to be monitored.

(3) The monitoring results of payload are displayed.

(d) Pause...........sets the display updating function to on or off.

☐...............updates the display. This function is turned off if you move the cursor here and press Set.

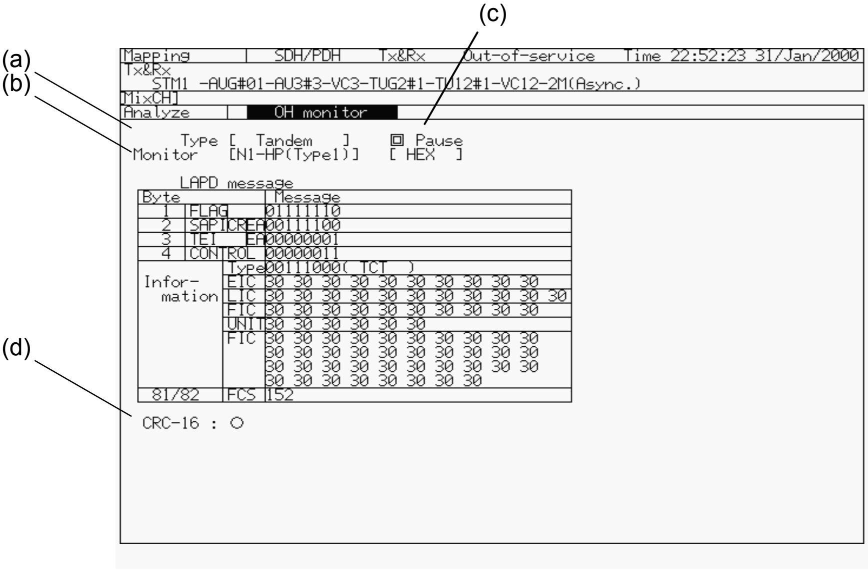
■...............does not update the display. This function is turned on if you move the cursor here and press Set.

7.7.5 Monitoring the Tandem Connection

Here is the procedure for monitoring tandem connection. This function is available only when the measurement related to the tandem connection is turned on, on the 'Setup : Measurement condition' screen.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



Mapping | SDH/PDH Tx&Rx Out-of-service Time 22:52:23 31/Jan/2000

Tx&Rx
STM1 -AUG#01-AU3#3-VC3-TUG2#1-TU12#1-VC12-2M(Async.)

Type [Tandem] ☐ Pause
Monitor [N1-HP(Type1)] [HEX]

LAPD message

Byte		Message
1	FLAG	01111110
2	SAPI CR EA	00111100
3	TEI EA	00000001
4	CONTROL	00000011
Infor-mation	Type	00111000(TCT)
	EIC	30 30 30 30 30 30 30 30 30 30
	LIC	30 30 30 30 30 30 30 30 30 30 30
	FIC	30 30 30 30 30 30 30 30 30 30
	UNIT	30 30 30 30 30 30
	FIC	30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30
81/82	FCS	152

CRC-16 : ○

(a) Type ..... sets the monitor type as 'Tandem'.

(b) Monitor ..... selects the item to be monitored from 'N1-HP(Type1)', 'N1-HP(Type2)', 'N1-LP(Type2)' and 'N2'. And, select the displayed item of PDH frame, and display mode from 'HEX' and 'ASCII'.

(3) The monitoring result is displayed.

(c) Pause .... sets the display updating function to on or off.

☐............... updates the display. This function is turned off if you move the cursor here and press Set.

■............... does not update the display. This function is turned on if you move the cursor here and press Set.

(d) CRC-16 .....calculates CRC-16 and the measurement result is displayed.

● (illuminated in red) .....CRC-16 error exists.

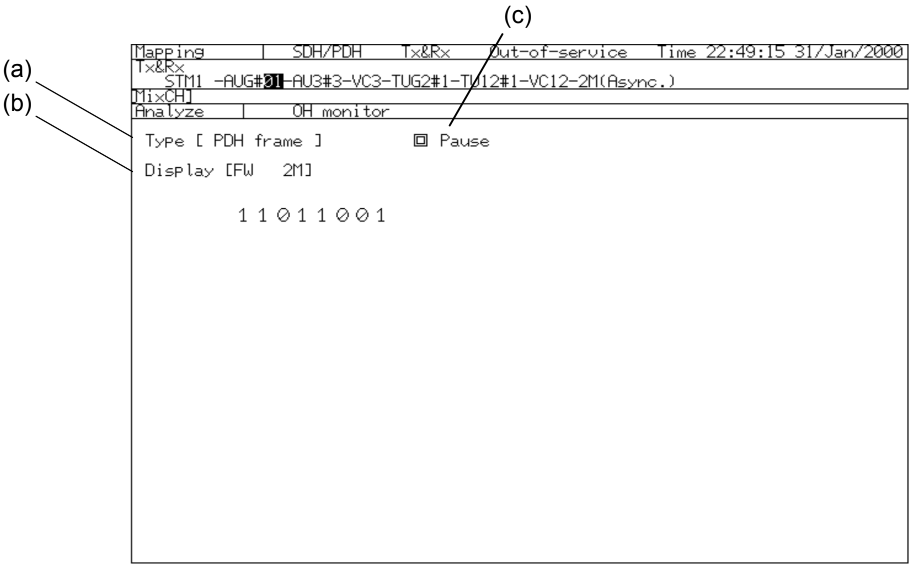
○ (illuminated in white) .....CRC-16 error does not exist.

7.7.6 Monitoring the PDH Frame

Here is the procedure for monitoring PDH frame.

(1) Open the 'Analyze : OH monitor' screen.

(2) Setup the screen parameters as follows:



```
Mapping      |   SDH/PDH    Tx&Rx    Out-of-service   Time 22:49:15 31/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU3#3-VC3-TUG2#1-TU12#1-VC12-2M(Async.)
[MixCH]
Analyze     |       OH monitor
 Type [ PDH frame ]          ⧈ Pause
 Display [FW   2M]

          1 1 0 1 1 0 0 1
```

(a) Type.............sets the monitor type at 'Path trace'.

(b) Display ....selects the display item of PDH frame.

(3) The monitoring results are displayed.

(c) Pause.............sets the display updating function to on or off.

⧈...............updates the display. This function is turned off if you move the cursor here and press Set.

▣...............does not update the display. This function is turned on if you move the cursor here and press Set.

Note

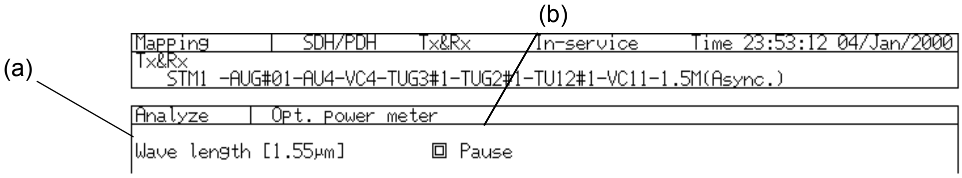
The 1.5M frame and the 45M frame can not be monitored.

7.8 Measuring the Optical Power *'Analyze : Opt. power meter' screen*

Here is the procedure for measuring the optical signal level inputted into the optical interface unit or the plug-in unit.

(1) Open the 'Analyze : Opt. power meter' screen.

(2) Setup the screen parameters.



```
Mapping      | SDH/PDH    Tx&Rx       In-service      Time 23:53:12 04/Jan/2000
Tx&Rx
    STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Analyze   | Opt. power meter
Wave length [1.55μm]          ☐ Pause
```

(a) Wavelength ..... sets the wavelength.

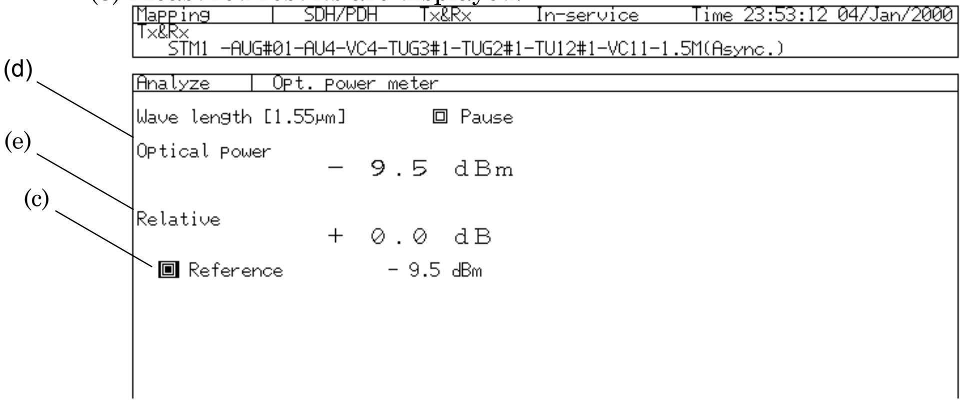
(b) Pause .... turns the display updating function on or off.

☐............... updates the display. This function is turned off if you move the cursor here and press Set.

■............... does not update the display. This function is turned on if you move the cursor here and press Set.

(c) Reference......... The current value of the optical signal level is displayed if you move the cursor here and press Set. This level is regarded as the reference level.

(3) Measured results are displayed.



```
Mapping      | SDH/PDH    Tx&Rx       In-service      Time 23:53:12 04/Jan/2000
Tx&Rx
    STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Analyze   | Opt. power meter
Wave length [1.55μm]          ☐ Pause
Optical power
                   - 9.5 dBm

Relative
                   + 0.0 dB
  ▣ Reference           - 9.5 dBm
```

(d) Optical power......... displays the optical power value.

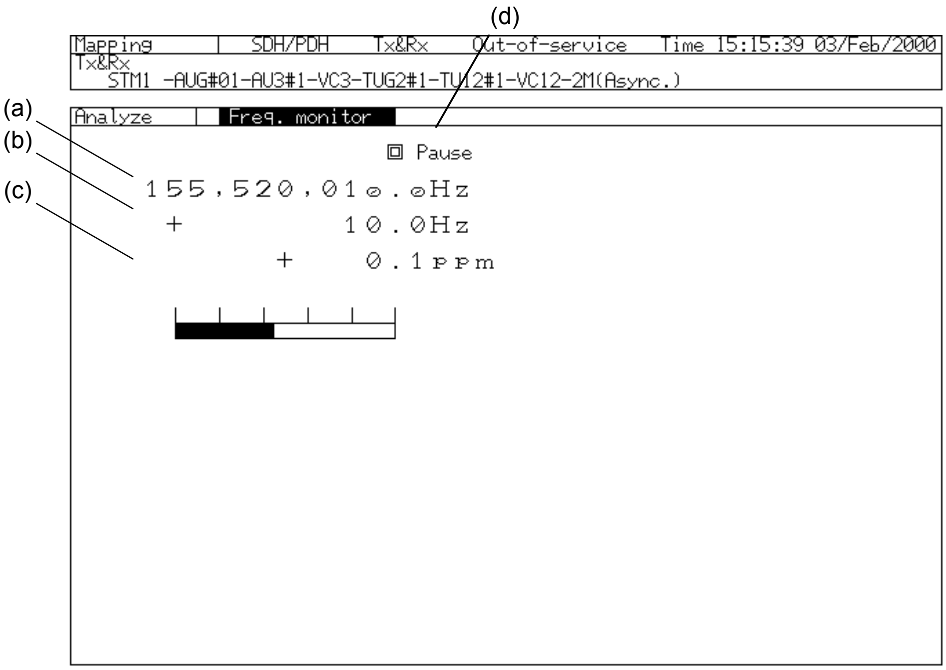
(e) Relative .... displays the value of the optical signal level relative to the reference value in (c) above in the range of -40.0 to +40.0 dB.

7.9 Measuring the Frequency of the Received Signal

Here is the procedure for displaying the frequency of the reproduced clock from the received signal.

7.9.1 Real Time Monitor of Frequency *'Analyze : Freq. monitor' screen*

A Real time monitor of frequency is displayed on the 'Analyze : Freq. monitor' screen.



155,520,010.0Hz
+ 10.0Hz
+ 0.1ppm

(a) Displays the frequency of the clock.

(b) Displays the difference to the measurement bit rate in the unit of Hz.

(c) The difference shown in (b) is displayed in ppm.

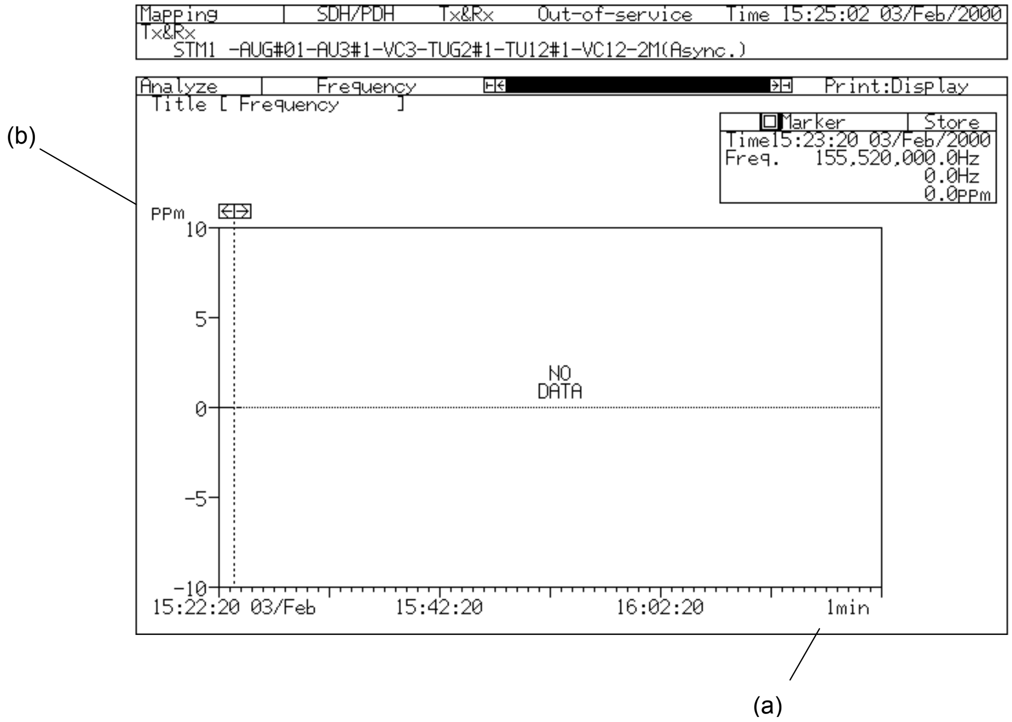
(d) 'Pause' holds the measurement result currently displayed.

☐ .... updates the display. This function is turned off if you move the cursor here and press Set.

▣ .... does not update the display. This function is turned on if you move the cursor here and press Set.

7.9.2 Displaying the Deviation of the Frequency *'Analyze : Frequency' screen*

The Deviation of the Frequency can be displayed on the 'Analyze : Frequency' screen.



Mapping | SDH/PDH Tx&Rx Out-of-service Time 15:25:02 03/Feb/2000

Tx&Rx

STM1 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC12-2M(Async.)

Analyze | Frequency Print:Display

Title [Frequency]

☐Marker | Store

Time15:23:20 03/Feb/2000

Freq. 155,520,000.0Hz

0.0Hz

0.0ppm

(a) [Abscissa scale] …..sets a sampling interval.

(b) Sets the accuracy of the measurement result displayed in ppm

7.10 Overhead Tests ‘Test menu : OH test’ screen

There are the following 4 kinds of the overhead tests.

OH Change	It generates an OH pattern preset on the "Setup : OH change data" screen.
OH BERT	It inserts a PRBS pattern into one byte of any OH. And, it measures the error rate of the pattern.
PTR 64 Frame	it generates pointers preset on the "Setup : PTR 64frame" screen.
OH Add/Drop	It inserts data inputted from the exterior into one byte of any OH. And, it outputs any one byte to outside.

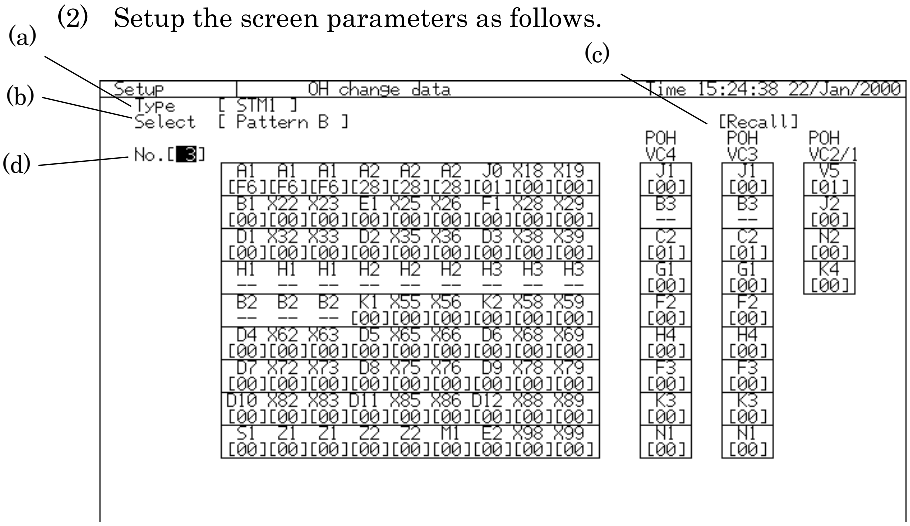
7.10.1 OH Change Test

Here is the procedure for generating 64 frames of overhead patterns (A pattern and B pattern).

Editing the Program Pattern *‘Setup : OH change data’ screen*

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

(2) Setup the screen parameters as follows.



```
Setup   |         OH change data                     Time 15:24:38 22/Jan/2000
 Type      [ STM1 ]
 Select    [ Pattern B ]                                   [Recall]
                                                      POH     POH     POH
 No.[3]                                               VC4     VC3     VC2/1
        A1  A1  A1  A2  A2  A2  J0  X18 X19           J1      J1      V5
       [F6][F6][F6][28][28][28][01][00][00]          [00]    [00]    [01]
        B1  X22 X23 E1  X25 X26 F1  X28 X29           B3      B3      J2
       [00][00][00][00][00][00][00][00][00]           --      --     [00]
        D1  X32 X33 D2  X35 X36 D3  X38 X39           C2      C2      N2
       [00][00][00][00][00][00][00][00][00]          [01]    [01]    [00]
        H1  H1  H1  H2  H2  H2  H3  H3  H3            G1      G1      K4
        --  --  --  --  --  --  --  --  --           [00]    [00]    [00]
        B2  B2  B2  K1  X55 X56 K2  X58 X59           F2      F2
        --  --  -- [00][00][00][00][00][00]          [00]    [00]
        D4  X62 X63 D5  X65 X66 D6  X68 X69           H4      H4
       [00][00][00][00][00][00][00][00][00]          [00]    [00]
        D7  X72 X73 D8  X75 X76 D9  X78 X79           F3      F3
       [00][00][00][00][00][00][00][00][00]          [00]    [00]
       D10  X82 X83 D11 X85 X86 D12 X88 X89           K3      K3
       [00][00][00][00][00][00][00][00][00]          [00]    [00]
        S1  Z1  Z1  Z2  Z2  M1  E2  X98 X99           N1      N1
       [00][00][00][00][00][00][00][00][00]          [00]    [00]
```

(a) Type .... selects the STM frame type to be edited, STM0 or STM1.

- "STM0" is available for the OH change test when the bit rate is 52M.
- "STM1" is available for the OH change test when the bit rate is 156M or more.

- When the bit rate is 622M or more, the OH change test corresponding to one channel of STM1 level can be performed. The overhead data set up on the "Setup : OH preset" screen is inserted into the other channels.

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

(c) Recall ....initializes the set STM OH change data.

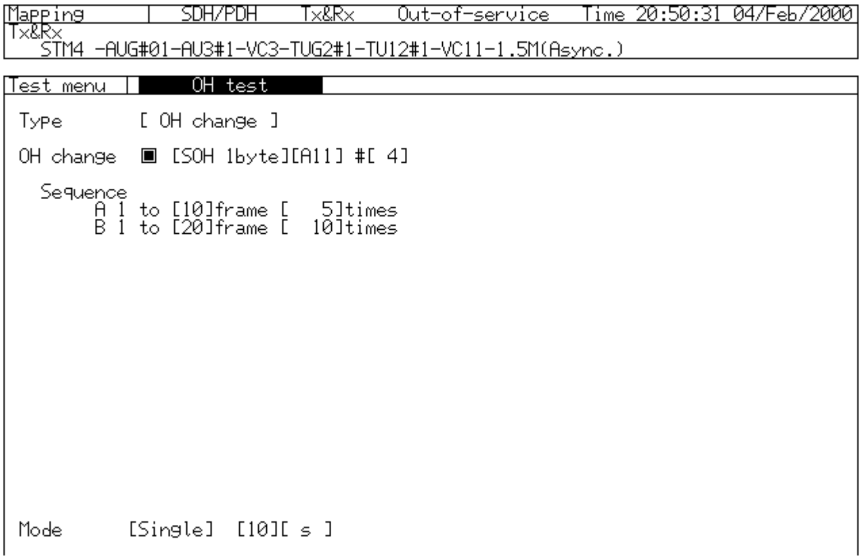
- Default .....If you move the cursor to Preset and press Set, the overhead data return to initial ones.
- Preset overwrite ....If you move the cursor there and press Set, a window appears. Specify the OH source and OH paste, and move the cursor to 'END' and press Set.

(d) No. .....specifies the SOH (STM1) No. to be edited on the 'Setup : OH preset' screen.

Generating the Programmed Pattern *'Test menu : OH test' screen*

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



```
Mapping       |  SDH/PDH    Tx&Rx    Out-of-service    Time 20:50:31 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu  |        OH test

 Type        [ OH change ]

 OH change   ■ [SOH 1byte][A11] #[ 4]

   Sequence
        A 1  to [10]frame [   5]times
        B 1  to [20]frame [  10]times

 Mode       [Single]  [10][ s ]
```

(a) Type .....Select "OH change".

(b) OH change .....Select the type of the overhead to be tested.

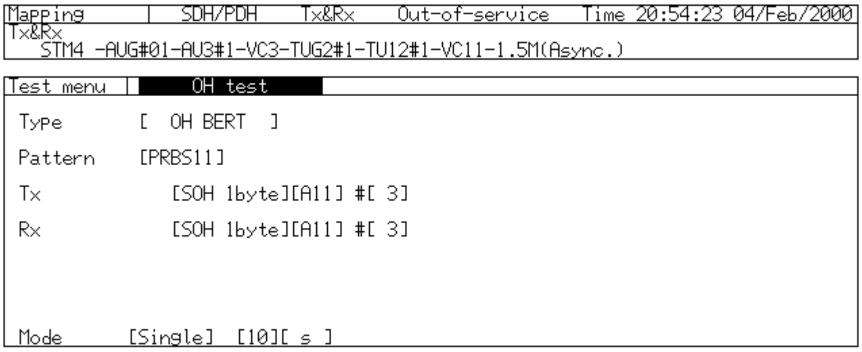
7.10.2 OH BERT Test

MP1570A can measure the error rate of one byte of any overhead, D1-D3 bytes, and D4-D12 bytes, taking advantage of the PRBS pattern

Setting and Starting Measurement *'Test menu : OH test' screen*

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



```
Mapping       |   SDH/PDH    Tx&Rx    Out-of-service   Time 20:54:23 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu | OH test

 Type        [  OH BERT  ]
 Pattern     [PRBS11]
 Tx             [SOH 1byte][A11] #[ 3]
 Rx             [SOH 1byte][A11] #[ 3]



 Mode       [Single]  [10][ s ]
```

(a) Type ….. Select "OH BERT".

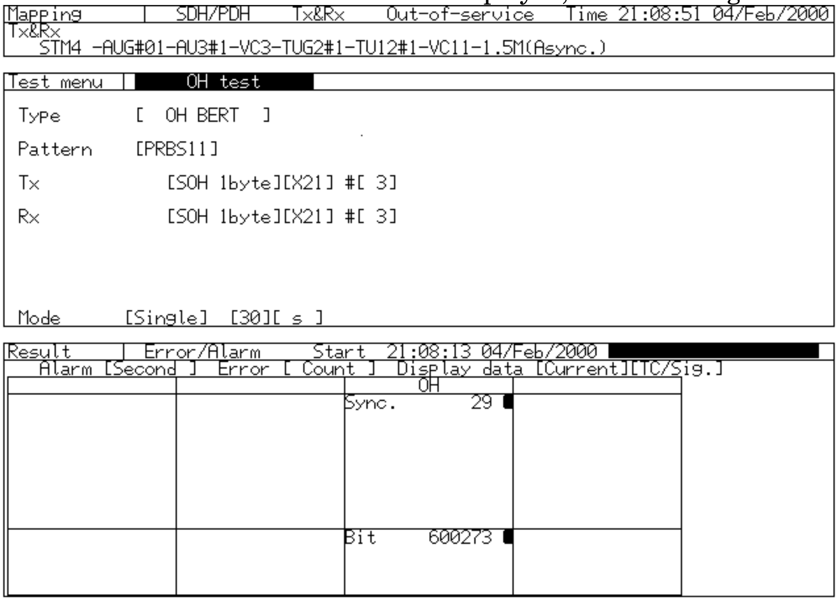
(b) Pattern …..Select a test pattern.

(c) Tx PRBS byte. …..Select a byte into which PRBS pattern is inserted. When the bit rate is 622M or more, specify a channel.

Displaying the Measurement Result

The measurement result is displayed on the "Result : Error/Alarm" screen.

When two- or three-division screen is displayed, select "TC/Sig."



```
Mapping     |  SDH/PDH    Tx&Rx    Out-of-service   Time 21:08:51 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu  |     OH test

 Type       [  OH BERT  ]
 Pattern    [PRBS11]
 Tx            [SOH 1byte][X21] #[ 3]
 Rx            [SOH 1byte][X21] #[ 3]

 Mode      [Single]  [30][ s ]

Result     | Error/Alarm     Start  21:08:13 04/Feb/2000
   Alarm [Second ]  Error [ Count ]  Display data [Current][TC/Sig.]
                                     OH
                               Sync.        29

                               Bit      600273
```

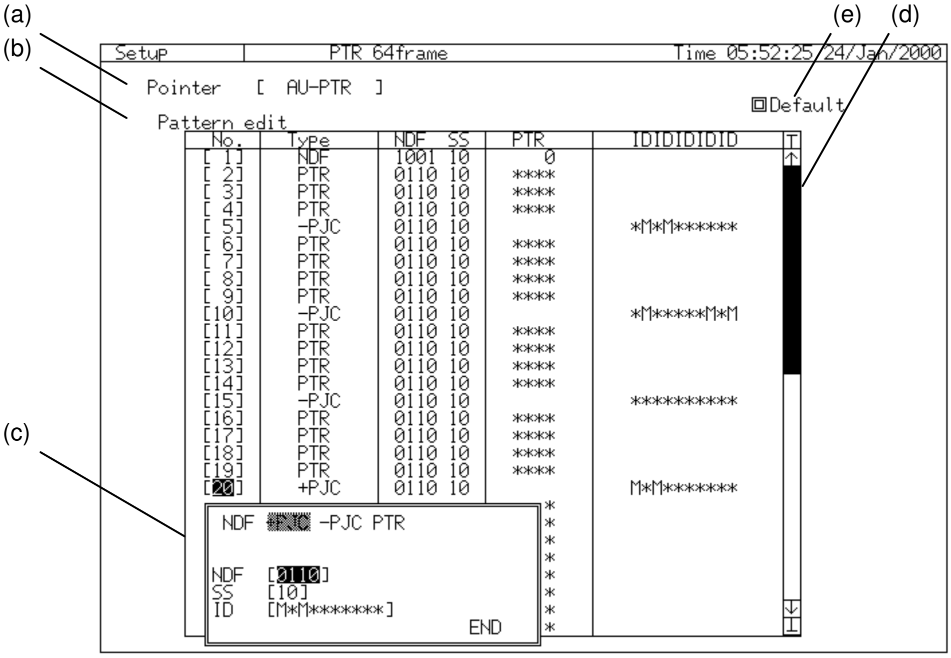
7.10.3 PTR 64 frame

MP1570A can generate 64 frames of preset pointers.

Editing Pointer Type to Be Generated

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

(2) Set up the screen parameters.



Pointer [AU-PTR]

☐Default

Pattern edit

No.	Type	NDF	SS	PTR	IDIDIDIDID
[1]	NDF	1001	10	0	
[2]	PTR	0110	10	****	
[3]	PTR	0110	10	****	
[4]	PTR	0110	10	****	
[5]	-PJC	0110	10		*M*M******
[6]	PTR	0110	10	****	
[7]	PTR	0110	10	****	
[8]	PTR	0110	10	****	
[9]	PTR	0110	10	****	
[10]	-PJC	0110	10		*M*****M*M
[11]	PTR	0110	10	****	
[12]	PTR	0110	10	****	
[13]	PTR	0110	10	****	
[14]	PTR	0110	10	****	
[15]	-PJC	0110	10		**********
[16]	PTR	0110	10	****	
[17]	PTR	0110	10	****	
[18]	PTR	0110	10	****	
[19]	PTR	0110	10	****	
[20]	+PJC	0110	10		M*M*******

NDF +PJC -PJC PTR

NDF [0110]
SS [10]
ID [M*M*******]

(a) Pointer …..selects the pointer type to be preset.

(b) No. ……shows the order of the pointers. Move the cursor here and press Set . And, a window for setting the pointer type is opened.

(c) Type …..selects the operation type of the pointer to be generated.

NDF …..changes NDF pointer values. In this case, set the pointer values. Besides, NDF bits and SS bits can be set.

+PJC ….. generates a positive justification. The ordinary positive justification (I bit inverted, D bit not-inverted) is generated at [***---*]. When the inversion/no-inversion is desired to be changed, specify the bit to “M”. Besides, NDF bits and SS bits can be set.

Example: +PJC from 0 of PTR value

For [**---*],

IDIDIDIDID
1010101010

For [*M*M---*M],
IDIDIDIDID
1111111111
For [M*M*M*---],
IDIDIDIDID
0000000000

-PJC --- generates a negative justification. The ordinary negative justification (D bit inverted, I bit not-inverted) is generated at [***---*]. When the inversion/no-inversion is desired to be changed, specify the bit to “M”.

Example: -PJC from 0 of PTR value
For [**---*],
IDIDIDIDID
0101010101
For [*M*M---*M],
IDIDIDIDID
0000000000
For [M*M*M*---],
IDIDIDIDID
1111111111

PTR --- sets the NDF bit, SS bit, and Pointer value. Action of PTR pointer change does not performed, but the set bit is output. When [*****] is selected for pointer value setting, the current pointer value is output as it is.

(d) [Data scroll] ..... scrolls the data upwards and downwards.

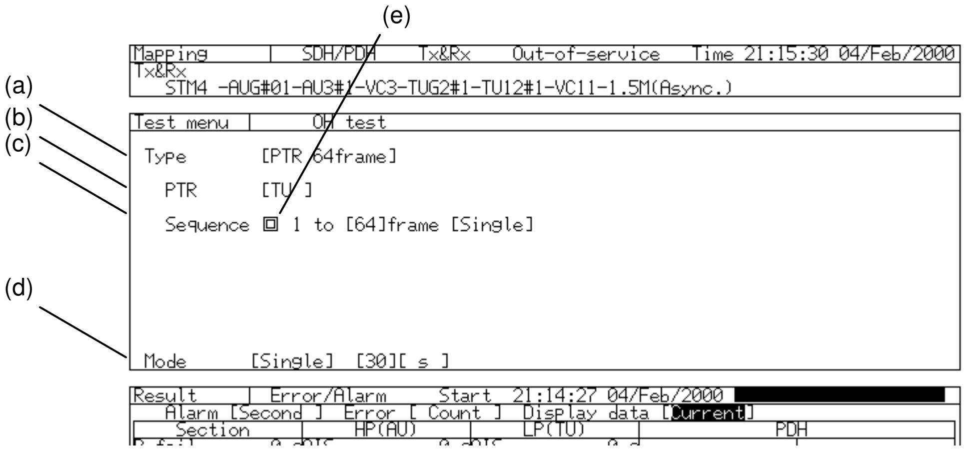
T...................... Moves to the top of the data.
↑...................... Moves 5 lines upwards.
↓...................... Moves 5 lines downwards.
⊥...................... Moves to the bottom of the data.

(e) Default .....initializes the set data.

Setting a Pointer Sequence

(1) Open the "Test menu : OH test" screen.

(2) Set up the screen parameters.



```
Mapping     |   SDH/PDH    Tx&Rx    Out-of-service   Time 21:15:30 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu  |       OH test

 Type        [PTR 64frame]
   PTR       [TU ]
   Sequence ▣ 1 to [64]frame [Single]

 Mode       [Single]  [30][ s ]

Result     |  Error/Alarm      Start  21:14:27 04/Feb/2000
   Alarm [Second ]  Error [ Count ]  Display data [Current]
    Section     |      HP(AU)      |      LP(TU)      |        PDH
```

(a) Type .....Select "PTR 64frame".

(b) PTR .....specifies the pointer type to be generated.

(c) Sequence frame .....specifies "No." of the final frame of the pointer.

(d) Mode .....specifies the sequence generation mode.

Single .....Only one sequence is generated.

Repeat .....The sequences are generated repeatedly.

(e) ▣ ..... The sequence is generated by moving the cursor here and pressing Set.

■ .....indicates that the sequence is being generated.

▣ .....indicates that the sequence is not generated.

7.10.4 OH Add/Drop

One byte of any overhead, D1-D3 bytes, and D4-D12 bytes can be inputted and outputted. Here is the setting procedure.

(a) Type .....Select "OH Add/Drop".

(b) Add .....selects the byte into which the data inputted from exterior is inserted. When the bit rate is 622M or more, specify a channel.

7.11 APS (Automatic Protection Switch) Test

Here is the procedure for testing the APS (Automatic Protection Switch).

There are three types in the APS test.

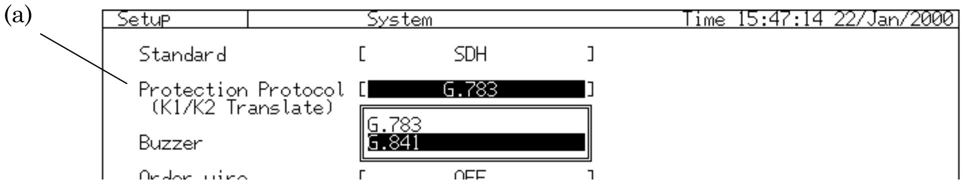
Generating APS sequence pattern	Generates programmed K1 and K2 bytes.
APS sequence capture	Displays captured K1 and K2 bytes by the specified trigger.
Measuring switching time	Measures the switching time.

7.11.1 Setting the Protection Protocol

When the APS test is performed, the protection protocol has to be set. Here is the procedure for defining SDH K1 byte and K2 byte by setting the protection protocol.

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

(2) Setup the screen parameters.



```
Setup            System                 Time 15:47:14 22/Jan/2000
  Standard               [       SDH        ]
  Protection Protocol    [      G.783       ]
   (K1/K2 Translate)      G.783
  Buzzer                  G.841
  Order wire             [       OFF        ]
```

(a) Protection Protocol...... Select G.783 or G.841.

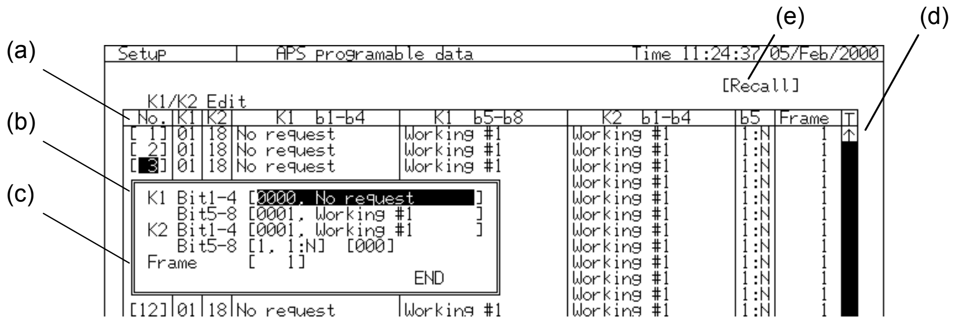
7.11.2 Generating APS Sequence Pattern *'Setup : APS programmable data' screen*

Here is the procedure for generating the K1 and K2 sequence pattern set beforehand.

- One sequence is composed of the K1 and K2 byte patterns and the continuous generation frames (1 to 8,000). Up to 64 sequenced can be set.

(1) Open the 'Setup : APS programmable data' screen to edit the program pattern to be generated.

(2) Set the screen parameters.



```
Setup          APS programable data                 Time 11:24:37 05/Feb/2000
                                                           [Recall]
 K1/K2 Edit
 No. |K1|K2|   K1  b1-b4   |   K1  b5-b8   |   K2  b1-b4    |b5 |Frame|T
[ 1] |01|18|No request     |Working #1     |Working #1      |1:N|    1|↑
[ 2] |01|18|No request     |Working #1     |Working #1      |1:N|    1|
[ 3] |01|18|No request     |Working #1     |Working #1      |1:N|    1|
  K1 Bit1-4 [0000, No request     ]        |Working #1      |1:N|    1|
     Bit5-8 [0001, Working #1     ]        |Working #1      |1:N|    1|
  K2 Bit1-4 [0001, Working #1     ]        |Working #1      |1:N|    1|
     Bit5-8 [1, 1:N]  [000]                |Working #1      |1:N|    1|
  Frame     [   1]                         |Working #1      |1:N|    1|
                        END                |Working #1      |1:N|    1|
                                           |Working #1      |1:N|    1|
                                           |Working #1      |1:N|    1|
                                           |Working #1      |1:N|    1|
[12] |01|18|No request     |Working #1     |Working #1      |1:N|    1|
```

(a) No. .....displays the sequence number. Move the cursor and press Set. A window to set the pattern appears.

(b) K1/K2 pattern .....sets K1 and K2 pattern in plain language or binary.

(c) Frame ....Set the frame No. to generate the pattern set in step (b).

(d) [Data scroll] ..... scrolls the data upwards and downwards.

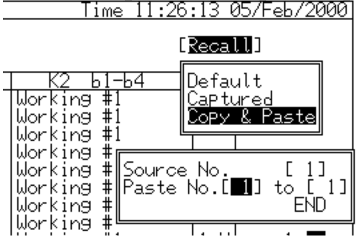
T........................Moves to the top of the data.

↑........................Moves 5 lines upwards.

↓........................Moves 5 lines downwards.

⊥........................Moves to the bottom of the data.

(e) Recall …. Captures the preset pattern and copies it to other data.



```
Time 11:26:13 05/Feb/2000

                 [Recall]
   K2  b1-b4      Default
Working #1        Captured
Working #1        Copy & Paste
Working #1
Working #
Working # Source No.     [ 1]
Working # Paste No.[ 1] to [ 1]
Working #                END
Working #
```

Default …..initializes the set data.

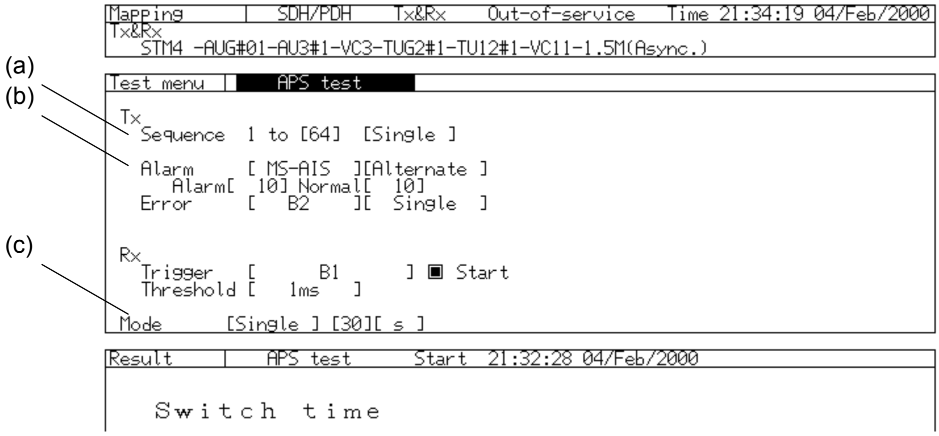
Captured …..Copies 64 sequences captured by this function from No.1 to No.64.

Copy & Paste …..copies the set sequence to other sequence.

Source …..specifies the sequence number to which the data is pasted.

(3) After editing APS sequence pattern, open the 'Test menu : APS test' screen to generate the programmed sequence.

(4) Set up the screen parameters.



```
Mapping   | SDH/PDH   Tx&Rx   Out-of-service   Time 21:34:19 04/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu |  APS test
 Tx
   Sequence   1 to [64]  [Single ]

   Alarm     [ MS-AIS  ][Alternate ]
      Alarm[  10] Normal[  10]
   Error     [   B2    ][  Single  ]


 Rx
   Trigger   [      B1      ] ▣ Start
   Threshold [   1ms    ]
 Mode       [Single ] [30][ s ]

Result    |   APS test       Start  21:32:28 04/Feb/2000

    Switch  time
```

(a) Sequence............sets No. of the final sequence set on the 'Setup : APS programmable data' screen.

(b) Error/Alarm addition …..Errors and alarms can be added to the generated pattern. See "6.12 Adding Error and Alarm" for the details.

(c) Mode …..sets the sequence mode as follows:

Single ....sends the pattern only once.

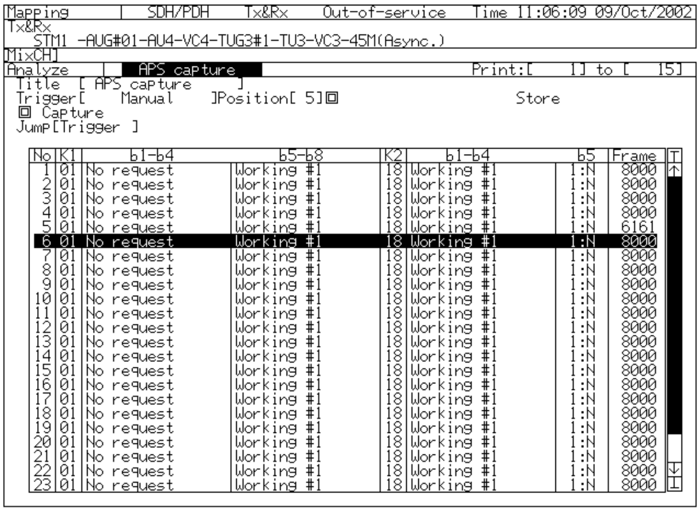
Repeat ....sends the pattern repeatedly.

7.11.3 APS Sequence Capture *'Analyze : APS capture' screen*

The K1 and K2 byte sequence can be captured and displayed by the specified trigger. One capture sequence continues until a change of the K1 and K2 byte is detected, and it captures 64 sequences. However, the number of the receive frame of one sequence is 8,000. If the K1 and K2 pattern do not change for more than 8,000 frames, it shifts to the next capture sequence.

(1) Open the 'Result : APS capture' screen.

(2) Setting the parameter of screen.



```
Mapping | SDH/PDH   Tx&Rx   Out-of-service   Time 11:06:09 09/Oct/2002
Tx&Rx
  STM1 -AUG#01-AU4-VC4-TUG3#1-TU3-VC3-45M(Async.)
[MixCH]
Analyze |  APS capture                         Print:[    1] to [   15]
 Title  [ APS capture       ]
 Trigger[    Manual    ]Position[ 5]⧈                  Store
 ⧈ Capture
 Jump[Trigger ]
```

No	K1	b1-b4	b5-b8	K2	b1-b4	b5	Frame
1	01	No request	Working #1	18	Working #1	1:N	8000
2	01	No request	Working #1	18	Working #1	1:N	8000
3	01	No request	Working #1	18	Working #1	1:N	8000
4	01	No request	Working #1	18	Working #1	1:N	8000
5	01	No request	Working #1	18	Working #1	1:N	6161
6	01	No request	Working #1	18	Working #1	1:N	8000
7	01	No request	Working #1	18	Working #1	1:N	8000
8	01	No request	Working #1	18	Working #1	1:N	8000
9	01	No request	Working #1	18	Working #1	1:N	8000
10	01	No request	Working #1	18	Working #1	1:N	8000
11	01	No request	Working #1	18	Working #1	1:N	8000
12	01	No request	Working #1	18	Working #1	1:N	8000
13	01	No request	Working #1	18	Working #1	1:N	8000
14	01	No request	Working #1	18	Working #1	1:N	8000
15	01	No request	Working #1	18	Working #1	1:N	8000
16	01	No request	Working #1	18	Working #1	1:N	8000
17	01	No request	Working #1	18	Working #1	1:N	8000
18	01	No request	Working #1	18	Working #1	1:N	8000
19	01	No request	Working #1	18	Working #1	1:N	8000
20	01	No request	Working #1	18	Working #1	1:N	8000
21	01	No request	Working #1	18	Working #1	1:N	8000
22	01	No request	Working #1	18	Working #1	1:N	8000
23	01	No request	Working #1	18	Working #1	1:N	8000

Capturing

(a) Trigger ....selects the type of the trigger to capture.

- If 'Manual' is selected for the trigger, ⧈ is displayed next to 'Position'. It is triggered off, by moving the cursor here and pressing Set.
- If 'External' is selected for the trigger, it is triggered off by a rise edge of the signal inputted from "Trigger input" connector. See "3.1.3 Right Side Panel" for the details.

(b) Position ...... specifies the sequence No. to be triggered off.

(c) Capture ..... A capture starts by moving the cursor here and pressing Set.

▣ .....indicates that it is waiting for a trigger. "Waiting for trigger" is displayed.

⧈ .....indicates that the capturing has finished.

Analyzing the Captured Data

Open the 'Analyze : APS capture' screen.

(a) No. ....displays the sequence No. of the captured data.

(b) K1 .....displays the captured data in hexadecimal or plain language.

(c) K2 .....displays the captured data in hexadecimal or plain language.

(d) Frame .....displays the number of the frames that received displayed K1 and K2 bytes. If K1 and K2 pattern do not change for more than 8,000 frames, it shifts to the next capture sequence.

(e) [Data scroll] ..... scrolls the data upwards and downwards.

T........................ Moves to the top of the data.

↑........................ Moves 5 lines upwards.

↓........................ Moves 5 lines downwards.

⊥........................ Moves to the bottom of the data.

(f) Jump ..... scrolls the screen to the captured data specified.

Trigger ....scrolls the screen to No. specified as the trigger position.

Number ..... scrolls the screen to No. inputted from a numeric input screen.

Storing the Captured Data

(a) Title ..... assigns a title to the screen currently displayed. This function is only available on a single display screen.

- If you press Set, the character input window is opened. Input the title.

(b) Print ..... selects the contents to be printed. (Press Print Now to start the printing.) The range of printing is specified by the sequence number.

(c) Store ..... stores the graph data in the memory. This is only available for single-screen display. If you press Set, the character input window is opened. Input a name and save it in the memory.

7.11.4 Measurement of Line Switching Time *'Test menu : APS test' screen*

Switching time of lines is obtained by measuring time when errors and alarm are generated.

This measurement is available when the bit rate is SDH/SONET or 2 Mb/s.

Measurement Principle

APS switching time is measured according to the following procedure.

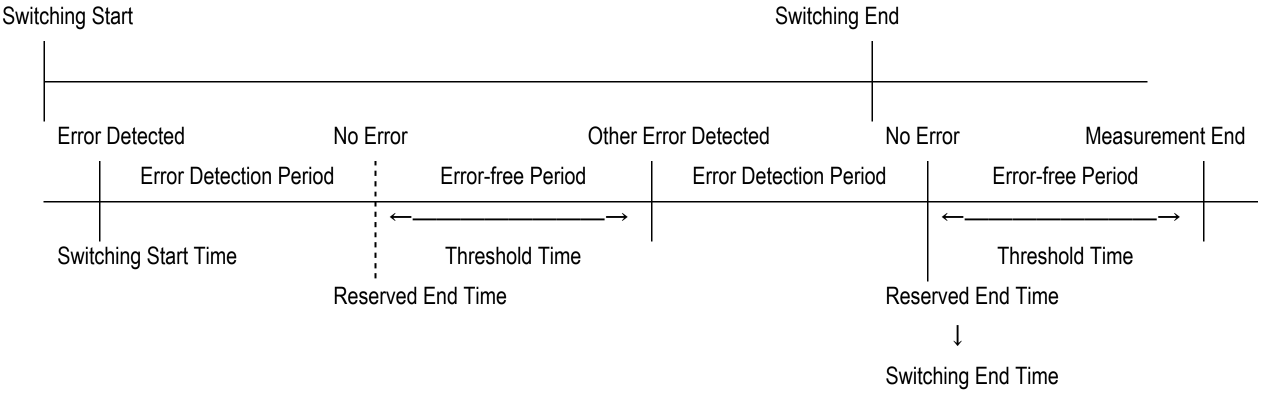
(1) When lines are switched, the errors and alarms, which are recognized as trigger, occur. Time when the error and alarm occur is regarded as switching start time.

(2) When the alarm is selected as the trigger, time when the alarm is released is regarded as the switching end time, and the measurement is finished. When an error is selected as the trigger, time when the error generation is finished is used as the reserved switching end time.

(3) After the reserved end time, if no time error set as a threshold is detected, the measurement is finished, regarding the reserved end time as the switching end time.

(4) If an error is detected during time set as a threshold, reserved end time is cleared. And time when the error generation is finished again is regarded as reserved end time.

(5) The procedures shown from (2) to (4) are repeated.

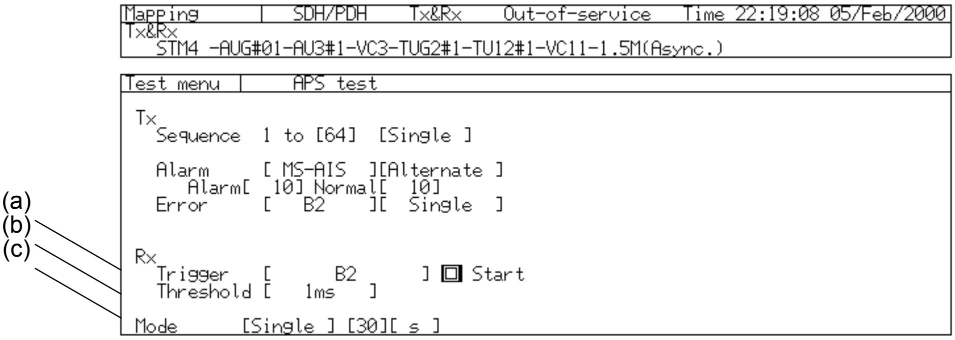


Measurement Procedure

Switching time is measured on the "Test menu : APS test" screen.

(1) Open the "Test menu : APS test" screen.

(2) Set up the screen parameters.



```
Mapping        | SDH/PDH   Tx&Rx   Out-of-service   Time 22:19:08 05/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu |     APS test
 Tx
   Sequence  1 to [64]  [Single ]

   Alarm     [ MS-AIS  ][Alternate ]
      Alarm[  10] Normal[  10]
   Error     [   B2    ][  Single  ]


 Rx
   Trigger   [      B2      ] ▣ Start
   Threshold [   1ms    ]
 Mode      [Single ] [30][ s ]
```

(a) Trigger ….selects an error or an alarm to be adopted as a trigger for starting measurement.

(b) Threshold …..When the error was selected as the trigger, set up a waiting time which is a period from error detection time to measurement end time.

(c) Mode …..Manual measurement can be performed along with APS measurement. When performing manual measurement, set up the measurement mode.

(3) After the setup, start the measurement. Move the cursor to "☐" and press Set to start the measurement.

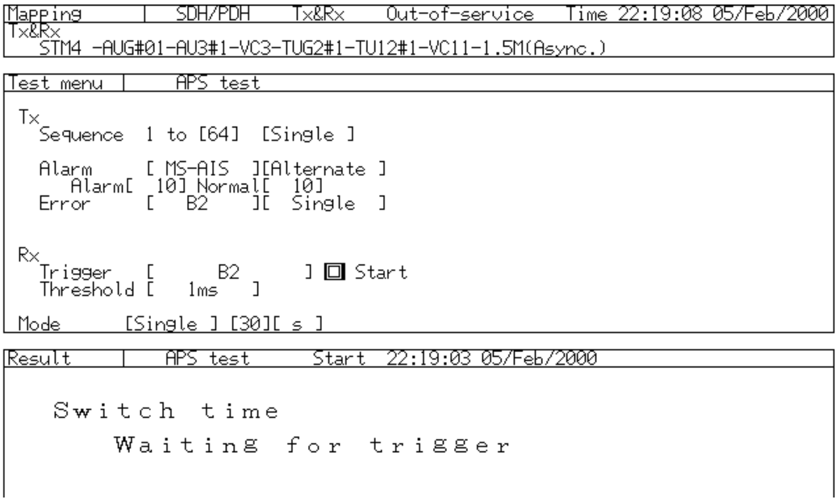
▣ …..indicates that the measurement is being performed.

☐ …..indicates that the measurement is not performed.

Displaying the Measurement Result.

(1) Open the "Result : APS test" screen to display the measurement result.

(2) "Waiting for trigger" is displayed on the screen. It is in the state of waiting a trigger input. If the trigger is inputted, the measurement starts and the measurement result will be displayed. If measurement is started newly, the former measurement results will be cleared and a new measurement result will be displayed.



```
Mapping      |   SDH/PDH    Tx&Rx    Out-of-service   Time 22:19:08 05/Feb/2000
Tx&Rx
   STM4 -AUG#01-AU3#1-VC3-TUG2#1-TU12#1-VC11-1.5M(Async.)

Test menu   |     APS test

 Tx
   Sequence  1 to [64]  [Single ]

   Alarm     [ MS-AIS  ][Alternate ]
      Alarm[  10] Normal[  10]
   Error     [   B2    ][  Single  ]


 Rx
   Trigger   [      B2      ] ☐ Start
   Threshold [   1ms    ]

 Mode       [Single ] [30][ s ]

Result      |    APS test      Start  22:19:03 05/Feb/2000

   Switch time
       Waiting for trigger
```

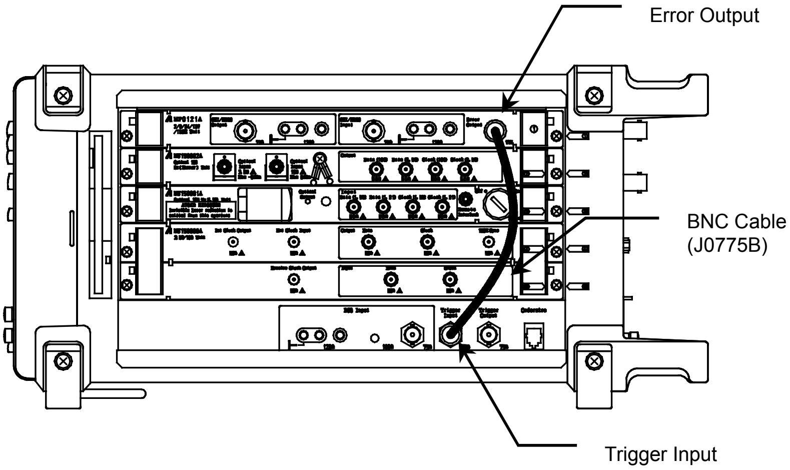
- The measurement result is displayed in the unit of ms.
- If switching time exceeds 2s, ">2000.0ms" is displayed.

Connection example:

This measurement may require an external cable connection, depending on the trigger setting.
The following triggers require an external connection.

(1) External
(2) Bit (for 2 Mb/s and other than concatenation mapping)

The connection example for Bit trigger at 2 Mb/s is shown below.



7.12 Frame Memory and Frame Capture

MP1570A equipped with option 13 (Frame Memory/Frame Capture) can perform the frame memory and frame capture.

Frame Memory

When the bit rate is 156M or 622M, 64 frames of patterns including payloads are preset, and the frame memory is generated in accordance with the set sequence.

Frame Capture

64 frames of the received data including payloads are memorized and displayed.

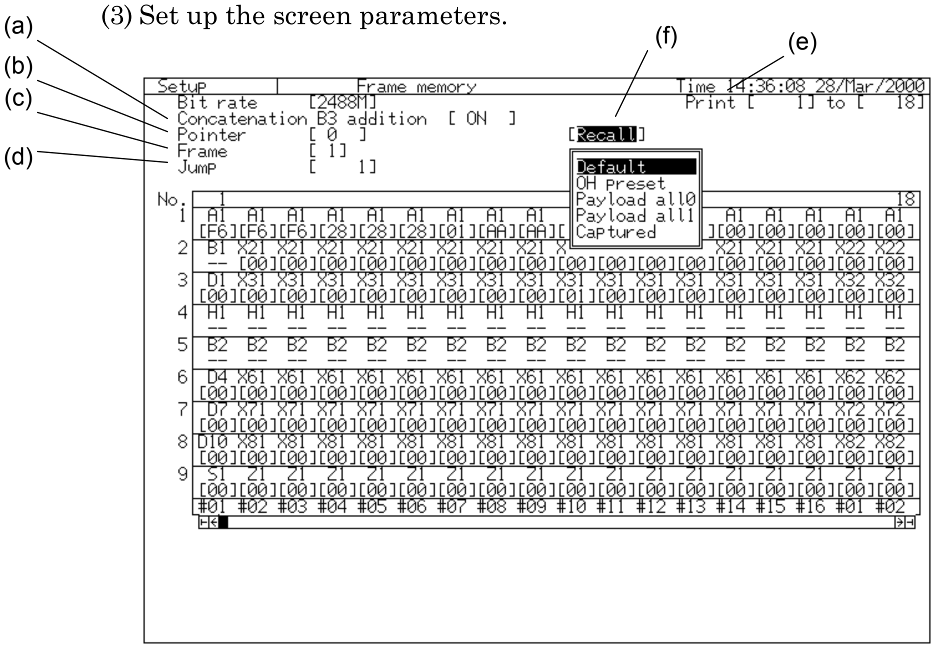
7.12.1 Frame Memory

'Setup : Frame memory' and 'Test menu : Frame memory" screen

(1) Set the bit rate on the "Setup : Mapping" screen.

(2) To edit the frame pattern to be generated, open the "Setup : Frame memory" screen.

(3) Set up the screen parameters.



```
Setup                  Frame memory                 Time 14:36:08 28/Mar/2000
  Bit rate        [2488M]                           Print [    1] to [   18]
  Concatenation B3 addition  [ ON  ]
  Pointer         [ 0  ]                     [Recall]
  Frame           [ 1]
  Jump            [    1]
No.  1                                                                      18
  1  A1   A1   A1   A1   A1   A1   A1   A1   A1                A1   A1   A1   A1   A1
    [F6][F6][F6][28][28][28][01][AA][AA][              ][00][00][00][00][00]
  2  B1  X21  X21  X21  X21  X21  X21  X21  X21  X               X21  X21  X21  X22  X22
     --  [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
  3  D1  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X31  X32  X32
    [00][00][00][00][00][00][00][00][00][01][00][00][00][00][00][00][00][00]
  4  H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1   H1
     --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --
  5  B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2   B2
     --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --   --
  6  D4  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X61  X62  X62
    [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
  7  D7  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X71  X72  X72
    [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
  8 D10  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X81  X82  X82
    [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
  9  S1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1   Z1
    [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
    #01  #02  #03  #04  #05  #06  #07  #08  #09  #10  #11  #12  #13  #14  #15  #16  #01  #02
```

(a) Concatenation B3 addition .....sets whether to perform the B3 calculation and add B3.

(b) Pointer .....sets the pointer value to "0" or "522".

(c) Frame .....specifies frame number to be edited.

(d) Jump .....specifies column number of the first frame to be displayed.

(e) Print .....When printing the displayed frame, specify the column number. See "8.5 Printing" for the details.

(4) Preset data as follows. Move the cursor to the desired byte and press Set . A numerical input window is displayed. Set the byte in hexadecimal numbers.

(f) Default .....sets the pattern.

Default .....initializes the pattern.

OH preset .....overwrites data which was set on the "Setup : OH preset" screen.

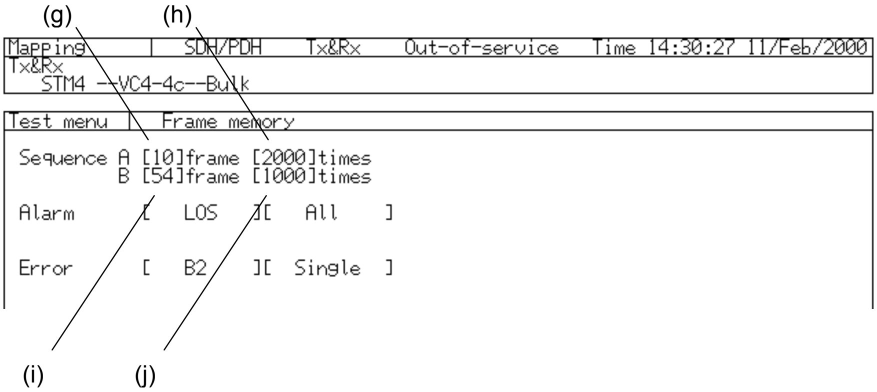
Payload all 0 .....sets all payload patterns to "0".

Payload all 1 .....sets all payload patterns to "1".

Captured ......overwrites 64 frames of data captured by the frame capture.

(5) After the settings shown in (4), open the "Test menu : Frame memory" screen to generate the edited frame data.

(6) Set up the screen parameters.



```
Mapping     |  SDH/PDH   Tx&Rx   Out-of-service   Time 14:30:27 11/Feb/2000
Tx&Rx
   STM4 --VC4-4c--Bulk

Test menu  |  Frame memory

 Sequence A [10]frame [2000]times
          B [54]frame [1000]times

 Alarm      [   LOS   ][   All    ]

 Error      [   B2    ][  Single  ]
```

(g) specifies the frame number of A frame.

(h) specifies the times to repeat A frame.

(i) specifies the frame number of B frame.

(j) specifies the times to repeat B frame.

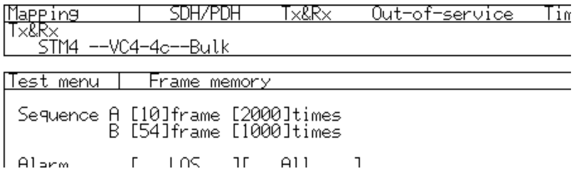
About Sequence to Be Generated

64 frames of data edited on the "Setup : Frame memory" screen are divided into A frame and B frame.

A frame .....Frames from No.1 to No.n (n=1 to 64) can be set.

B frame .....Frame from No.n+1 to No.m (m=n+1 to 64) can be set.

In the example shown below, the test sequences are generated as follows.



```
Mapping      | SDH/PDH    Tx&Rx    Out-of-service   Tim
Tx&Rx
   STM4 --VC4-4c--Bulk

Test menu  |   Frame memory

 Sequence A [10]frame [2000]times
          B [54]frame [1000]times

 Alarm      [   LOS   ][   All     ]
```

(1) A pattern .. No.1 - No.10, "2000" times

(2) B pattern .. No.11 - No.64, "1000" times

(3) The sequences shown in (1) and (2) are repeated.

Note:

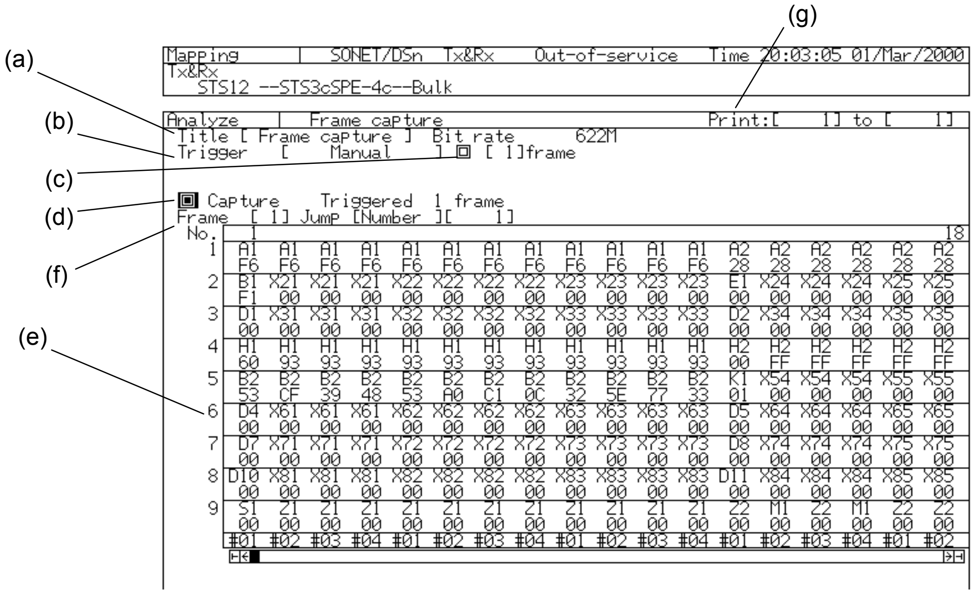
- The frame memory pattern begins to be generated, just after the "Test menu : Frame memory" screen is displayed.
- When the setting of (f), (g), (h), or (i) is changed, it is reflected by pressing Set.

7.12.2 Frame Capture

'Analyze : Frame capture' screen

The received data can be captured on the "Analyze : Frame capture" screen.   Here is the procedure for the capture.

Open the "Analyze : Frame capture" screen.



```
Mapping     |  SONET/DSn  Tx&Rx    Out-of-service    Time 20:03:05 01/Mar/2000
Tx&Rx
   STS12 --STS3cSPE-4c--Bulk

Analyze    |   Frame capture                            Print:[     1] to [     1]
 Title [ Frame capture ]  Bit rate      622M
 Trigger    [    Manual     ] ⊡ [ 1]frame


 ▣ Capture    Triggered  1 frame
 Frame  [ 1] Jump [Number ][    1]
  No.   1                                                                      18
    1  A1  A1  A1  A1  A1  A1  A1  A1  A1  A1  A1  A1  A2  A2  A2  A2  A2  A2
       F6  F6  F6  F6  F6  F6  F6  F6  F6  F6  F6  F6  28  28  28  28  28  28
    2  B1 X21 X21 X21 X22 X22 X22 X22 X23 X23 X23 X23  E1 X24 X24 X24 X25 X25
       F1  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
    3  D1 X31 X31 X31 X32 X32 X32 X32 X33 X33 X33 X33  D2 X34 X34 X34 X35 X35
       00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
    4  H1  H1  H1  H1  H1  H1  H1  H1  H1  H1  H1  H1  H2  H2  H2  H2  H2  H2
       60  93  93  93  93  93  93  93  93  93  93  93  00  FF  FF  FF  FF  FF
    5  B2  B2  B2  B2  B2  B2  B2  B2  B2  B2  B2  B2  K1 X54 X54 X54 X55 X55
       53  CF  39  48  53  A0  C1  0C  32  5E  77  33  01  00  00  00  00  00
    6  D4 X61 X61 X61 X62 X62 X62 X62 X63 X63 X63 X63  D5 X64 X64 X64 X65 X65
       00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
    7  D7 X71 X71 X71 X72 X72 X72 X72 X73 X73 X73 X73  D8 X74 X74 X74 X75 X75
       00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
    8 D10 X81 X81 X81 X82 X82 X82 X82 X83 X83 X83 X83 D11 X84 X84 X84 X85 X85
       00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
    9  S1  Z1  Z1  Z1  Z1  Z1  Z1  Z1  Z1  Z1  Z1  Z1  Z2  M1  Z2  M1  Z2  Z2
       00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00  00
      #01 #02 #03 #04 #01 #02 #03 #04 #01 #02 #03 #04 #01 #02 #03 #04 #01 #02
```

Capturing procedure

(a) Title ….. assigns a title to the screen currently displayed.   This function is only available on a single display screen.

- The title is needed when the analyze data is recalled on the Setup : Memory screen.

(b) Trigger …..selects the type of the trigger for capturing the data.

- When "Manual" is selected as a trigger, ⊡ is displayed next to "Position".   It is triggered off by moving the cursor here and pressing Set.
- When "External" is selected as a trigger, it is triggered off by the rise edge of the signal which is inputted from the "Trigger input" connector on the right side panel.   See "3.1.3 Right Side Panel" for Trigger input.

(c) Trigger frame …..specifies the frame to be triggered.   When "5 frame" is inputted as the frame to be triggered, 4 frames before it and 59 frames after it are captured.

(d) Capture .... The capture starts by moving the cursor here and pressing Set .

▣ .....indicates that the capturing has started and a trigger is waited.

◻ .....indicates that the capturing has finished.

- In the example shown above, No.1 frame is captured using a manual trigger.
-

Analyzing the Captured Data

The captured data is displayed in 9 row * (270*n) column.

(e) [Data scroll] ..... scrolls the data upwards and downwards.

⇤........................ Moves to the top page.
←........................ Moves half page before.
→........................ Moves half page forward.
⇥........................ Moves to the last page.

(f) Frame ....displays the specified capture frame.

Printing the Captured Data

(g) Print .... Specify column number to select the contents to be printed (Press Print Now to start the printing). Refer to "8.5 Printing" for the details.

Storing the Captured Data

The captured data can be stored into floppy disks after the capture. Refer to "8.6 Floppy Disk" for the details.

Note:

When all captured frames are store, two or more floppy disks might be needed.

7.13 IP over SDH

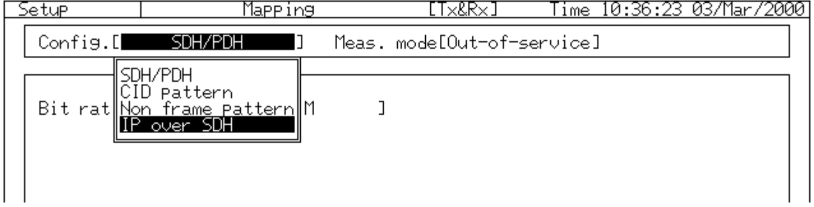
By installing a Frame Memory/Frame Capture option (option-13) and an IP over SDH option (option-14), MP1570A can measure IP packet which is mapped to the SDH frame.

Sending IP packet .... Three types of PPP packet and IP packet (version 4 and version 6) can be edited. The edited packet specifies the generation sequence, is mapped to SDH, and is outputted.

IP capture .... captures the packet of the specified address from the received SDH frame, and displays its contents.

7.13.1 Switching IP Measurement Screen

When making an IP measurement, set "Config." to "IP over SDH" on the Setup : Mapping screen.

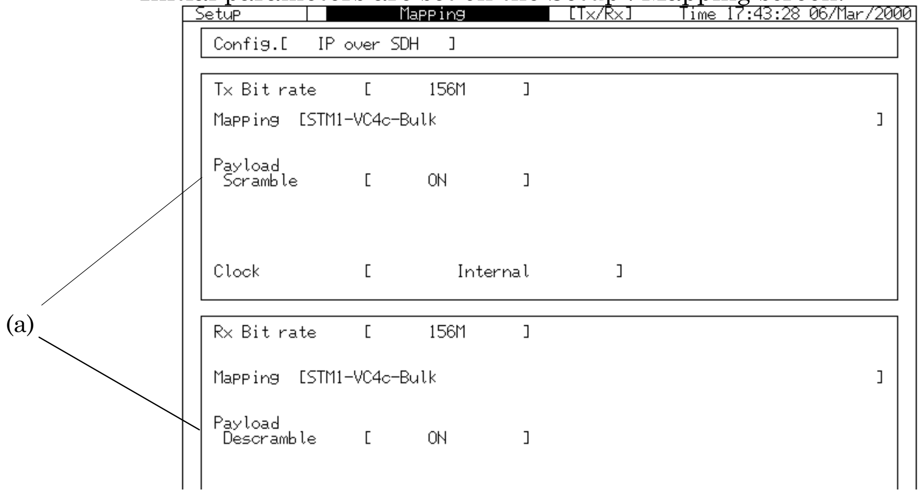


```
Setup | Mapping [Tx&Rx] Time 10:36:23 03/Mar/2000
Config.[ SDH/PDH ] Meas. mode[Out-of-service]
Bit rat                    M ]
```

7.13.2 Initial Setting

'Setup : Mapping' screen

Initial parameters are set on the Setup : Mapping screen.



```
Setup | Mapping [Tx/Rx] Time 17:43:28 06/Mar/2000
Config.[ IP over SDH ]

Tx Bit rate    [    156M    ]
Mapping  [STM1-VC4c-Bulk                         ]
Payload
 Scramble      [    ON      ]

Clock          [      Internal      ]

Rx Bit rate    [    156M    ]
Mapping  [STM1-VC4c-Bulk                         ]
Payload
 Descramble    [    ON      ]
```

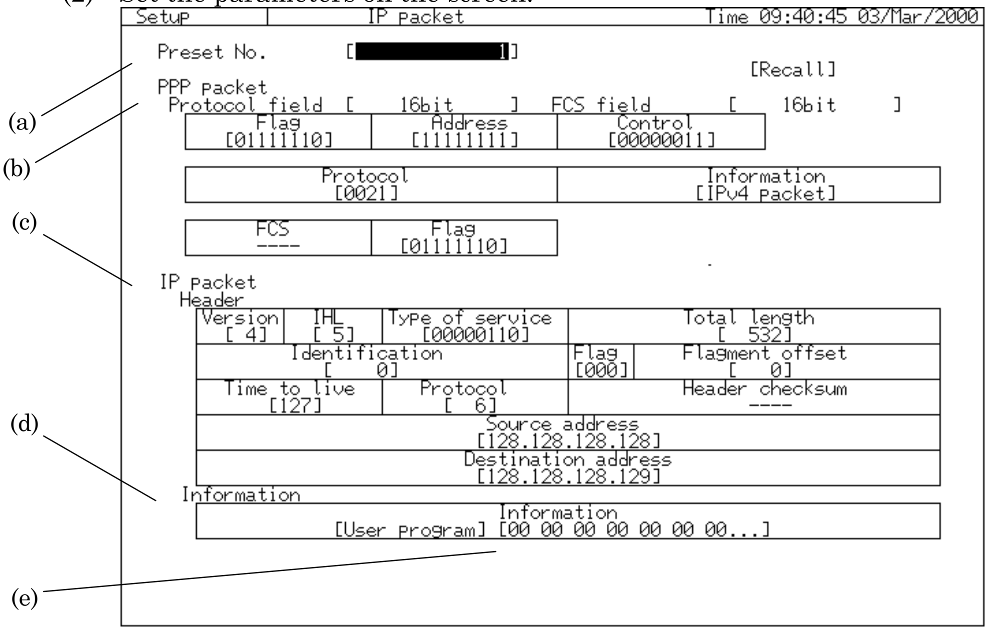
(a) Sets the scramble and the descramble of the packets.

- Refer to "Section 5 Application Examples and Basic Settings" for the settings of the other parameters.

7.13.3 Generating IP Packet *'Setup : IP packet' screen*

(1) Open the Setup : IP packet screen in order to edit a frame pattern to be generated.

(2) Set the parameters on the screen.



Setup | IP packet | Time 09:40:45 03/Mar/2000

Preset No. [1]

[Recall]

PPP packet

Protocol field [16bit] FCS field [16bit]

Flag [01111110] | Address [11111111] | Control [00000011]

Protocol [0021] | Information [IPv4 packet]

FCS ---- | Flag [01111110]

IP packet

Header

Version [4] | IHL [5] | Type of service [00000110] | Total length [532]

Identification [0] | Flag [000] | Flagment offset [0]

Time to live [127] | Protocol [6] | Header checksum ----

Source address [128.128.128.128]

Destination address [128.128.128.129]

Information

Information [User program] [00 00 00 00 00 00 00...]

(a) Preset No. ....specifies the packet to be generated.

- MP1570A can set three types of IP packet, and output them in accordance with the regulated sequence.

(b) PPP packet ....edits the PPP packet. Enter it in binary or hexadecimal numbers.

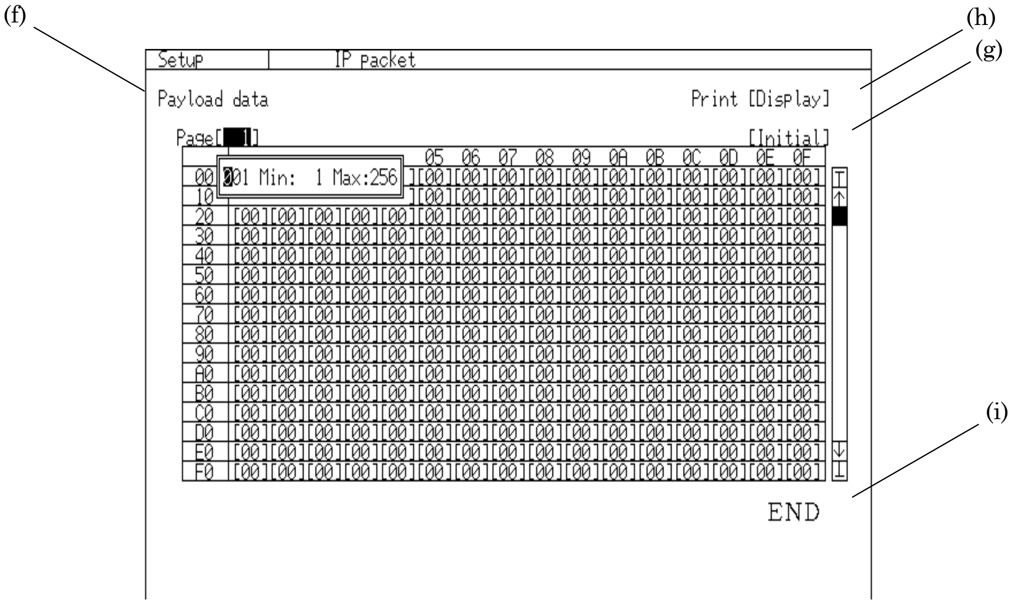
(c) IP packet...........edits the header of the IP packet. Enter it in binary or hexadecimal numbers.

(d) Information ....sets a test pattern which is inserted into the IP packet information domain.

(e) Preset data ....When "User program" is selected as the test pattern, edit the test pattern. Move the cursor here and press Set. And the test pattern edit window is displayed. Up to 65,535 bytes can be edited.

Note

The escape codes are automatically added and outputted.



```
Setup     IP packet
Payload data                                           Print [Display]
 Page[  1]                                                  [Initial]
                        05  06  07  08  09  0A  0B  0C  0D  0E  0F
00 001 Min:  1 Max:256 ][00][00][00][00][00][00][00][00][00][00][00]
10                     ][00][00][00][00][00][00][00][00][00][00][00]
20 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
30 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
40 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
50 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
60 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
70 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
80 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
90 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
A0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
B0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
C0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
D0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
E0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
F0 [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
                                                             END
```

(f) Payload data ..... displays the data to be inserted into the payload in the array format. The time flow of the data is from Row00/Column00 to RowF0/ColumnF0 and from Page 1 to Page 256.

(g) Initial .... As the initial values, all payload data can be set to the same value. Move the cursor here and press Set, and the numerical input screen is displayed. Enter the value in binary numbers.

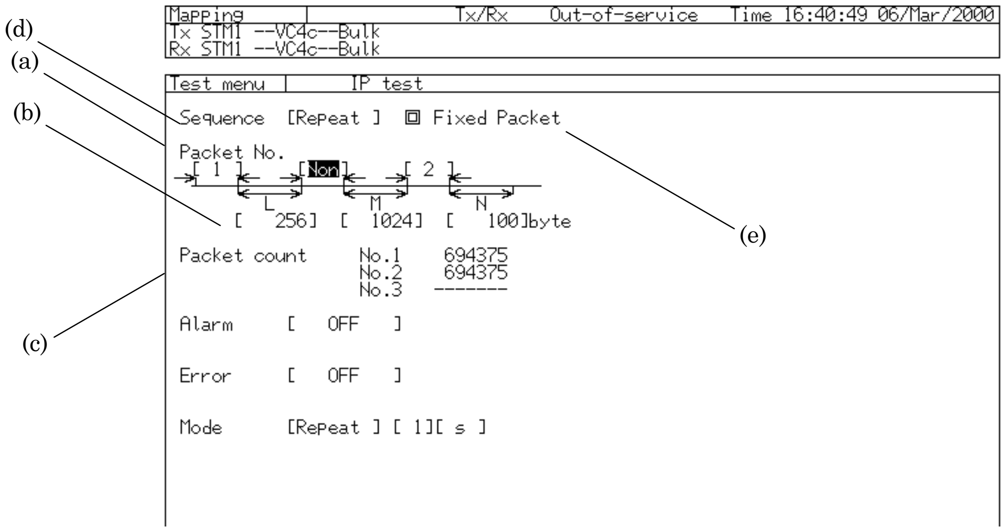
(h) Print .... selects the contents to be printed. (Press Set to start the printing.) Refer to "8.5 Printing" for the details.

Display	Data is displayed on the screen
All	Data from the start of measurement
After	Data after the currently displayed data
Before	Data before the currently displayed data

(i) END .... Move the cursor here and press Set to display the previous screen.

(3) Open the Test menu : IP test screen to generate the IP sequence.

(4) Set the screen parameters.



```
Mapping          Tx/Rx   Out-of-service   Time 16:40:49 06/Mar/2000
Tx STM1 --VC4c--Bulk
Rx STM1 --VC4c--Bulk

Test menu      IP test
Sequence   [Repeat ]  ▣ Fixed Packet
Packet No.
 [ 1 ]      [Non]      [ 2 ]
  [   256]  [  1024]  [   100]byte
Packet count      No.1    694375
                  No.2    694375
                  No.3   -------
Alarm      [   OFF   ]

Error      [   OFF   ]

Mode       [Repeat ] [  1][ s ]
```

(a) Packet No. .....sets a sequence to generate the IP packet. Specify the packet number which was set on the Setup : IP packet screen. When "Non" is selected, the packet at the point is not outputted.

(b) L, M, N ....specifies the idle bytes number which sets the interval between two IP packets.

(c) Packet count..displays the number of the outputted packets. The accumulative time is one second.

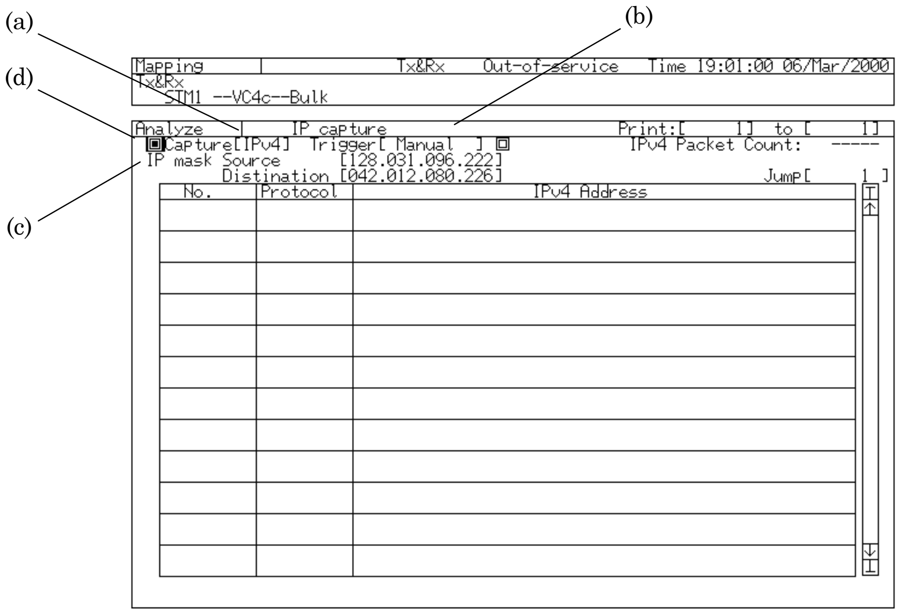
(d) Sequence ....specifies the sequence generation method.

(e) Fixed packet..After (a) and (b) are set, move the cursor here and press Set to fix the send packet. When it is fixed, "Start" is displayed. Move the cursor here and press Set again to output the packets.

7.13.4 Capturing IP Packet *'Analyze : IP capture' screen*

(1) The received IP packets are captured on the Analyze : IP capture screen. Open the Analyze : IP capture screen.

(2) Set the screen parameters.



```
Mapping                    Tx&Rx    Out-of-service    Time 19:01:00 06/Mar/2000
Tx&Rx
   STM1 --VC4c--Bulk

Analyze       IP capture                          Print:[      1]  to [      1]
 ▣Capture[IPv4]  Trigger[ Manual   ] ▣                IPv4 Packet Count:   -----
 IP mask Source        [128.031.096.222]
          Distination  [042.012.080.226]                            Jump[      1 ]
   No.     Protocol                      IPv4 Address
```

(a) [Selecting IP format] .... selects the IP format to be captured.

(b) Trigger............. selects a trigger to start a capture.

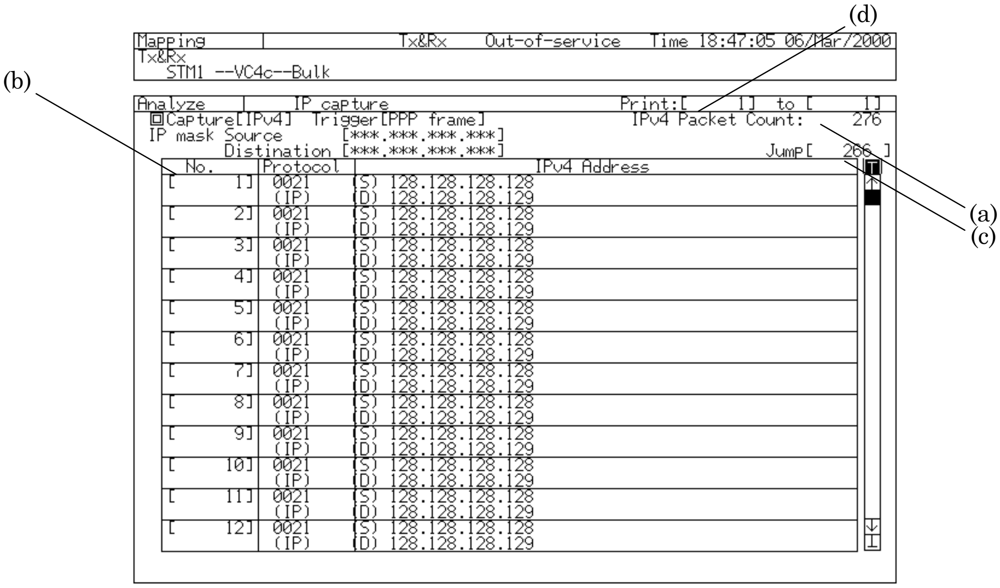
(c) IP mask .... sets the IP address to be captured (Address Filter). Addresses of the source and the destination can be set separately. Instead of specifying the address, the address value is ignored and the capture is performed by selecting "**" (Address Mask).

(d) Capture............ Move the cursor here and press Set to start the capture.

▣ .... indicates that the capture has started and is waiting for a trigger. "Waiting for trigger" is displayed on the screen.

7.13.5 Displaying Captured IP Packets *'Analyze : IP capture' screen*

(1) When all captures are completed, the captured data is displayed on the Analyze : IP capture screen.



```
Mapping  |                Tx&Rx    Out-of-service   Time 18:47:05 06/Mar/2000
Tx&Rx
   STM1 --VC4c--Bulk

Analyze  |      IP capture                        Print:[      1]  to [      1]
 ◘Capture[IPv4]  Trigger[PPP frame]              IPv4 Packet Count:      276
 IP mask Source       [***.***.***.***]
         Distination [***.***.***.***]                         Jump[   266 ]
    No.     |Protocol|                     IPv4 Address
[         1] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         2] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         3] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         4] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         5] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         6] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         7] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         8] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[         9] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[        10] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[        11] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
[        12] 0021     (S) 128.128.128.128
             (IP)     (D) 128.128.128.129
```

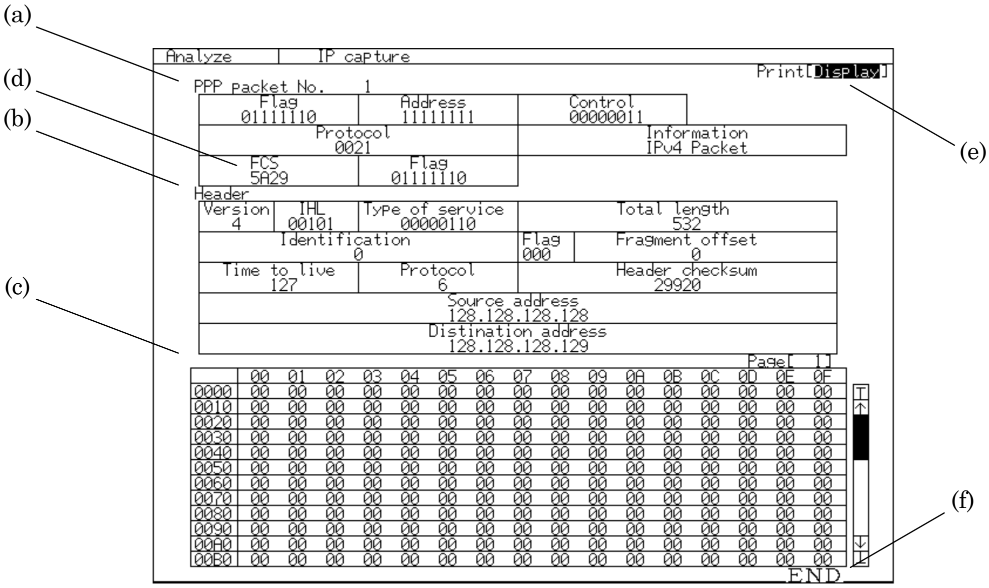
(a) IP packet count …displays the number of the captured IP packets.

(b) No. ....No. is added to the captured packet. And its protocol and address are displayed.

(c) Jump ....moves the screen to the specified packet number.

(d) Print..................prints out the measurement results of the captured data. Specify the start and the end of the packet numbers. Refer to "8.5 Printing" for the details of printing.

(2) Move the cursor to the desired number and press Set in order to display detailed information on the packet with the number. The captured PPP packet and IP packet are displayed.



Analyze | IP capture

Print[Display]

PPP packet No. 1

Flag 01111110	Address 11111111	Control 00000011	
Protocol 0021		Information IPv4 Packet	
FCS 5A29	Flag 01111110		

Header

Version 4	IHL 00101	Type of service 00000110	Total length 532	
Identification 0			Flag 000	Fragment offset 0
Time to live 127		Protocol 6	Header checksum 29920	
Source address 128.128.128.128				
Distination address 128.128.128.129				

Page[1]

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
0000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0090	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

END

(a) PPP packet .... displays the detected PPP packet.

(b) Header .... displays the header of the detected PPP packet.

(c) Information ...... displays the information field of the detected IP packet.

(d) FCS .... displays the information field of the detected IP packet. FCS It is displayed in array. FCS When an FCS error is detected, the FCS field is displayed in red. The detection result of the IP header is not displayed. And the measurement results of the captured data in which Flag of the PPP packet is in the lead are displayed.

(e) Print................. prints out the captured data. .) Refer to "8.5 Printing" for the details.

Display .... Data is displayed on the screen
All .... Data from the start of measurement
After .... Data after the currently displayed data
Before .... Data before the currently displayed data

(f) END .... Move the cursor here and press Set in order to return to the previous screen.

Note

The escape codes are automatically detected, and not displayed.

7.14 Sequence Test

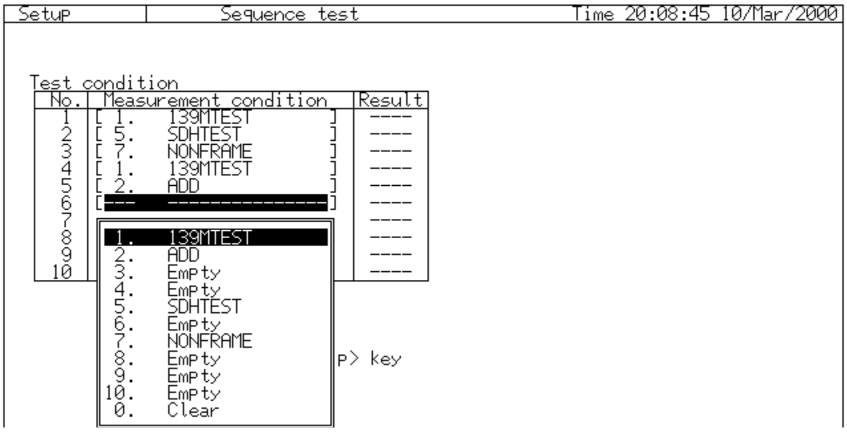
MP570A can automatically read several measurement conditions stored in the memory and make measurements in order of specified conditions. (Sequence test) Refer to "8.4 Saving and Reading the Data" for the details of storing measurement conditions to the memory.

7.14.1 Setting Measurement Sequence *'Setup :Sequence test' screen*

A measurement sequence is set on the Setup : Sequence test screen. Here is the setting procedure.

(1) Open the Setup : Sequence test screen.

(2) Specify the measurement conditions from the table on the screen in order of desired measurements. Move the cursor here and press Set to display a measurement condition selection window. Select a desired measurement condition.



```
Setup        |        Sequence test              Time 20:08:45 10/Mar/2000

Test condition
 No. | Measurement condition  |Result
  1  |[ 1.   139MTEST        ]| ----
  2  |[ 5.   SDHTEST         ]| ----
  3  |[ 7.   NONFRAME        ]| ----
  4  |[ 1.   139MTEST        ]| ----
  5  |[ 2.   ADD             ]| ----
  6  |[---   ----------------]| ----
  7  |                        | ----
  8  |  1.   139MTEST         | ----
  9  |  2.   ADD              | ----
 10  |  3.   Empty            | ----
        4.   Empty
        5.   SDHTEST
        6.   Empty
        7.   NONFRAME
        8.   Empty            p> key
        9.   Empty
       10.   Empty
        0.   Clear
```

(3) Repeat the procedure shown above to make the measurement sequence.

(4) After setting the sequence, press ● Start /Stop in accordance with a direction shown on the screen to start the measurement.

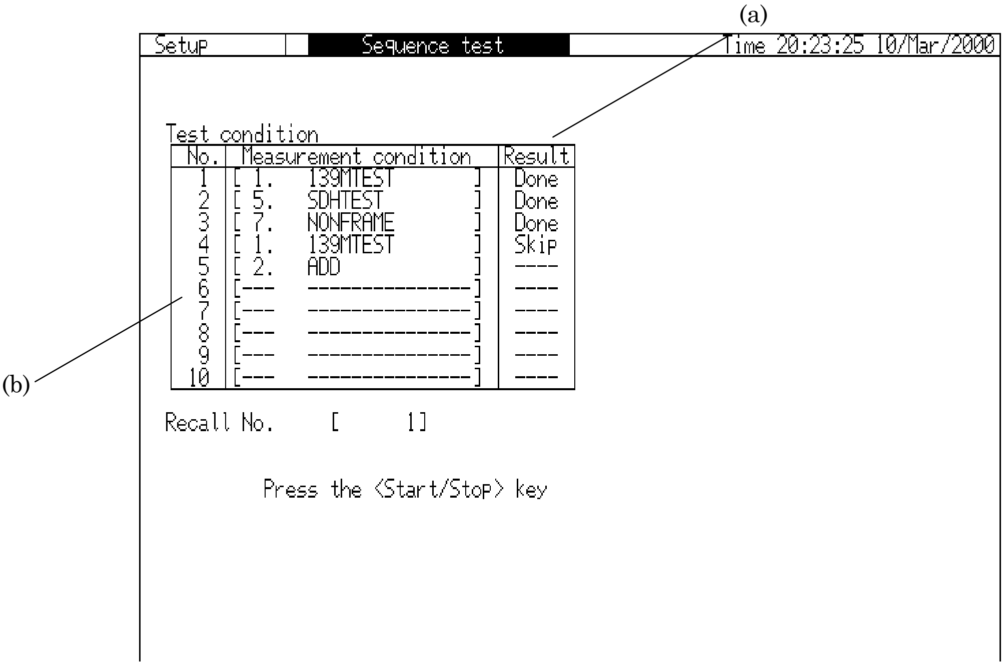
Note:

- The error and alarm measurement (performance measurement) and the frequency measurement can be performed in the sequence test. The other measurements can not be performed in the sequence test.
- When the measurement mode of the sequence measurement is set to "Repeat", it is changed to "Single". Besides, when the setting of measurement time is more than one hour or the manual measurement is set, the measurement condition is changed to "Single" and its measurement time is changed to one hour.

7.14.2 Displaying and Analyzing Measurement Results

'Result :Sequence test' and 'Analyze :Sequence test' screens

(1) When all measurements finish, table in which sequence number can be selected is displayed (The measurement results of the selected sequence can be displayed).



```
Setup  |  Sequence test  |  Time 20:23:25 10/Mar/2000

Test condition
 No. | Measurement condition   |Result
  1  |[ 1.   139MTEST         ] | Done
  2  |[ 5.   SDHTEST          ] | Done
  3  |[ 7.   NONFRAME         ] | Done
  4  |[ 1.   139MTEST         ] | Skip
  5  |[ 2.   ADD              ] | ----
  6  |[---   ----------------] | ----
  7  |[---   ----------------] | ----
  8  |[---   ----------------] | ----
  9  |[---   ----------------] | ----
 10  |[---   ----------------] | ----

Recall No.     [      1]

        Press the <Start/Stop> key
```

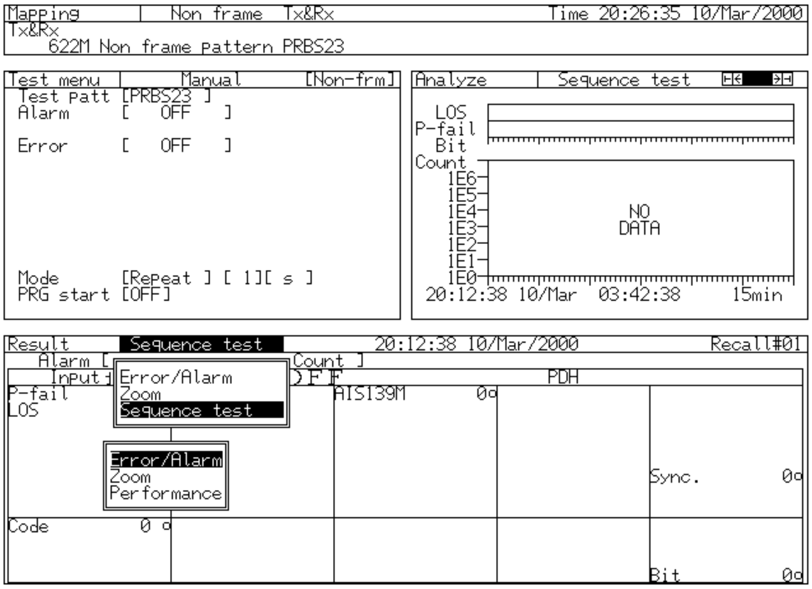
(a) Result .... indicates the measurement process.

Done .... indicates that the measurement finished.

Skip .... indicates that the measurement wasn't performed because the stored measurement condition didn't match to the condition of the sequence test.

(b) Recall No.......... selects the sequence number to display the measurement results.

(2) The measurement results selected on the Setup : Sequence test screen is displayed on the Result : Sequence test screen and the Analyze : Sequence test screen.



```
Mapping     |  Non frame  Tx&Rx                  Time 20:26:35 10/Mar/2000
Tx&Rx
    622M Non frame pattern PRBS23

Test menu |      Manual      [Non-frm]
 Test patt [PRBS23 ]
 Alarm     [   OFF   ]

 Error     [   OFF   ]

 Mode      [Repeat ] [ 1][ s ]
 PRG start [OFF]

Result   Sequence test      20:12:38 10/Mar/2000             Recall#01
```

- On the Result : Sequence screen, move the cursor to the desired measurement result and press Set. The displayed measurement result can be stored like normal measurements.
- On the Analyze : Sequence test screen, move the cursor to the desired analysis data and press Set. The displayed analysis data can be stored and printed like normal measurements.

Section 8 Other Functions

This section describes the other functions of MP1570A.

8.1 Setting the System *'Setup : System' screen*

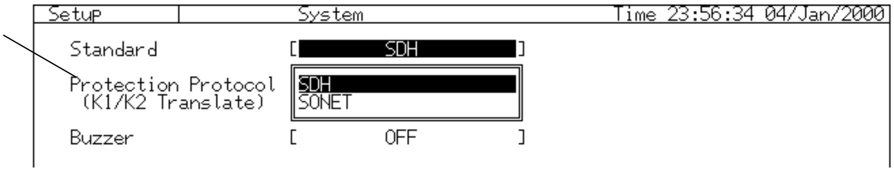
8.1.1 Selection of either SDH or SONET Display

MP1570A allows the selection of either SDH or SONET display if option-10 and option-11 are installed. (An explanation for SDH display is provided in this Operation Manual.) The selection procedure is as follows.

(1) Open the 'Setup : System' screen

(2) Setup the screen parameters.

(a)



Setup | System | Time 23:56:34 04/Jan/2000

Standard [SDH]

Protection Protocol (K1/K2 Translate)

SDH

SONET

Buzzer [OFF]

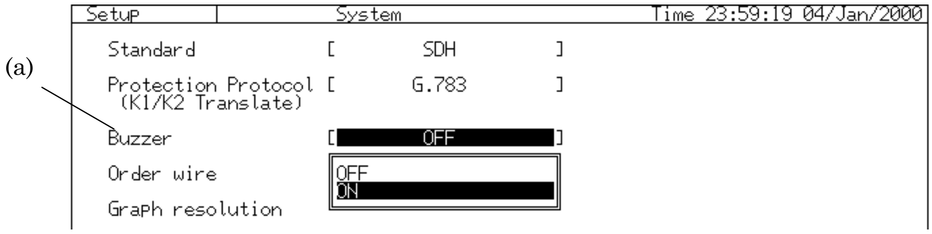
(a) Standard............Select SDH or SONET display.

8.1.2 Setting the Buzzer

Here is the procedure for setting the buzzer. If this function is set at ON, the buzzer is sounded whenever an error or alarm is detected.

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

(2) Setup the screen parameters.



```
Setup          System                          Time 23:59:19 04/Jan/2000
  Standard               [        SDH        ]
  Protection Protocol    [       G.783       ]
   (K1/K2 Translate)
  Buzzer                 [        OFF        ]
  Order wire             OFF
                         ON
  Graph resolution
```

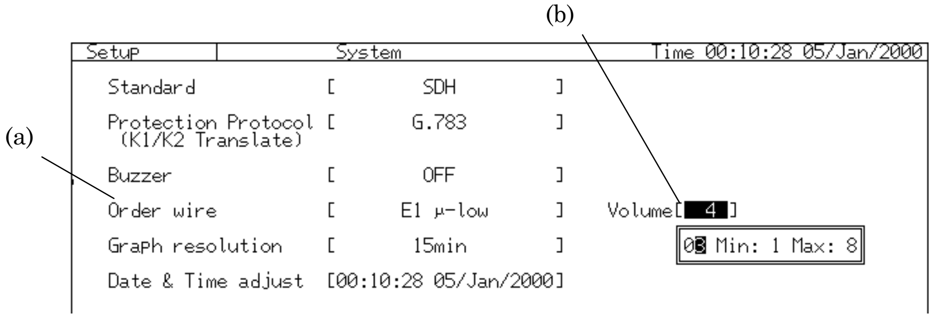
(a) Buzzer .... Sets on or off of the buzzer.

8.1.3 Setting the Orderwire (Voice Entry)

MP1570A allows the order wiring through the RJ11 connector on the right-hand side of the panel. Here is the setting procedure.

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

(2) Setup the screen parameters as follows:



```
Setup          System                          Time 00:10:28 05/Jan/2000
  Standard               [        SDH        ]
  Protection Protocol    [       G.783       ]
   (K1/K2 Translate)
  Buzzer                 [        OFF        ]
  Order wire             [      E1 μ-low     ]   Volume[  4 ]
  Graph resolution       [       15min       ]          08 Min: 1 Max: 8
  Date & Time adjust     [00:10:28 05/Jan/2000]
```

(a) Order wire......... Select either 'E1 μ -low', 'E1 a-low', 'E2 μ -low' or 'E2 a-low' for turning on the Order wire.

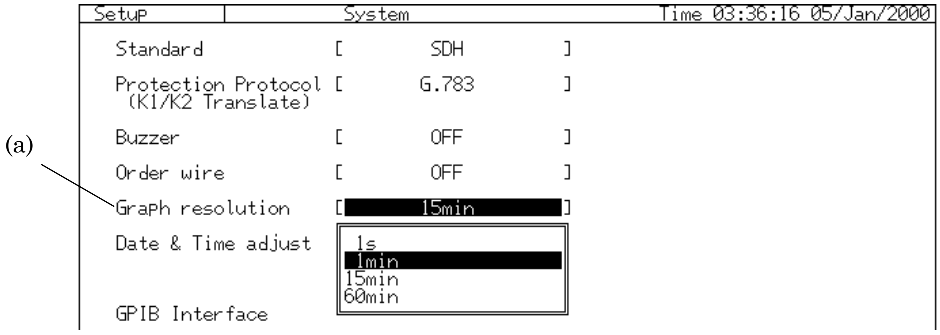
(b) Volume .... Set the volume.

8.1.4 Setting the Graph Resolution

The procedure for setting the resolution of a graph on measurement results LOG graphs (including the graphs showing the error and measured results of alarm and traffic monitors) displayed on the Analyze screen is as follows.

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

(2) Setup the screen parameters.



```
Setup          System                        Time 03:36:16 05/Jan/2000
  Standard             [      SDH      ]
  Protection Protocol  [     G.783     ]
   (K1/K2 Translate)
  Buzzer               [      OFF      ]
  Order wire           [      OFF      ]
  Graph resolution     [     15min     ]
  Date & Time adjust    1s
                        1min
                        15min
                        60min
  GPIB Interface
```

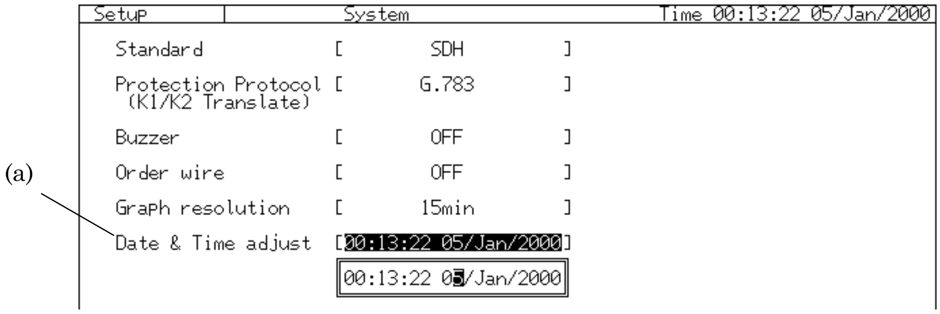
(a) Graph resolution ....Select the resolution from '1s', '1min', '15min' and '60min'.

8.1.5 Setting the Clock

Here is the procedure for setting the clock.

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

(2) Setup the screen parameters.



```
Setup          System                        Time 00:13:22 05/Jan/2000
  Standard             [      SDH      ]
  Protection Protocol  [     G.783     ]
   (K1/K2 Translate)
  Buzzer               [      OFF      ]
  Order wire           [      OFF      ]
  Graph resolution     [     15min     ]
  Date & Time adjust   [00:13:22 05/Jan/2000]
                        00:13:22 05/Jan/2000
```

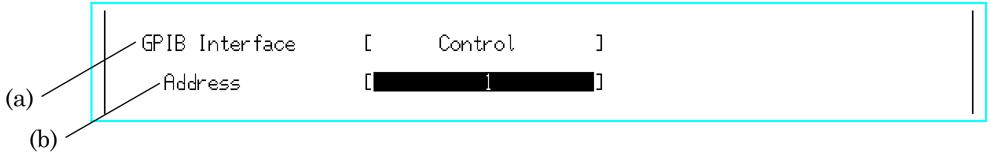
(a) Date & Time adjust.....Set the time and date.

8.1.6 Setting the GPIB Interface

Set the GPIB function if a GPIB board and the optional software are installed on MP1570A. Here is the setting procedure.

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

(2) Setup the screen parameters.



```
GPIB Interface      [     Control       ]
  Address           [        1          ]
```

(a) GPIB Interface ....Selects the GPIB interface application.

Control....... Uses the GPIB interface for remote control.

Printer .... Uses the GPIB interface for printer output.

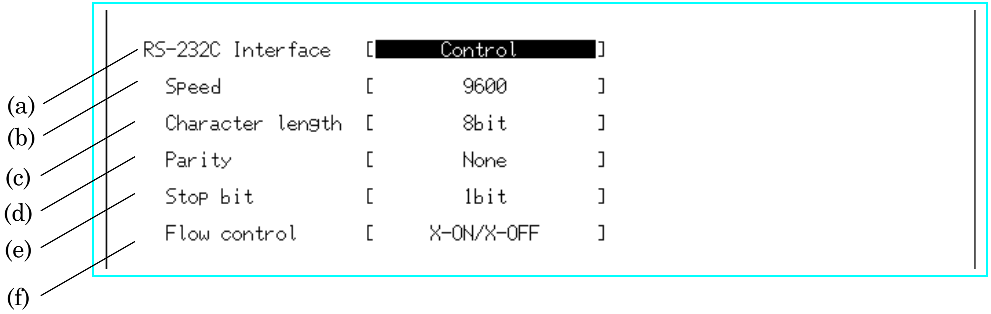
(b) Address ....Selects the interface address.

8.1.7 Setting the RS-232C Interface

Set the RS-232C function if a RS-232C board and the optional software are installed on MP1570A. Here is the setting procedure.

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

(2) Setup the screen parameters.



```
RS-232C Interface   [     Control       ]
  Speed             [       9600        ]
  Character length  [       8bit        ]
  Parity            [       None        ]
  Stop bit          [       1bit        ]
  Flow control      [    X-ON/X-OFF     ]
```

(a) RS-232C Interface ....Selects the RS-232C interface application.

Control....... Uses the RS-232C interface for remote control.

Printer .... Uses the RS-232C interface for printer output.

(b) Speed.......................Sets the baud rate.

(c) Character length ....Sets the bit length.

(d) Parity ....Sets the parity.

(e) Stop bit....................Sets the stop bit length.

(f) Flow control ....Sets the flow control.

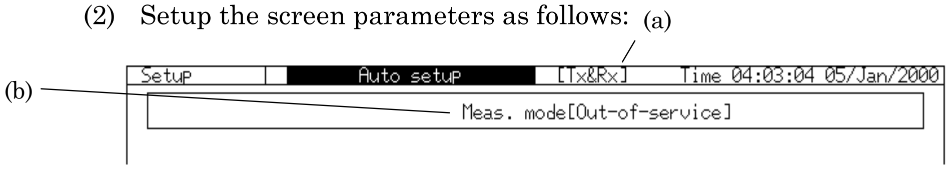
8.2 Auto. Setup

'Setup : Auto setup' screen

MP1570A recognizes the input signal and performs an automatic setup of (blank). Here is the setting procedure.

(1) Open the 'Setup : Auto setup' screen.

(2) Setup the screen parameters as follows:



Setup | Auto setup [Tx&Rx] Time 04:03:04 05/Jan/2000

Meas. mode[Out-of-service]

(a) [Operation mode] ... Selects the send and receive operation mode of MP1570A from 'Tx&Rx' and 'Tx/Rx'.

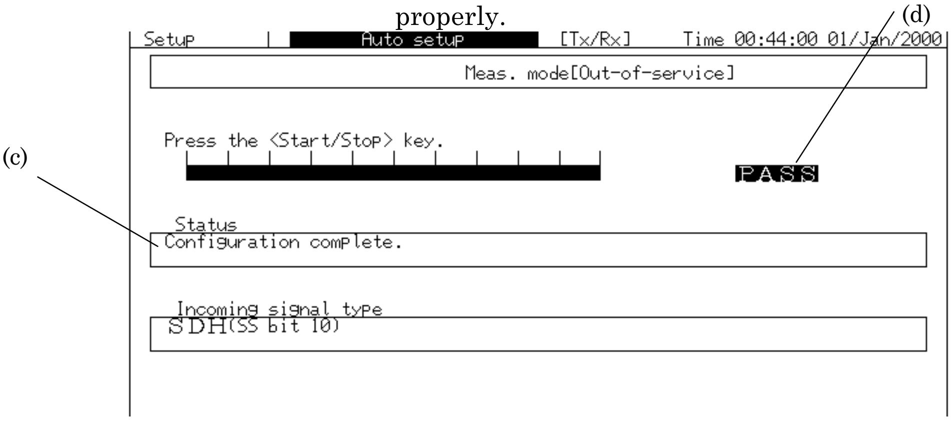
(b) Meas. Mode............ Selects the measurement mode from 'In-service' and 'Out-of-service'.

(3) Start the setting by pressing ● Start /Stop .

(c) Status..................... Displays the progress of setup on a bar graph.

(d) [Result] .... Displayed on completion of the setup

PASS ....Indicates that the setup was completed properly.



Setup | Auto setup [Tx/Rx] Time 00:44:00 01/Jan/2000

Meas. mode[Out-of-service]

Press the <Start/Stop> key.

PASS

Status

Configuration complete.

Incoming signal type

SDH(SS bit 10)

FAIL ....Indicates that a trouble exists and hence the setup could not be completed.

Setup | Auto setup [Tx/Rx] Time 00:48:29 01/Jan/2000

Meas. mode[Out-of-service]

Press the <Start/Stop> key.

FAIL

Status

The root is not found.

Incoming signal type

(e) Incoming Signal Type ....Displays SSbit type of AU pointer of input signal.

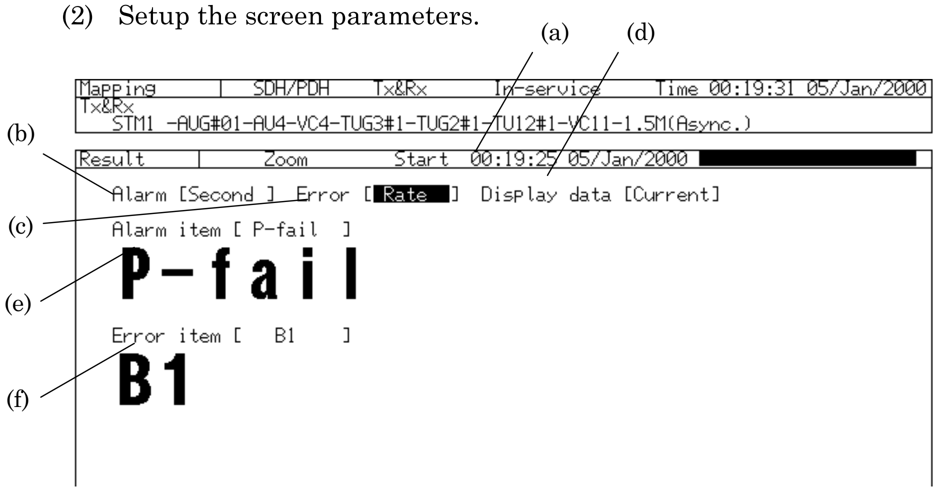
8.3 Zooming Up the Error and Alarm Measurement Results Display

'Result : Zoom' screen

Here is the procedure for zooming up the display of error and alarm measured results on the Error/Alarm screen.

(1) Open the 'Result : Zoom' screen.

(2) Setup the screen parameters.



```
Mapping      |  SDH/PDH    Tx&Rx      In-service      Time 00:19:31 05/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Result    |        Zoom         Start  00:19:25 05/Jan/2000
   Alarm [Second ]  Error [ Rate  ]  Display data [Current]
   Alarm item [ P-fail   ]
   P-fail
   Error item [   B1     ]
   B1
```

(a) [Measurement time display].........Selects the measurement time display mode as follows:

Start.................. Displays the time at which the measurement was started.

Elapsed............. Displays the time elapsed after the measurement was started.

- The bar graph shows the progress of measurement.

(b) Alarm ....Selects the display mode of alarm measurement results.

Second............ Displays the number of seconds for which the alarm is to be sounded.

Frame .... Displays the frame at which the alarm occurred.

(c) Error.......................Selects the display mode of error measurement results.

Count .... Displays the generated error count.

Rate................ Displays the generated error rate converted.

(d) Display data .... Selects the display mode of measured results.

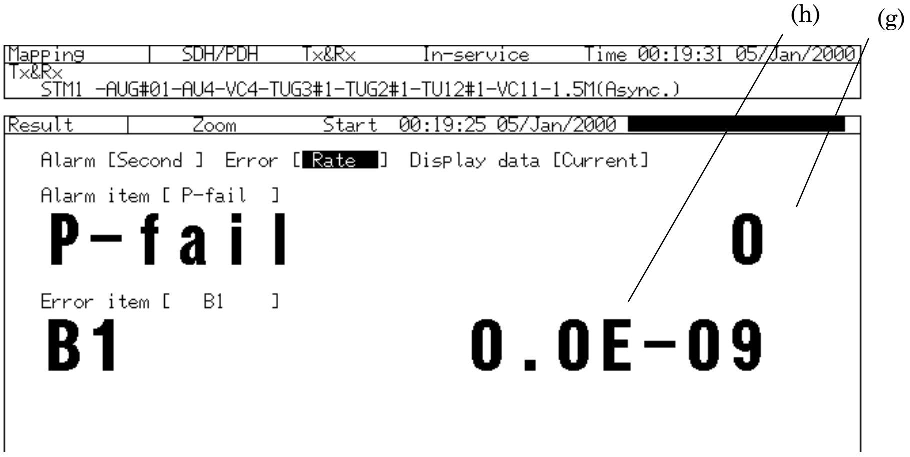
Current............ Displays the measured results from measurement start to the present time.

Last.................. Displays the measured results on completion of measurement. This is useful for repeated short-time measurements.

(e) Alarm item .... Selects the displayed alarms.

(f) Error item.......... Selects the displayed errors.

(3) Measured results are displayed.



```
Mapping  | SDH/PDH   Tx&Rx    In-service    Time 00:19:31 05/Jan/2000
Tx&Rx
   STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)
Result   |      Zoom         Start  00:19:25 05/Jan/2000
   Alarm [Second ]  Error [Rate  ]  Display data [Current]
   Alarm item [ P-fail  ]
   P-fail                                   0
   Error item [   B1    ]
   B1                       0.0E-09
```

(g) Displays the number of seconds for which the alarm was sounded and frame count.

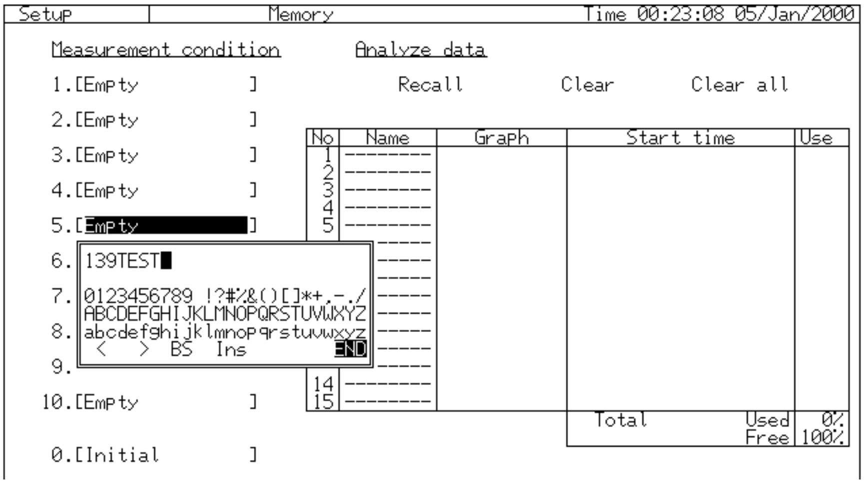
(h) Displays the generated error count or rate.

8.4 Saving and Reading the Data *'Setup : Memory' screen*

8.4.1 Saving the Measurement Conditions.

Here is the procedure for saving the measurement conditions.

For example, when you save the measurement conditions named '139TEST' in the 5th memory:



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

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

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

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

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

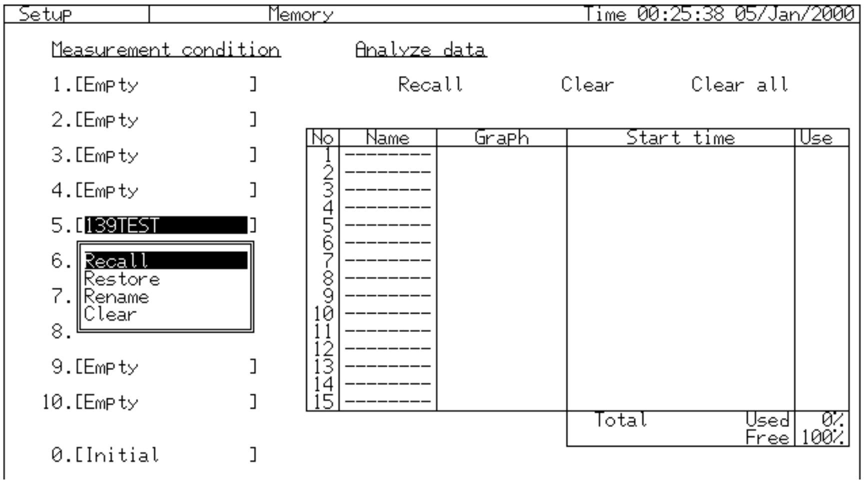
(6) After entering the string, move the cursor to 'END'.

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

- A default name, 'Memory*(*:1-10)' is set if you close the character entry window without setting the character string.

8.4.2 Reading the Measured Results

Here is the procedure for reading out the saved measurement conditions.



1.[Empty]
2.[Empty]
3.[Empty]
4.[Empty]
5.[139TEST]
6.
7.
8.
9.[Empty]
10.[Empty]

0.[Initial]

No	Name	Graph	Start time	Use
1	---------			
2	---------			
3	---------			
4	---------			
5	---------			
6	---------			
7	---------			
8	---------			
9	---------			
10	---------			
11	---------			
12	---------			
13	---------			
14	---------			
15	---------			
			Total Used	0%
			Free	100%

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

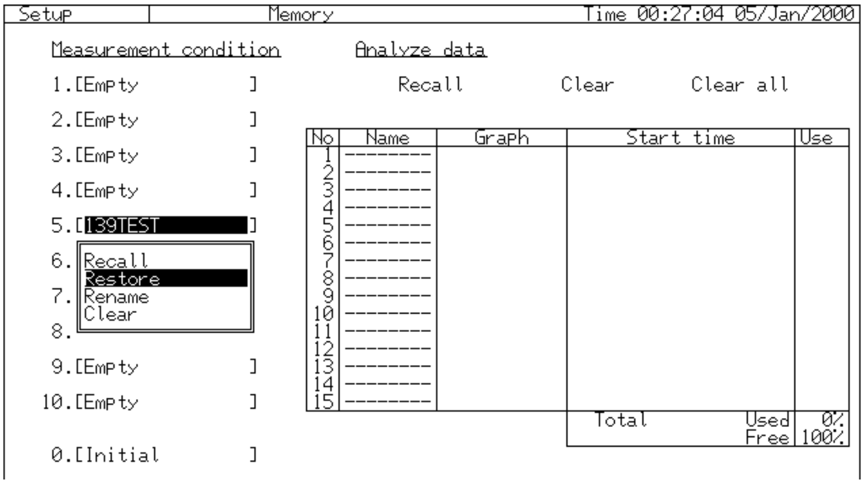
(2) Move the cursor to the memory of 'Measurement condition' to be read and press Set.

(3) The item selection window is opened. Move the cursor to 'Recall'.

(4) Press Set, and the measurement conditions are read out.

8.4.3 Overwriting the Measurement Conditions

Here is the procedure for overwriting the measurement conditions.



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

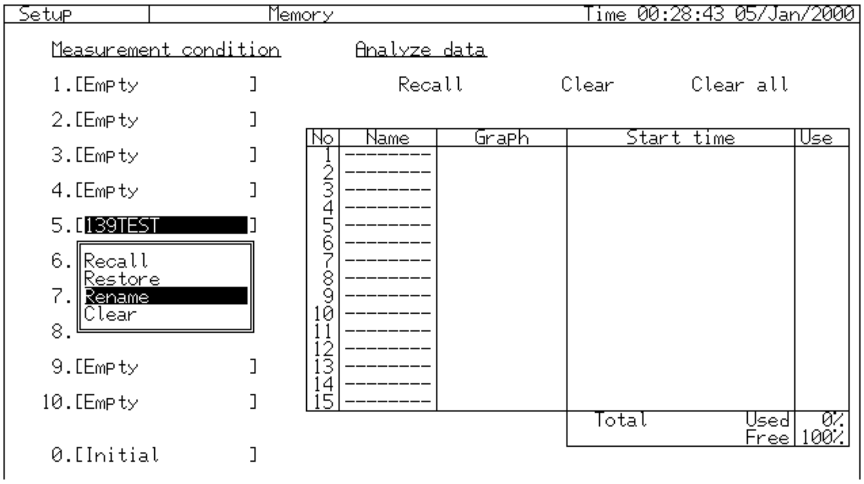
(2) Move the cursor to the 'Measurement condition' memory of to be overwritten and press Set.

(3) The item selection window is opened. Move the cursor to 'Restore' and press Set.

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The measurement conditions are overwritten and saved.

8.4.4 Renaming the Measurement Conditions

Here is the procedure for renaming the saved measurement conditions file.



1.[Empty]
2.[Empty]
3.[Empty]
4.[Empty]
5.[139TEST]
6.
7.
8.
9.[Empty]
10.[Empty]

0.[Initial]

No	Name	Graph	Start time	Use
1	---------			
2	---------			
3	---------			
4	---------			
5	---------			
6	---------			
7	---------			
8	---------			
9	---------			
10	---------			
11	---------			
12	---------			
13	---------			
14	---------			
15	---------			
			Total Used	0%
			Free	100%

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

(2) Move the cursor to the memory of 'Measurement condition' to be renamed and press Set.

(3) The item selection window is opened. Move the cursor to 'Rename' and press Set.

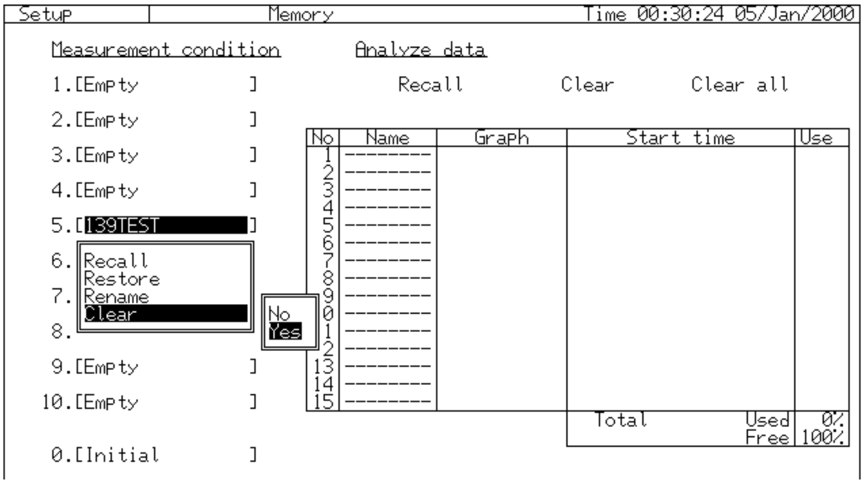
(4) The character entry window appears. Input a new name.

(5) Move the cursor to 'END' on completion of file name input.

(6) The character entry window is closed and the measurement conditions file is saved with the new name when you press Set.

8.4.5 Deleting the Measurement Conditions

Here is the procedure for deleting the measurement conditions.



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

(2) Move the cursor to the memory of 'Measurement condition' to be deleted and press Set.

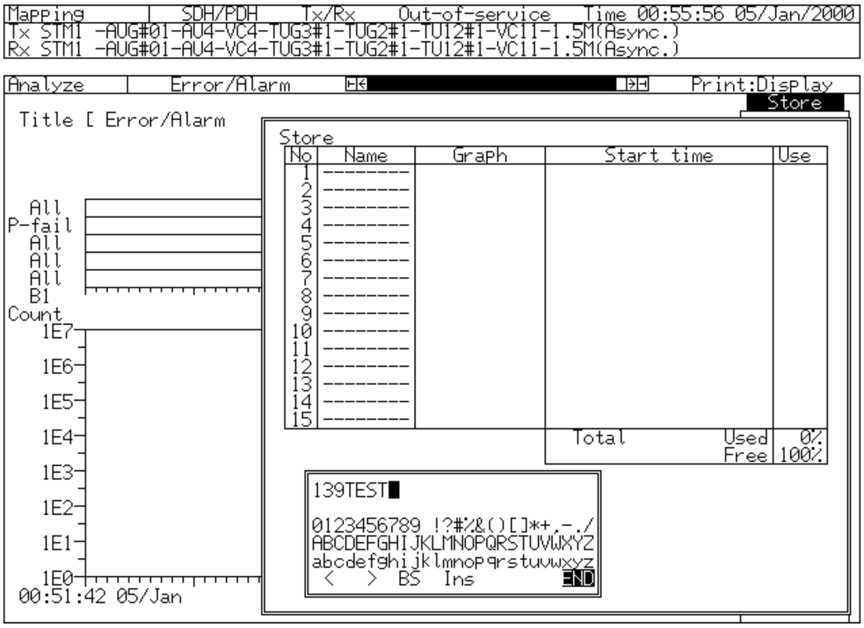
(3) The item selection window is opened. Move the cursor to 'Clear' and press Set.

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The measurement conditions are deleted.

8.4.6 Saving the Analysis Graph Data

Here is the procedure for saving the analysis graph data.

For example, when you want to save the displayed analysis graph data as '139TEST':



Mapping | SDH/PDH Tx/Rx Out-of-service Time 00:55:56 05/Jan/2000

Tx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Rx STM1 -AUG#01-AU4-VC4-TUG3#1-TUG2#1-TU12#1-VC11-1.5M(Async.)

Title [Error/Alarm

Store

No	Name	Graph	Start time	Use
1	--------			
2	--------			
3	--------			
4	--------			
5	--------			
6	--------			
7	--------			
8	--------			
9	--------			
10	--------			
11	--------			
12	--------			
13	--------			
14	--------			
15	--------			
			Total Used	0%
			Free	100%

139TEST█

(1) Open the single display 'Analyze : Error/Alarm' screen.

- You cannot save the analysis graph data on a two- or three-division display screen.

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

(3) The memory saving window appears. Enter the character string, '139TEST'.

(4) Move the cursor to 'END' after inputting the file name.

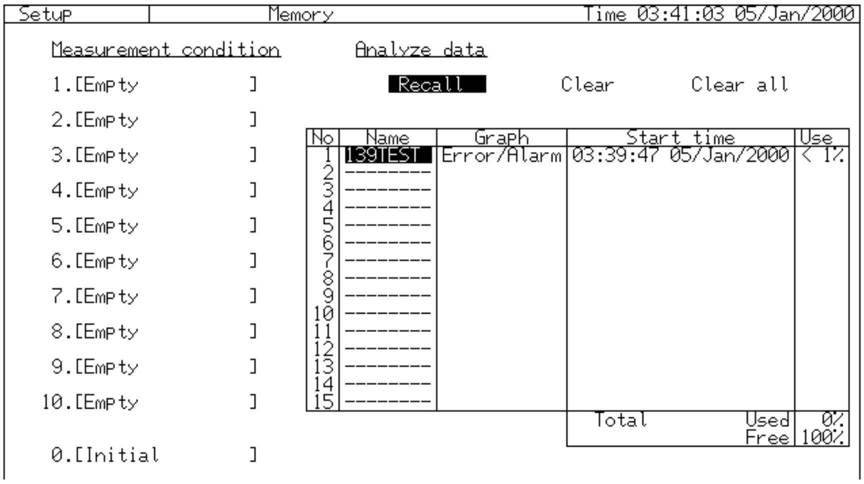
(5) The character entry window is closed and the analysis graph data is saved when you press Set.

NOTE

- Up to 15 data points can be saved. You cannot save data if all 15 memory units are occupied.
- The default name, 'Memory' is set if you close the memory saving window without setting the file name.
- When the data volume being saving exceeds the free memory space, the data cannot be saved.

8.4.7 Reading out the Analysis Graph Data

Here is the procedure for reading out the analysis graph data from the memory and displaying it on the screen.



Setup | Memory | Time 03:41:03 05/Jan/2000

Measurement condition

1.[Empty]
2.[Empty]
3.[Empty]
4.[Empty]
5.[Empty]
6.[Empty]
7.[Empty]
8.[Empty]
9.[Empty]
10.[Empty]

0.[Initial]

Analyze data

Recall Clear Clear all

No	Name	Graph	Start time	Use
1	139TEST	Error/Alarm	03:39:47 05/Jan/2000	< 1%
2	--------			
3	--------			
4	--------			
5	--------			
6	--------			
7	--------			
8	--------			
9	--------			
10	--------			
11	--------			
12	--------			
13	--------			
14	--------			
15	--------			

Total Used 0%
Free 100%

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

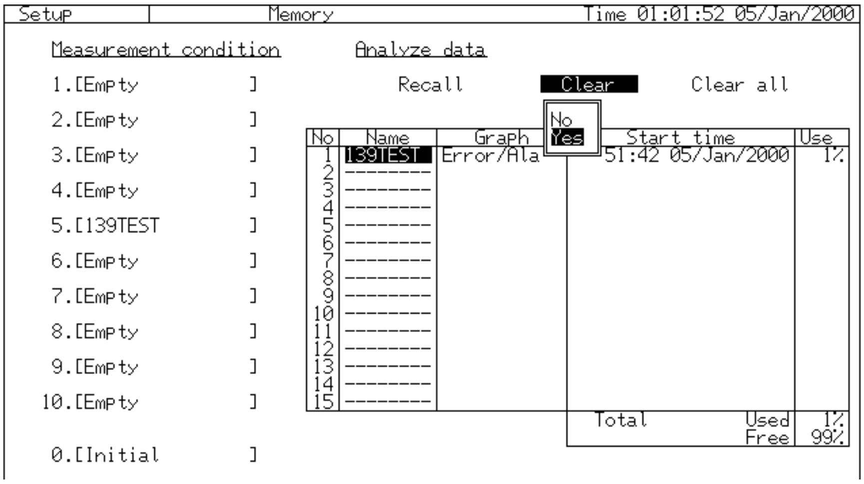
(2) Move the cursor to 'Recall' and press Set.

(3) The memory saving window is opened. Move the cursor to the memory from which the data is read, and press Set.

(4) The Analyze main screen appears, and displays the analysis graph data read out on it.

8.4.8 Deleting the Analysis Graph Data

Here is the procedure for deleting the saved analysis graph data.



1.[Empty]
2.[Empty]
3.[Empty]
4.[Empty]
5.[139TEST]
6.[Empty]
7.[Empty]
8.[Empty]
9.[Empty]
10.[Empty]

0.[Initial]

No	Name	Graph	Start time	Use
1	139TEST	Error/Ala	51:42 05/Jan/2000	1%
2	---------			
3	---------			
4	---------			
5	---------			
6	---------			
7	---------			
8	---------			
9	---------			
10	---------			
11	---------			
12	---------			
13	---------			
14	---------			
15	---------			
			Total Used	1%
			Free	99%

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

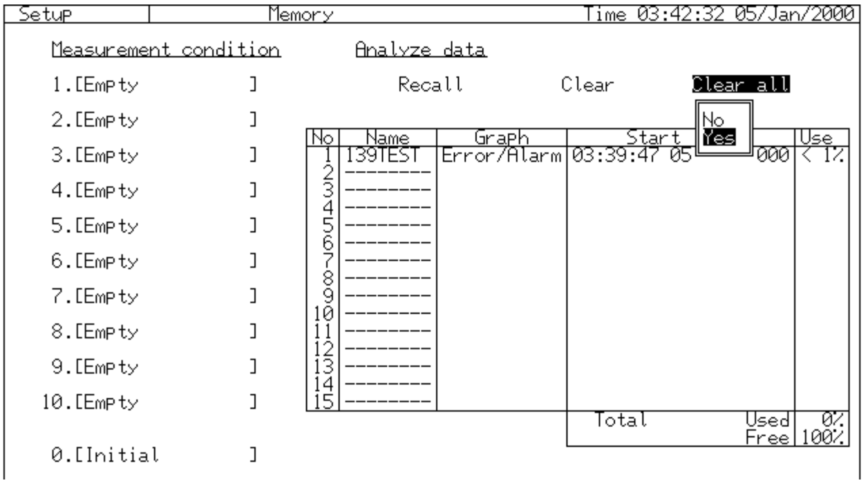
(2) Move the cursor to 'Clear' and press Set.

(3) The memory list is displayed. Move the cursor to the memory from which you want to delete the data, and press Set.

(4) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The data is deleted.

8.4.9 Deleting the Entire Analysis Graph Data

Here is the procedure for deleting the entire analysis graph data that has been saved.



Time 03:42:32 05/Jan/2000

1.[Empty]
2.[Empty]
3.[Empty]
4.[Empty]
5.[Empty]
6.[Empty]
7.[Empty]
8.[Empty]
9.[Empty]
10.[Empty]

0.[Initial]

No	Name	Graph	Start	Use
1	139TEST	Error/Alarm	03:39:47 05 000	< 1%
2	---------			
3	---------			
4	---------			
5	---------			
6	---------			
7	---------			
8	---------			
9	---------			
10	---------			
11	---------			
12	---------			
13	---------			
14	---------			
15	---------			
			Total Used	0%
			Free	100%

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

(2) Move the cursor to 'Clear ALL' and press Set.

(3) The Yes/No confirmation dialog appears. Choose 'Yes' and press Set. The data is deleted.

8.5 Printing

MP1570A offers 3 types of printing functions as follows:

(a) Screen data printing by pressing Print Now

(b) Automatic printing of measurement data by making the setting on the 'Setup : Print' screen

(c) Automatic printing of self test results by making the settings on the 'Setup : Self test' screen

Printing in the cases of (a) and (b) is as follows. For (c) set on the 'Setup : Self test' screen, see 'Section 9 Performance Test'.

NOTE

- Printout of screen data by pressing Print Now (a), has higher priority over automatic printing (b) and (c). If you press Print Now during automatic printing, automatic printing stops and is restarted after the screen data printing is completed.

- The ●On/Off lamp of the built-in printer should be illuminated when you use the printer. Press ●On/Off to turn it on.

- Open the 'Setup : System' screen and set the GPIB Interface or RS-232 Interface in 'Printer' when you use an external printer. For details, see '8.1.7 Setting the GPIB interface' and '8.1.8 Setting the RS-232C interface'.

- The data to be printed is lost if you press Print Now during printing by the built-in printer. The printing is not resumed if the key is pressed again.

- Press Feed to feed the printer form.

8.5.1 Printing the Screen Data

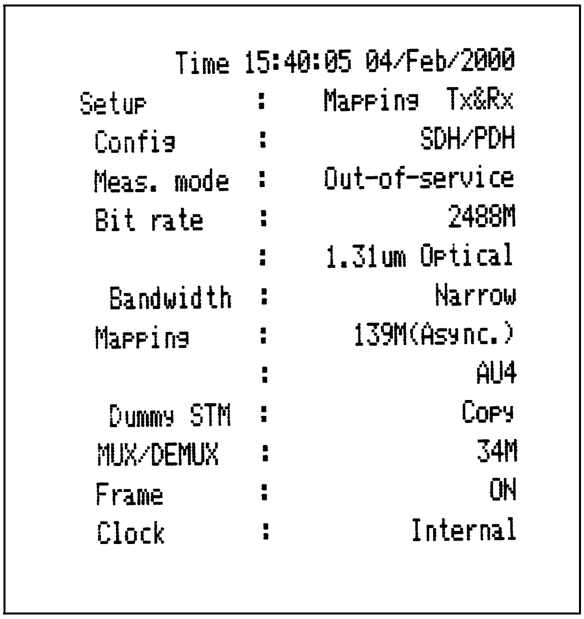
You can print out the screen data with Print Now.

Here is an example of using the built-in printer to print out the 'Setup : Memory' screen data. The printing steps are:

(1) Verify that the ●On/Off lamp of the printer is illuminated. Press the key and turn it on if it is off.

(2) The built-in printer prints out the data on the screen when you press Print Now.

A printout example ('Setup : Mapping' screen)



```
          Time 15:40:05 04/Feb/2000
Setup        :    Mapping  Tx&Rx
 Config      :           SDH/PDH
 Meas. mode  :    Out-of-service
 Bit rate    :             2488M
             :    1.31um Optical
  Bandwidth  :            Narrow
 Mapping     :      139M(Async.)
             :               AU4
  Dummy STM  :              Copy
 MUX/DEMUX   :               34M
 Frame       :                ON
 Clock       :          Internal
```

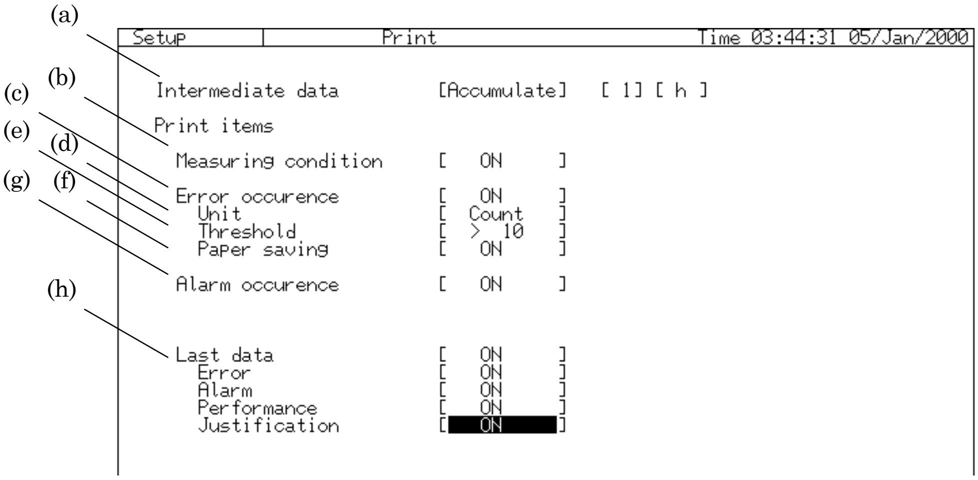
8.5.2 Automatic Printing of Measurement Data *'Setup : Memory' screen*

Here is the procedure for automatic printing of measurement data.

(1) Verify that the ●On/Off lamp of the printer is illuminated. Press the key and turn it on if it is off.

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

(3) Set the screen parameters.



```
Setup          Print                    Time 03:44:31 05/Jan/2000

  Intermediate data         [Accumulate]   [ 1] [ h ]
  Print items
    Measuring condition     [   ON     ]
    Error occurence         [   ON     ]
      Unit                  [  Count   ]
      Threshold             [  >  10   ]
      Paper saving          [   ON     ]
    Alarm occurence         [   ON     ]

    Last data               [   ON     ]
      Error                 [   ON     ]
      Alarm                 [   ON     ]
      Performance           [   ON     ]
      Justification         [   ON     ]
```

(a) Intermediate data........ Sets intermediate data printout at certain time intervals during the measurement.

OFF .... Does not print out intermediate data.

Individual .... Prints out the measurement values within a certain time.

Accumulate .... Prints out the accumulated measurement values after the .... measurement starts.

- Printing cycles must be set for 'Individual' and 'Accumulate' settings.

(b) Measurement condition........ Sets to On/Off the printout of measurement conditions set at the time of measurement start.

(c) Error occurrence..........Sets the printout of error occurrence on or off.

(d) Unit......... Sets the conditions of error printout as follows:

Count....................Prints out the error count

Rate......................Prints out the error rate converted from the error count.

(e) Threshold.....................Selects the printout threshold. Indicated by the error count or rate per second.

(f) Paper saving................Turns the paper-saving function on or off

- You can stop the printing after error occurrence for 10 consecutive seconds, in order to save the printer paper. Printing restarts after the consecutive error occurrence stops.

(g) Alarm occurrence ....Sets the printout of alarm occurrence on or off.

(h) Last data........................Sets on or off the printout of measurement data on the completion of the measurement.

- Sets to on and off the printout for Error, Alarm, Performance and Justification, respectively.

(4) Data is automatically printed out as set on (3) when you start the measurement by pressing ● Start /Stop .

An example of automatic printout of measurement data

```
Measuring   Condition   Tx/Rx
  Meas. mode:         In-service
  Bit rate  :             34M
  DEMUX     :         34M> 8M>
                          #1  #1
  Frame     :              ON
  Pattern   :           PRBS15
  Invert    :              ON
  Mode      :     Single  2hour
********************************
* 12:10:10 25/Dec/96  Start    *
********************************
  12:15:40  25/Dec/96
    FAS  8M            1.0E-03
  12:15:41  25/Dec/96
    FAS  8M            1.0E-03
********************************
* 13:10:10 25/Dec/96  Inter    *
********************************
--------- Error/Alarm ----------
------------ Input -------------
   P-fail                   0s
   LOS                      0s
   Code          0      0.0E-09
------------- PDH --------------
   AIS 34M                  0s
   LOF 34M                  0s
~                                ~
   FAS  8M       0      0.0E-10
   Bit           0     0.0E-10
------  Performance G.821p20----
   EC           0
   ES           0       0.0000%
                 AnD    0.0000%
   EFS        3600    100.0000%
   SES          0       0.0000%
   US           0       0.0000%
   DM           0       0.0000%
   Code ES       0
13:18:50 25/Dec/96
   RA 34M            Occur
13:19:15 25/Dec/96
   RA 34M            Recover
********************************
* 13:19:00 25/Dec/96  Saving   *
********************************
********************************
* 13:19:30 25/Dec/96 Saving OFF*
********************************
********************************
* 14:10:10 25/Dec/96  Stop     *
********************************
--------- Error/Alarm ----------
------------ Input -----------
   P-fail                   0s
   LOS                      0s
   Code          0      0.0E-09
------------ PDH ---------------
   AIS  34M                 0s
~                                ~
   DM                       0s
   Code ES             2.37E-05
```

Measurement conditions set at the time of measurement start

Measurement start time

Printout due to the occurrence of an error exceeding the threshold value

Time of intermediate data printout

Intermediate data

Printout due to occurrence of alarm

Paper-saving start time

Paper-saving stop time

Final measurement end time

Measurement results

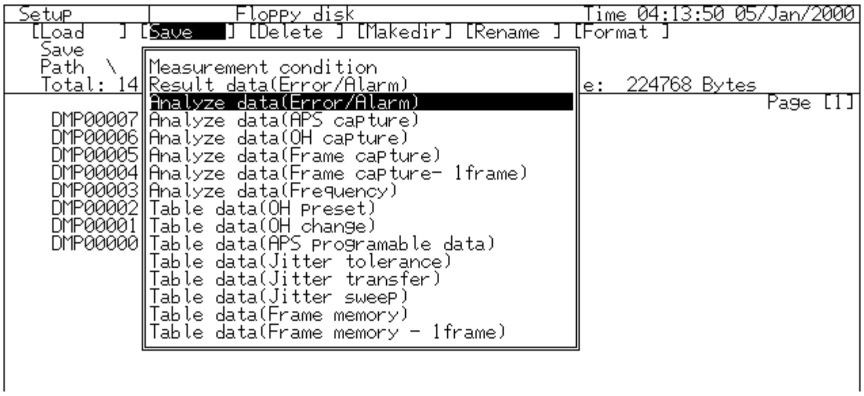
NOTE

Printing speed may not be sufficiently fast for printing a large volume of data when frequent errors and alarms occur or when repeated measurements are performed for short time intervals, such as 1s. Data can be lost on such occasions.

8.6 Floppy Disk *'Setup : Floppy disk' screen*

Here is the procedure for saving the measurement conditions and analysis graph data onto a floppy disk, and reading it out from the floppy disk.

8.6.1 Saving Data onto a Floppy Disk



```
 Setup          Floppy disk                     Time 04:13:50 05/Jan/2000
  [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]
   Save
   Path   \   Measurement condition
   Total: 14  Result data(Error/Alarm)          e:  224768 Bytes
              Analyze data(Error/Alarm)                       Page [1]
     DMP00007 Analyze data(APS capture)
     DMP00006 Analyze data(OH capture)
     DMP00005 Analyze data(Frame capture)
     DMP00004 Analyze data(Frame capture- 1frame)
     DMP00003 Analyze data(Frequency)
     DMP00002 Table data(OH preset)
     DMP00001 Table data(OH change)
     DMP00000 Table data(APS programable data)
              Table data(Jitter tolerance)
              Table data(Jitter transfer)
              Table data(Jitter sweep)
              Table data(Frame memory)
              Table data(Frame memory - 1frame)
```

(1) Open the 'Setup : Floppy disk' screen.

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

(3) The item selection window appears. Move the cursor to the type of data to be saved and press Set .

(4) The character entry window opens. Input the file name to be saved.

(5) After inputting it, move the cursor to 'END'.

(6) The character entry window closes and the data is saved when you press Set .

NOTE

- The character string for file name should contain 12 characters or less including an extension that is automatically added.
- A file is created on a directory displayed on the screen.
- Data is not saved if you close the character entry window without inputting a file name.

The analysis graph data is saved in text format if you select 'Text format' on the character entry window, but you cannot read a file saved in the text format with MP1570A. Here is a text file example of analysis graph data.

Text file example of analysis graph data

```
(a)   "ANRITSU;MP1570A;01.00;A;A_EALM","","","","","","","","","","","","","","","",
      "","","","","","","","","","","","","","","","","","","","","","","","","","",
      "","","","","","","","","","","","","","","","","","" ↓
(b)   "Date","Time","LOS","LOF139M","LOF34M","LOF8M","LOF2M","MF-LOSS","AIS139M","AI
      S34M","AIS8M","AIS2M","RDI139M","RDI34M","RDI8M","RDI2M","RDI-MF","LOF","OOF",
      "MS-AIS","MS-RDI","AU-AIS","AU-LOP","HP-RDI","TU-AIS","TU-LOP","TU-LOM","LP-RD
      I","SYNC","P-FAIL","BIT(EC)","FAS139M(EC)","FAS34M(EC)","FAS8M(EC)","FAS2M(EC)
      ","CRC-4(EC)","E-BIT(EC)","CODE(EC)","B1(EC)","B2(EC)","HP-B3(EC)","LP-B3(EC)",
      "BIP-2(EC)","MS-REI(EC)","HP-REI(EC)","LP-REI(EC)","BIT(ER)","FAS139M(ER)","FA
      S34M(ER)","FAS8M(ER)","FAS2M(ER)","CRC-4(ER)","E-BIT(ER)","CODE(ER)","B1(ER)",
      "B2(ER)","HP-B3(ER)","LP-B3(ER)","BIP-2(ER)","MS-REI(ER)","HP-REI(ER)","LP-REI
      (ER)" ↓
(c)         "23/Dec/99","08:23:40",123456,"",123456,123456,123456,123456,123456,123456,123
      456,123456,123456,123456,123456,123456,123456,123456,123456,123456,123456,1234
      56,123456,123456,123456,123456,123456,123456,123456,123456,789012,789012,78901
      2,789012,789012,789012,789012,789012,789012,789012,789012,789012,789012,789012,
      789012,789012,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,
      1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05,1.0E-05 ↓
(d)                           ·
                              ·
```

- The values are separated by commas.
- ‘ ↓ ’ feeds lines into (a), (b), (c) and (d).

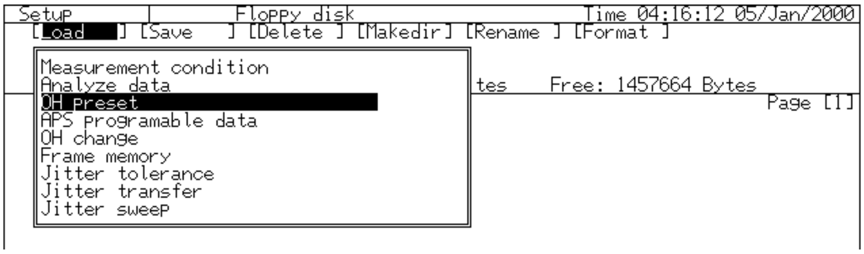
(a) .... Document data

(b) .... Dates, times, alarm items, error count items and error rate items that are constant regardless of MP1570A setting.

(c) .... Graph resolution setting time unit data on the 'Setup : System' screen corresponding to each item in (b).

(d) .... Graph resolution time data following (c). The contents are the same as those of (c). This pattern is repeated.

8.6.2 Reading out Data from a Floppy Disk



(1) Open the 'Setup : Floppy disk' screen.

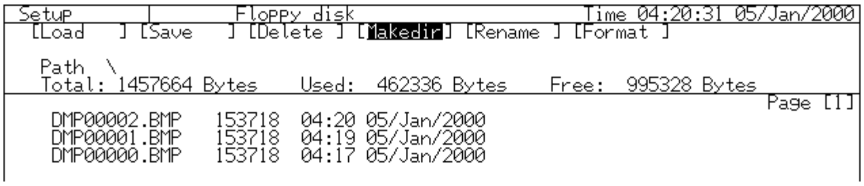
(2) Move the cursor to 'Load' and press Set .

(3) The item selection window appears. Move the cursor to the type of file 'Measurement condition' or 'Analyze data') from which you want to read out data, and press Set .

(4) Names of files saved in the disk are displayed. Move the cursor to the desired file name and press Set .

(5) The data is read out.

8.6.3 Creating a Directory



```
Setup        |      Floppy disk                    Time 04:20:31 05/Jan/2000
  [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]

   Path  \
   Total: 1457664 Bytes    Used:  462336 Bytes    Free:  995328 Bytes
                                                                 Page [1]
    DMP00002.BMP   153718  04:20 05/Jan/2000
    DMP00001.BMP   153718  04:19 05/Jan/2000
    DMP00000.BMP   153718  04:17 05/Jan/2000
```

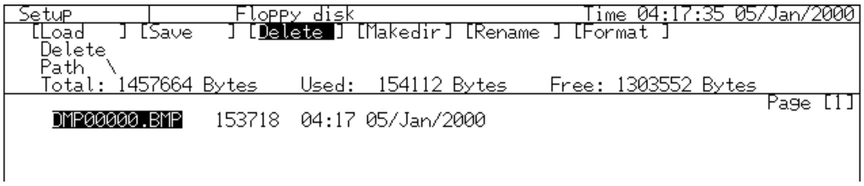
(1) Open the 'Setup : Floppy disk' screen.

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

(3) The character entry window appears. Input a directory name.

(4) After inputting it, move the cursor to 'END' and press Set. A new directory is created.

8.6.4 Deleting a File or a Directory



```
Setup        |      Floppy disk                    Time 04:17:35 05/Jan/2000
  [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]
   Delete
   Path  \
   Total: 1457664 Bytes    Used:  154112 Bytes    Free: 1303552 Bytes
                                                                 Page [1]
    DMP00000.BMP   153718  04:17 05/Jan/2000
```

(1) Open the 'Setup : Floppy disk' screen.

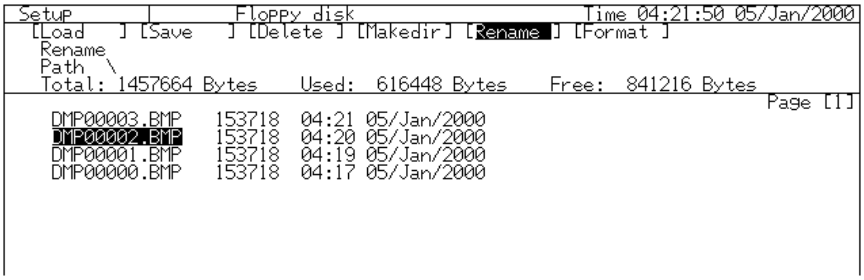
(2) Move the cursor to 'Delete' and press Set.

(3) Files are displayed. Move the cursor to the file or directory to be deleted and press Set.

(4) The Yes/No confirmation dialog opens. To delete the file, select 'Yes' and then press Set.

- All files in a directory must be deleted first in order to delete a directory.

8.6.5 Renaming a File



```
Setup         [         Floppy disk                       Time 04:21:50 05/Jan/2000
  [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]
   Rename
   Path  \
   Total: 1457664 Bytes    Used:  616448 Bytes    Free:  841216 Bytes
                                                                    Page [1]
    DMP00003.BMP    153718  04:21 05/Jan/2000
    DMP00002.BMP    153718  04:20 05/Jan/2000
    DMP00001.BMP    153718  04:19 05/Jan/2000
    DMP00000.BMP    153718  04:17 05/Jan/2000
```

(1) Open the 'Setup : Floppy disk' screen.

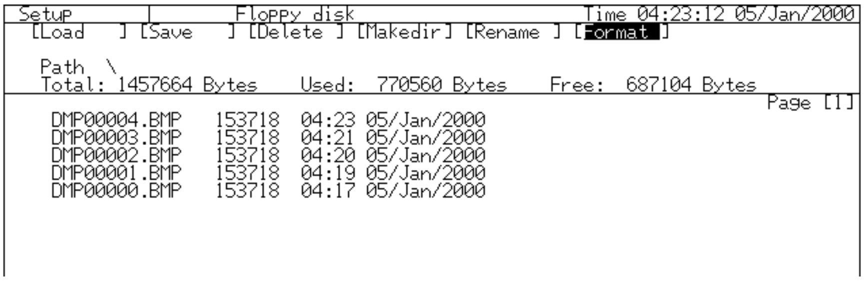
(2) Move the cursor to 'Rename' and press Set .

(3) The cursor is displayed in the file display field. Move the cursor to the file to be renamed and press Set .

(4) The character entry window appears. Input a new file name.

(5) After inputting it, move the cursor to 'END' and press Set . The file is renamed.

8.6.6 Formatting a Floppy Disk



```
Setup         [         Floppy disk                       Time 04:23:12 05/Jan/2000
  [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]

   Path  \
   Total: 1457664 Bytes    Used:  770560 Bytes    Free:  687104 Bytes
                                                                    Page [1]
    DMP00004.BMP    153718  04:23 05/Jan/2000
    DMP00003.BMP    153718  04:21 05/Jan/2000
    DMP00002.BMP    153718  04:20 05/Jan/2000
    DMP00001.BMP    153718  04:19 05/Jan/2000
    DMP00000.BMP    153718  04:17 05/Jan/2000
```

(1) Open the 'Setup : Floppy disk' screen.

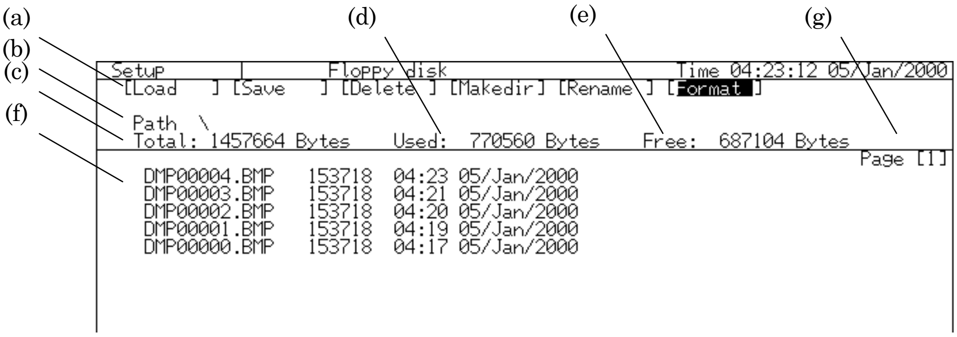
(2) Move the cursor to 'Format' and press Set .

(3) The Yes/No confirmation dialog opens. For formatting, choose 'Yes' and then press Set . The disk is formatted.

- An inserted disk is automatically formatted to 720 KB or 1.44 MB.

8.6.7 Description of 'Setup : Floppy disk' screen

This section describes the 'Setup : Floppy disk' screen.



```
Setup           |        Floppy disk                   Time 04:23:12 05/Jan/2000
 [Load    ] [Save    ] [Delete ] [Makedir] [Rename ] [Format ]

 Path  \
 Total: 1457664 Bytes     Used:  770560 Bytes     Free:  687104 Bytes
                                                                      Page [1]
  DMP00004.BMP    153718  04:23 05/Jan/2000
  DMP00003.BMP    153718  04:21 05/Jan/2000
  DMP00002.BMP    153718  04:20 05/Jan/2000
  DMP00001.BMP    153718  04:19 05/Jan/2000
  DMP00000.BMP    153718  04:17 05/Jan/2000
```

(a) [Status] .... Displayed during a process related to a floppy disk.

(b) Path .... Displays the current directory.

(c) Total .... Displays the total capacity of a floppy disk.

(d) Used .... Displays the used space of a floppy disk.

(e) Free .... Displays the free space of a floppy disk.

(f) [File list] .... Displays file names and directory names. The directories are indicated in the '< _____ >' format.

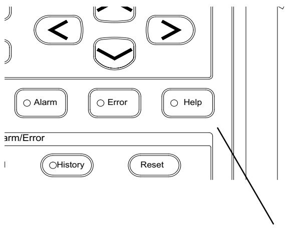
[Moving files] .... A file can be moved between directories if you move the cursor to a directory and press Set.

(g) Page .... Goes to the next page if file display exceeds a page.

8.7 Help Function

The MP1570A can display the functions and contents of parameters displayed on the screen (Help function). This function is convenient when the function of the parameter is not clear. Here is the procedure for using the help function.

(1) When the function and the content of a parameter displayed on the screen are not clear, move the cursor to the parameter and press Help .



Help key

(2) Information on the parameter is displayed on the screen.

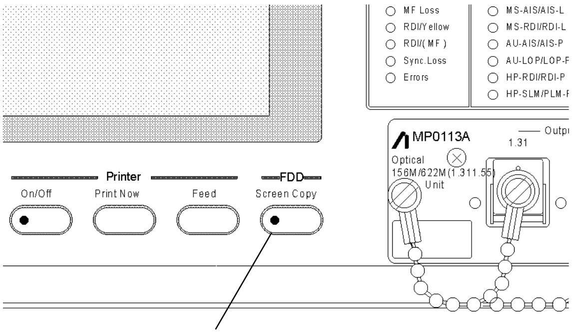
(3) Press Help again to display the screen which had been displayed before this function was used.

8.8 Screen Copy

The MP1570A can save the currently displayed screen on a floppy disk (Screen Copy). Here is the procedure for saving a screen.

(1) Insert a floppy disk into the floppy disk drive. See "8.6 Floppy Disk" for the disk format form and so on.

(2) Press Screen Copy ● the screen copy key to save the currently displayed screen.



Screen Copy key

- The lamp of Screen Copy ● lights up, during saving the screen.

(3) When saving the screen is finished, the lamp of Screen Copy ● is turned off. The file name of the saved screen is "DMPxxxxxx." A number is automatically added to "xxxxxx."

Section 9 Performance Test

This section describes the procedures for performing an operational check of MP1570A, Plug-in unit and Interface unit, as well as the steps to check the output waveform. Contact Anritsu or our dealer if you detect any in conformities with the specifications during the performance test as the device may be faulty. ***** ***** in this manual indicate front panel keys.

9.1 About Measurement Instruments Required to Execute Performance Test

The following table shows performance test items and measurement instruments required to execute the performance tests.

Test Item	Installed Unit	Required Measurement Instruments
Selftest		
Checking the CPU and Peripherals	——	——
Checking the Built-in Printer	——	——
Checking MP1570A	——	——
Checking the Interface Unit	——	——
2M Balanced Signal Output Waveform	MP0121A	120Ω/50Ω Impedance Converter Oscilloscope
2M/8M/34M/139M/156M Unbalanced Signal Output Waveform	MP0121A	75Ω/50Ω Impedance Converter Oscilloscope
1.5M Balanced Signal Output Waveform	MP0122A/B	100Ω/50Ω Impedance Converter Oscilloscope
45M/52M Unbalanced Signal Output Waveform	MP0122A/B	75Ω/50Ω Impedance Converter Oscilloscope
52M Optical Signal Output Waveform	MP0122B	MP9653A O/E Converter MA1418A 4th Bessel LPF Oscilloscope
MP0105A CMI Unit Output Signal Waveform	MP0105A	75Ω/50Ω Impedance Converter Oscilloscope
MP0108A NRZ Unit Output Signal Waveform	MP0108A	ECL Terminal × 2 Oscilloscope
MP0111A Optical 156M/622M(1.31) Unit Output Signal Waveform	MP0111A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope
MP0112A Optical 156M/622M(1.55) Unit Output Signal Waveform	MP0112A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope
MP0113A Optical 156M/622M(1.31/1.55) Unit Output Signal Waveform	MP0113A	MP9653A O/E Converter 4th Bessel LPF MA1514A for 156M MA1515A for 622M Oscilloscope

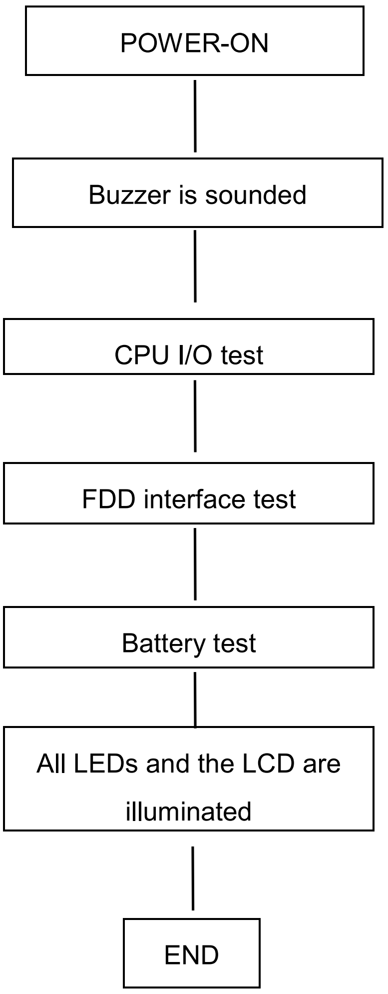
9.2 Selftest Items

The four self test items of MP1570A are:

- Check of CPU and peripherals
- Check of built-in printer
- Check of MP1570A functions
- Check of the interface unit

9.2.1 Checking the CPU and Peripherals

The self-test function of MP1570A checks the buzzer, CPU, peripheral IC, backup battery, lamps and LCD, etc. Upon power-on, MP1570A performs a check in the following order:



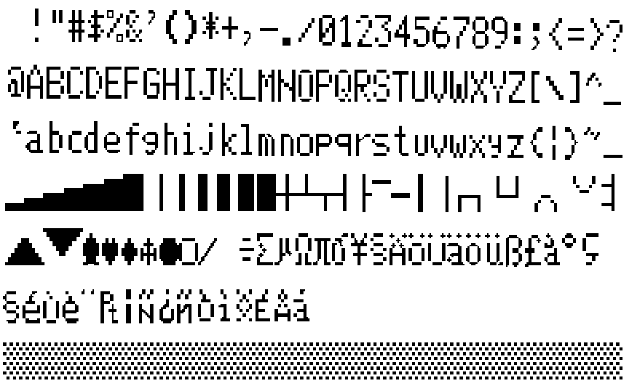
9.2.2 Checking the Built-in Printer

Here is the procedure for checking the built-in printer.

(1) Turn on the power switch of MP1570A while pressing (Print Now) .

(2) The built-in printer starts the printing test. You can check the printer operation by the test print.

A properly operating printer should print out as follows. If not, the printer may be faulty. Contact the Anritsu Corporation or our nearby dealer.



```
 !"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
`abcdefghijklmnopqrstuvwxyz{|}~_
```

NOTE

The difference between turning on the power switch while pressing (Print Now) and turning on the power switch without pressing (Print Now) (as usually done) is only that the former performs the test printing. The other functions are completely the same.

9.2.3 Checking MP1570A

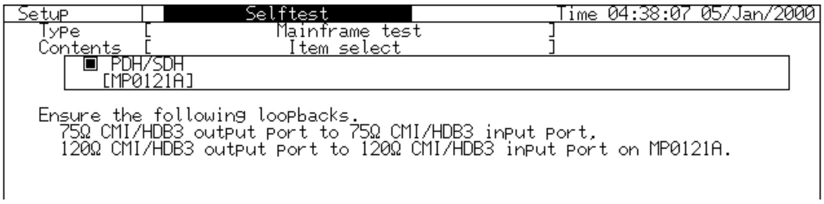
Here is the procedure for checking MP1570A.

(1) Open the 'Setup : Self test' screen.

(2) Move the cursor with ∧ ∨ < > to 'Type' and press Set.

(3) The item selection window opens. Move the cursor with ∧ ∨ to 'Mainframe test' and press Set.

(4) Connect the output and input connectors of the plug-in unit according to the message displayed on the screen.



```
Setup          Selftest                Time 04:38:07 05/Jan/2000
  Type      [         Mainframe test              ]
  Contents  [          Item select                ]
      ■ PDH/SDH
       [MP0121A]

  Ensure the following loopbacks.
    75Ω CMI/HDB3 output port to 75Ω CMI/HDB3 input port.
    120Ω CMI/HDB3 output port to 120Ω CMI/HDB3 input port on MP0121A.
```

(5) Start the self-test by pressing Start /Stop.

(6) The test ends automatically when all check items are checked.

(7) After the test is completed, the buzzer is sounded and the judgement result as shown below is displayed on the screen.

PASS.......... Self test result is normal.
FAIL........... Self test result is abnormal.

- The built-in printer automatically prints out the judgement result when it is turned on (i.e. when the lamp of On/Off on the front panel is illuminated).
- An error code is displayed when the self-test result is abnormal. For error codes, see 'Appendix G'.

9.2.4 Checking the Interface Unit

Here is the procedure for checking the operation of the interface unit.

(1) Turn off the power switch of MP1570A

(2) Install the interface unit to be checked on MP1570A.

(3) Turn on the power switch of MP1570A

(4) Open the 'Setup : Self test' screen.

(5) Move the cursor with ∧ ∨ < > to 'Type' and press Set .

(6) The item selection window opens. Move the cursor with ∧ ∨ to 'MPxxxxx Interface test' and press Set .

(7) Connect the output and input connectors of the interface unit according to the message displayed on the screen. (The connection instructions are given on the same location of the screen as that described in '9.1.3 Checking MP1570A'.)

(8) Start the self test of the interface unit by pressing Start/Stop .

(9) The test ends automatically when all check items are checked.

(10) After the test is completed, the buzzer is sounded and the judgement result as shown below is displayed on the screen.

PASS.......... Self test result is normal.
FAIL .... Self test result is abnormal.

- The built-in printer automatically prints out the judgement result when it is turned on (i.e. when the lamp of On/Off on the front panel is illuminated).
- An error code is displayed when the self test result is abnormal. For error codes, see 'Appendix G'.

NOTE

For performing the interface test of the MP0111A, MP0112A or MP0113A, directly connect the single-mode optical cable to the unit without the attenuator. The measured optical power shows FAIL if the attenuator is inserted.

9.3 2/8/34/139/156M CMI/HDB3 Output Waveform

Here is the procedure for checking the 2/8/34/139/156M CMI/HDB3 output waveform.

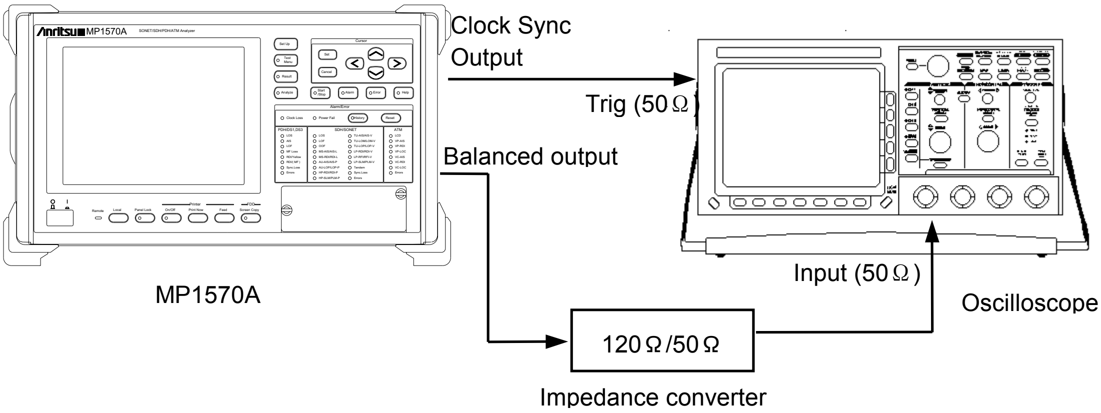
The waveform check is only possible when the MP0121A 2/8/34/139/156M unit is installed.

9.3.1 Connection

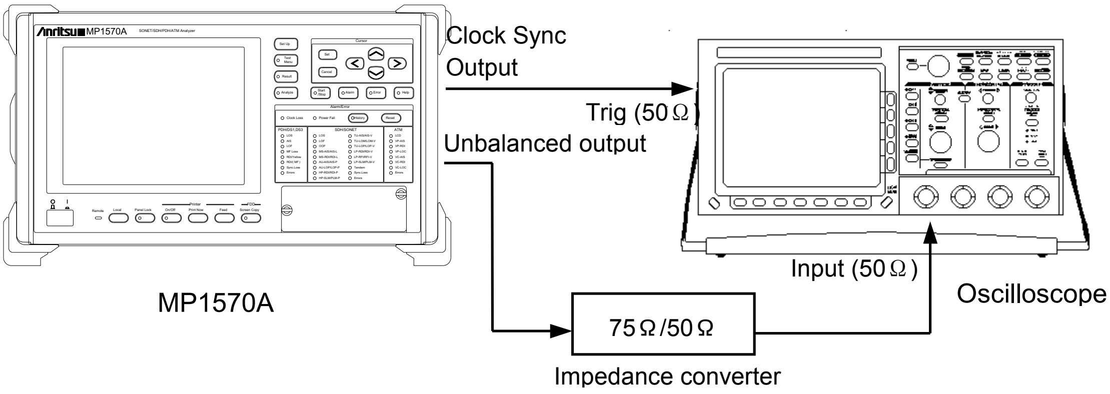
(1) Turn off the power switch of MP1570A.

(2) Install the MP0121A 2/8/34/139/156M unit on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below according to the bit rate and interface.



2M balanced



2M/8M/34M/139M/156M unbalanced

(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.3.2 Testing Procedures

Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The item selection window opens. Move the cursor with ∧ ∨ to 'Bit rate' and press Set.

(4) If you set the bit rate at '2M', move the cursor to 'Interface' and press Set. The item selection window opens. Select 'Balanced' or 'Unbalanced' on the window and press Set.

(5) Verify that the waveform displayed on the oscilloscope is included in the waveforms shown in '9.2.3 Pulse Mask (2/8/34/139/156M)'.

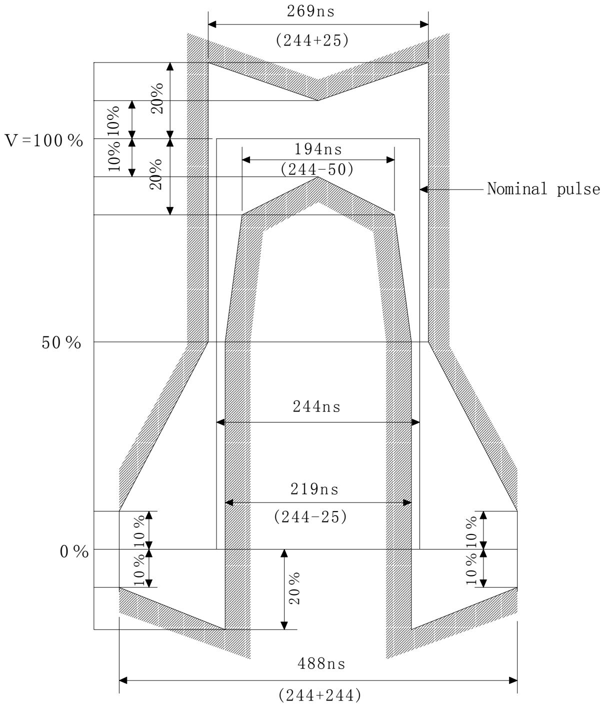
(6) Repeat the steps (1) to (5) for each bit rate and interface.

NOTE

The attenuation of the impedance converter is not included in the waveform shown in '9.2.3 Pulse Mask (2/8/34/139/156M)'. Recalculate the values taking into account the attenuation and inspect the level.

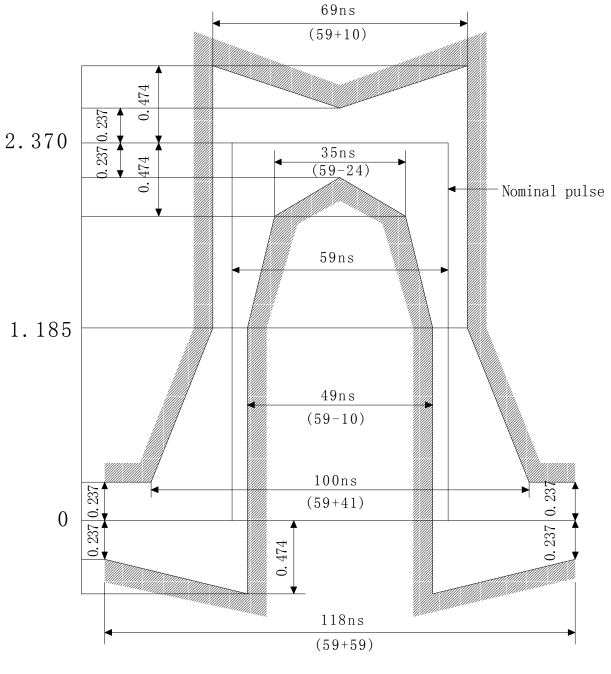
9.3.3 Pulse Mask (2/8/34/139/156M)

2 M

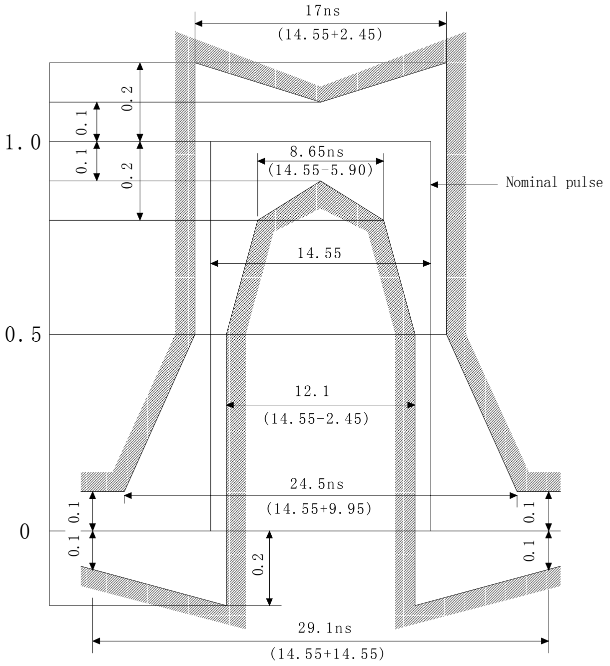


V = 100%
Balanced : 3V
Unbalanced : 2.37V

8 M



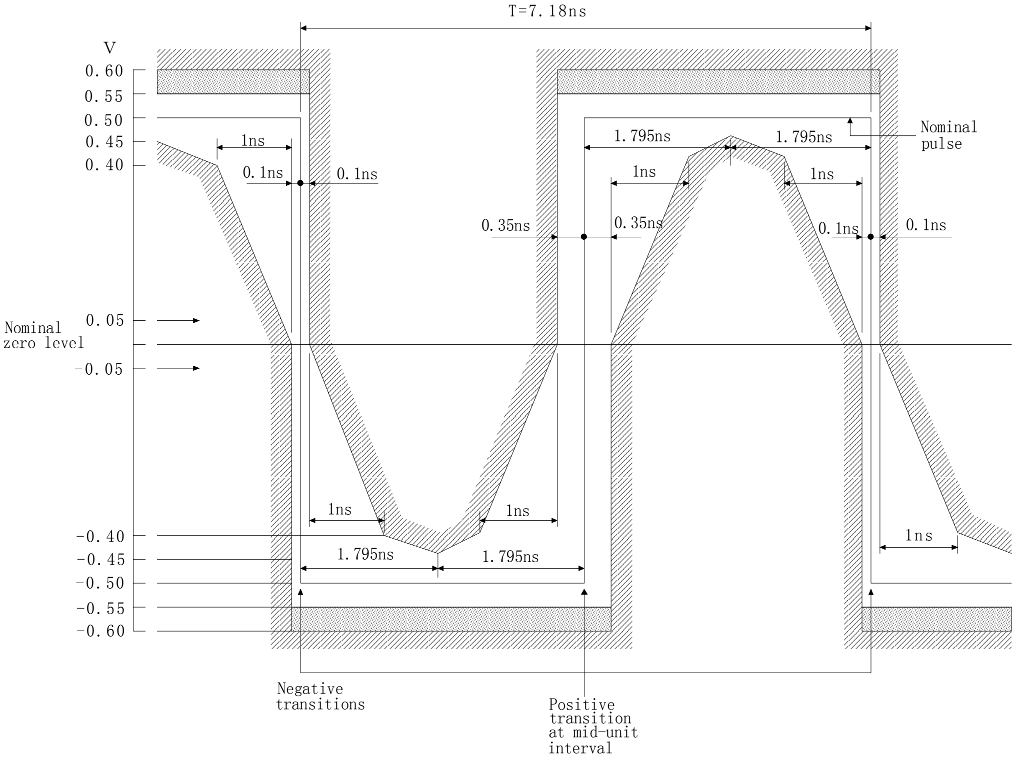
34 M


17ns
(14.55+2.45)
1.0
0.1
0.1
0.2
0.2
8.65ns
(14.55-5.90)
Nominal pulse
14.55
0.5
12.1
(14.55-2.45)
24.5ns
(14.55+9.95)
0.1
0.1
0
0.2
0.1
0.1
29.1ns
(14.55+14.55)

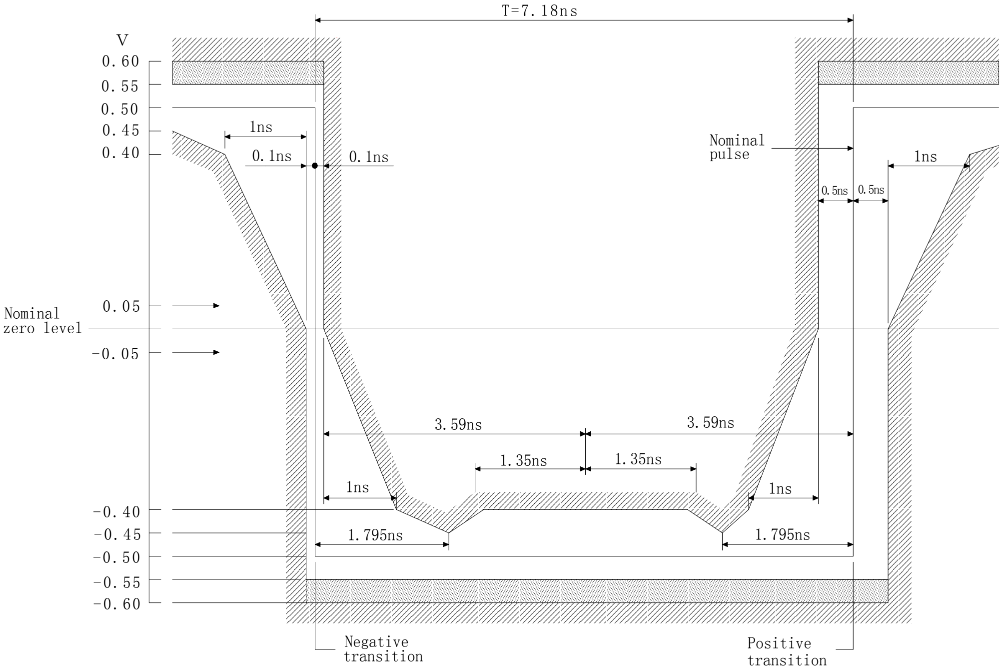
139M CMI

Nominal Peak-to-peak voltage(V) : 1±0.1V

binary 0

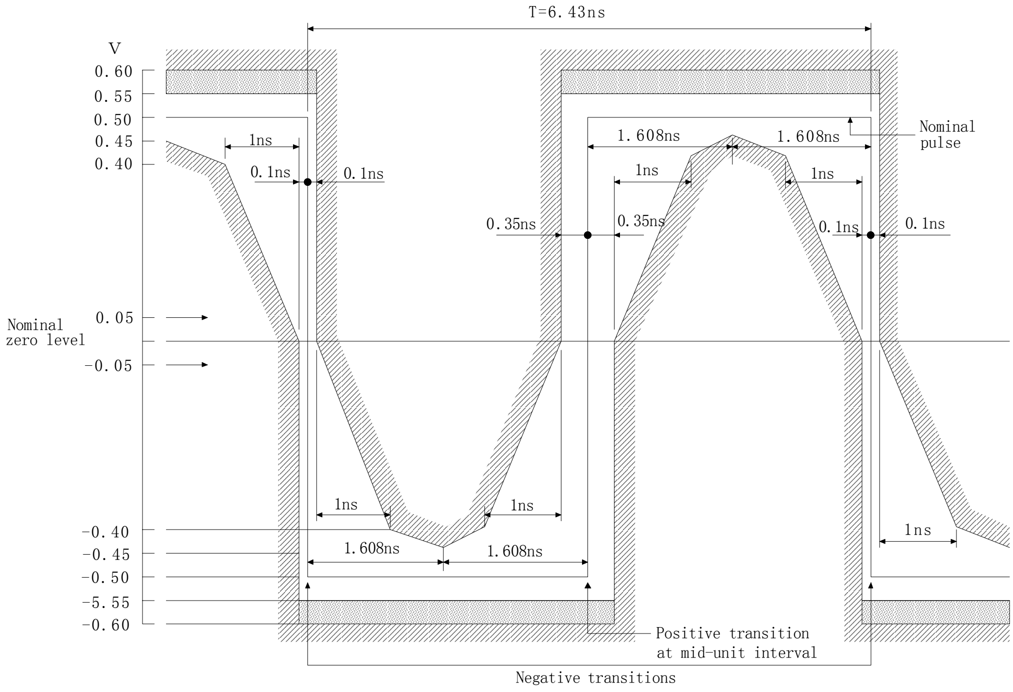


binary 1

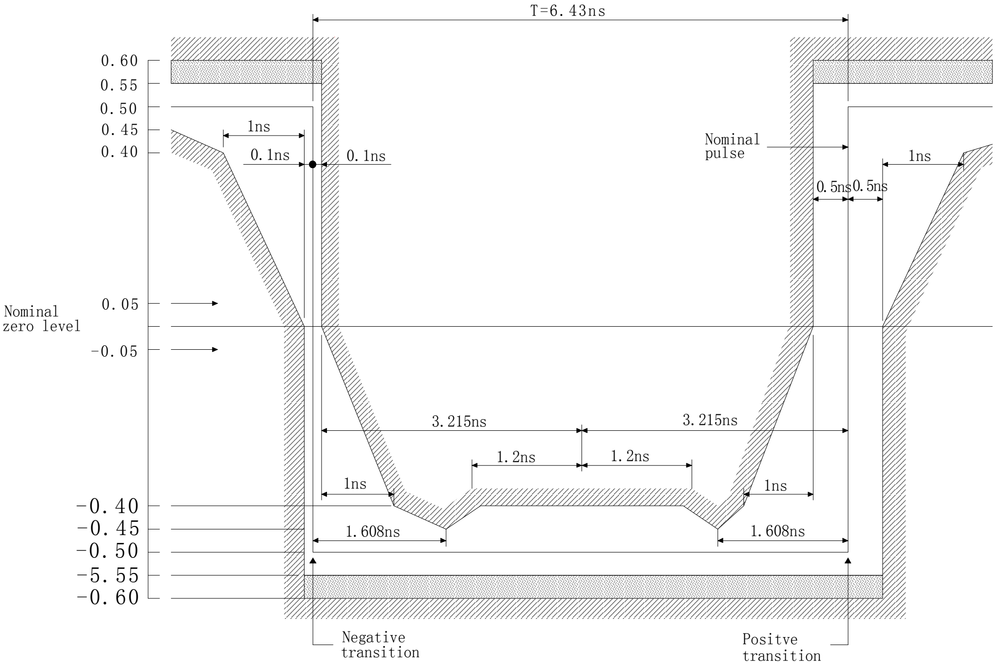

T=7.18ns
V
0.60
0.55
0.50
0.45
0.40
1ns
0.1ns
0.1ns
Nominal pulse
1ns
0.5ns
0.5ns
Nominal zero level
0.05
-0.05
3.59ns
3.59ns
1.35ns
1.35ns
1ns
1ns
-0.40
-0.45
-0.50
-0.55
-0.60
1.795ns
1.795ns
Negative transition
Positive transition

156M CMI

binary 0



binary 1


T=6.43ns
0.60
0.55
0.50
0.45
0.40
1ns
0.1ns
0.1ns
Nominal pulse
1ns
0.5ns
0.5ns
Nominal zero level
0.05
-0.05
3.215ns
3.215ns
1.2ns
1.2ns
1ns
1ns
-0.40
-0.45
-0.50
-5.55
-0.60
1.608ns
1.608ns
Negative transition
Positve transition

9.4 1.5/45/52M AMI/B8ZS/B3ZS Output Waveform

Here is the procedure for checking the 1.5/45/52M AMI/B8ZS/B3ZS output waveform.

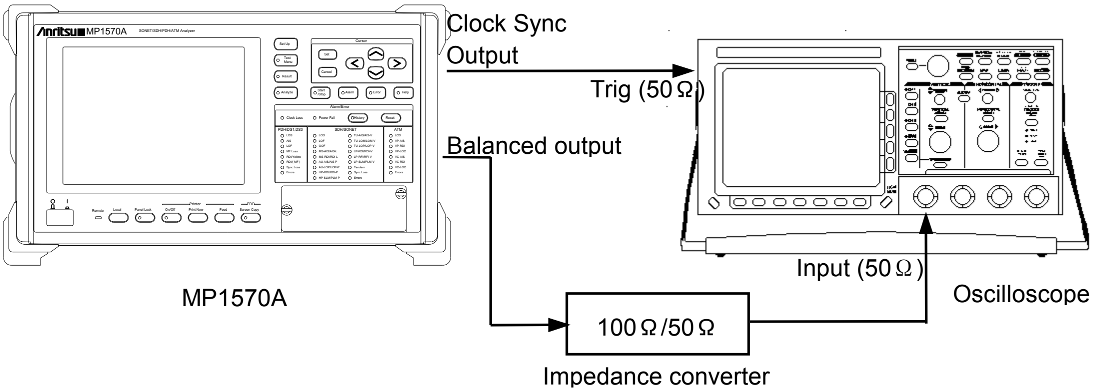
The waveform check is possible only when the MP0122A 1.5/45/52M unit or MP0122B 1.5/45//52/52M(1.31) unit is installed.

9.4.1 Connection

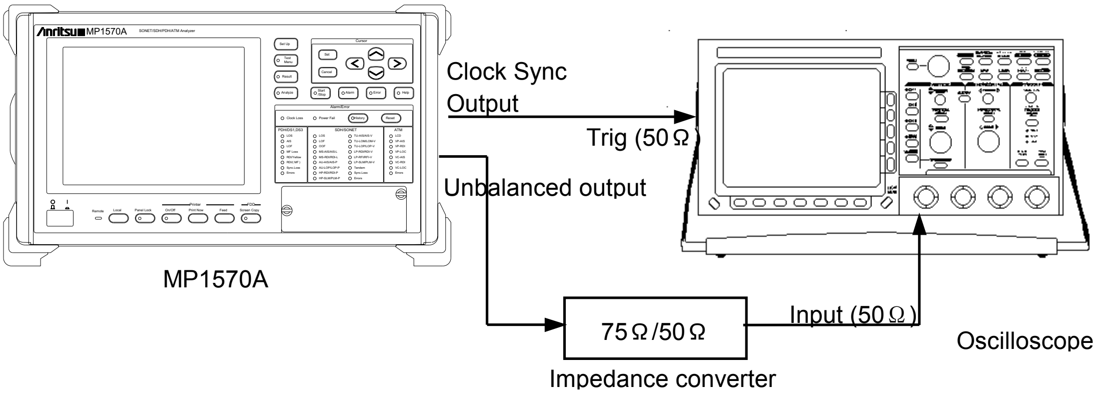
(1) Turn off the power switch of MP1570A.

(2) Install the MP0122A or MP0122B on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below according to the bit rate and interface.



1.5M balanced



45/52M unbalanced

(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.4.2 Testing Procedure

Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to 'Bit rate' and press Set.

(4) If you set the bit rate at '1.5M', move the cursor to 'Interface' and press Set. The items selection window opens. Select 'Balanced' or 'Unbalanced' on the window and press Set.

(5) Verify that the waveform displayed on the oscilloscope is included in the waveforms shown in '9.4.3 Pulse Mask (1.5/45/52M)'.

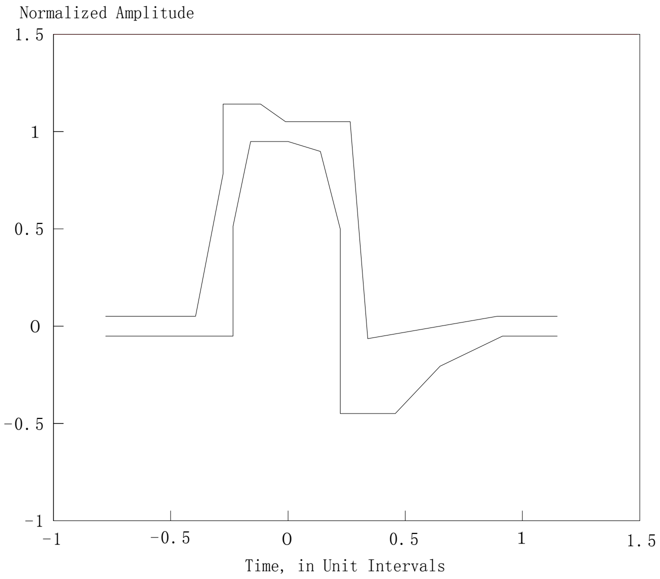
(6) For each bit rate and interface, repeat the steps (1) through (5).

NOTE

The attenuation of the impedance converter is not included in the waveform shown in '9.4.3 Pulse Mask (1.5/45/52M)'. Recalculate the values taking into account the attenuation and inspect the level.

9.4.3 Pulse Mask (1.5/45/52M)

1.5 M

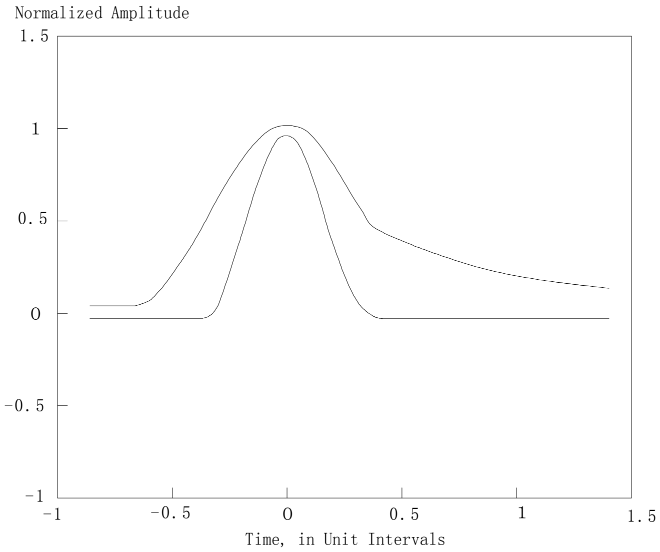


V=100%

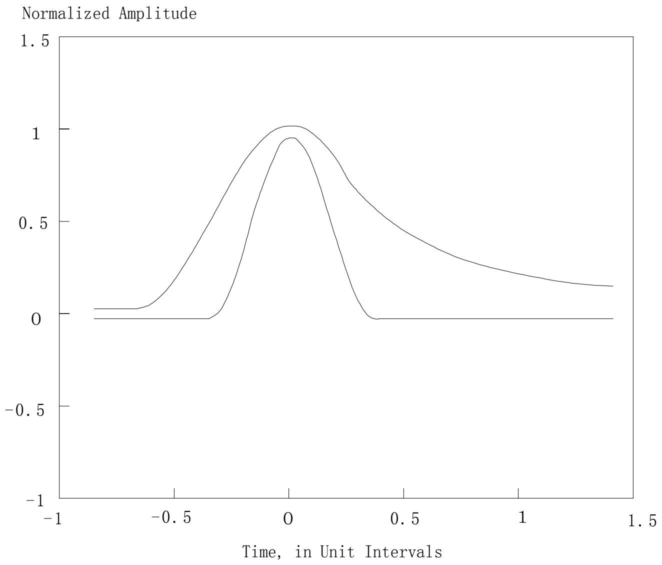
Balanced : 3V

Unbalanced : 2.37V

45 M



52 M


Normalized Amplitude
1.5
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
1
1.5
Time, in Unit Intervals

9.5 52M Optical Output Waveform

Here is the procedure for checking the 52M optical output waveform.

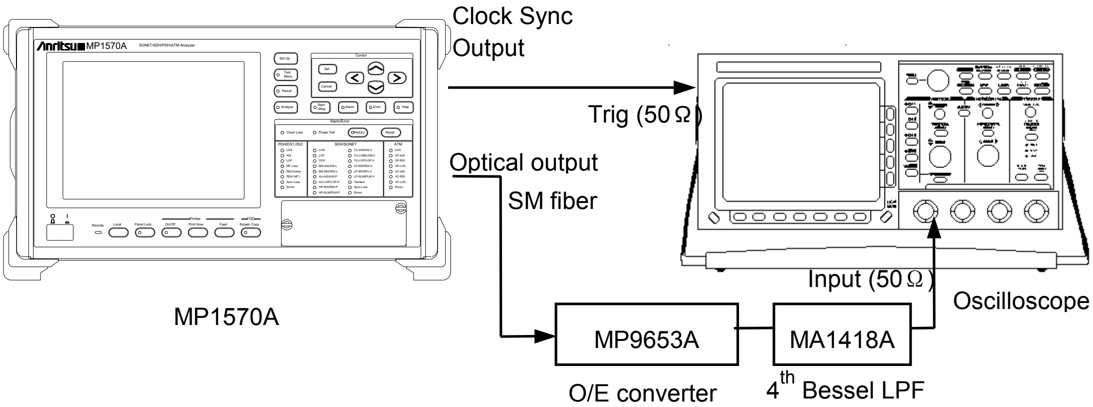
The waveform check is possible only when the MP0122B 1.5/45/52/52M(1.31) Unit is installed.

9.5.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0122B 1.5/45//52/52M(1.31) unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.5.2 Testing Procedure

Here is the procedure for testing the output waveform.

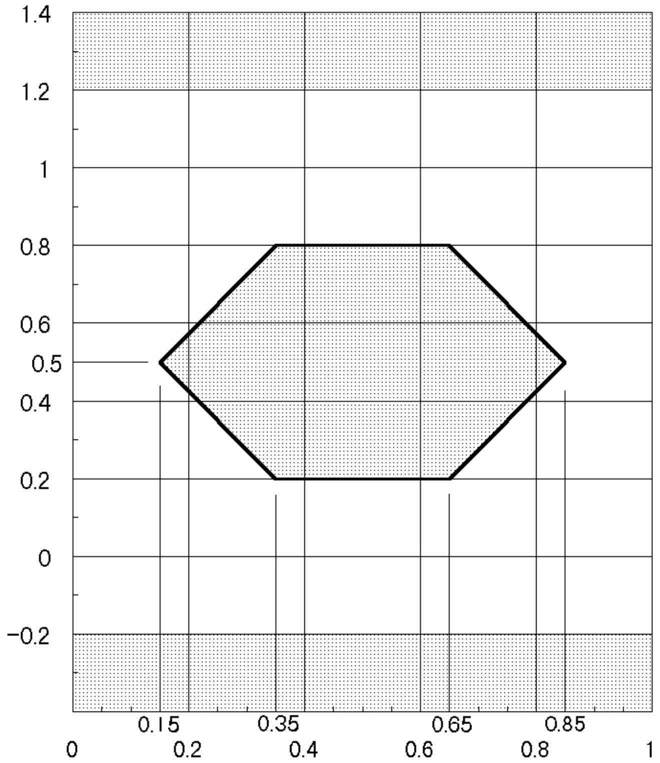
(1) Open the 'Setup : Mapping' screen.

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '52M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms given for pulse mask below.

9.5.3 Pulse Mask (52M)



9.6 MP0105A CMI Unit Output Waveform

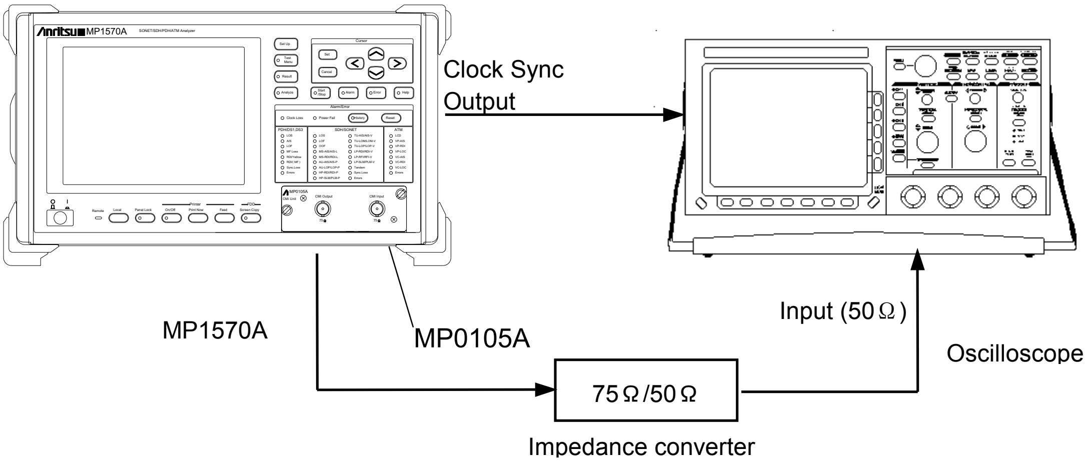
Here is the procedure for checking the output waveform of the MP0105A CMI unit. The waveform check is possible only when the MP0105A CMI unit is installed.

9.6.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0105A CMI unit in MP1570A.

(3) Connect MP1570A with the oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.6.2 Testing Procedure

Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' and press.

- If the MP0121A is installed, '156M CMI' and '156M' are displayed. When testing the 156M CMI signal outputted from the MP0105A, select '156M'.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of 156M CMI given in '9.3.3 Pulse mask (2/8/34/139/156M)'.

NOTE

The attenuation of the impedance converter is not included in the 156M CMI pulse mask given in '9.3.3 Pulse mask (2/8/34/139/156M)'. Recalculate the values taking into account the attenuation and inspect the level.

9.7 MP0108A NRZ Unit Output Waveform

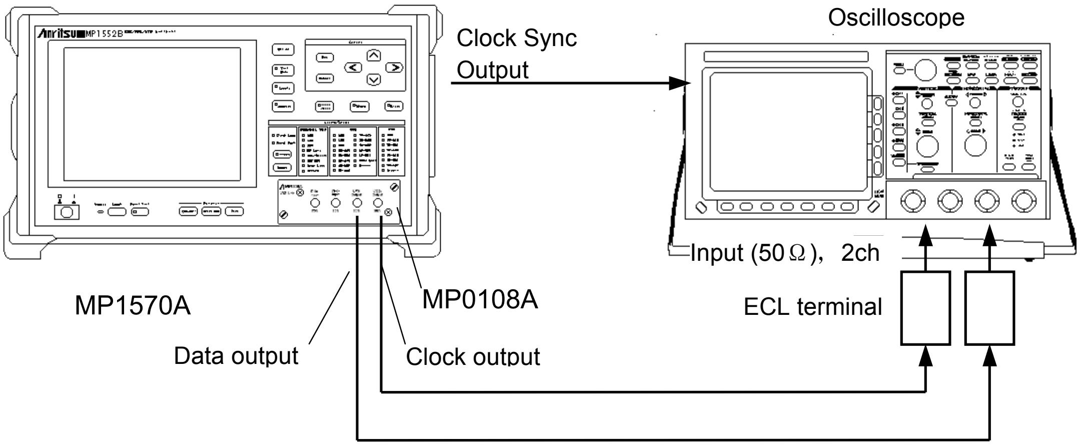
Here is the procedure for checking the output waveform of the MP0108A NRZ unit.

9.7.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0108A NRZ unit on MP1570A.

(3) Connect MP1570A to the oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.7.2 Testing Procedure

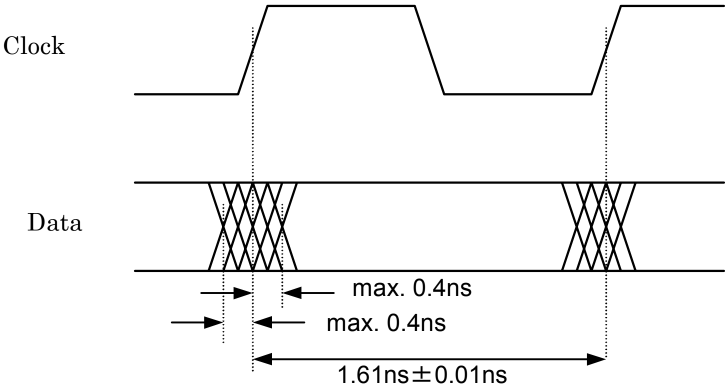
Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '622M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope meets the timing requirements as shown below.


Clock
Data
max. 0.4ns
max. 0.4ns
1.61ns±0.01ns

9.8 MP0111A Optical 156/622M (1.31) Unit Output Waveform

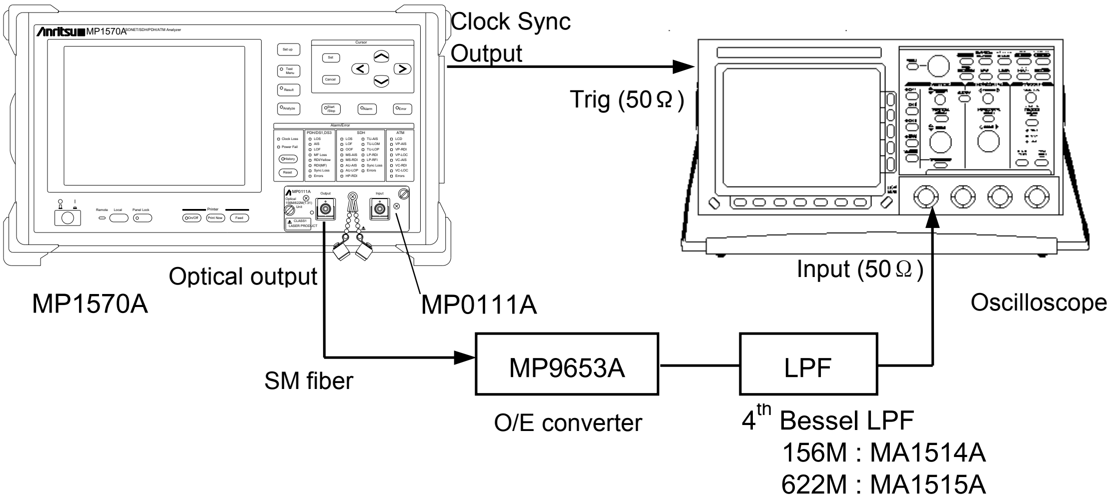
Here is the procedure for checking the output waveform of the MP0111A Optical 156/622M (1.31) unit.

9.8.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0111A Optical 156/622M unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.8.2 Testing Procedure

Here is the procedure for testing the output waveform.

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

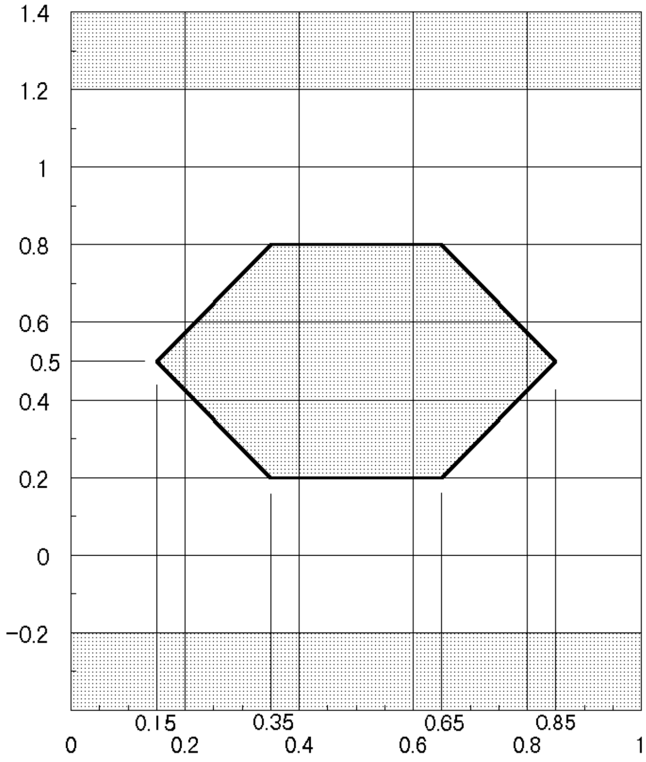
(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

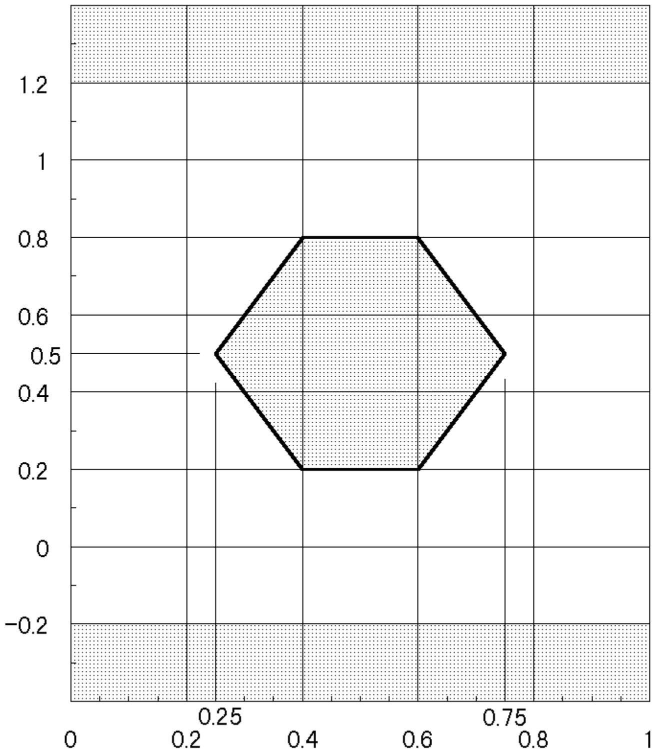
(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given on the next page.

(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the pulse mask.

9.8.3 Pulse Mask (156/622M)



156M Pulse mask



622M Pulse mask

9.9 MP0112A Optical 156/622M (1.55) Unit Output Waveform

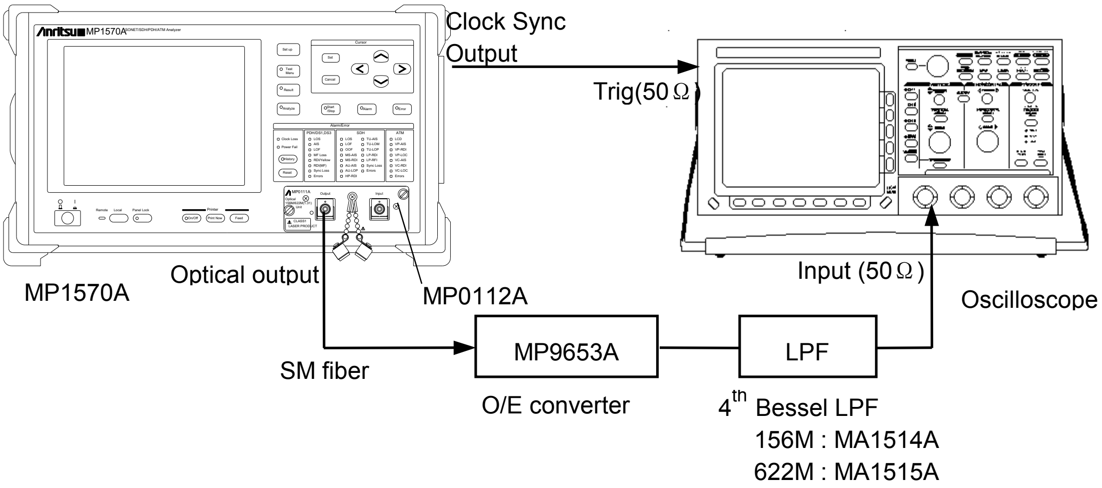
Here is the procedure for checking the output waveform of the MP0112A Optical 156/622M (1.55) unit.

9.9.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0112A Optical 156/622M unit on MP1570A

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



(4) Turn on the power switch of MP1570A after connecting as shown in (3).

9.9.2 Testing Procedure

Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

9.10 MP0113A Optical 156/622M (1.31/1.55) Unit Output Waveform

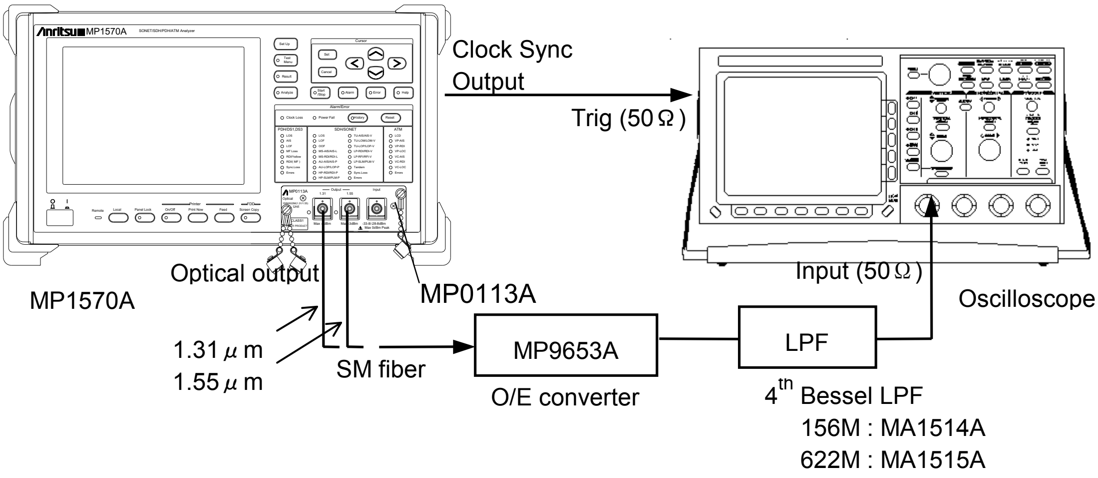
Here is the procedure for checking the MP0113A Optical 156/622M (1.31/1.55) unit output waveform.

9.10.1 Connection

(1) Turn off the power switch of MP1570A.

(2) Install the MP0113A Optical 156/622M unit on MP1570A.

(3) Connect MP1570A to the O/E converter and oscilloscope as shown in the figure below.



Turn on the power switch of MP1570A after connecting as shown in (3).

9.10.2 Testing Procedure

Here is the procedure for testing the output waveform.

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

(2) Move the cursor with ∧ ∨ < > to 'Bit rate' and press Set.

(3) The items selection window opens. Move the cursor with ∧ ∨ to '156M' or '622M' and press Set.

(4) Verify that the waveform displayed on the oscilloscope is included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

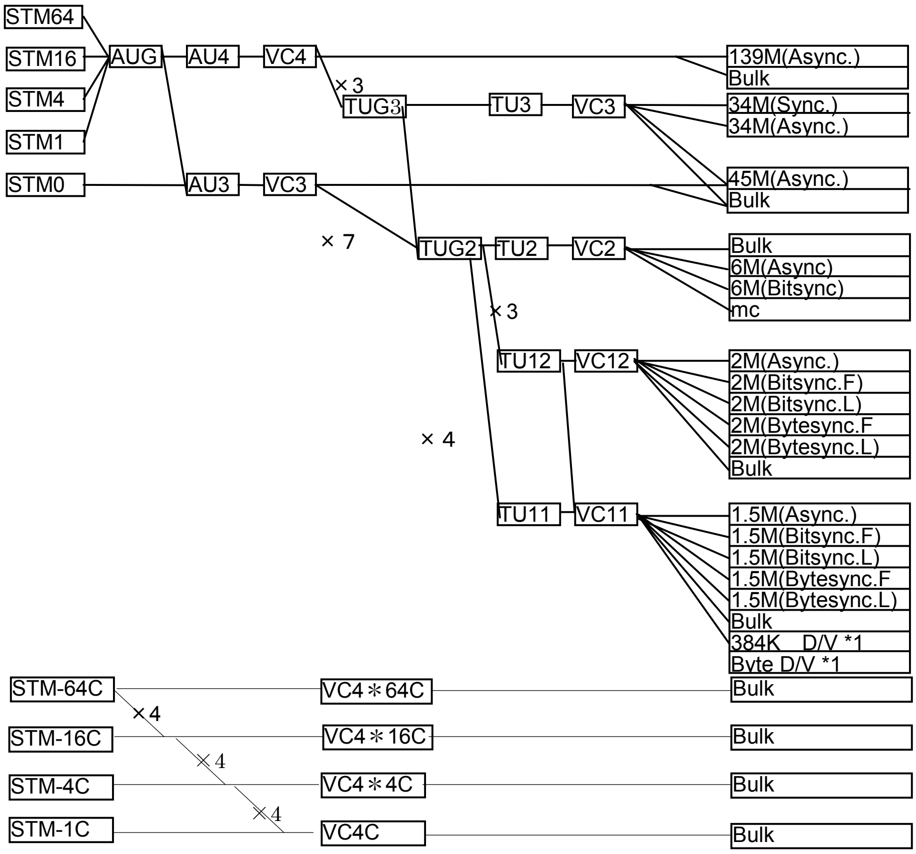
(5) Repeat steps (1) to (4), and make sure that all SDH bit rates are included in the waveforms of pulse mask given in '9.8.3 Pulse Mask (156/622M)'.

Appendix A Specifications

A.1 Specifications of the MP1570A

	Item	Specifications
1	Electrical performance	
1.1	External interface	External interface of the unit according to each unit's specifications.
1.1.1	External clock input	
	Frequency	2.048MHz,8.448MHz,34.368MHz,139.264MHz± 100ppm 1.544MHz,44.736MHz ±100ppm 155.52MHz,622.08MHz ±100ppm
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.2	DCS input	2M,1.5M,64k
	Frequency	(2M) 2.048MHz ±50ppm, 2.048Mbit/s ±50ppm (1.5M)1.544MHz ±50ppm, 1.544Mbit/s ±50ppm (64k) 64kHz+8kHz ±62ppm
	Interface	(2M) ITU-T G.703 Table10,HDB3(2M) (1.5M)B8ZS,AMI(1.5M) ANSI T1.403
	Level	(64k) 0.63Vo-p to 1.1Vo-p
	Code	(64k) AMI with 8k violation
	Connector	BNC75Ω SIEMENS 120Ω Balanced BANTAM 100Ω Balanced
1.1.3	Trigger output	SOH :B1,B2,B3,BIP-2,MS-REI,HP-REI,LP-REI, Frame(Tx, Rx),19MHz (Tx, Rx), bit, LOF,MS-AIS,MS-RDI,AU-AIS,AU-LOP,HP-SLM,HP-RDI, HP-UNEQ, PDH Frame (Tx) : TU-AIS,TU-LOP,TU-LOM,LP-SLM,LP-RDI, LP-UNEQ,LP-RFI
	Frequency(Frame)	SDH,8M,34M,139M,1.5M,45M 1 frame cycle 2M 1 multi-frame cycle
	Level	TTL(active High)
	Connector	BNC75Ω

	Item	Specifications
1.1.4	DCC input	1Byte OH,K1-K2,D1 to D3,D4 to D12
	Clock output	64KHz ,128kHz, 192kHz ,576kHz
	Level	V.11
	Connector	Multi-pin connector (D-sub 15pin)
1.1.5	DCC output	1Byte OH,H1-H2,K1-K2,D1 to D3,D4 to D12
	Clock output	64KHz ,128kHz, 192kHz ,576kHz
	Level	V.11
	Connector	Multi-pin connector (D-sub 15pin)
1.1.6	Clock sync.output	PDH,DSn,52M,156M,622M
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.7	Receive clk output	PDH,DSn,52M,156M,622M
	Level	ECL(AC)
	Connector	BNC50Ω
1.1.8	Trigger input	for Logging, APS test
	Level	TTL (active High)
	Connector	BNC75Ω
1.1.9	Order wire	E1,E2
	Connector	RJ11
1.2	Measurement Mode	Manual Single 1 to 99s, 1 to 99min, 1 to 99h, 1 to 99day Repeat 1 to 99s, 1 to 99min, 1 to 99h, 1 to 99day
	Display	Current, Last
	Program start	Measurement start time can be set.
1.3	Power fail detection	Measures Power fail during Error/Alarm measurement.
	Measurement range	0 to 999999,1.0E06 to 9.9E15,>9.9E15(s)
1.4	LED	Clock Loss, Power fail, (SDH) : LOS, LOF, OOF, MS-AIS/AIS-P, MS-RDI/RDI-L, AU-AIS/AIS-P, AU-LOP/LOP-P, HP-RDI/RDI-P, HP-SLM, TU-AIS/AIS-V, TU-LOM/LOM-V, TU-LOP/LOP-V, LP-RDI/RDI-V, LP-RFI/RFI-V, LP-SLM, Tandem, Sync. loss, Errors (PDH) LOS, AIS, LOF, MF loss, RDI/Yellow, RDI(MF), Sync. Loss, Errors (ATM) LCD, VP-AIS, VP-RDI, VP-LOC, VC-AIS, VC-RDI, VC-LOC, Errors
	History display	Displays the history for LEDs except Clock Loss.

	Item	Specifications
1.5	SDH function	For details of 2.5G and 10G, see the specifications for MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A and MU150000A.
1.5.1	mapping	 - 2M, 34M, 139M: when MP0121A is installed - 1.5M, 45M: when MP0122A or MP0122B is installed - STM-0: when MP0122A or MP0122B is installed - STM64, STM-64C: when MU150000A is installed - STM16: when MP0127A, MP0128A, MP0129A, MU150008A, MU150009A, MU150010A or MU150000A is installed - STM-16C: when MU150008A, MU150009A, MU150010A or MU150000A is installed - *1 : Effective when Option09 is installed.
1.5.2	Frame format	Framed/Unframed
1.5.3	Clock	Internal, External(except STM-0), Receive, Lock
	Internal clock Accuracy	±3.5ppm
	Clock loss LED	Illuminated when 'External clock loss', 'DCS clock loss' and 'Unlock' occur.
1.5.4	Through mode	only on Tx & Rx mode
	Bitrate	52M, 156M, 622M, 2488.320M, 9953.28Mbit/s
	Mode	Transparent through, OH overwrite, SOH 1-byte overwrite, POH 1-byte overwrite and Payload overwrite

	Item	Specifications
1.5.5	Insert/Extract	In this mode, errors and alarms can be added to only the following:
	Bitrate	10G:STM-0,STM1 2.5G: STM-0,STM1
	Error	FAS, Bit all, Bit info, B1, B2
	Alarm	LOS, LOF, MS－AIS, MS－RDI
1.5.6	Test pattern	PRBS: 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, 2^{20}-1(Zero suppress) ,2^{31}-1(Only 64c, 16c mapping), Invert ON/OFF Word: 16bit. Program,all0, all1, Add/Drop : At the time of Async of 1.5M, 2M, 34M, 45M and 139M. (when MP0131A is installed)
1.5.7	Error addition	FAS, Bit all, Bit info, B1, B2, B3, HP IEC, BIP-2, MS-REI, HP-REI, LP-REI, N2 BIP-2, TC-REI, OEI
	Timing	Single Single burst: 1 to 64000 bits Rate: $1*10^{-3}$, $1*10^{-4}$, $1*10^{-5}$, $1*10^{-6}$, $1*10^{-7}$, $1*10^{-8}$, $1*10^{-9}$ Rate User program: $A*10^{-B}$(A=1.0 to 9.9 step 0.1 B=2 to 10) Alternative: error=0 to 8000, normal=1 to 8000(frame)
1.5.8	Alarm addition	LOS, LOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ, TU-AIS, TU-LOP, TU-LOM, LP-SLM, LP-TIM, LP-RDI, LP-UNEQ, LP-RFI, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI, LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Timing	Single Single burst: 1 to 64000 frame Alternative: alarm=0 to 8000, normal=1 to 8000(frame) All

	Item	Specifications	
1.5.9	OH preset data		
(1)	SOH/POH	SOH	All Bytes except B1, B2, H1, H2 and H3
		VC3/VC4 POH	All Bytes except B3
		VC1 POH	All Bytes except BIP-2
(2)	Dummy channel POH	VC3/VC4 POH	All Bytes except B3
		VC1 POH	All Bytes except BIP-2
(3)	K1,K2 setting	Set in plain language or in bit unit.	
(4)	Pointer setting	AU pointer/TU pointer	
		NDF	0000 to 1111
		SS	00 to 11
		Pointer value	0 to 1023
		Adds +Justification/-Justification	
(5)	Dummy channel pointer	AU pointer	fixed at 522 SS: 00 to 11
		TU pointer	fixed at 0 SS: 00 to 11
(6)	Path trace	J0, J1, J2(with or without CRC7)	
	Stting	ASCII data	
(7)	Dummy Path trace	J1, J2(with or without CRC7)	
	Stting	ASCII data	
(8)	Tandem connection	Selects ON/OFF for N1 and N2. Selects type1 or type2 when N1 is ON.	
	High order N1(Type1)		

b1	b2	b3	b4	b5	b6	b7	b8
IEC				Data link			

8 bits can be set. (In the case of measurement channel #1, LAPD is inserted into the lower 4 bits.)

Item	Specifications

LAPD message structure

	1	2	3	4	5	6	7	8	Note
1	FLAG								01111110
2	SAPI						CR	EA	SAPI=15,OR=0(DTE/1(Carrier),EA=0
3	TEI							EA	TEA=0,EA=1
4	CONTROL								00000011
5	76 OCTET INFORMATION FIELD								ECI 10 Octet
									LCI 11 Octet
									FIC 10 Octet
									UNT 6 Octet
80									FIC 38 Octet
81									
82	FCS								CRC16

High order N1(Type2)
Low order N1

b1	b2	b3	b4	b5	b6	b7	b8
IEC				TC-REI	OEI	TC-APID,TC-RDI,ODI	

IEC,TC-REI,OEI：Can be set.
TC-APId：76frames can be set.

Low order N2

b1	b2	b3	b4	b5	b6	b7	b8
BIP-2		"1"	IncomingAIS	TC-REI	OEI	TC-APID,TC-RDI,ODI	

BIP2 : Same data as that for BIP2 of V5.
b3-6 : Can be set.
TC-APId : 76 frames can be set.

APId

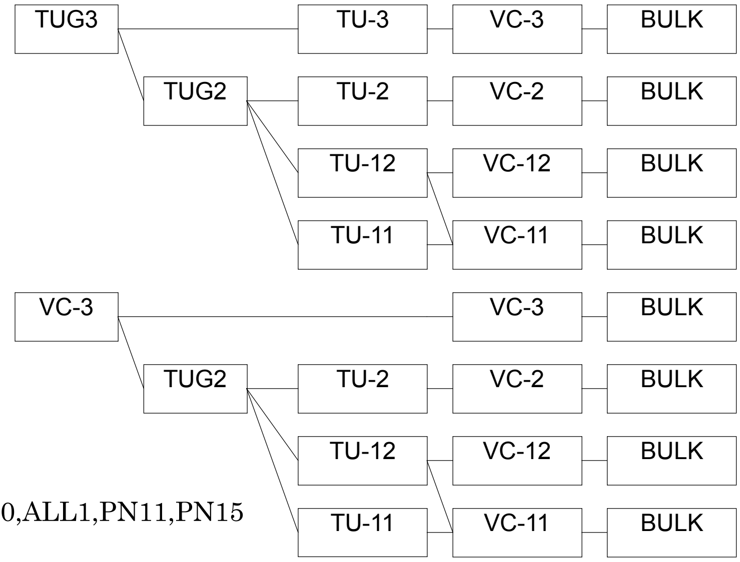
Frame#	Bit7	Bit8
1-8	Frame Aligment Signal : 1111111111111110	
9-12	TC-APId byte#1 : $1C_1C_2C_3C_4C_5C_6C_7$	
13-16	TC-APId byte#2 : 0XXXXXXX	
17-20	TC-APId byte#3 : 0XXXXXXX	
	:	
65-68	TC-APId byte#15 : 0XXXXXXX	
69-72	TC-APId byte#16 : 0XXXXXXX	
73	Reserved(=0)	TC-RDI
74	ODI	Reserved(=0)
75	Reserved(=0)	Reserved(=0)
76	Reserved(=0)	Reserved(=0)

(9) Dummy channel Tandem Connection

Item	Specifications
High order N1(Type1)	8bitCan be set.
High order N1(Type2)	IEC,TC-REI,OEI：Can be set.
Low order N1	ditto
Low order N2	The same data as that for BIP2 of V5. b3-8：Can be set.

<table>
<tr><th></th><th>Item</th><th>Specifications</th></tr>
<tr><td>(10)</td><td>Japan mapping
Signaling(ST)
(Option09)</td><td>Can be set for 384k data/voice, Byte data/voice
W byte
<table>
<tr><td>b1</td><td>b2</td><td>ST1</td><td>ST2</td><td>ST3</td><td>ST4</td><td>1</td><td>1</td></tr>
</table></td></tr>
<tr><td></td><td>8-multiframe Setting</td><td>
<table>
<tr><td>ST1</td><td>F</td><td>TS1</td><td>TS5</td><td>TS9</td><td>TS13</td><td>TS17</td><td>TS21</td><td>SP</td></tr>
<tr><td>ST2</td><td>F</td><td>TS2</td><td>TS6</td><td>TS10</td><td>TS14</td><td>TS18</td><td>TS22</td><td>D2</td></tr>
<tr><td>ST3</td><td>F</td><td>TS3</td><td>TS7</td><td>TS11</td><td>TS15</td><td>TS19</td><td>TS23</td><td>D3</td></tr>
<tr><td>ST4</td><td>F</td><td>TS4</td><td>TS8</td><td>TS12</td><td>TS16</td><td>TS20</td><td>TS24</td><td>D4</td></tr>
</table>
F(ST frame): 1 and 0 are repeated.
TS1-TS24 (signaling bit): user program
SP (BAIS): normal=1, BAIS=0 user program (initial value=1)
D2-D4 (switching signal) : user program (initial value All=0)</td></tr>
<tr><td></td><td>8-multiframe Alarm</td><td>HG AIS,HG REC,1.5MBAIS</td></tr>
</table>

	Item	Specifications				
	64-multiframe Setting	1	Fs	(Fs)	(Fs)	(Fs)
		2	AIS(ch1)	AIS(ch7)	AIS(ch13)	AIS(ch19)
		3	AIS(ch2)	AIS(ch8)	AIS(ch14)	AIS(ch20)
		4	AIS(ch3)	AIS(ch9)	AIS(ch15)	AIS(ch21)
		5	AIS(ch4)	AIS(ch10)	AIS(ch16)	AIS(ch22)
		6	AIS(ch5)	AIS(ch11)	AIS(ch17)	AIS(ch23)
		7	AIS(ch6)	AIS(ch12)	AIS(ch18)	AIS(ch24)
		8	1.5MBAIS	Kx	Ky	Kz
		9	Fs	(Fs)	(Fs)	(Fs)
		10-15	BAIS(ch1-24)			
		16	LOOP-OCU	LOOP-1.5M	....	....
		17	Fs	(Fs)	(Fs)	(Fs)
		18-23	PTY(ch1-24)			
		24	....	....	....	....
		25	Fs	(Fs)	(Fs)	(Fs)
		26-31	BEER(ch1-24)			
		32	....	....	....	....
		33	Fs	(Fs)	(Fs)	(Fs)
		34	LOOP2(B1)	LP		
		35	LOOP2(B3)	LP		
		36	LOOP2(D)	LP		
		37-39	LP			
		40	....	....	....	....
		41	Fs	(Fs)	(Fs)	(Fs)
		42-47	TRACE(ch1-24)			
		48	....	....	....	....
		49	Fs	(Fs)	(Fs)	(Fs)
		50-55	Spare (s)			
		56	....	....	....	....
		57	Fs	(Fs)	(Fs)	(Fs)
		58-63	Spare (UNR)			
		64	....	....	....	....
		Fs: 11010110 11000001 10011010 10011100 11110110 10000101 Other: user program				
	64-multiframe Alarm	AIS,BAIS,1.5M BAIS				

	Item	Specifications
1.5.10	Mixed payload	Can be set for 2 dummy values of TUG3 of STM-1 in the measured channel.
	mapping AU4	
	AU3	
	Pattern	ALL0,ALL1,PN11,PN15
1.5.11	Dummy chennel	
	Mode	Copy/Dummy
	Pattern	All0,All1,PN11,PN15(PN is for Bulk only.) In Dummy mode 1) An STM-1 having measurement channels can obtain a mapping upto the same hierarchy as that of the measurement channels. 2) An STM-1 that has mixed time measurement channels can obtain a mapping upto the bulk. 3) An STM-1 that has no measurement channels can obtain a mapping upto bulk in the same hierarchy as that of the measurement channels.
1.5.12	Payload offset	±100ppm/0.1ppm step
	Mode	C-bit Control

	Item	Specifications
1.5.13	Measurement	
	*In-service	
(1)	Error	B1, B2, B3, HP IEC, BIP-2, MS-REI, HP-REI, LP-REI, N2 BIP-2, TC-REI, OEI
	Measurement range	Error count : 0 to 999999, 1.0E06 to 9.9E15,>9.9E15 Error ratio : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15
(2)	Alarm	HP-SLM, HP-TIM, HP-RDI, HP-UNEQ, TU-AIS, TU-LOP, TU-LOM, LP-SLM, LP-TIM, LP－RDI, LP-UNEQ, LP－RFI, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI , LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Measurement range	Alarm :0-999μs,1-999ms, 1-999999s, 1.0E06 to 9.9E15, 9.9E15 (μs ... measured at every 125 μs) Alarm count(frame): 0 to 999999, 1.0E06 to 9.9E15,>9.9E15
(3)	Performance	G826 : B1, B2, B3, BPI-2, MS-REI, HP-REI, LP-REI ES SES ESR SESR BBER } 0 to 999999, 1.0E06 to 9.9E15, 9.9E15 US BBE SDP M2101,M2110,M2120
	*Out-of-service	
(4)	Error	B1, B2, B3, HP IEC, BIP-2, MS-REI, HP-REI, LP-REI, N2 BIP-2, TC-REI, OEI, Bit
	Measurement range	Error count : 0 to 999999, 1.0E06 to 9.9E15,>9.9E15 Error ratio : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15
(5)	Alarm	HP-SLM, HP-TIM, HP-RDI, HP-UNEQ, TU-AIS, TU-LOP, TU-LOM, LP-SLM, LP-TIM, LP-RDI, LP-UNEQ, LP-RFI, VC-AIS, ISF, FAS, HP-Incoming AIS, HP-TC-RDI, HP-ODI , LP-Incoming AIS, LP-TC-RDI, LP-ODI
	Measurement range	Alarm :0-999μs,1-999ms, 1-999999s, 1.0E06 to 9.9E15, 9.9E15 (μs, 125μ step) Alarm count(frame): 0 to 999999, 1.0E06 to 9.9E15,>9.9E15
(6)	Performance	Out-of-service G821/M2100/M2110/M2120 G826 : Same as In-service G826

	Item	Specifications		
(7)	ON/OFF conditions	Measurement	ON/OFF	
		LOS	Detection :	No optical input
			Removal :	Proper optical input
		OOF	Detection :	5 frames (4 frames: for 2.5G of MP0127/28/29, MU150008/09/10A)
			Removal :	2 frames
		LOF	Detection :	1-5ms/step0.1ms (3ms)
			Removal :	1-5ms/step0.1ms (3ms)
		MS-AIS	Detection :	b678=111 of K2 in 1-15 frames (5 frames)
			Removal :	Excluding b678=111 of K2 in 1-15 frames (5 frames)
		MS-RDI	Detection :	b678=110 of K2 in 1-15 frames (5 frames)
			Removal :	Excluding b678=110 of K2 in 1-15 frames (5 frames)
		AU-AIS	Detection :	H1, H2 all 1 in 1-15 frames (3 frames)
			Removal :	Normal H1, H2 in 1-15 frames (3 frames)
		AU-LOP	Detection :	Abnormal H1, H2 in 1-15 frames (3 frames)
			Removal :	Common in AU and AIS
		HP-UNEQ	Detection :	Excluding 00(h) of C2 in 1-15 frames (1 frame)
			Removal :	Conflict with C2 set in receive in 1-15 frames (5 frames)
		HP-SLM	Detection :	No conflict with C2 set in receive in 1-15 frames (5 frames)
			Removal :	No conflict with C2 set in receive in 1-15 frames (5 frames)
		HP-RDI	Detection :	b5=1 of G1 in 1-15 frames (10 frames)
			Removal :	b5=0 of G1 in 1-15 frames (10 frames)
		TU-AIS	Detection :	H1, H2/V1, V2 all 1 in 1-15 frames (3frames)
			Removal :	Normal H1, H2/V1, V2 in 1-15 frames (3 frames)
		TU-LOM	Detection :	Abnormal H4 in 1-15 frames (5frames)
			Removal :	Normal H4 in 1-15 frames (1 frame)
		TU-LOP	Detection :	Abnormal H1, H2/V1, V2 in 1-15 frames (8 frames)
			Removal :	Normal H1, H2/V1, V2 in 1-15 frames (3 frames)
		LP-UNEQ	Detection :	00(h) of C2 or b5-b7000 of V5 in 1-15 frames (1 frame)
			Removal :	Excluding above in 1-15 frames (1frame)
		LP-RDI	Detection :	b5=1 of V5 in 1-15 frames (10 frames)
			Removal :	b5=1 of V5 in 1-15 frames (10 frames)

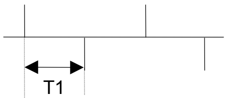
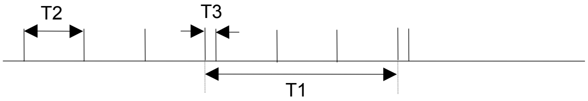
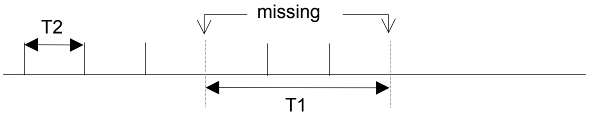
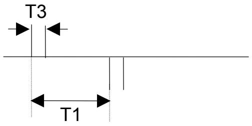
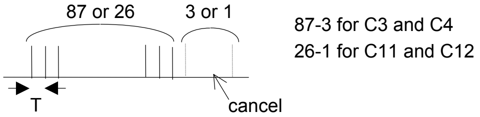
	Item	Specifications		
		LP-SLM	Detection :	No conflict with C2 set in receive in 1-15 frames (5 frames) Removal : Conflict with C2 set in receive in 1-15 frames (5 frames)
		LP-RFI	Detection :	b4=1 of V5 detected in 1-15 frames (1 frame)
			Removal :	b4=0 of V5 detected in 1-15 frames (1 frame)
		VC-AIS	Detection :	FF(h) of C2 or b5-b7"111" of V5 in 1-15 frames (1 frame)
			Removal :	Excluding those above in 1-15 frames (1 frame)
		ISF	Detection :	IEC="1111" of N1 in 1-15 frames (1 frame)(type1)
			Removal :	Excluding those above in 1-15 frames (1 frame)
		FAS	Detection :	b7, b8="FFFE" of N1 in 1-15 frames (1 frame)
			Removal :	Excluding those above in 1-15 frames (2 frames)
		HP-Incoming AIS	Detection :	IEC="1110" of N1 in 1-15 frames (1 frame)(type2)
			Removal :	Excluding those above in 1-15 frames (2 frames)
		HP-TC-RDI	Detection :	TC-RD1=1 in 1-15 frames (5frames)(type2)
			Removal:	Excluding those above in 1-15 frames (5 frames)
		HP-ODI	Detection :	ODI=1 in 1-15 frames (5 frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-Incoming AIS	Detection :	b4"1" of N2 in 1-15 frames (5 frames)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-TC-RDI	Detection :	TC-RDI=1 of N1 or N2 in 1-15 frames (5 frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)
		LP-ODI	Detection :	ODI=1 in 1-15 frames (5frames)(type2)
			Removal :	Excluding those above in 1-15 frames (5 frames)

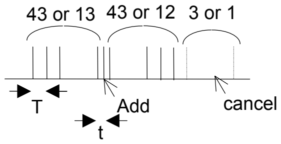
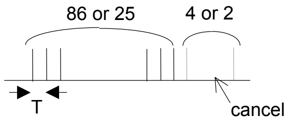
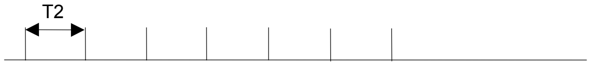
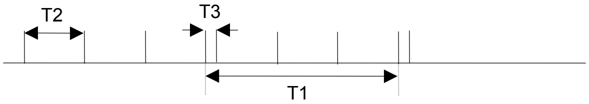
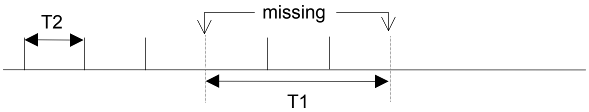
	Item	Specifications
(8)	Justification	AU-PTR, TU-PTR, C, C1/C2 NDF, +PJC, -PJC, Cons, C, C1/C2 Count : 0 to 999999, 1.0E06 to 9.9E15, 9.9E15 Rate : 1.0E-15 to 9.9E-01, 1.0E-00<1.0E-15 ppm : -1000ppm to +1000ppm/step0.1ppm <overflow (ppm except for NDF & Cons.)
(9)	K1,K2 monitor	Monitored in plain language or in units of bit.
(10)	Pointer monitor	AU-PTR, TU-PTR
	Graph	Pointer value, Pointer Inc/Dec Resolution:1s,1,15,60min
(11)	OH monitor	SOH 9*9byte, Specified payload, VC4POH, VC3POH, VC1POH
(12)	Path trace	J0, J1, J2 (with or without CRC7)
	Display	ASCII data Judgement whether CRC7 error exists Displays 'TIM' if conflict with send data is detected.
	Data updating	3 seconds
(13)	Tandem monitor	
	Display	For N1(type1) : Displays 82 bytes of LAPD message structure. Displays in ASCII for TCT/ISId/TSId. Judges the presence of CRC16 error. For N1(type2), N2 : Displays b7, b8 in 76 frames. Judges the presence of CRC7 error.
	Data updating	3 seconds
(14)	Signaling	
	monitor	Displays the signalling of selected single 8-multi or 64-multi channel.
	Alarm	8-multi:HG AIS,HG REC,1.5 64-multi: AIS,BAIS,1.5M BAIS

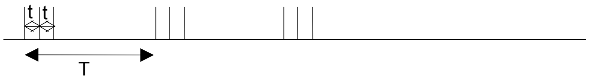
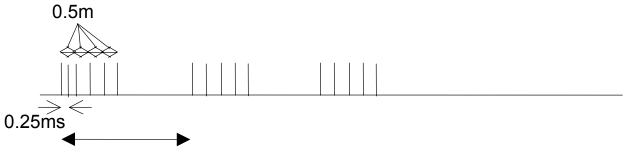
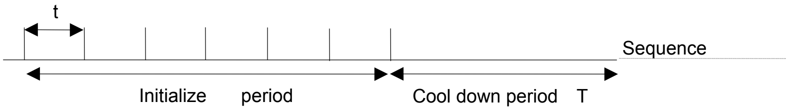
	Item	Specifications
1.5.14	Simultaneous measurement	Measures the error and alarm of VC2(7ch), VC12(21ch), VC11(28ch) of TUG3 or VC-3 simultaneously.
	Error	BIP-2,LP-REI
	Alarm	TU-AIS,TU-LOP,TU-LOM,LP-RDI,LP-RFI
	Measurement	Error/alarm second:0-9999s<overflow
	Display	Displays the error and alarm
	History	Can be set.
1.5.15	Trouble search	
	Measurement time	250ms/route
	Wait time	0.5, 1, 2, 5 seconds
	Display	Displays the data for all channels on TUG-3 or AU3 level.
1.5.16	APS test	
(1)	Switch time	
	Trigger	B1,B2,B3,BIP-2,MS-REI,HP-REI,LP-REI,MS-AIS,AU-AIS,AU-LOP, HP-RDI,TU-AIS,TU-LOM,TU-LOP,LP-RDI,LP-RFI, Bit, External
	Measurement range	2s
	Resolution	1ms
	Threshold	1E-4,1E-5 (for Bit, External)
(2)	sequence generation	
	Depth	2-64word repeat/8000frame('Repeat' can be set for each K1/K2.)
(3)	sequence capture	
	Depth	64word repeat/8000frame(Displays 'Repeat' for each K1/K2.)
	Trigger	Same as the Switch time
	Trigger point	1-64sequence
1.5.17	OH test	
(1)	OH change	SOH/POH 1byte,K1/K2,RSOH,MSOH,SOH,POH (Excluding B1, B2, B3, BIP-2)
	Timing	A-pattern :1-64frame,B-pattern :1-64frame Alternative A=1-8000, B-1-8000 times
(2)	PTR 64frame	AU-PTR, TU-PTR
	Timing	Single, repeat(2-64)
	Setting	PTR,NDF,+PJC,-PJC
(3)	OH BERT	SOH/POH 1byte,D1-D3,D4-D12 (Excluding B1, B2, B3, BIP-2)
	Pattern	2^{11}-1,2^{15}-1(INV)
(4)	OH add/drop	SOH/POH 1byte,D1-D3,D4-D12 (Excluding the add of B1, B2, B3, BIP-2)
(5)	OH capture	SOH/POH1byte,H1/H2,K1/K2
	Depth	1023byte
	Trigger	error/alarm, K1/K2 conflict/no conflict (16-bit mask possible), NDF, +PJC, -PJC, 3cons, Manual
	Trigger point	1-1023 can be set.
	Display	HEX for 1 byte, binary for H1/H2, K1/K2
1.5.18	CID pattern measurement	Consecutive-0 signal 0-100byte LOS,LOF,OOF,PN7 error

	Item	Specifications
1.5.19	Error performance check	Automatically generates the parameter detection pattern for error performance measurement.
15.20	Delay measurement	
	Measurement Period	0.5, 1, 2, 5、10s
	Measurement range	0 to 999 μ s, 1.0 to 999.9ms, 1.0 to 10.0s,>Timeout
	Accuracy	±5 μ s when period=0.5/s, ±50 μ s when 2/5/10s

	Item	Specifications
1.5.21	Frame memory	(Option13)
	Memory size	64frame
	Configuration	A frame(1 to 64)×(1 to 8000frame) B frame(0 to 64-A)×(1 to 8000frame)
	Payload pattern	All0 , all1, Playback (Transmits the captured data.)
	Parity	Automatically calculates B1 and B2. Concatenation B3 addition On/Off (but pointer fixed)
	Error addition	FAS, Bit all,B1,B2,B3,MS-REI
1.5.22	Frame capture	(Option13)
	Memory size	64frame
	Trigger	error/alarm, K1/K2 conflict/no conflict (16-bit masking allowed), NDF, +PJC, -PJC, 3cons, Manual External
	Trigger point	1-64
	Display	HEX display

	Item	Specifications
1.5.23	Pointer sequence	AU-PTR/TU-PTR (Setting range depends on the corresponding mapping.)
(1)	Single of opposite polarity	 T1: C3,C4 1ms to 60000ms/step 1ms(Initial setting30000ms) C11,C12 4ms to 60000ms/step 1ms(Initial setting30000ms)
(2)	Regular with double	 Adjustment polarity : +Just or -Just T1: C3,C4 2m to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) C11,C12 8ms to 60000ms/step T2ms (T1>T2)(Initial setting30000ms) T2: C3,C4 1ms to 30000ms/step 1ms (Initial setting1000ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1000ms) T3: C3,C4 0.5ms C11,C12 2ms
(3)	Regular with missing	 Adjustment polarity : +Just or -Just T1: C3,C4 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) C11,C12 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: C3,C4 1ms to 30000ms/step 1ms (Initial setting1000ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1000ms)
(4)	Double of opposite polarity	 T1: 4ms to 60000ms/step 1ms (Initial setting30000ms) T3: C3,C4 0.5ms C11,C12 2ms
(5)	87-3/26-1 Normal	 Adjustment polarity : +Just or -Just T: C3,C4 1ms to 30000ms/step 1ms (Initial setting1200ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1200ms)

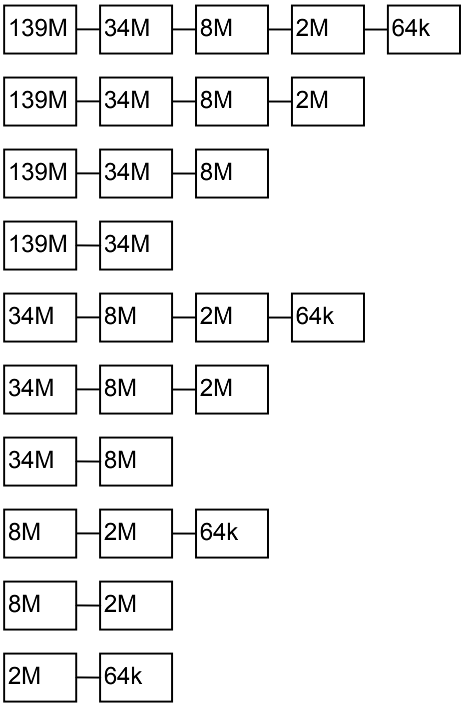
	Item	Specifications
(6)	87-3/26-1 Add	 Adjustment polarity : +Just or -Just Interval : 1 in N (N=1 to 10) T: C3,C4 1ms to 30000ms/step 1ms (Initial setting1200ms) C11,C12 4ms to 30000ms/step T2ms (Initial setting1200ms) t: C3,C4 0.5ms C11,C12 2ms
(7)	87-3/26-1 Cancel	 Adjustment polarity : +Just or -Just Interval : 1 in N (N=1 to 10) T: C3,C4 1ms to 30000ms/step 1ms (Initial setting1200ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1200ms)
(8)	Continuous pattern Normal	 Adjustment polarity : +Just or -Just T2: C3,C4 1ms to 30000ms/step 1ms (Initial setting1000ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1000ms)
(9)	Continuous pattern Add	 Adjustment polarity : +Just or -Just T1: C3,C4 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) C11,C12 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: C3,C4 1ms to 30000ms/step 1ms (Initial setting1000ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1000ms) T3: C3,C4 0.5ms C11,C12 2ms
(10)	Continuous pattern Cancel	 Adjustment polarity : +Just or -Just T1: C3,C4 2ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) C11,C12 8ms to 60000ms/step T2ms (T1>T2) (Initial setting30000ms) T2: C3,C4 1ms to 30000ms/step 1ms (Initial setting1000ms) C11,C12 4ms to 30000ms/step 1ms (Initial setting1000ms)

	Item	Specifications
(11)	Single pointer adjustment	 Adjustment polarity : +Just or -Just T: 1ms to 30000ms/step 1ms (Initial setting30000ms)
(12)	Maximum rate pointer burst	 Adjustment polarity : +Just or -Just T: 1ms to 30000ms/step 1ms (Initial setting30000ms) t: 0.5ms
(13)	Phase transient pointer burst	 T: 1ms to 30000ms/step 1ms (Initial setting30000ms)
(14)	Initialize period	 Adjustment polarity : Same as the measurement sequence t: 1ms to 30000ms/step 1ms (Initial setting5ms) T: 1s to 99s/step1s
(15)	Cool down period	T: 1s to 99s/step1s
1.5.24	B2 measurement	Displays the measured results of B2 error for each channel (for each STM unit for STM64). channels for STM1, 12 channels for STM4, 48 channels for STM16 and 64 channels for STM64.
1.6	Graphics	Error/Alarm
	Bar resolution	1s/1/15/60min
	Max. memory size	(at the time of 'all error') 1s/bar...3min 1min/bar...3h 15min/bar...1.875day(45h) 60min/bar...7.5day(180h)
	Max. graph display	1s/bar...1.2h(72min) 1min/bar...3days 15min/bar...1.6days 60min/bar...99days

	Item	Specifications
1.7	PDH function	According to the specifications of MP0121A, MP0122A and MP0122B
1.8	ATM function	According to the specifications of MP0123A (supports the items below when Option 15 is installed).
2	Printer	Measurement results can be printed with both built-in and external printers. (when either Option 01 or 02 is installed)
3	Internal memory Set memory Graphic memory	 10 types, Initial Max. 15 types (Memory used is displayed in %.)
4	Others	FDD, Clock, Buzzer (3 types of sound) RS-232C (when Option 01 is installed) GP-1B (when Option 02 is installed) Ethernet (when Option 03 is installed) VGA output (when Option 04 is installed)
5	Environmental performance Power Operational temperature range allowed Storage temperature range allowed	 AC85 to 132V AC170 to 250V(Auto Switching for 100V and 200V series) 47.5Hz to 63Hz 0 to 40℃ (not applicable during FDD operation) -20 to 60℃
6	Mechanical performance Dimensions Weight	 177mm(H),320mm(W),350mm(D) (protrusion excluded) 10 kg or less (excluding the unit weight)

A.2 Specifications of the MP0121A

	Item	Specifications
1	Output	HDB3/CMI output
1.1	Bit rate	HDB3............................. 2.048Mbit/s, 8.448Mbit/s, 34.368Mbit/s
		CMI................................ 139.264Mbit/s, 155.520Mbit/s
1.2	Accuracy	2M, 8M, 34M, 139M .... ±7ppm
		156M .... According to MP1570A specifications
1.3	Interface	2.048Mbit/s .... ITU-T G.703 Table6 Fig15
		8.448Mbit/s .... ITU-T G.703 Table7 Fig16
		34.368Mbit/s .... ITU-T G.703 Table8 Fig17
		139.264Mbit/s .... ITU-T G.703 Table9 Fig19, Fig20
		155.520Mbit/s .... ITU-T G.703 Table11 Fig24, Fig25
1.4	Connector	BNC75Ω unbalanced type
		Siemens 3-pin 120Ω balanced type
1.5	Code	2.048Mbit/s .... HDB3 balanced/unbalanced
		8.448Mbit/s .... HDB3 unbalanced
		34.368Mbit/s .... HDB3 unbalanced
		139.264Mbit/s .... CMI unbalanced
		155.520Mbit/s .... CMI unbalanced
2	HDB3/CMI input	
2.1	Bit rate	2.048Mbit/s, 8.448Mbit/s, 34.368Mbit/s,
		139.264Mbit/s, 155.520Mbit/s .... ±100ppm
2.2	Interface	<balanced>
		2M .... 3V_{op}±0.3V+cable loss 0 - 6dB
		when monitored:0.3V_{op}±0.03V+cable loss 0 - 6dB
		<unbalanced>
		2M, 8M .... 2.37V_{op}±0.237V+cable loss0 to 6dB
		when monitored:0.237V_{op}±0.0237V+cable loss0 to 6dB
		34M .... 1V_{op}±0.1V+cable loss0 to 12dB
		when monitored:0.1V_{op}±0.01V+cable loss0 to 12dB
		139M, 156M .... 1V_{pp}±0.1V+cable loss0 to 12dB
		when monitored:0.1V_{pp}±0.01V+cable loss0 to 12dB
2.3	Connector	BNC75Ω unbalanced
		Siemens 3-pin120Ω balanced
2.4	Code	2.048Mbit/s .... HDB3 balanced/unbalanced
		8.448Mbit/s .... HDB3 unbalanced
		34.368Mbit/s .... HDB3 unbalanced
		139.264Mbit/s .... CMI unbalanced
		155.520Mbit/s .... CMI unbalanced
3	Error output	Outputs a 1RZ pulse per 1 bit error.
3.1	Level	TTL
3.2	Connector	BNC75Ω

	Item	Specifications
4	PDH measurement	
4.1	Send clock	Built-in, external, lock (when Jitter unit is installed) receive
4.2	Frame Format	Nonframe ... 2M, 8M, 34M, 139M Frame . ..... 2M (30ch or 31ch, with/without CRC4) : G.704 8M : G.742 34M, 139M : G.751
4.3	MUX/DEMUX (Option 06)	according to MP1570A specifications 
4.4	Test pattern	PRBIT/S .... 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, Invert ON/OFF Word .... 16 bit program all 0, all 1
4.5	Error addition	Type Nonframe (139M, 34M, 8M, 2M) ....: Bit all, Code 139MFrame .... Bit139M, Code, FAS, Bit info 34MFrame .... Bit34M, Code, FAS, Bit info 8MFrame .... Bit8M, Code, FAS, Bit info 2MFrame .... Bit2M, Code, FAS, Bit info, E Bit (Can be added to tributary when MUX is ON.) Timing Except FAS.......... single Rate (1*10^{-3}, 1*10^{-4}, 1*10^{-5}, 1*10^{-6}, 1*10^{-7}) FAS .... n frames in 16 frames (n=1-4), all

	Item	Specifications
4.6	Alarm addition	Type Nonframe (139M, 34M, 8M, 2M) ....LOS, AIS 139M, 34M, 8MFrame..................................LOS, LOF, AIS, RDI 2MFrame..............LOS, LOF, AIS, RDI, RDI(MF) (Can be added to tributary when MUX is ON.) Timing ....all
4.7	Error measurement	Nonframe (139M, 34M, 8M, 2M) ....Code, Bit* 139M, 34M, 8MFrame............. FAS, Code, Bit* 2MFrame..............FAS, Code, CRC4, EBit, Bit* (Tributary error can be detected when DEMUX is ON.) Display range.......Count : 0 to 999999, 1.0E06 to 9.9E15, >9.9E15 Rate : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15 *Bit : only when out-of-service
4.8	Alarm measurement	Nonframe (139M, 34M, 8M, 2M) ....Power fail, LOS, AIS, Sync. loss* 139M, 34M, 8Mframe .... Power fail, LOS, LOF, AIS, RDI, Sync. loss* 2Mframe...............Power fail, LOS, LOF, AIS, RDI, RDI(MF), MF loss, Sync. loss* (Tributary alarm can be detected when DEMUX is ON.) Display range ......0 to 999999, 1.0E06 to 9.9E15, >9.9E15s *Sync. loss : Only when out-of-service
4.9	Error analysis	Selects G.821, M.2100 or G.826
4.9.1	G.821	Item under evaluation FAS(in-service) Type............EC, ES, EFS, SES, US, DM, Code ES %ES, %ES(ANNEX.D), %EFS, %SES, %US, %DM Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15 0.0000 to 100.0000%
4.9.2	M.2100	Type............Tx ES E Bit, Rx ES FAS, Tx SES E Bit, Rx SES FAS, US Display range ......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
4.9.3	G.826	Item under evaluation CRC(when 2M CRC4 is on), FAS(when 2M CRC4 is off) Type............ES, SES, BBE, SDP, US, ESR, SESR, BBER Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
5	Monitor	FAS 139M, FAS 34M, FAS 8M, FW 2M, NFW 2M, MFW 2M, Info byte

	Item	Specifications
6	Trouble search	Automatically searches for errors and alarms on all routes for the specified mapping and displays the existence of trouble, type and route. Measurement time 250 ms/route Waiting time ....0.5, 1, 2, 5 seconds Display..................Displays 'NO Trouble' if no trouble exists. Displays trouble type and route if a trouble exists.
7	Delay	Measures the delay of the device under test Measurement cycle ..... 0.5, 1 second Measurement range ..... 0-1.00 second, time-out Display accuracy ..... within ±5 μs 0 to 999 μs, 1.0 to 999.9ms, 1.0s, time-out
8	Others	
8.1	dimensions, mass	21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg
8.2	operating temperature	According to MP1570A specifications

A.3 Specifications of the MP0122A and MP0122B

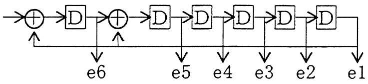
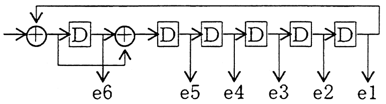
	Item	Specifications
1	Output	B3ZS, AMI/B8ZS Output
		Optical output (when MP0122B is installed)
1.1	Bit rate	AMI/B8ZS 1.544Mbit/s
		B3ZS.............................. 44.736Mbit/s, 51.84Mbit/s
		Optical........................... 51.84 Mbit/s (when MP0122B is installed)
1.2	Accuracy	1.5M, 45M .... ±7ppm
		52M............................... according to MP1570A specifications
1.3	Interface	Electrical output........... according to ANSI T1.102
		Optical........................... according to MP1552B specifications
1.4	Connector	BNC75Ω unbalanced
		BANTAM 100Ω balanced
		FC-PC(SM) when MP0122B is installed
1.5	Code	1.544Mbit/s .... AMI/B8ZS balanced
		44.736Mbit/s .... B3ZS unbalanced
		51.84Mbit/s .... B3ZS unbalanced
2	Input	B3ZS, AMI/B8ZS
		Optical input (when MP0122B is installed)
2.1	Bit rate	AMI/B8ZS 1.544Mbit/s
		B3ZS.............................. 44.736Mbit/s, 51.84Mbit/s
		Optical........................... 51.84Mbit/s (when MP0122B is installed)
2.2	Interface	Balanced
		1.5M .... 3VOP, -6dB to 2dB
		When monitored: 0.3V_{op}±0.03V
		But after passing through 655FeetABAM cable
		Unbalanced
		45M, 52M .... 0.91V_{op}, -6dB to 6dB+0 to 900Feet728 cable
		When monitored:0.091V_{op}, -6dB to 6dB
		+0 to 450Feet 728 cable
		Optical
		According to MP1552B specifications
2.3	Connector	BNC75Ω unbalanced
		BANTAM 100Ω balanced
		FC-PC(SM) (when MP0122B is installed)
2.4	Code	1.544Mbit/s .... AMI/B8ZS balanced
		44.736Mbit/s .... B3ZS unbalanced
		51.84Mbit/s .... B3ZS unbalanced
3	Error output	1RZ pulse output per 1 bit error
3.1	Level	TTL
3.2	Connector	BNC75Ω
4	Monitor output	According to MP1570A specifications

	Item	Specifications
5	PDH measurement	
5.1	Send clock	Internal, external, lock, receive
5.2	Frame format	Nonframe .... 1.5M, 45M Frame .... 1.5M (D4, ESF, Japan ESF *8 Note 1) 45M (M13, C bit)
5.3	MUX/DEMUX (Option)	According to MP1570A specifications 45M — 1.5M — 64k (Option07) 45M — 1.5M (Option07) 45M — 2M — 64k (Option08) 45M — 2M (Option08)
5.4	Test pattern	PRBS .... $2^{11-}1$, 2^{15}-1, $2^{20-}1$, 2^{20}-1zero surplus, 2^{23}-1, Invert ON/OFF Word .... 16bit program all 0, all 1, 3in24
5.5	Error addition	Type 1.5M Nonframe..............Bit 1.5M, Code 1.5M DS1(D4) ....Bit 1.5M, Code, Bit info 5M DS1(ESF) ....Bit 1.5M, Code, Bit info, CRC6 5M Japan(ESF)..............Bit 1.5M, Code, Bit info, CRC6 45M Nonframe ....Bit 45M, Code 45M DS3(M13)...............Bit 45M, Code, Bit info, FAS45M, Parity 45M DS3(CBi) ....Bit 45M, Code, Bit info, FAS45M, Parity, C Parity, REI 52M.................................Code, Bit 52M All Except FAS ....Single, Rate (1*10－n, n=3 to 9 Parity, c Parity, CRC-6, REI は n=4 to 9) However, CRC-6 single error of 1.5M Japan ESF frame cannot be added. FAS............................n frames in 16 frames (n=1-4), all
5.6	Alarm addition	Type 1.5M Nonframe..............LOS, AIS1.5M 1.5M DS1(D4) ....LOS, LOF1.5M, AIS1.5M 1.5M DS1(ESF) ....LOS, LOF1.5M, AIS1.5M, RDI1.5M 1.5M Japan(ESF)...........LOS, LOF1.5M, AIS1.5M, RDI1.5M 45M Nonframe ....LOS 45M DS3(M13, C Bit) ....LOS, LOF45M, AIS45M, RDI45M 52M.................................LOS All .... All

	Item	Specifications
5.7	Error measurement	 1.5M Nonframe............. Code, Bit* 1.5M DS1(D4) .... Code, FAS1.5M, Bit* 1.5M DS1(ESF)............. Code, FAS1.5M, CRC6, Bit* 1.5M Japan(ESF).......... Code, FAS1.5M, CRC6, Bit* 45M Nonframe.............. Code, Bit* 45M DS3(M13).............. Code, FAS45M, Parity, Bit* 45M DS3(C Bit) .... Code, FAS45M, Parity, C Bit, REI, Bit* Display range .Count : 0 to 999999, 1.0E06 to 9.9E15, >9.9E15 Rate : 1.0E-15 to 9.9E-01, 1.0E-00, <1.0E-15 *Bit : only when out-of-service
5.8	Alarm measurement	 1.5M Nonframe .... Power fail, LOS, AIS1.5M, Sync. loss* 1.5M DS1(D4) .... Power fail, LOS, LOF1.5M, AIS1.5M 1.5M DS1(ESF)............. Power fail, LOS, LOF1.5M, AIS1.5M, RDI1.5M, Sync. loss* 1.5M Japan(ESF).......... Power fail, LOS, LOF1.5M, AIS1.5M, RDI1.5M, Sync. loss* 45M Nonframe .... Power fail, LOS, Sync. loss* 45M DS3(M13, C Bit).... Power fail, LOS, LOF45M, AIS45M, RDI45M, Sync. loss* Display range .0 to 999999, 1.0E06 to 9.9E15, >9.9E15 seconds *Sync. loss : only when out-of-service

	Item	Specifications
5.9	Error analysis	Selects G.821, M.2100 or G.826
5.9.1	G.821	Type .... EC, ES, EFS, SES, US, DM, Code ES %ES, %ES (ANNEX.D), %EFS, %SES, %US, %DM Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15 0.0000 to 100.0000%
5.9.2	M.2100	Type .... Tx ES E Bit, Rx ES FAS, Tx SES E Bit, Rx SES FAS, US Display range ......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
5.9.3	G.826	Item under evaluation : Bit (when out-of-service), FAS1.5M(when in-service, DS1(D4)) CRC6 (when in-service, DS1(ESF)), FAS45M (when in-service, DS3(M13, C Bit)) Type .... ES, SES, ESR, SESR, BBER, UR, BBE, SDP Display range.......0 to 999999, 1.0E06 to 9.9E15, >9.9E15
6	Trouble search	Automatically searches for errors and alarms on all routes for the specified mapping and displays the existence of trouble, type and route. Measurement time 250 ms/route Waiting time ....0.5, 1, 2, 5 seconds Display ..... Displays 'NO Trouble' if no trouble exists. Displays trouble type and route if a trouble exists.
7	Delay	Measures the delay of the device under test Measurement cycle 0.5, 1 second Measurement range 0 to 1.00 second, time-out Display accuracy ..... within ±5 μs 0 to 999 μs, 1.0 to 999.9ms, 1.0s, time-out
8	Others	
8.1	dimensions, weight	MP0122A .....21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg MP0122B .....21(H) × 255(W) × 167.6(D) mm (excluding protrusions.) Approx. 1 kg
8.2	operating temperature	According to MP1570A specifications

Note 1 1.5M Japan ESF frame differs from DS1 ESF frame in the following respects:

	Japan ESF	DS1 ESF
1.5RDI occurrence, detection pattern	1111 1111 1111 1111 repetition in DL bit	1111 1111 0000 0000 repetition in DL bit
CRC-6 operation		

⊕ ....XOR

D ....Shift register

Appendix B Options

The table below shows the optional items that are available for MP1570A. These items other than optical connectors must be installed at our plant.

Model or Order No.	Item	Remarks
MP1570A-01	RS-232C	Option 01
MP1570A-02	GPIB	Option 02
MP1570A-03	ETHERNET	Option 03
MP1570A-04	VGA Output	Option 04
MP1570A-06	MUX/DEMUX	Option 06 2/8/34/139M MUX/DEMUX
MP1570A-07	MUX－DEMUX	Option 07 1.5/45M MUX/DEMUX
MP1570A-08	DS3（45M）-2M	Option 08
MP1570A-09	Japan Mapping	Option 09 VC11 Signalling
MP1570A-10	SDH	Option 10 - Either option10 or option11 is installed as the standard.
MP1570A-11	SONET	Option 11
MP1570A-13	Frame Memory/Capture	Option 13 156M/622M
MP1570A-14	IP-Over-SDH/SONET	Option 14 156M/622M/2.4G/10G Frame Memory option required.
MP1570A-15	IP-Over-ATM	Option 15 156M/622M MP0123A required.
MP1570A-22	K1/K2 Overwrite through	Option 22 52M/156M/622M/2.4G/10G

Model or Order No.	Item	Remarks
MP0124A-01	Wander	Option 01 2/8/34/139M 156/622M RMS measurement
MP0124A-02	RMS meas	Option 02 2/8/34/139M 156/622M Wander measurement
MP0125A-01	Wander	Option 01 1/5/45/52M 156/622M RMS measurement
MP0125A-02	Wander	Option 02 1/5/45/52M 156/622M Wander measurement
MP0126A-01	RMS meas	Option 01 2/8/34/139M 1.5/45/52M 156/622M RMS measurement
MP0126A-02	Wander	Option 02 2/8/34/139M 1.5/45/52M 156/622M wander measurement
MP0128A-01	1550 nm band LD module with built-in EA modulator	Option 01
MP0129A-01	1550 nm band LD module with built-in EA modulator	Option 01
MP0130A-01	RMS meas	Option 01 2448M RMS measurement

Model or Order No.	Item	Remarks
MP0111A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0111A
MP0111A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0111A
MP0111A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0111A
MP0111A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0111A
MP0112A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0112A
MP0112A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0112A
MP0112A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0112A
MP0112A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0112A
MP0113A-38	Replaceable ST optical connector	Option 38 3 pairs for MP0113A
MP0113A-39	Replaceable DIN optical connector	Option 39 3 pairs for MP0113A
MP0113A-40	Replaceable SC optical connector	Option 40 3 pairs for MP0113A
MP0113A-43	Replaceable HMS-10/A optical connector	Option 43 3 pairs for MP0113A
MP0122B-38	Replaceable ST optical connector	Option 38 2 pairs for MP0122B
MP0122B-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0122B
MP0122B-40	Replaceable SC optical connector	Option 40 2 pairs for MP0122B
MP0122B-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0122B

Model or Order No.	Item	Remarks
MP0127A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0127A
MP0127A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0127A
MP0127A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0127A
MP0127A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0127A
MU150008A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150008A
MU150008A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150008A
MU150008A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150008A
MU150008A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150008A
MP0128A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0128A
MP0128A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0128A
MP0128A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0128A
MP0128A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0128A
MU150009A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150009A
MU150009A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150009A
MU150009A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150009A
MU150009A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150009A

Model or Order No.	Item	Remarks
MP0129A-38	Replaceable ST optical connector	Option 38 2 pairs for MP0129A
MP0129A-39	Replaceable DIN optical connector	Option 39 2 pairs for MP0129A
MP0129A-40	Replaceable SC optical connector	Option 40 2 pairs for MP0129A
MP0129A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MP0129A
MU150010A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150010A
MU150010A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150010A
MU150010A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150010A
MU150010A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150010A
MU150000A-01	Frame Memory/Capture (2.5G/10G)	Option 01 for MU150000A
MU150001A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150001A
MU150001A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150001A
MU150001A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150001A
MU150001A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150001A
MU150002A-38	Replaceable ST optical connector	Option 38 2 pairs for MU150002A
MU150002A-39	Replaceable DIN optical connector	Option 39 2 pairs for MU150002A
MU150002A-40	Replaceable SC optical connector	Option 40 2 pairs for MU150002A
MU150002A-43	Replaceable HMS-10/A optical connector	Option 43 2 pairs for MU150002A

Model or Order No.	Item	Remarks
MU150017A-38	Replaceable ST optical connector	Option 38 1 pair for MU150017A
MU150017A-39	Replaceable DIN optical connector	Option 39 1 pair for MU150017A
MU150017A-40	Replaceable SC optical connector	Option 40 1 pair for MU150017A
MU150017A-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150017A
MU150017B-38	Replaceable ST optical connector	Option 38 1 pair for MU150017B
MU150017B-39	Replaceable DIN optical connector	Option 39 1 pair for MU150017B
MU150017B-40	Replaceable SC optical connector	Option 40 1 pair for MU150017B
MU150017B-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150017B
MU150031A-38	Replaceable ST optical connector	Option 38 1 pair for MU150031A
MU150031A-39	Replaceable DIN optical connector	Option 39 1 pair for MU150031A
MU150031A-40	Replaceable SC optical connector	Option 40 1 pair for MU150031A
MU150031A-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150031A
MU150031C-38	Replaceable ST optical connector	Option 38 1 pair for MU150031C
MU150031C-39	Replaceable DIN optical connector	Option 39 1 pair for MU150031C
MU150031C-40	Replaceable SC optical connector	Option 40 1 pair for MU150031C
MU150031C-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150031C

Model or Order No.	Item	Remarks
MU150061A-38	Replaceable ST optical connector	Option 38 1 pair for MU150061A
MU150061A-39	Replaceable DIN optical connector	Option 39 1 pair for MU150061A
MU150061A-40	Replaceable SC optical connector	Option 40 1 pair for MU150061A
MU150061A-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150061A
MU150061B-38	Replaceable ST optical connector	Option 38 1 pair for MU150061B
MU150061B-39	Replaceable DIN optical connector	Option 39 1 pair for MU150061B
MU150061B-40	Replaceable SC optical connector	Option 40 1 pair for MU150061B
MU150061B-43	Replaceable HMS-10/A optical connector	Option 43 1 pair for MU150061B

Appendix C Accessories

The table below shows the accessories for MP1570A.

Model or Order No.	Item	Remarks
MX150001A	Application software for wander (MTIE, TDEV) measurement	for MP0124A, MP0125A, MP0126A-02
J0126B	Coaxial cable with BNC plug at both ends, 2 m	75 Ω for MP1570A, MP0105A
J0776D	Coaxial cable, 2 m	50 Ω, for MP1570A
J0162A	Balanced cable 3 pins at both ends (with F plug), 1 m	120 Ω, for MP1570A
J0162B	Balanced cable pins at both ends (with F plug), 2 m	120 Ω, for MP1570A
J0845A	Balanced cable, 3 pins at both ends BANTAM	100 Ω, for MP1570A
J0796A	Replaceable ST optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796B	Replaceable DIN optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796C	Replaceable SC optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796D	Replaceable HMS-10/A optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0796E	Replaceable FC optical connector	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0635A	Optical fiber cable, 1m	SM, FC-SPC connector at both ends
J0635B	Optical fiber cable, 2m	SM, FC-SPC connector at both ends
J0635C	Optical fiber cable, 3m	SM, FC-SPC connector at both ends
J0747B	Fixed attenuator (10dB)	
J0747C	Fixed attenuator (15dB)	
JO747D	Fixed attenuator (20dB)	

Model or Order No.	Item	Remarks
MZ8012A	Connector cleaning set	for MP0111A, MP0112A, MP0113A, MP0122B 1 set
J0322B	Coaxial cable SMA connector at both ends, 1 m	50 Ω for MP0108A
J0008	GPIB cable, 2 m	
B0336C	Carrying case	
B0322	Soft case	

Appendix D Initial Values

D.1 Initial Values of OH Preset Data

OH Preset Data are set to the following initial values.

(Open the 'Setup : OH Preset Data' screen, move the cursor to '⧈ Default' and press the Set key. The initial values are set.)

OH preset data are set to the initial values by moving the cursor to '⧈ Default' and pressing Set on the 'Setup : OH preset data' screen.

SOH ....Bit rate: 52M

1	2	3
A1 [F6]	A2 [28]	J0 [00]
B1 --	E1 [00]	F1 [00]
D1 [00]	D2 [00]	D3 [00]
H1 --	H2 --	H3 --
B2 --	K1 --	K2 --
D4 [00]	D5 [00]	D6 [00]
D7 [00]	D8 [00]	D9 [00]
D10 [00]	D11 [00]	D12 [00]
S1 [00]	M1 [00]	E2 [00]

SOH ....Bit rate: 156M

1	2	3	4	5	6	7	8	9
A1	A1	A1	A2	A2	A2	J0	X18	X19
[F6]	[F6]	[F6]	[28]	[28]	[28]	[00]	[AA]	[AA]
B1	X22	X23	E1	X25	X26	F1	X28	X29
--	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]
D1	X32	X33	D2	X35	X36	D3	X38	X39
[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]
H1	H1	H1	H2	H2	H2	H3	H3	H3
--	--	--	--	--	--	--	--	--
B2	B2	B2	K1	X55	X56	K2	X58	X59
--	--	--	--	[00]	[00]	--	[00]	[00]
D4	X62	X63	D5	X65	X66	D6	X68	X69
[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]
D7	X72	X73	D8	X75	X76	D9	X78	X79
[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]
D10	X82	X83	D11	X85	X86	D12	X88	X89
[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]
S1	Z1	Z1	Z2	Z2	M1	E2	X98	X99
[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]	[00]

SOH ....Bit rate: 622M

SOH(#1)

1	5	9	13	17	21	25	29	33
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	J0 [01]	X18 [AA]	X19 [AA]
B1 --	X22 [00]	X23 [00]	E1 [00]	X25 [00]	X26 [00]	F1 [00]	X28 [00]	X29 [00]
D1 [00]	X32 [00]	X33 [00]	D2 [00]	X35 [00]	X36 [00]	D3 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	K1 --	X55 [00]	X56 [00]	K2 --	X58 [00]	X59 [00]
D4 [00]	X62 [00]	X63 [00]	D5 [00]	X65 [00]	X66 [00]	D6 [00]	X68 [00]	X69 [00]
D7 [00]	X72 [00]	X73 [00]	D8 [00]	X75 [00]	X76 [00]	D9 [00]	X78 [00]	X79 [00]
D10 [00]	X82 [00]	X83 [00]	D11 [00]	X85 [00]	X86 [00]	D12 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	E2 [00]	X98 [00]	X99 [00]

SOH(#2)

2	6	10	14	18	22	26	30	34
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [02]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

SOH(#3)

3	7	11	15	19	23	27	31	35
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [03]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	M1 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

SOH(#4)

4	8	12	16	20	24	28	32	36
A1 [F6]	A1 [F6]	A1 [F6]	A2 [28]	A2 [28]	A2 [28]	C1 [04]	X18 [AA]	X19 [AA]
X21 [00]	X22 [00]	X23 [00]	X24 [00]	X25 [00]	X26 [00]	X27 [00]	X28 [00]	X29 [00]
X31 [00]	X32 [00]	X33 [00]	X34 [00]	X35 [00]	X36 [00]	X37 [00]	X38 [00]	X39 [00]
H1 --	H1 --	H1 --	H2 --	H2 --	H2 --	H3 --	H3 --	H3 --
B2 --	B2 --	B2 --	X54 [00]	X55 [00]	X56 [00]	X57 [00]	X58 [00]	X59 [00]
X61 [00]	X62 [00]	X63 [00]	X64 [00]	X65 [00]	X66 [00]	X67 [00]	X68 [00]	X69 [00]
X71 [00]	X72 [00]	X73 [00]	X74 [00]	X75 [00]	X76 [00]	X77 [00]	X78 [00]	X79 [00]
X81 [00]	X82 [00]	X83 [00]	X84 [00]	X85 [00]	X86 [00]	X87 [00]	X88 [00]	X89 [00]
S1 [00]	Z1 [00]	Z1 [00]	Z2 [00]	Z2 [00]	Z2 [00]	X97 [00]	X98 [00]	X99 [00]

POH

POH VC4
J1 [00]
B3 --
C2 [01]
G1 [00]
F2 [00]
H4 [00]
F3 [00]
K3 [00]
N1 [00]

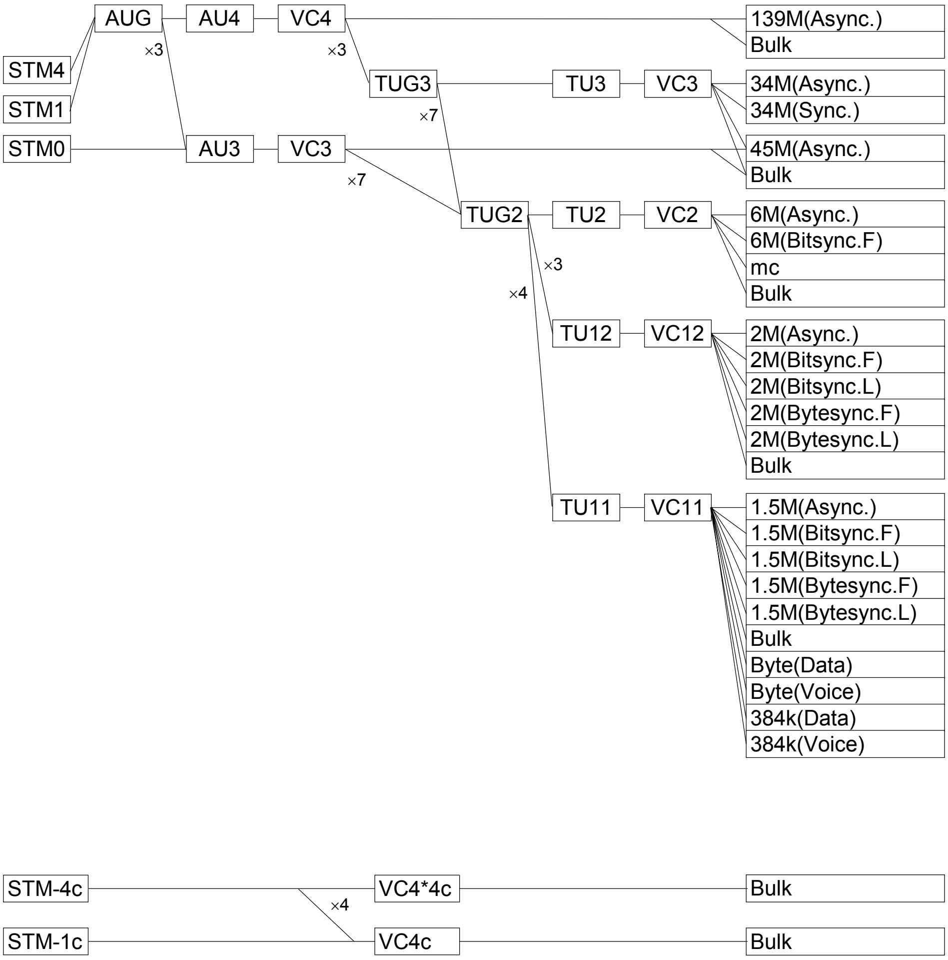
POH VC3
J1 [00]
B3 --
C2 [01]
G1 [00]
F2 [00]
H4 [00]
F3 [00]
K3 [00]
N1 [00]

POH VC2/1
V5 [**]
J2 [00]
N2 [00]
K4 [00]

D.2 Initial Values of Signal Labels (C2, V5(b5-b7))

The initial values of signal levels (C2, V5(b5-b7)) depend on the mapping.

The initial values are shown below.



	via AU4			via AU3		
	VC4 C2	VC3 (TU3) C2	VC2/1 V5 b5-b7	VC4 C2	VC3 C2	VC2/1 V5 b5-b7
139M(Async.)	12	--	--	--	--	--
Bulk	FE	--	--	--	--	--
34M(Async.)	02	04	--	--	--	--
34M(Sync.)	02	04	--	--	--	--
45M(Async.)	02	04	--	--	04	--
Bulk	02	FE	--	--	FE	--
6M(Async.)	02	01	04	--	02	04
6M(Bitsync.F)	02	01	06	--	02	06
mc	02	01	0C	--	02	0C
Bulk	02	01	0C	--	02	0C
2M(Async.)	02	01	04	--	02	04
2M(Bitsync.F)	02	01	06	--	02	06
2M(Bitsync.L)	03	03	06	--	03	06
2M(Bytesync.F)	02	01	08	--	02	08
2M(Bytesync.L)	03	03	08	--	03	08
Bulk	02	01	FE	--	02	FE
1.5M(Async.)	02	01	04	--	02	04
1.5M(Bitsync.F)	02	01	06	--	02	06
1.5M(Bitsync.L)	03	03	06	--	03	06
1.5M(Bytesync.F)	02	01	08	--	02	08
1.5M(Bytesync.L)	03	03	08	--	03	08
Bulk	02	01	FE	--	02	FE
Byte(Data)	02	01	08	--	02	08
Byte(Voice)	02	01	08	--	02	08
384k(Data)	02	01	02	--	02	02
384k(Voice)	02	01	02	--	02	02
Bulk	FE	--	--	--	--	--
Bulk	FE	--	--	--	--	--

D.3 Initial Values of the Test Patterns

The initial values of the test patterns are shown below.
(The test patterns are automatically changed to the initial values if you set the DEMUX, the lowest stage of Mapping, or Bit rate on the receiver section.

Test pattern	DEMUX	Mapping	Bit rate
PRBS20z Invert:OFF	1.5M	VC4-TUG3-TUG2-TU11-VC11-1.5M [*1]	1.5M
		VC4-TUG3-TUG2-TU12-VC11-1.5M [*1]	
		VC3-TUG2-TU11-VC11-1.5M [*1]	
		VC3-TUG2-TU11-VC11-Byte [*1]	
		VC3-TUG2-TU12-VC11-1.5M [*1]	
		VC3-TUG2-TU12-VC11-Byte [*1]	
PRBS23 Invert:ON	34M	VC4-139M	139M
		VC4-Bulk	45M
		VC4-TUG3-TU3-VC3-34M	34M
		VC4-TUG3-TU3-VC3-45M	
		VC4-TUG3-TU3-VC3-Bulk	
		VC3-45M	
		VC3-Bulk	
		VC4*-Bulk	
		VC4*4c-Bulk	
		VC4*16c-Bulk	
		VC4*64c-Bulk	
		VC2-6M	
PRBS15 Invert:ON	8M	VC4-TUG3-TUG2-TU2-VC2-Bulk	8M
	2M	VC4-TUG3-TUG2-TU2-VC2-mc	2M
		VC4-TUG3-TUG2-TU12-VC12-2M	
		VC4-TUG3-TUG2-TU12-VC12-Bulk	
		VC4-TUG3-TUG2-TU12-VC11-Bulk	
		VC3-TUG2-TU2-VC2-Bulk	
		VC3-TUG2-TU2-VC2-mc	
		VC3-TUG2-TU12-VC12-2M	
		VC3-TUG2-TU12-VC12-Bulk	
		VC3-TUG2-TU12-VC11-Bulk	
		VC4-TUG3-TUG2-TU12-VC11-384k	
		VC4-TUG3-TUG2-TU11-VC11-384k	
		VC3-TUG2-TU12-VC11-384k	
		VC3-TUG2-TU11-VC11-384k	
PRBS11 Invert:OFF	64k	---	--
PRBS7 Invert:OFF	---	CID [*2]	
PRBS23 Invert:ON	---	Non frame	

The priorities are : DEMUX > Mapping
DEMUX > Bit rate

NOTE

*1 PRBS15, the same as VC11 Bulk, is set as the initial value if the 1.5/45/52M unit is not installed.

*2 Only ‘PRBS7’ can be selected when the ‘CID pattern’ is selected. Then, 'Invert ON' cannot be selected.

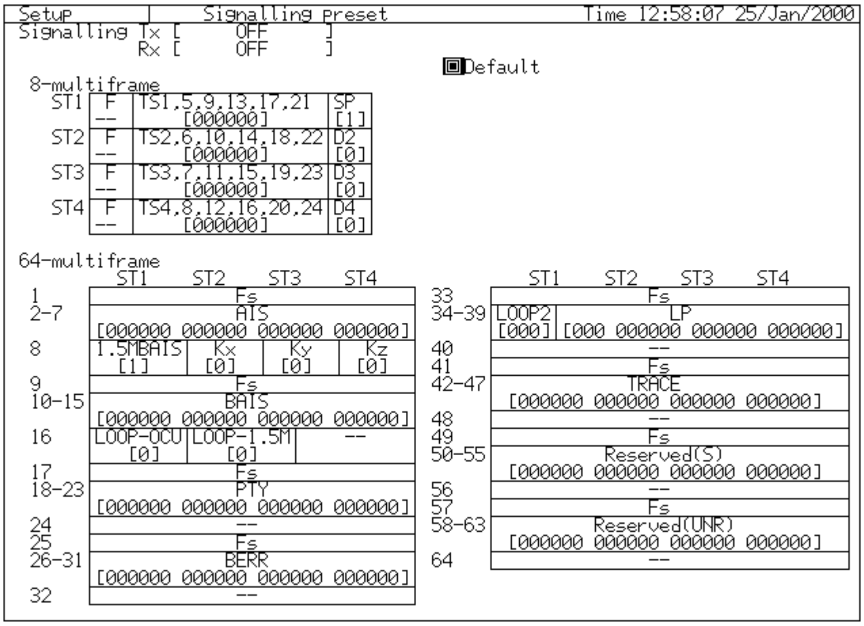
D.4 Initial Values of Signalling Preset Data

Signalling preset data are set to the initial values by the following procedure.

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

(2) Move the cursor to '☐ Default' and press Set.

The initial values are shown below.



Setup | Signalling preset | Time 12:58:07 25/Jan/2000

Signalling Tx [OFF]
Rx [OFF]

▣Default

8-multiframe

ST1	F --	TS1,5,9,13,17,21 [000000]	SP [1]
ST2	F --	TS2,6,10,14,18,22 [000000]	D2 [0]
ST3	F --	TS3,7,11,15,19,23 [000000]	D3 [0]
ST4	F --	TS4,8,12,16,20,24 [000000]	D4 [0]

64-multiframe

	ST1	ST2	ST3	ST4
1	Fs			
2-7	AIS [000000 000000 000000 000000]			
8	1.5MBAIS [1]	Kx [0]	Ky [0]	Kz [0]
9	Fs			
10-15	BAIS [000000 000000 000000 000000]			
16	LOOP-OCU [0]	LOOP-1.5M [0]	--	
17	Fs			
18-23	PTY [000000 000000 000000 000000]			
24	--			
25	Fs			
26-31	BERR [000000 000000 000000 000000]			
32	--			

	ST1	ST2	ST3	ST4
33	Fs			
34-39	LOOP2 [000]	LP [000 000000 000000 000000]		
40	--			
41	Fs			
42-47	TRACE [000000 000000 000000 000000]			
48	--			
49	Fs			
50-55	Reserved(S) [000000 000000 000000 000000]			
56	--			
57	Fs			
58-63	Reserved(UNR) [000000 000000 000000 000000]			
64	--			

D.5 Initial Values of Tandem Connection Data

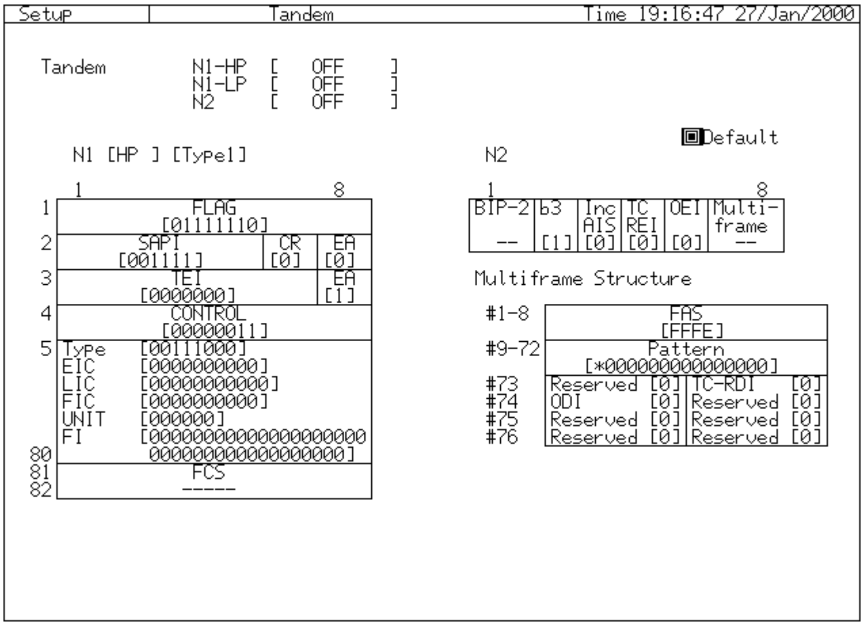
Tandem connection data are set to the initial values by the following procedure.

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

(2) Moving the cursor to '▣ Default' and press Set

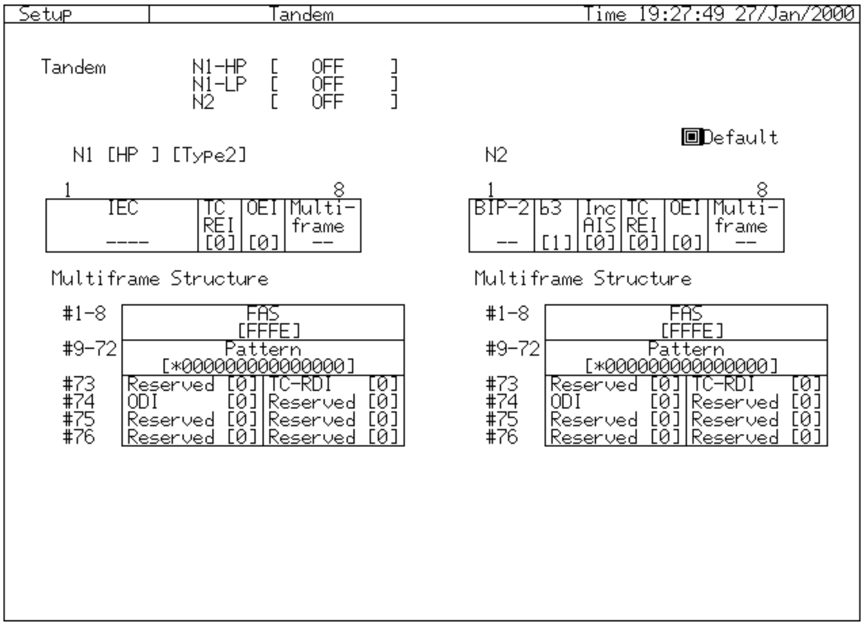
The initial values are shown below.

Type 1



```
Setup          Tandem                          Time 19:16:47 27/Jan/2000

Tandem        N1-HP  [   OFF     ]
              N1-LP  [   OFF     ]
              N2     [   OFF     ]

                                                         ▣Default
   N1 [HP ] [Type1]                       N2

     1                     8               1                       8
 1  |         FLAG          |             |BIP-2|b3  |Inc|TC  |OEI|Multi-|
    |      [01111110]       |             |     |    |AIS|REI |   |frame |
 2  |     SAPI      | CR | EA|             |  -- |[1] |[0]|[0] |[0]|  --  |
    |   [001111]    |[0] |[0]|
 3  |       TEI          | EA|            Multiframe Structure
    |    [0000000]       |[1]|
 4  |       CONTROL         |             #1-8   |          FAS            |
    |     [00000011]        |                    |         [FFFE]          |
 5  |Type   [00111000]      |             #9-72  |        Pattern          |
    |EIC    [0000000000]    |                    |  [*000000000000000]     |
    |LIC    [00000000000]   |             #73    |Reserved [0]|TC-RDI   [0]|
    |FIC    [0000000000]    |             #74    |ODI      [0]|Reserved [0]|
    |UNIT   [000000]        |             #75    |Reserved [0]|Reserved [0]|
    |FI     [00000000000000000000         #76    |Reserved [0]|Reserved [0]|
 80 |        000000000000000000]|
 81 |         FCS           |
 82 |        -----          |
```

Type 2



```
Setup          Tandem                          Time 19:27:49 27/Jan/2000

Tandem        N1-HP  [   OFF     ]
              N1-LP  [   OFF     ]
              N2     [   OFF     ]

                                                         ▣Default
   N1 [HP ] [Type2]                       N2

   1                      8                1                       8
  |     IEC     |TC |OEI|Multi-|           |BIP-2|b3  |Inc|TC  |OEI|Multi-|
  |             |REI|   |frame |           |     |    |AIS|REI |   |frame |
  |    ----     |[0]|[0]|  --  |           |  -- |[1] |[0]|[0] |[0]|  --  |

  Multiframe Structure                     Multiframe Structure

  #1-8   |          FAS            |       #1-8   |          FAS            |
         |         [FFFE]          |              |         [FFFE]          |
  #9-72  |        Pattern          |       #9-72  |        Pattern          |
         |  [*000000000000000]     |              |  [*000000000000000]     |
  #73    |Reserved [0]|TC-RDI   [0]|       #73    |Reserved [0]|TC-RDI   [0]|
  #74    |ODI      [0]|Reserved [0]|       #74    |ODI      [0]|Reserved [0]|
  #75    |Reserved [0]|Reserved [0]|       #75    |Reserved [0]|Reserved [0]|
  #76    |Reserved [0]|Reserved [0]|       #76    |Reserved [0]|Reserved [0]|
```

D.6 Initial Values of Frame Memory Data

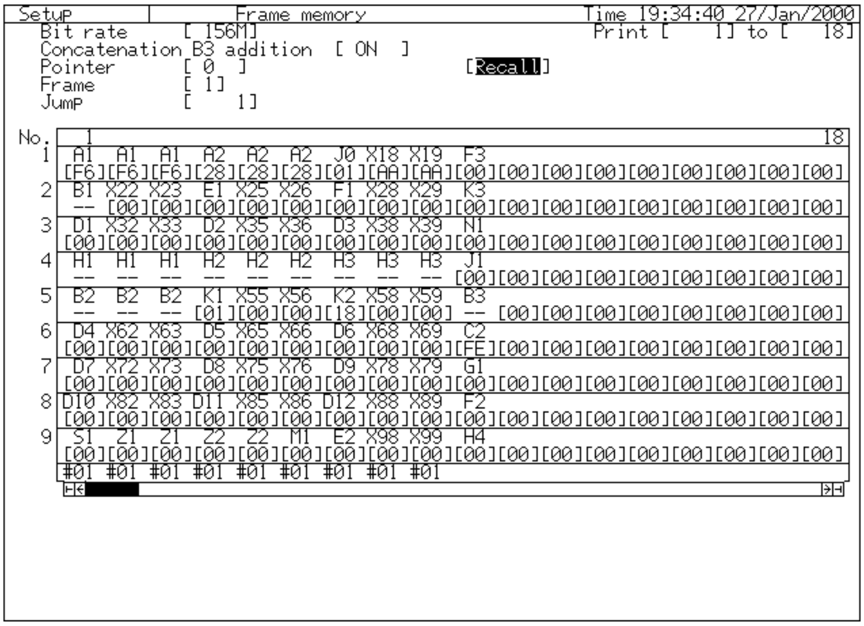
Frame memory data are set to the initial values by the following procedure.

(1) Open the 'Setup : Frame memory' screen.

(2) Moving the cursor to 'Recall" and press Set .

(3) A 'Yes/No' dialog is displayed. Move the cursor to 'Yes' and press Set .

The initial values are shown below.



```
Setup          Frame memory                                  Time 19:34:40 27/Jan/2000
  Bit rate        [ 156M]                                     Print [    1] to [   18]
  Concatenation B3 addition  [ ON  ]
  Pointer         [ 0  ]                       [Recall]
  Frame           [ 1]
  Jump            [    1]

No. | 1                                                                          18
 1  | A1   A1   A1   A2   A2   A2   J0  X18  X19   F3
    |[F6][F6][F6][28][28][28][01][AA][AA][00][00][00][00][00][00][00][00][00]
 2  | B1  X22  X23   E1  X25  X26   F1  X28  X29   K3
    | --  [00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
 3  | D1  X32  X33   D2  X35  X36   D3  X38  X39   N1
    |[00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
 4  | H1   H1   H1   H2   H2   H2   H3   H3   H3   J1
    | --   --   --   --   --   --   --   --   --  [00][00][00][00][00][00][00][00][00]
 5  | B2   B2   B2   K1  X55  X56   K2  X58  X59   B3
    | --   --   --  [01][00][00][18][00][00] --  [00][00][00][00][00][00][00][00]
 6  | D4  X62  X63   D5  X65  X66   D6  X68  X69   C2
    |[00][00][00][00][00][00][00][00][00][FE][00][00][00][00][00][00][00][00]
 7  | D7  X72  X73   D8  X75  X76   D9  X78  X79   G1
    |[00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
 8  |D10  X82  X83  D11  X85  X86  D12  X88  X89   F2
    |[00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
 9  | S1   Z1   Z1   Z2   Z2   M1   E2  X98  X99   H4
    |[00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00][00]
    |#01 #01  #01  #01  #01  #01  #01  #01  #01
```

- When the MP1570A is turned on, Frame Memory Data are set to as follows.

  Frame Memory #1 ....is set to the default values of OH preset data #1.

  Frame Memory #2～final frame ....are not set.

- Contents of the frame memory are not maintained when the MP1570A is turned off.

D.7 Initial Values of OH Change Data

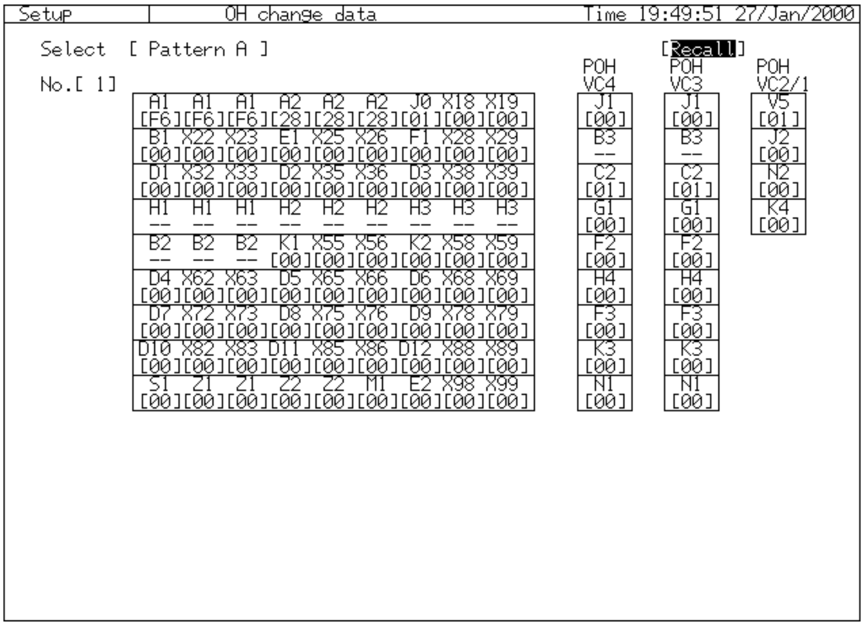
OH change data are set to the initial values by the following procedure.

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

(2) Moving the cursor to 'Recall" and press Set .

(3) A 'Yes/No' dialog is displayed. Move the cursor to 'Yes' and press Set .

The initial values are shown below.



```
Setup   |        OH change data                        Time 19:49:51 27/Jan/2000

   Select  [ Pattern A ]                                   [Recall]
                                                  POH      POH      POH
   No.[ 1]                                        VC4      VC3      VC2/1
   A1   A1   A1   A2   A2   A2   J0  X18  X19      J1       J1       V5
  [F6][F6][F6][28][28][28][01][00][00]          [00]     [00]     [01]
   B1  X22  X23   E1  X25  X26   F1  X28  X29      B3       B3       J2
  [00][00][00][00][00][00][00][00][00]           --       --      [00]
   D1  X32  X33   D2  X35  X36   D3  X38  X39      C2       C2       N2
  [00][00][00][00][00][00][00][00][00]          [01]     [01]     [00]
   H1   H1   H1   H2   H2   H2   H3   H3   H3      G1       G1       K4
   --   --   --   --   --   --   --   --   --     [00]     [00]     [00]
   B2   B2   B2   K1  X55  X56   K2  X58  X59      F2       F2
   --   --   --  [00][00][00][00][00][00]          [00]     [00]
   D4  X62  X63   D5  X65  X66   D6  X68  X69      H4       H4
  [00][00][00][00][00][00][00][00][00]          [00]     [00]
   D7  X72  X73   D8  X75  X76   D9  X78  X79      F3       F3
  [00][00][00][00][00][00][00][00][00]          [00]     [00]
  D10  X82  X83  D11  X85  X86  D12  X88  X89      K3       K3
  [00][00][00][00][00][00][00][00][00]          [00]     [00]
   S1   Z1   Z1   Z2   Z2   M1   E2  X98  X99      N1       N1
  [00][00][00][00][00][00][00][00][00]          [00]     [00]
```

- The initial values of OH Preset Data are the same as the default values.

D.8 Initial Values of PTR 64 Frame Data

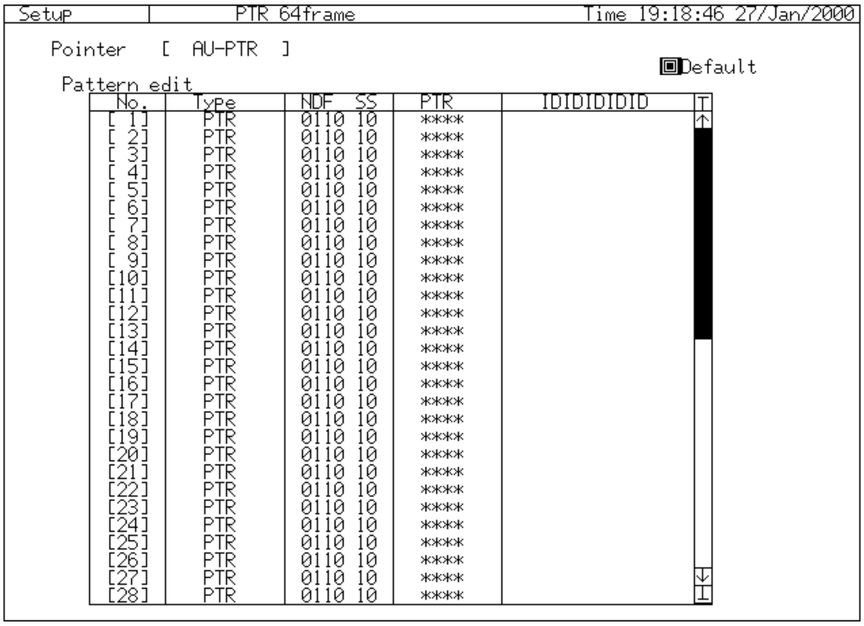
PTR 64 frame data are set to the initial values by the following procedure.

(1) Open the ‘Setup : PTR 64frame’ screen.

(2) Move the cursor to ‘▣ Default’ and press Set .

The initial values are shown below.

AU pointer



Setup | PTR 64frame | Time 19:18:46 27/Jan/2000

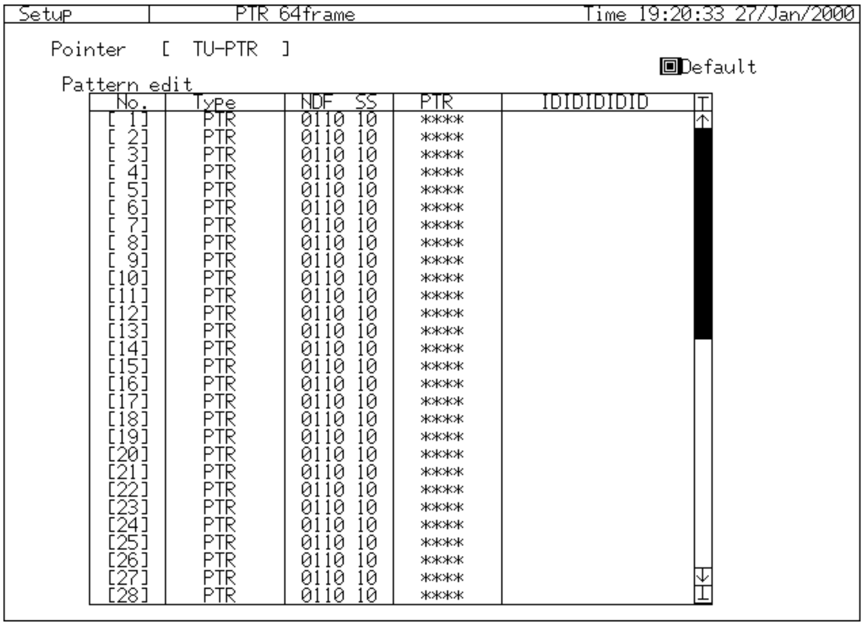
Pointer [AU-PTR]

▣Default

Pattern edit

No.	Type	NDF SS	PTR	IDIDIDIDID
[1]	PTR	0110 10	****	
[2]	PTR	0110 10	****	
[3]	PTR	0110 10	****	
[4]	PTR	0110 10	****	
[5]	PTR	0110 10	****	
[6]	PTR	0110 10	****	
[7]	PTR	0110 10	****	
[8]	PTR	0110 10	****	
[9]	PTR	0110 10	****	
[10]	PTR	0110 10	****	
[11]	PTR	0110 10	****	
[12]	PTR	0110 10	****	
[13]	PTR	0110 10	****	
[14]	PTR	0110 10	****	
[15]	PTR	0110 10	****	
[16]	PTR	0110 10	****	
[17]	PTR	0110 10	****	
[18]	PTR	0110 10	****	
[19]	PTR	0110 10	****	
[20]	PTR	0110 10	****	
[21]	PTR	0110 10	****	
[22]	PTR	0110 10	****	
[23]	PTR	0110 10	****	
[24]	PTR	0110 10	****	
[25]	PTR	0110 10	****	
[26]	PTR	0110 10	****	
[27]	PTR	0110 10	****	
[28]	PTR	0110 10	****	

TU pointer



Setup | PTR 64frame | Time 19:20:33 27/Jan/2000

Pointer [TU-PTR]

▣Default

Pattern edit

No.	Type	NDF SS	PTR	IDIDIDIDID
[1]	PTR	0110 10	****	
[2]	PTR	0110 10	****	
[3]	PTR	0110 10	****	
[4]	PTR	0110 10	****	
[5]	PTR	0110 10	****	
[6]	PTR	0110 10	****	
[7]	PTR	0110 10	****	
[8]	PTR	0110 10	****	
[9]	PTR	0110 10	****	
[10]	PTR	0110 10	****	
[11]	PTR	0110 10	****	
[12]	PTR	0110 10	****	
[13]	PTR	0110 10	****	
[14]	PTR	0110 10	****	
[15]	PTR	0110 10	****	
[16]	PTR	0110 10	****	
[17]	PTR	0110 10	****	
[18]	PTR	0110 10	****	
[19]	PTR	0110 10	****	
[20]	PTR	0110 10	****	
[21]	PTR	0110 10	****	
[22]	PTR	0110 10	****	
[23]	PTR	0110 10	****	
[24]	PTR	0110 10	****	
[25]	PTR	0110 10	****	
[26]	PTR	0110 10	****	
[27]	PTR	0110 10	****	
[28]	PTR	0110 10	****	

D.9 Initial Values of APS Programmable Data

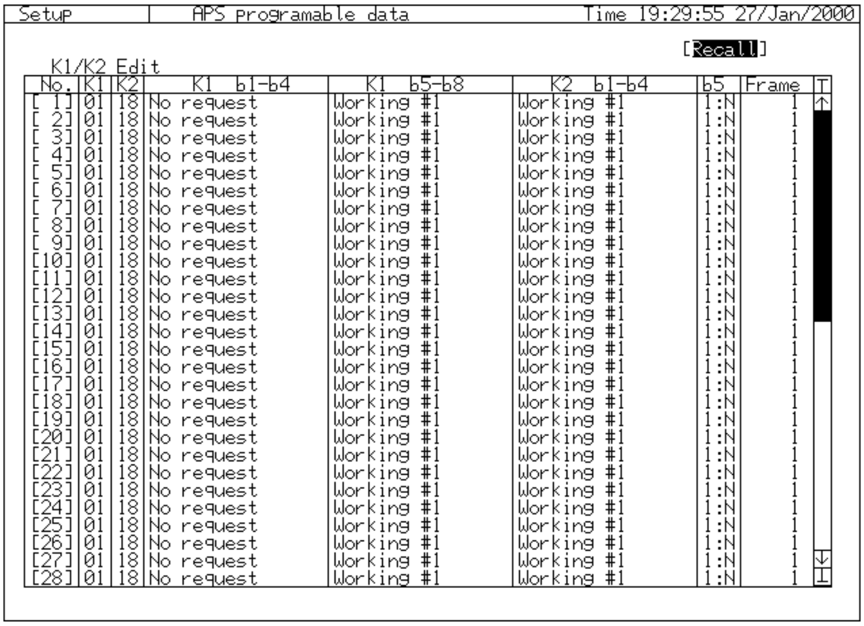
APS programmable data are set to the initial values by the following procedure.

(1) Open the 'Setup : AOS program data' screen.

(2) Moving the cursor to 'Recall" and press Set .

(3) A 'Yes/No' dialog is displayed. Move the cursor to 'Yes' and press Set .

The initial values are shown below.



Setup | APS programable data | Time 19:29:55 27/Jan/2000

[Recall]

K1/K2 Edit

No.	K1	K2	K1 b1-b4	K1 b5-b8	K2 b1-b4	b5	Frame
[1]	01	18	No request	Working #1	Working #1	1:N	1
[2]	01	18	No request	Working #1	Working #1	1:N	1
[3]	01	18	No request	Working #1	Working #1	1:N	1
[4]	01	18	No request	Working #1	Working #1	1:N	1
[5]	01	18	No request	Working #1	Working #1	1:N	1
[6]	01	18	No request	Working #1	Working #1	1:N	1
[7]	01	18	No request	Working #1	Working #1	1:N	1
[8]	01	18	No request	Working #1	Working #1	1:N	1
[9]	01	18	No request	Working #1	Working #1	1:N	1
[10]	01	18	No request	Working #1	Working #1	1:N	1
[11]	01	18	No request	Working #1	Working #1	1:N	1
[12]	01	18	No request	Working #1	Working #1	1:N	1
[13]	01	18	No request	Working #1	Working #1	1:N	1
[14]	01	18	No request	Working #1	Working #1	1:N	1
[15]	01	18	No request	Working #1	Working #1	1:N	1
[16]	01	18	No request	Working #1	Working #1	1:N	1
[17]	01	18	No request	Working #1	Working #1	1:N	1
[18]	01	18	No request	Working #1	Working #1	1:N	1
[19]	01	18	No request	Working #1	Working #1	1:N	1
[20]	01	18	No request	Working #1	Working #1	1:N	1
[21]	01	18	No request	Working #1	Working #1	1:N	1
[22]	01	18	No request	Working #1	Working #1	1:N	1
[23]	01	18	No request	Working #1	Working #1	1:N	1
[24]	01	18	No request	Working #1	Working #1	1:N	1
[25]	01	18	No request	Working #1	Working #1	1:N	1
[26]	01	18	No request	Working #1	Working #1	1:N	1
[27]	01	18	No request	Working #1	Working #1	1:N	1
[28]	01	18	No request	Working #1	Working #1	1:N	1

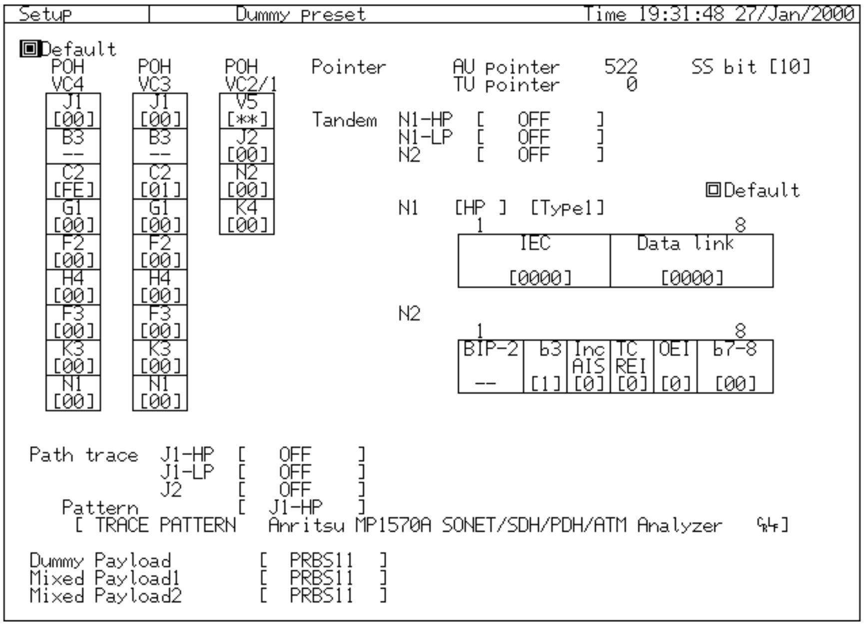
D.10 Initial Values of Dummy Preset Data

Dummy preset data are set to the initial values by the following procedure.

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

(2) Move the cursor to '☐ Default' and press Set .

The initial values are shown below.



```
Setup        Dummy preset                              Time 19:31:48 27/Jan/2000

▣Default
  POH      POH      POH       Pointer       AU pointer    522     SS bit [10]
  VC4      VC3      VC2/1                   TU pointer      0
   J1       J1       V5
  [00]     [00]     [**]      Tandem   N1-HP  [   OFF    ]
   B3       B3       J2                N1-LP  [   OFF    ]
   --       --      [00]               N2     [   OFF    ]
   C2       C2       N2
  [FE]     [01]     [00]                                             ☐Default
   G1       G1       K4                N1    [HP ]  [Type1]
  [00]     [00]     [00]                        1                    8
   F2       F2                                  |    IEC     |  Data link  |
  [00]     [00]                                 |   [0000]   |   [0000]    |
   H4       H4
  [00]     [00]
   F3       F3                         N2
  [00]     [00]                                 1                    8
   K3       K3                                  |BIP-2| b3|Inc|TC |OEI| b7-8|
  [00]     [00]                                 |     |   |AIS|REI|   |     |
   N1       N1                                  | --  |[1]|[0]|[0]|[0]| [00]|
  [00]     [00]

 Path trace   J1-HP  [   OFF     ]
              J1-LP  [   OFF     ]
              J2     [   OFF     ]
    Pattern          [  J1-HP    ]
      [ TRACE PATTERN   Anritsu MP1570A SONET/SDH/PDH/ATM Analyzer    ␍␊]

 Dummy Payload        [  PRBS11  ]
 Mixed Payload1       [  PRBS11  ]
 Mixed Payload2       [  PRBS11  ]
```

Appendix E　Alarm Detection and Removal Conditions

E.1　PDH Alarm Detection and Removal Conditions

Alarm	Detecting conditions	Removing conditions	Remarks
LOS	during signal loss	during signal detection	
LOF(2M)	3 frames	(1) Normal frame alignment (2) TS0(b2) of frame without frame alignment signal is "1". (3) Normal frame alignment	Removed in (1) to (3) sequence.
LOF (others)	4 frames	3 frames	
AIS(2M)	2 diframes with 2 or less "0" per diframe	2 diframes with 3 or more "0" per diframe	1diframe : 512bits
AIS (Others)	2 diframes with 4 or less "0" per diframe	2 diframes with 5 or more "0" per diframe	
MF loss	2 multi-frames	1 multi-frame	
RDI(2M)	4 frames	2 frames	TS0(b3) of the frame that is not on FAS
RDI(MF)	3 frames	2 frames	Frame0 の TS16(b6)
RDI (Others)	4 frames	2 frames	Remote Alarm bit
Sync loss	10^3 bits or more per 10^4	30 bits	64k PRBS
	$5*10^2$ bits or more per 10^4		64k Word
	10^4 bits or more per 10^5		2M, 8M, 34M, 139M PRBS
	$5*10^3$ bits or more per 10^5		2M, 8M, 34M, 139M Word

E.2 Alarm Detection and Removal Conditions of SDH

The alarm detection and removal conditions of SDH can arbitrarily be set (up to 15 frames for each frame). The initial values of the alarm detection and removal conditions are shown below.

Alarm		Detection conditions	Removal conditions	Remarks
LOS		during signal loss	during signal detection	Can not be changed
OOF		5 frames 4 frames (2.5G Unit)	2 frames	Can not be changed
LOF		3 ms	3 ms	
MS-AIS		5 frames	5 frames	
MS-RDI		5 frames	5 frames	
AU-AIS		3 frames	3 frames	
AU-LOP		8 frames	——	with SSbit/ without SSbit
HP-RDI		10 frames	10 frames	
TU-AIS		3 frames	3 frames	
TU-LOP		8 frames	——	*1 with SSbit/ without SSbit
LP-RDI		10 frames	10 frames	*1
HP-SLM *2		5 frames	5 frames	*1
HP-UNEQ		1 frame	1 frame	
LP-SLM *2		5 frames	5 frames	*1
LP-UNEQ		1 frame	1 frame	*1
LP-RFI		1 frame	1 frame	*1
TU-LOM		5 frames	1 frame	*1
HP	HP-VCAIS	5 frames	1 frame	*3
	ISF	5 frames	1 frame	*3
	FAS	1 frame	2 frames	*3
	IUC AIS	1 frame	2 frames	*3
	TC-RDI	1 frame	5 frames	*3
	ODI	5 frames	5 frames	*3
LP	VC-AIS	5 frames	1 frame	*3
	FAS	1 frame	2 frames	*3
	IUS AIS	5 frames	5 frames	*4
	TC-RDI	5 frames	5 frames	*4
	ODI	5 frames	5 frames	*4

Note

*1 ..... Multi-frame when multi-frame is structured.

*2 ..... The detection pattern of HP/LP-SLM is automatically set in the initial state (see 'D.2 Initial Vaules of Signal Labels'). If you would like to set an arbitray pattern, set the 'SLM detection pattern' to 'Manual' on the 'Setup : Measurement condition' screen.

*3 ..... The measurement of the tandem connection is turned off in the initial state.

*4 ..... The alarm detection and removal conditions are set to thress times respectivily. These conditions can not be changed.

Appendix F Performance Measurement

F.1 Measurement Items

In the performance measurement, data for each item is calculated every one second (every one minute for DM) during the period from the start of measurement (including start of 'Repeat') to the end of measurement (including end of 'Repeat') to obtain the total data.

The measurement items are as follows:

Type of measurement			G.821		M.2100		G.826	
							Near-end	Far-end
Measurement data Measurement			EC AnD%ES ES %ES EFS %EFS SES %SES US %US DM %DM	Code ES	Rx ES Rx SES US	Tx ES Tx SES	ES SES ESR SESR BBER BBE SDP US	
2M 8M 34M 139M 1.5M 45M	In-service		FAS	Code	Same as G.826	E-bit	FAS, CRC-4, Parity, or CRC-6	
	Out-of-service		Bit	Code	Bit		Bit	
52M 156M 622M	For Bulk						B1 B2 B3 BIP-2	MS-REI HP-REI LP-REI
	For others	In-service	FAS		Same H. as G.826	E-bit		
		Out-of-service	Bit		Bit			

<table>
<tr><td colspan="3">Type of measurement</td><td colspan="2">M.2101</td></tr>
<tr><td colspan="3">Measurement data
Measurement</td><td>Rx ES
Rx SES
US</td><td>Tx ES
Tx SES</td></tr>
<tr><td rowspan="2">2M
8M
34M
139M
1.5M
45M</td><td colspan="2">In-service</td><td rowspan="2" colspan="2"></td></tr>
<tr><td colspan="2">Out-of-service</td></tr>
<tr><td rowspan="3">52M
156M
622M</td><td colspan="2">For Bulk</td><td rowspan="3">B2
B3
BIP-2</td><td rowspan="3">MS-REI
HP-REI
LP-REI</td></tr>
<tr><td rowspan="2">For others</td><td>In-service</td></tr>
<tr><td>Out-of-service</td></tr>
</table>

<table>
<tr><td colspan="3">Type of measurement</td><td colspan="2">M.2110</td><td colspan="2">M.2120</td></tr>
<tr><td colspan="3">Measurement Data
Measurement</td><td>Rx 2-hour
Rx 24-hour
Rx 7day
ES
SES
US</td><td>Tx 2-hour
Tx 24-hour
Tx 7day
ES
SES</td><td>Rx TR1-ES
Rx TR1-SES
Rx TR2-ES
Rx TR2-SES
ES
SES
US</td><td>Tx TR1-ES
Tx TR1-SES
Tx TR2-ES
Tx TR2-SES
ES
SES</td></tr>
<tr><td rowspan="2">2M
8M
34M
139M
1.5M
45M</td><td colspan="2">In-service</td><td>Same as G.826</td><td>E-bit</td><td>Same as G.826</td><td>E-bit</td></tr>
<tr><td colspan="2">Out-of-service</td><td>Bit</td><td></td><td>Bit</td><td></td></tr>
<tr><td rowspan="3">52M
156M
622M</td><td colspan="2">For Bulk</td><td rowspan="3">B2
B3
BIP-2</td><td rowspan="3">MS-REI
HP-REI
LP-REI</td><td rowspan="3">B2
B3
BIP-2</td><td rowspan="3">MS-REI
HP-REI
LP-REI</td></tr>
<tr><td rowspan="2">For others</td><td>In-service</td></tr>
<tr><td>Out-of-service</td></tr>
</table>

NOTES

- PM measurement is not performed if the measurement item cannot be measured.
- If 'Tributary' can be measured in FAS, FAS errors having the selected bit rate are regarded as the object of measurement.
- Parity becomes the object of measurement when 45M is on.
- CRC-4 becomes the object of measurement when CRC is on for 2M.
- CRC-6 becomes the object of measurement when ESF is on for 1.5M.

Word definitions

- S_{Total}.......Total measurement time excluding the power loss time.
- S_{Avail}.......Effective measurement time obtained by the formula below.

$$S_{Avail} = S_{Total} - S_{Unavail}$$

- $S_{Unavail}$ ..Non operating time

F.2　G. 821　Measurement Data

F.2.1　Measurement range

EC ES EFS SES US DM Code ES	.... 0~999999, 1.0E06~9.9E15, >9.9E15
%ES AnD%ES %EFS %SES %US %DM	.... 0.0000~100.0000 %

F.2.2 In-service (FAS)

Item	Definition
EC(Error Count)	FAS error count within the measurement period
ES(Error Seconds)	Sum total of seconds when one or more FAS errors occurred within the S_{avail} period.
EFS (Error Free Seconds)	Sum total of seconds when no FAS errors occurred within the S_{avail} period. $EFS = S_{Avail} - ES$
SES (Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{avail} period. - $> 10^{-3}$ FAS error - LOS - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.)
US (Unavailable Seconds)	Sum of total of non-operating time - If SES continues for ten seconds, the first second is the start of US. If other than SES continues for ten seconds, the first but one is the end of US. - If a measurement session is completed during US evaluation, and if the next measurement session is started, the evaluation counter is reset upon start of the next measurement session.
DM(Degraded Minutes)	Total period when more than 10^{-6}. FAS errors occurred provided that an accumulated measurement time of 60seconds is considered excluding the time of SES within the S_{avail} period. - If the measurement time does not attain a value of 60 seconds when the measurement is completed, 1 is added if the error rate for that period is greater than 10^{-6}.
Code ES	Sum total of seconds during which code errors occurred within the S_{avail} period.
%ES	Rate of seconds during which FAS errors occurred within the S_{Avail} period. $\%ES = (ES / S_{Avail}) \times 100$
AnD%ES	In accordance with ITU-T G.821 Annex D, %ES is converted in terms of 64 kb/s: $ESa = \sum_{i=1}^{i=j} (n / N)\, i$ $AnD\%ES = (Esa / S_{Avail}) \times 100$ $j = S_{Avail}$ n: Number of errors occurring during the i-th second within the S_{avail} period N: Error measurement object bits per second as converted in terms of 64 kb/s

Item	Definition
%EFS	Rate of error seconds when no FAS errors occurred within the S_{avail} period. %EFS = 100–%ES
%SES	Rate of error seconds when SES occurred within the S_{avail} period. %SES = (SES / S_{Avail}) × 100
%US	Rate of US within the S_{total} period. %US = (US / S_{Total}) × 100
%DM	Rate of DM within the S_{avail} period. M_{Avail} = [S_{Avail} / 60]$_{INT}$ Fractions of []INT are rounded-up. %DM = (DM / M_{Avail}) × 100

- Performance measurement cannot be performed in the in-service mode if 'Frame' is off.

F.2.3 Out-of-service(PDH : Bits)

Item	Definition
EC(Error Count)	Bit error count within the measurement period.
ES(Error Seconds)	Sum total of seconds when one or more bit errors occurred within the S_{avail} period.
EFS (Error Free Seconds)	Sum total of seconds when no FAS errors occurred within the S_{avail} period. $EFS = S_{Avail} - ES$
SES (Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{avail} period. - $> 10^{-3}$ bit error - LOS - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.)
US (Unavailable Seconds)	Sum of total of non-operating time - If SES continues for ten seconds, the first second is the start of US. If other than SES continues for ten seconds, the first but one is the end of US. - If a measurement session is completed during US evaluation, and if the next measurement session is started, the evaluation counter is reset upon start of the next measurement session.
DM(Degraded Minutes)	Total of periods when more than 10^{-6} bit errors occurred provided that an accumulated measurement time of 60 seconds is considered excluding the time of SES within the S_{avail} period. - If the measurement time does not attain a value of 60 seconds when the measurement is completed, 1 is added if the error rate for that period is greater than 10^{-6}.
Code ES	Sum total of seconds during which code errors occurred within the S_{avail} period.
%ES	Rate of seconds during which FAS errors occurred within the S_{Avail} period. $\%ES = (ES / S_{avail}) \times 100$

Item	Definition
AnD%ES	In accordance with ITU-T G.821 Annex D, %ES is converted in terms of 64 kb/s: $ESa = \sum_{i=1}^{i=j} (n / N) i$ $AnD\%ES = (Esa / S_{Avail}) \times 100$ $j = S_{Avail}$ n: Number of errors occurring during the i-th second within the S_{Avail} period. N: Error measurement object bits per second as converted in terms of 64 kb/s
%EFS	Rate of error seconds when no bit errors occurred within the S_{Avail} period. $\%EFS = 100 – \%ES$
%SES	Rate of error seconds when SES occurred within the S_{avail} period. $\%SES = (SES / S_{Avail}) \times 100$
%US	Rate of US within the S_{total} period. $\%US = (US / S_{Total}) \times 100$
%DM	Rate of DM within the S_{Avail} period. $M_{Avail} = [S_{Avail} / 60]_{INT}$ Fractions of []INT are rounded-up. $\%DM = (DM / M_{Avail}) \times 100$

Reference ..... Number of errors equivalent to 10^{-3}

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	64*N	64*N	—
1.5M	1,544	1,536	8
2M	2,048	1,920 / 1,984[*1]	28
8M	8,448	8,192	99
34M	34,368	33,792	223
45M	44,736	44,210	230
139M	139,264	137,472	568

*1 ...... 30ch / 31ch

The values in the table are calculated as follows:

Frame-off bit: (Number of bits per second) × 1E-3

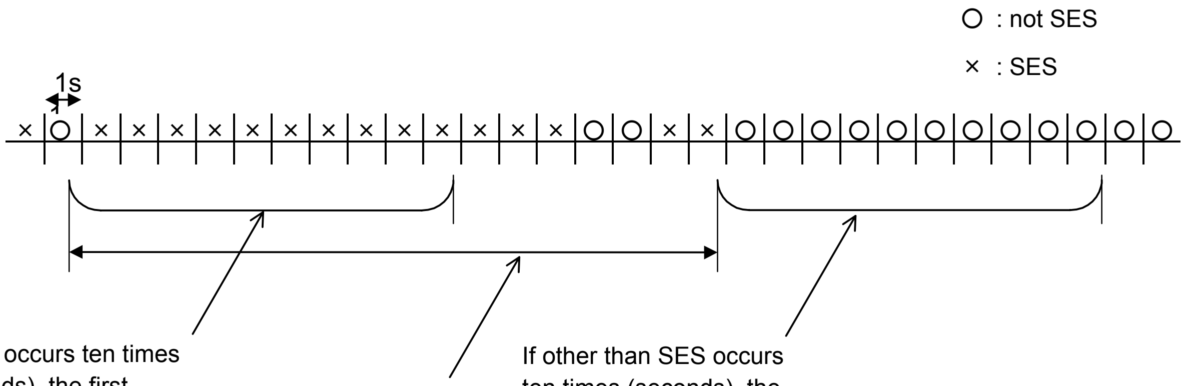
Frame-on bit:

$$(\text{Number of bits per second}) \times \frac{(\text{Number of bits in test signal in a frame})}{(\text{Total number of bits in a frame})} \times 1\text{E-}3$$

Frame-on frame:

$$(\text{Number of bits per second}) \times \frac{(\text{Number of frame error bits in a frame})}{(\text{Total number of bits in a frame})} \times 1\text{E-}3$$

Reference ..... Calculation of US



If SES occurs ten times (seconds), the first second is the start of US.

US : 17(seconds)

If other than SES occurs ten times (seconds), the first but one second is the end of US.

Number of errors equivalent to 10^{-6}

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	4.0*N	4.0*N	—
1.5M	92.7	92.2	0.5
2M	122.9	115.2 / 119.0*1	1.7
8M	506.9	491.5	6.0
34M	2,062.1	2,027.5	13.4
45M	2,684.2	2,652.6	13.8
139M	8-355.8	8,248-3	34-3

*1: 30ch / 31ch

*2: In the table above, an error value exceeding 122 (122.9, for example) is regarded as DM=1.

*3: For a threshold of less than 60 seconds, the value given above is multiplied by S/60. (S = the time)

The values in the table are calculated as follows:

Frame-off bit: (Number of bits per second) × 1E-3

Frame-on bit:

$$\text{(Number of bits per second)} \times \frac{\text{(Number of bits in test signal in a frame)}}{\text{(Total number of bits in a frame)}} \times \text{1E-6}$$

Frame-on frame:

$$\text{(Number of bits per second)} \times \frac{\text{(Number of frame error bits in a frame)}}{\text{(Total number of bits in a frame)}} \times \text{1E-6}$$

Number of bits for which a measurement is performed per second converted to 64 kb/s basis (N)

Bit rate for which a measurement is performed	Frame-off	Frame-on	
	Bit	Bit	Frame
64k*N	1*N	1*N	—
1.5M	25	24	0.13*2
2M	32	30 / 31*1	0.44*2
8M	132	128	2
34M	537	528	4
45M	699	691	4
139M	2,176	2,148	9

*1: 30ch / 31ch

*2: Regarded as 1ES if only one error exists.

(n/N)i : when 0<n<N ...(n/N) i =n/N

(n/N)i : when n≥N ...(n/N)i =1

The above formula is in accordance with ITU-T G.821 ANNEX D.

The values in the table are 'number of errors equivalent to 10^{-3}' divided by 64.

F.3 M.2100 Measurement Data

F.3.1 Measurement range

Rx ES	0~999999,1.0E06~9.9E15,>9.9E15
Tx ES	
Rx SES	
Tx SES	
US	
Test	: Acceptable, Degraded, Unacceptable

F.3.2 In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period: - LOS - AIS (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - One or more FAS errors (CRC-4: OFF for 2M, 8M-34M, 139M) - One or more CRC-4 errors (CRC-4: ON for 2M)
Tx ES (Transmit Error Seconds)	Sum total of seconds when one or more Ebit errors occurred within the S_{Avail} period.
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period. - LOS - AIS (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for the stages higher than that of the object of measurement are detected.) - 8 or more FAS errors (other than ESF for 1.5M) - 380 or more CRC-6 errors (ESF for 1.5M) - 28 or more FAS errors (CRC-4: OFF for 2M) - 805 or more CRC-4 errors (CRC-4: ON for 2M) - 41 or more FAS errors (8M) - 52 or more FAS errors (34M) - 2444 or more Parity error (45M) - 69 or more FAS error (139M)
Tx SES (Transmit Severely Errored Second)	Sum total of seconds when 805 or more Ebit errors occurred within the S_{Avail} period.
US(Unavailable Seconds)	Same as G.821

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'PDH frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.3.3 Out-of-service(PDH : Bit)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period: - LOS - AIS (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - One or more bit errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds when the following states occurred within the S_{Avail} period. - LOS - AIS (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - LOF (When DEMUX is on, frame losses for stages higher than that of the object of measurement are detected.) - Bit error 10^{-3} or more
US(Unavailable Seconds)	Same as G.821

F.3.4 Test

Judgement results are given for ES, SES and US according to the set threshold (S1 and S2).

Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	≤	Measured results		

- The priority is in order of Unacceptable > Degraded > Acceptable.

Test display is available for both Rx and Tx. The worst state in ES, SES and US is displayed for Rx, and the worst result in ES and SES is shown for Tx. These are not displayed when the thresholds for Rx and Tx are set at Off.

F.4 G.826 Measurement Data

F.4.1 Measurement range

ES	.... 0~999999, 1.0E06~9, 9E15, > 9E15
SES	
BBE	
SDP	
US	
ESR	.... 1.0E-15~1.0E+00, < 1.0E-15
SESR	
BBER	

- 0.0E-00 when S_{Avail} is 0.

F.4.2 PDH : In-service (FAS, CRC-4, Parity, CRC6)

Item	Definition
ES (Error Seconds)	Sum total of seconds when the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more FAS errors in one block (2M CRC: OFF, 8M-34M, 139M) - One or more Parity errors in one block (45M) - One or more FAS errors or CRC-4 errors in one block (2M CRC: ON) - One or more CRC-6 errors in one block (ESF for 1.5M) SDP: - LOS - AIS (when DEMUX is on, frame losses for stages higher than that of the object of measurement are detected) - LOF (when DEMUX is on, frame losses for stages higher than that of the object of measurement are detected)
SES (Severely Error Seconds)	Sum total of seconds when the following states occurred: - EB is ≧30% - One or more SDP
BBE (Background Block Error)	Sum total of time within the S_{Avail} period except SES - EB is ≧30% - One or more SDP
ESR (Error Second Ratio)	Rate of ES within the S_{Avail} period ESR = ES / S_{Avail}
SESR (Severely Errored Second Ratio)	Rate of SES within the S_{avail} period SESR = SES / S_{Avail}

Item	Definition
BBER (Background Block Error Ratio)	Rate of BBE to the total blocks (excluding SES) within the S_{Avail} period $$\text{BBER} = \frac{\text{(Number of EBs within a period equivalent to the } S_{Avail} \text{ period from which SES is subtracted)}}{(S_{Avail} - \text{SES}) \times \text{B No}}$$ B No : Number of blocks per second
SDP (Severely Disturbed Period)	Sum total of seconds when SDP occurred - LOS - AIS (when DEMUX is on, AIS for stages higher than that of the object of measurement are detected) - LOF (when DEMUX is on, LOF for stages higher than that of the object of measurement are detected)
US (Unavailable Seconds)	Sum total of non-operating time - If SES continues ten seconds, the first second is the start of US. - If other than SES continues for ten seconds, the first but one second is the end of US. - If a measurement is completed and the next measurement is started during US judgement, the judgement counter is reset when the new measurement is started.

F.4.3 PDH : Out-of-service (PDH : Bit)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more bit errors in one block SDP: - Consecutive occurrence (4 times or for more than 1 ms) of EB with LOS or bit errors of 10^{-2} or more. 1.5M, 2M and 8M : consecutive 4 34M, 45M and 139M : 1 ms
SES BBE ESR SESR BBER SDP US	Same as the case of In-service

F.4.4 SDH : B1

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: - One or more B1 errors in one block SDP: - LOS, LOF occurrence
SES (Severely Error Seconds)	Sum total of seconds during which the following states occurred: - EB is ≥30% - One or more SDP
BBE (Background Block Error)	- Sum total of EB count within the S_{Avail} period except SES
ESR (Error Second Ratio)	Rate of ES within the S_{Avail} period $ESR = ES / S_{Avail}$
SESR (Severely Errored Second Ratio)	Rate of SES within the S_{Avail} period $SESR = SES / S_{Avail}$
BBER (Background Block Error Ratio)	Rate of BBE to the total blocks (excluding SES) within the S_{Avail} period $BBER = \frac{\text{(Number of EB within a period equivalent to the } S_{Avail} \text{ period from which SES is subtracted)}}{(S_{Avail} - SES) \times \text{B No}}$ B No : Number of blocks per second
SDP (Severely Disturbed Period)	Sum total of seconds when SDP occurred - LOS, LOF
US (Unavailable Seconds)	Sum total of non-operating time - If SES continues for ten seconds, the first second is the start of US. - If other than SES continues for ten seconds, the first but one second is the end of US. - If a measurement is completed and the next measurement is started during US judgement, the judgement counter is reset when the new measurement is started.

F.4.5 SDH : B2

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B2 errors in one block SDP: LOS, LOF or MS-AIS occurrence
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.6 SDH : B3

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, AU-AIS or AU-LOP
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.7 SDH : B3 (TU3)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, AU-AIS, AU-LOP, TU-AIS or TU-LOP
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.8 SDH : BIP-2

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more BIP-2 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, AU-AIS, AU-LOP, TU-AIS, TU-LOP or TU-LOM
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.9 SDH : MS-REI

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, or MS-RDI
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.10 SDH : HP-REI

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, or HP-RDI
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.11 SDH : LP-REI (TU3)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, TU-AIS, TU-LOP or LP-RDI
SES BBE ESR SESR BBER SDP US	Same as B1

F.4.12 SDH : LP-REI (TU2, TU12, TU11)

Item	Definition
ES (Error Seconds)	Sum total of seconds during which the following states occurred: - One or more EB - One or more SDP (Severely Disturbed Period) EB: One or more B3 errors in one block SDP: Occurrence of LOS, LOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, TU-AIS, TU-LOP, TU-LOM or LP-RDI
SES BBE ESR SESR BBER SDP US	Same as B1

Reference .... Block size

SDH

Type	Mapping	Block number/second	≥30%EB
VC4	–	8,000	2,400
VC3	–	8,000	2,400
VC2	–	2,000	600
VC12	Locked	8,000	2,400
	Except Locked	2,000	600
VC11	Locked	8,000	2,400
	Except Locked	2,000	600

PDH

Error measurement	Bit number/block	Block number/second	≥30%EB	SDP Block number
139M error	11,712(4 frames)	11,890	3,568	12
45M error	4,760(7 frames)	9,398	2,820	8
34M error	6,144(4 frames)	5,593	5,593	6
8M error	3,392(4 frames)	2,490	748	4
2M error	2,048(8 frames)	1,000	300	4
1.5M error	4,632(4 frames)	333	100	4

Bit error number corresponding to 10^{-2}

Bit rate	Frame : OFF	Frame : ON
139Mbit/s	118	117
45Mbit/s	48	48
34Mbit/s	62	61
8Mbit/s	34	34
2Mbit/s	21	20
1.5Mbit/s	47	47
N*64kbit/s	N*64/100	N*64/100

←Integer after round-off

F. 5　M.2101　Measurement Data

F.5.1　Measurement range

Rx ES
Tx ES .... 0~999999, 1.0E06~9.9E15, > 9.9E15
Rx SES
Tx SES
US
Test .... Acceptable, Degraded, Unacceptable

F.5.2　Section

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - One or more B2 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - One or more MS-REI errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOF - MS-AIS - 2500 or more B2 errors（STS1，STS3） - 1000 or more B2 errors（STS12）
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI
US (Unavailable Seconds)	Same as M.2100

F.5.3 HO-path

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - One or more B3 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - 2400 or more B3 errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - 2400 or more B3 errors
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - HP-RDI - One or more HP-REI errors
US (Unavailable Seconds)	Same as M.2100

F.5.4 LO-path (VC3)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - TU-AIS - TU-LOP - One or more B3 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - AU-AIS - AU-LOP - HP-RDI - LP-RDI - One or more LP-REI errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - TU-AIS - TU-LOP - 2400 or more B3 errors
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - AU-AIS - AU-LOP - HP-RDI - LP-RDI
US (Unavailable Seconds)	Same as M.2100

F.5.5 LO-path (VC11, VC12, VC2)

Item	Definition
Rx ES (Receive Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - TU-AIS - TU-LOP - TU-LOM - One or more BIP-2 errors
Tx ES (Transmit Error Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - AU-AIS - AU-LOP - HP-RDI - TU-AIS - TU-LOP - TU-LOM - LP-RDI - One or more LP-REI errors
Rx SES (Receive Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - AU-AIS - AU-LOP - TU-AIS - TU-LOP - TU-LOM - 2400 or more BIP-2 errors

Item	Definition
Tx SES (Transmit Severely Errored Seconds)	Sum total of seconds during which the following states occurred: - LOS - LOF - MS-AIS - MS-RDI - AU-AIS - AU-LOP - HP-RDI - TU-AIS - TU-LOP - TU-LOM - LP-RDI
US (Unavailable Seconds)	Same as M.2100

- All the layers to be measured are measured at the same time.

F.5.6 Test

Judgement results are given for ES, SES and US according to the set thresholds (S1 and S2).

Judgement results

Acceptable			Measured results	≤	S1
Degraded	S1	<	Measured results	≤	S2
Unacceptable	S2	<	Measured results		

- The priority is in order of Unacceptable > Degraded > Acceptable.

Test display is available for both Rx and Tx. The worst state in ES, SES and US is displayed for Rx, and the worst result in ES and SES is shown for Tx. These are not displayed when the thresholds for Rx and Tx are set at Off.

F.6 M.2110 Measurement Data

F.6.1 Measurement Range

Rx 2hour
Tx 2hour
Rx 24 hour Acceptable, Degraded, Unacceptable
Tx 24 hour
Rx 7day
Tx 7day

Rx ES
Rx SES
Tx ES
Tx SES .... 0~999999, 1.0E06~9.9E15, > 9.9E15
US

F.6.2 In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2100
Tx ES (Transmit Error Seconds)	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
Tx SES (Transmit Severely Errored Second)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'PDH frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.6.3　Out-of-service(PDH : Bit)

Item	Definition
Rx ES (Receive Error Seconds	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

F.6.4　Section

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.6.5　HO-path

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.6.6 LO-path (VC3)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.6.7 LO-path (VC11, VC12, VC2)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

- All the layers to be measured are measured at the same time.

F.6.8 Calculating Threshold

Measurement threshold is defined as follows.

PDH

RPO = A × P0 × TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below.

Bit rate	ES(%)	SES(%)
1.5M,2M	2.75	0.1
8M	2.57	0.1
34M,45M	3.75	0.1
139M	8.75	0.1

TP : Measurement item (Unit : s)

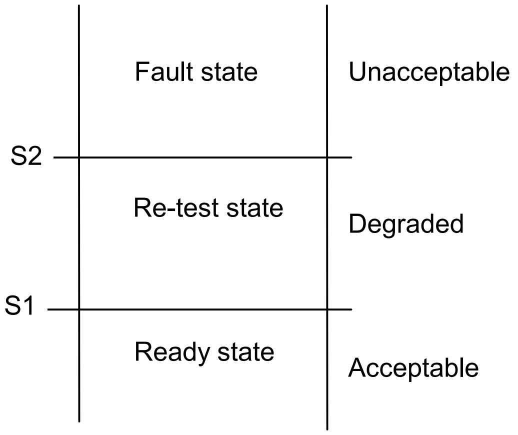
(example : 2hour : 2×60×60)

BISO = RPO/2

$D = 2\sqrt{BISO}$

S1 = RPO/2 – D

S2 = RPO/2 + D



SDH Section, STS-Path

$APO = A \times P0 \times TP$

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below

Mapping	ES(%)	SES(%)
VC3	3.75	0.1
VC4	8	0.1

TP : Measurement item (unit : s)

(example : 2hour : $2 \times 60 \times 60$)

$BISO = APO/10$

$D = 2\sqrt{BISO}$

$S1 = APO/2 - D$

$S2 = APO/2 + D$

SDH VT-Path

$APO = A \times P0 \times TP$

where

A : Allocation (0.5% to 63%)

P0 : is fixed accroding to table shown below.

Mapping	ES(%)	SES(%)
VC11/12	2	0.1
VC2	2.5	0.1
VC3	3.75	0.1

TP : Measurement item (unit : s)

(example : 2hour : $2 \times 60 \times 60$)

$BISO = APO/2$

$D = 2\sqrt{BISO}$

$S1 = APO/2 - D$

$S2 = APO/2 + D$

F.7 M.2120 Measurement Data

F.7.1 Measurement Range

Rx TR1-ES
Tx TR1-ES
Rx TR1-SES
Tx TR1-SES Acceptable, Degraded, Unacceptable
Rx TR2-ES
Tx TR2-ES
Rx TR2-SES
Tx TR2-SES

Rx ES
Tx ES
Rx SES .... 0~999999, 1.0E06~9.9E15, > 9.9E15
Tx SES
US

F.7.2 In-service (FAS, CRC-4, Ebit, Parity, CRC6)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2100
Tx ES (Transmit Error Seconds)	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
Tx SES (Transmit Severely Errored Second)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

- Performance measurement on in-service mode cannot be performed if 'Frame' is off.
- Measurement for Tx can be performed only when 'PDH frame' is set to 2M and CRC-4 is set to ON using the 'Setup : Mapping' screen.

F.7.3 Out-of-service(PDH : Bit)

Item	Definition
Rx ES (Receive Error Seconds	Same as M.2100
Rx SES (Receive Severely Errored Seconds)	Same as M.2100
US(Unavailable Seconds)	Same as M.2100

F.7.4 Section

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 7.5 HO-path

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F.7.6 LO-path (VC3)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

F. 7.7 LO-path (VC11, VC12, VC2)

Item	Definition
Rx ES (Receive Error Seconds)	Same as M.2101
Tx ES (Transmit Error Seconds)	Same as M.2101
Rx SES (Receive Severely Errored Seconds)	Same as M.2101
Tx SES (Transmit Severely Errored Seconds)	Same as M.2101
US (Unavailable Seconds)	Same as M.2101

- All the layers to be measured are measured at the same time.

F.7.8 Calculating Threshold

Measurement threshold is defined as follows.

PDH

TR1 15min

Path Allocation	ES	SES
0.2~2.5	120	15
3~4	120	15
4.5~7	120	15
7.5~10	120	15
10.5~11	120	15
11.5~13	150	15
13.5~15.5	150	15
16~18.5	150	15
19~20	180	15
20.5~21.5	180	15
22~24.5	180	15
25~27	180	15
27.5~30	180	15
30.5~33	180	15
33.5~36	180	15
36.5~40	180	15
40~63	180	15

TR2 24hour

RPO = A × P0 × TP

where

A : Allocation(0.5% to 63%)

P0 : is fixed accroding to table shown below.

Bit rate	ES(%)	SES(%)
1.5M,2M	2.75	0.1
8M	2.57	0.1
34M,45M	3.75	0.1
139M	8.75	0.1

TP : Measurement item (unit : s)

ES = RPO × set value

SES = RPO × set value

Unacceptable	APO, RPO × 10
Degraded	APO,RPO × 0.75 (0.5)
Acceptable	APO, RPO × 0.17

SDH

TR1 15min

Section, HO-path

Bitrate	ES	SES
STM0,STM1	50	10
STM4	50	10
STM16	70	10
STM64	70	10

LO-path

Mapping	ES	SES
VC11/12	120	15
VC2	120	15
VC3	150	15
VC4	150	15

TR2 24hour

APO = A × P0 × TP

where

A : Allocation (0.5% to 63%)

P0 : is fixed according to table shown below.

Mapping	ES(%)	SES(%)
VC11/12	2	0.1
VC2	2.5	0.1
VC3	3.75	0.1
VC4	8	0.1

TP : Measurement item (unit : s)

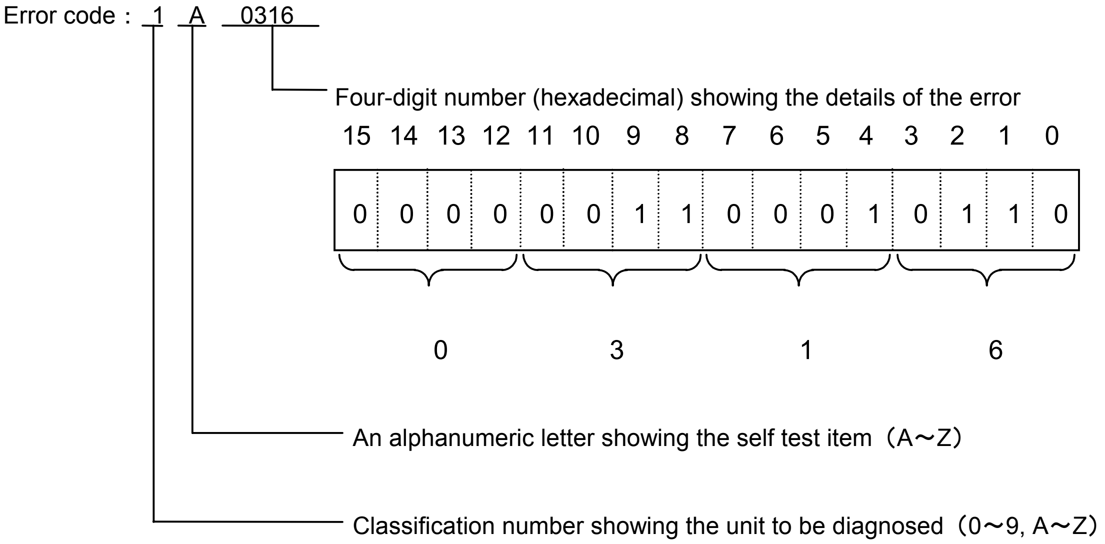
ES = RPO × set value

SES = RPO × set value

Appendix G　Self Test Error Codes

G.1　About Error Codes

If an error is detected in self test, an error code corresponding to the type of error is displayed. The error code consists of two alphanumeric characters and a 4-digit number (hexadecimal).



0, 1 : MP0121A 2/8/34/139/156M(CMI) unit
2, 3 : MP0122A/B 1.5/45/52M unit
4 : MP0124A 2/8/34/139M 156/622M Jitter unit
5 : MP0125A 1.5/45/52M 156/622M Jitter unit
6, 7 : MP0126A 2/8/34/139M 1.5/45/52M 156M/622M Jitter unit
8, 9 : MP0123A ATM unit
A : MP0127A, MP0128A, MP0129A 2.5G unit
F, G : MU150008A, MU150009A, MU150010A 2.5G unit
B : MP0130A 2.5G Jitter unit
C : MP0131A Add/Drop unit
D : MU150000A 2.5G/10G unit
E : MU150001A/B, MU150002A/B, MU150017A/B, MU150031A/C, MU150061A/B 10G unit
H : MU150005A 2/8/34/139M 156/622M Jitter unit
I : MU150006A 1.5/45/52M Jitter unit
J,K : MU150007A 2/8/34/139M 1.5/45/52M 156/622M Jitter unit
L : MU150011A 2.5G Jitter unit
M～V : Reserved
W : MP0111A, MP0112A
X : MP0113A(1.31), MP0113A(1.55)
Y : MP0109A, MP0110A
Z : MP0105A, MP0108A

G.2 Error Details

The tables below list the displayed messages, and the details of the error for each bit.

- In the tables where two messages are listed, the message listed above is the one for SDH, and the message listed below is the one for SONET.

Example

Message for SDH

Message for SONET

0E	Signal (156M<->VC2)		An error or alarm was detected unde
	Signal (156M<->VT6SPE)	b0	BRate = 156M, Mapping = VC2 (Bul
			TUG2# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = VC2-6M (
			TUG2# = 2, Pattern = PRBS15

(1) MP0121A 2/8/34/139M Unit

‘ 0A - 0B’ Checks on Signals 1

Char.	Message	Bit	Error Details
0A	Signal (2/8/34/139M:Unbalanced)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Pattern = PRBS11, Frame = OFF
		b1	BRate = 8M, Pattern = PRBS15, Frame = OFF
		b2	BRate = 34M, Pattern = PRBS20, Frame = OFF
		b3	BRate = 139M, Pattern = PRBS23, Frame = OFF
		b4	BRate = 2M, Pattern = PRBS11, Frame = ON
		b5	BRate = 8M, Pattern = PRBS15, Frame = ON
		b6	BRate = 34M, Pattern = PRBS20, Frame = ON
		b7	BRate = 139M, Pattern = PRBS23, Frame = ON
0B	Signal (2M:Balanced)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Pattern = "11101001001101001", Frame = ON

‘0C - 0E’ Checks on Signals 2 #1

Char.	Message	Bit	Error Details
0C	Signal (622M<->VC4)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping:VC4 (Bulk), AUG# = 1 to 4 Pattern = PRBS23
0D	Signal (156M<->VC4, VC3) Signal (156M<-STS3cSPE, STS1SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VC4 (Bulk), AUG# = 1 Pattern = PRBS20
		b1	BRate = 156M, Mapping = 139M (Async.), AUG# = 1, Frame = OFF Pattern = PRBS15
		b2	BRate = 156M, Mapping = 139M (Async.), AUG# = 1, Frame = ON Pattern = "1010101010101010"
		b3	BRate = 156M, Mapping = VC3 (Bulk), AUG# = 1, TUG3# = 1 Pattern = PRBS23
		b4	BRate = 156M, Mapping = 34M (Async.), AUG# = 1, TUG3# = 2 Pattern = PRBS15
		b5	BRate = 156M, Mapping = 34M (Sync.), AUG# = 1, TUG3# = 3 Pattern = PRBS11

0E	Signal (156M<->VC2)		An error or alarm was detected under the following conditions:
	Signal (156M<->VT6SPE)	b0	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = VC2-6M (Async.), AUG# = 1, TUG3# = 1 TUG2# = 2, Pattern = PRBS15
		b2	BRate = 156M, Mapping = VC2-6M (Bitsync.), AUG# = 1, TUG3# = 1 TUG2# = 3, Pattern = PRBS20
		b3	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 2 TUG2# = 5, Pattern = "1010101010101010"
		b4	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 3 TUG2# = 6, Pattern = "1010101010101010"
		b5	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 3 TUG2# = 7, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 1 mc# = 7, Pattern = PRBS11
		b7	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 2 mc# = 6, Pattern = PRBS15
		b8	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 3 mc# = 5, Pattern = PRBS20
		b9	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 2, TUG2# = 4 mc# = 4, Pattern = PRBS23
		b10	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 2, TUG2# = 5 mc# = 3, Pattern = "1010101010101010"
		b11	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 3, TUG2# = 6 mc# = 2, Pattern = "1010101010101010"
		b12	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 3, TUG2# = 7 mc# = 1, Pattern = "1010101010101010"

‘0F - 0I’ Checks on Signals 2 #2

Char.	Message	Bit	Error Details
0F	Signal (156M<->VC12)		An error or alarm was detected under the following conditions:
	Signal (156M<->VT2SPE)	b0	BRate = 156M, Mapping = VC12 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 1, TU12# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 2M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 2, TU12# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 2M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 3, TU12# = 1, Pattern = PRBS15
		b3	BRate = 156M, Mapping = 2M (BitF), AUG# = 1, TUG3# = 3 TUG2# = 4, TU12# = 2, Pattern = PRBS20
		b4	BRate = 156M, Mapping = 2M (BitL), AUG# = 1, AU3# = 1 TUG2# = 5, TU12# = 2, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 2M (ByteF), AUG# = 1, AU3# = 2 TUG2# = 6, TU12# = 3, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = 2M (ByteL), AUG# = 1, AU3# = 3 TUG2# = 7, TU12# = 3, Pattern = PRBS11
0G	Signal (156M<->VC11)		An error or alarm was detected under the following conditions:
	Signal (156M<->VT1.5SPE)	b0	BRate = 156M, Mapping = VC11 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 1, TU12# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 1.5M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 2, TU12# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 1.5M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 3, TU12# = 1, Pattern = PRBS15
		b3	BRate = 156M, Mapping = 1.5M (BitF), AUG# = 1, TUG3# = 3 TUG2# = 4, TU12# = 2, Pattern = PRBS20
		b4	BRate = 156M, Mapping = 1.5M (BitL), AUG# = 1, AU3# = 1 TUG2# = 5, TU12# = 2, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 1.5M (ByteF), AUG# = 1, AU3# = 2 TUG2# = 6, TU12# = 3, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = 1.5M (ByteL), AUG# = 1, AU3# = 3 TUG2# = 7, TU12# = 3, Pattern = PRBS11
0H	Signal (156M CMI<->VC4)		An error or alarm was detected under the following conditions:
	Signal (156M CMI<->STS3cSPE)	b0	BRate = 156M CMI, Mapping = VC4 (Bulk), AUG# = 1 Pattern = PRBS23
0I	Signal (Concatenation Mapping 622M, 156M)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Concatenation Mapping = STM4C-VC4*4C Pattern = PRBS23

'0J - 0N' Checks on Signals 2 #3

Char.	Message	Bit	Error Details
0J	Signal (Dummy 622M)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 2, TUG3# = 1, TUG2# = 1, TU12# = 1, Pattern = PRBS15
		b1	BRate = 622M, Mapping = VC4 (Bulk), Pattern = PRBS15, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 3, TUG3# = 3, TUG2# = 7, TU12# = 3, Pattern = PRBS15
0K	Signal (Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU12 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
		b1	BRate = 622M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU12 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU12 (Bulk), Pattern = PRBS23
		b2	BRate = 622M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU12 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 622M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU12 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU12 (Bulk), Pattern = PRBS23
		b4	BRate = 622M, Main CH Mapping = VC4-TUG3 (#3)-TU12 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 622M, Main CH Mapping = VC4-TUG3 (#3)-TU12 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23

0L	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M
0M	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Pattern = PRBS23
		b1	BRate = 156M, Pattern = PRBS23
0N	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping = AU4-VC4 (Bulk), Pattern = PRBS11,

(2) MP0121A/MP0122B 1.5/45/52M Unit

‘2A - 2B’ Checks on Signals

Char.	Message	Bit	Error Details
2A	Signal (1.5M)		An error or alarm was detected under the following conditions:
		b0	Code = AMI, Frame = OFF, DSX = 0ft, Pattern = PRBS11
		b1	Code = B8ZS, Frame = OFF, DSX = 655ft, Pattern = PRBS15
		b2	Framed (1.5M) = D4, Code = AMI, Frame = ON, DSX = 0ft Pattern = PRBS20
		b3	Framed (1.5M) = ESF, Code = B8ZS, Frame = ON, DSX = 655ft Pattern = PRBS20z
2B	Signal (45M)		An error or alarm was detected under the following conditions:
		b0	Frame = OFF, DSX = 0ft, Pattern = PRBS20z
		b1	Framed (45M) = M13, Frame = ON, DSX = 450ft, Pattern = PRBS23
		b2	Framed (45M) = C-bit, Frame = ON, DSX = 900ft Pattern = "1010101010101010"

‘2C - 2E’ Checks on Signals 2 #1

Char.	Message	Bit	Error Details
2C	Signal (622M<->VC3) Signal (622M<-STS1SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping:VC3 (Bulk), AUG# = 1 to 4, TUG3# = 1 Pattern = PRBS23
2D	Signal (156M<->VC3) Signal (156M<-STS1SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VC3 (Bulk), AUG# = 1, TUG3# = 1 to 3 Pattern = PRBS20
		b1	BRate = 156M, Mapping = 45M (Async.), AUG# = 1, AU3# = 1 to 3 Frame = OFF, Pattern = PRBS20z
2E	Signal (156M<->VC2) Signal (156M<->VT6SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = VC2-6M (Async.), AUG# = 1, TUG3# = 1 TUG2# = 2, Pattern = PRBS15
		b2	BRate = 156M, Mapping = VC2-6M (Bitsync.), AUG# = 1, TUG3# = 1 TUG2# = 3, Pattern = PRBS20
		b3	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 2 TUG2# = 5, Pattern = "1010101010101010"
		b4	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 3 TUG2# = 6, Pattern = "1010101010101010"
		b5	BRate = 156M, Mapping = VC2 (Bulk), AUG# = 1, TUG3# = 3 TUG2# = 7, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 1 mc# = 7, Pattern = PRBS11
		b7	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 2 mc# = 6, Pattern = PRBS15
		b8	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 1, TUG2# = 3 mc# = 5, Pattern = PRBS20
		b9	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 2, TUG2# = 4 mc# = 4, Pattern = PRBS23
		b10	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 2, TUG2# = 5 mc# = 3, Pattern = "1010101010101010"
		b11	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 3, TUG2# = 6 mc# = 2, Pattern = "1010101010101010"
		b12	BRate = 156M, Mapping = VC2 (mc), AUG# = 1, AU3# = 3, TUG2# = 7 mc# = 1, Pattern = "1010101010101010"

‘2F - 2H’ Checks on Signals 2 #2

Char.	Message	Bit	Error Details
2F	Signal (156M<->VC11) Signal (156M<->VT1.5SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = VC11 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 1, TU11# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 1.5M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 2, TU11# = 1, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 1.5M (BitF), AUG# = 1, TUG3# = 3 TUG2# = 3, TU11# = 2, Pattern = PRBS20
		b3	BRate = 156M, Mapping = 1.5M (BitL), AUG# = 1, AU3# = 1 TUG2# = 4, TU11# = 2, Pattern = PRBS20z
		b4	BRate = 156M, Mapping = 1.5M (ByteF), AUG# = 1, AU3# = 2 TUG2# = 5, TU11# = 3, Pattern = PRBS23
		b5	BRate = 156M, Mapping = 1.5M (ByteL), AUG# = 1, AU3# = 3 TUG2# = 6, TU11# = 4, Pattern = "1010101010101010"
		b6	BRate = 156M, Mapping = VC11 (Bulk), AUG# = 1, TUG3# = 1 TUG2# = 7, TU12# = 1, Pattern = PRBS11
		b7	BRate = 156M, Mapping = 1.5M (Async.), AUG# = 1, TUG3# = 2 TUG2# = 6, TU12# = 1, Pattern = PRBS15
		b8	BRate = 156M, Mapping = 1.5M (BitF), AUG# = 1, TUG3# = 3 TUG2# = 5, TU12# = 2, Pattern = PRBS20
		b9	BRate = 156M, Mapping = 1.5M (BitL), AUG# = 1, AU3# = 1 TUG2# = 4, TU12# = 2, Pattern = PRBS20z
		b10	BRate = 156M, Mapping = 1.5M (ByteF), AUG# = 1, AU3# = 2 TUG2# = 3, TU12# = 3, Pattern = PRBS23
		b11	BRate = 156M, Mapping = 1.5M (ByteL), AUG# = 1, AU3# = 3 TUG2# = 2, TU12# = 3, Pattern = "1010101010101010"
2G	Signal (156M<->VC11 Japan mapping) Signal (156M<->VT1.5SPE Japan mapping)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = 384k (Data), AUG# = 1, TUG3# = 1 TUG2# = 4, TU11# = 1, 384k# = 1, Pattern = PRBS11
		b1	BRate = 156M, Mapping = 384k (Data), AUG# = 1, AU3# = 1 TUG2# = 5, TU12# = 1, 384k# = 2, Pattern = PRBS15
		b2	BRate = 156M, Mapping = 384k (Voice), AUG# = 1, AU3# = 1 TUG2# = 1, TU11# = 1, 384k# = 3, Pattern = PRBS20
		b3	BRate = 156M, Mapping = 384k (Voice), AUG# = 1, AU3# = 1 TUG2# = 1, TU12# = 1, 384k# = 4, Pattern = "1010101010101010"
		b4	BRate = 156M, Mapping = Byte (Data), AUG# = 1, TUG3# = 1 TUG2# = 4, TU11# = 1, Byte# = 1, Pattern = PRBS11
		b5	BRate = 156M, Mapping = Byte (Data), AUG# = 1, AU3# = 1 TUG2# = 5, TU12# = 1, Byte# = 2, Pattern = PRBS15
		b6	BRate = 156M, Mapping = Byte (Voice), AUG# = 1, AU3# = 1 TUG2# = 1, TU11# = 1, Byte# = 3, Pattern = PRBS20
		b7	BRate = 156M, Mapping = Byte (Voice), AUG# = 1, AU3# = 1 TUG2# = 1, TU12# = 1, Byte# = 4, Pattern = "1010101010101010"

2H	Signal (52M B3ZS<->VC3) Signal (52M B3ZS<->STS1SPE)		An error or alarm was detected under the following conditions:
		b0	BRate = 52M B3ZS, Mapping = VC3 (Bulk), AU3# = 1 Pattern = PRBS23, DSX = 0ft
		b1	BRate = 52M B3ZS, Mapping = VC3 (Bulk), AU3# = 1 Pattern = PRBS15, DSX = 450ft
		b2	BRate = 52M B3ZS, Mapping = VC3 (Bulk), AU3# = 1 Pattern = PRBS11, DSX = 900ft

‘2I - 2M’ Checks on Signals 2 #3

Char.	Message	Bit	Error Details
2I	Signal (Dummy 622M)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Dummy ch Mapping (Tx) = AU4-VC11 (Bulk) (AUG# = 1, TUG3# = 1, TU11# = 1), Dummy ch Mapping (Rx) = AU4-VC11 (Bulk) AUG# = 2, TUG3# = 1, TUG2# = 1, TU11# = 1, Pattern = PRBS15
		b1	BRate = 622M, Mapping = VC4 (Bulk), Pattern = PRBS15, Dummy ch Mapping (Tx) = AU4-VC11 (Bulk) (AUG# = 1, TUG3# = 1, TU11# = 1), Dummy ch Mapping (Rx) = AU4-VC11 (Bulk) AUG# = 3, TUG3# = 3, TUG2# = 7, TU11# = 3, Pattern = PRBS15
2J	Signal (Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
		b1	BRate = 622M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b2	BRate = 622M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 622M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b4	BRate = 622M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 622M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
2K	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M
2L	Signal (Non-frame)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Pattern = PRBS23
		b1	BRate = 156M, Pattern = PRBS23
		b2	BRate = 52MB3ZS, Pattern = PRBS23
2M	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 622M, Mapping = AU3-VC3 (Bulk), Pattern = PRBS11,

MP0122B Unit

‘3H’ Checks on 52M (1.31um) Interface of MP0122B

Char.	Message	Bit	Error Details
3H	Signal (1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	Alarm = OFF
		b1	Alarm = LOS

(3) MP0124A 2/8/34/139M 156/622M Jitter Unit

‘4A’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
4A	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

‘4B’ Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
4B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

‘4C’ Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
4C	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range:20UI, Mod.freq:1kHz, Ampl.:10UIpp
		b1	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b5	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b6	BRate = 139M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b7	BRate = 139M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

‘4D’ Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
4D	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	Brate = 156M CMI, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 156M CMI, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
	Jitter	b2	BRate = 156M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
	(SONET:RX Measure)	b3	BRate = 156M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

‘4G’ Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
4G	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

‘4H’ Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
4H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(4) MP0125A 1.5/45/52M 156/622M Jitter Unit

'5A' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
5A	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'5B' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
5B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'5C' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
5C	Jitter (1.5/45M:RX Measure)		Jitter measurement error is abnormal under the following conditions:
		b0	BRate = 1.5M, Range:20UI, Mod.freq:0.1kHz, Ampl.:10UIpp
		b1	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'5D' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
5D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b1	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp

'5G' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
5G	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

'5H' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
5H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 52M B3ZS
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(5) MP0126A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit

‘6A’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
6A	Jitter		Jitter tolerance is abnormal under the following conditions:
	(2/8/34/139M:Tolerance)	b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

‘6B’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
6B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp時

‘6C’ Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
6C	Jitter		Jitter measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range:20UI, Mod.freq:1kHz, Ampl.:10UIpp
		b1	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b5	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b6	BRate = 139M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b7	BRate = 139M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

‘6D’ Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
6D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 156M CMI, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 156M CMI, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 10kHz, Ampl. = 1UIpp

'6G' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
6G	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

'6H' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
6H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

'7A' Checks on Jitter tolerance in transmitting side1

Char.	Message	Bit	Error Details
7A	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'7B' Checks on Jitter tolerance in transmitting side2

Char.	Message	Bit	Error Details
7B	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'7C' Checks on Jitter measurement error in receiving side1

Char.	Message	Bit	Error Details
7C	Jitter (1.5/45M:RX Measure)		Jitter measurement error is abnormal under the following conditions:
		b0	BRate = 1.5M, Range:20UI, Mod.freq:0.1kHz, Ampl.:10UIpp
		b1	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b3	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'7D' Checks on Jitter measurement error in receiving side2

Char.	Message	Bit	Error Details
7D	Jitter (SDH:RX Measure)		Jitter measurement error is abnormal under the following conditions:
	Jitter (SONET:RX Measure)	b0	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 10UIpp
		b1	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b2	BRate = 156M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b3	BRate = 156M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp
		b4	BRate = 622M, Range = 20UI, Mod.freq = 20kHz, Ampl. = 10UIpp
		b5	BRate = 622M, Range = 2UI, Mod.freq = 20kHz, Ampl. = 1UIpp

'7G' Checks on frequency measurement error1

Char.	Message	Bit	Error Details
7G	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

'7H' Checks on frequency measurement error2

Char.	Message	Bit	Error Details
7H	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 52M B3ZS
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

(6) 2.5G Unit (MP0127A/MP0128A/MP0129A)

‘AA’ Checks on Signals1 (Optical 1.31)

Char.	Message	Bit	Error Details
AA	Signal (2488M 1.31 Optical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC3 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31

‘AF’ Checks on Signals (Electrical 1)

Char.	Message	Bit	Error Details
AF	Signal (2488M Electrical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical

‘AG’ Checks on Signals (Optical 1.55)

Char.	Message	Bit	Error Details
AG	Signal (2488M 1.55 Optical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55

‘AL’ Checks on Signals (Electrical 2)

Char.	Message	Bit	Error Details
AL	Signal (2488M Electrical)	b0	An error or alarm was detected under the following conditions: BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical

(7) 2.5G unit (MU150008A/MU150009A/MU150010A)

‘FA - FB’ Checks on Signals1 (Optical 1.31)

Char.	Message	Bit	Error Details
FA	Signal (2488M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31
FB	Signal (2488M 1.31 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16C Pattern = PRBS31, 2.5G Interface = Optical Wave length = 1.31
		b1	BRate = 2488M, Concatenation Mapping = STM16C-VC4*4C 1to4 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31
		b2	BRate = 2488M, Concatenation Mapping = STM16C-VC4C 1to16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.31

‘FC - FF’ Checks on Signals 2

Char.	Message	Bit	Error Details
FC	Signal (2488M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
		b1	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b2	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU12 (Bulk), Pattern = PRBS23
		b4	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
FD	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FE	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FF	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = AU4-VC4 (Bulk), Pattern = PRBS11,

‘FK - FM’ Checks on Signals (Electrical 1)

Char.	Message	Bit	Error Details
FK	Signal (2488M Electrical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Electrical
FL	Signal (2488M Electrical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16C Pattern = PRBS31, 2.5G Interface = Electrical Wave length = 1.31
		b1	BRate = 2488M, Concatenation Mapping = STM16C-VC4*4C 1to4 Pattern = PRBS23, 2.5G Interface = Electrical Wave length = 1.31
		b2	BRate = 2488M, Concatenation Mapping = STM16C-VC4C 1to16 Pattern = PRBS23, 2.5G Interface = Electrical Wave length = 1.31
FM	Signal (2488M 1.31 Dummy)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 2, TUG3# = 1, TUG2# = 1, TU12# = 1, Pattern = PRBS15
		b1	BRate = 2488M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 16, TUG3# = 3, TUG2# = 7, TU12# = 3, Pattern = PRBS15

'FN - FO' Checks on Signals (Optical 1.55)

Char.	Message	Bit	Error Details
FN	Signal (2488M 1.55 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC3 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55
FO	Signal (2488M 1.55 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16C Pattern = PRBS31, 2.5G Interface = Optical Wave length = 1.55
		b1	BRate = 2488M, Concatenation Mapping = STM16C-VC4*4C 1to4 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55
		b2	BRate = 2488M, Concatenation Mapping = STM16C-VC4C 1to16 Pattern = PRBS23, 2.5G Interface = Optical Wave length = 1.55

'FP - FR' Checks on Signals 2

Char.	Message	Bit	Error Details
FP	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FQ	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M
FR	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = AU4-VC4 (Bulk), Pattern = PRBS11,

(8) MP0130A 2.5G Jitter Unit

‘BA’ Checks on Jitter tolerance in transmitting side

Char.	Message	Bit	Error Details
BA	Jitter (Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 2488M, Mod.freq:20kHz, Ampl.:2UIpp
		b1	BRate = 2488M, Mod.freq = 20MHz, Ampl. = 0.2UIpp

‘BB’ Checks on Jitter measurement error in receiving side

Char.	Message	Bit	Error Details
BB	Jitter (RX Measure)		Measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 20UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 2488M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

‘BD’ Checks on frequency measurement error

Char.	Message	Bit	Error Details
BD	Frequency		The frequency is abnormal under the following conditions:
		b0	BRate = 2488M

(9) MP0123A ATM Unit

‘8A - 8B’ Checks on Signals 1

Char.	Message	Bit	Error Details
8A	Signal (156/622M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 156M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 156M, Mapping = ATM User PRG, Header = UNI Pattern = Single PRBS9
		b2	BRate = 156M, Mapping = AAL1, Header = UNI Pattern = Cross PRBS9
		b3	BRate = 156M, Mapping = AAL2, Header = UNI Pattern = Single PRBS7
		b4	BRate = 156M, Mapping = AAL3/4, Header = UNI Pattern = Cross PRBS15
		b5	BRate = 156M, Mapping = AAL5, Header = UNI Pattern = Word16
		b6	BRate = 156M, Mapping = ATM O.191, Header = NNI
		b7	BRate = 156M, Mapping = ATM User PRG, Header = NNI Pattern = Edit pattern
		b8	BRate = 156M, Mapping = AAL1, Header = NNI Pattern = Time stamp
		b9	BRate = 156M, Mapping = AAL2, Header = NNI Pattern = Word8
		b10	BRate = 156M, Mapping = AAL3/4, Header = NNI Pattern = Word16
		b11	BRate = 156M, Mapping = AAL5, Header = NNI Pattern = Edit pattern
8B	Signal (52M B3ZS:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 52MB3ZS, Mapping = ATM O.191, Header = UNI
		b1	BRate = 52MB3ZS, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 52MB3ZS, Mapping = AAL1, Header = UNI Pattern = Single PRBS9
		b3	BRate = 52MB3ZS, Mapping = AAL2, Header = NNI Pattern = Time stamp
		b4	BRate = 52MB3ZS, Mapping = AAL3/4, Header = NNI Pattern = Edit pattern
		b5	BRate = 52MB3ZS, Mapping = AAL5, Header = NNI Pattern = Word16

‘8C - 8D’ Checks on Signals 2

Char.	Message	Bit	Error Details
8C	Signal (34/139M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 139M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 139M, Mapping = ATM User PRG, Header = UNI Pattern = Time stamp
		b2	BRate = 139M, Mapping = AAL1, Header = UNI Pattern = Word16
		b3	BRate = 139M, Mapping = AAL2, Header = UNI Pattern = Edit pattern
		b4	BRate = 139M, Mapping = AAL3/4, Header = UNI Pattern = Single PRBS9
		b5	BRate = 139M, Mapping = AAL5, Header = UNI Pattern = Cross PRBS9
		b6	BRate = 34M, Mapping = ATM O.191, Header = NNI
		b7	BRate = 34M, Mapping = ATM User PRG, Header = NNI Pattern = Cross PRBS15
		b8	BRate = 34M, Mapping = AAL1, Header = NNI Pattern = Edit pattern
		b9	BRate = 34M, Mapping = AAL2, Header = NNI Pattern = Edit pattern
		b10	BRate = 34M, Mapping = AAL3/4, Header = NNI Pattern = Time stamp
		b11	BRate = 34M, Mapping = AAL5, Header = NNI Pattern = Single PRBS9
8D	Signal (2M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 2M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 2M, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 2M, Mapping = AAL1, Header = UNI Pattern = Cross PRBS15
		b3	BRate = 2M, Mapping = AAL2, Header = NNI Pattern = Word8
		b4	BRate = 2M, Mapping = AAL3/4, Header = NNI Pattern = Cross PRBS9
		b5	BRate = 2M, Mapping = AAL5, Header = NNI Pattern = Cross PRBS15

‘8E - 8F’ Checks on Signals 3

Char.	Message	Bit	Error Details
8E	Signal (45M/45MPLCP:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 45M, PLCP = OFF, Mapping = ATM O.191, Header = UNI
		b1	BRate = 45M, PLCP = OFF, Mapping = ATM User PRG, Header = UNI Pattern = Single PRBS9
		b2	BRate = 45M, PLCP = OFF, Mapping = AAL1, Header = UNI Pattern = Cross PRBS23
		b3	BRate = 45M, PLCP = OFF, Mapping = AAL2, Header = UNI Pattern = Time stamp
		b4	BRate = 45M, PLCP = OFF, Mapping = AAL3/4, Header = UNI Pattern = Cross PRBS9
		b5	BRate = 45M, PLCP = OFF, Mapping = AAL5, Header = UNI Pattern = Word16
		b6	BRate = 45M, PLCP = ON, Mapping = ATM O.191, Header = NNI
		b7	BRate = 45M, PLCP = ON, Mapping = ATM User PRG, Header = NNI Pattern = Edit pattern
		b8	BRate = 45M, PLCP = ON, Mapping = AAL1, Header = NNI Pattern = Cross PRBS9
		b9	BRate = 45M, PLCP = ON, Mapping = AAL2, Header = NNI Pattern = Word8
		b10	BRate = 45M, PLCP = ON, Mapping = AAL3/4, Header = NNI Pattern = Cross PRBS15
		b11	BRate = 45M, PLCP = ON, Mapping = AAL5, Header = NNI Pattern = Cross PRBS23
8F	Signal (1.5M:ATM)		An error or alarm was detected under the following conditions:
		b0	BRate = 1.5M, Mapping = ATM O.191, Header = UNI
		b1	BRate = 1.5M, Mapping = ATM User PRG, Header = UNI Pattern = Cross PRBS9
		b2	BRate = 1.5M, Mapping = AAL1, Header = UNI Pattern = Time stamp
		b3	BRate = 1.5M, Mapping = AAL2, Header = NNI Pattern = Edit pattern
		b4	BRate = 1.5M, Mapping = AAL3/4, Header = NNI Pattern = Word16
		b5	BRate = 1.5M, Mapping = AAL5, Header = NNI Pattern = Single PRBS9

(10) MP0131A Add/Drop Unit

‘CA’

Char.	Message	Bit	Error Details
CA	Add/Drop		PN error is abnormal under the following conditions.
		b0	BRate = 156M, Mapping = AU4-139M (Async.)
		b1	BRate = 156M, Mapping = AU4-45M (Async.), Drop DSX = 450ft
		b2	BRate = 156M, Mapping = AU3-45M (Async.), Drop DSX = 450ft
		b3	BRate = 156M, Mapping = AU4-34M (Async.)
		b4	BRate = 156M, Mapping = AU4-2M (Async.) Interface = Unbalanced
		b5	BRate = 156M, Mapping = AU4-2M (Async.) Interface = Balanced
		b6	Brate = 156M, Mapping = AU4-1.5M (Async.), Code = AMI Drop DSX = 655ft
		b7	BRate = 156M, Mapping = AU4-1.5M (Async.), Code = B8ZS Drop DSX = 655ft

(11) MP150000A 2.5G/10G Unit

‘DA - DB’ Checks on Signals

Char.	Message	Bit	Error Details
DA	Signal (9953M)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = VC4 (Bulk), AUG# = 1 to 64 Pattern = PRBS23
DB	Signal (9953M Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Concatenation Mapping = STM16C-VC4*64C Pattern = PRBS31
		b1	BRate = 9953M, Concatenation Mapping = STM16C-VC4*16C 1to4 Pattern = PRBS23
		b2	BRate = 9953M, Concatenation Mapping = STM16C-VC4*4C 1to16 Pattern = PRBS23
		b3	BRate = 9953M, Concatenation Mapping = STM16C-VC4C 1to64 Pattern = PRBS23

‘DC - DD’ Checks on Signals

Char.	Message	Bit	Error Details
DC	Signal (2488M Electrical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1to16 Pattern = PRBS23
DD	Signal (2488M Electrical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16C Pattern = PRBS31
		b1	BRate = 2488M, Concatenation Mapping = STM16C-VC4*4C 1to4 Pattern = PRBS23
		b2	BRate = 2488M, Concatenation Mapping = STM16C-VC4C 1to16 Pattern = PRBS23

'DE' Checks on Signals (Dummy Electrical)

Char.	Message	Bit	Error Details
DE	Signal (9953/2488M Dummy)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 2, TUG3# = 1, TUG2# = 1, TU12# = 1, Pattern = PRBS15
		b1	BRate = 9953M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 64, TUG3# = 3, TUG2# = 7, TU12# = 3, Pattern = PRBS15
		b3	BRate = 2488M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 2, TUG3# = 1, TUG2# = 1, TU12# = 1, Pattern = PRBS15
		b4	BRate = 2488M, Dummy ch Mapping (Tx) = AU4-VC12 (Bulk) (AUG# = 1, TUG3# = 1, TU12#1), Dummy ch Mapping (Rx) = AU4-VC12 (Bulk) AUG# = 16, TUG3# = 3, TUG2# = 7, TU12# = 3, Pattern = PRBS15

‘DF - DJ’　Checks on Signals 2

Char.	Message	Bit	Error Details
DF	Signal (9953M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
		b1	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b2	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b4	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 9953M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk)　Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23

DG	Signal (2488M Mixed)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
		b1	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#1)-TU3 (Bulk), Mixed CH Mapping (Tx) = VC4-TU2 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b2	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b3	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#2)-TU2 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU11 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#3)-TU11 (Bulk), Pattern = PRBS23
		b4	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#1)-TU3 (Bulk), Pattern = PRBS23
		b5	BRate = 2488M, Main CH Mapping = VC4-TUG3 (#3)-TU11 (Bulk), Mixed CH Mapping (Tx) = VC4-TU3 (Bulk), VC4-TU2 (Bulk) Mixed CH Mapping (Rx) = VC4-TUG3 (#2)-TU2 (Bulk), Pattern = PRBS23
DH	Signal (CID)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M
		b1	BRate = 2488M
DI	Signal (Nonframe)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Pattern = PRBS23, Wave Length = 1.31um
		b1	BRate = 2488M, Pattern = PRBS23, Wave Length = 1.31um
DJ	Signal (OH test)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = AU4-VC4 (Bulk), Pattern = PRBS11,
		b1	BRate = 2488M, Mapping = AU4-VC4 (Bulk), Pattern = PRBS11,

(12) MU150001A/B, MU150002A, MU150017A/B, MU150031A/C, MU150061A/B Optical 10G Unit

‘EA - EB’ Checks on Signals (Optical 10G/1.55)

Char.	Message	Bit	Error Details
EA	Signal (9953M 1.55 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = VC4 (Bulk), AUG# = 1 to 64 Pattern = PRBS23, Wave length = 1.55
EB	Signal (9953M 1.55 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Concatenation Mapping = STM64C-VC4*64c Pattern = PRBS31, Wave length = 1.55
		b1	BRate = 9953M, Concatenation Mapping = STM64C-VC4*16c 1to4 Pattern = PRBS23, Wave length = 1.55
		b2	BRate = 9953M, Concatenation Mapping = STM64C-VC4*4c 1to16 Pattern = PRBS23, Wave length = 1.55 BRate
		b3	= 9953M, Concatenation Mapping = STM64C-VC4c 1to64 Pattern = PRBS23, Wave length = 1.55

‘EC - ED’ Checks on Signals2 (Optical 2.5G/1.55)

Char.	Message	Bit	Error Details
EC	Signal (2488M 1.55 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC4 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, Wave length = 1.55
ED	Signal (2488M 1.55 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16c Pattern = PRBS31, Wave length = 1.55 BRate
		b1	= 2488M, Concatenation Mapping = STM16C-VC4*4c 1to4 Pattern = PRBS23, Wave length = 1.55 BRate
		b2	= 2488M, Concatenation Mapping = STM16C-VC4c 1to16 Pattern = PRBS23, Wave length = 1.55

‘EG - EH’ Checks on Signals3 (Optical 2.5G/ 1.31)

Char.	Message	Bit	Error Details
EG	Signal (2488M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Mapping = VC3 (Bulk), AUG# = 1 to 16 Pattern = PRBS23, Wave length = 1.31
EH	Signal (2488M 1.31 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 2488M, Concatenation Mapping = STM16C-VC4*16c Pattern = PRBS31, Wave length = 1.31 BRate
		b1	= 2488M, Concatenation Mapping = STM16C-VC4*4c 1to4 Pattern = PRBS23, Wave length = 1.31 BRate
		b2	= 2488M, Concatenation Mapping = STM16C-VC4c 1to16 Pattern = PRBS23, Wave length = 1.31

‘EK - EL’　Checks on Signals4 (Optical 10G/1.31)

Char.	Message	Bit	Error Details
EK	Signal (9953M 1.31 Optical)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Mapping = VC4 (Bulk), AUG# = 1 to 64 Pattern = PRBS23, Wave length = 1.31
EL	Signal (9953M 1.31 Optical Concatenation)		An error or alarm was detected under the following conditions:
		b0	BRate = 9953M, Concatenation Mapping = STM64C-VC4*64c Pattern = PRBS31, Wave length = 1.31
		b1	BRate = 9953M, Concatenation Mapping = STM64C-VC4*16c 1to4 Pattern = PRBS23, Wave length = 1.31
		b2	BRate = 9953M, Concatenation Mapping = STM64C-VC4*4c 1to16 Pattern = PRBS23, Wave length = 1.31
		b3	BRate = 9953M, Concatenation Mapping = STM64C-VC4c 1to64 Pattern = PRBS23, Wave length = 1.31

(13) MU150005A 2/8/34/139M 156/622M Jitter Unit

‘HA’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
HA	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

‘HB’ Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
HB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

‘HC’ Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
HC	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 2M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 2M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b8	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b11	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b12	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b13	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b14	BRate = 139M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b15	BRate = 139M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'HD' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
HD	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 156M CMI, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 156M CMI, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
	Jitter	b2	BRate = 156M CMI, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
	(SONET:RX Measure)	b3	BRate = 156M CMI, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'HG' Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
HG	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

'HH' Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
HH	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

'HI' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HI	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:Peak)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 400UI, Data
		b3	BRate = 2M, Range = 2UI, Data
		b4	BRate = 2M, Range = 20UI, Data
		b5	BRate = 2M, Range = 2UI, Clock
		b6	BRate = 2M, Range = 20UI, Clock
		b7	BRate = 2M, Range = 400UI, Clock
		b8	BRate = 2M, Range = 2UI, Clock
		b9	BRate = 2M, Range = 20UI, Clock

‘HJ’　Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HJ	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:Peak)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 400UI, Data
		b3	BRate = 8M, Range = 2UI, Data
		b4	BRate = 8M, Range = 20UI, Data
		b5	BRate = 8M, Range = 2UI, Clock
		b6	BRate = 8M, Range = 20UI, Clock
		b7	BRate = 8M, Range = 400UI, Clock
		b8	BRate = 8M, Range = 2UI, Clock
		b9	BRate = 8M, Range = 20UI, Clock

‘HK’　Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HK	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:Peak)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 400UI, Data
		b3	BRate = 34M, Range = 2UI, Data
		b4	BRate = 34M, Range = 20UI, Data
		b5	BRate = 34M, Range = 2UI, Clock
		b6	BRate = 34M, Range = 20UI, Clock
		b7	BRate = 34M, Range = 400UI, Clock
		b8	BRate = 34M, Range = 2UI, Clock
		b9	BRate = 34M, Range = 20UI, Clock

‘HL’　Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HL	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:Peak)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 400UI, Data
		b3	BRate = 139M, Range = 2UI, Data
		b4	BRate = 139M, Range = 20UI, Data
		b5	BRate = 139M, Range = 2UI, Clock
		b6	BRate = 139M, Range = 20UI, Clock
		b7	BRate = 139M, Range = 400UI, Clock
		b8	BRate = 139M, Range = 2UI, Clock
		b9	BRate = 139M, Range = 20UI, Clock

‘HM’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HM	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:RMS)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 2UI, Clock
		b3	BRate = 2M, Range = 20UI, Clock

‘HN’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HN	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:RMS)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 2UI, Clock
		b3	BRate = 8M, Range = 20UI, Clock

‘HO’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HO	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:RMS)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 2UI, Clock
		b3	BRate = 34M, Range = 20UI, Clock

‘HP’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HP	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:RMS)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 2UI, Clock
		b3	BRate = 139M, Range = 20UI, Clock

‘HQ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
HQ	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:Peak)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 400UI, Data
	(SONET:Rx Intrinsic:Peak)	b3	BRate = 156M CMI, Range = 2UI, Data
		b4	BRate = 156M CMI, Range = 20UI, Data
		b5	BRate = 156M CMI, Range = 2UI, Clock
		b6	BRate = 156M CMI, Range = 20UI, Clock
		b7	BRate = 156M CMI, Range = 400UI, Clock
		b8	BRate = 156M CMI, Range = 2UI, Clock
		b9	BRate = 156M CMI, Range = 20UI, Clock

‘HR’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
HR	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 2UI, Clock
	(SONET:Rx Intrinsic:RMS)	b3	BRate = 156M CMI, Range = 20UI, Clock

(14) MU150006A 1.5/45/52M 156/622M Jitter Unit

'IA' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
IA	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

'IB' Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
IB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

'IC' Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
IC	Jitter		Jitter tolerance is abnormal under the following conditions:
	(1.5/45M:RX Measure)	b0	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b1	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 1.5M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

'ID' Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
ID	Jitter		Jitter tolerance is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
	(SONET:RX Measure)	b1	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

‘IG’ Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
IG	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

‘IH’ Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
IH	Frequency (SDH)		The frequency is abnormal under the following conditions:
	Frequency (SONET)	b0	BRate = 52M B3ZS
		b1	BRate = 156M
		b2	BRate = 622M

‘II’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
II	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:Peak)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 400UI, Data
		b3	BRate = 1.5M, Range = 2UI, Data
		b4	BRate = 1.5M, Range = 20UI, Data
		b5	BRate = 1.5M, Range = 2UI, Clock
		b6	BRate = 1.5M, Range = 20UI, Clock
		b7	BRate = 1.5M, Range = 400UI, Clock
		b8	BRate = 1.5M, Range = 2UI, Clock
		b9	BRate = 1.5M, Range = 20UI, Clock

‘IJ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
IJ	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:Peak)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 400UI, Data
		b3	BRate = 45M, Range = 2UI, Data
		b4	BRate = 45M, Range = 20UI, Data
		b5	BRate = 45M, Range = 2UI, Clock
		b6	BRate = 45M, Range = 20UI, Clock
		b7	BRate = 45M, Range = 400UI, Clock
		b8	BRate = 45M, Range = 2UI, Clock
		b9	BRate = 45M, Range = 20UI, Clock

‘IK’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IK	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:RMS)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 2UI, Clock
		b3	BRate = 1.5M, Range = 20UI, Clock

'IL' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IL	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:RMS)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 2UI, Clock
		b3	BRate = 45M, Range = 20UI, Clock

'IM' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
IM	Jitter		The measurement error is abnormal under the following conditions:
	(SDH::Rx Intrinsic:Peak)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 400UI, Data
		b3	BRate = 52M B3ZS, Range = 2UI, Data
		b4	BRate = 52M B3ZS, Range = 20UI, Data
		b5	BRate = 52M B3ZS, Range = 2UI, Clock
		b6	BRate = 52M B3ZS, Range = 20UI, Clock
		b7	BRate = 52M B3ZS, Range = 400UI, Clock
		b8	BRate = 52M B3ZS, Range = 2UI, Clock
		b9	BRate = 52M B3ZS, Range = 20UI, Clock

'IN' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
IN	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 2UI, Clock
		b3	BRate = 52M B3ZS, Range = 20UI, Clock

(15) MP150007A 2/8/34/139M 1.5/45/52M 156/622M Jitter Unit

‘JA’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
JA	Jitter (2/8/34/139M:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 2M, Mod.freq:10kHz, Ampl.:2UIpp
		b1	BRate = 2M, Mod.freq = 100kHz, Ampl. = 0.5UIpp
		b2	BRate = 8M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b3	BRate = 8M, Mod.freq = 400kHz, Ampl. = 0.5UIpp
		b4	BRate = 34M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b5	BRate = 34M, Mod.freq = 800kHz, Ampl. = 0.5UIpp
		b6	BRate = 139M, Mod.freq = 20kHz, Ampl. = 2UIpp
		b7	BRate = 139M, Mod.freq = 3.5MHz, Ampl. = 0.5UIpp

‘JB’ Checks on Jitter tolerance in transmitting side 2

Char.	Message	Bit	Error Details
JB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following condition.
		b0	BRate = 156MCMI, Mod.freq = 20kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 156MCMI, Mod.freq = 1.5MHz, Ampl. = 0.2UIpp

‘JC’ Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
JC	Jitter		The measurement error is abnormal under the following conditions:
	(2/8/34/139M:RX Measure)	b0	BRate = 2M, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 2M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 2M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 2M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 8M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 8M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 8M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b8	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 34M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 34M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b11	BRate = 34M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b12	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b13	BRate = 139M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b14	BRate = 139M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b15	BRate = 139M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

‘JD’ Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
JD	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 156M CMI, Range = 400UI, Mod.freq:10Hz, Ampl.= 200UIpp
		b1	BRate = 156M CMI, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
	Jitter	b2	BRate = 156M CMI, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
	(SONET:RX Measure)	b3	BRate = 156M CMI, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

‘JG’ Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
JG	Frequency (2/8/34/139M)		The frequency is abnormal under the following conditions:
		b0	BRate = 2M
		b1	BRate = 8M
		b2	BRate = 34M
		b3	BRate = 139M

‘JH’ Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
JH	Frequency (SDH)		The frequency is abnormal under the following conditions:
		b0	BRate = 156M CMI
	Frequency (SONET)	b1	BRate = 156M
		b2	BRate = 622M

‘JI’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JI	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:Peak)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 400UI, Data
		b3	BRate = 2M, Range = 2UI, Data
		b4	BRate = 2M, Range = 20UI, Data
		b5	BRate = 2M, Range = 2UI, Clock
		b6	BRate = 2M, Range = 20UI, Clock
		b7	BRate = 2M, Range = 400UI, Clock
		b8	BRate = 2M, Range = 2UI, Clock
		b9	BRate = 2M, Range = 20UI, Clock

‘JJ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JJ	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:Peak)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 400UI, Data
		b3	BRate = 8M, Range = 2UI, Data
		b4	BRate = 8M, Range = 20UI, Data
		b5	BRate = 8M, Range = 2UI, Clock
		b6	BRate = 8M, Range = 20UI, Clock
		b7	BRate = 8M, Range = 400UI, Clock
		b8	BRate = 8M, Range = 2UI, Clock
		b9	BRate = 8M, Range = 20UI, Clock

‘JK’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JK	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:Peak)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 400UI, Data
		b3	BRate = 34M, Range = 2UI, Data
		b4	BRate = 34M, Range = 20UI, Data
		b5	BRate = 34M, Range = 2UI, Clock
		b6	BRate = 34M, Range = 20UI, Clock
		b7	BRate = 34M, Range = 400UI, Clock
		b8	BRate = 34M, Range = 2UI, Clock
		b9	BRate = 34M, Range = 20UI, Clock

‘JL’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JL	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:Peak)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 400UI, Data
		b3	BRate = 139M, Range = 2UI, Data
		b4	BRate = 139M, Range = 20UI, Data
		b5	BRate = 139M, Range = 2UI, Clock
		b6	BRate = 139M, Range = 20UI, Clock
		b7	BRate = 139M, Range = 400UI, Clock
		b8	BRate = 139M, Range = 2UI, Clock
		b9	BRate = 139M, Range = 20UI, Clock

‘JM’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JM	Jitter		The measurement error is abnormal under the following conditions:
	(2M:Rx Intrinsic:RMS)	b0	BRate = 2M, Range = 2UI, Data
		b1	BRate = 2M, Range = 20UI, Data
		b2	BRate = 2M, Range = 2UI, Clock
		b3	BRate = 2M, Range = 20UI, Clock

‘JN’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JN	Jitter		The measurement error is abnormal under the following conditions:
	(8M:Rx Intrinsic:RMS)	b0	BRate = 8M, Range = 2UI, Data
		b1	BRate = 8M, Range = 20UI, Data
		b2	BRate = 8M, Range = 2UI, Clock
		b3	BRate = 8M, Range = 20UI, Clock

‘JO’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JO	Jitter		The measurement error is abnormal under the following conditions:
	(34M:Rx Intrinsic:RMS)	b0	BRate = 34M, Range = 2UI, Data
		b1	BRate = 34M, Range = 20UI, Data
		b2	BRate = 34M, Range = 2UI, Clock
		b3	BRate = 34M, Range = 20UI, Clock

‘JP’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JP	Jitter		The measurement error is abnormal under the following conditions:
	(139M:Rx Intrinsic:RMS)	b0	BRate = 139M, Range = 2UI, Data
		b1	BRate = 139M, Range = 20UI, Data
		b2	BRate = 139M, Range = 2UI, Clock
		b3	BRate = 139M, Range = 20UI, Clock

‘JQ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
JQ	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:Peak)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 400UI, Data
	(SONET:Rx Intrinsic:Peak)	b3	BRate = 156M CMI, Range = 2UI, Data
		b4	BRate = 156M CMI, Range = 20UI, Data
		b5	BRate = 156M CMI, Range = 2UI, Clock
		b6	BRate = 156M CMI, Range = 20UI, Clock
		b7	BRate = 156M CMI, Range = 400UI, Clock
		b8	BRate = 156M CMI, Range = 2UI, Clock
		b9	BRate = 156M CMI, Range = 20UI, Clock

‘JR’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
JR	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 156M CMI, Range = 2UI, Data
		b1	BRate = 156M CMI, Range = 20UI, Data
	Jitter	b2	BRate = 156M CMI, Range = 2UI, Clock
	(SONET:Rx Intrinsic:RMS)	b3	BRate = 156M CMI, Range = 20UI, Clock

‘KA’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
KA	Jitter (1.5/45M:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 1.5M, Mod.freq:3kHz, Ampl.:2UIpp
		b1	BRate = 1.5M, Mod.freq = 40kHz, Ampl. = 0.5UIpp
		b2	BRate = 45M, Mod.freq = 50kHz, Ampl. = 2UIpp
		b3	BRate = 45M, Mod.freq = 400kHz, Ampl. = 0.5UIpp

‘KB’ Checks on Jitter tolerance in transmitting side 1

Char.	Message	Bit	Error Details
KB	Jitter (SDH:Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 52M B3ZS, Mod.freq = 3kHz, Ampl. = 2UIpp
	Jitter (SONET:Tolerance)	b1	BRate = 52M B3ZS, Mod.freq = 400kHz, Ampl. = 0.2UIpp

‘KC’ Checks on Jitter measurement error in receiving side 1

Char.	Message	Bit	Error Details
KC	Jitter		Jitter tolerance is abnormal under the following conditions:
	(1.5/45M:RX Measure)	b0	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b1	BRate = 1.5M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 1.5M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 1.5M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 45M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 45M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 45M, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp

‘KD’ Checks on Jitter measurement error in receiving side 2

Char.	Message	Bit	Error Details
KD	Jitter		Jitter tolerance is abnormal under the following conditions:
	(SDH:RX Measure)	b0	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
	(SONET:RX Measure)	b1	BRate = 52M B3ZS, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b2	BRate = 52M B3ZS, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b3	BRate = 52M B3ZS, Range = 2UI, Mod.freq = 1kHz, Ampl. = 1UIpp
		b4	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b5	BRate = 156M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b6	BRate = 156M, Range = 20UI, Mod.freq = 1kHz, Ampl. = 8UIpp
		b7	BRate = 156M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp
		b8	BRate = 622M, Range = 800UI, Mod.freq = 10Hz, Ampl. = 200UIpp
		b9	BRate = 622M, Range = 400UI, Mod.freq = 10Hz, Ampl. = 40UIpp
		b10	BRate = 622M, Range = 20UI, Mod.freq = 1.5kHz, Ampl. = 8UIpp
		b11	BRate = 622M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

‘KG’ Checks on frequency measurement error 1

Char.	Message	Bit	Error Details
KG	Frequency (1.5/45M)		The frequency is abnormal under the following conditions:
		b0	BRate = 1.5M
		b1	BRate = 45M

‘KH’ Checks on frequency measurement error 2

Char.	Message	Bit	Error Details
KH	Frequency (SDH)		The frequency is abnormal under the following conditions:
	Frequency (SONET)	b0	BRate = 52M B3ZS
		b1	BRate = 156M
		b2	BRate = 622M

‘KI’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KI	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:Peak)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 400UI, Data
		b3	BRate = 1.5M, Range = 2UI, Data
		b4	BRate = 1.5M, Range = 20UI, Data
		b5	BRate = 1.5M, Range = 2UI, Clock
		b6	BRate = 1.5M, Range = 20UI, Clock
		b7	BRate = 1.5M, Range = 400UI, Clock
		b8	BRate = 1.5M, Range = 2UI, Clock
		b9	BRate = 1.5M, Range = 20UI, Clock

‘KJ’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KJ	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:Peak)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 400UI, Data
		b3	BRate = 45M, Range = 2UI, Data
		b4	BRate = 45M, Range = 20UI, Data
		b5	BRate = 45M, Range = 2UI, Clock
		b6	BRate = 45M, Range = 20UI, Clock
		b7	BRate = 45M, Range = 400UI, Clock
		b8	BRate = 45M, Range = 2UI, Clock
		b9	BRate = 45M, Range = 20UI, Clock

‘KK’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KK	Jitter		The measurement error is abnormal under the following conditions:
	(1.5M:Rx Intrinsic:RMS)	b0	BRate = 1.5M, Range = 2UI, Data
		b1	BRate = 1.5M, Range = 20UI, Data
		b2	BRate = 1.5M, Range = 2UI, Clock
		b3	BRate = 1.5M, Range = 20UI, Clock

‘KL’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KL	Jitter		The measurement error is abnormal under the following conditions:
	(45M:Rx Intrinsic:RMS)	b0	BRate = 45M, Range = 2UI, Data
		b1	BRate = 45M, Range = 20UI, Data
		b2	BRate = 45M, Range = 2UI, Clock
		b3	BRate = 45M, Range = 20UI, Clock

‘KM’ Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
KM	Jitter		The measurement error is abnormal under the following conditions:
	(SDH::Rx Intrinsic:Peak)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 400UI, Data
		b3	BRate = 52M B3ZS, Range = 2UI, Data
		b4	BRate = 52M B3ZS, Range = 20UI, Data
		b5	BRate = 52M B3ZS, Range = 2UI, Clock
		b6	BRate = 52M B3ZS, Range = 20UI, Clock
		b7	BRate = 52M B3ZS, Range = 400UI, Clock
		b8	BRate = 52M B3ZS, Range = 2UI, Clock
		b9	BRate = 52M B3ZS, Range = 20UI, Clock

‘KN’ Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
KN	Jitter		The measurement error is abnormal under the following conditions:
	(SDH:Rx Intrinsic:RMS)	b0	BRate = 52M B3ZS, Range = 2UI, Data
		b1	BRate = 52M B3ZS, Range = 20UI, Data
		b2	BRate = 52M B3ZS, Range = 2UI, Clock
		b3	BRate = 52M B3ZS, Range = 20UI, Clock

(16) MU150011A 2.5M Jitter Unit

'LA' Checks on Jitter tolerance in transmitting side

Char.	Message	Bit	Error Details
LA	Jitter (Tolerance)		Jitter tolerance is abnormal under the following conditions:
		b0	BRate = 2488M, Mod.freq:20kHz, Ampl.:2UIpp
		b1	BRate = 2488M, Mod.freq = 20MHz, Ampl. = 0.2UIpp

'LB' Checks on Jitter measurement error in receiving side

Char.	Message	Bit	Error Details
LB	Jitter (RX Measure)		Measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 32UI, Mod.freq = 10kHz, Ampl. = 10UIpp
		b1	BRate = 2488M, Range = 2UI, Mod.freq = 100kHz, Ampl. = 1UIpp

'LD' Checks on frequency measurement error

Char.	Message	Bit	Error Details
LD	Frequency		The frequency is abnormal under the following conditions:
		b0	BRate = 2488M

'LE' Checks on Jitter measurement (Intrinsic:Peak) in receiving side

Char.	Message	Bit	Error Details
LE	Jitter (Rx Intrinsic:Peak)		The measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 2UI, Data
		b1	BRate = 2488M, Range = 32UI, Data
		b2	BRate = 2488M, Range = 2UI, Data
		b3	BRate = 2488M, Range = 32UI, Data
		b4	BRate = 2488M, Range = 2UI, Clock
		b5	BRate = 2488M, Range = 32UI, Clock
		b6	BRate = 2488M, Range = 2UI, Clock
		b7	BRate = 2488M, Range = 32UI, Clock

'LF' Checks on Jitter measurement (Intrinsic:RMS) in receiving side

Char.	Message	Bit	Error Details
LF	Jitter (Rx Intrinsic:RMS)		The measurement error is abnormal under the following conditions:
		b0	BRate = 2488M, Range = 2UI, Data
		b1	BRate = 2488M, Range = 32UI, Data
		b2	BRate = 2488M, Range = 2UI, Clock
		b3	BRate = 2488M, Range = 32UI, Clock

(17) MP0109A Unit

'YA' MP0109A 622M Interface

Char.	Message	Bit	Error Details
YA	Interface(MP0109A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'YC' MP0109A 156M Interface

Char.	Message	Bit	Error Details
YC	Interface(MP0109A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(18) MP0110A Unit

'YE' MP0110A 622M Interface

Char.	Message	Bit	Error Details
YE	Interface(MP0110A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'YG' MP0110A 156M Interface

Char.	Message	Bit	Error Details
YG	Interface(MP0110A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(19) MP0104A Unit

'ZA' MP0104A 156M Interface

Char.	Message	Bit	Error Details
ZA	Interface(MP0104A:156M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

(20)　MP0104B Unit

'ZC'　MP0104B　156M Interface

Char.	Message	Bit	Error Details
ZC	Interface(MP0104B:156M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

'ZE'　MP0104B 622M Interface

Char.	Message	Bit	Error Details
ZE	Interface(MP0104B:622M)	b0	An error or alarm was detected under the following conditions: Alarm=OFF
		b1	No LOS was detected under the following conditions: Alarm=LOS

(21)　MP0105A Unit

'ZG'　MP0105A　156M Interface

Char.	Message	Bit	Error Details
ZG	Interface(MP0105A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(22)　MP0106B Unit

'ZI'　MP0106B 156M Interface

Char.	Message	Bit	Error Details
Z I	Interface(MP0106B:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'ZK'　MP0106B 622M Interface

Char.	Message	Bit	Error Details
ZK	Interface(MP0106B:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(23) MP0108A Unit

'ZM' MP0108A 622M Interface

Char.	Message	Bit	Error Details
ZM	Interface(MP0108A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'ZN' MP0108A 156M Interface

Char.	Message	Bit	Error Details
ZN	Interface(MP0108A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(24) MP0111A Unit

'WA' MP0111A 622M Interface

Char.	Message	Bit	Error Details
WA	Interface(MP0111A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WC' Optical power of MP0111A 622M Interface

Char.	Message	Bit	Error Details
WC	Jitter(MP0111A:622M Power)	b0	Optical power is abnormal under the following condition. BRate:622M

'WD' Optical power of MP0111A 156M Interface

Char.	Message	Bit	Error Details
WD	Interface(MP0111A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

'WF' Optical power of MP0111A 156M Interface

Char.	Message	Bit	Error Details
WF	Jitter(MP0111A:156M Power)	b0	Optical power is abnormal under the following condition. BRate:156M

(25) MP0112A Unit

‘WG’ MP0112A 622M Interface

Char.	Message	Bit	Error Details
WG	Interface(MP0112A:622M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

‘WI’ Optical power of MP0112A 622M Interface

Char.	Message	Bit	Error Details
W I	Jitter(MP0112A:622M Power)	b0	Optical power is abnormal under the following condition. BRate:622M

‘WJ’ MP0112A 156M Interface

Char.	Message	Bit	Error Details
WJ	Interface(MP0112A:156M)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

‘WL’ MP0112A 156M Interface Checks on Optical Power

Char.	Message	Bit	Error Details
WL	Jitter(MP0112A:156M Power)	b0	Optical power is abnormal under the following condition. BRate:156M

(26) MP0113A Unit(1.31)

‘XA’ MP0113A 622M(1.31) Interface

Char.	Message	Bit	Error Details
XA	Interface(MP0113A:622M 1.31)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

‘XD’ MP0113A 156M(1.31) Interface

Char.	Message	Bit	Error Details
XD	Interface(MP0113A:156M 1.31)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

(27) MP0113A Unit(1.55)

‘XG’ MP0113A 622M(1.55) Interface

Char.	Message	Bit	Error Details
XG	Interface(MP0113A:622M 1.55)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

‘XJ’ MP0113A 156M(1.55) Interface

Char.	Message	Bit	Error Details
XJ	Interface(MP0113A:156M 1.55)	b0	An error or alarm was detected under the following conditions: Alarm:OFF
		b1	No LOS was detected under the following conditions: Alarm:LOS

Appendix H Daily Maintenance, Storage and Transportation

H.1 Daily Maintenance

Stained outer surfaces

Wipe the stained outer surface using a cloth moistened in diluted neutral detergent. Wipe the surface in the same way after using that a dusty place, or before long-time storage. Do not use thinner or benzene as they may remove the surface paint.

Stained display screen

Wipe the stained display screen with a soft dry cloth. For a severely stained screen, use a cloth moistened in diluted neutral detergent. Do not use thinner or benzene.

Loose screws

Tighten loose screws with a suitable tool.

H.2 Storage

Precautions on storage

Avoid storing MP1570A in any of the following locations:

- Where the temperature does not fall in the -20 to +60°C range
- Where the humidity does not fall in the 20 to 75% range.
- Where it is exposed to direct sunlight.
- Where it is exposed to dust.
- Where condensation may occur due to high humidity.
- Where it is exposed to corrosive gases.

Recommended storage conditions

If MP1570A is to be stored for a long time, take the precautions mentioned above. We recommend that you to store it in a place that satisfies the following conditions:

- Temperature ..... 5 to 30°C
- Humidity ..... 40 to 75%

H.3 Transportation

Pay due attention to the following points when transporting MP1570A:

- Cover the front panel of MP1570A with a protective cover.
- Insert cushioning material which was removed when you unpacked MP1570A into the box.

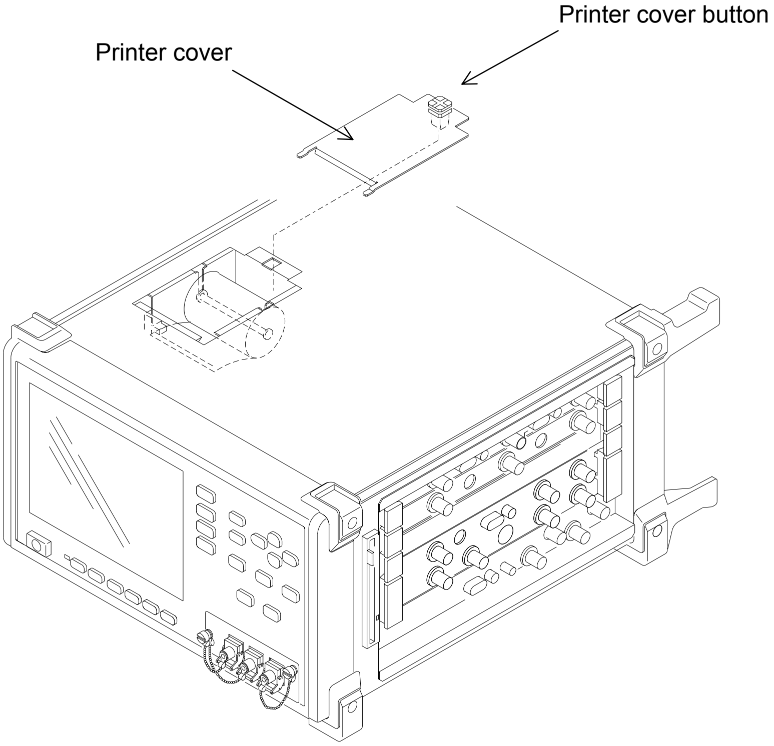
If you do not have any such cushioning materials, do the following steps:

(1) Apply a protective cover to the front of MP1570A.
(2) Wrap MP1570A in a plastic bag.
(3) Prepare a corrugated cardboard box, wooden box or aluminum case that is larger than MP1570A by 10 to 15 cm in each dimension, and put the cushioning materials at the bottom of the box up to a thickness of 10 to 15 cm.
(4) Put MP1570A wrapped in a plastic bag into the box, and insert the cushioning materials around it.
(5) Seal the box with a string, tape or band.

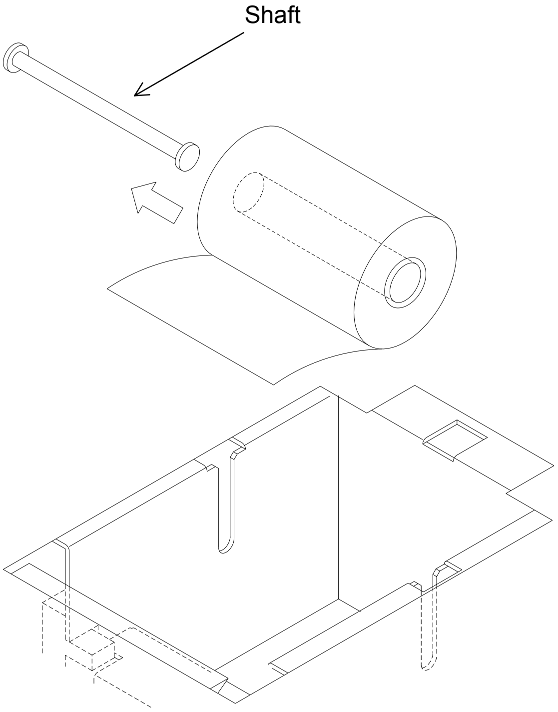
Appendix I Setting the Built-in Printer Paper

Here are the steps to load the printer paper in the built-in printer of MP1570A.

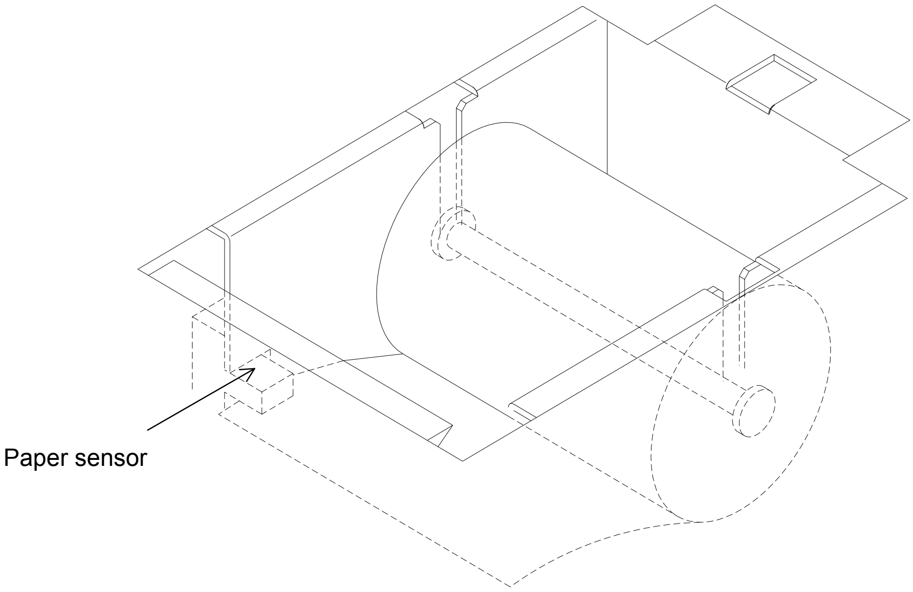
(1) Remove the printer cover by turning the printer cover button on the top of MP1570A clockwise or counter-clockwise.



(2) Remove the roll shaft and insert it through the new paper roll as shown in the figure below.



(3) Set the paper roll shaft, putting the paper end into the paper sensor.



(4) Make sure that the paper roll is properly loaded.

(5) You can feed paper by pressing Feed on the front panel.

Note

Always use the specified printer paper in accordance with '1.3.1 Equipment configuration with standard accessories'.

Use of other printer paper can cause the following troubles:

- Poor print quality due to low sensitivity
- Printer head wear due to the rough paper surface
- Abnormal printing noise
- Printer head corrosion or damage
- Print discoloring due to poor print preservation

Appendix J Mounting the Protective Cap of the Optical Connector

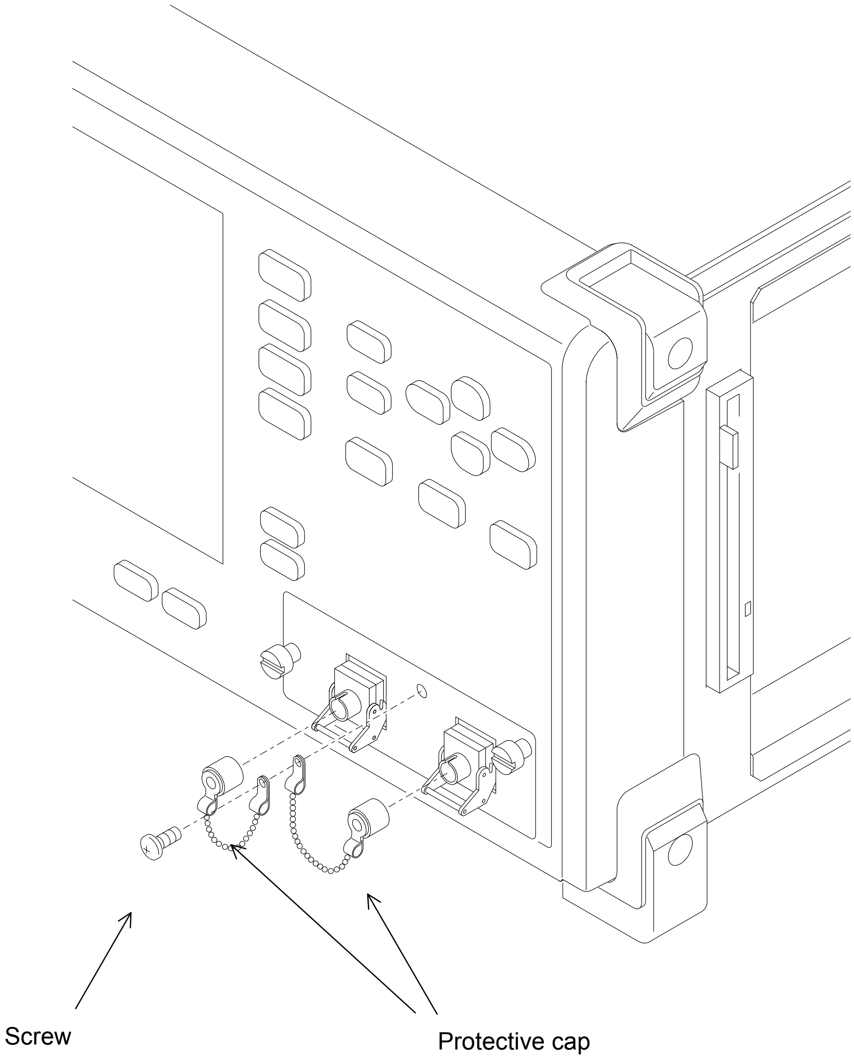
The optical interface units, MP0111A, MP0112A and MP0113A include replaceable optical connectors with protective caps as accessory parts. On replacing the optical connector, replace the cap as well.

J.1 Procedure for Mounting the Protective Cap of MP0111A and MP0112A.

(1) Check that the power switch of MP1570A is turned off.

(2) Remove the screws fixing the protective cap using a 2.5-mm Phillips screwdriver. Remove the protective caps.

(3) Fix the new protective caps with the removed screws.

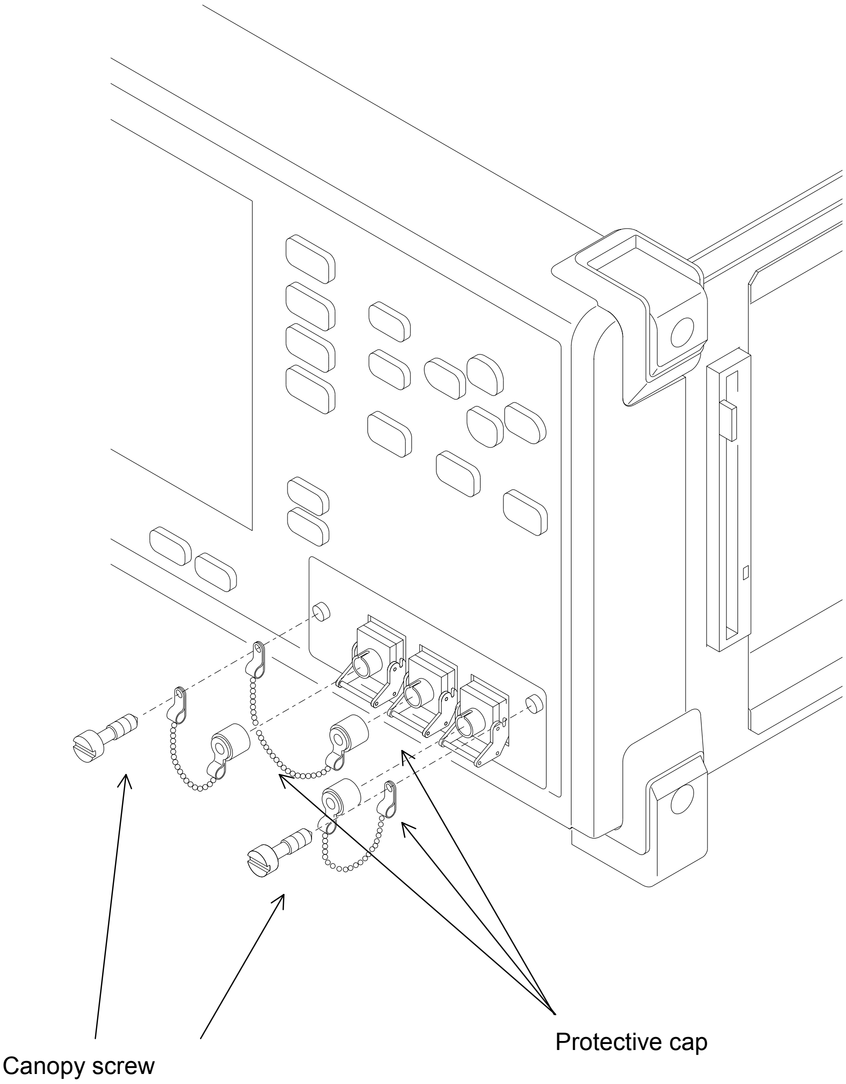


J.2 Procedure for Mounting the Protective Cap of MP0113A

(1) Check that the power switch of MP1570A is turned off.

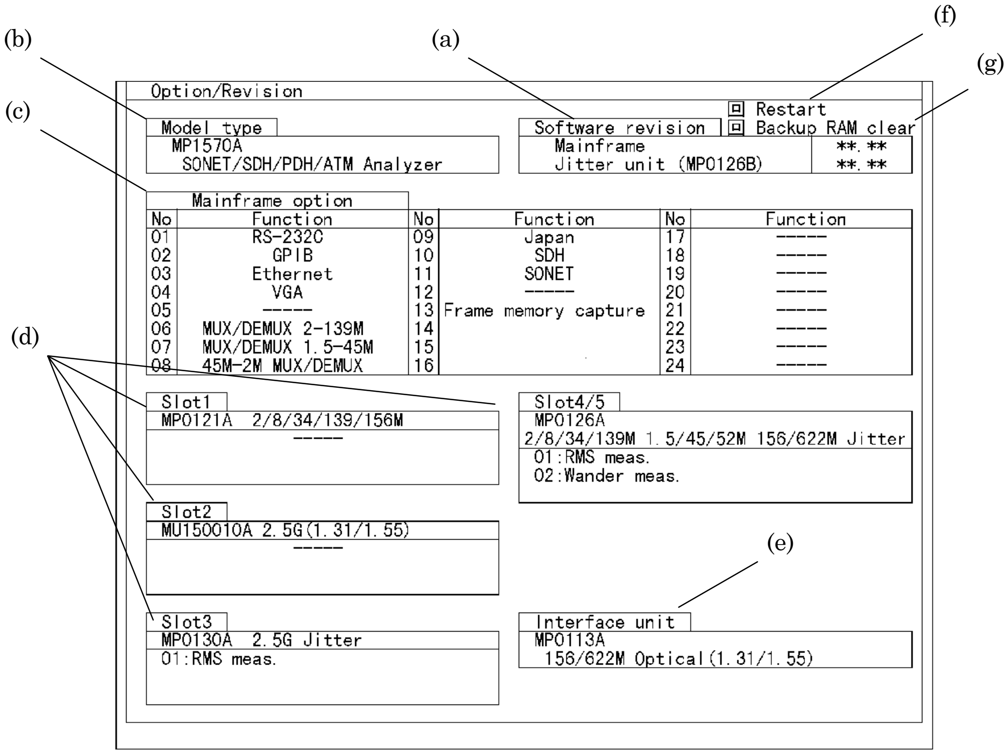
(2) Remove the canopy screws fixing the MP0113A to MP1570A.

(3) Mount the new protective caps and fix them with the screws removed in (2).



Appendix K Revision Numbers of Optional Items and Software

The revision numbers of optional items and software installed on MP1570A are displayed on the 'Option/Revision' screen. The 'Option/Revision' screen appears when you turn on the power switch while pressing Local. Here are the details of the display.



Option/Revision

☐ Restart
☐ Backup RAM clear

Model type
MP1570A
SONET/SDH/PDH/ATM Analyzer

Software revision
Mainframe **.**
Jitter unit (MP0126B) **.**

Mainframe option

No	Function	No	Function	No	Function
01	RS-232C	09	Japan	17	-----
02	GPIB	10	SDH	18	-----
03	Ethernet	11	SONET	19	-----
04	VGA	12	-----	20	-----
05	-----	13	Frame memory capture	21	-----
06	MUX/DEMUX 2-139M	14		22	-----
07	MUX/DEMUX 1.5-45M	15		23	-----
08	45M-2M MUX/DEMUX	16		24	-----

Slot1
MP0121A 2/8/34/139/156M

Slot4/5
MP0126A
2/8/34/139M 1.5/45/52M 156/622M Jitter
01:RMS meas.
02:Wander meas.

Slot2
MU150010A 2.5G(1.31/1.55)

Slot3
MP0130A 2.5G Jitter
01:RMS meas.

Interface unit
MP0113A
156/622M Optical(1.31/1.55)

(a) Software revision ..... displays the revision numbers of the software installed on MP1570A.

(b) Model type ..... displays the model name

(c) Mainframe option ..... displays the numbers and functions of optional items

(d) Slot, Slot2, Slot3, Slot4/5 ..... displays the model name, serial number, and options of the plug-in units installed in MP1570A.

(e) Interface unit ..... displays the unit name and serial number of the interface unit installed on the front panel of MP1570A

(f) ☐ Restart ..... The screen setting is reset and an ordinary screen appears if you move the cursor here and press Set.

(g) ☐ Backup RAM clear ..... On/Off for deleting the measurement conditions stored in memory.

☐ ..... Not delete

▣ ..... Delete

- When this button is set to "▣ ", all the initial values are set as the measurement conditions by and moving the cursor to "☐ Restart" and pressing Set .

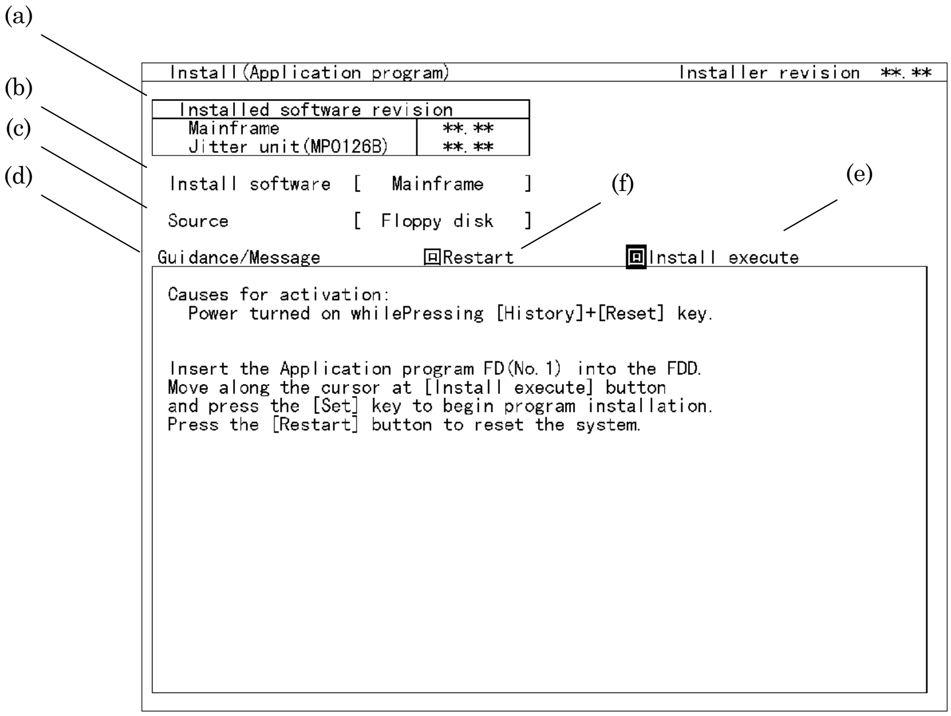
Appendix L Installation

L.1 Installing the Application Software *'Install (Application program)' screen*

You can install the application software on the 'Install' screen.

The 'Install' screen appears if you turn on the power switch of MP1570A while pressing ●History and Reset .

The 'Install' screen displays the startup conditions of the installation and the guidance message as follows:



```
Install(Application program)                                   Installer revision  **.**
 Installed software revision
   Mainframe                      **.**
   Jitter unit(MP0126B)           **.**
Install software   [   Mainframe    ]
Source             [ Floppy disk    ]
Guidance/Message
Causes for activation:
  Power turned on whilePressing [History]+[Reset] key.

Insert the Application program FD(No.1) into the FDD.
Move along the cursor at [Install execute] button
and press the [Set] key to begin program installation.
Press the [Restart] button to reset the system.
```

(a) Installed Software revision .... Revision information of the installed software. This is updated after the installation.

(b) Install software .... Sets the application to be installed.

(c) Source .... Sets the installation steps.

(d) Guidance Message .... Guidance message related to the installation

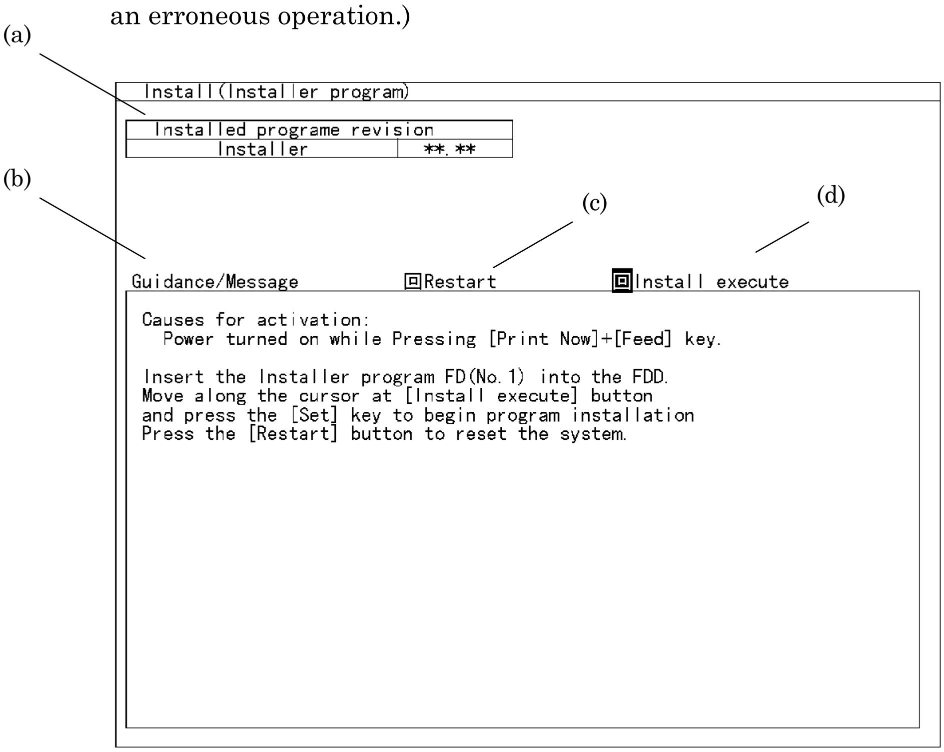
(e) Install Execute .... The reversed cursor is displayed here on completion of disk arrangement and installation.

(f) Restart .... Resets to display the ordinary screen when Set is pressed.

L.2 Upgrading the Installer *'Install (Installer Program)' screen*

You can upgrade the installer on the 'Install (Install Program)' screen. The 'Install (Install Program)' screen appears when you turn on the power switch of MP1570A while pressing Print Now and Feed.

The 'Install (Install Program)' screen displays the revision number of the installer on the upper-right corner. (The upgrading (installation) of the installer is usually prohibited. The field shown in green to prevent an erroneous operation.)



```
Causes for activation:
  Power turned on while Pressing [Print Now]+[Feed] key.

Insert the Installer program FD(No.1) into the FDD.
Move along the cursor at [Install execute] button
and press the [Set] key to begin program installation
Press the [Restart] button to reset the system.
```

(a) Installed Program revision .... Displays the revision information. This is updated after the installation.

(b) Guidance / Message ....Displays a guidance message for installation

(c) Restart ....Resets the screen to open the 'Install' screen when Set is pressed. Install the software for MP1570A.

(d) Install Execute ....The reversed cursor is displayed here on completion of disk arrangement and installation.