MU120001A
STM-4/OC-12 Unit
Operation Manual

Seventh Edition

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

ANRITSU CORPORATION

Document No.: M-W1308AE-7.0

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

Symbols used in manual

DANGER 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. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

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

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

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

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

These indicate that the marked part should be recycled.

MU120001A
STM-4/OC-12 Unit
Operation Manual

30 July 1997 (First Edition)
21 September 2004 (Seventh Edition)

For Safety

WARNING ⚠

1. ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.
   Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

2. Laser radiation warning
   - NEVER look directly into the cable connector on the equipment nor into the end of a cable connected to the equipment. If laser radiation enters the eye, there is a risk of injury.
   - The Laser Safety label is attached to the equipment for safety use as indicated in "Laser Safety" on a following page.

Repair

WARNING ⚠

3. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative 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 parts.

For Safety

CAUTION ⚠

Check Terminal

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

For Safety

Laser Safety

The laser in this equipment is classified as Class 1 according to the IEC 60825-1 specifications, or as Class I according to the 21CFR 1040.10 specifications. These classes of lasers are safe under reasonably foreseeable operating conditions.

Classes are indicated on the label attached near the laser-radiations.

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

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

Equipment Certificate

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

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

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

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

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

Anritsu Corporation Contact

If this equipment develops a fault, contact Anritsu Service and Sales offices at the address at the end of paper-edition manual or the separate file of CD-edition manual.

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

Plug-in Units: MU120001A STM-4/OC-12 Unit

2. Applied Directive and Standards

When the MU120001A STM-4/OC-12 Unit is installed in the MP1220A, the applied directive and standards of this Unit are conformed to those of the MP1220A main frame.

PS: About main frame
The kind of main frame (a measuring apparatus) will be to increase. Please, contact us about the newest information of the main frame.

C-tick Conformity marking

Anritsu affixes the C-tick marking 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

1. Product Model

Plug-in Units: MU120001A STM-4/OC-12 Unit

2. Applied Directive and Standards

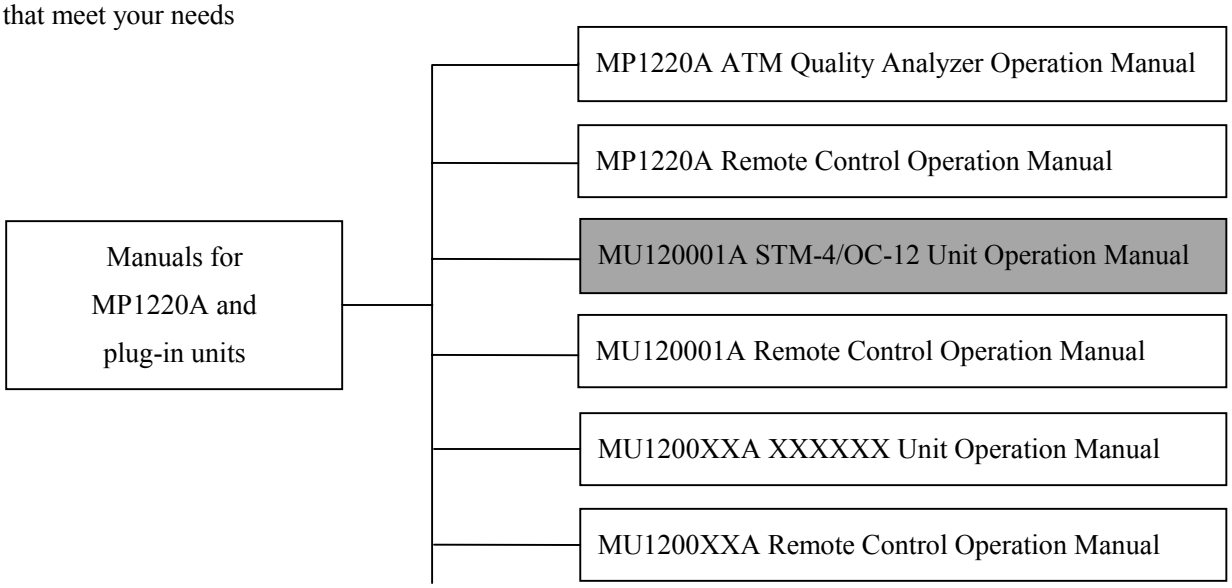
When the MU120001A STM-4/OC-12 Unit is installed in the MP1220A, the applied directive and standards of this Unit are conformed to those of the MP1220A main frame.

PS: About main frame
The kind of main frame (a measuring apparatus) will be to increase. Please, contact us about the newest information of the main frame.

PREFACE

Organization of the Operation Manual

MU120001A STM-4/OC-12 Unit is one of the plug-in units which can be inserted to the MP1220A ATM Quality Analyzer. Manuals are provided for the mainframe and each of the plug-in units. Each manual is supplemented with a remote control instruction manual (the remote control software is optional). Select and use the manuals that meet your needs



- MP1220A ATM Quality Analyzer Operation Manual
  Provides an overview of the MP1220A and describes its usage precautions, panel configuration, specifications, performance, and operation.
- MP1220A ATM Quality Analyzer Remote Control Operation Manual
  Describes how to control the equipment through an external interface, and provides program examples.
- Operation Manuals for each unit
  Provides an overview of each unit and describes its specifications, performance and operation.
- Operation Manuals for each unit's remote control units
  Describes how to control the unit through an external interface, and provides programs examples.

CONTENTS

IV.

SECTION 1 OVERVIEW

1.1 Product Overview

The MU120001A STM-4/OC-12 Unit (referred hereafter as "this unit"), which is inserted into a slot of the MP1220A ATM Quality Analyzer (referred hereafter as the "mainframe"), adds a frame to, or terminates 51.840Mb/s, 155.520Mb/s, and 622.08Mb/s signals, and also performs HEC synchronization.

Features

- **Loop back function**
  - Loop back function for received signal (received signal is looped back inside the unit, and sent back to external connector, MU120020A QoS unit, and MU120021A protocol unit)
  - Loop back function for transmitted signal (transmission signal is looped back to the receiver unit, as well as sent to the external connector).

- **Error/Alarm measurement**

Displays error ratios, error counts, error status, and alarm status.

- Cell number count by HEC function
  - Number of cells discarded due to header error
  - Number of cells corrected for header error

1.2 Specifications

Table 1-1 shows the specifications of the unit.

Table 1-1 Specifications

No.	Item	Specifications
1	Input/Output	
1.1	Output	
	Transmission bit rate	51.840Mb/s ± 10ppm
		155.520Mb/s ± 10ppm
		622.080Mb/s ± 10ppm
	Output pulse shape	In compliance to G.957(ITU-T) and TA-NWT-000253
	Output level	-15 ～ 8 dBm
	Wavelength	1.31 μ m (SM)
	Input	
	Reception bit rate	51.840Mb/s ± 100ppm
		155.520Mb/s ± 100ppm
		622.080Mb/s ± 100ppm
	Input level	52M : -34 ～ -8dBm
		156M : -34 ～ -8dBm
		622M : -28 ～ -8dBm
	Wavelength	1.31 μ m (SM)
	Connector	FC-PC (Exchangeable)
	Coding scheme	NRZ
1.2	Ext Clk Input	
	Frequency	When OC-1 : 51.840MHz±100ppm (rectangular wave only)
		When OC-3 (STM-1) : 155.520MHz±100ppm (rectangular wave only)
		When OC-12 (STM-4) : 155.520MHz±100ppm (rectangular wave only)
	Level	0.6 ～ 1.2Vp-p
	Connector	BNC 50Ω
1.3	Rcv Clk Output	
	Frequency	When OC-1 : 51.840MHz (±ppm allowance is determined by the input)
		When OC-3(STM-1) : 155.520MHz (±ppm allowance is determined by the input)
		When OC-12(STM-4) : 155.520MHz (±ppm allowance is determined by the input)

No.	Item	Specifications
	Level	0.7 ～ 1.4Vp-p(transmission or reception independence, loop back from reception to transmission Duty50±5%)
	Connector	BNC 50Ω
1.4	Trig Output	
	Level	TTL (triggered when pulled low)
	Connector	BNC75Ω
2	Operation mode	
2.1	Frame format	SDH/SONET
2.2	Measurement mode	Input and output are mutually independent. The reception signal is looped back to transmission stage. The transmission signal is looped back to reception stage inside the unit.
2.3	Unit through function	
	Transmission through	The cell from the lower unit can be passed through the upper unit.
	Reception through	The cell from the upper unit can be passed through the lower unit.
3	Transmission function	
3.1	Network type	UNI/NNI
3.2	Clock selection	Internal, External, Received
3.3	Overhead setting	
	SOH	All bytes except B1, B2, H1, H2, H3.
	POH	All bytes except B3.
3.4	TC function	
	Transmission free cell setting	GFC, PT, CLP, HEC and Payload (48 bytes are same value as bite unit.)
	Transmission scramble cell	ON/OFF
	Transmission coset processing	ON/OFF

No.	Item	Specifications
3.5	Error addition	
	Types	Bit, B1, B2, B3, FEBE-L(MS-REI), FEBE-P(HP-REI), Cell
	Timing	SINGLE, $1x10^{-n}$ (n=3, 4, 5, 6, 7, 8, 9), ALL However, 622M : n=4, 5, 6, 7, 8, 9 for B1, B3, FEBE-L(MS-REI), FEBE-P(HP-REI). n=3, 4, 5, 6 for Cell. 156M : n=4, 5, 6, 7, 8, 9 for B1, B3, FEBE-P(HP-REI). n=3, 4, 5, 6 for Cell. 52M : n=3, 4, 5, 6 for Cell
	Burst	1-64 (only when cell is used)
	Word addition to Error	Specify arbitrary byte in the cell (only when cell is used)
	Error Mask	Specifies mask bit (only when cell is used)
3.6	Alarm Addition	
	Types	LOS, LOF, AIS-L(MS-AIS), RDI-L(MS-RDI), AIS-P(AU-AIS), RDI-P(HP-RDI), LCD
	Timing	ALL
4	Reception function	
4.1	Network type	UNI/NNI
4.2	1023ch measurement function	
	Setting	Type selection : VP or VP/VC Default channel : ON/OFF Channel number : 1～1023 Setting channel search time : 5～99sec (1second unit) 1～99min (1minute unit)
4.3	Overhead monitor	
	SOH	All bytes Except 622M transmission to reception loopback.
	POH	All bytes

No.	Item	Specifications
4.4	TC function	
	Cell de-scramble	ON/OFF
	Coset processing	ON/OFF
	HEC error correction	ON/OFF
4.5	Error Detection	
	Types	B1, B2, B3, FEBE-L(MS-REI), FEBE-P(HP-REI), Corrected Cell, Discarded Cell, however B1,B2 and FEBE-L(MS-REI) are not measured in the 622M transmission to reception loopback.
	Display	Count display : 0～999999, 1.00E06～9.99E15, >9.99E15 Error seconds display : 0～999999, 1.00E06～9.99E15, >9.99E15[s] Rate display : 1.00E-15～1.00E00, 0.00E00～0.00E-15, <1.00E-15
4.6	Alarm Detection	
	Types	LOS, OOF, LOF, AIS-L(MS-AIS), RDI-L(MS-RDI), AIS-P(AU-AIS), RDI-P(HP-RDI), LOP-P(AU-LOP), LCD, however LOS is not displayed in the 622M transmission to reception loopback. OOF,LOF,AIS-L(MS-AIS),RDI-L(MS-RDI) and LOP-P(AU-LOP) are not measured in the 622M transmission to reception loopback.
	Display	0-999999, 1.00E06-9.99E15, >9.99E15 [s]
4.7	Analyze function	Displays the detected Error/Alarm in the graph.
5	Pointer Operation	
5.1	Pointer settings by the user	S Bit : 00 to 11 Pointer value : 0 to 782
5.2	Justification Timing	+PJC, -PJC SINGLE, REPEAT: n seconds interval (n=0.5, 1, 2, 5, 10)
5.3	Pointer value monitor	NDF bit, S bit, AU pointer value
6	Path Trace (J0, J1)	(SDH)
6.1	Transmission function	Path Trace User setting : ON/OFF CRC-7 addition : ON/OFF Data setting display : CRC-7 addition ON : 15 bytes HEX/ASCII CRC-7 addition ON : 64 bytes HEX/ASCII (SONET) Path Trace User setting : ON/OFF Data setting display : 64 bytes HEX/ASCII
6.2	Path Trace (J0, J1) monitor	Monitor/Pause display : 64 bytes ASCII data, Judgment of CRC-7 error or no error.

<table>
<tr><th>No.</th><th>Item</th><th>Specifications</th></tr>
<tr><td>7</td><td>K1/K2 byte monitor
K1 bit</td><td>Monitor/Pause
(1 is MSB)
<table>
<tr><th>1234</th><th>Display</th></tr>
<tr><td>1111</td><td>Lockout of Protection</td></tr>
<tr><td>1110</td><td>Forced Switch</td></tr>
<tr><td>1101</td><td>Signal Fail - High Priority</td></tr>
<tr><td>1100</td><td>Signal Fail - Low Priority</td></tr>
<tr><td>1011</td><td>Signal Degrade - High Priority</td></tr>
<tr><td>1010</td><td>Signal Degrade - Low Priority</td></tr>
<tr><td>1001</td><td>Unused</td></tr>
<tr><td>1000</td><td>Manual Switch</td></tr>
<tr><td>0111</td><td>Unused</td></tr>
<tr><td>0110</td><td>Wait to Restore</td></tr>
<tr><td>0101</td><td>Unused</td></tr>
<tr><td>0100</td><td>Exercise</td></tr>
<tr><td>0011</td><td>Unused</td></tr>
<tr><td>0010</td><td>Reverse Request</td></tr>
<tr><td>0001</td><td>Do Not Revert</td></tr>
<tr><td>0000</td><td>No Request</td></tr>
</table>
(8 is LSB)
<table>
<tr><th>5678</th><th>Display</th></tr>
<tr><td>1111</td><td>Extra Traffic Channel</td></tr>
<tr><td>1110</td><td>Working Channel</td></tr>
<tr><td>1101</td><td>Working Channel</td></tr>
<tr><td>1100</td><td>Working Channel</td></tr>
<tr><td>1011</td><td>Working Channel</td></tr>
<tr><td>1010</td><td>Working Channel</td></tr>
<tr><td>1001</td><td>Working Channel</td></tr>
<tr><td>1000</td><td>Working Channel</td></tr>
<tr><td>0111</td><td>Working Channel</td></tr>
<tr><td>0110</td><td>Working Channel</td></tr>
<tr><td>0101</td><td>Working Channel</td></tr>
<tr><td>0100</td><td>Working Channel</td></tr>
<tr><td>0011</td><td>Working Channel</td></tr>
<tr><td>0010</td><td>Working Channel</td></tr>
<tr><td>0001</td><td>Working Channel</td></tr>
<tr><td>0000</td><td>Null Channel</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Specifications</th></tr>
<tr><td></td><td>K2 bit</td><td>(1 is MSB)
<table>
<tr><th>1234</th><th>Display</th></tr>
<tr><td>1111</td><td>Extra Traffic Channel</td></tr>
<tr><td>1110</td><td>Working Channel</td></tr>
<tr><td>1101</td><td>Working Channel</td></tr>
<tr><td>1100</td><td>Working Channel</td></tr>
<tr><td>1011</td><td>Working Channel</td></tr>
<tr><td>1010</td><td>Working Channel</td></tr>
<tr><td>1001</td><td>Working Channel</td></tr>
<tr><td>1000</td><td>Working Channel</td></tr>
<tr><td>0111</td><td>Working Channel</td></tr>
<tr><td>0110</td><td>Working Channel</td></tr>
<tr><td>0101</td><td>Working Channel</td></tr>
<tr><td>0100</td><td>Working Channel</td></tr>
<tr><td>0011</td><td>Working Channel</td></tr>
<tr><td>0010</td><td>Working Channel</td></tr>
<tr><td>0001</td><td>Working Channel</td></tr>
<tr><td>0000</td><td>Null Channel</td></tr>
</table>
<table>
<tr><th>5</th><th>Display</th></tr>
<tr><td>1</td><td>1 : n architecture</td></tr>
<tr><td>0</td><td>1+1 architecture</td></tr>
</table></td></tr>
<tr><td>8</td><td>Trigger generation
Type

Port connection
Trigger output
Internal trigger</td><td>ON/OFF
LOS, OOF, LOF, AIS-L(MS-AIS), RDI-L(MS-RDI),
AIS-P(AU-AIS), RDI-P(HP-RDI), LOP-P(AU-LOP)
ON/OFF
Internal-1/Internal-2
Internal-1/Internal-2</td></tr>
<tr><td>9</td><td>Mechanical
Dimension
Mass</td><td>
29.5 (H)×169 (W)×241 (D)[mm]
1.0 kg or less</td></tr>
<tr><td>10</td><td>Environmental performance</td><td>Conforms to the mainframe specifications.</td></tr>
</table>

1.3 Configuration of the Instrument.

1.3.1 Standard configuration

Table 1-2 shows the standard configuration of this unit.

Table 1-2 Standard configuration

Item	Type or Symbol	Name	Quantity	Remarks
This unit	MU120001A	STM-4/OC-12 Unit	1	
Accessory	M-W1308AE	MU120001A Operation Manual	1	
	M-W1314AE	MU120001A Remote Control Operation Manual	1	

1.3.2 Accessories

Table 1-3 shows Accessories of this unit

Table 1-3 Accessories

Type or Symbol	Name	Quantity	Remarks
J0775D	Coaxial cord, 2m (75Ω)	1	
J0776D	Coaxial cord, 2m (50Ω)	1	
J0635B	Optical fiber cord, 2m (SM)	1	both end with FC-SPC connector
J0660B	Optical fiber cord, 2m (SM)	1	both end with SC-SPC connector
J0796A	Replaceable Optical Connector (ST)	1	
J0796B	Replaceable Optical Connector (DIN)	1	
J0796C	Replaceable Optical Connector (SC)	1	
J0796D	Replaceable Optical Connector (HNS-10/A)	1	
J0796E	Replaceable Optical Connector (FC)	1	

SECTION 2 PREPARATION FOR USE

2.1 Environmental Requirements for the Installation Site

Avoid using the instrument in the following locations:

1. Temperature higher than 50℃ or lower than 5℃ is expected, or humidity higher than 85% or lower than 45% is expected
2. Where the sun directly hits the instrument, or the atmosphere is dusty
3. Where dew condensation is expected, or corrosive gases are present
4. Where the instrument is exposed to oxidation or severe vibration

2.2 Safety Precautions

- This unit is designed solely for use with the MP1220A ATM Quality Analyzer. Never attempt to insert the unit into another instrument; this may cause irreversible damage to the instrument or an accident.
- When the signal is input to the instrument, take every care to avoid applying voltages exceeding the rated values. This may cause irreversible damage to the circuitry.
- When you try to use the instrument after placing it in low temperature for a prolonged period of time, dew formation may cause short circuit. Be sure the instrument is well equilibrated to the ambient temperature and kept dry.
- To avoid electrostatic damage, the grounds of this unit and external devices (including experimental ones) should be connected prior to any signal connection.
- Because capacitance may be accumulated between the external shields and inner core of the coaxial cable, be sure to discharge the capacitance before use.

SECTION 3 PANEL CONFIGURATION

3.1 Panel Configuration and Description

Fig.3-1 shows the front panel of the unit, and Table 3-1 describes the function of each item.

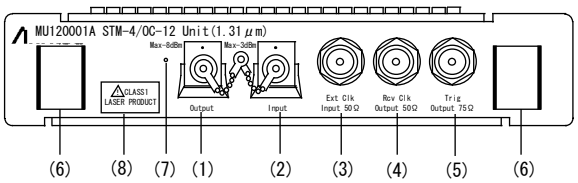


Fig.3-1 MU120001A STM-4/OC-12 UNIT front panel

Table 3-1 Description of MU120001A STM-4/OC-12 UNIT front panel

No.	Label	Description
(1)	Output	Optical signal output connector (FC)
(2)	Input	Optical signal input connector (FC)
(3)	Ext Clk Input 50Ω	External clock input connector (BNC)
(4)	Rcv Clk Output 50Ω	Received clock output connector (BNC)
(5)	Trig Output 75Ω	Trigger output connector (BNC)
(6)	(Ejector)	Insertion/extraction ejector for the unit
(7)	(LED)	Optical signal indicating LED. LED is lighted when the optical signal is output.
(8)	CLASS 1 LASER PRODUCT	Safe laser presenting no danger when used according to design specifications (JIS, IEC825 and 21 CFR1040.10).

SECTION 4 DESCRIPTION OF SCREEN

4.1 MU120001A STM-4/OC-12 UNIT window

The MU120001A STM-4/OC-12 Unit window, which can be invoked from the Tool Bar in MP1220A ATM Quality Analyzer window, is used to configure all settings and to show results. See the MP1220A ATM Quality Analyzer User's manual for a detailed description of the window.

The MU120001A STM-4/OC-12 Unit window is comprised of the following panels.

Table 4-1 Configuration panel

Panel Name	Main Purpose
Construction Panel	Configures transmitter/receiver interface settings.
Tx-Setup panel	Configures transmitter functions
Rx-Setup panel	Configures receiver functions
Alarm/Error panel	Displays Alarm/Error measurement results
Analyze panel	Displays Alarm/Error history. But, this panel is only displayed when the Logging of Measurement-1 panel is set ON in Main frame window. (Refer to the MP1220A ATM Quality Analyzer Operation Manual)
Monitor panel	Displays overhead of the monitoring

Fig.4-1 shows the MU120001A STM-4/OC-12 Unit window.

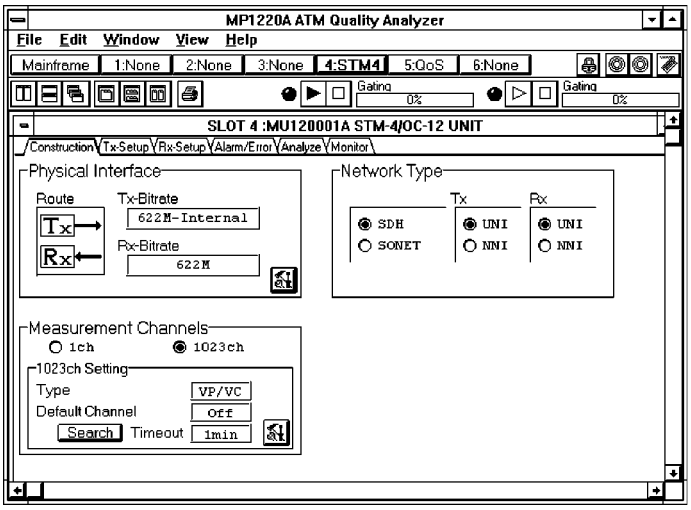


Fig.4-1 MU120001A STM-4/OC-12 Unit window

4.2 Construction Panel

Fig.4-2 shows the construction panel, and Table 4-2 describes each item.

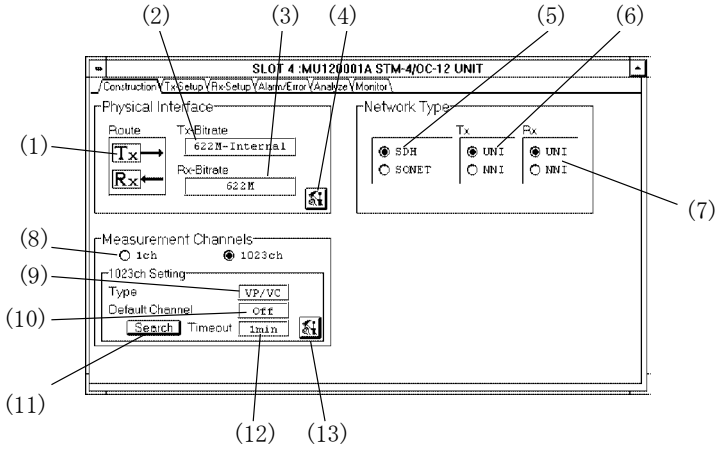


Fig.4-2 Description of construction panel

No.	Item	Description
(1)	Route	Displays the flow of the signals inside the unit.
(2)	Tx-Bitrate	Displays the bit rate and type of clock in the transmission unit.
(3)	Rx-Bitrate	Displays the bit rate in the reception unit.
(4)		Opens Physical Interface Setup dialog box.
(5)	SDH, SONET	Configures frames.
(6)	Tx	Network type of the transmitter
(7)	Rx	Network type of the receiver
(8)	Measurement Channels	Sets the monitor of the band width of each channel and AIS/RDI status in ATM network. (Live-Monitor measurement) The MU120020A QoS Unit and MU120021A Protocol Unit are needed for selecting "1023ch" of the Live-Monitor measurement. 1ch : Selects the monitor for 1ch. 1023ch : Selects the monitor for 2ch to 1023ch at the same time. When set "1023ch" at "Repeat" in measurement mode, the warning dialog box appears and the setting returns to "1ch".
(9)	Type	Displays the type name capable of 1023ch measurement.
(10)	Default Channel	Shows if the Default Channel settings is enabled/disabled.
(11)	Search	Starts the 1023ch search when the button is pushed.
(12)	Time Out	Displays time-out interval for 1023ch search.
(13)		Opens Search Condition configuration dialog. Cannot be used while measurement is taking place.

4.2.1 Physical Interface Setup dialog box

Fig.4-3 shows the Physical Interface Setup dialog box, and Table 4-3 describes each item.

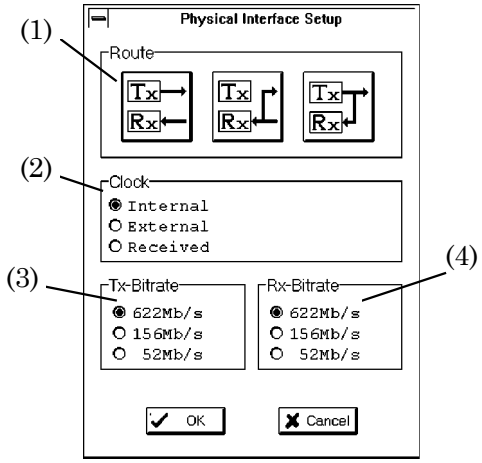


Fig.4-3 Physical Interface Setup dialog box

Table 4-3 Description of Physical Interface Setup dialog box

No.	Item	Description
(1)	Route	Selects the flow of signal inside the unit.  : Transmitter and receiver function independently  : Receiver loop back operation  : Transmitter loop back operation
(2)	Clock	Selects the transmitter clock Internal : functions by internal clock External : functions by the clock from external connector Received : functions by the regenerated clock from received data
(3)	Tx-Bitrate	Selects transmitting rate
(4)	Rx-Bitrate	Selects receiving rate

Note

Tx-Bitrate : 52 Mb/s
Clock : External

Selects the above setting after the external clock is supplied to Ext Clk Input connector.
Once the connecting cable between the external clock source and Ext Clk Input connector is discontinued or the external clock is not supplied, LCD alarm will be added with data even if the external clock is supplied again.
In this case, selects Internal Clock (selects OK) then selects External Clock, the normal data will be transmitted.

Note

Route : 

Tx-Bitrate : 622Mb/s

When this unit is used by above setting, the data is sent by internal loop back as the Path level.

4.2.2 Search Condition Setup dialog box

Fig.4-4 shows the Search Condition Setup dialog box, and Table 4-4 describes each item in the box.

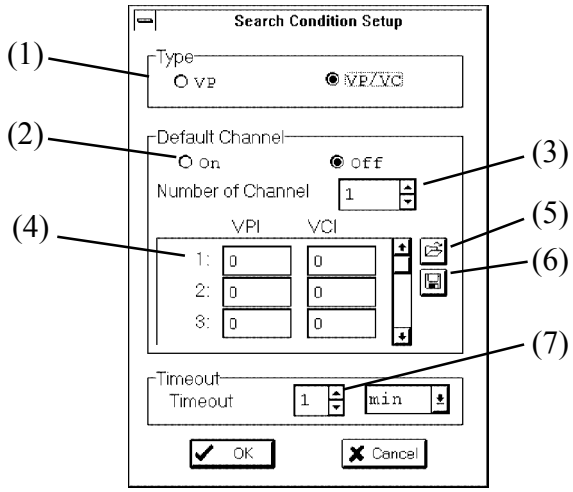


Fig.4-4 Search Condition Setup dialog box

Table 4-4 Description of Search Condition Setup dialog box

No.	Item	Description
(1)	Type	Selects type of cells to search
(2)	Default Channel	Select if Default Channel setting is activated
(3)	Number of Channel	Specifies the number of the channels to search
(4)		Specifies VPI and VCI values
(5)		Reads Default Channel settings from a file
(6)		Saves Default Channel settings to a file
(7)	Time Out	Sets the time out for searching 1023ch

4.3 Tx-Setup Panel

Fig.4-5 shows the Tx-Setup panel, and Table 4-5 contains the descriptions of each item in the panel.

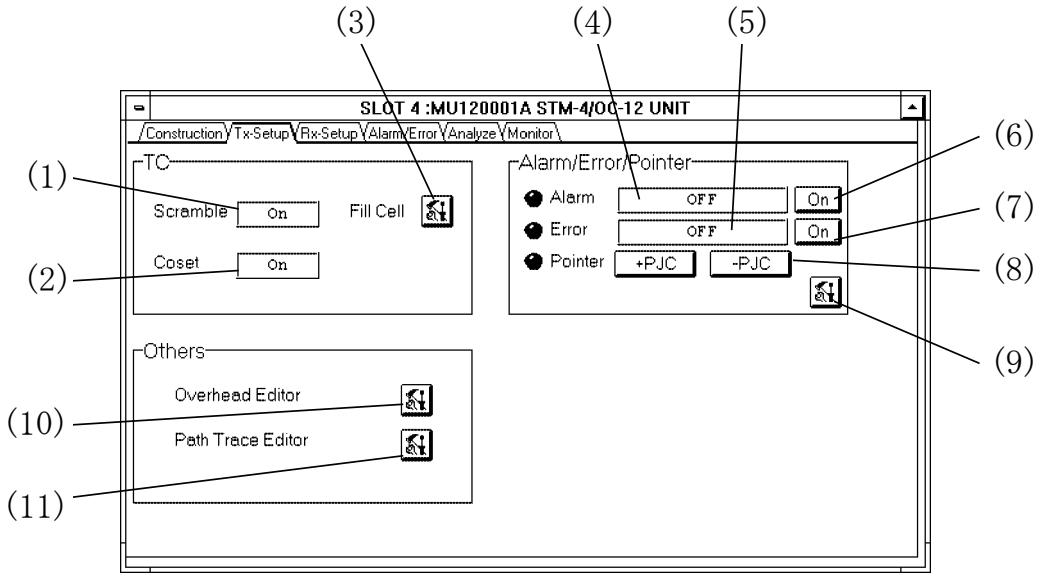


Fig.4-5 Tx-Setup panel

Table 4-5 Description of Tx-setup panel

No.	Item	Description
(1)	Scramble	Display current scramble setting in the Transmission cell payload.
(2)	Coset	Display current coset setting in the transmission cell HEC.
(3)	Fill Cell	Opens Tc setup dialog box.
(4)	Alarm	Displays the type of alarms currently used.
(5)	Error	Displays the type of errors currently used.
(6)	On	Adds the alarm displayed in (4).
(7)	On	Adds the error displayed in (5).
(8)	+PJC, -PJC	Increments/decrements specified pointer interval.
(9)		Opens alarm/error/pointer setup dialog box.
(10		Opens overhead editor.
(11)		Opens path Trace editor.

4.3.1 Tc Setup dialog box

Fig.4-6 shows the Tc Setup dialog box, and Table 4-6 describes each item in the dialog box.

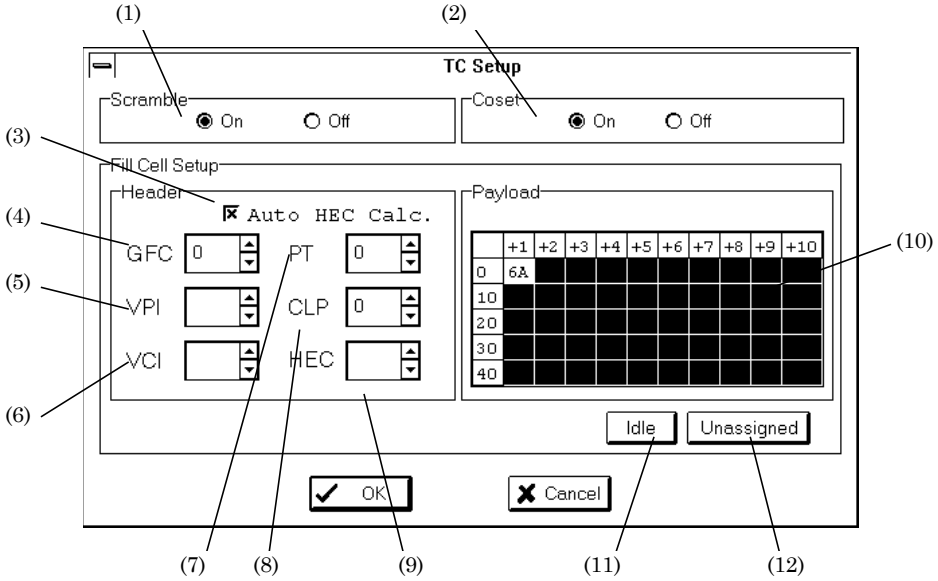


Fig.4-6 Tc Setup dialog box

Table 4-6 Description of Tc Setup dialog box

No.	Item	Description
(1)	Scramble	Selects scramble setting in the payload of transmission cell.
(2)	Coset	Selects coset setting in HEC of Transmission cell.
(3)	Auto HEC Calc	Selects if HEC is automatically calculated and added.
(4)	GFC	Specifies CFC value. CFC cannot be selected if 4.2(5) is set to NNI.
(5)	VPI	Displays VPI value. The value is fixed to 0.
(6)	VCI	Displays VCI value. The value is fixed to 0.
(7)	PT	Specifies PT value.
(8)	CLP	Specifies CLP value.
(9)	HEC	Specifies HEC value. The value cannot be specified if Auto HEC Calc. is checked in (1).
(10)	Payload	Specifies the Payload value. Double click on the frame of crossing the vertical position 0 and horizontal position +1, then Byte Setup dialog box is opened.
(11)	Idle	If you push the button, the contents of Idle cell are displayed in the Header and Payload group boxes. The contents of the Idle cell are; GFC:0, VPI:0, PT:0, CLP:1, HEC: calculated value, and Payload: 6A.
(12)	Unassigned	If you push the button, the contents of Unassigned cell are displayed in the Header and Payload boxes. The contents of the Unassigned cell are; GFC:0, VPI:0, VCI:0, PT:0, CLP:0, HEC: calculated value, and Payload: 6A.

4.3.1.1 Byte Setup Dialog Box

Figure 4-7 shows the Byte Setup dialog box, and Table 4-7 describes the dialog box.

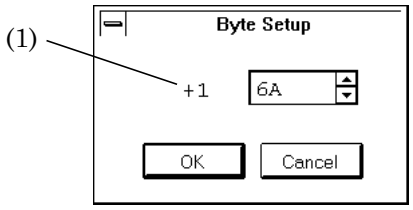


Fig.4-7 Byte Setup Dialog Box

Table 4-7 Byte Setup Dialog Box Description

No.	Item	Description
(1)		Specifies a payload value. All 48 bites are set to the specified value.

4.3.2 Alarm/Error/Pointer Setup dialog box

4.3.2.1 Alarm panel

Fig.4-8 shows the Alarm panel, and Table 4-8 describes each item in the panel.

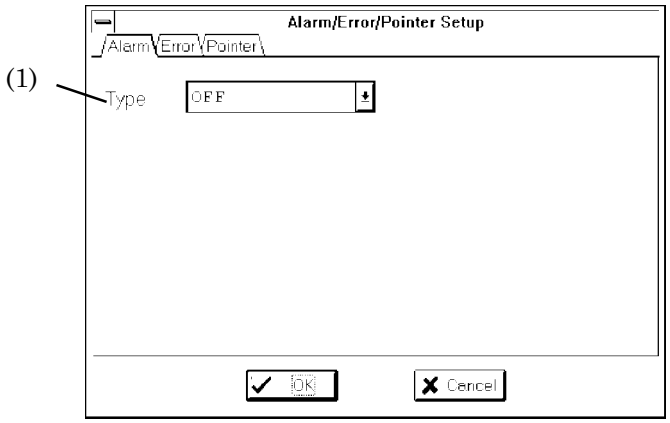


Fig.4-8 Alarm panel

Table 4--8 Description of alarm panel

No.	Item	Description
(1)	Type	Selects the type of alarms to add.

4.3.2.2 Error panel

Fig.4-9 shows the Error panel, and Table 4-9 describes each item in the panel.

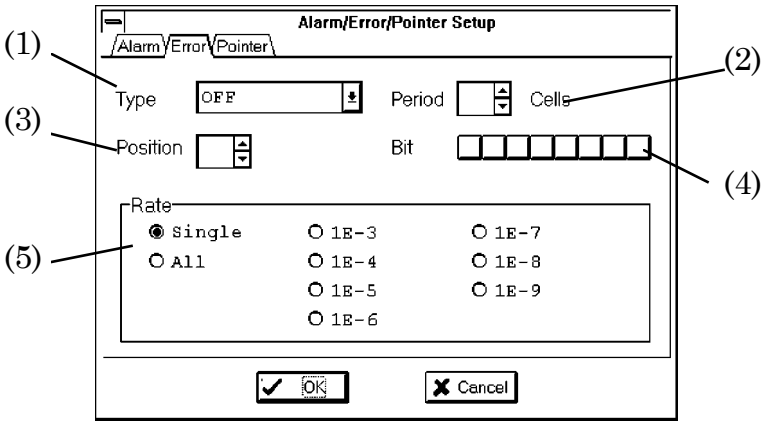


Fig.4-9 Error panel

Table 4-9 Description of Error panel

No.	Item	Description
(1)	Type	Selects the type of errors to add. If Bit has been selected either in the MU120020A QoS unit or the MU120021A protocol unit setting screens, a warning dialog appears to prompt your verification when Cell is selected.
(2)	Period	Specifies the number of continuous cells to add the error. Specify the desired value (from 1 through 64 cells). The value can be specified only if you have selected Cell in (1).
(3)	Position	Specifies the byte position in the cell to reverse the bit. The position can be specified only if you have selected Cell in (1).
(4)	Bit	Specifies the bit to reverse. This can be specified only if you have selected Cell in (1).
(5)	Rate	Selects the timing to add the error. The selections are Single, All, and rates (1E-n, where n=3, 4, 5, 6, 7, 8, 9)

4.3.2.3 Pointer panel

Fig.4-10 shows the Pointer panel, and Table 4-10 describes each item in the panel.

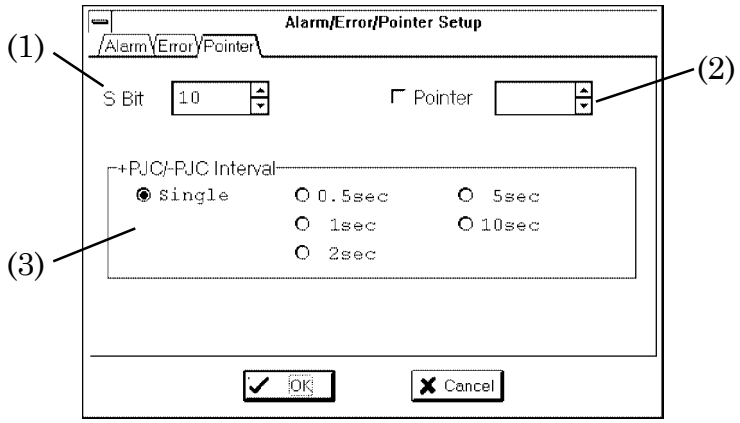


Fig.4-10 Pointer panel

Table 4-10 Description of Pointer panel

No.	Item	Description
(1)	S Bit	Specifies the bit position for the pointer operation.
(2)	Pointer	Specifies the pointer.
(3)	+PJC/-PJC Interval	Selects the pointer interval.

4.3.3 Overhead Editor

Fig.4-11 shows the Overhead Editor, and Table 4-11 describes each item in the editor.

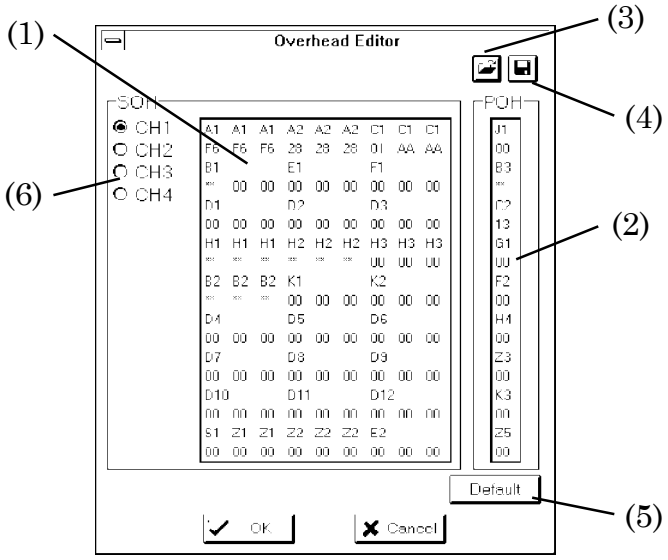


Fig.4-11 Overhead editor

Table 4-11 Description of overhead editor

No.	Item	Description
(1)	SOH	Displays the Section Overhead.
(2)	POH	Displays the Path Overhead.
(3)		Reads overhead setting data from a file.
(4)		Writes overhead setting data to a file.
(5)	Default	Sets default values.
(6)	CH1/2/3/4	When sets 622M, selects SOH channel as (1) setting.

4.3.3.1 Byte Setup dialog box

Fig.4-12 shows the Byte Setup dialog box, and Table 4-12 describes each item in the dialog.

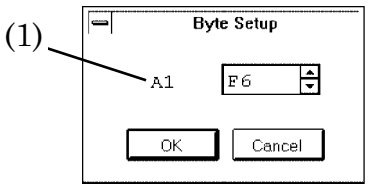


Fig.4-12 Byte Setup dialog box

Table 4-12 Description of Byte Setup dialog box

No.	Item	Description
(1)		Specifies the value for SOH and POH.

4.3.4 Path Trace Editor (J0, J1)

Fig.4-13 shows the Path Trace Editor, and Table 4-13 describes each item in the editor.

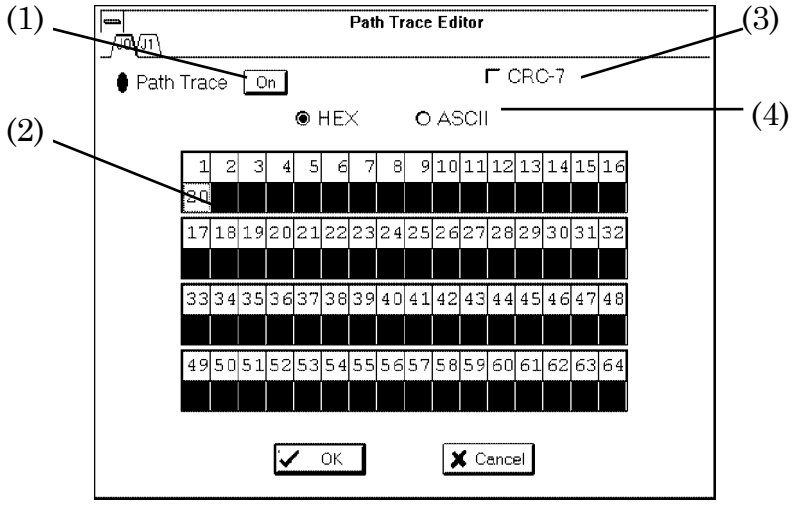


Fig.4-13 Path Trace Editor

Table 4-13 Description of Path Trace Editor

No.	Item	Description
(1)	On/Off	Selects the Path Trace setting.
(2)		Displays the Path Trace.
(3)	CRC-7	Selects the CRC-7 setting.
(4)	HEX/ASCII	Selects the method to specify Path Trace.

4.3.4.1 Byte Setup dialog box

Fig.4-14 shows the Byte Setup dialog box, and Table 4-14 describes each item in the dialog.

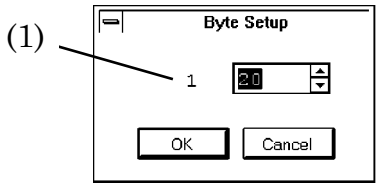


Fig.4-14 Byte Setup dialog box

Table 4-14 Description of Byte Setup dialog

No.	Item	Description
(1)		Specifies the value of Path Trace.

4.4 Rx-Setup Panel

Fig.4-15 shows the Rx-Setup panel, and Table 4-15 describes each item in the panel.

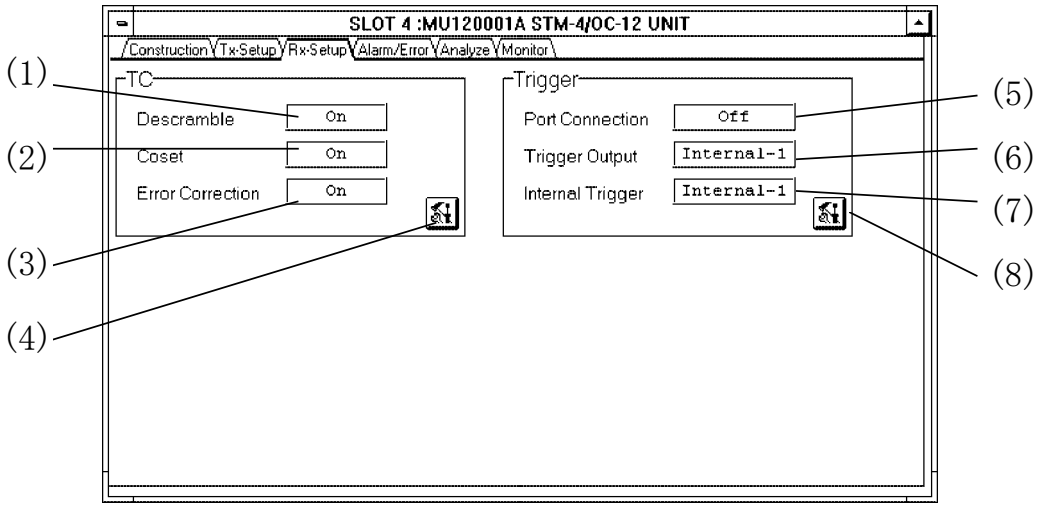


Fig.4-15 Rx-Setup panel

Table 4-15 Description of Rx-Setup panel

No.	Item	Description
(1)	Descramble	Displays current descrambling setting for the payload in the receiver cell.
(2)	Coset	Displays current setting of coset processing in the HEC in the receiver cell.
(3)	Error Correction	Displays current HEC correction in the receiver cell.
(4)		Opens Tc Setup dialog box.
(5)	Port Connection	Shares trigger signal among unit groups.
(6)	Trigger Output	Displays current setting if the trigger is output to Trigger Output.
(7)	Internal Trigger	Displays current setting if the trigger is output to trigger line.
(8)		Opens Trigger Setup dialog box.

4.4.1 TC Setup Dialog Box

Fig.4-16 shows the TC Setup dialog box, and Table 4-16 describes each item in the dialog.

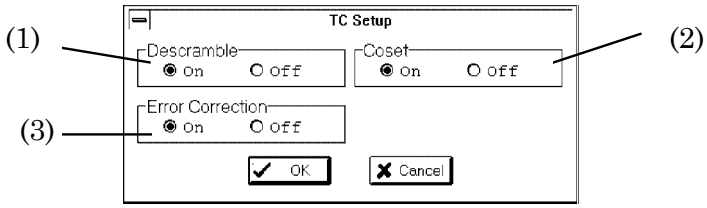


Fig.4-16 TC Setup dialog box

Table 4-16 Description of TC Setup dialog box

No.	Item	Description
(1)	Descramble	Selects if the payload descrambling is to be performed in the receiver cell.
(2)	Coset	Selects if the coset processing of HEC is to be performed in the receiver cell.
(3)	Error Correction	Selects if the HEC correction is to be performed in the receiver cell.

4.4.2 Trigger Setup dialog box

Fig.4-17 shows the Trigger Setup dialog box, and Table 4-17 describes each item in the dialog.

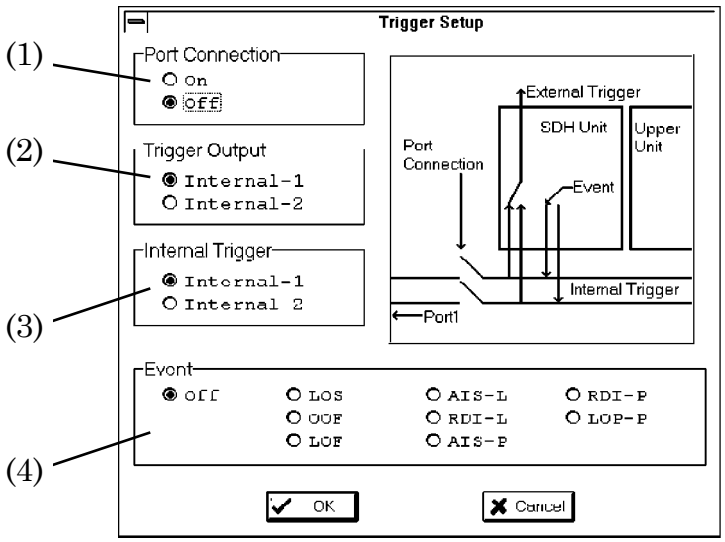


Fig.4-17 Trigger Setup dialog box

Table 4-17 Description of Trigger Setup dialog box

No.	Item	Description
(1)	Port Connection	The trigger is shared in the unit group when select ON.
(2)	Trigger Output	Selects Trigger Output connector. Internal-1 : trigger signal from trigger line 1 is output to Trigger Output. Internal-2 : trigger signal from trigger line 2 is output to Trigger Output.
(3)	Internal Trigger	Selects the trigger line to send trigger. Internal-1 : trigger signal is output to trigger line 1. Internal-2 : trigger signal is output to trigger line 2.
(4)	Event	Selects the type of trigger output.

4.5 Alarm/Error Panel

Fig.4-18 shows the Alarm/Error panel, and Table 4-18 describes each item in the panel.

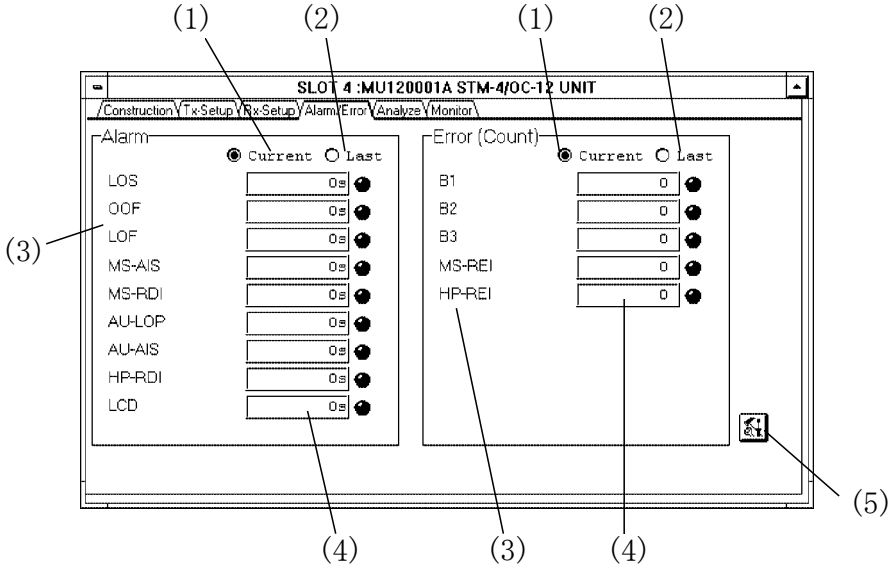


Fig.4-18 Alarm/Error panel

Table 4-18 Description of Alarm/Error panel

No.	Item	Description
(1)	Current	Displays the interim result from the start of the measurement to the current time.
(2)	Last	Displays the result when the measurement is completed.
(3)		For the specified receiver bit rate and frames, all of the detectable alarms and errors, and all the cell items are displayed.
(4)	LED	Displays alarms, errors, and status of the cell detection. Red : currently occurring. Orange : occurred during the measurement (Current is selected). occurred in the previous measurement (Last is selected)
(5)		Reads Default Channel settings from a file

Note

Route : 

Tx-Bitrate : 622 Mb/s

When this unit is used by above setting, the data is sent by internal loopback as the Path level. (Refer to 4.2.1) and the Section level is not measured in the reception unit.
Therefore, set LOF, MS-AIS(AIS-L), MS-RDI(RDI-L), Alarm addition, Bit, B1, B2, MS-REI(FEBE-L) Error addition or Pointer value of the Alarm/Error/Pointer Setup dialog box (Refer to 4.3.2), OOF, LOF, MS-AIS(AIS-L), MS-RDI(RDI-L), AU-LOP(LOP-P), B1, B2, MS-REI(FEBE-L) on Alarm/Error panel continue to display O.

4.5.1 Layout dialog box

Fig.4-19 shows the Layout dialog box, and Table 4-19 describes each item in the dialog.

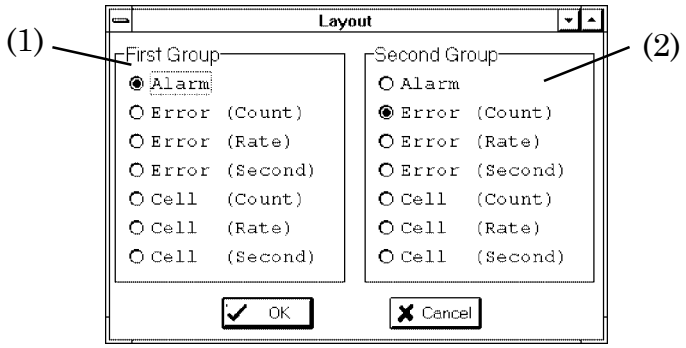


Fig.4-19 Layout dialog box

Table 4-19 Description of Layout dialog box

No.	Item	Description
(1)	Type	Check the group box to display in the Alarm/Error panel. Selections are from: Alarm, Error (Count, Rate, Second), Cell (Count, Rate, Second). Selected display is shown in the left screen if vertical split is selected, or full screen display is selected. Selected display is shown in the upper screen if horizontal split screen is selected.
(2)	Default Channel	Check an item in the same manner as in the First Group. Selected display is shown in lower screen, if horizontal split is selected.

4.6 Analyze Panel

Fig.4-20 shows the Analyze panel, and Table 4-20 describes each item in the panel .

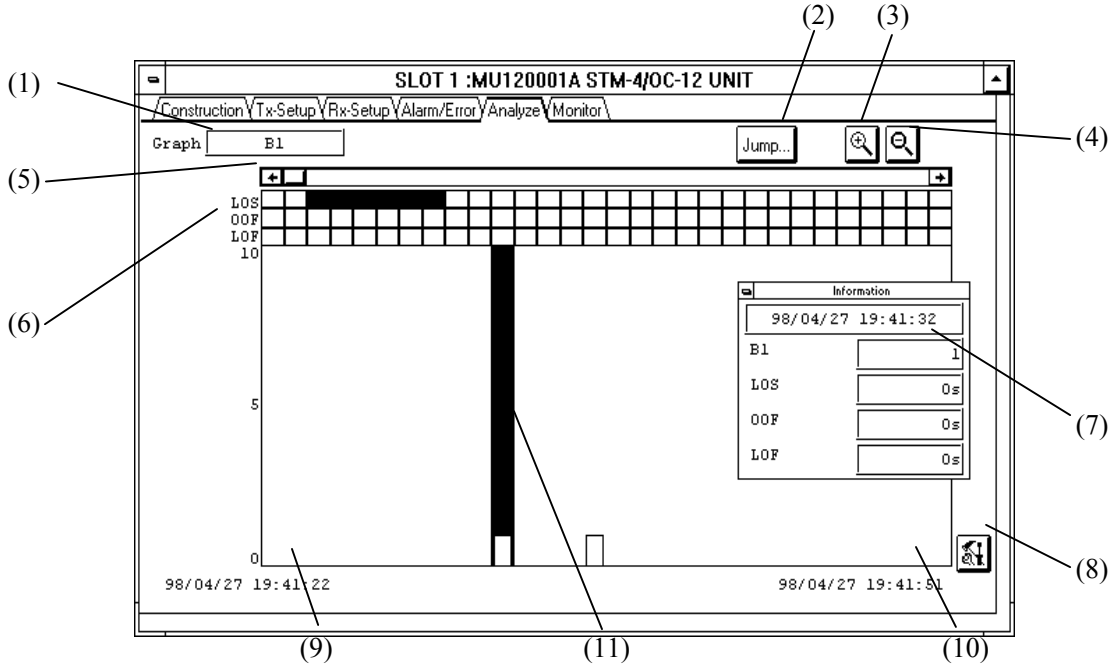


Fig.4-20 Analyze panel

Table 4-20 Description of Analyze panel

No.	Item	Description
(1)	Graph	Indicates the type of errors to be shown by the graph. This value is changed in the Analyze Setup dialog.
(2)	Jump	Opens Jump dialog box.
(3)		Expands the graph. The graph is expanded so that the position of the marker remains at the center of the screen.
(4)		Reduces the graph. The graph is reduced so that the marker remains at the center of the screen.
(5)	Scrolls the screen.	Scrolls the screen horizontally.
(6)	[Alarm]	Indicates the occurrence of an Alarm. Up to three alarms are simultaneously displayed.
(7)		Display the time at the marker position, and detailed information of error/alarm at the position.
(8)		Opens Analyze Setup dialog box.
(9)		Displays the time of the graph's top.
(10)		Displays the time of the graph's tailing end.
(11)		The marker for specifying one bar in the bar graph. Specify it by clicking the bar or Jump dialog box.

4.6.1 Jump dialog box

Fig.4-21 shows the Jump dialog box, and Table 4-21 describes each item in the dialog.

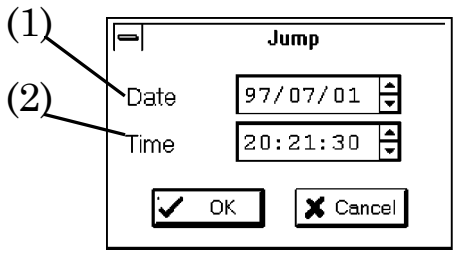


Fig.4-21 Jump dialog box

Table 4-21 Description of Jump dialog box

No.	Item	Description
(1)	Date	Selects type of cells to search
(2)	Time	Select if Default Channel setting is activated

4.6.2 Analyze Setup dialog box

Fig.4-22 shows the Analyze Setup dialog box, and Table 4-22 describes each item in the dialog .

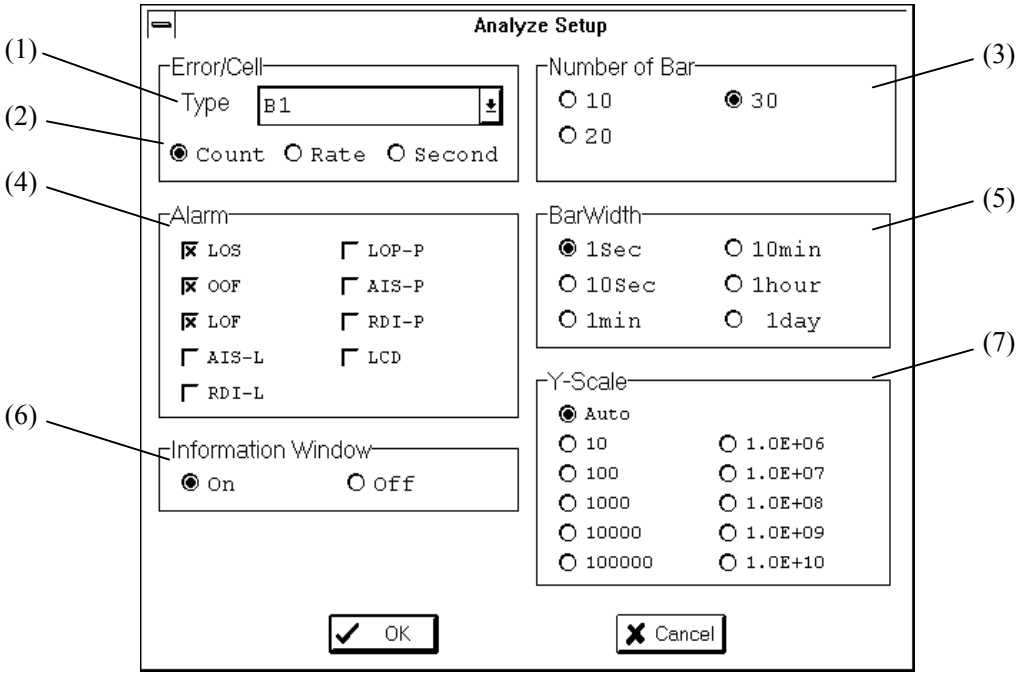


Fig.4-22 Analyze Setup dialog box

Table 4-22 Description of Analyze Setup dialog box

No.	Item	Description
(1)	Type	Selects the type of errors or cells to display in the graph. Only one item can be displayed at any one time.
(2)		Selects display format for the error. Count : displays the number of errors. Rate : displays the rate of errors. Second : displays the error seconds
(3)	Number of Bar	Selects the number of bar graphs to show in a screen.
(4)	Alarm	Selects the alarms to display in the graph. Up to three alarms can be displayed simultaneously.
(5)	Bar Width	Selects the time interval for one bar graph to be shown.
(6)	Information Window	Selects if 4.6 (8) is to be shown in the Analyze sheet.
(7)	Y-Scale	Selects the type of vertical axis. Auto : Minimum axis scale that allows all the data is automatically chosen.

4.7 Monitor Panel

Fig.4-23 shows the Monitor panel, and Table 4-23 describes each item in the panel.

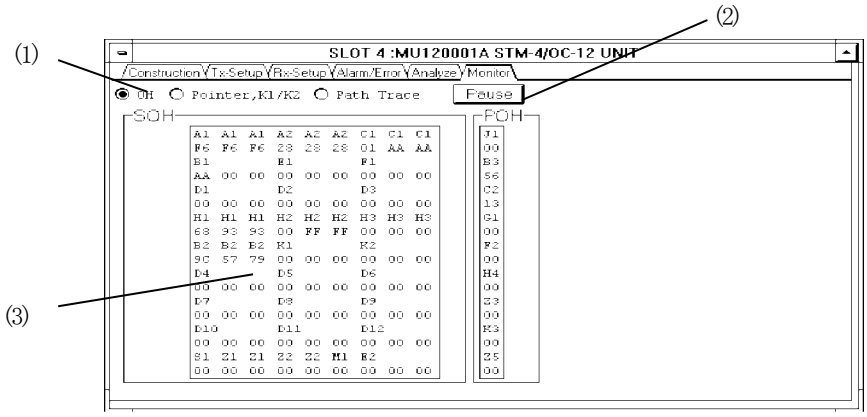


Fig.4-23 Monitor panel

Table 4-23 Description of Monitor panel

No.	Item	Description
(1)		Selects the type of information to be displayed in (3).
(2)	Pause	Pauses the display.
(3)		Following information is displayed according to the selection in (1): OH : displays SOH, POH. Pointer,K1/K2 : displays AU Pointer and K1/K2 bit. Path Trace : displays the Trace of J0 and J1, and renews it each 500ms.

Note

Route : Tx/Rx

Tx-Bitrate : 622 Mb/s

When selects the above setting (refer to 4.2.1), the data of this unit is transmitted to the internal loop back as the Path level. Therefore, SOH data on the display panel is not same as the current data.

SECTION 5 MEASUREMENT

5.1 Performance measurement

1. Connection

Connect the system as shown in Fig.5-1, and power the system.

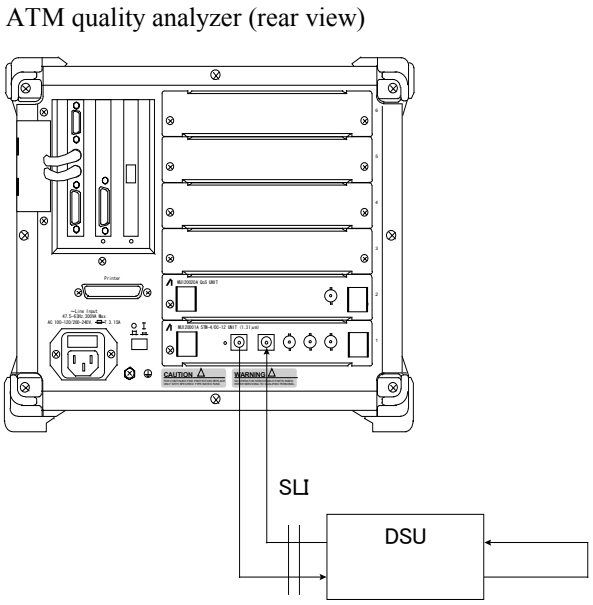


Fig.5-1 Performance measurement connection

2. Physical interface setup

Open Physical Interface dialog box of Physical Interface group boxes in Construction panel, and select settings of physical interface as below:

Route	:	Tx→ Rx←
Clock	:	Internal
Tx-Bitrate	:	622Mb/s
Rx-Bitrate	:	622Mb/s

3. Results of measurements

Open Layout dialog box in Alarm/Error panel. Select Error(Count), Error(Rate), or Error(Second) either in the First Group box or in the Second Group box.

Press the start button (Go-button), and the error determination is displayed in Alarm/Error panel. Either interim or final results can be displayed by selecting Current or Last.

4. Analyze

If a log file was set up in the mainframe prior to the run, you can see the errors and their timings in the Analyze Panel.

SECTION 6 PERFORMANCE TEST

6.1 About the Performance Test

This Section describes the procedures for the performance test to verify the functions of this unit. See MP1220A ATM Quality Analyzer User's Manual for a detailed description of the procedures from insertion of the unit to the mainframe, powering on of the system, and opening the MU120001A STM-4/OC-12 Unit window.
Appendix A shows an example of performance verification sheet.

6.1.1 Alarm/Error measurement test

1. Connection

Connect the system as shown in Fig.6-1, and power the system.

ATM quality analyzer (rear view)

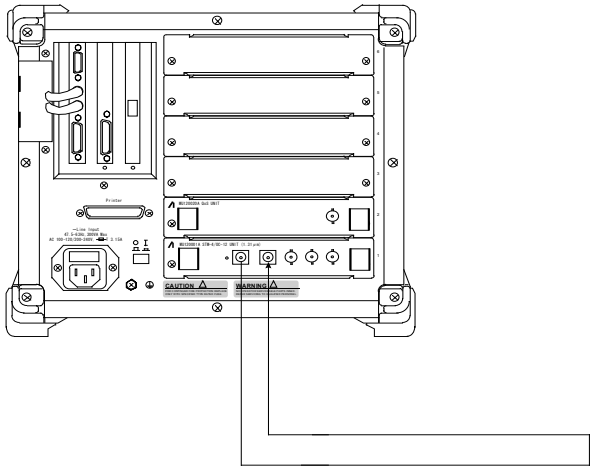


Fig.6-1 Alarm/Error measurement connection

2. Physical Interface Setup

Open Physical Interface Setup dialog in the Construction panel, and set up items of physical interface as follows:

Route	:	
Clock	:	Internal
Tx-Bitrate	:	622Mb/s
Rx-Bitrate	:	622Mb/s

3. Results of measurement

Open the Layout dialog box in the Alarm/Error panel.

Select either Alarm, Error(Count), Error(Rate), Error(Second), Cell(Count), Cell(Rate), or Cell(Second).

Press the start button (Go-button), and the error determination is displayed in Alarm/Error panel. Either interim or final results can be displayed by selecting Current/Last.

Performs steps 1 through 3 when Tx-Bitrate and Rx-Bitrate in the Physical Interface are set to either 156Mb/s or 52Mb/s.

SECTION 7 MAINTENANCE

7.1 Daily Maintenance

1. Wipe dirt off the surface of the instrument with a cloth dampened with a diluted neutral detergent.

2. Suck dust, if any, with a vacuum cleaner.

3. If any part is found loose, use the designated tool to tighten it.

7.2 Notes on Storage

For prolonged storage of the instrument, pay attention to the followings:

1. Clean the instrument of dust and dirt before storage.

2. Avoid storage in a place where the temperature rises above 60℃, or falls below -20℃.

3. Avoid prolonged storage in a place where direct sun hits the instrument, or in a dusty place.

4. Avoid prolonged storage in a place where dew condensation or the corrosive gases may occur.

5. Avoid storage in a place where the instrument may be exposed to oxidation or severe vibration

7.3 Transportation

If the packing materials used for factory shipping have been preserved, use them when transporting the instrument. Otherwise, follow the packing procedures described below. Be sure to wear a clean pair of gloves and handle the instrument with care to avoid scratching or denting the surface.

1. Clean dirt and dust off the instrument's surface with a dry cloth.

2. Check if any part is missing or has become loose.

3. Protruding or damage-prone portions should be carefully protected. Wrap the instrument with sheets of polyethylene, and furthermore with sheets of moisture proof paper.

4. Place the wrapped instrument inside a cardboard box and close the box with masking tape. Depending on the transportation distance and method, a wooden box may be required for protection.

7.4 Calibration

This instrument cannot be calibrated outside the manufacturer's factory. Anritsu recommends periodic factory calibration to maintain optimum performance.

APPENDIX

Appendix A Performance Test Sheet

Instrument : MU120001A STM-4/OC-12 Unit
Report No. : _____
Serial No. : _____
Tested by : _____
Test Site : _____
Ambient Temperature : _____ °C
Date : ____/____/_____(Date/month/year)
Relative Humidity : _____ %
Notes : _____

Alarm/Error Performance Test

Item	Criteria	Result	Pass/fail
B1	0[Count]		
B2	0[Count]		
B3	0[Count]		
FEBE-L (MS-REI)	0[Count]		
FEBE-P (HP-REI)	0[Count]		
LOS	0[s]		
LOF	0[s]		
OOF	0[s]		
AIS-L (MS-AIS)	0[s]		
RDI-L (MS-RDI)	0[s]		
AIS-P (AU-AIS)	0[s]		
RDI-P (HP-RDI)	0[s]		
LOP-P (AU-LOP)	0[s]		
LCD	0[s]		
Corrected	0[Count]		
Discarded	0[Count]		

Appendix A Performance Test Sheet

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