FlexGain FOM16, V3

TDM AND GIGABIT ETHERNET CONVERGENCE FIBER MULTIPLEXER

TECHNICAL DESCRIPTION AND OPERATIONS MANUAL

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VERSION CONTROL

Manual Version	Date	Software Version	Major changes to previous version
1.0	01.12.2014	1.0.8-716	Initial Version

SAFETY REGULATIONS

IF THE UNIT IS NOT USED IN ACCORDANCE TO REGULATIONS DESCRIBED AND DEFINED IN THE “TECHNICAL DESCRIPTION” AND “TECHNICAL SPECIFICATIONS” CHAPTERS, FLEXDSL TELECOMMUNICATIONS AG REFUSES TO TAKE ANY RESPONSIBILITY. FURTHERMORE, NO WARRANTY IS GRANTED IN SUCH CASE!

IT’S ONLY ALLOWED TO USE EXTERNAL POWER SUPPLYS THAT ARE APPROVED ACOORDING TO THE SAFETY STANDARD IEC/EN 60950-1.

THE DISCONNECTING DEVICE FOR THE RACK IS THE MAINS PLUG AND/OR THE APPLIANCE COUPLER. THE MAINS PLUG AND/OR THE APPLIANCE COUPLER HAS/HAVE TO BE EASILY ACCESSIBLE AND THE MAINS PLUG HAS TO BE NEXT TO THE RACK IF THE MAINS PLUG SERVES AS THE DISCONNECTING DEVICE.

INCORRECT USE OF THIS DEVICE, USE IN ANY OTHER ENVIRONMENT AND/OR HOUSING THAN PROVIDED BY FLEXDSL MIGHT LEAD TO HARMFUL CONDITIONS. FAILURE TO FOLLOW THESE PRECAUTIONS MAY RESULT IN DEATH, SEVERE INJURY OR PROPERTY DAMAGE.

Please read this manual carefully before operating the system.
Installation of this equipment has to be done by **qualified** personnel only.

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Our equipment is marked with the recycling symbol. It means that at the end of the life of the equipment you must dispose it separately at an appropriate collection point and not place it in the normal domestic unsorted waste stream. (European Union only)

1 SEELECTION GUIDE

FOM16, V3, Modular 4x / 8x / 16x E1, 2x / 4x / 8x Ethernet (10/100/1000Base-T/1000Base-X)	
FG-FOM16/16E,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 16x (4x4) E1 (120 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FG-FOM16/12UE,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 12x (3x4) E1 (75 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FG-FOM16/8E,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 8x (2x4) E1 (120 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FG-FOM16/8UE,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 8x (2x4) E1 (75 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FG-FOM16/4E,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 4x (1x4) E1 (120 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FG-FOM16/4UE,V3	FlexDSL Fibre Optic Modem, modular (4x slot), 19"/1U, 2*SFP slots (1+0/1+1), 4x (1x4) E1 (75 Ohm), 2x Ethernet 10/100/1000Base-TX, 48VDC/220VAC power, Local Craft Terminal, Graphical User Interface (GUI), Telnet, SNMP
FOM16,V3 Tributary Cards	
FG-FOM16-Trib4xE1B,V3	Add-on 4x E1 module for FG-FOM16,V3 (max. 4x), 120 Ohms RJ48
FG-FOM16-Trib4xE1U,V3	Add-on 4x E1 module for FG-FOM16,V3 (max. 4x), 75 Ohms BNC
FG-FOM16-Trib2xETH,V3	Add-on 2x Ethernet (10/100/1000Base-T/1000Base-X) module for FG-FOM16,V3 (max. 2x), RJ45 and SFP Cage
FG-FOM16-Trib4xE1B-2xETH,V3	Add-on 2x Ethernet (10/100/1000Base-T), 4x E1 module for FG-FOM16,V3 (max. 2x), 120 Ohms RJ48 (E1) and RJ45 (Ethernet)
SFP Transciever modules [Note]	
FG-SMF-SFP10	SFP module, Single Mode 1310nm, 1.25Gbps, 10km
FG-SMF-SFP20	SFP module, Single Mode 1310nm, 1.25Gbps, 20km
FG-SMF-SFP40	SFP module, Single Mode 1310nm, 1.25Gbps, 40km

Note: Other optical modules including multimode and Single Fiber modules are available upon request.

2 PRECAUTION

The present document describes the FlexGain FOM16, V3 devices family. The document contains the technical description of the devices, installation, configuration, and operation instructions. Appendices containing additional information about the system are also an integral part of the present document.

WARNING
BEFORE STARTING OPERATING THE EQUIPMENT, READ CAREFULLY THE CURRENT MANUAL AND THE INSTALLATION MANUAL. FLEXDSL TELECOMMUNICATIONS AG REFUSES NEITHER TAKING ANY RESPONSIBILITY NOR GRANTING ANY WARRANTY TO ANY DEVICE MALFUNCTIONING OR ANY DAMAGES DUE TO FAILURE TO COMPLY WITH THE REQUIREMENTS STATED IN THE MANUALS, ESPECIALLY IN THE SECTION RELATED TO “SERVICE INSTRUCTIONS”.

WARNING
IMPROPER USE OF OUR EQUIPMENT, USE IN ANY OTHER ENVIRONMENT OR IMPROPER INSTALLATION AND MAINTENANCE MIGHT LEAD TO HARMFUL CONDITIONS. FAILURE TO FOLLOW THESE PRECAUTIONS MAY RESULT IN DEATH; SEVERE INJURY OR PROPERTY DAMAGE.
FLEXDSL TELECOMMUNICATIONS AG REFUSES NEITHER TAKING ANY RESPONSIBILITY NOR GRANTING ANY WARRANTY IN SUCH CASE.

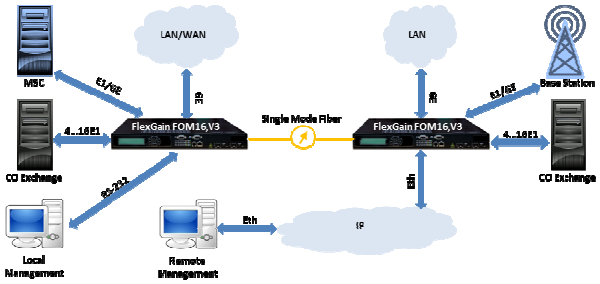
WARNING
ELECTRONIC MODULES CAN BE DAMAGED OR DECREASED IN RELIABILITY BY STATIC ELECTRICAL DISCHARGE. BEFORE HANDLING MODULES, WEAR AN ANTISTATIC DISCHARGE WRIST STRAP TO PREVENT DAMAGE TO ELECTRONIC COMPONENTS. PLACE MODULES IN ANTISTATIC PACKING MATERIAL WHEN TRANSPORTING OR STORING. WHEN WORKING ON MODULES, ALWAYS PLACE THEM ON AN APPROVED ANTISTATIC MAT THAT IS ELECTRICALLY GROUNDED. TO PREVENT ELECTRICAL SHOCK, DO NOT INSTALL EQUIPMENT IN A WET LOCATION OR DURING A LIGHTNING STORM.

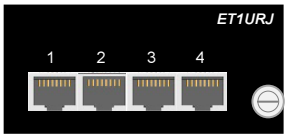
3 TECHNICAL DESCRIPTION

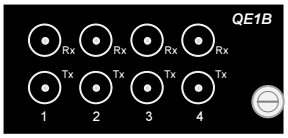
3.1 General Information

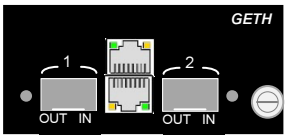
The FlexGain FOM16, V3 (hereafter FG-FOM16,V3) a TDM and Gigabit Ethernet Convergence fiber multiplexer is a flexible solution for meeting versatile E1 hybrid multiplexing, data service (GE LAN) and wireless application.

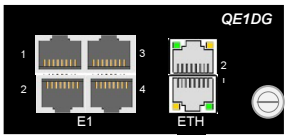
With FG-FOM16,V3 a network can be built together with the access equipment, mobile base station, wireless access base station, switch and router to meet the requirements for a broad range of customers. The FG-FOM16,V3 can be used in central office, remote Controlled Environment Vault (CEV), campus or high-rise building environment.









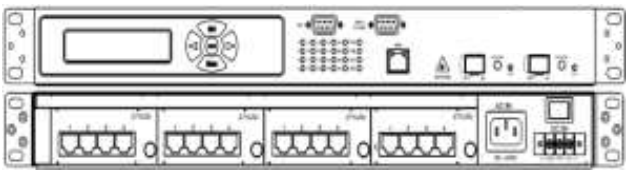


The FlexGain FOM16, V3 is a flexible system and, by adding of tributary interfaces, GE data service can be provided in addition to the traditional E1 services.

The system has a set of various tributary interface plug-in cards:

- FG-FOM16-Trib4xE1B,V3
- FG-FOM16-Trib4xE1U,V3
- FG-FOM16-Trib2xETH,V3
- FG-FOM16-Trib4xE1B-2xETH,V3

The FG-FOM16,V3 is quite compact and takes only 1U-space in the rack. A mounting set is included to support both, rack-mount and wall-mount, usage. Desk-top operation is also possible.



The FG-FOM16,V3 system can be locally managed through Craft Interface Terminal (CIT) or remotely managed via a simple network management protocol (SNMP) interface or Telnet. User-friendly graphical user interface (GUI) and front panel LCD are provided for alarm reporting, performance monitoring (PM), provisioning and loopback testing. LED indicators for power, test and alarm are provided for easy status control. System settings and configurations are stored in the Flash Memory.

3.2 Key Features

System:

- Compact (1U Minirack) Fiber Optical Multiplexer (FOM) for transmission of:
  - Data (2/4/8 GE LAN) and/or
  - 4/8/12/16 E1 (120Ohm or 75 Ohm) Channels

  over a Single Fiber Link
- Available Tributary Cards are:
  - 4x E1, 120 ohms RJ48
  - 4x E1, 75 ohms BNC
  - 2x Ethernet (10/100/1000Base-T/1000Base-X)
  - 2x Ethernet (10/100/1000Base-T) and 4x E1, 120 ohms RJ48 (E1) and RJ45 (Ethernet)
- 16xE1+8xGE Maximum System Capacity
- 1+1 Redundant Optical Fiber Link with Automatic Protection Switching (APS):
  - APS can be initiated automatically or manually and terminated manually
- IEC 61000-4-5 class 3 or FCC part 68 comliant Surge Protection
- RoHS compliance
- Dual 95-240VAC and 36-72VDC power input
- 19”/23” rack mountable (ETS 300119 compliant)

Ethernet:

- MAC-layer Port-isolated Ethernet channels support
- Displaying of MAC and VLAN tables for each Ethernet channel
- Link Down setting per Ethernet port when aggregation port or remote counterpart Ethernet link is down
- 10/100/1000Base-T/1000Base-X full-duplex flow control ports are fully compliant with the applicable sections of IEEE802.3, IEEE802.3u and IEEE802.3x
- 8K MAC-address table with automatic learning and aging
- Full IEEE 802.1Q VLAN ID processing per port, configurable VLAN membership, VLAN tagging for up to 256 sets of VLAN ID
- Port Based VLAN
- IEEE 802.1Q Quality of Service (QoS) with 4 traffic classes
- QoS determined by Port, IEEE802.1p, IPv4 Type of Service (TOS) & Differentiated Services (DSCP), and IPv6 Traffic Class
- Strict Priority or Weighted Fair Queuing scheme
- Ingress/egress rate limiting for each Ethernet channel (256…1000Mbps)
- Jumbo Frames Support (up to 9000 bytes)

Management and Control:

- Maintenance and Operation Control can be provided from one side
- Local Control Management (LCM) through built-in two-row LCD and keypads
- RS-232 CIT and a separate 10/100Base-T Network Management System (NMS) interface
- Consistent management information via LCM, CIT and NMS
- Graphical User Interface (GUI)
- SNMP MIB support:
  - RFC 1406 (DS1, E1 objects)
  - RFC 2493 (Performance History)
  - RFC 2233 (Interface Group)
  - RFC 1407 (Optical Interface)
- Default configuration setup
- Automatic system settings backup in the Flash after each re-configuring
- Alarm outputs

3.3 System Applications

The FG-FOM16,V3 is a high-quality, reliable, and robust digital signal transmission equipment which is suitable for inter-office connection, access and mobile backhaul network applications such as:

- Base Stations connection,
- Trunks between digital switches,
- LAN interfconnection and WAN access.

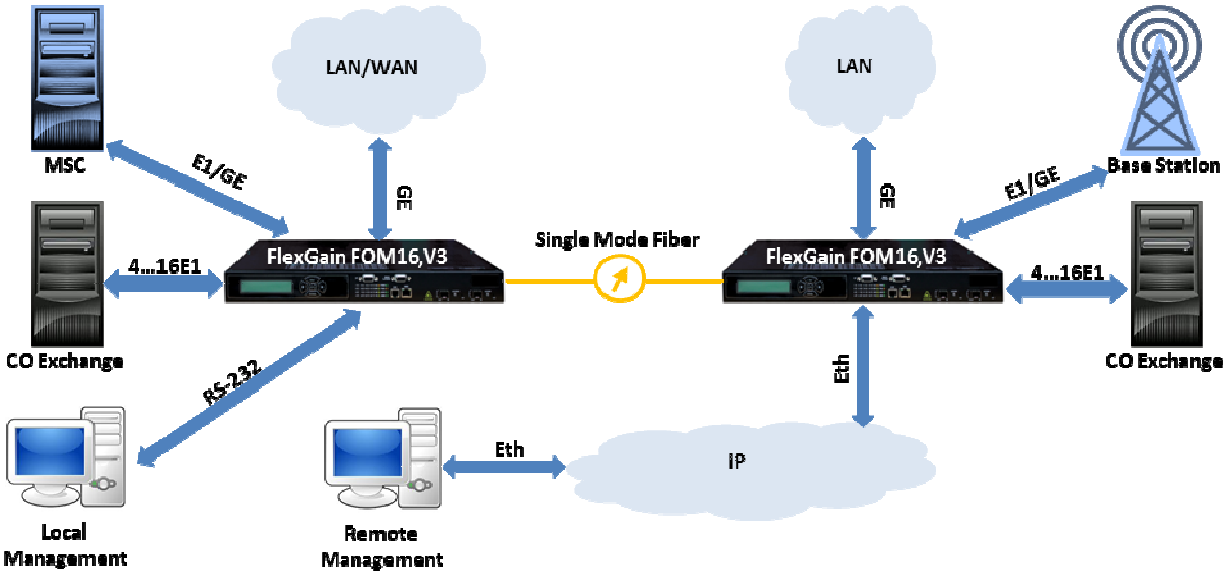


Figure 3.1 FlexGain FOM16,V3 apllications

The FG-FOM16,V3 is used for point-to-point connection of two nodes over one pair of Fibre (in case of BIDI SFP using the only one Fiber is required). Second pair of Fibre could be used for 1+1 protection (in case of BIDI SFP using the only one Fiber is required). The System grants error free transmission of 4…16 E1 and a Gigabit Ethernet (up to 8 GE ports can be equipped).

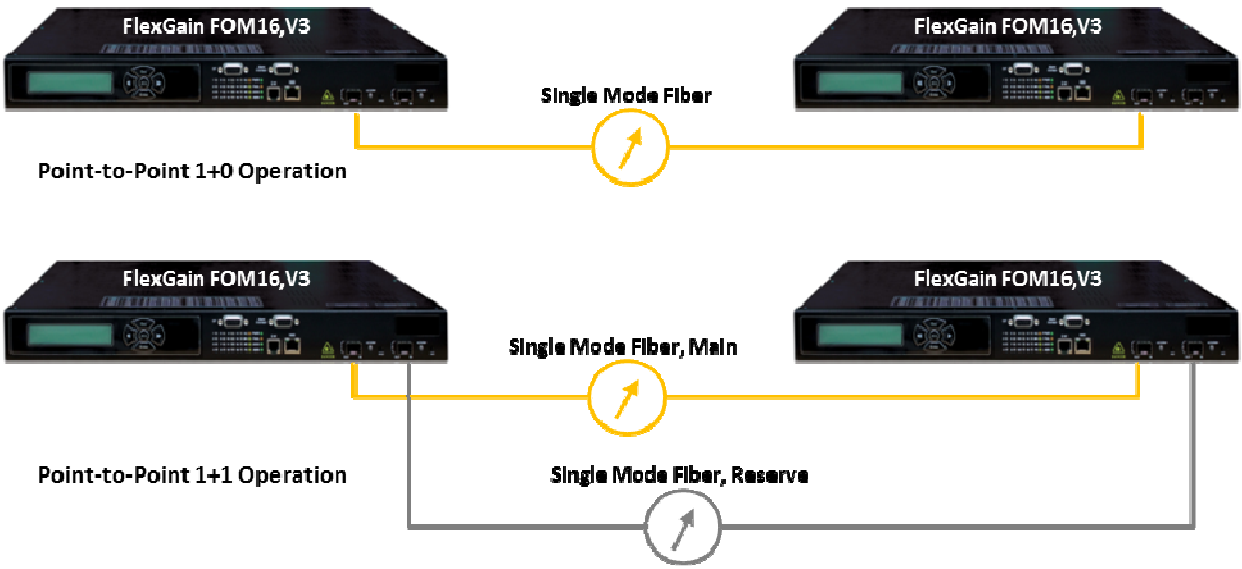


Figure 3.2 FlexGain FOM16,V3 1+0 and 1+1 operation

3.4 System Description

The FG-FOM16,V3 uses a modular design concept and provides wide range of tributary interfaces. It is a compact, flexible, versatile, easy to install, easy to use and easy to maintain system. Up to 16 E1 configurable interfaces and 8 (maximum) Ethernet interfaces are provided via tributary cards in one system. The block diagram gives an overview of the system structure.

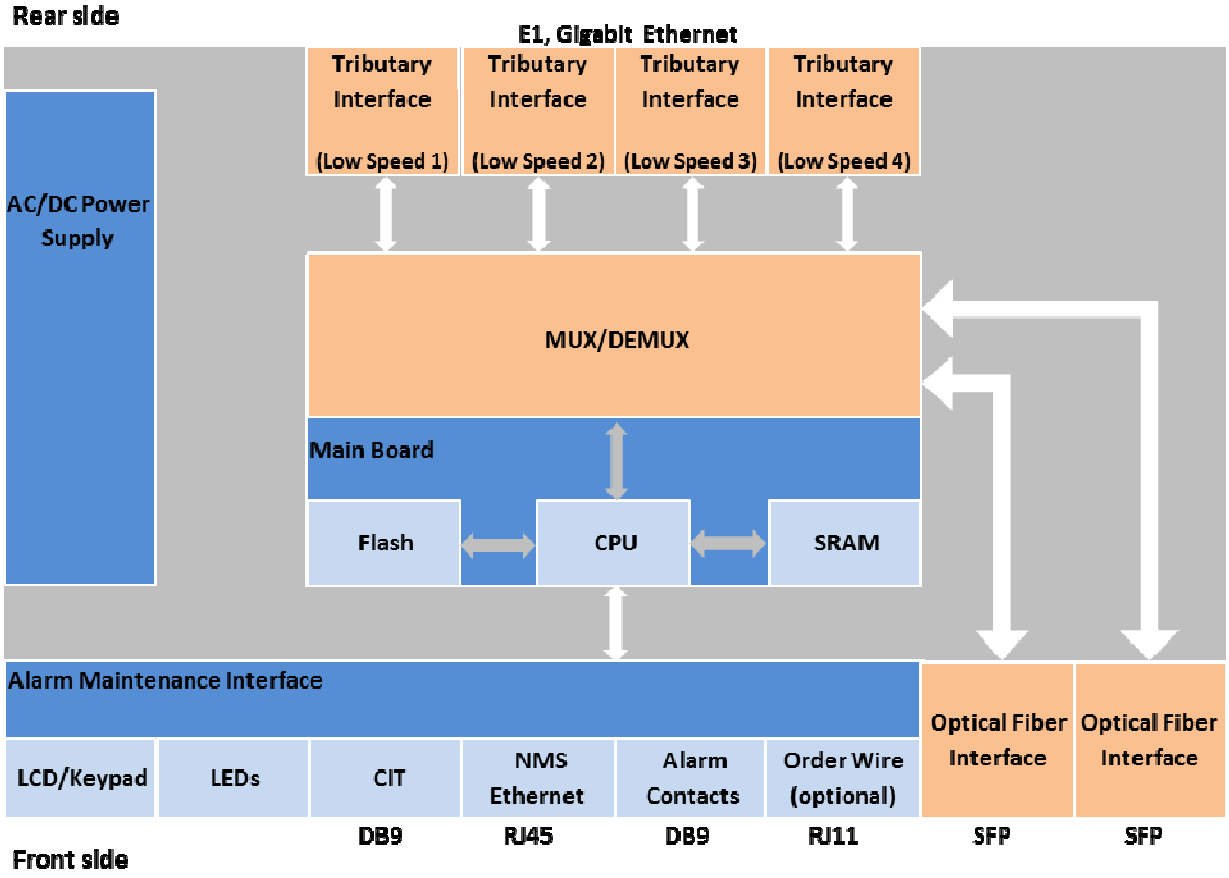


Figure 3.3 FlexGain FOM16,V3 Block Diagram

The FG-FOM16,V3 consists of high-speed interface, MUX/DEMUX (multiplexor/demultiplexor), and low-speed tributary interfaces. The low-speed interfaces provide electrical interfaces for E1 signals and electrical and optical interfaces for Gigabit Ethernet data. The MUX/DEMUX multiplexes and demultiplexes low-speed tributaries' signals into a high-speed signal. The CPU subsystem provides control and monitor functions for the FG-FOM16,V3. It communicates with management devices through a RS-232 port or an NMS Ethernet port. Functions provided by the subsystem include:

- Unit administration through RS-232 and Ethernet ports,
- Nonvolatile storage of configuration parameters,
- Alarm generation and recognition,
- Access to performance and status reports,
- Control and diagnostic functions,
- SNMP agent for management by an SNMP manager,
- Remote monitor and control of far end through EOC (Embedded Operations Channel),
- Order-wire interface (Option).

3.5 Base Unit Description

The FG-FOM16,V3 consists of a base unit (BU) and add-on tributary cards. The system appearance is shown below:

Figure 3.4 FlexGain FOM16,V3 appearance

The Base Unit is the main system unit with integrated power-supply, multiplexing-demultiplexing electronics and CPU subsystem that provides all necessary management and control functions. The BU has two high-speed optical channels and has four tributary slots for E1, T1 and GE interfaces.

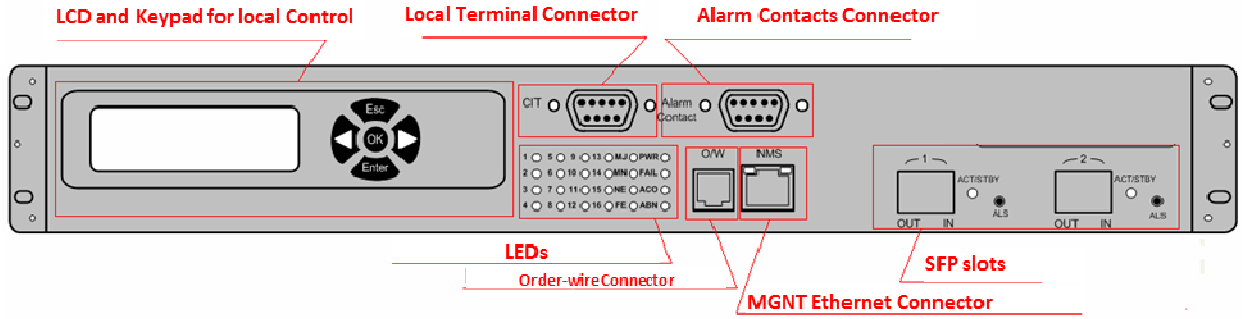


Figure 3.5 FlexGain FOM16,V3 Front Panel View

Tributary units must be inserted to the rear side of FG-FOM16,V3.

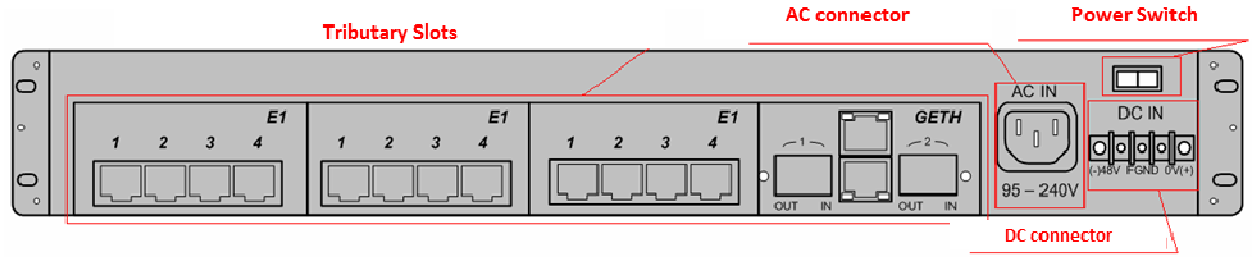


Figure 3.6 FlexGain FOM16,V3 Rear View

If the initial installation is not fully equipped, the capacity expansion can be done by adding plug-in units without any service interrupt. All plug-in units are hot swappable, the working of other units is not affected and interrupted.

3.6 Optical Interface

The optical interface module provides optical to electrical conversion and clock recovery functions and serves as a transport interface. The connector type of the optical interface module is LC. Up to 30 dB system gain can be achieved for transmitting the optical signal at a very low bit error rate (1×10^{-10}).

Figure 3.7 SFP Tranciever module

There are three types of high speed optical modules available for different transmission distance requirement as below:

SFP Transciever modules	
FG-SMF-SFP10	SFP module, Single Mode 1310nm, 1.25Gbps, 10km
FG-SMF-SFP20	SFP module, Single Mode 1310nm, 1.25Gbps, 20km
FG-SMF-SFP40	SFP module, Single Mode 1310nm, 1.25Gbps, 40km

Other optical modules including multimode and Single Fiber modules are available upon request.

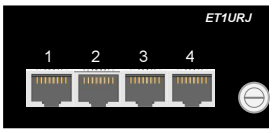
3.7 Tributary Interfaces

The FG-FOM16,V3 BU has 4 tributary slots for interface cards. Any card might be used in any slot despite its type or the types of other cards already inserted. The Table below gives an overview of FG-FOM16,V3 tributary interface cards:

Model	Card Marking	Interface Type	# of Interfaces	Connector Type
FG-FOM16-Trib4xE1B,V3	*ET1URJ*	E1(120Ω) / T1(100Ω) Configurable	4	RJ48
FG-FOM16-Trib4xE1U,V3	*QE1B*	E1 (75Ω)	2	BNC
FG-FOM16-Trib2xETH,V3	*GETH*	GE Combo: • 10/100/1000Base-T • 1000Base-X	2	RJ45 / SFP Cage
FG-FOM16-Trib4xE1B-2xETH,V3	*QE1DG*	• E1 (120Ω) + • 10/100/1000Base-T	2 + 2	RJ48 for E1 RJ45 for Ethernet

All tributary interfaces of the FG-FOM16,V3 are hot-swappable, i.e. inserting/removing of any plug-in card does not affect working of other system components.

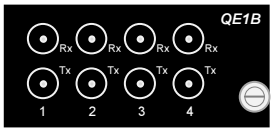
3.7.1 Trib4xE1B,V3 Balanced Tributary Interface



Model:	**FG-FOM16-Trib4xE1B,V3**
Interface:	4x E1 (120Ohm)
E1:	ITU-T G.703, G.823, G.824
Physical Interfaces:	4x RJ48 (E1)

This is an E1/T1 module. This module provides 4 E1 or 4 DS1 ports. The loopback control is also provided. The transmission performance for each E1/DS1 signal through the system is less than 1 error per 10^{10} bits, which is compliant with ITU-T G.826.

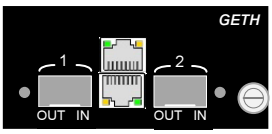
3.7.2 Trib4xE1U,V3 Unalanced Tributary Interface



Model:	**FG-FOM16-Trib4xE1U,V3**
Interface:	4x E1 (75Ohm)
E1:	ITU-T G.703, G.823, G.824
Physical Interfaces:	4x BNC (E1)

This is a 4 E1 interface module. This module provides 4 E1 ports. The loopback control is also provided. The transmission performance for each E1 signal through the system is less than 1 error per 10^{10} bits, which is compliant with ITU-T G.826.

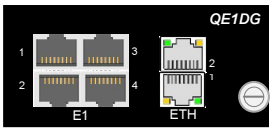
3.7.3 Trib2xETH,V3 Tributary Interface with two Gigabit Ethernet Combo Ports



Model:	**FG-FOM16-Trib2xETH,V3**
Interface:	2x Ethernet 10/100/1000BaseT or 1000BaseX
Ethernet:	IEEE802.3, IEEE802.3u, IEEE802.3x, IEEE 802.1Q VLAN, Q in Q, 802.1P Qos, DSCP, 4 priority queues per port and rate limiting 8k MAC Address Entries 256 VLAN ID Maximum frame size is 9000 bytes
Physical Interfaces:	2x RJ45 and 2x SFP Cage

The LAN Module provides 2 Combo Gigabit Ethernet LAN Ports (10/100/1000Base-T /1000Base-X) which utilize up to 1000 Mbps bandwidth for bridging the Ethernet data to the remote site. VLAN function is also supported.

3.7.4 Trib4xE1B-2xETH,V3 Gigabit Ethernet and E1 Tributary Interface



Model:	**FG-FOM16-Trib4xE1B-2xETH,V3**
Interface:	2x Ethernet 10/100/1000BaseT or 1000BaseX 4x E1 (120Ohm)
Ethernet:	IEEE802.3, IEEE802.3u, IEEE802.3x, IEEE 802.1Q VLAN, Q in Q, 802.1P Qos, DSCP, 4 priority queues per port and rate limiting 8k MAC Address Entries 256 VLAN ID Maximum frame size is 9000 bytes
E1:	ITU-T G.703, G.823, G.824
Physical Interfaces:	4x RJ48 (E1) and 2x RJ45 (Ethernet)

This is an E1 and Ethernet mixed module. This module provides 4 E1 ports. The E1 loopback control is also provided. The transmission performance for each E1 signal through the system is less than 1 error per 10^{10} bits, which is compliant with ITU-T G.826. The unit also has two 10/100/1000Base-T LAN ports which utilize up to 1000 Mbps bandwidth for bridging the Ethernet data to the remote site. VLAN function is also supported.

3.8 Operation and Management Interfaces

The FG-FOM16,V3 can be managed through a terminal interface or an SNMP-based management interface. The terminal interface is used for connection to CIT terminal through the RS-232 port. The Ethernet port is used for SNMP management interface; it is compliant with the IEEE 802.3 standard. The SNMP agent in the FG-FOM16,V3 allows the SNMP manager to perform configuration, operation, alarm management and all other management functions. The MIB consists of the following components:

- Standard MIB II specified by RFC 1213,
- E1/T1 MIB by RFC 1406,
- RFC 2493 for performance History,
- RFC 2233 for Interface Group,
- E3 MIB by RFC 1407,
- Private MIBs.

3.8.1 Remote Access Configuration

The FG-FOM16,V3 supports several methods of remote access for management purpose. These methods include LAN links and embedded operations channel (EOC) between two end points:

- LAN Connection: the system supports a direct LAN connection to the Ethernet port for SNMP functions.
- EOC: the system provides control and monitor functions to the far end FG-FOM16,V3 through an embedded operations channel (EOC) carried in the optical fiber. The EOC is used for delivering commands to and obtaining status from the far end FG-FOM16,V3 unit.

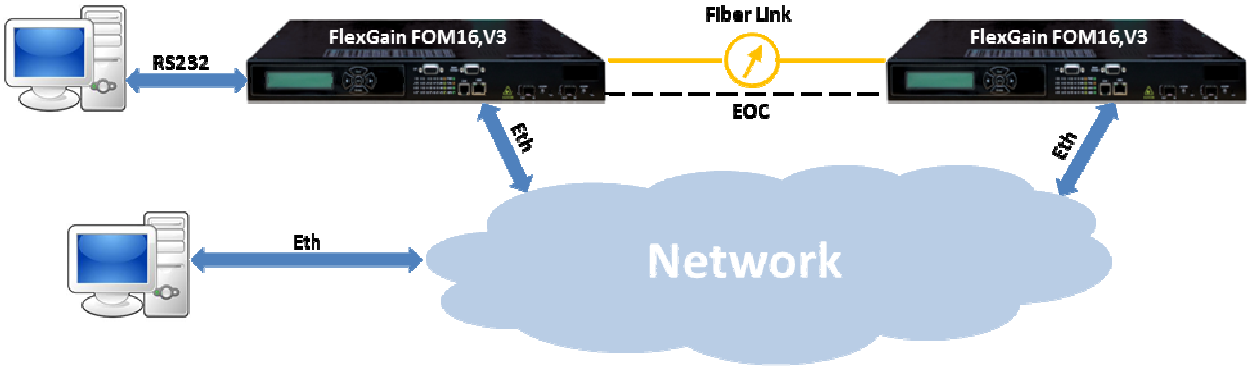


Figure 3.8 FlexGain FOM16,V3 Remote Access Management

3.8.2 Network Management Functions

The FG-FOM16,V3 can activate alarms when equipment/signal failures are detected and reports to CIT or Management PC automatically. The different alarm severity levels are provided for all possible events and conditions, and the severity levels include major and minor alarms. The alarms of unused channels can be blocked to prevent unnecessary disturbance.

The FG-FOM16,V3 has an EOC (Embedded Operation Channel) for OAM&P (Operation, Administration, Maintenance, and Provision) functions, which include provisioning, fault message, performance data and loopback control.

The FG-FOM16,V3 provides a single-ended maintenance and operation capability to access the local and remote FG-FOM16,V3 to perform maintenancing.

The provision of the service types (E1 and LAN) of each plug-in unit including line code and frame format of each channel locally and remotely is supported as well.
The alarm and status reports include the following parameters for each channel and for local and remote site:

- Managed object,
- Alarm / Event type,
- Alarm severity (Major (MJ) or Minor (MN)),
- Day and time of occurrence,
- Service status (IS or OOS),
- Service types (T1, E1 or LAN),
- Frame format,
- Line code,
- Loopback (activated, deactivated, and loopback type).

To prevent the unauthorized user logging, authentication and authorization functions are supported by means of access security (user certificate and password check).

The SNMP is used as a network management protocol. The Monitoring Software can communicate with the FG-FOM16,V3 via the Ethernet port to obtain status, performance and configuration information. The system configuration can also be set via the Monitoring Software.

3.9 Alarm Indication and Contacts

The Supervisory System can display the status by LEDs and LCD module on the front panel.

The System provides the fault detection and faulty card isolation function. The system monitors all alarms, such as loss of signals, optical signal loss, remote alarm, etc. in real time.

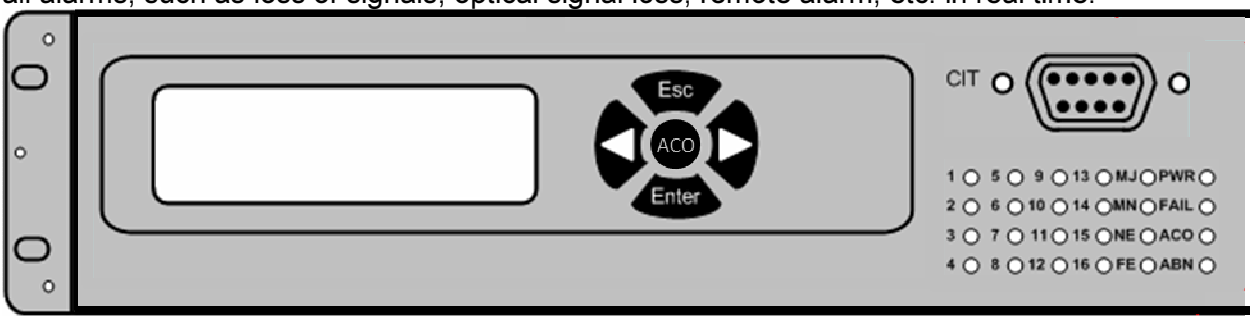


Figure 3.9 E1/LAN/System Operation LEDs and LCD

E1 Operation LEDs (1-16)	
E1 Channel Status	LED Status
T1/E1 out of service or no card is installed	Off
T1/E1 in service and in normal status	Green On
T1/E1 in service with LOS	Red On
T1/E1 in service with AIS	Red Blinking
T1/E1 in service with LOF	Red On
T1/E1 in service with LLB or RLB	Green Blinking
Not ready for service (Re-plug the Tributary Card)	Red & Green Blinking

LAN Interface Operation LEDs (1-16)	
LEDs allocation in case of a card with Ethernet Interface is installed: LED 1/2: The 1st/2nd channel of Slot 1 LED 5/6: The 5th/6th channel of Slot 1 LED 9/10: The 9th/10th channel of Slot 1 LED 13/14: The 13th/14th channel of Slot 1	
LAN Channel Status	LED Status
Out of service or not installed	Off
Channel in service and in normal status	Green On
No LAN connection	Red On
Channel in service with LLB or RLB	Green Blinking
Not ready for service (Re-plug the Tributary Card)	Red On

System LEDs	
System Status	LED Status
System Power On	PWR LED Green On
Alarm Cut Off	ACO LED Green On
RLB or LLB	ABN LED Green On
Both Optical Working and Protection Links are in service with LOS or LOF	MJ LED Red On
Optical Link is Working and Protection Link are in service and with LOS or LOF	MN LED Yellow On
Any Low Speed channel is in service with LOS	MJ LED Red On
Alarms occur in Near End	NE LED Yellow On
Alarms occur in Far End (Including RDI)	FE LED Yellow On
Any error occur when the built-in test is active	FAIL LED Red On
System failure	FAIL LED Red On
Receive AIS (Alarm Indicate Signal)Note	MN LED Yellow On
Receive RDI (Remote Defect Indication)Note	MN LED Yellow On

Note: No NE LED lights up when AIS or RDI alarm has been received.

1.

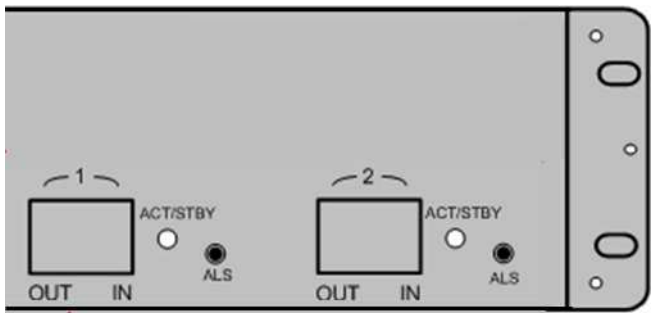


Figure 3.10 Optical Interface Operation LEDs

Optical Interface Operatrion LEDs (ACT/STBY)	
Optical Channel Status	LED Status
Out of service or is not installed	Off
Channel in service and in normal status	Green On
Channel in service with LOS	Red On
Channel in service with LOF	Red On
Channel in standby status and in normal status	Yellow On
Channel in standby status with LOS	Red On
Channel in standby with LOF	Red On
Channel in service with RDI	Green On
Channel in service with LLB or RLB	Green Blinking
Unknown remote side device	Red & Green Blinking

The system also provides the following alarm relay contacts:

- MJA: Audible Major Alarm
- MJV: Visual Major Alarm
- MNA: Audible Minor Alarm
- MNV: Visual Minor Alarm

The activation of MJA and MJV relays depends on whether MJ red LED is on or not; and, in the same way, that of MNA and MNV relay depends on whether MN yellow LED is on or not.

The ACO key can be pressed to disable the MJA and MNA relays. After disabling MJA and / or MNA relays by ACO, these relays are re-activated if any other alarm condition occurs and the associated MJ and MN LEDs will be turned on.

3.10 Automatic Protection Switching (APS)

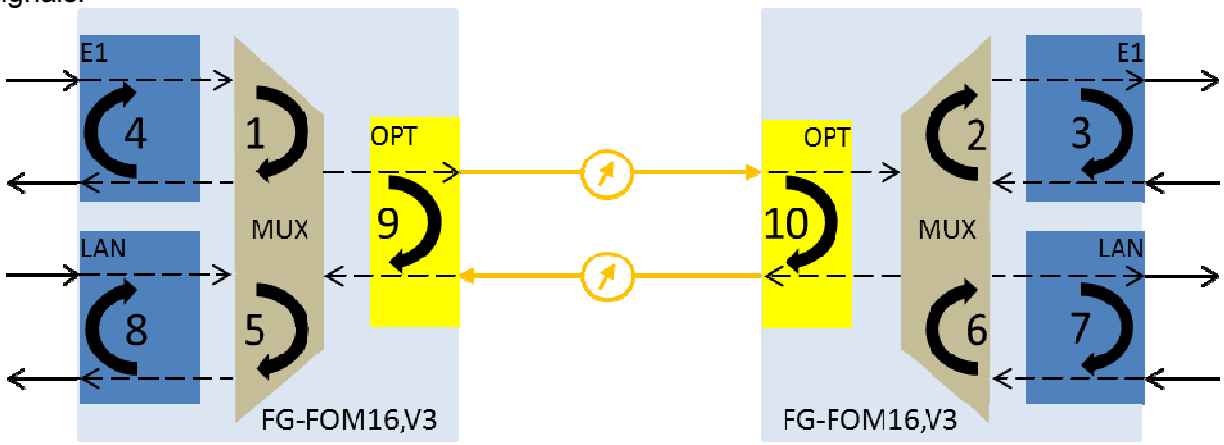
The FG-FOM16,V3 system offers optical 1+1 automatic protection switching if two optical SFP modules are up and running. When one of optical signals fails (SF, LOS, LOF) or signal degrade (SD, BER ≥10-5), system switches to second stable optical link.

The mechanism of protection switching is non-revertible and bi-directional to prevent unwanted oscillation between service and protection facilities. The switching time is less than 60 ms. The FG-FOM16,V3 system goes to locked switch state, if system has 8 times auto protection in 10 minutes. If FG-FOM16,V3 is in locked switch state, user can use a command to release force switch state.

The protection switching can be initiated automatically and manually. The protection switching can be terminated manually.

3.11 Loopback and Testing

The FG-FOM16,V3 system has internal remote and local loopback testing facilities for maintenance purposes. These functions are used to test the integrity and connectivity of E1 and optical signals.



2.

Figure 3.11 Test Loops

Test Loops Description[Note1]					
Loop #	Initiating side	Loopback Type	Channel Blinking LED at	Sending AIS toward[Note2]	LAN Status
E1					
1	Local	Local	Local	Remote side	None
2	Remote	Local	Remote	Local side	None
3	Local	Remote	Local/ Remote	Remote side	None
4	Remote	Remote	Local/ Remote	Local side	None
LAN					
5	Local	Local	Local	None	No Packet Transmission @ Remote Side
6	Remote	Remote	Remote	None	No Packets Transmission @ Local Side
7	Local	Remote	Local/ Remote	None	No Packets Transmission @ Remote Side
8	Remote	Remote	Local/ Remote	None	No Packets Transmission @ Local Side
Optical					
9	Local	Local	Local	Remote side	No Packets Transmission @ Remote Side
10	Local	Remote	Local/ Remote	Remote side	No Packets Transmission @ Remote Side

Note1: It is not possible to activate several Loops from one side at the same time.
Note2: AIS also occured when there is no optical signal at the Local or Remote Side.

The test pattern generator and detector are built-in for loopback testing. The test results are displayed by BER (Bit Error Ratio). Note, that either Loopback#3 or Loopback#10 has to be performed prior to Bit Error Testing!

3.12 Performance Monitoring (Option)

The FG-FOM16,V3 system also collects the performance data like Code Violation (CV), Error Seconds (ES), Severely Error Seconds (SES), and Unavailable Seconds (UAS) with settable Threshold Values for 15 min and 24 hour intervals.

Performance Monitoring Data		
Items	Data	
E1 Tributary		
Near-End Line	CV, ES, SES	
Near-End Path	CV, ES, SES, UAS	
Far-End Line	CV, ES, SES	
Far-End Path	CV, ES, SES, UAS	
Aggregation Interface		
Near-End Line	CV, ES, SES	
Near-End Path	CV, ES, SES, UAS	
Far-End Line	CV, ES, SES	
Far-End Path	CV, ES, SES, UAS	
E1 Tributary Near-End	The E1 input port of local FG-FOM16,V3	
E1 Tributary Far-End	The E1 input port of remote FG-FOM16,V3	
Aggregate Near-End	The high-speed side of local FG-FOM16,V3	
Aggregate Far-End	The high-speed side of remote FG-FOM16,V3	
Line	A transmission medium line coding level. Used for performance monitoring at the physical layer	
Path	A logical connection between the points at which a standard frame signal at the given rate is processed	

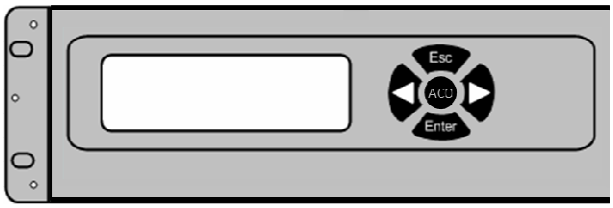
LAN		
Near-End Line	SES	
Near-End Path	ES, SES, UAS	
Far-End Line	SES	
Far-End Path	ES, SES, UAS	
Line	Disconnection occurred	
Path	CRC Error of packets occurred or Disconnection occurred	

Treshold Settings		
E1 parameter	15 Min	24 Hours
ES	0…9999	0…9999
SES	0…9999	0…9999
UAS	0…9999	0…9999

The historical performance data includes 15-minute interval for ES, SES, and UAS of the latest 24 hours as well as total 24-hour interval for ES, SES, and UAS of the latest 7 days that derives from the error messages of incoming digital paths.

4 PROGRAMMING GUIDE

4.1 Front Panel Operation



The front panel consists of 2x20-character LCD-display and 5 keys labelled with **ESC**, **Enter**, ◄, ► and **ACO**.

Figure 4.1 LCD-display and 4 keypads

- **Enter** key is used to go down in the menu tree or to choose a selection
- ◄ and ► keys show other menu item at the same level
- **ESC** key returns to an upper layer menu or to the main menu.
- The 1st line of LCD shows the operation items and selected items have the 1st character underlined.
- The second line displays a prompt string.
- A "**<**" or a "**>**" represent that the menu is a multi-page.

4.1.1 LCM Menu Structure

After powering up the first Menu appears:

```
LOCAL REMOTE
Local
```

The first layer menu includes **LOCAL** and **REMOTE** submenu. Each sub-menu is further splitted into sub-level menu:

```
CFG STATUS MAINT   >
Configure
```

```
PM TEST&DIAG ADMIN <
Performance Mon
```

Subsequent chapters give detailed information regarding these menus. Please refer to the next page Table for Menu Structure with correspondent Manual Page of detailed description:

LCM Menu Structure and Manual Navigation			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
CFG – Configuration Menu			
SVC	LSU	Enabling/disabling of Low Speed or Optical channels operation	29
	OPT		
ET1	TYPE	Setting of E1/T1 Tributary parameters	30
	FRAME		
	CODE		
	EQUALIZER		
LAN	VLAN	Global: Enabling/disabling of 802.1Q VLAN processing	33
		Port: Setiing of rules for VID over ingress LAN port or Port Based VLAN CONFIG	34 37
		VID: Managing VID Table	37
	QoS:	Global: Setting of Scheduliung Mode for LAN port	40
		Port: QoS port settings (802.1p/DSCP/default PID)	40
		802.1p: Setting of QoS 802.1p tabl.	42
		DSCP: Setting of DSCP table	43
	RATELIMIT	Set Ingress/Egress port limitation	44
	PROVISION	Global: Setting of Port Isolation Mode	45
		Port: Configuring of Port Speed, Auto Link Down, Flow Control and Packet size	46
OPT	ALS	Automatic Laser Shutdown Settings	49
	PROTECT	Set Protection Switching Mode for Optical Aggregation interface	49
	LOCKED	Releasing Mode of Protection switching	50
MISC	-	<DOES NOT SUPPORTED>	
STATUS Menu			
EQUIP	-	View card type.	51
E1/T1	SVC,TYPE, FRAME, CODE, LPBK	View Service Status, Interface Type, Frame, Line Code and Loopback Settings of E1/T1 Tributary	52
LAN	SVC, MODE, LNK, LPBK, RATELIMIT	View Service Status, Line Rate Mode, Link Status, Loopback, and Rate Limit Settings of LAN Tributary	54
OPT	SVC, PROV, LNK, LPBK	View Service Status, ALS and APS configuration, SFP Status and Loopback Settings of Aggregation Interface	56
Will be continued			

LCM Menu Structure and Manual Navigation (Continued)			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
MAINT - Maintainance and Perfomance Event Menu			
ALM (Alarm Report)	ALMHIS	View Alarm History	58
	ALMCUR	View Current Alarms	59
	ALMCLR	Clear Alarm History	59
PMEVENT (Performance Data View)	15MIN	View 15 minutes PM events	60
	HOUR	View 1 hour PM events	60
	DAY	Clear 1 day PM events	60
PM – Performance Monitor Menu			
HIS	15MIN DAY	View PM history	61
CUR	15MIN HOUR DAY	View current PM data	62
THR	THRCFG THRCLR	Set Threshold Values	62
CLR	CLRHIS	Clear specific PM data history	64
	CLRALL	Clear all PM data history	65
TEST & DIAG – Test and Diagnose Menu			
LED	-	LED testing	66
LPBK	LSU, OPT	Run Loopbacks	66
PATT	START RESULT CLR	Run Bit Errror Test and view testing result and clear result	67
ALS	ALS	Run ALS Testing	69
ADMIN – Administration Menu			
VERSION	-	View software version	70
NETWORK	IP GATEWAY SUBNET	Set IP address, gateway, and subnet mask	70
	SNMP	Set SNMP configuration。	71
REBOOT	NETAPPLY REBOOT RESET	Applying of network configuration Rebooting device Load default configuration	73

WARNING

BEFORE DEVICE COMMISIONING:

- POWER UP THE DEVICE
- GO TO **ADMIN→NETWORK→IP** BY KEYPADS
- SET PROPER IP NETWORK SETTINGS

4.1.2 CFG – Configuration Menu

Description: Set Configuration of the System.
Configuration Menu includes **SVC**, **ET1**, **LAN**, **OPT** and **MISC** submenus.

To enter to Configuration Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys and then press **Enter** twice.

CFG – Configuration Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
SVC	LSU	Enabling/disabling of Low Speed or Optical channels operation	29
	OPT		
ET1	TYPE	Setting of E1/T1 Tributary parameters	30
	FRAME		
	CODE		
	EQUALIZER		
LAN	VLAN	Global: Enabling/disabling of 802.1Q VLAN processing	33
		Port: Setiing of rules for VID over ingress LAN port or Port Based VLAN CONFIG	34 37
		VID: Managing VID Table	37
	QoS:	Global: Setting of Scheduliung Mode for LAN port	40
		Port: QoS port settings (802.1p/DSCP/default PID)	40
		802.1p: Setting of QoS 802.1p tabl.	42
		DSCP: Setting of DSCP table	43
	RATELIMIT	Set Ingress/Egress port limitation	44
	PROVISION	Global: Setting of Port Isolation Mode	45
		Port: Configuring of Port Speed, Auto Link Down, Flow Control and Packet size	46
OPT	ALS	Automatic Laser Shutdown Settings	49
	PROTECT	Set Protection Switching Mode for Optical Aggregation interface	49
	LOCKED	Releasing Mode of Protection switching	50
MISC	-	<DOES NOT SUPPORTED>	

4.1.2.1 SVC – Line Service Settings

Description: Set Line Service Mode (to be In Service or Out of Service) for each channel of the unit.

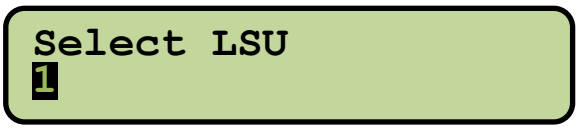
To enter to Line Service Settings select **SVC** by using of ◄ or ► keys and then press **Enter**:

4.1.2.1.1 LSU - Low Speed Service Settings

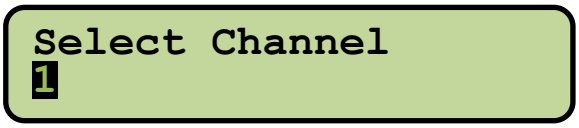
PATH: CFG→SVC→LSU

1. Use ◄ and ► to choose low speed unit (**LSU**) section, then press **Enter**:

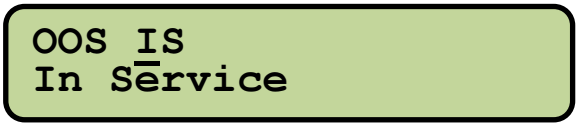
2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



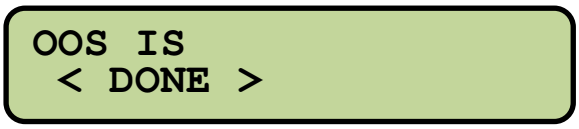
3. Use ◄ and ► keys to choose a channel and press Enter:



4. Use ◄ and ► keys to select a desired option, **In-Service** or **Out-of-Service**:



5. Press **Enter** to execute the command:

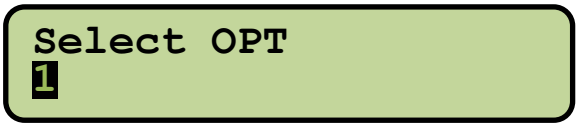


4.1.2.1.2 OPT - High Speed Service Settings

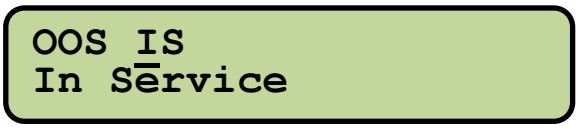
PATH: CFG→SVC→OPT

1. Use ◄ and ► to choose optical (**OPT**) section, then press **Enter**:

2. Use ◄ and ► keys to choose optical channel 1 or 2 and press **Enter**:



3. Use ◄ and ► keys to select a desired option, **In-Service** or **Out-of-Service**:

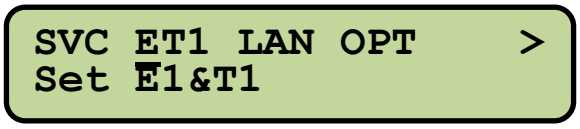


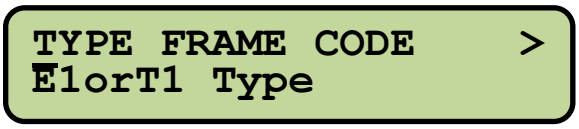
4. Press **Enter** to execute the command:

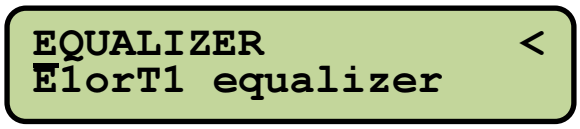
4.1.2.2 ET1 – E1/T1 Tributary Settings

Description: Configuring of E1/T1 interfaces.

To enter to E1/T1 Tributary Settings select **ET1** by using of ◄ or ► keys and then press **Enter**:







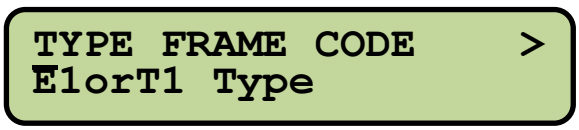
4.1.2.2.1 TYPE – E1/T1 Tributary Type Settings

Description: Set Tributary card mode (**E1** or **T1**).

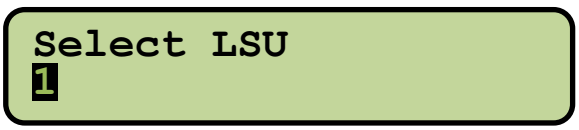
PATH: CFG→ET1→TYPE

Note: This section is void for LAN interfaces.

1. Use ◄ and ► to choose Tributary card mode (**TYPE**) section, then press **Enter**:

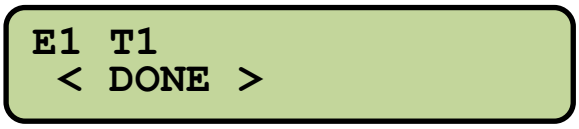


2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



3. Use ◄ and ► keys to select a desired option, **E1** or **T1**:

4. Press **Enter** to execute the command:



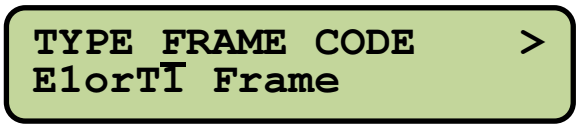
4.1.2.2.2 FRAME – E1/T1 Frame Type Settings

Description: Set E1 or T1 framing for E1/T1 channels.

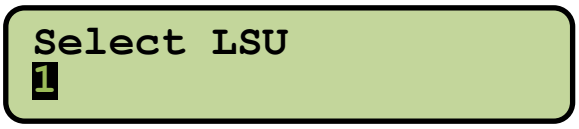
PATH: CFG→ET1→Frame

Note: This section is void for LAN interfaces.

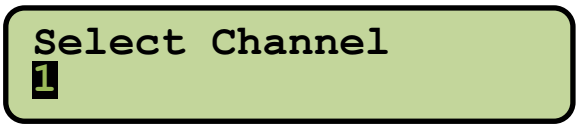
1. Use ◄ and ► to choose frame type (**FRAME**) section, then press **Enter**:



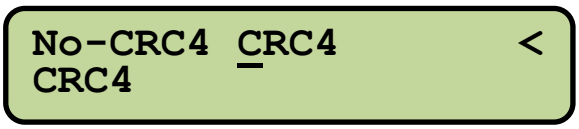
2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



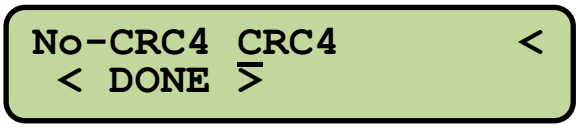
3. Use ◄ and ► keys to choose a channel and press **Enter**:



4. Use ◄ and ► keys to select a desired option:



5. Press **Enter** to execute the command:



4.1.2.2.3 CODE – E1/T1 Linecode Settings

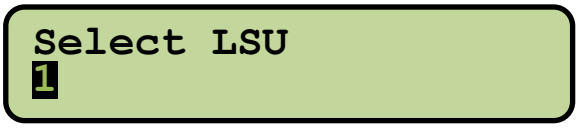
Description: Set line code for E1/T1 channels.

PATH: CFG→ET1→CODE

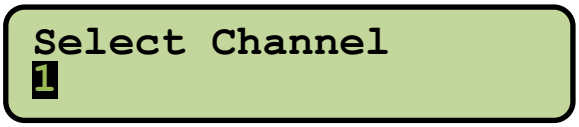
Note: This section is void for LAN interfaces.

1. Use ◄ and ► to choose linecode (**CODE**) section, then press **Enter**:

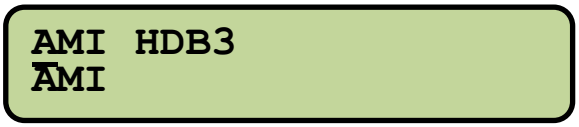
2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

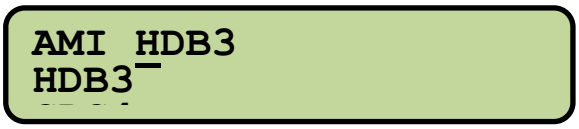


3. Use ◄ and ► keys to choose a channel and press **Enter**:

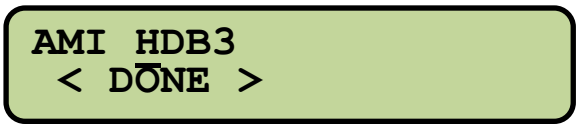


4. Use ◄ and ► keys to select a desired option, **AMI** or **HDB3**:





5. Press **Enter** to execute the command:



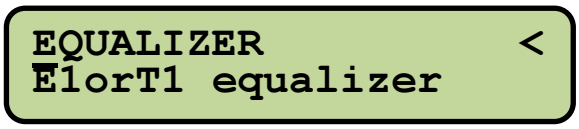
4.1.2.2.4 EQUALIZER – T1 Equalizer Settings

Description: Set transmission distance (T1 only) for attenuation compensation.

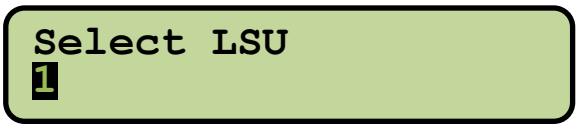
PATH: CFG→ET1→EQUALIZER

Note: This section is void for E1 and LAN interfaces.

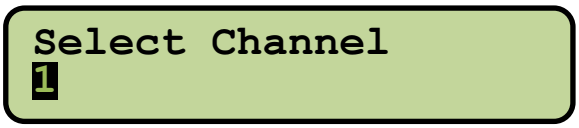
1. Use ◄ and ► to choose **EQUALIZER** section, then press **Enter**:



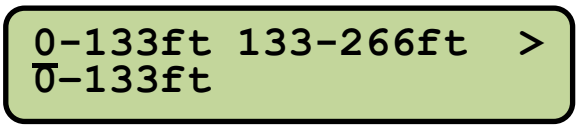
2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

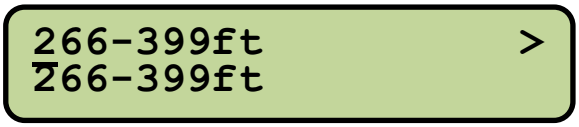


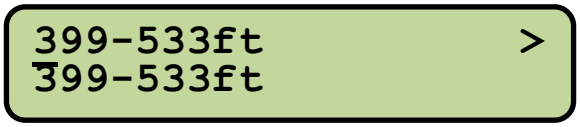
3. Use ◄ and ► keys to choose a channel and press **Enter**:

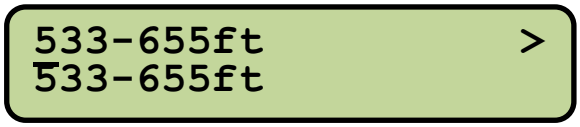


4. Use ◄ and ► keys to select a desired option:

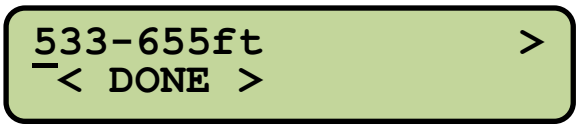








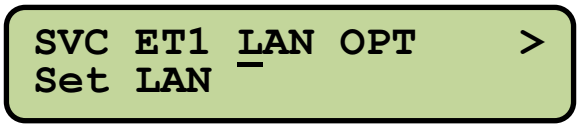
5. Press **Enter** to execute the command:



4.1.2.3 LAN – LAN Tributary Settings

Description: Configuring of LAN interfaces.

To enter to LAN Tributary Settings select **LAN** by using of ◄ or ► keys and then press **Enter**:



4.1.2.3.1 VLAN – VLAN Settings

Description: Configuring of VLANs.

PATH: CFG→LAN→VLAN

Note: This section is void for E1/T1 interfaces.
Note: This section's submenues are blocked when Port Isolation is activated (see page 45).

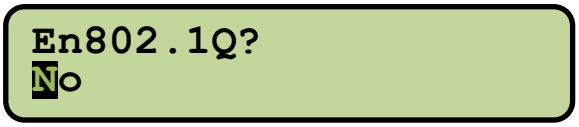
The VLAN submenue includes **GLOBAL**, **PORT** and **VID** submenues. Use ◄ and ► keys to cycle through to a desired item then press **Enter** to select.

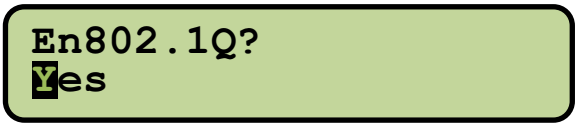
- **GLOBAL** – enabling/disabling of 802.1Q VLAN processing.

  PATH: CFG→LAN→VLAN→GLOBAL

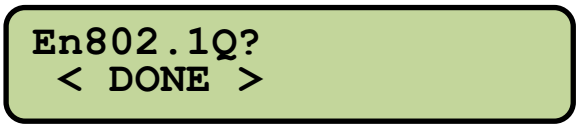
1. Use ◄ and ► to choose **GLOBAL** section, then press **Enter**:

2. Use ◄ and ► keys to choose **No** (disable 802.1Q) or **Yes** (enable 802.1Q):





3. Press **Enter** to execute the command:



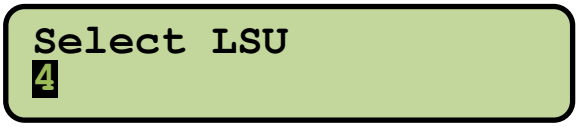
- **PORT** – **(1)** Setiing rules for VID over ingress LAN port **when 802.1Q is being enabled**.

  PATH: CFG→LAN→VLAN→PORT

1. Use ◄ and ► to choose **PORT** section, then press **Enter**:

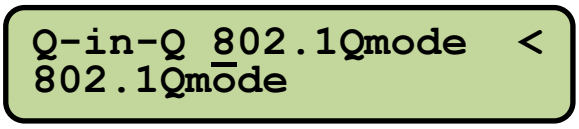
2. Use ◄ and ► keys to choose **LSU/Trunk** and press **Enter**:

3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



4. Use ◄ and ► keys to choose a channel and press **Enter**:

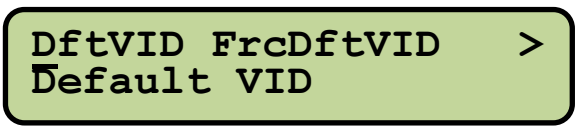
5. Use ◄ and ► keys to choose desired option (**DftVID**, **FrcDftVID**, **Q-in-Q**, **802.1Qmode**):



- **DftVID** – Set default VLAN ID for LAN port.

  PATH: CFG→LAN→VLAN→PORT→DftVID

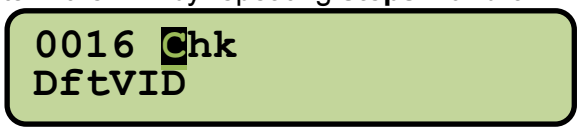
1. Use ◄ and ► to choose **DftVID** section, then press **Enter**:



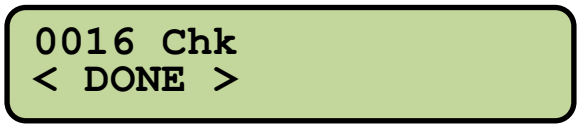
2. Use ◄ and ► keys to move the cursor until it shown under required location:

3. Use ◄ and ► keys to change the digit and press **Enter**:

4. Perform settings of all necessary digits in the VID by repeating **steps 2 and 3**.
5. Use ◄ and ► keys to move the cursor until it shown under Chk:



6. Then press **Enter** to confirm you selection:

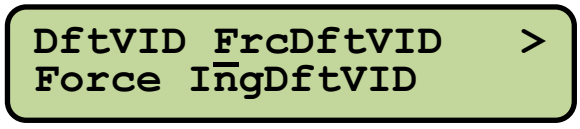


If the invalid VID is entered then following message occurs:

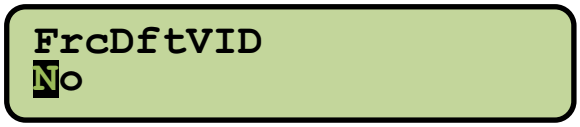
- **FrcDftVID** – Force Ingress Default VID.

  PATH: CFG→LAN→VLAN→PORT→FrcDftVID

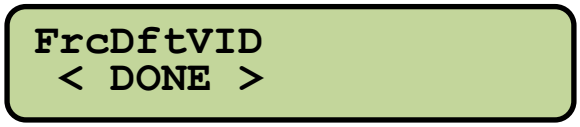
1. Use ◄ and ► to choose **FrcDftVID** section, then press **Enter**:



2. Use ◄ and ► keys to choose **No** (Remain the original VID of packets) or **Yes** (Change the original VID of packets as Default VLAN ID):



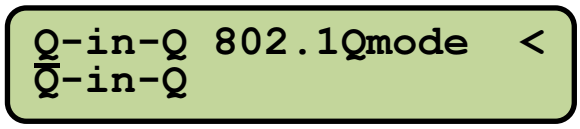
3. Then press **Enter** to confirm you selection:



- **Q-in-Q** – enable/disable double tag.
  Description: Attach additional default VID to packets' original VID. Packets to be sent out by this double VID as destination VID.

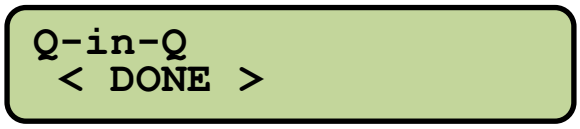
  PATH: CFG→LAN→VLAN→PORT→Q-in-Q

1. Use ◄ and ► to choose **Q-in-Q** section, then press **Enter**:



2. Use ◄ and ► keys to choose **No** (disable Q-in-Q) or **Yes** (enable Q-in-Q):

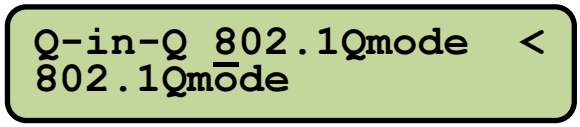
3. Then press **Enter** to confirm you selection:



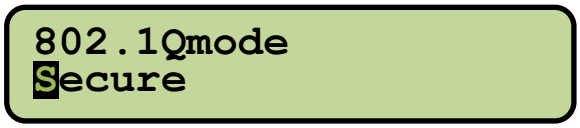
- **802.1Qmode** – setting of checking packets mode for ingress ports.

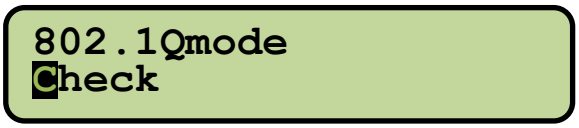
  PATH: CFG→LAN→VLAN→PORT→802.1Qmode

1. Use ◄ and ► to choose **802.1Qmode** section, then press **Enter**:



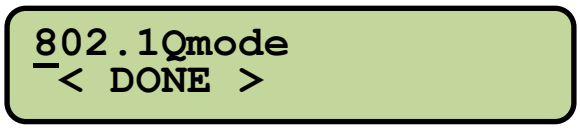
2. Use ◄ and ► keys to choose **Check** (disable Q-in-Q) or **Secure** (enable Q-in-Q):





Secure: Enable 802.1Q for checking ingress and egress ports. Discard Ingress membership violations. And discard exgress frames whose VID is not contained in the VID table.
Check: Enable 802.1Q for this egress port. Do not discard Ingress membership violations and discard egress packets which its VID is not contained in the VID table.

3. Then press **Enter** to confirm you selection:

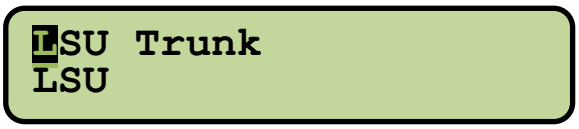


- **PORT – (2)** Setting of Port Base VLAN Configuration **when 802.1Q is being disabled**.

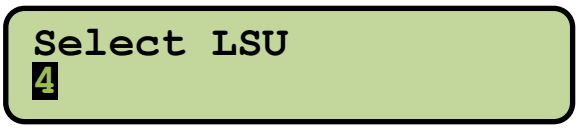
  PATH: CFG→LAN→VLAN→PORT

1. Use ◄ and ► to choose **PORT** section, then press **Enter**:

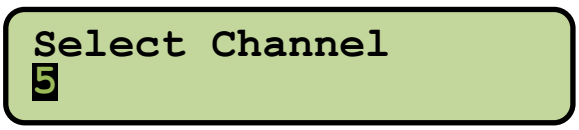
2. Use ◄ and ► keys to choose **LSU/Trunk** and press **Enter**:



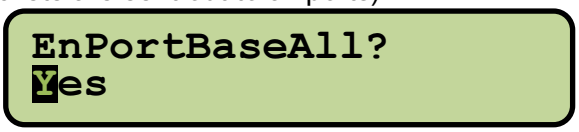
3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



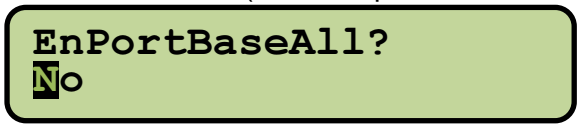
4. Use ◄ and ► keys to choose a channel and press **Enter**:

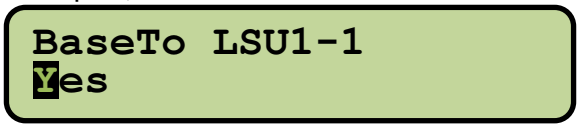


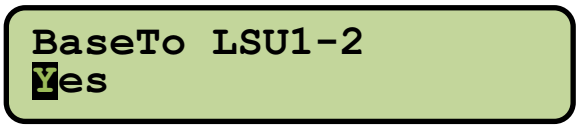
6. Use ◄ and ► keys to choose desired option:
   - **Yes** (EnPort Base All – means all packets are sent out to all ports):

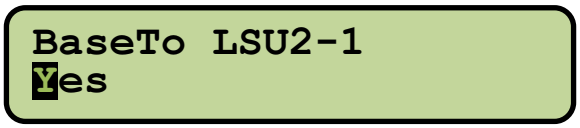


   - **No** (send out packets according individual port, see below:

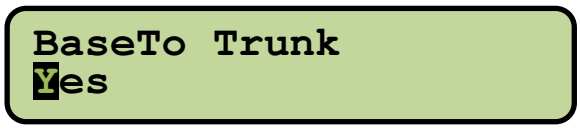








……



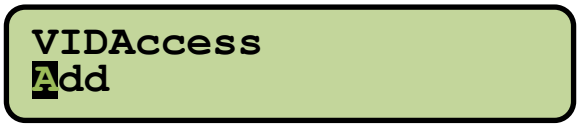
- **VID – VID** table setting.

  PATH: CFG→LAN→VLAN→VID

1. Use ◄ and ► to choose **VID** section, then press **Enter**:

2. Use ◄ and ► to choose VID table access mode and press **Enter**:

VID table access mode	
Option	Definition
Add	Add a new VID tag and set its relationship to other ports. Valid options are: Untag, Tag, Discard
Delete	Delete previous VID tag.
Modify	Modify existing VID tag and its relationship to other ports.
Flush	Clear all VID tags。



3. **Add/Modify** modes:
   a. Use ◄ and ► keys to move the cursor until it shown under required location:

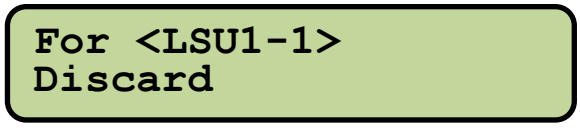
   b. Use ◄ and ► keys to change the digit and press **Enter**:

   c. Perform settings of all necessary digits in the VID by repeating **steps a and b**.

   d. Use ◄ and ► keys to move the cursor until it shown under **Chk**:

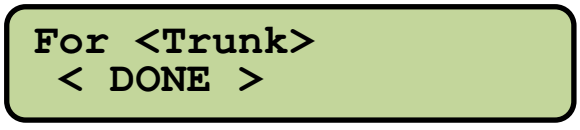
   e. Then press **Enter** to confirm you selection. If the invalid VID is entered then following message occurs:

   f. If the valid VID is entered then system drives you through the ports (by pressing **Enter**). Select for each entry one of the following possible modes:



      - Untag: Allow this specific VID tag to enter but remove tag.
      - Tag: Allow specific VID tag to pass through and put on an additional VID tag during egress.
      - Discard: Reject packets with specific VID tag.

   g. After fininshing the of the procedure the system displays <Done> message:



4. **Delete** mode:
   a. Use ◄ and ► keys to move the cursor until it shown under required location:

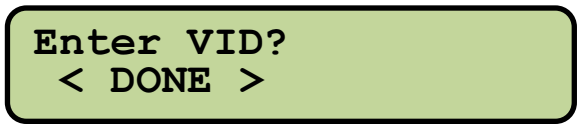
   b. Use ◄ and ► keys to change the digit and press **Enter**:

   c. Perform settings of all necessary digits in the VID by repeating **steps a and b**.

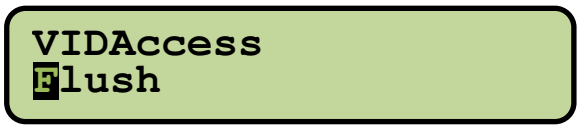
   d. Use ◄ and ► keys to move the cursor until it shown under **Chk**:

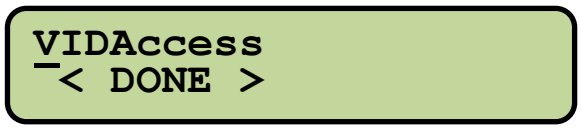
   e. Then press **Enter** to confirm you selection. If the invalid VID is entered then following message occurs:

   f. If the valid is entered then system displays <Done> message:



5. **Flush** mode:
   a. Just choose **Flush** option and press **Enter**. All entries will be deleted from the table.





4.1.2.3.2 QoS – QoS Settings

Description: Configuring of QoS.

PATH: CFG→LAN→QoS

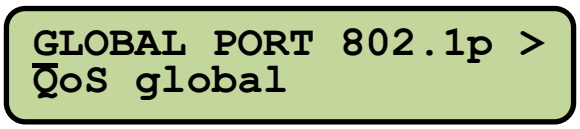
Note: This section is void for E1/T1 interfaces.

The QoS submenue includes **GLOBAL**, **PORT**, **802.1p** and **DSCP** submenues. Use ◄ and ► keys to cycle through to a proper item then press **Enter** to select.

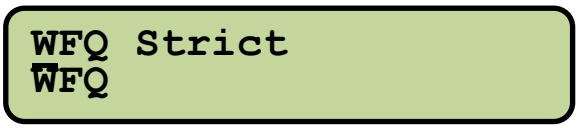
- **GLOBAL** – Setting of Scheduliung Mode for LAN port.

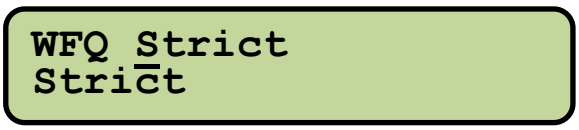
  PATH: CFG→LAN→QoS→GLOBAL

1. Use ◄ and ► to choose **GLOBAL** section, then press **Enter**:

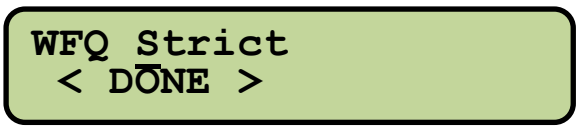


2. Use ◄ and ► keys to choose **WFQ** (Weighted Fair Queue) or **Strict**:





3. Press **Enter** to execute the command:

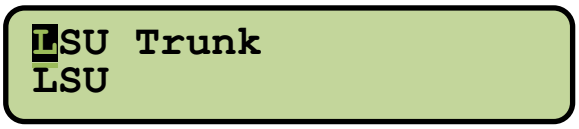


- **PORT** – QoS port settings.

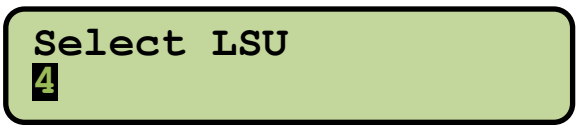
  PATH: CFG→LAN→QoS→PORT

1. Use ◄ and ► to choose **PORT** section, then press **Enter**:

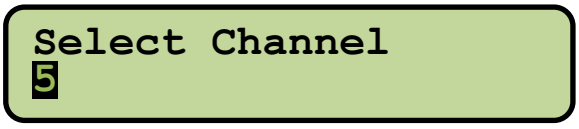
2. Use ◄ and ► keys to choose **LSU/Trunk** and press **Enter**:



3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

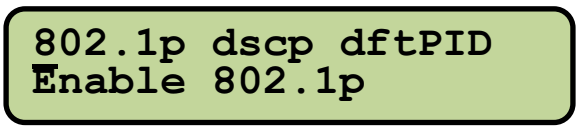


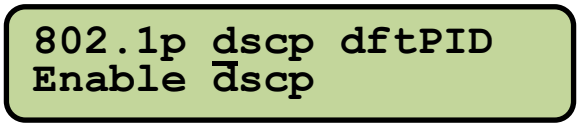
4. Use ◄ and ► keys to choose a channel and press **Enter**:



5. Use ◄ and ► keys to choose desired option:
   - enabling/disabling of 802.1p
   - enabling/disabling of DSCP or
   - setting of default PID (dftPID)

   then press **Enter** to confirm your selection:

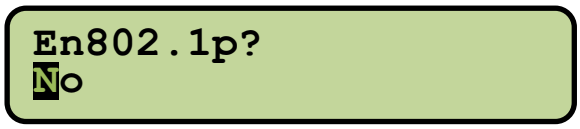


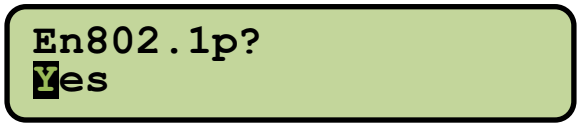


- **802.1p** – enabling/disabling of 802.1p.

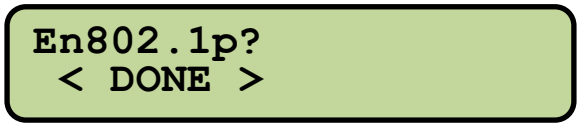
  PATH: CFG→LAN→QoS→PORT→802.1p

1. Use ◄ and ► keys to choose **No** (disable 802.1p) or **Yes** (enable 802.1p):





2. Then press Enter to confirm you selection:

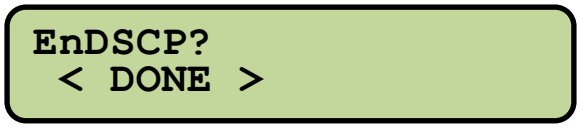


- **dscp** – enabling/disabling of DSCP.

  PATH: CFG→LAN→QoS→PORT→dscp

1. Use ◄ and ► keys to choose **No** (disable DSCP) or **Yes** (enable DSCP):

2. Then press **Enter** to confirm you selection:



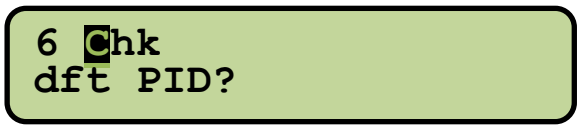
- **dftPID** – setting of default PID.

  PATH: CFG→LAN→QoS→PORT→dftPID

1. Use ◄ and ► keys to move the cursor until it shown under required location:

2. Use ◄ and ► keys to change the digit and press Enter:

3. Use ◄ and ► keys to move the cursor until it shown under Chk:



4. Then press Enter to confirm you selection. If the invalid PID is entered then following message occurs:

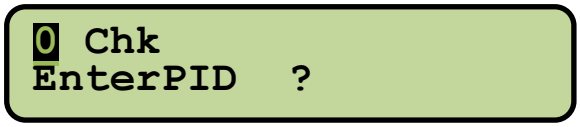
- **802.1p** – Setting of QoS 802.1p table.

  Description: Assign the Traffic Class (Class 0 (the lowest class)…Class 3 (the highest class) for PID (PID0…PID7).

  PATH: CFG→LAN→QoS→802.1p

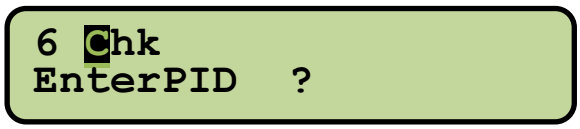
1. Use ◄ and ► to choose **802.1p** section, then press **Enter**:

2. Use ◄ and ► keys to move the cursor until it shown under required location:



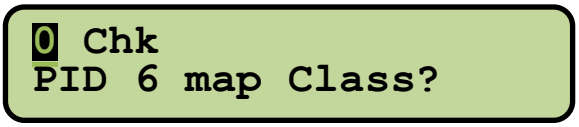
3. Use ◄ and ► keys to change the digit and press Enter:

4. Use ◄ and ► keys to move the cursor until it shown under Chk:

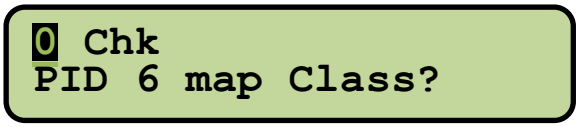


5. Then press **Enter** to confirm you selection. If the invalid PID is entered then following message occurs:

6. If the valid PID is entered then system asks you about Class degree

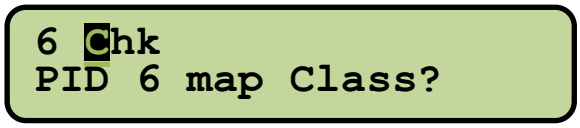


7. Use ◄ and ► keys to move the cursor until it shown under required location:



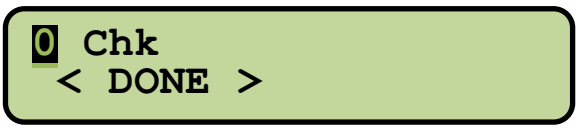
8. Use ◄ and ► keys to change the digit and press Enter:

9. Use ◄ and ► keys to move the cursor until it shown under Chk:



10. Then press **Enter** to confirm you selection. If the invalid Class is entered then following message occurs:

11. If the valid Class is entered then system dispays <Done> message:



- **DSCP** – Setting of DSCP table.

  Description: Map DSCP of packets (0…63) to Class (Class 0 (the lowest class)…Class 3 (the highest class).

  PATH: CFG→LAN→QoS→DSCP

1. Use ◄ and ► to choose **DSCP** section, then press **Enter**:

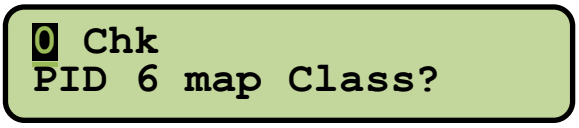
2. Use ◄ and ► keys to move the cursor until it shown under required location:

3. Use ◄ and ► keys to change the digit and press Enter:

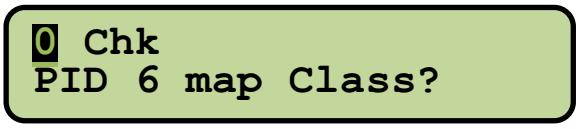
4. Use ◄ and ► keys to move the cursor until it shown under Chk:

5. Then press **Enter** to confirm you selection. If the invalid DSCP is entered then following message occurs:

6. If the valid DSCP is entered then system asks you about Class degree

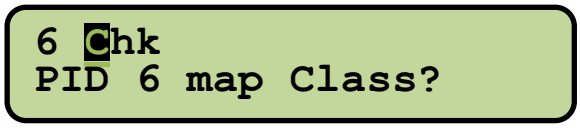


7. Use ◄ and ► keys to move the cursor until it shown under required location:



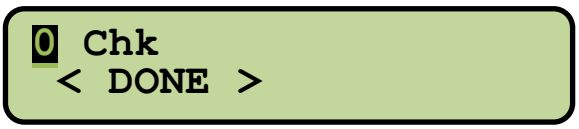
8. Use ◄ and ► keys to change the digit and press Enter:

9. Use ◄ and ► keys to move the cursor until it shown under Chk:



10. Then press **Enter** to confirm you selection. If the invalid Class is entered then following message occurs:

11. If the valid Class is entered then system dispays <Done> message:



4.1.2.3.3 RATELIMIT – Rate Limit Settings

Description: Set Ingress/Egress Rate Limiting.

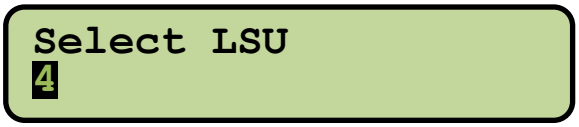
PATH: CFG→LAN→RATELIMIT

Note: This section is void for E1/T1 interfaces.

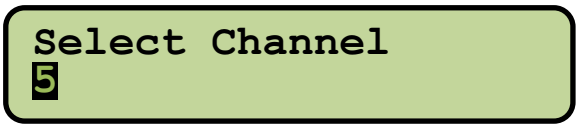
1. Use ◄ and ► to choose **RateLimit** Settings section, then press **Enter**:

2. Use ◄ and ► keys to choose **LSU/Trunk** and press **Enter**:

3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

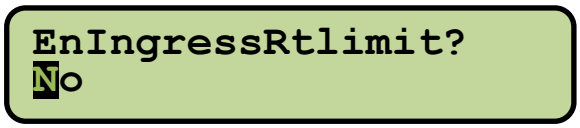


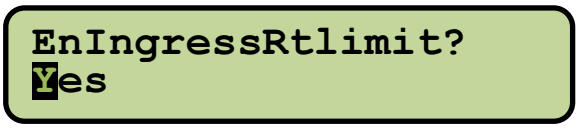
4. Use ◄ and ► keys to choose a channel and press **Enter**:



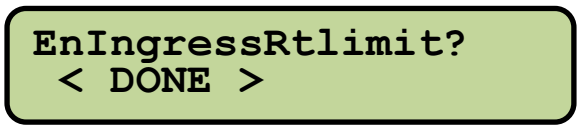
5. Use ◄ and ► keys to choose Ingress or Egress option and press **Enter**:

6. Use ◄ and ► keys to choose **No** (disable rate limitation) or **Yes** (enable rate limitation):



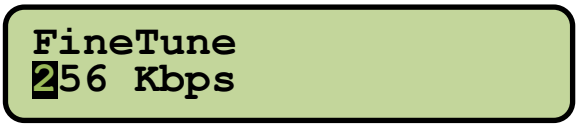


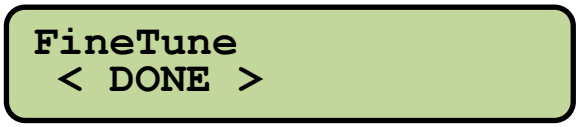
7. Then press **Enter** to confirm you selection. If Rate limitation is disabled then system shows <Done> message:



   Else (Rate limitation is enabled) system asks enter the rate limit. Use ◄ and ► keys to choose the rough rate range: 0-1 Mbps, 1-10 Mbps, 10-100 Mbps or 100-1000 Mbps, then press **Enter**:

8. Then use ◄ and ► keys to choose the fine rate limit and press **Enter** to confirm you selection:





See next page for valid option table for Rate limitation.

Rate limiting table						
Rought rate range	Fine Tune Values					
0…1 Mbps	256 Kbps	512 Kbps	768 Kbps	1 Mbps		
1...10 Mbps	1.5 Mbps	2 Mbps	2.5 Mbps	3 Mbps	3.5 Mbps	4 Mbps
	4.5 Mbps	5 Mbps	5.5 Mbps	6 Mbps	6.5 Mbps	7 Mbps
	7.5 Mbps	8 Mbps	8.5 Mbps	9 Mbps	10 Mbps	
10...100 Mbps	15 Mbps	20 Mbps	25 Mbps	30 Mbps	35 Mbps	40 Mbps
	45 Mbps	50 Mbps	55 Mbps	60 Mbps	65 Mbps	70 Mbps
	75 Mbps	80 Mbps	85 Mbps	90 Mbps	95 Mbps	100 Mbps
100...1000 Mbps	150 Mbps	200 Mbps	250 Mbps	300 Mbps	350 Mbps	400 Mbps
	450 Mbps	500 Mbps	550 Mbps	600 Mbps	650 Mbps	700 Mbps
	750 Mbps	800 Mbps	850 Mbps	900 Mbps	950 Mbps	1000 Mbps

4.1.2.3.4 PROVISION – LAN Provision Settings

Description: Setting of Port Isolation Mode and Configuring of LAN ports.

PATH: CFG→LAN→PROVISION

Note: This section is void for E1/T1 interfaces.

The PROVISION submenue includes **GLOBAL** and **PORT** submenues. Use ◄ and ► keys to cycle through to a proper item then press **Enter** to select the underlined item.

- **GLOBAL** – Setting of Port Isolation Mode.

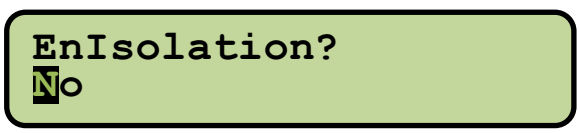
  Description: Enabling/disabling of Port Isolation mode.

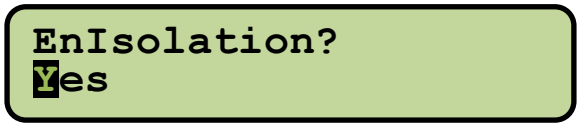
  PATH: CFG→LAN→PROVISION→GLOBAL

  Note: Once **Port Isolation** has been enabled, VLAN and VID Table Settings will be locked until **Port Isolation** has been disabled. After that, the settings of VLAN Settings and VID Table will be recovered as default setting.

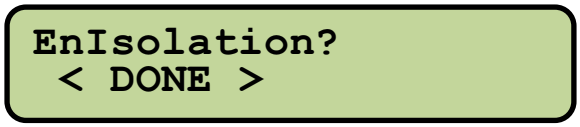
1. Use ◄ and ► to choose **GLOBAL** section, then press **Enter**:

2. Use ◄ and ► keys to choose No (disable Port Isolation) or **Yes** (enable Port Isolation):





Then press Enter to confirm you selection:

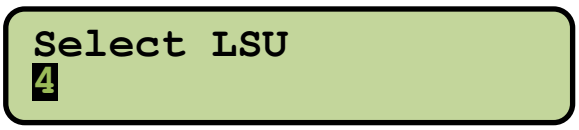


- **PORT** –. Configuring of Port Speed, Auto Link Down, Flow Control and Packet size.

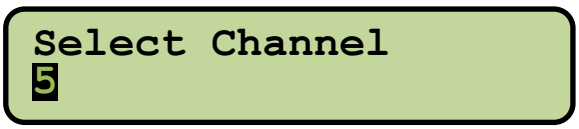
  PATH: CFG→LAN→PROVISION→PORT

1. Use ◄ and ► to choose **PORT** section, then press **Enter**:

2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

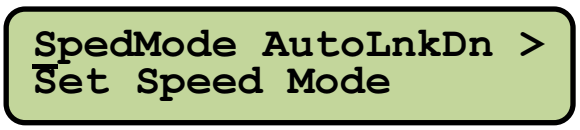


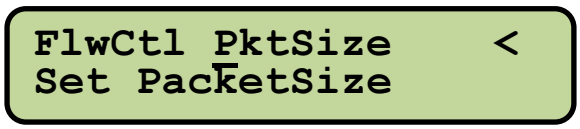
3. Use ◄ and ► keys to choose a channel and press **Enter**:



4. Use ◄ and ► keys to choose desired option:
   - Setting of Speed Rate mode
   - Setting of Auto Link Down mode
   - Enabling or Packet Flow Control
   - Setting of Packet Size

   then press **Enter** to confirm your selection:





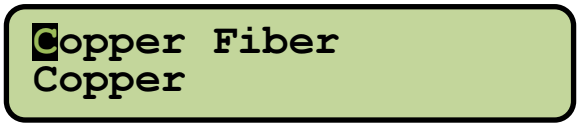
- **SpedMode** – Configuring of port Speed with Autonegotiation.

  Description: Setting of either Autonegotiation or ForceSpeed mode for specific LAN port based on adjustable **speed modes** and **interface** types

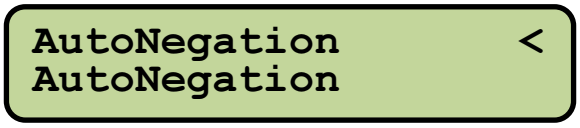
  PATH: CFG→LAN→PROVISION→PORT→SpedMode

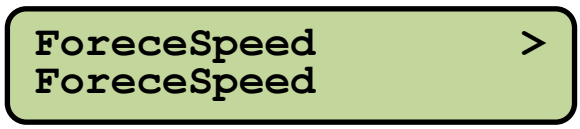
Supported Speed Rate Modes	
Copper LAN Interface	Optical LAN Interface
10M-T_Half	1000M-X_Half
10M-T_Full	
100M-T_Half	
100M-T_Full	1000M-X_Full
1000M-T_Half	
1000M-T_Full	

1. Use ◄ and ► keys to choose port type (**Copper** or **Fiber**) and press **Enter**:

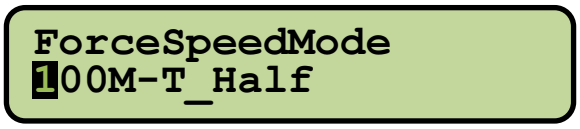


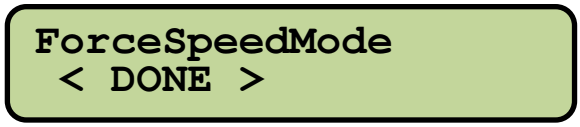
2. Use ◄ and ► keys to choose between **Autonegotiation** (AutoNegation) or **ForceSpeed** (ForeceSpeed) modes and press **Enter**:



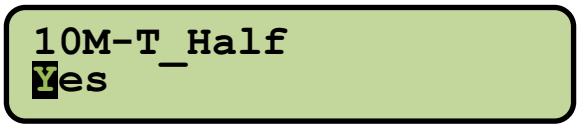


3. **ForeceSpeed** mode: Use ◄ and ► keys to choose desired speed mode and press **Enter**:

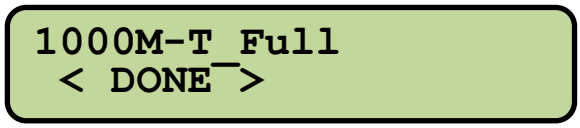




4. **Autonegotiation** mode: Use ◄ and ► keys and **Enter** to pass through available speed modes and choose each item **Yes** or **No**:



.....

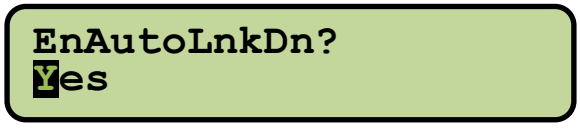


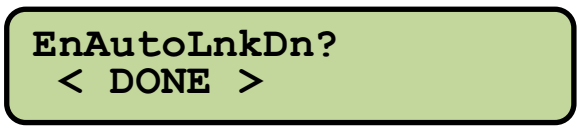
- **AutoLnkDn** – Enabling/disabling of Auto Link Down mode.

Description: Auto Link Down stops transmission at Local side when disconnection or LOS happened at Remote side and vice versa.

PATH: CFG→LAN→PROVISION→PORT→AutoLnkDn

Use ◄ and ► keys to choose **No** (disable ALD) or **Yes** (enable ALD) and press **Enter**:

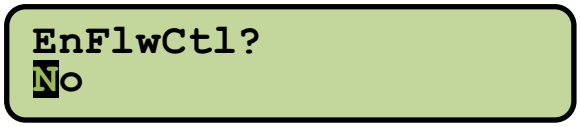


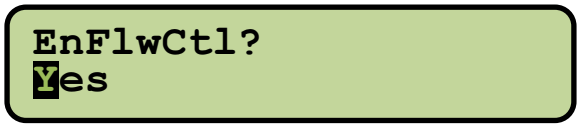


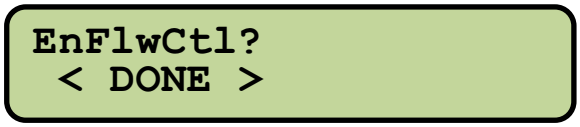
- **FlwCtl** – Enabling/disabling of Flow Control.

PATH: CFG→LAN→PROVISION→PORT→FlwCtl

Use ◄ and ► keys to choose **No** (disable Flow Control) or **Yes** (enable Flow Control) and press **Enter**:







- **PktSize** – Setting of Packet Size.

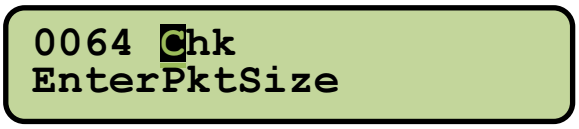
Description: Set packet size to 64…9000 bytes

PATH: CFG→LAN→PROVISION→PORT→PktSize

1. Use ◄ and ► keys to move the cursor until it shown under required location:

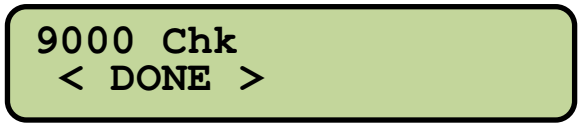
2. Use ◄ and ► keys to change the digit and press Enter:

3. Perform settings of all necessary digits by repeating **steps 1-2**.
4. Use ◄ and ► keys to move the cursor until it shown under Chk:



5. Then press **Enter** to confirm you selection. If the invalid Packet Size is entered then following message occurs:

6. If the valid Packet Size is entered then system dispays <Done> message:



4.1.2.4 OPT – Aggregation Optical Interface Settings

Description: Configuring of Aggregation Optical Interface.

To enter to Optical Settings select **OPT** by using of ◄ or ► keys and then press **Enter**:

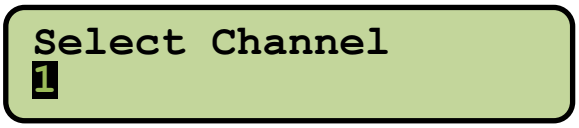
4.1.2.4.1 ALS – Automatic Laser Shutdown Settings

Description: Enabling/disabling of Automatic Laser Shutdown. When disabled the signal is kept transmitted at transmission side despite disconnection happened. When enabled in case of disconnection the system goes into cycling mode that combines optical transmission of 2 seconds and optical disconnection of 64 seconds.

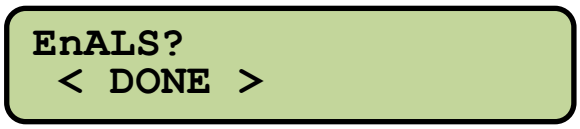
PATH: CFG→OPT→ALS

1. Use ◄ and ► to choose **ALS** section, then press **Enter**:

2. Use ◄ and ► keys to choose a channel and press **Enter**:



3. Use ◄ and ► keys to choose **No** (disable ALS) or **Yes** (enable ALS) and press **Enter**:



4.1.2.4.2 PROTECT – Set Protection Mode for Aggregation Interface

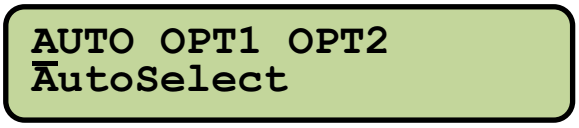
Description: Configuring APS (Automatic Protect Switching).

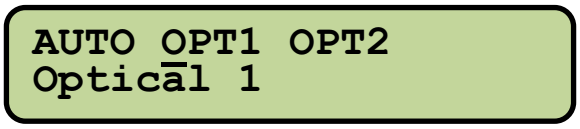
PATH: CFG→OPT→PROTECT

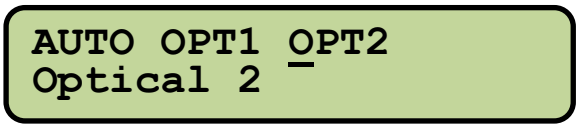
Aggregation Interface Protection Modes	
AUTO	Device automatically selects one of the two optical interfaces as the working interface and the other one as the standby interface. If the working path interrupts, the standby one is switched on automatically.
OPT-1	Transmission through the first optical interface. No protection.
OPT-2	Transmission through the second optical interface. No protection.

1. Use ◄ and ► to choose **PROTECT** section, then press **Enter**:

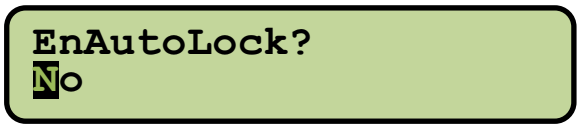
2. Use ◄ and ► keys to choose a desired option and press **Enter**:

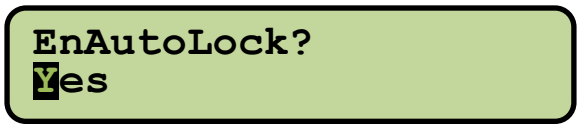


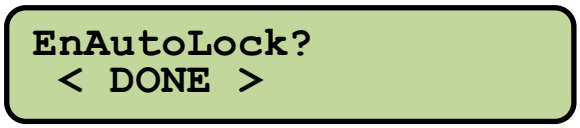




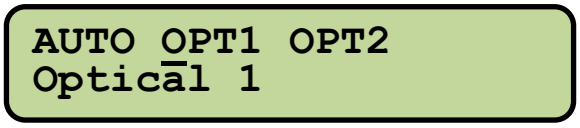
3. **AUTO** mode: Use ◄ and ► keys to choose **No** (disable AUTOLOCK mode) or **Yes** (enable AUTOLOCK Mode) and press **Enter**:

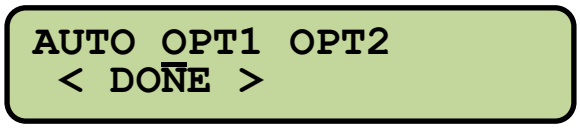






4. **OPT-1(2)**:press **Enter**:





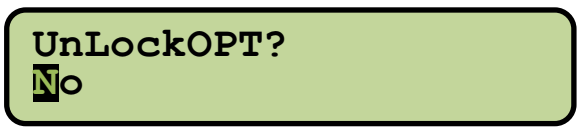
4.1.2.4.3 LOCKED –Releasing Locked Mode of Protection Switching

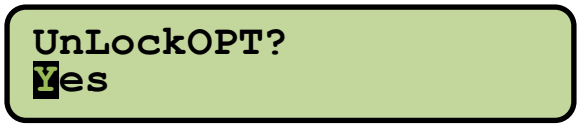
Description: When enabled the switching between working path and redundand path is performed automatically. When disabled the path will not be switched back. This will require the manual releasing of protection switching.

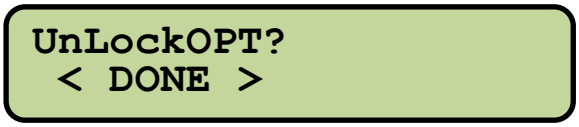
PATH: CFG→OPT→LOCKED

1. Use ◄ and ► to choose **LOCKED** section, then press **Enter**:

2. Use ◄ and ► keys to choose **No** (Manually releasing) or **Yes** (enable automatic releasing) and press **Enter**:



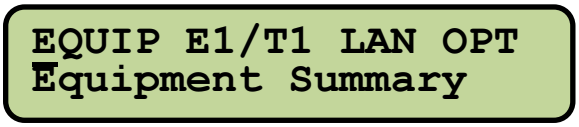




4.1.3 STATUS – System Status Menu

Description: Reviewing system configuration after finishing setting

Status Menu includes **EQUIP**, **E1/T1**, **LAN** and **OPT** submenus.



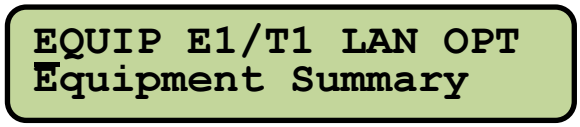
To enter to Status Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys, then press **Enter**, choose **STATUS** and press **Enter**.

STATUS Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
EQUIP	-	View card type.	51
E1/T1	SVC,TYPE, FRAME, CODE, LPBK	View Service Status, Interface Type, Frame, Line Code and Loopback Settings of E1/T1 Tributary	52
LAN	SVC, MODE, LNK, LPBK, RATELIMIT	View Service Status, Line Rate Mode, Link Status, Loopback, and Rate Limit Settings of LAN Tributary	54
OPT	SVC, PROV, LNK, LPBK	View Service Status, ALS and APS configuration, SFP Status and Loopback Settings of Aggregation Interface	56

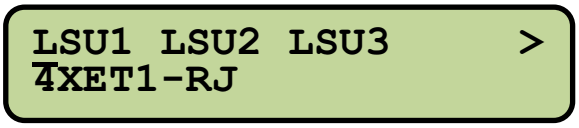
4.1.3.1 EQUIP – View Card Type

Description: Check type of inserted cards

1. Use ◄ and ► to choose **EQUIP** section, then press **Enter**:



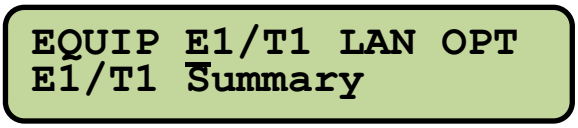
2. Use ◄ and ► keys to choose a desired slot and view a card type:



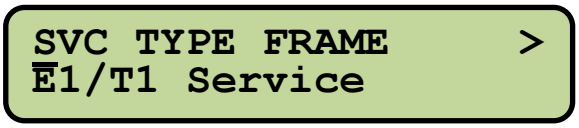
4.1.3.2 E1/T1 – View Settings of E1/T1 Tributary

Description: View Settings of E1/T1 interfaces.

1. Use ◄ and ► to choose **E1/T1** section, then press **Enter**:



2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:

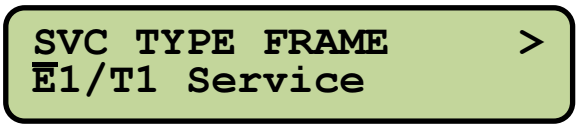


4.1.3.2.1 SVC – View Service Status of E1/T1 Tributary

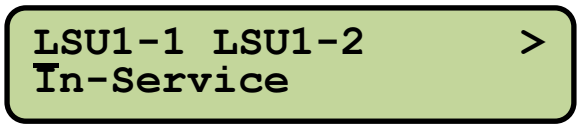
Description: Check out E1/T1 channels Status (In service/Out of service)

PATH: STATUS→E1/T1→SVC

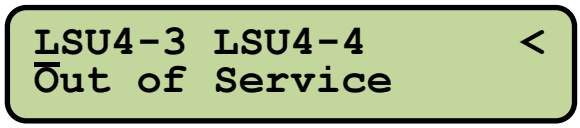
1. Use ◄ and ► keys to choose **SVC** section then press **Enter**:



2. Use ◄ and ► keys to choose E1/T1 channel to view:



.....

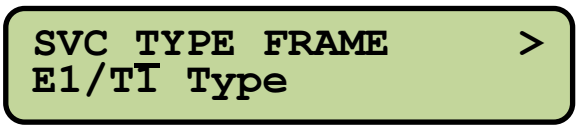


4.1.3.2.2 TYPE – View Line Type of E1/T1 Tributary

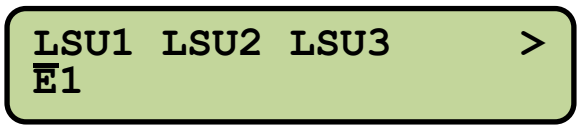
Description: View Line Type Setting of E1/T1 interfaces.

PATH: STATUS→E1/T1→TYPE

1. Use ◄ and ► keys to choose **TYPE** section then press **Enter**:



2. Use ◄ and ► keys to choose E1/T1 card to view:

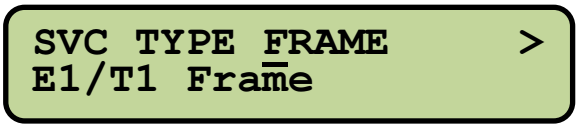


4.1.3.2.3 FRAME – View Frame Settings of E1/T1 Tributary

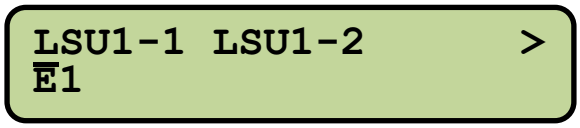
Description: View Line Frame Setting of E1/T1 interfaces.

PATH: STATUS→E1/T1→FRAME

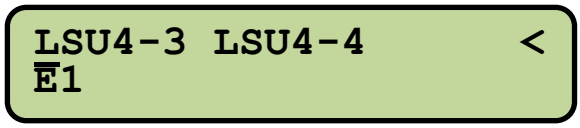
1. Use ◄ and ► keys to choose **FRAME** section then press **Enter**:



2. Use ◄ and ► keys to choose E1/T1 channel to view:



.....



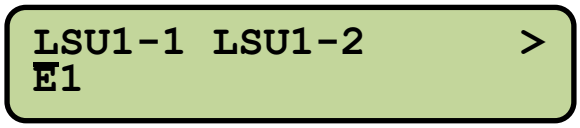
4.1.3.2.4 CODE – View Line Code Settings of E1/T1 Tributary

Description: View Line Code Setting of E1/T1 interfaces.

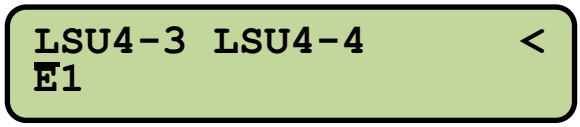
PATH: STATUS→E1/T1→CODE

1. Use ◄ and ► keys to choose **CODE** section then press **Enter**:

2. Use ◄ and ► keys to choose E1/T1 channel to view:



.....



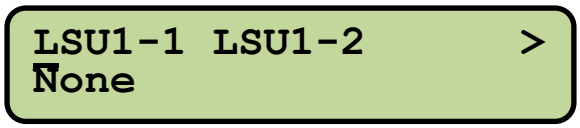
4.1.3.2.5 LPBK – View Loopback Settings of E1/T1 Tributary

Description: Display Loopback Settings of E1/T1 tributary channels.

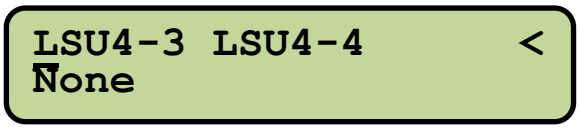
PATH: STATUS→E1/T1→LPBK

1. Use ◄ and ► keys to choose **LPBK** section then press **Enter**:

2. Use ◄ and ► keys to choose E1/T1 channel to view:



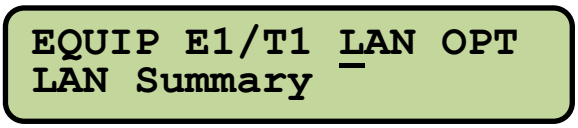
.....



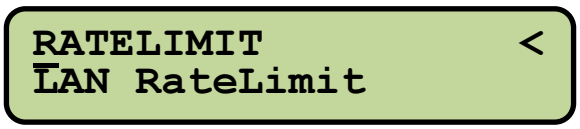
4.1.3.3 LAN – View Settings of LAN Tributary

Description: Display Settings of LAN tributary.

1. Use ◄ and ► to choose **LAN** section, then press **Enter**:



2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:



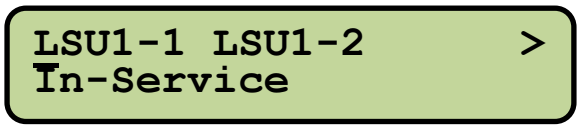
4.1.3.3.1 SVC – View Service Status of LAN Tributary Channels

Description: Check out LAN channels Status (In service/Out of service).

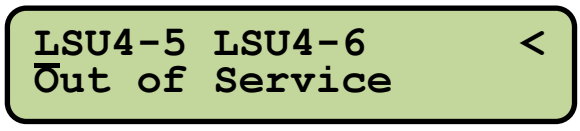
PATH: STATUS→LAN→SVC

1. Use ◄ and ► keys to choose **SVC** section then press **Enter**:

2. Use ◄ and ► keys to choose LAN channel to view:



.....



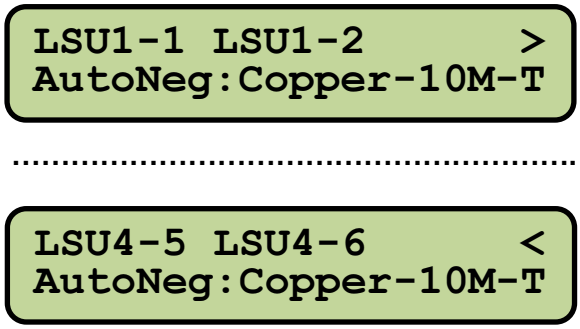
4.1.3.3.2 Mode – View Line Rate Mode of LAN Tributary Channels

Description: Display Line Rate mode of LAN tributary channels.

PATH: STATUS→LAN→Mode

1. Use ◄ and ► keys to choose **Mode** section then press **Enter**:

2. Use ◄ and ► keys to choose LAN channel to view:



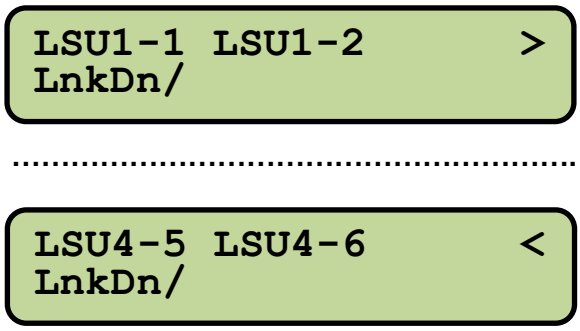
4.1.3.3.3 LNK – View Link status of LAN Tributary Channels

Description: Display Link status of LAN tributary channels.

PATH: STATUS→LAN→LNK

1. Use ◄ and ► keys to choose **LNK** section then press **Enter**:

2. Use ◄ and ► keys to choose LAN channel to view:

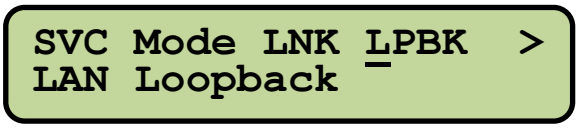


4.1.3.3.4 LPBK – View Loopback Settings of LAN Tributary Channels

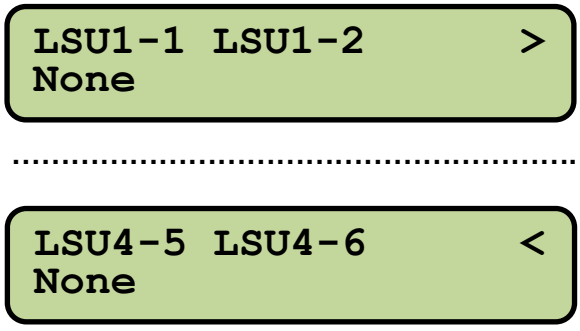
Description: Display Loopback Settings of LAN tributary channels.

PATH: STATUS→LAN→LPBK

1. Use ◄ and ► keys to choose **LNK** section then press **Enter**:



2. Use ◄ and ► keys to choose LAN channel to view:

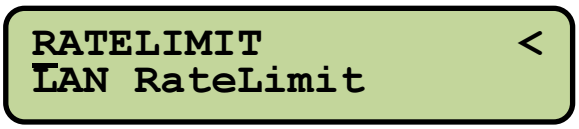


4.1.3.3.5 RATELIMIT – View Rate Limit Settings of LAN Tributary Channels

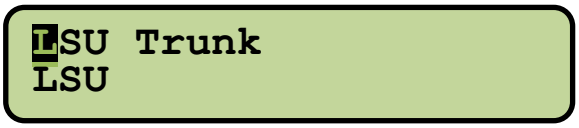
Description: Display Rate Limit Settings of LAN tributary channels.

PATH: STATUS→LAN→ RATELIMIT

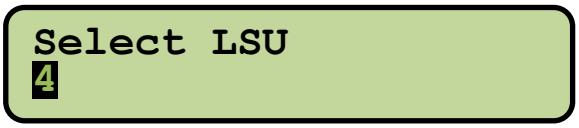
1. Use ◄ and ► keys to choose **RATELIMIT** section then press **Enter**:



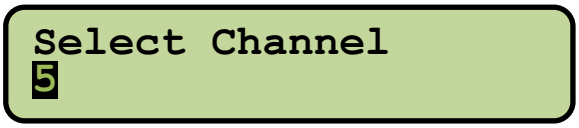
2. Use ◄ and ► keys to choose a LSU/Trunk and press **Enter**:



3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



4. Use ◄ and ► keys to choose a channel and press **Enter**:

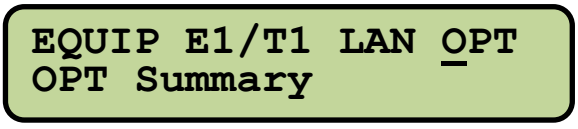


5. Use ◄ and ► keys to choose **Ingress** or **Egress** option and press **Enter**:

4.1.3.4 OPT – View Settings of Aggregation Interface

Description: Display settings of Aggregation Interface.

1. Use ◄ and ► to choose **OPT** section, then press **Enter**:



2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:

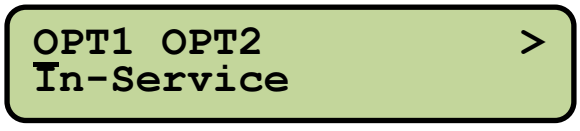
4.1.3.4.1 SVC – View Service Status of Aggregation Interface

Description: Check out of Aggregation Interface Status (In service/Out of service).

PATH: STATUS→OPT→SVC

1. Use ◄ and ► keys to choose **SVC** section then press **Enter**:

2. Use ◄ and ► keys to choose LAN channel to view:

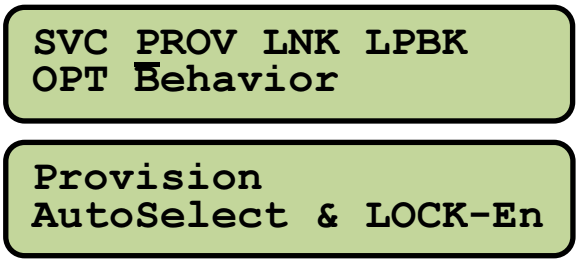


4.1.3.4.2 PROV – View ALS and APS Settings of Aggregation Interface

Description: Display ALS and APS Settings of Aggregation Interface.

PATH: STATUS→OPT→PROV

Use ◄ and ► keys to choose **PROV** section then press **Enter** to see the transmission status:

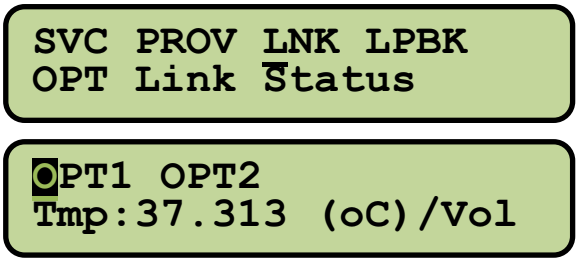


4.1.3.4.3 LNK – View Status of SFP-trancievers of Aggregation Interface

Description: Display Status of SFP-trancievers of Aggregation Interface.

PATH: STATUS→OPT→LNK

1. Use ◄ and ► keys to choose **LNK** section then press **Enter**:
2. Use ◄ and ► keys to switch between interfaces:

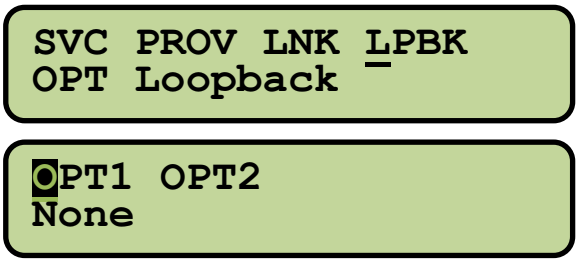


4.1.3.4.4 LPBK –View Loopback Settings of Aggregation Interface

Description: Display Loopback Settings of Aggregation Interface.

PATH: STATUS→OPT→LPBK

1. Use ◄ and ► keys to choose **LPBK** section then press **Enter**:
2. Use ◄ and ► keys to switch between interfaces:



4.1.4 MAINT – Maintenance and Performance Event Menu

Maintenance and Performance Event Menu includes **ALM** and **PMEVENT** submenus.

To enter to MAINT Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys, then press **Enter**, choose **MAINT** and press **Enter**.

See next page for Chapter Navigation

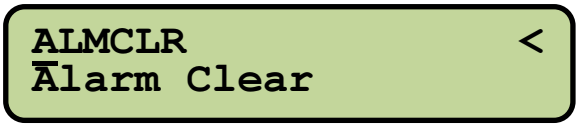
MAINT - Maintainance and Perfomance Event Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
ALM (Alarm Report)	ALMHIS	View Alarm History	58
	ALMCUR	View Current Alarms	59
	ALMCLR	Clear Alarm History	59
PMEVENT (Performance Data View)	15MIN	View 15 minutes PM events	60
	HOUR	View 1 hour PM events	60
	DAY	Clear 1 day PM events	60

4.1.4.1 ALM – View and Clear Alarm Reports

Description: Displaying and clearing of Alarm Reports.

1. Use ◄ and ► to choose **ALM** section, then press **Enter**:

2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:

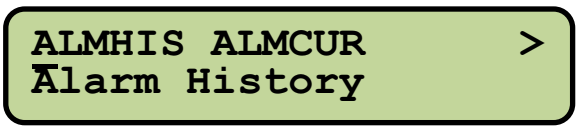


4.1.4.1.1 ALMHIS - View Alarm History

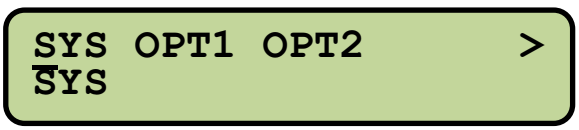
Description: Display Alarm History.

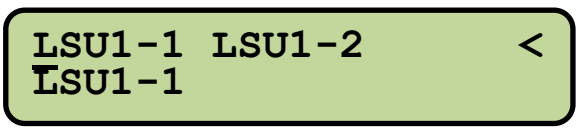
Path: MAINT→ ALM→ALMHIS

1. Use ◄ and ► keys to choose **ALMHIS** section then press **Enter**:



2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:





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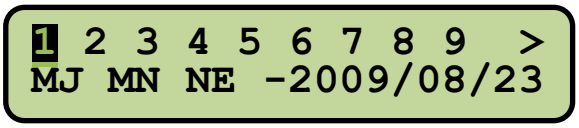
3. Use ◄ and ► keys to choose a history record number (1…30) to view then press **Enter**:



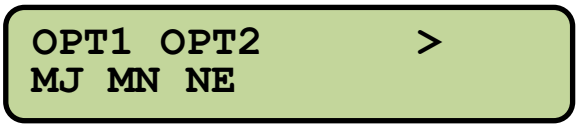
4.1.4.1.2 ALMCUR - View Current Alarms

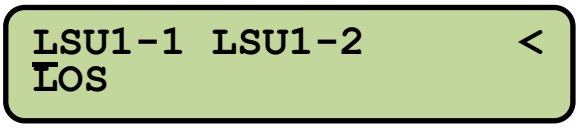
Description: Display Current Alarms.

Path: MAINT→ ALM→ALMCUR

1. Use ◄ and ► keys to choose **ALMCUR** section then press **Enter**:

2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:





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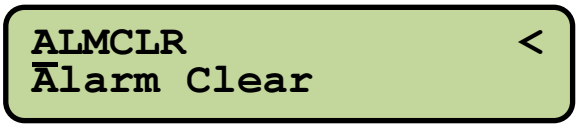
4.1.4.1.3 ALMCLR – Clear Alarm History

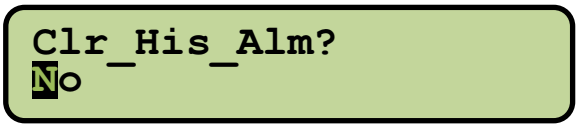
Description: Clear Alarms.

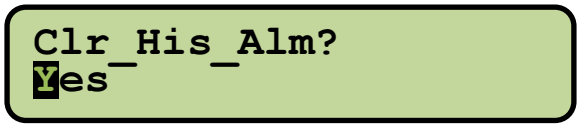
Path: MAINT→ ALM→ALMCLR

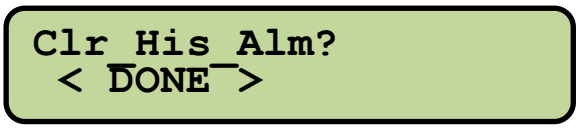
1. Use ◄ and ► keys to choose **ALMCLR** section then press **Enter**:



2. Use ◄ and ► keys to choose **No** (Keep Alarm History) or **Yes** (Delete all entries from Alarm History) and press **Enter**:





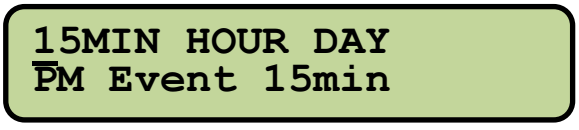


4.1.4.2 PMEVENT – Performance Data View

Description: Displaying PM Events.

1. Use ◄ and ► to choose **PMEVENT** section, then press **Enter**:

2. Use ◄ and ► keys to choose a desired section to view then press **Enter**:



The table below describes PM data items.

PM Items	LN	PATH	NE	FE	CV
Description	Line	Path	Near End	Far End	Code Violation
PM Items	ES	SES	UAS	CRC	-
Description	Error Second	Severely Error Second	Unavailable Second	CRC Error	-

4.1.4.2.1 15MIN - View PM Threshold Events within last 15 Minutes

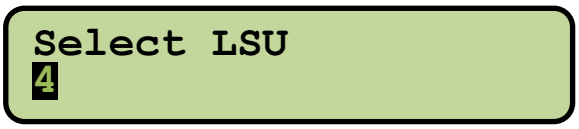
Description: Display PM Threshold Events within last 15 Minutes.

Path: MAINT→ PMEVENT→15MIN

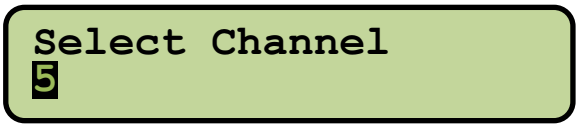
1. Use ◄ and ► keys to choose desired time interval then press **Enter**:

2. Use ◄ and ► keys to choose LSU/OPT and press **Enter**:

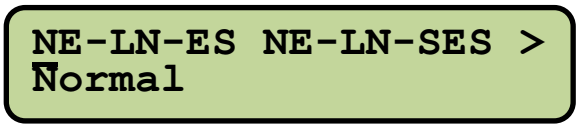
3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

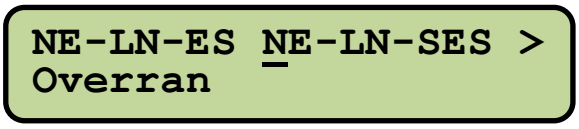


4. Use ◄ and ► keys to choose a channel and press **Enter**:



5. Use ◄ and ► keys to choose desired event type:





4.1.4.2.2 HOUR - View PM Threshold Events within last Hour

Description: Display PM Threshold Events within last hour.

Path: MAINT→ PMEVENT→HOUR

See section 4.1.4.2.1 for using procedure.

4.1.4.2.3 DAY - View PM Threshold Events within last Day

Description: Display PM Threshold Events within last day.

Path: MAINT→ PMEVENT→DAY

See section 4.1.4.2.1 for using procedure.

4.1.5 PM – Performance Monitor Menu

Performance Monitor Menu includes **HIS**, **CUR**, **THR** and **CLR** submenus.

To enter to Configuration Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys, choose **PM** and then press **Enter**.

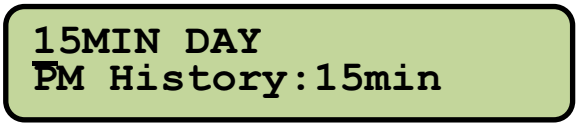
PM – Performance Monitor Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
HIS	15MIN DAY	View PM history	61
CUR	15MIN HOUR DAY	View current PM data	62
THR	THRCFG THRCLR	Set Threshold Values	62
CLR	CLRHIS	Clear specific PM data history	64
	CLRALL	Clear all PM data history	65

4.1.5.1 HIS – View PM History

Description: Displaying PM History by 15 Minutes or 1 day intervals.

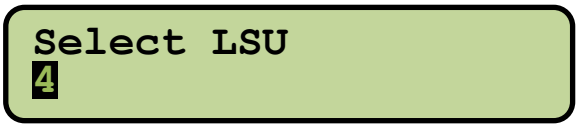
1. Use ◄ and ► to choose **HIS** section, then press **Enter**:

2. Use ◄ and ► keys to choose a desired time interval to view then press **Enter**:

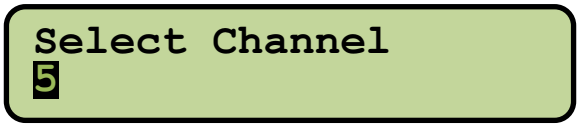


3. Use ◄ and ► keys to choose **LSU/OPT** and press **Enter**:

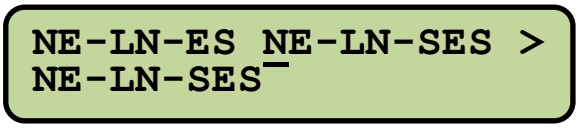
4. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



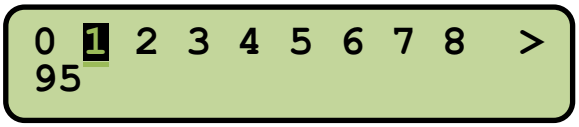
5. Use ◄ and ► keys to choose a channel and press **Enter**:



6. Use ◄ and ► keys to choose desired event type, then press **Enter**:



7. Use ◄ and ► keys to choose a history time interval number (0…96) to view:

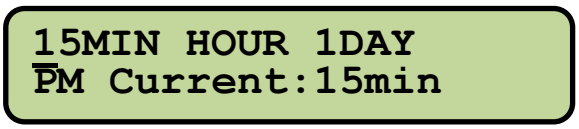


4.1.5.2 CUR – View Current PM Data

Description: Displaying current PM data for last 15 Minutes, 1 hour or 1 day interval.

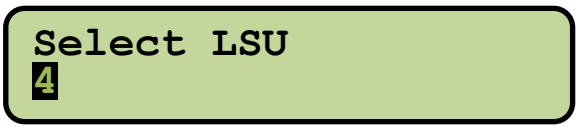
1. Use ◄ and ► to choose **CUR** section, then press **Enter**:

2. Use ◄ and ► keys to choose desired time interval then press **Enter**:

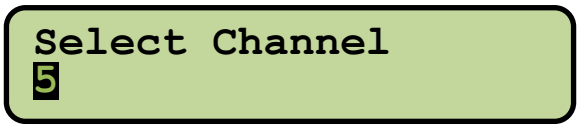


3. Use ◄ and ► keys to choose LSU/OPT and press **Enter**:

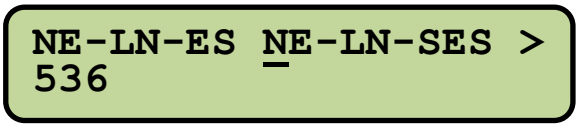
4. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



5. Use ◄ and ► keys to choose a channel and press **Enter**:



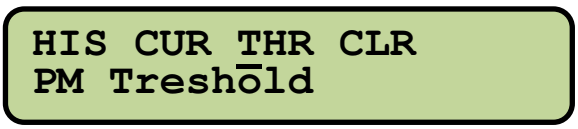
8. Use ◄ and ► keys to choose desired event type:



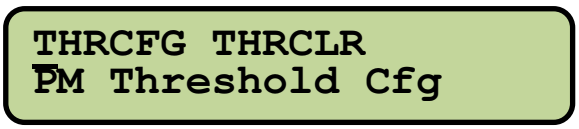
4.1.5.3 THR – Set Threshold Values

Description: Set or Reset Threshold Values.

1. Use ◄ and ► to choose **THR** section, then press **Enter**:



2. Use ◄ and ► keys to choose desired section then press **Enter**:

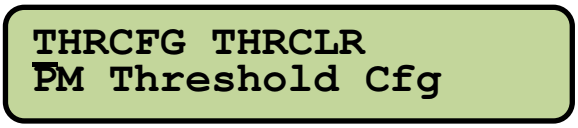


4.1.5.3.1 THRCFG – Set Threshold Values

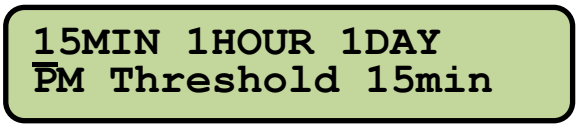
Description: Set Threshold Values.

Path: PM→THR→THRCFG

1. Use ◄ and ► to choose **THRCFG** section, then press **Enter**:

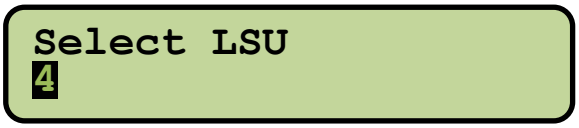


2. Use ◄ and ► keys to choose desired time interval then press **Enter**:

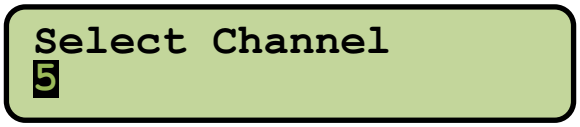


3. Use ◄ and ► keys to choose **LSU/OPT** and press **Enter**:

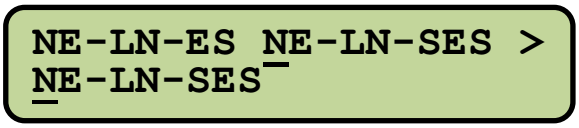
4. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



5. Use ◄ and ► keys to choose a channel and press **Enter**:



6. Use ◄ and ► keys to choose desired event type and press **Enter**:



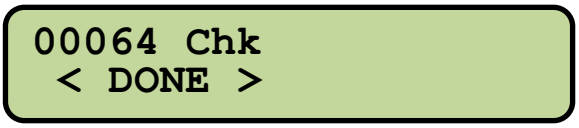
7. Use ◄ and ► keys to move the cursor until it shown under required location:

8. Use ◄ and ► keys to change the digit and press **Enter**:

9. Perform settings of all necessary digits by repeating **steps 10-11**.
10. Use ◄ and ► keys to move the cursor until it shown under **Chk**:

11. Then press **Enter** to confirm you selection. If the invalid Treshold Value is entered then following message occurs:

12. If the valid Treshold Value is entered then system dispays <Done> message:

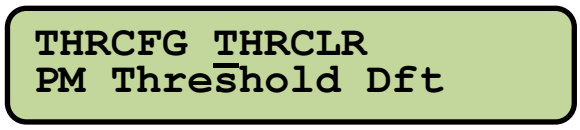


4.1.5.3.2 THRCLR – Reset Threshold Values

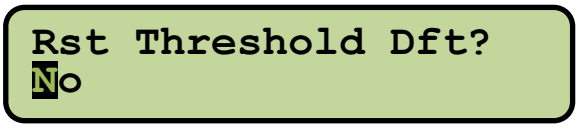
Description: Set Threshold Values to default.

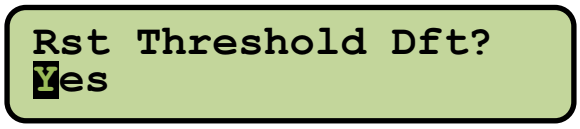
Path: PM→THR→THRCLR

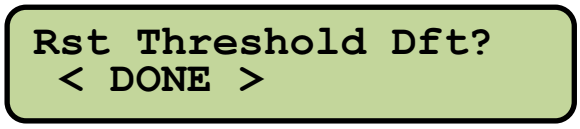
1. Use ◄ and ► to choose **THRCLR** section, then press Enter:



2. Use ◄ and ► keys to choose **No** (Keep current Threshold Values) or **Yes** (Set Threshold Values to default) and press **Enter**:



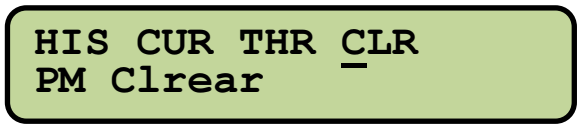




4.1.5.4 CLR – Clear PM Data History

Description: Clear PM Data History.

1. Use ◄ and ► to choose **CLR** section, then press **Enter**:



2. Use ◄ and ► keys to choose desired section then press **Enter**:

4.1.5.4.1 CLRHIS – Clear Specific PM Data History

Description: Clear specific PM data Records.

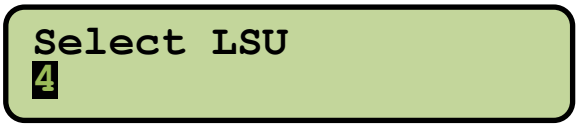
Path: PM→CLR→CLRHIS

1. Use ◄ and ► to choose **CLRHIS** section, then press **Enter**:

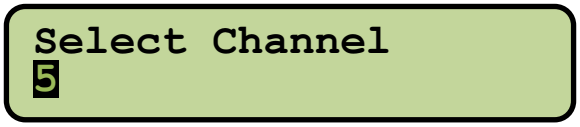
2. Use ◄ and ► keys to choose desired history section then press **Enter**:

3. Use ◄ and ► keys to choose **LSU/OPT** and press **Enter**:

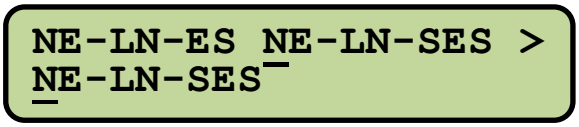
4. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



5. Use ◄ and ► keys to choose a channel and press **Enter**:



6. Use ◄ and ► keys to choose desired event type and press **Enter**:



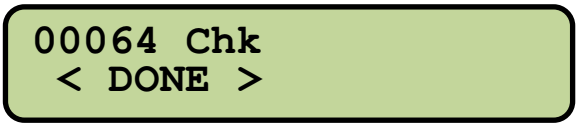
7. Use ◄ and ► keys to move the cursor until it shown under required location:

8. Use ◄ and ► keys to change the digit and press **Enter**:

9. Perform settings of all necessary digits by repeating **steps 10-11**.
10. Use ◄ and ► keys to move the cursor until it shown under **Chk**:

11. Then press **Enter** to confirm you selection. If the invalid Index is entered then following message occurs:

12. If the valid Index is entered then system dispays <Done> message:



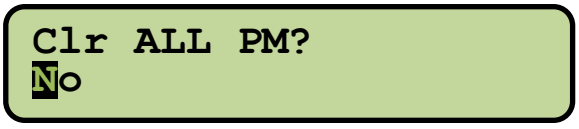
4.1.5.4.2 CLRALL – Clear All PM Data

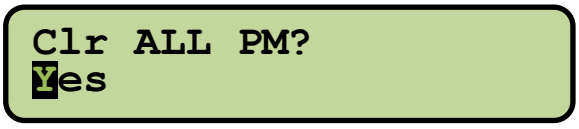
Description: Clear All PM Data.

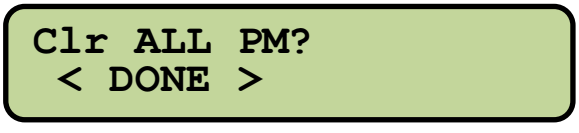
Path: PM→CLR→CLRALL

1. Use ◄ and ► to choose **CLRALL** section, then press **Enter**:

2. Use ◄ and ► keys to choose **N**o (Keep current PM data) or **Yes** (Clear all PM data) and press **Enter**:







4.1.6 TEST&DIAG– Test and Diagnostic Menu

Test and Diagnostic Menu includes **LED**, **LPBK**, **PATT** and **ALS** submenus.

To enter to Configuration Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys, choose **TEST&DIAG** and then press **Enter**.

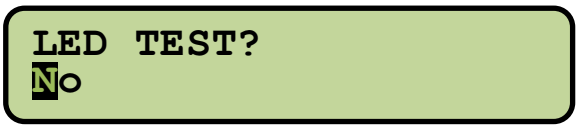
TEST & DIAG – Test and Diagnostic Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
LED	-	LED testing	66
LPBK	LSU, OPT	Run Loopbacks	66
PATT	START RESULT CLR	Run Bit Errror Test and view testing result and clear result	67
ALS	ALS	Run ALS Testing	69

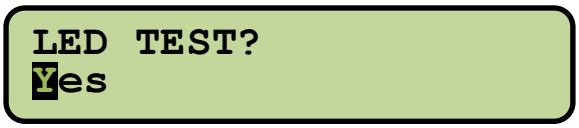
4.1.6.1 LED – LED Testing

Description: Perform LED Testing.

1. Use ◄ and ► to choose **LED** section, then press **Enter**:

2. Use ◄ and ► keys to choose **No** (exit) or **Yes** (Perform LED testing) and press **Enter**:





System starts to test the LEDs and displaying this message:

Press **ESC** to exit.

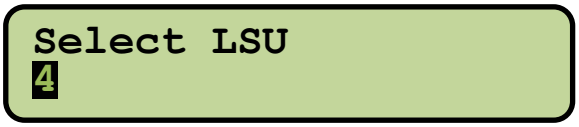
4.1.6.2 LPBK – Run Loopbacks

Description: Set/remove Test Loopbacks (Please refer to section 3.11).

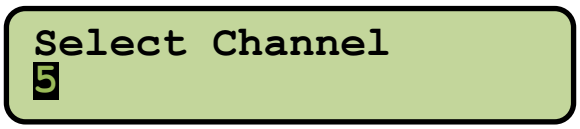
1. Use ◄ and ► to choose **LPBK** section, then press **Enter**:

2. Use ◄ and ► keys to choose **LSU/OPT** and press **Enter**:

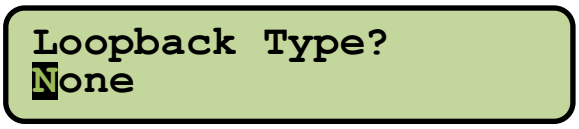
3. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:

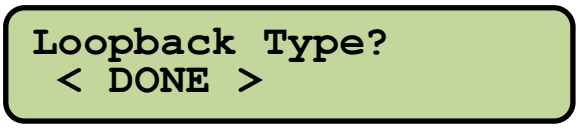


4. Use ◄ and ► keys to choose a channel and press **Enter**:



5. Use ◄ and ► keys to choose desired loopback type (**None/Local/Remote**) and press **Enter**:



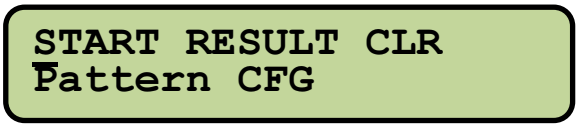


4.1.6.3 PATT – BER Testing

Description: Run Bit Errror Test and view testing result and clear result.

1. Use ◄ and ► to choose **PATT** section, then press **Enter**:

2. Use ◄ and ► keys to choose desired section then press **Enter**:

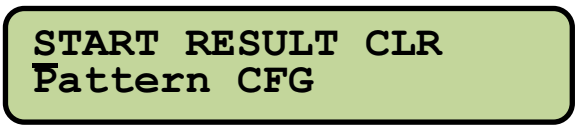


4.1.6.3.1 START – Starting, Stopping and Configuring BER Testing

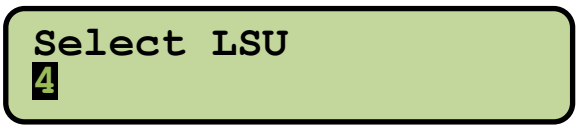
Description: Run and stop BER test, Test Pattern Selection.

Path: TEST&DIAG→PATT→START

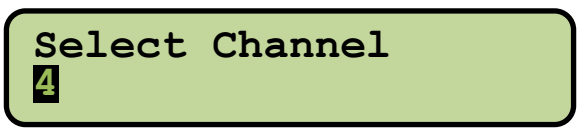
1. Use ◄ and ► to choose **START** section, then press **Enter**:



2. Use ◄ and ► keys to choose a low speed card LS1…LS4 and press **Enter**:



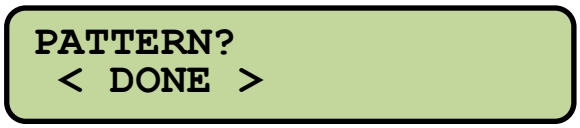
3. Use ◄ and ► keys to choose a channel and press **Enter**:



4. If BERT was activated before the system asks to terminate tesing session. Use ◄ and ► keys to choose **Yes**/**No** and press **Enter**:

5. Then use ◄ and ► keys to choose desired Pattern type and press **Enter**:

   Possible test patterns are:
   - PRBS9, PRBS11, PRBS15, PRBS23
   - 0000, 1000, 1010, 1100, 1111.



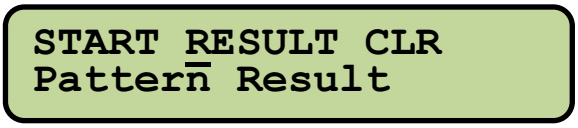
The test section is activated. Repeate **steps 1-4** to terminate BERT.

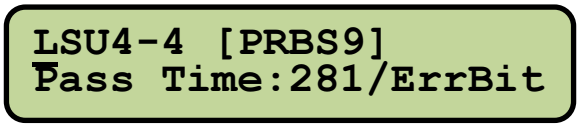
4.1.6.3.2 RESULT – View Results of BER Testing

Description: View BERT results.

Path: TEST&DIAG→PATT→RESULT

Use ◄ and ► to choose **RESULT** section, then press **Enter** to view BERT results:





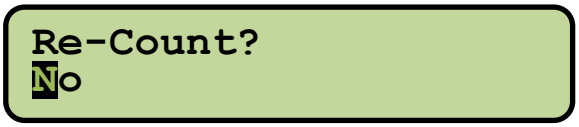
4.1.6.3.3 CLR – Clear BERT Results

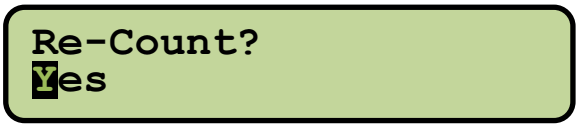
Description: Clear BERT results.

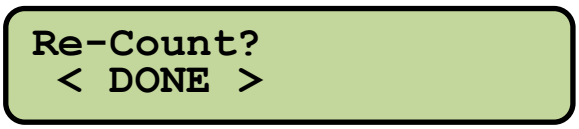
Path: TEST&DIAG→PATT→CLR

1. Use ◄ and ► to choose **CLR** section, then press **Enter**:

2. Use ◄ and ► keys to choose **No** (Continue Test) or **Yes** (Reset BERT Counters) and press **Enter**:





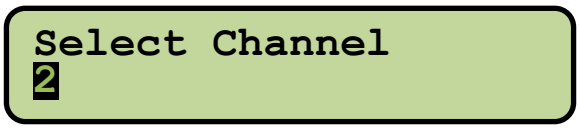


4.1.6.4 ALS – Run ALS Testing

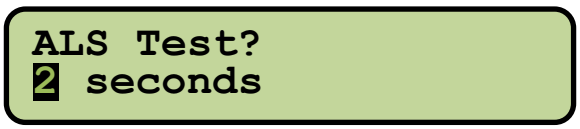
Description: Run ALS Testing.

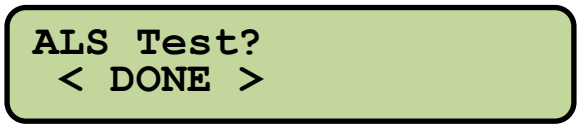
1. Use ◄ and ► to choose **ALS** section, then press **Enter**:

2. Use ◄ and ► keys to choose a channel and press **Enter**:



3. Use ◄ and ► keys to choose a testing option (**2** or **90** seconds), then press **Enter**:





4.1.7 ADMIN - Administration Menu

The Administration menu includes **VERSION**, **NETWORK** and **REBOOT** menues.

To enter to Configuration Menu press **Enter**, select **Local** or **Remote** device by using of ◄ or ► keys, choose **ADMIN** and then press **Enter**.

ADMIN – Administration Menu			
2nd-Tier Menu	2rd-Tier Menu	Description	Page
VERSION	-	View software version	70
NETWORK	IP GATEWAY SUBNET	Set IP address, gateway, and subnet mask	70
	SNMP	Set SNMP configuration。	71
REBOOT	NETAPPLY REBOOT RESET	Applying of network configuration Rebooting device Load default configuration	73

4.1.7.1 VERSION - Version Menu

Description: View the firmware version of the device.

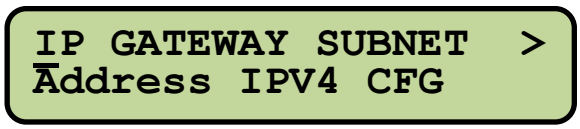
Use ◄ and ► to choose **VERSION** section, then press **Enter** to view the information about software version

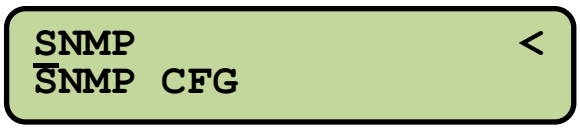
4.1.7.2 NETWORK - IP/GATEWAY/SUBNET and SNMP Settings

Description: Setting of IP address, Gateway IP, Subnet Mask or entering to SNMP configuration.

Use ◄ and ► to choose desired setting to change:

- IP-address
- Gateway
- Subnet Mask or
- enter to SNMP configuration



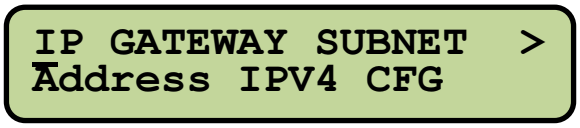


4.1.7.2.1 Example Procedure: Setting of an IP-address

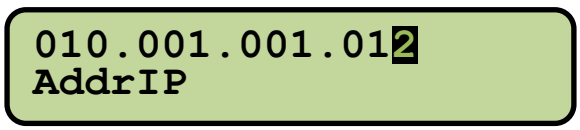
In this section, IP setting procedure is taken as an example. Use similar steps for other settings.

PATH: ADMIN→NETWORK→IP/GATEWAY/SUBNET

1. Use ◄ and ► keys to choose an **IP**-address setting section and press **Enter**:



2. Use ◄ and ► keys to move the cursor until it shown under required location and press **Enter**:



3. Use ◄ and ► keys to change the digit:

4. Then press **Enter** to confirm you selection:

```
10.1.1.14
<DONE>
```

5. Press **Esc** to return to the IP-address setting section.

6. Perform settings of all necessary digits in the IP-address by repeating **steps 2-4**.

Note: If digit beyond a valid range, ex. the 1st digit should be less than 3 (ex. 310.010.001.011), then **Out of Range** message pops up:

```
0
Out of Range
```

WARNING

AFTER ANY CHANGES MADE IN **ADMIN/NETWORK** SECTION **ACTIVATE** THEM BY PERFORMING **ADMIN→ REBOOT→NETAPPLY**!

4.1.7.2.2 SNMP – Setting of SNMP Configuration

Description: Setting of SNMP port, trap port and trap IP addresses

PATH: ADMIN→NETWORK→SNMP

1. Use ◄ and ► keys to choose an **SNMP** setting section:

```
SNMP                    <
SNMP CFG
```

2. Use ◄ and ► keys to choose desired section then press **Enter**:

```
SNMPPORT TRAPPORT       >
Snmp Port
```

```
TRAP1 TRAP2 TRAP3       <
Trap1 IP
```

- **SNMPPORT** – Setting SNMP port.

  PATH: ADMIN→NETWORK→SNMP→SNMPPORT

1. Use ◄ and ► to choose **SNMPPORT** section, then press **Enter**:

```
SNMPPORT TRAPPORT       >
Snmp Port
```

2. Use ◄ and ► keys to move the cursor until it shown under required location, then press **Enter**:

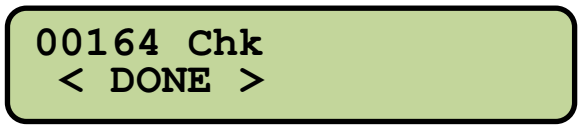
```
00161 Chk
Snmp Port
```

3. Use ◄ and ► keys to change the digit and press **Enter**:

4. Perform settings of all necessary digits by repeating **steps 2-3**.
5. Use ◄ and ► keys to move the cursor until it shown under Chk:

6. Then press **Enter** to confirm you selection. If the invalid Port is entered then following message occurs:

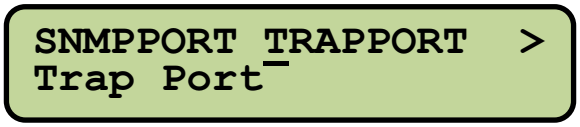
7. If the valid Port is entered then system dispays <Done> message:



- **TRAPPORT** – Setting trap port.

  PATH:
  ADMIN→NETWORK→SNMP→TRAPPORT

1. Use ◄ and ► to choose **TRAPPORT** section, then press **Enter**:



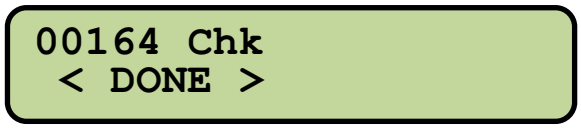
2. Use ◄ and ► keys to move the cursor until it shown under required location, then press **Enter**:

3. Use ◄ and ► keys to change the digit and press **Enter**:

4. Perform settings of all necessary digits by repeating **steps 2-3**.
5. Use ◄ and ► keys to move the cursor until it shown under Chk:

6. Then press **Enter** to confirm you selection. If the invalid Port is entered then following message occurs:

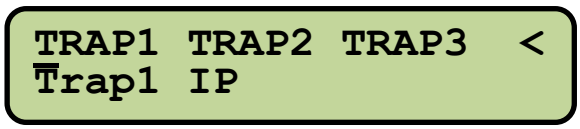
7. If the valid Port is entered then system dispays <Done> message:



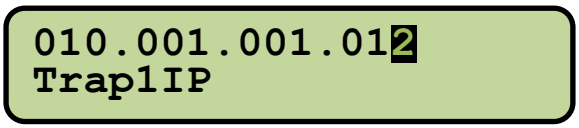
- **TRAP1/2/3** – Setting of trap destinations' IP addresses.

  PATH: ADMIN→NETWORK→SNMP→TRAP1/2/3

1. Use ◄ and ► to choose **TRAP1** (**TRAP2** or **TRAP3**) section, then press **Enter**:

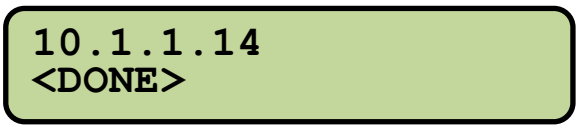


2. Use ◄ and ► keys to move the cursor until it shown under required location and press **Enter**:



3. Use ◄ and ► keys to change the digit:

4. Then press **Enter** to confirm you selection:



5. Press **Esc** to return to the IP-address setting section.

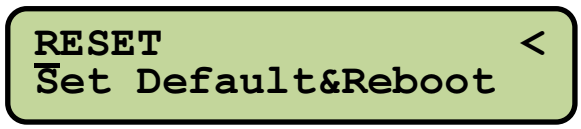
6. Perform settings of all necessary digits in the IP-address by repeating **steps 2-4**.

4.1.7.3 REBOOT - Applying of Network Config/Rebooting/Load Default Configuration

Description: Applying of Network configuration, Rebooting of the device, Load default configuration.

1. Use ◄ and ► to choose **REBOOT** section, then press **Enter**:

2. Use ◄ and ► keys to choose desired section then press **Enter**:



4.1.7.3.1 NETAPPLY – Applying of Network Configuration

Description: Applying of network configuration changes.

PATH: ADMIN→REBOOT→NETAPPLY

1. Use ◄ and ► keys to choose **NETAPPLY** section:

2. Use ◄ and ► keys to choose **No** (exit) or **Yes** (apply network configuration changes) and press **Enter**:

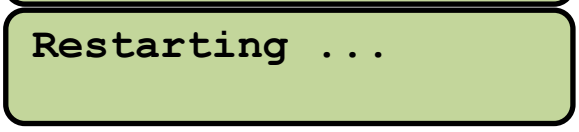
4.1.7.3.2 REBOOT – Rebooting Device

Description: Rebooting device. Configuration is not affected.

PATH: ADMIN→REBOOT→REBOOT

1. Use ◄ and ► keys to choose **REBOOT** section:

2. Use ◄ and ► keys to choose **No** (exit) or **Yes** (rebooting device) and press **Enter**:

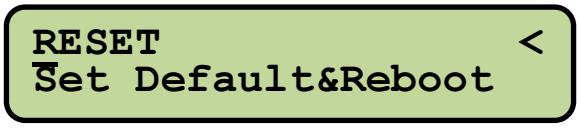


4.1.7.3.3 RESET – Load Default Configuration

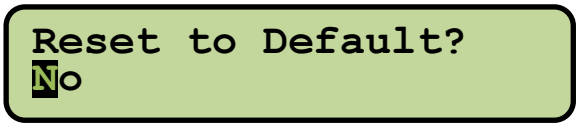
Description: Load default configuration and rebooting device.

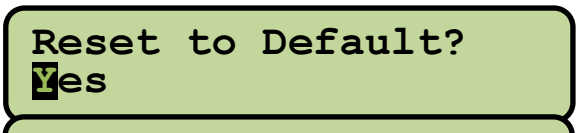
PATH: ADMIN→REBOOT→RESET

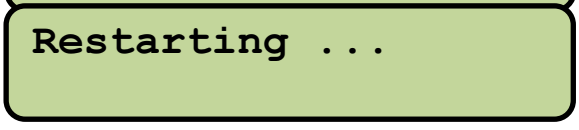
1. Use ◄ and ► keys to choose **RESET** section:



2. Use ◄ and ► keys to choose **No** (exit) or **Yes** (set to default and rebooting device) and press **Enter**:







4.2 Using of Craft Interface

This section describes functions of the FG-FOM16,V3 Craft Interface.

4.2.1 Control Keys

The FG-FOM16,V3 Craft Interface has some special functions of some keys. These control keys are not essential to operate the system. However, these special keys help users to facilitate the operating process. Control keys are listed and discribed below:

Copntrol Keys Functions	
Control Key	*Function in FG-FOM16,V3 Craft Interface*
] / [	Select other option.
C	Clean the present data.
ENTER	Execute the selected command
ESC	Back to previous menu or escape from current command
0	Back to previous menu
>	View the next page.
<	View the previous page.
n	Display data about previous channel in specified menu.
m	Display data about next channel in specified menu.

4.2.2 System Login

If the system is correctly connected, the following prompt appears on the terminal screen:

```
Press 'Enter' to activate console.

Login User Name:
```

If the system is being started the first time, no User Name or User Password is in the system. At this instance, press **Enter** to access the FG-FOM16,V3 Craft Interface.

```
Press 'Enter' to activate console.

Login User Name:
Login User Password:
```

Once User Name and User Password have been established, the next time user login, correct User ID and Password have to be entered. Please refer to the Administration section for information about User Accounts Data.

4.2.3 Main Menu

The Main menu is the first screen displayed after login. Main menu lists major command groups for the FG-FOM16,V3 Craft Interface Software. The command groups are described below. It divides into "**Local Terminal**" & "**Remote Terminal**" and all commands are similar in them. Also, there is the same command tree when the system is accessed by Telnet.

```
Login User Name:

Main Menu

          1. Local Terminal
          2. Remote Terminal
          ?. Help

*> [1]:
```

```
Local Terminal

          1. Configuration
          2. Status List
          3. Maintenance
          4. Performance
          5. Test & Diagnose
          6. Administration
          0. Return Previous Menu
          ?. Help

*>> [1]:
```

4.2.3.1 Craft Interface Menu Structure

Local Terminal		
1. Configuration		
1. Service Configuration		
2. E1/T1 Configuration	1. Line Type Setting 2. Line Frame Setting 3. Line Coding Setting 4. Line Equalizer Setting	
3. LAN Configuration	1. VLAN Setting	1. VLAN Global Configuration 2. VLAN Port Configuration 3. VID Table Setting
	2. QoS Setting	1. QoS Global Configuration 2. QoS Port Configuration 3. QoS 802.1p Mapping Table 4. QoS DSCP Mapping Table
	3. Rate Limit Setting	
	4. LAN Provision Setting	1. LAN Global Setting 2. LAN Port Setting
4. V.35 Configuration (Reserved)		
5. Optical Configuration	1. OPT ALS Setting 2. OPT Protection Switch 3. OPT Locked Cancel	
6. Misc. Configuration (is not supported)		

Local Terminal		
2. Status List		
1. Service Monitor		
2. E1/T1 Monitor	1. Line Type Monitor 2. Line Frame Monitor 3. Line Coding Monitor 4. Line Equalizer Monitor	
3. LAN Monitor	1. VLAN Monitor	1. VLAN Global Configuration 2. VLAN Port Configuration 3. VID Table Setting
	2. QoS Monitor	1. QoS Global Monitor 2. QoS Port Monitor 3. QoS 802.1p Mapping Table 4. QoS DSCP Mapping Table
	3. Rate Limit Monitor	
	4. Provision Monitor	1. LAN Global Monitor 2. LAN Port Monitor
	5. Line Interface Monitor	
	6. Line Statistic Monitor	1. Port Packet Counter 2. Clear Packet Counter 3. MAC Table Monitor 4. Clear MAC Table
4. V.35 Monitor (Reserved)		
5. OIptical Monitor	1. Optical Provision Monitor 2. Optical Measurement Monitor	
6. Line Equipment Monitor		
7. Misc. Monitor (is not supported)		

Local Terminal	
3. Maintenance	**4. Performance**
1. Current Alarm 2. History Alarm 3. Clear History Alarm 4. P.M. Threshold Alarm 5. Lan Packets Threshold Alarm	1. Get and Clear 15Min P.M. 2. Get and Clear 1Day P.M. 3. Clear All P.M. 4. Get Current P.M. 5. P.M. Threshold Setting 6. P.M. Threshold Monitor 7. P.M. Threshold Reset 8. Lan Packet Threshold Setting 9. Lan Packet Threshold Monitor 10. Lan Packet Threshold Reset

Local Terminal		
5. Test & Diagnose		**6. Administration**
1. LED Test		1. System Network Restart 2. System Reset to Default & Reboot 3. Hardware Reboot 4. System Setting 5. System Information 6. Network Setting 7. Network Information 8. User Account Setting 9. System Software Upgrade
2. Bit Error Rate Test	1. Pattern Test 2. Test Result	
3. Loopback Test		
4. Optical ALS Test		
5. Optical Laser Power Test		

4.2.4 Configuration Menu

Description: Set configuration of the system.

PATH: Local Terminal→1. Configuration

```
Configuration (Local)

          1. Service Configuration
          2. E1/T1 Configuration
          3. LAN Configuration
          4. V.35 Configuration
          5. Optical Configuration
          6. Misc. Configuration
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.4.1 Service Configuration Command

Description: Set line service (to be In Service or Out of Service) for each channel of the unit.

PATH: Local Terminal→1. Configuration→1. Service Configuration

Example: Service setting for Trib4xE1B-2xETH Card (combined 4xE1 and 2xLAN interfaces):

```
Configuration (Local)

          1. Service Configuration
          2. E1/T1 Configuration
          3. LAN Configuration
          4. V.35 Configuration
          5. Optical Configuration
          6. Misc. Configuration
          0. Return Previous Menu
          ?. Help

*>>> [1]:1
Select Interface [All_LSU]: E1T1_LSU
Select LSU [LSU_1]: LSU_4
 Apply To All Channel [Yes]:  No
 Enter LSU4-1 [In Service]:  In Service
 Enter LSU4-2 [In Service]:  In Service
 Enter LSU4-3 [In Service]:  In Service
 Enter LSU4-4 [In Service]:  In Service

*>>> [1]:
Select Interface [All_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
 Apply To All Channel [Yes]:  No
 Enter LSU4-5 [In Service]:  In Service
 Enter LSU4-6 [In Service]:  In Service

*>>> [1]:
```

1. In the Configuration Menu enter 1 to select **Service Configuration**. After that system will cycle you through configuring procedure.
2. Choose Interface Type (Select Interface): enter 1 for E1T1_LSU.
3. Select LSU number (Select LSU): enter 4 for selecting LSU_4 (the card is inserted into 4th slot).
4. Reject or agree apllying for all channels (Apply to All Channel): use **]** or **[** keys to select **No** or **Yes**.
5. Choose either **In Service** or **Out of Service** setting for each LSU channel (Enter LSU4-1/2/3/4) by using of **]** or **[** keys.
6. Choose Interface Type (Select Interface): enter 3 for LAN_LSU.
7. Select LSU number (Select LSU): enter 4 for selecting LSU_4 (the card is inserted into 4th slot).
8. Reject apllying for all channels (Apply to All Channel): use **]** or **[** keys to select **No**.
9. Choose either **In Service** or **Out of Service** setting for each LSU channel (Enter LSU4-5/6) by using of **]** or **[** keys.

Note: The valid options for Interface Type are:

1 – E1T1_LSU
2 – V35_LSU – (reserved, card does not exist)
3 – LAN LSU
4 – Optical

4.2.4.2 E1/T1 Configuration Menu

Description: Configuring of E1/T1 interfaces.

PATH: Local Terminal→1. Configuration→2. E1/T1 Configuration

```
E1/T1 Configuration (Local)

          1. Line Type Setting
          2. Line Frame Setting
          3. Line Coding Setting
          4. Line Equalizer Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.4.2.1 Line Type Setting Command

Description: Set Tributary card mode (**E1** or **T1**).

PATH: Local Terminal→1. Configuration→2. E1/T1 Configuration→1. Line Type Setting

Example: E1/T1 Line Type Setting:

```
E1/T1 Configuration (Local)

          1. Line Type Setting
          2. Line Frame Setting
          3. Line Coding Setting
          4. Line Equalizer Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
Enter LSU_1 E1T1 Type [E1]:  E1
Enter LSU_2 E1T1 Type [E1]:  E1
Enter LSU_3 E1T1 Type [E1]:  E1
Enter LSU_4 E1T1 Type [E1]:  E1

*>>>> [1]:
```

1. In the E1/T1Configuration Menu enter 1 to select **Line Type Setting**. After that system will cycle you through configuring procedure.
2. Choose either **E1** or **T1** setting for each LSU card (Enter LSU_1(/2/3/4) E1T1 Type) by using of **]** or **[** keys.

Note: The command applies Line Type for all ports of the card. It is impossible to set different Line Types for the ports within one card.

4.2.4.2.2 Line Frame Setting Command

Description: Set E1 or T1 framing for E1/T1 channels.

PATH: Local Terminal→1. Configuration→2. E1/T1 Configuration→2. Line Frame Setting

Example: E1/T1 Frame Setting:

```
E1/T1 Configuration (Local)

          1. Line Type Setting
          2. Line Frame Setting
          3. Line Coding Setting
          4. Line Equalizer Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2
Select LSU [LSU_1]: LSU_1
Select Channel [LSU1-1]: LSU1-1
 Enter E1T1 Frame [CRC4]:

*>>>> [2]:
Select LSU [LSU_1]: LSU_1
Select Channel [LSU1-1]: LSU1-1
 Enter E1T1 Frame [CRC4]:  CRC4
                     .
                     .
                     .
*>>>> [2]:
```

1. In the E1/T1Configuration Menu enter 2 to select **Line Frame Setting**. After that system will cycle you through configuring procedure.
2. Select the slot number (Select LSU) by pressing 1…4, then Enter.
3. Select Channel number by pressing 1…4, then Enter.
4. Choose either **CRC4, No-CRC** or **Un-Frame of Service** setting for each LSU channel (Enter LSU1-1/2/3/4) by using of **]** or **[** keys.
5. Repeat if necessary the steps 2-4 for other LSU cards.

Note: The valid options for T1 are:

- Un-Frame
- ESF
- D4

4.2.4.2.3 Line Coding Setting Command

Description: Set line code for E1/T1 channels.

PATH: Local Terminal→1. Configuration→2. E1/T1 Configuration→3. Line Coding Setting

Example: E1/T1 Coding Setting:

```
E1/T1 Configuration (Local)

          1. Line Type Setting
          2. Line Frame Setting
          3. Line Coding Setting
          4. Line Equalizer Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3
Select LSU [LSU_1]: LSU_1
Select Channel [LSU1-1]: LSU1-1
 Enter E1T1 Coding [HDB3]: HDB3
                    .
                    .
                    .
Select Channel [LSU4-4]: LSU4-4
 Enter E1T1 Coding [HDB3]: HDB3

*>>>> [3]:
```

1. In the E1/T1Configuration Menu enter 3 to select **Line Coding Setting**. After that system will cycle you through configuring procedure.
2. Select the slot number (Select LSU) by pressing 1…4, then Enter.
3. Select Channel number by pressing 1…4, then Enter.
4. Choose either **HDB3** or **AMI** setting for each LSU channel (Enter LSU1-1/2/3/4) by using of **]** or **[** keys.
5. Repeat if necessary the steps 2-4 for other LSU cards.

Note: The valid options for T1 are: **AMI** and **B8ZS.**

4.2.4.2.4 Line Equalizer Setting Command

Description: Set transmission distance (T1 only) for attenuation compensation.

PATH: Local Terminal→1. Configuration→2. E1/T1 Configuration→4. Line Equalizer Setting

Example: T1 Equalizer Setting:

```
E1/T1 Configuration (Local)

          1. Line Type Setting
          2. Line Frame Setting
          3. Line Coding Setting
          4. Line Equalizer Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:4
Select LSU [LSU_1]: LSU_1
Select Channel [LSU1-1]: LSU1-1
 Enter T1 Equalizer [0-133ft]: 0-133ft
Select Channel [LSU1-2]: LSU1-2
 Enter T1 Equalizer [0-133ft]: 0-133ft
Select Channel [LSU1-3]: LSU1-3
 Enter T1 Equalizer [0-133ft]: 0-133ft
Select Channel [LSU1-4]: LSU1-4
 Enter T1 Equalizer [0-133ft]: 0-133ft
                    .
                    .
                    .
                    .
                    .
                    .
*>>>> [4]:
```

1. In the E1/T1Configuration Menu enter 4 to select **Line Equalizer Setting**. After that system will cycle you through configuring procedure.
2. Select the slot number (Select LSU) by pressing 1…4, then Enter.
3. Select Channel number by pressing 1…4, then Enter.
4. Choose transmission distance setting for each LSU channel (Enter LSU1-1/2/3/4) by using of **]** or **[** keys.
5. Repeat if necessary the steps 2-4 for other LSU cards.

Note: The valid options are:

- 0-133ft
- 133-266ft
- 266-399ft
- 399-533ft
- 533-655ft

4.2.4.3 LAN Configuration Menu

Description: Configuring of LAN interfaces.

PATH: Local Terminal→1. Configuration→3. LAN Configuration

```
LAN Configuration (Local)

          1. VLAN Setting
          2. QoS Setting
          3. Rate Limit Setting
          4. LAN Provision Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.4.3.1 VLAN Setting Menu

Description: Configuring of VLANs.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→1. VLAN Setting

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.4.3.2 VLAN Global Configuration Command

Description: Enabling/disabling of 802.1Q.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→1. VLAN Setting→1. VLAN Global Configuration

Example: Enabling/disabling of 802.1Q:

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
VLAN 802.1Q Enable [No]: Yes

*>>>>> [1]:1
VLAN 802.1Q Enable [Yes]: No
  Note! PortBase VLAN Works NOW

*>>>>> [1]:
```

1. In the VLAN Setting Menu enter 1 to select **VLAN Global Configuration**. After that system will cycle you through configuring procedure.
2. Choose either **Yes** (enable) or **No** (disable) setting by using of **]** or **[** keys.
3. Press Enter key to execute the command.

Note: The command is active only when Port-to-Port Isolation is disabled (see chapter 4.2.4.3.13).

4.2.4.3.3 VLAN Port Configuration Command (Option1: 802.1Q is enabled)

Description: Set VLAN configuration for LAN ports.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→1. VLAN Setting→2. VLAN Port Configuration

Example: VLAN Port Configuration (Option1: 802.1Q is enabled):

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
Port Default VID (1-4095) [16]: 16
Force Ingress to Default VID [No]: Yes
Q-in-Q Action [No]: Yes
802.1Q Mode [Check]: Secure
Select Channel [LSU4-6]: LSU4-6
Port Default VID (1-4095) [16]: 16
Force Ingress to Default VID [No]: No
Q-in-Q Action [No]: No
802.1Q Mode [Check]: Check

*>>>>> [2]:
```

1. In the VLAN Setting Menu enter 2 to select **VLAN Port Configuration**. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting for by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card), then Enter.
5. Enter Port Default VID.
6. Choose either **Yes** or **No** setting for Force Ingress to Default VID by using of **]** or **[** keys. then Enter
7. Choose either **Yes** or **No** setting for Q-inQ Action by using of **]** or **[** keys then Enter.
8. Choose either **Check** or **Secure** setting for 802.1Q Mode by using of **]** or **[** keys then Enter.
9. Repeat steps above for other LSU channels or/and slots

Notes:

1. Force Ingress to Default VID:
- **Yes**: Replace the original VID of packets to Default VLAN ID.
- **No**: Remain the original VID of packets.

2. Q-in-Q Action – inserting second tag (default VID) into preambule:
- **Yes**: Always transmit frames with double tag where secong tag is default VID assigned on the port.
- **No**: Q-in-Q is disabled.

3. 802.1Q Mode:
- **Secure**: Enable 802.1Q for ingress and egress port. Discard Ingress membership violations and discard frames whose VID is not contained in the VID table.
- **Check**: Enable 802.1Q for this egress port. Do not discard Ingress membership violations and discard the frame if its VID is not contained in the VID table.

4.2.4.3.4 PBVLAN Port Configuration Command (Option2: 802.1Q is disabled)

Description: Set PBVLAN configuration for LAN ports.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→1. VLAN Setting→2. VLAN Port Configuration

Example: PBVLAN Port Configuration (Option2: 802.1Q is disabled):

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
Port Based to All ports [No]: No
  Port Based to LSU1-1 [Yes]: No
  Port Based to LSU1-2 [No]: No
  Port Based to LSU2-1 [Yes]: No
  Port Based to LSU2-2 [Yes]: No
  Port Based to LSU3-1 [Yes]: No
  Port Based to LSU3-2 [Yes]: No
  Port Based to LSU4-6 [Yes]: Yes
  Port Based to Trunk [Yes]: No
Select Channel [LSU4-6]: LSU4-6
Port Based to All ports [Yes]: No
  Port Based to LSU1-1 [Yes]: No
                      .
                      .
  Port Based to Trunk [Yes]: Yes

*>>>>> [2]:
```

1. In the VLAN Setting Menu enter 2 to select **VLAN Port Configuration**. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting for by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card), then Enter.
5. Reject or agree apllying for all channels (Port Based to All ports): use **]** or **[** keys to select **No** or **Yes**.
6. Assign egress destination port(s) by choosing either **Yes** or **No** setting for each port (Port Based to…) by using of **]** or **[** keys, then Enter.
7. Repeat steps above for other LSU channels or/and slots.

4.2.4.3.5 VID Table Setting Command

Description: Manage VID Table.
PATH: Local Terminal→1. Configuration→3. LAN Configuration→1. VLAN Setting→3. VID Table Setting
Example: Managing VID Table (**adding** or **modifying** existing VID in the table):

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3

VID Access [Add]: Add
Enter add VID (1-4095) [16]:
  Associated with PORT <LSU1-1> [Untag]: Untag
  Associated with PORT <LSU1-2> [Untag]: Untag
  Associated with PORT <LSU2-1> [Untag]: Untag
  Associated with PORT <LSU2-2> [Untag]: Untag
  Associated with PORT <LSU3-1> [Untag]: Untag
  Associated with PORT <LSU3-2> [Untag]: Untag
  Associated with PORT <LSU4-5> [Untag]: Untag
  Associated with PORT <LSU4-6> [Untag]: Untag
  Associated with PORT <Trunk> [Untag]: Tag

Press ESC To Exit & Save

*>>>>> [3]:
```

1. In the VLAN Setting Menu enter 3 to select **VID Table Setting**. After that system will cycle you through configuring procedure.
2. Choose VID access mode as **Add** or **Modify** by using of **]** or **[** keys.
3. Enter VID.
4. Choose action type regarding each port (**Discard**, **Tag** or **Untag)** by using of **]** or **[** keys.
5. Press Escape to execute the command.

Note:

- **Untag**: Allow this specific VID tag to enter but remove tag.
- **Tag**: Allow specific VID tag to pass through and put on the default VID tag during egress.
- **Discard**: Reject specific VID tag packets.

Example: Managing VID Table (**delete** a specified VID in existing VID table):

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3

VID Access [Add]: Delete
Enter delete VID (1-4095) [16]:16

Press ESC To Exit & Save

*>>>>> [3]:
```

1. In the VLAN Setting Menu enter 3 to select **VID Table Setting**. After that system will cycle you through configuring procedure.
2. Choose VID access mode as **Delete** by using of **]** or **[** keys.
3. Enter VID.
4. Press Escape to execute the command.

Example: Managing VID Table (**clear** all VID in existing VID table):

```
VLAN Setting (Local)

          1. VLAN Global Configuration
          2. VLAN Port Configuration
          3. VID Table Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3

VID Access [Add]: Flush
Are you sure to FLUSH all? [No]:Yes
Please Wait ...

*>>>>> [3]:
```

1. In the VLAN Setting Menu enter 3 to select **VID Table Setting**. After that system will cycle you through configuring procedure.
2. Choose VID access mode as **Flush** by using of **]** or **[** keys.
3. Choose **Yes** to clear all VID in existing VID table by using of **]** or **[** keys. then Enter.

4.2.4.3.6 QoS Setting Menu

Description: Configuring of QoS.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→2. QoS Setting

```
QoS Setting (Local)

          1. QoS Global Configuration
          2. QoS Port Configuration
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.4.3.7 QoS Global Configuration Setting Command

Description: Setting QoS scheduling mode.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→2. QoS Setting→1. QoS Global Configuration

Example: Setting QoS scheduling mode:

```
QoS Setting (Local)

          1. QoS Global Configuration
          2. QoS Port Configuration
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
Enter Scheduling Mode [WFQ]: Strict

*>>>>> [1]:
```

1. In the QoS Setting Menu enter 1 to select **QoS Global Configuration**. After that system will cycle you through configuring procedure.
2. Choose either **WFQ** or **Strict** setting by using of **]** or **[** keys.
3. Press Enter key to execute the command.

Note:

- **WFQ**: Packets are sent out according to Weighted Fair Queue. 8, 4, 2, 1 weighting ratio is applied to the 4 queues (1st pr priority~4th priority).
- **Strict**: Packets are sent out according to the class level of queue strictly.

4.2.4.3.8 QoS Port Configuration Setting Command

Description: Configuring QoS per port.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→2. QoS Setting→2. QoS Port Configuration

Example: Configuring QoS per port:

```
QoS Setting (Local)

          1. QoS Global Configuration
          2. QoS Port Configuration
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
Enter 802.1p QoS Enable [No]: No
Enter DSCP QoS Enable [No]: No
Port Default PID (0-7) [0]: 2
Select Channel [LSU4-6]: LSU4-6
Enter 802.1p QoS Enable [No]: Yes
Enter DSCP QoS Enable [No]: Yes
Port Default PID (0-7) [0]: 3

*>>>>> [2]:
```

1. In the QoS Setting Menu enter 2 to select QoS Port Configuration. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting for by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card), then Enter.
5. Choose either **Yes** (Enable) or **No** (Disable) setting for 802.1p QoS by using of **]** or **[** keys then Enter.
6. Choose either **Yes** (Enable) or **No** (Disable) setting for DSCP QoS by using of **]** or **[** keys then Enter.
7. Enter Port Default PID.

4.2.4.3.9 QoS 802.1p Mapping Table Command

Description: Managing QoS 802.1p Mapping Table.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→2. QoS Setting→3. QoS 802.1p Mapping Table

Example: Managing QoS 802.1p Mapping Table:

```
QoS Setting (Local)

          1. QoS Global Configuration
          2. QoS Port Configuration
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3
Enter Configured PID (0-7) [0]: 0
Enter PID-0 Traffic Class (0-3) [0]: 0

Press ESC To Exit & Save

*>>>>> [3]:
```

1. In the QoS Setting Menu enter 3 to select QoS 802.1p Mapping Table. After that system will cycle you through configuring procedure.
2. Enter configured PID.
3. Enter PID Traffic Class (0-3).
4. Repeat steps above for other PIDs.
5. Press Escape to execute command.

Note: 4 kinds of Traffic Class type are available: 0(the lowest priority)…3 (the highest priority).

4.2.4.3.10 DSCP Mapping Table Command

Description: Managing DSCP Mapping Table.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→2. QoS Setting→4. QoS DSCP Mapping Table

Example: Managing DSCP Mapping Table:

```
QoS Setting (Local)

          1. QoS Global Configuration
          2. QoS Port Configuration
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:4
Enter Configured DSCP (0-63) [0]: 2
Enter DSCP-2 Traffic Class (0-3) [2]: 3

Press ESC To Exit & Save

*>>>>> [4]:
```

1. In the QoS Setting Menu enter 4 to select **QoS DSCP Mapping Table**. After that system will cycle you through configuring procedure.
2. Enter configured DSCP.
3. Enter PID Traffic Class (0-3).
4. Repeat steps above for other DSCPs.
5. Press Escape to execute command.

Note: 4 kinds of Traffic Class type are available: 0(the lowest priority)…3 (the highest priority).

4.2.4.3.11 Rate Limit Setting Command

Description: Setting Ingress/Egress Rate Limiting for LAN ports.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→3. Rate Limit Setting

Example: Disable Rate Limiting for egress port; set Rate Limiting for ingress port for all packet types:

```
LAN Configuration (Local)

          1. VLAN Setting
          2. QoS Setting
          3. Rate Limit Setting
          4. LAN Provision Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
Egress RateLimit Enable [Yes]: No
Ingress RateLimit Enable [Yes]: Yes
 Select Packets Type To RateLimit [Yes]: No
 ALL Packets To RateLimit [Yes]: Yes
  Ingress Rate Limit Range [10~100 Mbps]: 1~10 Mbps
  Ingress Rate Limit Fine Tune [1.5 Mbps]: 2.0 Mbps
Select Channel [LSU4-6]: LSU4-6
Egress RateLimit Enable [No]: No
Ingress RateLimit Enable [Yes]: Yes
 Select Packets Type To RateLimit [No]: No
 ALL Packets To RateLimit [Yes]: Yes
  Ingress Rate Limit Range [10~100 Mbps]: 10~100 Mbps
  Ingress Rate Limit Fine Tune [100 Mbps]: 100 Mbps

*>>>> [3]:
```

1. In the LAN Configuration enter 3 to select **Rate Limit Setting**. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting for by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4 or **]** or **[**, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card) or by using **]** or **[**, then Enter.
5. Choose **No** (Disable) setting for Egress RateLimit Enable by using of **]** or **[** keys then Enter.
6. Choose **Yes** (Enable) setting for Ingress RateLimit Enable by using of **]** or **[** keys then Enter.
7. Choose **No** (Disable) setting for Select Packets Type To RateLimit by using of **]** or **[** keys then Enter.
8. Choose **Yes** (Enable) setting for ALL Packets To RateLimit by using of **]** or **[** keys then Enter.

9. Choose desired Rate Limit Range by using of **]** or **[** keys then Enter.
10. Choose desired Rate Limit Fine Tune by using of **]** or **[** keys then Enter.
11. Repeat steps above for other channels/cards if necessary.

Example: Enable Rate Limititation for egress port; set Rate Limitation for ingress port for specific packet types:

```
LAN Configuration (Local)

          1. VLAN Setting
          2. QoS Setting
          3. Rate Limit Setting
          4. LAN Provision Setting
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
Egress RateLimit Enable [Yes]: Yes
  Egress Rate Limit Range [1~10 Mbps]: 1~10 Mbps
  Egress Rate Limit Fine Tune [2.0 Mbps]: 2.0 Mbps
Ingress RateLimit Enable [Yes]: Yes
 Select Packets Type To RateLimit [Yes]: Yes
  Packet Type - BC [Yes]: Yes
  Packet Type - MC [Yes]: Yes
  Packet Type - UniC [No]: No
  Packet Type - UnknUniC [No]: No
  Packet Type RateLimit (6.5Packets*PHY)/sec [10000]: 10000
 ALL Packets To RateLimit [No]: Yes
  Ingress Rate Limit Range [0~1 Mbps]: 1~10 Mbps
  Ingress Rate Limit Fine Tune [1.5 Mbps]: 2.0 Mbps

*>>>> [3]:
```

1. In the LAN Configuration enter 3 to select **Rate Limit Setting**. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting for by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4 or **]** or **[**, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card) or by using **]** or **[**, then Enter.
5. Choose **Yes** (Enable) setting for Egress RateLimit Enable by using of **]** or **[** keys then Enter.
6. Choose desired Egress Rate Limit Range by using of **]** or **[** keys then Enter.
7. Choose desired Egress Rate Limit Fine Tune by using of **]** or **[** keys then Enter.
8. Choose **Yes** (Enable) setting for Ingress RateLimit Enable by using of **]** or **[** keys then Enter.
9. Choose **Yes** (Enable) setting for Select Packets Type To RateLimit by using of **]** or **[** keys then Enter.
10. Choose either **Yes** or **No** for each packet type by using of **]** or **[** keys then Enter.
11. Enter Packet Type Rate Limit.
12. Choose **Yes** (Enable) setting for ALL Packets To RateLimit by using of **]** or **[** keys then Enter.
13. Choose desired Ingress Rate Limit Range by using of **]** or **[** keys then Enter.
14. Choose desired In gress Rate Limit Fine Tune by using of **]** or **[** keys then Enter.
15. Repeat steps above for other channels/cards if necessary.

Notes:

1. **Packet Type Rate Limit (6.5 Packets * PHY)/sec**:
   - This threshold is for specific packet type of ingress port. Specific packets over this threshold would be discarded until next second begins.
   - PHY means current bandwidth of Internet.
   - Valid range: 0…65535
2. **Packet Type:**
   - BC: Broadcast
   - MC: Multicast
   - UniC: Flooded Unicast
   - UnknUniC: Unknown Unicast

Rate Limiting Options table						
Egress/Ingress Rate Limit Range	Egress/Ingress Rate Limit Fine Tune					
0~1 Mbps	256 Kbps	512 Kbps	768 Kbps	1 Mbps		
1~10 Mbps	1.5 Mbps	2 Mbps	2.5 Mbps	3 Mbps	3.5 Mbps	4 Mbps
	4.5 Mbps	5 Mbps	5.5 Mbps	6 Mbps	6.5 Mbps	7 Mbps
	7.5 Mbps	8 Mbps	8.5 Mbps	9 Mbps	10 Mbps	
10~100 Mbps	15 Mbps	20 Mbps	25 Mbps	30 Mbps	35 Mbps	40 Mbps
	45 Mbps	50 Mbps	55 Mbps	60 Mbps	65 Mbps	70 Mbps
	75 Mbps	80 Mbps	85 Mbps	90 Mbps	95 Mbps	100 Mbps
100~1000 Mbps	150 Mbps	200 Mbps	250 Mbps	300 Mbps	350 Mbps	400 Mbps
	450 Mbps	500 Mbps	550 Mbps	600 Mbps	650 Mbps	700 Mbps
	750 Mbps	800 Mbps	850 Mbps	900 Mbps	950 Mbps	1000 Mbps

4.2.4.3.12 LAN Provision Setting Menu

Description: Setting of Port Isolation Mode and Configuring of LAN ports.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→4. LAN Provision Setting

```
LAN Provision Setting (Local)

          1. LAN Global Setting
          2. LAN Port Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.4.3.13 LAN Global Setting Command

Description: Setting of Port Isolation Mode.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→4. LAN Provision Setting→1. LAN Global Setting

Example: Enabling/disabling of Port Isolation:

```
LAN Provision Setting (Local)

          1. LAN Global Setting
          2. LAN Port Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
Enable Port-to-Port Isolation [No]: Yes

*>>>>> [1]:
```

1. In the LAN Provision Setting Menu enter 1 to select **LAN Global Setting**. After that system will cycle you through configuring procedure.
2. Choose either **Yes** (enable) or **No** (disable) setting for Port-to-Port Isolation by using of **]** or **[** keys.
3. Press Enter key to execute the command.

Notes:

1. Once Port Isolation has been enabled, VLAN Setting and VID Table Setting will be locked until Port Isolation has been disabled. After that, the settings of VLAN Setting and VID Table will be recovered as default setting.
2. With Port Isolation, the port is isolated despite VLAN settings. As result, data of the local side 1st LAN port is transmitted only to remote side 1st LAN port. Same for other LAN ports

4.2.4.3.14 LAN Port Setting Command

Description: Configuring of LAN ports.

PATH: Local Terminal→1. Configuration→3. LAN Configuration→4. LAN Provision Setting→2. LAN Port Setting

Example: Configuring of LAN ports:

```
LAN Provision Setting (Local)

          1. LAN Global Setting
          2. LAN Port Setting
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
 LAN AutoNeg Mode [Yes]: Yes
 LAN Speed - Interface: Copper
  Advertise speed mode 10M-T_Half [Yes]: Yes
  Advertise speed mode 10M-T_Full [Yes]: Yes
  Advertise speed mode 100M-T_Half [Yes]: Yes
  Advertise speed mode 100M-T_Full [Yes]: Yes
  Advertise speed mode 1000M-T_Half [Yes]: Yes
  Advertise speed mode 1000M-T_Full [Yes]: Yes
 LAN Speed - Interface: Fiber
  Advertise speed mode 1000M-X_Half [Yes]: Yes
  Advertise speed mode 1000M-X_Full [Yes]: Yes
 Enter LAN Auto Link Down [Enable]: Enable
 Enter LAN Flow Control [Disable]: Enable
 Enter LAN Packet Size [9000]: 9000
Select Channel [LSU4-6]: LSU4-6
 LAN AutoNeg Mode [Yes]: No
 LAN Speed - Interface: Copper
  Enter LAN Speed Mode [100M-T_Half]: 100M-T_Full
 LAN Speed - Interface: Fiber
  Enter LAN Speed Mode [1000M-X_Full]: 1000M-X_Full
 Enter LAN Auto Link Down [Enable]: Enable
 Enter LAN Flow Control [Disable]: Enable
 Enter LAN Packet Size [9000]: 9000

*>>>>> [2]:
```

1. In the LAN Provision Setting Menu enter 2 to select **LAN Port Setting**. After that system will cycle you through configuring procedure.
2. Choose either **LAN_LSU** or **LAN_Trunk** setting by using of **]** or **[** keys.
3. Select the slot number (Select LSU) by pressing 1…4 or **]** or **[**, then Enter.
4. Select Channel number by pressing 5 or 6 (for Trib4xE1B-2xETH Card) or by pressing 1 or 2 (for Trib2xETH Card) or by using **]** or **[**, then Enter.
5. Choose **Yes** (Enable) or **No** (Disable) setting for LAN AutoNeg Mode by using of **]** or **[** keys then Enter.
6. Choose **Yes** (Enable) or **No** (Disable) setting for LAN AutoNeg Mode by using of **]** or **[** keys then Enter.
7. If Autonegotiation is enabled: choose **Yes** (Enable) or **No** (Disable) setting Advertise speed mode by using of **]** or **[** keys then Enter.
   If Autonegotiation is disabled: choose LAN Speed Mode by using of **]** or **[** keys.
8. Choose **Yes** (Enable) or **No** (Disable) setting for LAN Auto Link Down by using of **]** or **[** keys then Enter.
9. Choose **Yes** (Enable) or **No** (Disable) setting for LAN Flow Control by using of **]** or **[** keys then Enter.
10. Enter LAN Packet Size.

Supported LAN Speed Modes	
Copper LAN Interface	Optical LAN Interface
10M-T_Half	1000M-X_Half
10M-T_Full	
100M-T_Half	
100M-T_Full	1000M-X_Full
1000M-T_Half	
1000M-T_Full	

4.2.4.4 V.35 Configuration Menu

RESERVED: for V.35 Tributary Card (future option).

4.2.4.5 Optical Configuration Menu

Description: Configuring of Aggregation Optical Interface.

PATH: Local Terminal→1. Configuration→5. Optical Configuration

```
Optical Configuration (Local)

          1. Optical ALS Setting
          2. Optical Protect Switch
          3. Optical Locked Cancel
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.4.5.1 Optical ALS Setting Command

Description: Setting Optical ALS (Automatic Laser Shutdown) Mode.

PATH: Local Terminal→1. Configuration→5. Optical Configuration→1. Optical ALS Setting

Example: Enabling/disabling of ALS Mode:

```
Optical Configuration (Local)

          1. Optical ALS Setting
          2. Optical Protect Switch
          3. Optical Locked Cancel
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
Enter Optical-1 ALS Enable [No]:  Yes
Enter Optical-2 ALS Enable [No]:  Yes

*>>>> [1]:
```

1. In the Optical Configuration Menu enter 1 to select **Optical ALS Setting**. After that system will cycle you through configuring procedure.
2. Choose either **Yes** (enable) or **No** (disable) setting for Optical-1(2) ALS Enable by using of **]** or **[** keys.
3. Press Enter key to execute the command.

Note:

- When disabled the signal is kept transmitted at transmission side despite disconnection happened.
- When enabled in case of disconnection the system goes into cycling mode that combines optical transmission of 2 seconds and optical disconnection of 64 seconds.

4.2.4.5.2 Optical Protect Switch Command

Description: Configuring APS (Automatic Protect Switching).

PATH: Local Terminal→1. Configuration→5. Optical Configuration→2. Optical Protect Switching

Example: Enabling of APS Mode:

```
Optical Configuration (Local)

          1. Optical ALS Setting
          2. Optical Protect Switch
          3. Optical Locked Cancel
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2
Enter Protect Switch [Auto]:  Auto
 AutoLock Switch [Enable]:  Enable

*>>>> [2]:
```

1. In the Optical Configuration Menu enter 2 to select **Optical Protect Switch**. After that system will cycle you through configuring procedure.
2. Choose **Auto** (enable) setting for Protect Switch by using of **]** or **[** keys.
3. Choose either **Enable** or **Disable** setting for AutoLock Switch by using of **]** or **[** keys.
4. Press Enter key to execute the command.

Notes:

1. If **APS** is enabled then one channel is active (LED light become green) and the other one is in standby (LED light become orange). As soon as the active optical channel is out of order, the original active channel is switched to the standby onel automatically.
2. **AutoLock Switch**:

- When enabled: This setting terminates the APS when switching between channels occurs more frequently than 8 times within 10 minutes.To release the Lock State use Optical Locked Cancel (see chapter 4.2.4.5.3).
- When disabled: switching between main and standby channels is not locked.

Example: Disabling of APS Mode:

```
Optical Configuration (Local)

          1. Optical ALS Setting
          2. Optical Protect Switch
          3. Optical Locked Cancel
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2
Enter Protect Switch [Auto]:  OPT1

*>>>> [2]:
```

1. In the Optical Configuration Menu enter 2 to select **Optical Protect Switch**. After that system will cycle you through configuring procedure.
2. Choose **OPT1** or **OPT2** (disabling APS) setting for Protect Switch by using of **]** or **[** keys.
3. Press Enter key to execute the command.

Note: If **APS** is disabled then one channel (**OPT1** or **OPT2**) is always active.

4.2.4.5.3 Optical Locked Cancel Command

Description: Releasing of AutoLock state of APS.

PATH: Local Terminal→1. Configuration→5. Optical Configuration→3. Optical Locked Cancel

Example: Unlock APS:

```
Optical Configuration (Local)

          1. Optical ALS Setting
          2. Optical Protect Switch
          3. Optical Locked Cancel
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3
Enter Unlock Optical [Yes]: Yes

*>>>> [3]:
```

1. In the Optical Configuration Menu enter 3 to select **Optical Locked Cancel**. After that system will cycle you through configuring procedure.
2. Choose **Yes** (unlock) setting for Unlock Optical by using of **]** or **[** keys.
3. Press Enter key to execute the command.

4.2.5 Status List Menu

Description: Reviewing system configuration after finishing setting

PATH: Local Terminal→1. Configuration

```
Status List (Local)

          1. Service Monitor
          2. E1/T1 Monitor
          3. LAN Monitor
          4. V.35 Monitor
          5. Optical Monitor
          6. Line Equipment Monitor
          7. Misc. Monitor
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.5.1 Service Monitor Command

Description: View service status of all units.

PATH: Local Terminal→2. Status List→1. Service Monitor

```
Status List (Local)

          1. Service Monitor
          2. E1/T1 Monitor
          3. LAN Monitor
          4. V.35 Monitor
          5. Optical Monitor
          6. Line Equipment Monitor
          7. Misc. Monitor
          0. Return Previous Menu
          ?. Help

*>>> [1]:1
               < Local Service Status >
================================================================================
   Item  Service                          Item  Service
--------------------------------------------------------------------------------
  OPT-1  In Service (working)            OPT-2  In Service (standby)
 LSU1-1  Out of Service                 LSU1-2  Out of Service
 LSU1-3  Out of Service                 LSU1-4  Out of Service
 LSU2-1  In Service                     LSU2-2  In Service
 LSU2-3  In Service                     LSU2-4  In Service
 LSU3-1  In Service                     LSU3-2  In Service
 LSU3-3  In Service                     LSU3-4  In Service
 LSU4-1  In Service                     LSU4-2  In Service
 LSU4-3  In Service                     LSU4-4  In Service
 LSU4-5  In Service                     LSU4-6  In Service
================================================================================

*>>> [1]:
```

4.2.5.2 E1/T1 Monitor Menu

Description: View Settings of E1/T1 interfaces.

PATH: Local Terminal→2. Status List→2. E1/T1 Monitor

```
E1/T1 Monitor (Local)

          1. Line Type Monitor
          2. Line Frame Monitor
          3. Line Coding Monitor
          4. Line Equalizer Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.5.2.1 Line Type Monitor Command

Description: View Line Type Setting of E1/T1 interfaces.

PATH: Local Terminal→2. Status List→2. E1/T1 Monitor→1. Line Type Monitor

```
E1/T1 Monitor (Local)

          1. Line Type Monitor
          2. Line Frame Monitor
          3. Line Coding Monitor
          4. Line Equalizer Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
               < Local E1/T1 Line Type >
================================================================================
   Item  Type          Item  Type          Item  Type          Item  Type
--------------------------------------------------------------------------------
   LSU-1  T1           LSU-2  E1           LSU-3  E1           LSU-4  E1
================================================================================

*>>>> [1]:
```

4.2.5.2.2 Line Frame Monitor Command

Description: View Line Frame Setting of E1/T1 interfaces.

PATH: Local Terminal→2. Status List→2. E1/T1 Monitor→2. Line Frame Monitor

```
E1/T1 Monitor (Local)

          1. Line Type Monitor
          2. Line Frame Monitor
          3. Line Coding Monitor
          4. Line Equalizer Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2
               < Local Line Frame >
================================================================================
   Item  Mode          Item  Mode          Item  Mode          Item  Mode
--------------------------------------------------------------------------------
 LSU1-1  ESF         LSU1-2  ESF         LSU1-3  ESF         LSU1-4  ESF
 LSU2-1  CRC4        LSU2-2  CRC4        LSU2-3  CRC4        LSU2-4  CRC4
 LSU3-1  CRC4        LSU3-2  CRC4        LSU3-3  CRC4        LSU3-4  CRC4
 LSU4-1  CRC4        LSU4-2  CRC4        LSU4-3  CRC4        LSU4-4  CRC4
================================================================================

*>>>> [2]:
```

4.2.5.2.3 Line Coding Monitor Command

Description: View Line Code Setting of E1/T1 interfaces.

PATH: Local Terminal→2. Status List→2. E1/T1 Monitor→3. Line Coding Monitor

```
E1/T1 Monitor (Local)

          1. Line Type Monitor
          2. Line Frame Monitor
          3. Line Coding Monitor
          4. Line Equalizer Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3
               < Local Line Code >
================================================================================
   Item  Code          Item  Code          Item  Code          Item  Code
--------------------------------------------------------------------------------
 LSU1-1  B8ZS        LSU1-2  B8ZS        LSU1-3  B8ZS        LSU1-4  B8ZS
 LSU2-1  HDB3        LSU2-2  HDB3        LSU2-3  HDB3        LSU2-4  HDB3
 LSU3-1  HDB3        LSU3-2  HDB3        LSU3-3  HDB3        LSU3-4  HDB3
 LSU4-1  HDB3        LSU4-2  HDB3        LSU4-3  HDB3        LSU4-4  HDB3
================================================================================

*>>>> [3]:
```

4.2.5.2.4 Line Equalizer Monitor Command

Description: View Equalizer Setting of T1 interfaces.

PATH: Local Terminal→2. Status List→2. E1/T1 Monitor→4. Line Equalizer Monitor

```
E1/T1 Monitor (Local)

          1. Line Type Monitor
          2. Line Frame Monitor
          3. Line Coding Monitor
          4. Line Equalizer Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:4
               < Local Line Equalizer >
================================================================================
   Item  EQ            Item  EQ            Item  EQ            Item  EQ
--------------------------------------------------------------------------------
 LSU1-1  0-133ft     LSU1-2  0-133ft     LSU1-3  0-133ft     LSU1-4  0-133ft
 LSU2-1  ----        LSU2-2  ----        LSU2-3  ----        LSU2-4  ----
 LSU3-1  ----        LSU3-2  ----        LSU3-3  ----        LSU3-4  ----
 LSU4-1  ----        LSU4-2  ----        LSU4-3  ----        LSU4-4  ----
================================================================================

*>>>> [4]:
```

4.2.5.3 LAN Monitor Menu

Description: View Settings, Link Status and Link Statistic of LAN interfaces.

PATH: Local Terminal→2. Status List→3. LAN Monitor

```
LAN Monitor (Local)

          1. VLAN Monitor
          2. QoS Monitor
          3. Rate Limit Monitor
          4. Provision Monitor
          5. Line Interface Monitor
          6. Line Statistic Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.5.3.1 VLAN Monitor Menu

Description: View VLAN Settings.

PATH: Local Terminal→2. Status List→3. LAN Monitor→1. VLAN Monitor

```
VLAN Monitor (Local)

          1. VLAN Global Monitor
          2. VLAN Port Monitor
          3. VID Table Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.5.3.2 VLAN Global Monitor Command

Description: View 802.1Q Setting.

PATH: Local Terminal→2. Status List→3. LAN Monitor→1. VLAN Monitor→1. VLAN Global Monitor

```
VLAN Monitor (Local)

          1. VLAN Global Monitor
          2. VLAN Port Monitor
          3. VID Table Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
VLAN 802.1Q Enable: No

*>>>>> [1]:
```

Note: VLAN 802.1Q Enable:

- **Yes**: means that the system works in VLAN mode
- **No**: means that the system works in PBVLAN mode

4.2.5.3.3 VLAN Port Monitor Command (Option1: 802.1Q is enabled)

Description: View VLAN configuration for LAN ports.

PATH: Local Terminal→2. Status List→3. LAN Monitor→1. VLAN Monitor→2. VLAN Port Monitor

```
VLAN Monitor (Local)

          1. VLAN Global Monitor
          2. VLAN Port Monitor
          3. VID Table Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2

Local VLAN Configuration List: [LSU1-1]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU1-2]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU2-1]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU2-2]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU3-1]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU3-2]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU4-5]
Port Default VID (1-4095): [16]
Force Ingress to Default VID: [Enable]
Q-in-Q Action: [Yes]
802.1Q Mode: [Secure]

Press Any Key

Local VLAN Configuration List: [LSU4-6]
Port Default VID (1-4095): [16]
Force Ingress to Default VID: [Disable]
Q-in-Q Action: [No]
802.1Q Mode: [Check]

Press Any Key

Local VLAN Configuration List: [Trunk]
Port Default VID (1-4095): [16]
Force Ingress to Default VID: [Disable]
Q-in-Q Action: [No]
802.1Q Mode: [Check]

*>>>>> [2]:
```

1. In the VLAN Monitor Menu enter 2 to select **VLAN Port Monitor**.
2. Press Enter to see VLAN Settings for the next system LAN port.

Notes:

1. Force Ingress to Default VID:
   - **Yes**: The original VID of packets are replaced by Default VLAN ID.
   - **No**: The original VID of packets are not changed.
2. Q-in-Q Action – inserting of the second tag (default VID) into preambule:
   - **Yes**: All frames are transmitted with double tag where the secong tag is default VID assigned to the port.
   - **No**: Q-in-Q is not supported.
3. 802.1Q Mode:
   - **Secure**: 802.1Q is enabled for ingress and egress port. The Ingress membership violations and the frames whose VID is not contained in the VID table are discarded.
   - **Check**: 802.1Q is enabled for this egress port. The Ingress membership violations and the frames whose VID is not contained in the VID table are not discarded.

4.2.5.3.4 PBVLAN Port Monitor Command (Option2: 802.1Q is disabled)

Description: View PBVLAN configuration.

PATH: Local Terminal→2. Status List→3. LAN Monitor→1. VLAN Monitor→2. VLAN Port Monitor

```
VLAN Monitor (Local)

          1. VLAN Global Monitor
          2. VLAN Port Monitor
          3. VID Table Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2

Local VLAN Configuration List: [LSU1-1]
  < No Equipment >

Press Any Key

                    .
                    .
                    .

Local VLAN Configuration List: [LSU3-2]
  < No Equipment >

Press Any Key

Local VLAN Configuration List: [LSU4-5]
  Port Based to 1-1: [No]
  Port Based to 1-2: [No]
  Port Based to 2-1: [No]
  Port Based to 2-2: [No]
  Port Based to 3-1: [No]
  Port Based to 3-2: [No]
  Port Based to 4-5: [No]
  Port Based to 4-6: [Yes]
  Port Based to Trunk: [No]

Press Any Key

Local VLAN Configuration List: [LSU4-6]
  Port Based to 1-1: [No]
  Port Based to 1-2: [No]
  Port Based to 2-1: [No]
  Port Based to 2-2: [No]
  Port Based to 3-1: [No]
  Port Based to 3-2: [No]
  Port Based to 4-5: [No]
  Port Based to 4-6: [No]
  Port Based to Trunk: [Yes]

Press Any Key

Local VLAN Configuration List: [Trunk]
  Port Based to 1-1: [Yes]
  Port Based to 1-2: [Yes]
  Port Based to 2-1: [Yes]
  Port Based to 2-2: [Yes]
  Port Based to 3-1: [Yes]
  Port Based to 3-2: [Yes]
  Port Based to 4-5: [Yes]
  Port Based to 4-6: [Yes]
  Port Based to Trunk: [No]

*>>>>> [2]:
```

1. In the VLAN Monitor Menu enter 2 to select **VLAN Port Monitor**.
2. Press Enter to see PBVLAN Settings for the next system LAN port.

4.2.5.3.5 VID Table Monitor Command

Description: View VID Table.

PATH: Local Terminal→2. Status List→3. LAN Monitor→1. VLAN Monitor→3. VID Table Monitor

```
VLAN Monitor (Local)

          1. VLAN Global Monitor
          2. VLAN Port Monitor
          3. VID Table Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3
               < Local VID Table List >
================================================================================
  NO. VID  LSU1-1   LSU1-2   LSU2-1   LSU2-2   LSU3-1   LSU3-2   LSU4-5   LSU4-6   Trunk
--------------------------------------------------------------------------------
    0   16 Untag    Untag    Untag    Untag    Untag    Untag    Untag    Untag    Untag
    1   22 Tag      Untag    Discard  Untag    Untag    Tag      Discard  Untag    Untag
--------------------------------------------------------------------------------

*>>>>> [3]:
```

Note:

- **Untag**: This specific VID tag is allowed to enter but the tag is removed.
- **Tag**: This specific VID tag is allowed to pass through and the default VID tag is added as the second tag during egress.
- **Discard**: This specific VID tag packets are rejected.

4.2.5.3.6 QoS Monitor Menu

Description: View QoS Settings.

PATH: Local Terminal→2. Status List→3. LAN Monitor→2. QoS Monitor

```
QoS Monitor (Local)

          1. QoS Global Monitor
          2. QoS Port Monitor
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.5.3.7 QoS Global Monitor Command

Description: View QoS scheduling mode.

PATH: Local Terminal→2. Status List→3. LAN Monitor→2. QoS Monitor→1. QoS Global Monitor

```
QoS Monitor (Local)

          1. QoS Global Monitor
          2. QoS Port Monitor
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1

Local QoS Scheduling Mode: [Strict]

*>>>>> [1]:
```

In the QoS Monitor Menu enter 1 to select **QoS Global Monitor**.

Note:

- **WFQ**: Packets are sent out according to Weighted Fair Queue. 8, 4, 2, 1 weighting ratio is applied to the 4 queues (1st priority~4th priority).
- **Strict**: Packets are sent out according to the class level of queue strictly.

4.2.5.3.8 QoS Port Monitor Command

Description: View QoS configuration per port.

PATH: Local Terminal→2. Status List→3. LAN Monitor→2. QoS Monitor→2. QoS Port Monitor

1. In the QoS Monitor Menu enter 2 to select **QoS Port Monitor**.
2. Press Enter to see QoS Settings for the next system LAN port.

```
QoS Monitor (Local)

          1. QoS Global Monitor
          2. QoS Port Monitor
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2

Local QoS List: [LSU1-1]
  < No Equipment >

Press Any Key
                                                .
                                                .
                                                .
Local QoS List: [LSU3-2]
  < No Equipment >

Press Any Key

Local QoS List: [LSU4-5]
    QoS 802.1p Enable: [No]
    QoS DSCP Enable: [No]
    QoS Default PID: [2]

Press Any Key

Local QoS List: [LSU4-6]
    QoS 802.1p Enable: [Yes]
    QoS DSCP Enable: [Yes]
    QoS Default PID: [3]

Press Any Key

Local QoS List: [Trunk]
    QoS 802.1p Enable: [No]
    QoS DSCP Enable: [No]
    QoS Default PID: [0]

*>>>>> [2]:
```

4.2.5.3.9 QoS 802.1p Mapping Table Command

Description: View QoS 802.1p Mapping Table.

PATH: Local Terminal→2. Status List→3. LAN Monitor→2. QoS Monitor→3. QoS 802.1p Mapping Table

```
QoS Monitor (Local)

          1. QoS Global Monitor
          2. QoS Port Monitor
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3
                    < Local QoS 802.1p Mapping Table >
================================================================================
 PID | Class        PID | Class         PID | Class         PID | Class
--------------------------------------------------------------------------------
   0   0              1   1               2   2               3   3
   4   0              5   1               6   2               7   3
================================================================================
```

Note: Class 0 has the lowest priority; Class 3 has the highest priority.

4.2.5.3.10 QoS DSCP Mapping Table Command

Description: View QoS DSCP Mapping Table.

PATH: Local Terminal→2. Status List→3. LAN Monitor→2. QoS Monitor→3. QoS DSCP Mapping Table

```
QoS Monitor (Local)

          1. QoS Global Monitor
          2. QoS Port Monitor
          3. QoS 802.1p Mapping Table
          4. QoS DSCP Mapping Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:4
                    < Local QoS DSCP Mapping Table >
================================================================================
 DSCP | Class       DSCP | Class        DSCP | Class        DSCP | Class
--------------------------------------------------------------------------------
    0   0             1   1              2   3              3   3
    4   0             5   1              6   2              7   3
    8   0             9   1             10   2             11   3
   12   0            13   1             14   2             15   3
   16   0            17   1             18   2             19   3
   20   0            21   1             22   2             23   3
   24   0            25   1             26   2             27   3
   28   0            29   1             30   2             31   3
   32   0            33   1             34   2             35   3
   36   0            37   1             38   2             39   3
   40   0            41   1             42   2             43   3
   44   0            45   1             46   2             47   3
   48   0            49   1             50   2             51   3
   52   0            53   1             54   2             55   3
   56   0            57   1             58   2             59   3
   60   0            61   1             62   2             63   3
================================================================================

*>>>>> [4]:
```

Note: Class 0 has the lowest priority; Class 3 has the highest priority.

4.2.5.3.11 Rate Limit Monitor Command

Description: View Rate Limiting Settings per port.

PATH: Local Terminal→2. Status List→3. LAN Monitor→3. Rate Limit Monitor

```
LAN Monitor (Local)

          1. VLAN Monitor
          2. QoS Monitor
          3. Rate Limit Monitor
          4. Provision Monitor
          5. Line Interface Monitor
          6. Line Statistic Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:3

Local Rate Limit List: [LSU1-1]
  < No Equipment >

Press Any Key

Local Rate Limit List: [LSU1-2]
  < No Equipment >

Press Any Key

Local Rate Limit List: [LSU2-1]
  < No Equipment >

Press Any Key
                            .
                            .
                            .

Local Rate Limit List: [LSU3-2]
  < No Equipment >

Press Any Key

Local Rate Limit List: [LSU4-5]
Egress RateLimit Enable: [Yes]
 Egress RateLimit: [002048] kbps
Ingress RateLimit Enable: [Yes]
 Packet Type - BC: [Yes]
 Packet Type - MC: [Yes]
 Packet Type - UniC: [No]
 Packet Type - UnknUniC: [No]
 Packet Type RateLimit: [010000] (6.5Packets*PHY)/sec
 ALL Packets RateLimit: [002048] kbps

Press Any Key

Local Rate Limit List: [LSU4-6]
Egress RateLimit Enable: [No]
Ingress RateLimit Enable: [Yes]
 Packet Type - BC: [No]
 Packet Type - MC: [No]
 Packet Type - UniC: [No]
 Packet Type - UnknUniC: [No]
 Packet Type RateLimit: [000000] (6.5Packets*PHY)/sec
 ALL Packets RateLimit: [102400] kbps

Press Any Key

Local Rate Limit List: [Trunk]
Egress RateLimit Enable: [No]
Ingress RateLimit Enable: [No]

*>>>> [3]:
```

1. In the LAN Monitor Menu enter 3 to select **Rate Limit Monitor**.
2. Press Enter to see Rate Limit Settings for the next system LAN port.

Notes:

1. **Packet Type Rate Limit (6.5 Packets * PHY)/sec**:

- This threshold is for specific packet type of ingress port. Specific packets over this threshold would be discarded until the next second begins.
- PHY means current bandwidth of Internet.

2. **Packet Type:**

- BC: Broadcast
- MC: Multicast
- UniC: Flooded Unicast
- UnknUniC: Unknown Unicast

4.2.5.3.12 Provision Monitor Menu

Description: View Port Isolation Mode and LAN ports settings.

PATH: Local Terminal→2. Status List→3. LAN Monitor→4. Provision Monitor

```
Provision Monitor (Local)

          1. LAN Global Monitor
          2. LAN Port Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.5.3.13 LAN Global Monitor Command

Description: View Port Isolation Mode.

PATH: Local Terminal→2. Status List→3. LAN Monitor→4. Provision Monitor→1. LAN Global Monitor

```
Provision Monitor (Local)

          1. LAN Global Monitor
          2. LAN Port Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
Local LAN Global Provision:
    Port-to-Port Isolation Enabled: [No]

*>>>>> [1]:
```

Note:

- **Yes**: the port is isolated despite VLAN settings. As result, data of the local side 1st LAN port is transmitted only to remote side 1st LAN port. Same for other LAN ports
- **No**: data is processed according to VLAN settings.

4.2.5.3.14 LAN Port Monitor Command

Description: View LAN ports settings.

PATH: Local Terminal→2. Status List→3. LAN Monitor→4. Provision Monitor→2. LAN Port Monitor

1. In the Provision Monitor Menu enter 2 to select **LAN Port Monitor**.
2. Press Enter to see LAN Port Settings for the next system LAN port.

```
Provision Monitor (Local)

          1. LAN Global Monitor
          2. LAN Port Monitor
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2

Local LAN Port Prov: [LSU1-1]
  < No Equipment >

Press Any Key

Local LAN Port Prov: [LSU1-2]
  < No Equipment >

Press Any Key

Local LAN Port Prov: [LSU2-1]
  < No Equipment >

Press Any Key

Local LAN Port Prov: [LSU2-2]
  < No Equipment >
```

```
Press Any Key

Local LAN Port Prov: [LSU3-1]
  < No Equipment >
                    .
                    .
Press Any Key

Local LAN Port Prov: [LSU4-5]
 AutoNeg Mode: [Enable]
 Copper Advertise 10M-T_Half: [Yes]
 Copper Advertise 10M-T_Full: [Yes]
 Copper Advertise 100M-T_Half: [Yes]
 Copper Advertise 100M-T_Full: [Yes]
 Copper Advertise 1000M-T_Half: [Yes]
 Copper Advertise 1000M-T_Full: [Yes]
 Fiber Advertise 1000M-X_Half: [Yes]
 Fiber Advertise 1000M-X_Full: [Yes]
 Auto Link Down: [Enable]
 Flow Control: [Enable]
 Packet Size: [9000]

Press Any Key

Local LAN Port Prov: [LSU4-6]
 AutoNeg Mode: [Disable]
 Copper Speed: [100M-T_Full]
 Fiber Speed: [1000M-X_Full]
 Auto Link Down: [Enable]
 Flow Control: [Enable]
 Packet Size: [9000]

Press Any Key

Local LAN Port Prov: [Trunk]
 Flow Control: [Disable]

*>>>>> [2]:
```

4.2.5.3.15 Line Interface Monitor Command

Description: View Link Status of LAN interfaces.

PATH: Local Terminal→2. Status List→3. LAN Monitor→5. Line Interface Monitor

```
LAN Monitor (Local)

          1. VLAN Monitor
          2. QoS Monitor
          3. Rate Limit Monitor
          4. Provision Monitor
          5. Line Interface Monitor
          6. Line Statistic Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [4]:5

 [Page:4/4]    < Loc Lan Port Line Status >
================================================================================
                         LSU4-5          LSU4-6
--------------------------------------------------------------------------------
Interface:               Copper          Copper
Link:                    Down            Down
AutoNeg:                 Down            Down
speed:                   10M-Half        100M-Full
Recv Utilization:        0.00%           0.00%
Sent Utilization:        0.00%           0.00%
--------------------------------------------------------------------------------
[Esc]Exit  [n]Previous Page  [m]Next Page
================================================================================

*>>>> [5]:
```

4.2.5.3.16 Line Statistic Monitor Menu

Description: View Link Statistic of LAN interfaces.

PATH: Local Terminal→2. Status List→3. LAN Monitor→6. Line Statistic Monitor

```
Line Statistic Monitor (Local)

          1. Packet Counter
          2. Clear Packet Counter
          3. MAC Table Monitor
          4. Clear MAC Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:
```

4.2.5.3.17 Packet Counter Command

Description: View LAN packet counters.

PATH: Local Terminal→2. Status List→3. LAN Monitor→6. Line Statistic Monitor→1. Packet Counter

```
Line Statistic Monitor (Local)

          1. Packet Counter
          2. Clear Packet Counter
          3. MAC Table Monitor
          4. Clear MAC Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:1
 [Page:4/5]    < Loc Lan Port Packet Counter >
================================================================================
                          LSU4-5          LSU4-6
--------------------------------------------------------------------------------
In_UniCast    :                0               0
In_MultiCast  :                0               0
In_BroadCast  :                0               0
In_Discard    :                0               0
In_CrcErr     :                0               0
In_GoodOctet  :                0               0
In_BadOctet   :                0               0
In_Total      :                0               0

Out_UniCast   :                0               0
Out_MultiCast :                0               0
Out_BroadCast :                0               0
Out_Discard   :                0               0
Out_CrcErr    :                0               0
Out_GoodOctet :                0               0
Out_Total     :                0               0

In_FlwCtlPause:                0               0
In_UnderSize  :                0               0
In_OverSize   :                0               0
In_ErrFrmMAC  :                0               0
In_Jabber     :                0               0
In_Fragment   :                0               0
Out_LateCol   :                0               0
Out_FlwCtlPaus:                0               0
Out_ColEvent  :                0               0
Out_ColMultipl:                0               0
Out_ExceCol   :                0               0
Out_Deferred  :                0               0
--------------------------------------------------------------------------------
[Esc]Exit  [n]Previous Page  [m]Next Page
================================================================================
```

See Next Page for Counters DescriptionTable

Counters DescriptionTable	
Counter Name	Description
In_Unicast	The number of good frames received that have a Unicast destination MAC address.
In_Multicast	The number of good frames received that have a Multicast destination MAC address. Note: This includes neither 802.3 Flow Control messages counted in In_FlwCtlPause nor Broadcast frames counted in In_Broadcasts.
In_Broadcasts	The number of good frames received that have a Broadcast destination MAC address.
In_Discard	The number of discarded packets
In_CrcErr	Total frames received with a CRC error (not counted in In_Fragments and in In_Jabber).
In_GoodOctet	The lower 32-bits of the 64-bit InGoodOctets counter. The sum of octets of all good Ethernet frames received, that are not bad frames.
In_BadOctet	The sum of octets of all bad Ethernet frames received.
In_Total	The number of all frames received
Out_Unicast	The number of frames sent that have a Unicast destination MAC address
Out_Multicast	The number of frames sent that have a Multicast destination MAC address
Out_Broadcasts	The number of frames sent that have a Broadcast destination MAC address
Out_Discard	The number of discarded packets
Out_CrcErr	Total frames sent with a CRC error
Out_GoodOctet	The sum of octets of all good Ethernet frames sent, that are not bad frames.
Out_Total	The number of all frames sent
In_FlwCtlPause	The number of good Flow Control frames received.
In_Undersize	Total frames received with a length of less than 64 octets but with a valid FCS.
In_Oversize	Total frames received with a length of more than MaxSize octets but with a valid FCS.
In_ErrFrmMAC	Total frames received with an RxErr signal from the PHY.
In_Jabber	Total frames received with a length of more than MaxSize octets but with an invalid FCS.
In_Fragment	Total frames received with a length of less than 64 octets and an invalid FCS.
Out_LateCol	The number of late collisions. This counter is applicable in half duplex only
Out_FlwCtlPaus	The number of Flow Control frames sent.
Out_ColEvent	The number of collision events seen by the MAC, not including those counted in Single, Multiple, Excessive or Late counters. This counter is applicable in half duplex only
Out_Col Multiple	The total number of successfully transmitted frames that experienced exactly one collision. This counter is applicable in half-duplex only.
Out_ExceCol	The number frames dropped in the transmit MAC because the frame experience 16 consecutive collisions. The counter is applicable in half-duplex only.
Deferred	The total number of successfully transmitted frames that experienced No collisions but frames are delayed because the medium was busy during the first attempt. This counter is applicable in half-duplex only.

4.2.5.3.18 Clear Packet Counter Command

Description: Clear LAN packet counters.

PATH: Local Terminal→2. Status List→3. LAN Monitor→6. Line Statistic Monitor→2. Clear Packet Counter

```
Line Statistic Monitor (Local)

          1. Packet Counter
          2. Clear Packet Counter
          3. MAC Table Monitor
          4. Clear MAC Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:2
Clear All Ports [No]: Yes

*>>>>> [2]:
```

4.2.5.3.19 MAC Table Monitor Command

Description: View MAC Table of specific LAN port.

PATH: Local Terminal→2. Status List→3. LAN Monitor→6. Line Statistic Monitor→3. MAC Table Monitor

```
Line Statistic Monitor (Local)

          1. Packet Counter
          2. Clear Packet Counter
          3. MAC Table Monitor
          4. Clear MAC Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:3
Enter LAN Port [LSU1-1]:  LSU4-5
< Local Learning MAC Table >  <LSU4-5>
================================================================================
No.       MAC ADDRESS
--------------------------------------------------------------------------------
1         01:02:3E:4D:E5:F6
================================================================================

*>>>>> [3]:
```

4.2.5.3.20 Clear MAC Table Command

Description: Clear LAN packet counters.

PATH: Local Terminal→2. Status List→3. LAN Monitor→6. Line Statistic Monitor→4. Clear MAC Table

```
Line Statistic Monitor (Local)

          1. Packet Counter
          2. Clear Packet Counter
          3. MAC Table Monitor
          4. Clear MAC Table
          0. Return Previous Menu
          ?. Help

*>>>>> [1]:4
Clear All Learned MACs [No]: Yes

*>>>>> [4]:
```

4.2.5.4 V.35 Monitor Menu (Reserved for V.35 Tributary Card (future option))

4.2.5.5 Optical Monitor Menu

Description: View settings and status of aggregation optical interface.

PATH: Local Terminal→2. Status List→5. Optical Monitor

```
Optical Monitor (Local)

          1. Optical Provision Monitor
          2. Optical Measurement Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.5.5.1 Optical Provision Monitor Command

Description: View settings of aggregation optical interface.

PATH: Local Terminal→2. Status List→5. Optical Monitor→1. Optical Provision Monitor

```
Optical Monitor (Local)

          1. Optical Provision Monitor
          2. Optical Measurement Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
Protect Switch: [Auto]
AutoLock Switch: [Enable]
Optical-1 ALS Enable: [Yes]
Optical-2 ALS Enable: [Yes]

*>>>> [1]:
```

4.2.5.5.2 Optical Mesurement Monitor Command

Description: View status of aggregation optical interface.

PATH: Local Terminal→2. Status List→5. Optical Monitor→2. Optical Mesurement Monitor

```
Optical Monitor (Local)

          1. Optical Provision Monitor
          2. Optical Measurement Monitor
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2

Local Measurements Optical-1:
        Temperature :  0.000 (oC)
     Supply Voltage :  0.000 (V)
    TX Bias Current :  0.000 (mA)
           TX Power :  0.000 (dBm)
           RX Power :  0.000 (dBm)

Local Measurements Optical-2:
        Temperature :  0.000 (oC)
     Supply Voltage :  0.000 (V)
    TX Bias Current :  0.000 (mA)
           TX Power :  0.000 (dBm)
           RX Power :  0.000 (dBm)

*>>>> [2]:
```

4.2.5.6 Line Equipment Monitor Comand

Description: View types of inserted tributary cards.

PATH: Local Terminal→2. Status List→6. Line Equipment Monitor

```
Status List (Local)

          1. Service Monitor
          2. E1/T1 Monitor
          3. LAN Monitor
          4. V.35 Monitor
          5. Optical Monitor
          6. Line Equipment Monitor
          7. Misc. Monitor
          0. Return Previous Menu
          ?. Help

*>>> [1]:6
               < Local Equipments >
================================================================================
   Item  Type          Item  Type          Item  Type          Item  Type
--------------------------------------------------------------------------------
 LSU-1  4xET1-RJ    LSU-2  4xET1-RJ     LSU-3  4xET1-RJ     LSU-4  QE1DG
================================================================================

*>>> [6]:
```

Note: The possible values are:

4xET1-RJ	FG-FOM16-Trib4xE1B,V3	Add-on 4x E1 module for FG-FOM16,V3 (max. 4x), 120 ohms RJ48
4xET1-BN	FG-FOM16-Trib4xE1U,V3	Add-on 4x E1 module for FG-FOM16,V3 (max. 4x), 75 ohms BNC
2xGETH	FG-FOM16-Trib2xETH,V3	Add-on 2x Ethernet (10/100/1000Base-T/1000Base-X) module for FG-FOM16,V3 (max. 2x), RJ45 and SFP Cage
QE1DG	FG-FOM16-Trib4xE1B-2xETH,V3	Add-on 2x Ethernet (10/100/1000Base-T), 4x E1 module for FG-FOM16,V3 (max. 2x), 120 ohms RJ48 (E1) and RJ45 (Ethernet)

4.2.6 Maintenance Menu

Description: Alarm Viewing and Clearing.

PATH: Local Terminal→3. Maintanance

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.6.1 Current Alarm Command

Description: View all uncleared Alarms.

PATH: Local Terminal→3. Maintanance→1. Current Alarm

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:1


               < Local Current Alarm >
================================================================================================
  Item   Alarm     Item   Alarm      Item   Alarm      Item   Alarm      Item   Alarm      Item   Alarm
------------------------------------------------------------------------------------------------
 SYSTEM  MJ MN NE
 OPT-1   LOS      OPT-2   LOS
 LSU1-1  LOS      LSU1-2  LOS       LSU1-3  LOS       LSU1-4  LOS
 LSU2-1  LOS      LSU2-2  LOS       LSU2-3  LOS       LSU2-4  LOS
 LSU3-1  LOS      LSU3-2  LOS       LSU3-3  LOS       LSU3-4  LOS
 LSU4-1  LOS      LSU4-2  LOS       LSU4-3  LOS       LSU4-4  LOS       LSU4-5  LPF       LSU4-6  LPF
------------------------------------------------------------------------------
  [Esc]:Exit
==============================================================================

*>>> [1]:
```

4.2.6.2 History Alarm Command

Description: View Alarm History.

PATH: Local Terminal→3. Maintanance→2. History Alarm

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:2
Enter History Alarm [Sys]: Sys

 [Page:1/3]    < History Alarm >   < SYSTEM >
================================================================================
 Record |  Alarm                                    Date/Time
--------------------------------------------------------------------------------
   1 |       MJ MN NE                               2000/01/11,00:01:40
   2 |       -- No Record --
   3 |       -- No Record --
   4 |       -- No Record --
   5 |       -- No Record --
   6 |       -- No Record --
   7 |       -- No Record --
   8 |       -- No Record --
   9 |       -- No Record --
  10 |       -- No Record --
--------------------------------------------------------------------------------
[Esc]Exit  [<]Previous Page  [>]Next Page  [n]Previous CH  [m]Next CH
================================================================================

*>>> [2]:
Enter History Alarm [Sys]: LSU
Enter LSU Number [LSU_1]: LSU_1
Enter Channel Number [CH1]: CH1
```

```
 [Page:1/3]    < History Alarm >   < LSU1-1 >
================================================================================
 Record |  Alarm                                    Date/Time
--------------------------------------------------------------------------------
   1 |          LOS                                 2000/01/11,00:01:40
   2 |       -- No Record --
   3 |       -- No Record --
   4 |       -- No Record --
   5 |       -- No Record --
   6 |       -- No Record --
   7 |       -- No Record --
   8 |       -- No Record --
   9 |       -- No Record --
  10 |       -- No Record --
--------------------------------------------------------------------------------
[Esc]Exit  [<]Previous Page  [>]Next Page  [n]Previous CH  [m]Next CH
================================================================================

*>>> [2]:
Enter History Alarm [Sys]: Optical
Enter Optical Channel [OPT1]: OPT1

 [Page:1/3]    < History Alarm >   < OPT-1 >
================================================================================
 Record |  Alarm                                    Date/Time
--------------------------------------------------------------------------------
   1 |          LOS                                 2000/01/11,00:01:40
   2 |       -- No Record --
   3 |       -- No Record --
   4 |       -- No Record --
   5 |       -- No Record --
   6 |       -- No Record --
   7 |       -- No Record --
   8 |       -- No Record --
   9 |       -- No Record --
  10 |       -- No Record --
--------------------------------------------------------------------------------
[Esc]Exit  [<]Previous Page  [>]Next Page  [n]Previous CH  [m]Next CH
================================================================================

*>>> [2]:
```

4.2.6.3 Clear History Alarm Command

Description: Clear Alarm History.

PATH: Local Terminal→3. Maintanance→3. Clear History Alarm

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:3

Enter Clear Histroy Alarm [No]:   Yes

*>>> [3]:
```

4.2.6.4 P.M. Threshold Alarm Command

Description: View Threshold Overran Status.

PATH: Local Terminal→3. Maintanance→4. P.M. Threshold Alarm

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:4
Enter PM Threshold Alarm [LSU]: Optical


             < P.M. Threshold Alarm >    < OPT-1 >
================================================================================
 Item            |     15-Min      1-Hour       1-Day
--------------------------------------------------------------------------------
 NE-LN-ES        |    Overran     Overran     Overran
 NE-LN-SES       |    Overran     Overran     Overran
 NE-PH-ES        |    Overran     Overran     Overran
 NE-PH-SES       |     Normal      Normal      Normal
 NE-PH-UAS       |    Overran     Overran     Overran
--------------------------------------------------------------------------------
 FE-LN-ES        |     Normal      Normal      Normal
 FE-LN-SES       |     Normal      Normal      Normal
 FE-PH-ES        |     Normal      Normal      Normal
 FE-PH-SES       |     Normal      Normal      Normal
 FE-PH-UAS       |     Normal      Normal      Normal
--------------------------------------------------------------------------------
 [Esc]Previous Menu  [n]Previous CH  [m]Next CH
================================================================================

*>>> [4]:
Enter PM Threshold Alarm [LSU]: LSU


             < P.M. Threshold Alarm >    < LSU1-1 >
================================================================================
 Item            |     15-Min      1-Hour       1-Day
--------------------------------------------------------------------------------
 NE-LN-ES        |     Normal      Normal      Normal
 NE-LN-SES       |     Normal     Overran     Overran
 NE-LN-CV        |     Normal      Normal      Normal
 NE-PH-ES        |     Normal      Normal      Normal
 NE-PH-SES       |     Normal      Normal      Normal
 NE-PH-UAS       |     Normal     Overran     Overran
 NE-PH-CV        |     Normal      Normal      Normal
 NE-PH-CRC       |     Normal      Normal      Normal
--------------------------------------------------------------------------------
 FE-LN-ES        |     Normal      Normal      Normal
 FE-LN-SES       |     Normal      Normal      Normal
 FE-LN-CV        |     Normal      Normal      Normal
 FE-PH-ES        |     Normal      Normal      Normal
 FE-PH-SES       |     Normal      Normal      Normal
 FE-PH-UAS       |     Normal      Normal      Normal
 FE-PH-CV        |     Normal      Normal      Normal
 FE-PH-CRC       |     Normal      Normal      Normal
--------------------------------------------------------------------------------
 [Esc]Previous Menu  [n]Previous CH  [m]Next CH
================================================================================

*>>> [4]:
```

4.2.6.5 LAN Packets Threshold Alarm Command

Description: View LAN Packets Threshold Overran Status.

PATH: Local Terminal→3. Maintanance→5. LAN Packets Threshold Alarm

```
Maintenance (Local)

          1. Current Alarm
          2. History Alarm
          3. Clear History Alarm
          4. P.M. Threshold Alarm
          5. Lan Packets Threshold Alarm
          0. Return Previous Menu
          ?. Help

*>>> [1]:5


               < Local Lan Packet Threshold Alarm >
================================================================================
LSU1-1  LSU1-2  LSU2-1  LSU2-2  LSU3-1  LSU3-2  LSU4-1  LSU4-2  Trunk
--------------------------------------------------------------------------------
------  ------  ------  ------  ------  ------  Normal  Normal  Normal
--------------------------------------------------------------------------------
  [Esc]:Exit
================================================================================

*>>> [5]:
```

4.2.7 Performance Menu

Description: Viewing and Managing of Perfomance Data.

PATH: Local Terminal→4. Performance

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.7.1 Get and Clear 15Min PM Command

Description: View or Clear of 15 Minutes Interval Perfomance Data.

PATH: Local Terminal→4. Performance→1. Get and Clear 15Min PM

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:1
Enter 15Min P.M.-[LSU_1]: LSU_1
Enter Channel Number [CH1]: CH1
Get 15Min P.M.-[Line-Nearend]: Line-Nearend


 [Page:1/7]    < P.M. QUART LINE NEAR >    < LSU1-1 >
================================================================================
 QUART |          ES       SES        CV
--------------------------------------------------------------------------------
  0 |              0       379         0
  1 |              0       900         0
  2 |              0       900         0
  3 |              0       900         0
  4 |              0       900         0
  5 |              0       900         0
  6 |              0         0         0
  7 |              0         0         0
  8 |              0         0         0
  9 |              0         0         0
 10 |              0         0         0
 11 |              0         0         0
 12 |              0         0         0
 13 |              0         0         0
 14 |              0         0         0
 15 |              0         0         0
--------------------------------------------------------------------------------
 [Esc]Previous Menu  [<]Previous Page  [>]Next Page  [n]Previous CH  [m]Next CH
 [C]Clear
================================================================================

*>>> [1]:
```

Hot Key definition:

[Esc]:	-	Escape the present page.
[<]:	-	Enter previous page
[>]:	-	Enter the Next performance monitor page
[n]:	-	Display data of previous channel
[m]:	-	Display data of next channel
[Enter]:	-	Return the page1 of P.M./Renewal
[C]	-	Clear current 15min or previous 15min

4.2.7.2 Get and Clear 1Day PM Command

Description: View or Clear of 1 Day Interval Perfomance Data.

PATH: Local Terminal→4. Performance→2. Get and Clear 1Day PM

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:2
Enter 1Day P.M.-[LSU_1]: LSU_1
Enter Channel Number [CH1]: CH1
Get 1Day P.M.-[Line-Nearend]: Line-Nearend


          < P.M. 1Day LINE NEAR >    < LSU1-1 >
================================================================================
 DAY |            ES       SES        CV
--------------------------------------------------------------------------------
  0 |              0      6036         0
  1 |              0         0         0
  2 |              0         0         0
  3 |              0         0         0
  4 |              0         0         0
  5 |              0         0         0
  6 |              0         0         0
  7 |              0         0         0
--------------------------------------------------------------------------------
 [Esc]Previous Menu  [n]Previous CH  [m]Next CH  [C]Clear
================================================================================

*>>> [2]:
```

Hot Key definition:

[Esc]:	-	Escape the present page.
[<]:	-	Enter previous page
[>]:	-	Enter the Next performance monitor page
[n]:	-	Display data of previous channel
[m]:	-	Display data of next channel
[Enter]:	-	Return the page1 of P.M./Renewal
[C]	-	Clear current 15min or previous 15min

4.2.7.3 Clear All PM Command

Description: Clear All Perfomance Data.

PATH: Local Terminal→4. Performance→3. Clear All PM

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:3

Sure to Clear All P.M. [No]:  Yes

*>>> [3]:
```

4.2.7.4 Get Current PM Command

Description: Get Current Perfomance Data.

PATH: Local Terminal→4. Performance→4. Get Current PM

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:4
Enter Current PM [LSU]: LSU


               < P.M. CURRENT >    < LSU1-1 >
================================================================================
 Item           |     15-Min      1-Hour       1-Day
--------------------------------------------------------------------------------
 NE-LN-ES       |          0           0           0
 NE-LN-SES      |        279         279         279
 NE-LN-CV       |          0           0           0
 NE-PH-ES       |          0           0           0
 NE-PH-SES      |          0           0           0
 NE-PH-UAS      |        279         279         279
 NE-PH-CV       |          0           0           0
 NE-PH-CRC      |          0           0           0
--------------------------------------------------------------------------------
 FE-LN-ES       |          0           0           0
 FE-LN-SES      |          0           0           0
 FE-LN-CV       |          0           0           0
 FE-PH-ES       |          0           0           0
 FE-PH-SES      |          0           0           0
 FE-PH-UAS      |          0           0           0
 FE-PH-CV       |          0           0           0
 FE-PH-CRC      |          0           0           0
--------------------------------------------------------------------------------
 [Esc]Previous Menu  [n]Previous CH  [m]Next CH
================================================================================

*>>> [4]:
```

4.2.7.5 P.M. Threshold Setting Command

Description: Set Threshold Values.

PATH: Local Terminal→4. Performance→5. P.M. Threshold Setting

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:5
Enter PM Threshold Setting [LSU]: LSU
Select LSU Slot [LSU_1]: LSU_1
Select LSU Channel [CH1]: CH1
Select Time Base [15-Min]: 15-Min
Enter Threshold of NE-LN-ES   [100]:1
Enter Threshold of NE-LN-SES  [100]:1
Enter Threshold of NE-LN-CV   [100]:5
Enter Threshold of NE-PH-ES   [100]:1
Enter Threshold of NE-PH-SES  [100]:1
Enter Threshold of NE-PH-UAS  [100]:1
Enter Threshold of NE-PH-CV   [100]:5
Enter Threshold of NE-PH-CRC  [100]:1
Enter Threshold of FE-LN-ES   [100]:1
Enter Threshold of FE-LN-SES  [100]:1
Enter Threshold of FE-LN-CV   [100]:5
Enter Threshold of FE-PH-ES   [100]:1
Enter Threshold of FE-PH-SES  [100]:1
Enter Threshold of FE-PH-UAS  [100]:1
Enter Threshold of FE-PH-CV   [100]:5
Enter Threshold of FE-PH-CRC  [100]:1

*>>> [5]:
```

4.2.7.6 P.M. Threshold Monitor Command

Description: View Threshold Values.

PATH: Local Terminal→4. Performance→6. P.M. Threshold Monitor

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:6
Enter PM Threshold Setting Monitor [LSU]: LSU


             < P.M. Threshold Monitor >    < LSU1-1 >
================================================================================
 Item           |     15-Min      1-Hour       1-Day
```

```
-------------------------------------------------------------------------------
 NE-LN-ES        |          1          100          100
 NE-LN-SES       |          1          100          100
 NE-LN-CV        |          5          100          100
 NE-PH-ES        |          1          100          100
 NE-PH-SES       |          1          100          100
 NE-PH-UAS       |          1          100          100
 NE-PH-CV        |          5          100          100
 NE-PH-CRC       |          1          100          100
-------------------------------------------------------------------------------
 FE-LN-ES        |          1          100          100
 FE-LN-SES       |          1          100          100
 FE-LN-CV        |          5          100          100
 FE-PH-ES        |          1          100          100
 FE-PH-SES       |          1          100          100
 FE-PH-UAS       |          1          100          100
 FE-PH-CV        |          5          100          100
 FE-PH-CRC       |          1          100          100
-------------------------------------------------------------------------------
 [Esc]Previous Menu  [n]Previous CH  [m]Next CH
===============================================================================

*>>> [6]:
```

4.2.7.7 P.M. Threshold Reset Command

Description: Set Threshold Default Values.

PATH: Local Terminal→4. Performance→7. P.M. Threshold Reset

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:7

Reset All P.M. Threshold to Default [No]:  Yes

*>>> [7]:
```

4.2.7.8 Lan Packet Threshold Setting Command

Description: Set Minimum Threshold for Recieved LAN Packets.

PATH: Local Terminal→4. Performance→8. Lan Packet Threshold Setting

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:8
Select Interface [LAN_LSU]: LAN_LSU
Select LSU [LSU_4]: LSU_4
Select Channel [LSU4-5]: LSU4-5
  Select PKTs Period Base [1] min: 1
  Enter Floor Threshold of PKTs [10]: 100
Select Channel [LSU4-6]: LSU4-6
  Select PKTs Period Base [1] min: 1
  Enter Floor Threshold of PKTs [10]: 100

*>>> [8]:
```

Note: **Floor Threshold of PKTs**: Valid range: 1-65535. "0" means **Disable** Threshold.

4.2.7.9 Lan Packet Threshold Monitor Command

Description: View Minimum Threshold Values for Recieved LAN Packets.

PATH: Local Terminal→4. Performance→9. Lan Packet Monitor

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:9

               < Local Lan Packet Threshold Monitor >
================================================================================
       | TimeBase  Packets
--------------------------------------------------------------------------------
LSU1-1 | < No Equipment >
LSU1-2 | < No Equipment >
LSU2-1 | < No Equipment >
LSU2-2 | < No Equipment >
LSU3-1 | < No Equipment >
LSU3-2 | < No Equipment >
LSU4-5 |        1      100
LSU4-6 |        1      100
 Trunk |        1        0

--------------------------------------------------------------------------------
================================================================================

*>>> [9]:
```

4.2.7.10 Lan Packet Threshold Reset Command

Description: Set Minimum Threshold Values for Recieved LAN Packets to Default Values.

PATH: Local Terminal→4. Performance→10. Lan Packet Reset

```
Performance (Local)

          1. Get and Clear 15Min P.M.
          2. Get and Clear 1Day P.M.
          3. Clear All P.M.
          4. Get Current P.M.
          5. P.M. Threshold Setting
          6. P.M. Threshold Monitor
          7. P.M. Threshold Reset
          8. Lan Packet Threshold Setting
          9. Lan Packet Threshold Monitor
         10. Lan Packet Threshold Reset
          0. Return Previous Menu
          ?. Help

*>>> [1]:10

Reset All Lan Packets Threshold to Default [No]:  Yes

*>>> [10]:
```

4.2.8 Test & Diagnose Menu

Description: Perform HW tests, BER Testing and Test Loopbacks.

PATH: Local Terminal→5. Test & Diagnose

```
Test & Diagnose (Local)

          1. LED Test
          2. Bit Error Rate Test
          3. Loopback Test
          4. Optical ALS Test
          5. Optical Laser Power Test
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.8.1 LED Test Command

Description: Run LED Test Procedure.

PATH: Local Terminal→5. Test & Diagnose→1. LED Test

```
Test & Diagnose (Local)

          1. LED Test
          2. Bit Error Rate Test
          3. Loopback Test
          4. Optical ALS Test
          5. Optical Laser Power Test
          0. Return Previous Menu
          ?. Help

*>>> [1]:1

Enter LED Test [No]:   Yes

  LED Test Start ...

*>>> [1]:
```

4.2.8.2 Bit Error Rate Test Menu

Description: Perform BER Testing.

PATH: Local Terminal→5. Test & Diagnose→2. Bit Error Rate Test

```
Bit Error Rate Test (Local)

          1. Pattern Test
          2. Test Result
          0. Return Previous Menu
          ?. Help

*>>>> [1]:
```

4.2.8.2.1 Pattern Test Command

Description: Start/Stop BER Testing. Set Test Pattern.

PATH: Local Terminal→5. Test & Diagnose→2. Bit Error Rate Test→1. Pattern Test

```
Bit Error Rate Test (Local)

          1. Pattern Test
          2. Test Result
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
Select Test Card [LSU_1]: LSU_1
Select Test Channel [CH1]: CH1
Select Test Pattern [PRBS9]:  PRBS9
  Start Running Test: LSU1-CH1 [PRBS9]

*>>>> [1]:
```

Notes:

1. The Valid Options of “Test Pattern” are:
   - “0000”, “1000” , “1010”, “1100”, “PRBS9”, “PRBS11”, “PRBS15” “PRBS23”.
2. Before starting any testing, the previous testing needs to be stoped:

```
Bit Error Rate Test (Local)

          1. Pattern Test
          2. Test Result
          0. Return Previous Menu
          ?. Help

*>>>> [1]:1
LSU1-CH1 [PRBS9] Testing, STOP TEST? [No]: Yes
Another TEST? [No]: No

*>>>> [1]:
```

4.2.8.2.2 Test Result Command

Description: Start/Stop BER Testing. Set Test Pattern.

PATH: Local Terminal→5. Test & Diagnose→2. Bit Error Rate Test→2. Test Result

```
Bit Error Rate Test (Local)

          1. Pattern Test
          2. Test Result
          0. Return Previous Menu
          ?. Help

*>>>> [1]:2


               ET1 Under Testing: LSU1-CH1 [PRBS9]
======================================================================
      Start Time: 2000/01/12,18:54:20
     Elapse Time: 48
      Error Bits: 0
  Bit Error Rate: 1.0e-06
    Alarm Status: No Alarm
    Alarm Stored: No
----------------------------------------------------------------------
  [Esc]:Exit  [I]:Insert Error  [Z]:Restart Test  [C]:Clear
======================================================================

*>>>> [2]:
```

Note: Hot Key Definition:

[**Enter**]: Refresh outcomes (Elapse Time) about BER Testing
[**Esc**]: Exit the setting
[**i**]: Insert a bit error
[**z**]: Restart the Traffic test

4.2.8.3 Loopback Test Command

Description: Set/Remove Loopbacks.

PATH: Local Terminal→5. Test & Diagnose→3. Loopback Test

```
Test & Diagnose (Local)

          1. LED Test
          2. Bit Error Rate Test
          3. Loopback Test
          4. Optical ALS Test
          5. Optical Laser Power Test
          0. Return Previous Menu
          ?. Help

*>>> [2]:3

Loopback Test Card [LSU1]:  LSU1
Loopback Test Channel [CH1]: CH1
Loopback Test Action [None]: Local

*>>> [3]:
```

Note: Loopback Test Action:

- Valid options are Local, Remote, and None.
- **None**: Cancel the present testing.

4.2.8.4 Optical ALS Test Command

Description: Perform ALS (Automatic Laser Shutdown) Testing.

PATH: Local Terminal→5. Test & Diagnose→4. Optical ALS Test

```
Test & Diagnose (Local)

          1. LED Test
          2. Bit Error Rate Test
          3. Loopback Test
          4. Optical ALS Test
          5. Optical Laser Power Test
          0. Return Previous Menu
          ?. Help

*>>> [1]:4

Select Optical Channel [OPT1]:  OPT1
Enter Optical-1 ALS Test [2 seconds]: 2 seconds

*>>> [4]:
```

Note: Optical-1 ALS Test:

- **2 seconds**: Perform 2 seconds ALS test.
- **90 seconds**: Perform 90 seconds ALS test.

4.2.8.5 Optical Laser Power Test Command

Description: View Optical Channel Status.

PATH: Local Terminal→5. Test & Diagnose→5. Optical Laser Power Test

```
Test & Diagnose (Local)

          1. LED Test
          2. Bit Error Rate Test
          3. Loopback Test
          4. Optical ALS Test
          5. Optical Laser Power Test
          0. Return Previous Menu
          ?. Help

*>>> [1]:5
Optical Laser Power Test:
  Optical-1 Laser: No Power
  Optical-2 Laser: No Power

*>>> [5]:
```

Note: Optical-1/2 Laser:

- **Received**: It means there is optical signal has been transmitted
- **No Power**: It means there is no optical signal to be transmitted

4.2.9 Administration Menu

Description: Perform Following Functions:

- **System Network Restart**: Restart network configuration of the system.
- **System Reset to Default & Reboot**: Force system configuration to default and reboot the device.
- **Hardware Reboot**: Reboot the device.
- **System Setting**: Set system date, time, name, contact person info and device location.
- **System Information**: View device hardware and firmware versions, current system date/time, contact information and device location.
- **Network Setting**: Set network configuration of the device.
- **Network Information**: View network settings.
- **User Account Setting:** Manage User Accounts.
- **System Software Upgrade**: Firmware upgrade of local/remote device.

PATH: Local Terminal→6. Administration

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:
```

4.2.9.1 System Network Restart Command

Description: Apply Network Configuration Changes

PATH: Local Terminal→6. Administration→1. System Network Restart

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:1
Re-configure System Settings [No]:  Yes

*>>> [1]:
```

See next page for the Note!

Note: The following Network Settings changes must be followed by System Network Restart:

- Host IP address
- Host gateway IP address
- Host sub-net mask
- SNMP trap IP address
- SNMP trap community
- SNMP port number
- SNMP trap port number
- SNMP SET/GET community

4.2.9.2 System Reset to Default & Reboot Command

Description: Apply Default Configuration and Restart the system.

PATH: Local Terminal→6. Administration→2. System Reset to Default & Reboot

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:2
Reset System to Default and Reboot [No]:  Yes
System Restarting...
```

4.2.9.3 Hardware Reboot Command

Description: Reboote the system.

PATH: Local Terminal→6. Administration→3. Hardware Reboot

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:3
Reboot? [No]:  Yes
System Restarting...
```

4.2.9.4 System Setting Command

Description: Set system date, time, name, contact person info and device location.

PATH: Local Terminal→6. Administration→4. System Setting

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:4
Enter System Date [2014/11/26]:  2014/11/26
Enter System Time [11:16:53]:  11:17:00
Enter System Name [FOM16-GE]:FOM16-GE
Enter System Contact [LAB]:LAB
Enter System Location [Urdorf]:Urdorf

*>>> [4]:
```

4.2.9.5 System Information Command

Description: View device hardware and firmware versions, current system date/time, contact information and device location.

PATH: Local Terminal→6. Administration→5. System Information

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:5

Local System Information:

  System Time:                2014/11/26 11:19:53
  Kernel Version:             2.6.15-716
  Software Version:           1.0.8-716
  Hardware Version:           6.23
  System Description:         FOM-GE-J
  System Name:                FOM16-GE
  System Contact:             LAB
  System Location:            Urdorf

*>>> [5]:
```

4.2.9.6 Network Setting Command

Description: Set network configuration of the device.

PATH: Local Terminal→6. Administration→6. Network Setting

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:6

< Local Network Configuration >
Enter IP Address [10.1.1.15]: 10.1.1.14
Enter Subnet Mask [255.255.255.0]: 255.255.255.0
Enter Gateway Address [10.1.1.249]: 10.1.1.249
Enter TRAP1 Address [10.15.4.1]: 10.15.4.1
Enter TRAP2 Address [10.15.1.1]: 0.0.0.0
Enter TRAP3 Address [10.15.5.1]: 0.0.0.0
Enter TRAP4 Address [0.0.0.0]:
Enter TRAP4 Community [Trap]:
Enter TRAP5 Address [0.0.0.0]:
Enter TRAP5 Community [Trap]:
Enter TRAP6 Address [0.0.0.0]:
Enter TRAP6 Community [Trap]:
Enter TRAP7 Address [0.0.0.0]:
Enter TRAP7 Community [Trap]:
Enter TRAP8 Address [0.0.0.0]:
Enter TRAP8 Community [Trap]:
Enter SNMP Port Number [161]:
Enter Trap Port Number [163]:
Enter SNMP SET Community [private]:
Enter SNMP READ Community [public]:
Restart Network [No]:  Yes

*>>> [6]:
```

4.2.9.7 Network Information Command

Description: View network configuration of the device.

PATH: Local Terminal→6. Administration→7. Network Information

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:7

< Local Network Information >
  IP Address:       10.1.1.14
```

```
  MAC Address:       00.0A.BE.01.97.1B
  Subnet Mask:       255.255.255.0
  Gateway Address:   10.1.1.249
  TRAP1 Address:     10.15.4.1
  TRAP2 Address:     0.0.0.0
  TRAP3 Address:     0.0.0.0
  TRAP4 Address:     0.0.0.0
  TRAP4 Community:   Trap
  TRAP5 Address:     0.0.0.0
  TRAP5 Community:   Trap
  TRAP6 Address:     0.0.0.0
  TRAP6 Community:   Trap
  TRAP7 Address:     0.0.0.0
  TRAP7 Community:   Trap
  TRAP8 Address:     0.0.0.0
  TRAP8 Community:   Trap
  SNMP Port:         161
  Trap Port:         163
  SET Community:     private
  READ Community:    public

*>>> [7]:
```

4.2.9.8 User Account Setting Command

Description: Manage User Accounts: Add, Modify, Delete and List user account via this command. Once a new **User Account** has been **added**, it is necessary to login by correct **User Name/User Password** according to this setting each logging in. Five sets of User Account are available.

PATH: Local Terminal→6. Administration→8. User Account Setting

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:8

Enter Action [Add]:  Add

Enter User Name: Admin
Enter User Password: *****
Retype User Password: *****

*>>> [8]:
```

4.2.9.9 System Software Upgrade Command

Description: Perform SW update of Local or Remote Unit via FTP or TFTP.

PATH: Local Terminal→6. Administration→9. System Software Upgrade

```
Administration (Local)

          1. System Network Restart
          2. System Reset to Default & Reboot
          3. Hardware Reboot
          4. System Setting
          5. System Information
          6. Network Setting
          7. Network Information
          8. User Account Setting
          9. System Software Upgrade
          0. Return Previous Menu
          ?. Help

*>>> [1]:9

Enter Protocol [FTP]:  FTP
Enter Host IP Address : 10.0.2.3
Enter Image File Name: u600p_ufs_17m.img
Enter User Name: flexdsl
Enter User Password: ****
Enter Port Number: 21
Upgrade REMOTE site [No]: Yes
Upgrade LOCAL site [No]: Yes
Start to Download [Yes]: Yes
    < Transfer Image Waiting...>
    < Remote Download Image Waiting...>
```

1. In the Administration Menu enter 9 to select **System Software Upgrade**. After that system will cycle you through configuring procedure.
2. Choose Protocol: use **]** or **[** keys to select **FTP** or **TFTP**.
3. Enter the Host IP Address of FTP/TFTP.
4. Specify the file name of new firmware.
5. Specify available user name for accessing FTP/TFTP.
6. Specify available password for accessing FTP/TFTP.
7. Specify available port number of FTP/TFTP (usually 21).
8. Confirm SW upgrade (choose **Yes** or **No**) for Remote device.
9. Confirm SW upgrade (choose **Yes** or **No**) for Local device.
10. Confirm above settings and start downloading process (choose **Yes**). Press Enter key to execute the command.

5 SIMPLE STEPS THAT MAKE SYSTEM RUNNING

After successful installation, connection and powering on the device (see Chater 7.1) you should perform several simple steps to make the system running. The system has all E1/T1 ports as well as Ethernet enabled and configured for transparent data transmission. So, all you need to do is to switch off ports you wouldn't use, make extra configuration for Ethernet (if needed).
All system management could be done via Front Panel (see Chapter 4.1) or via Craft Interface (see Chapter 4.2).

1. Set-Up IP address of each device. Go to Chapter 4.1.7.2 or to 4.2.9.6. After setting up the IP address don't forget to apply changes by using NETAPPLY (see Chapter 4.1.7.3.1) or Net Restart Command (see Chapter 4.2.9.1).
2. Now you should have access by Telnet. Please use Out Band Ethernet Management Port, see Chapter 7.2.2.
3. Disable all unused ports. You need to do it to disable all alarms that were caused by unused ports. Go to Chapter 4.1.2.1 for disabling Low-Speed cards, channels and unused Fiber SFP port. If you are using CLI you should read Chapter 4.2.4.1
4. At that point you shouldn't see any alarms. Otherwise go to Chapter 4.1.4.1 or 4.2.6.1.
5. If you would like to have more then simple bridge mode from Ethernet transmission, please go to Chapter 4.1.2.3 or 4.2.4.3 for deep Ethernet configuration.

6 SERVICE INSTRUCTIONS

- Before unpacking, check if the packing box is intact and if the equipment model is equal to that specified in the purchase order/contract.
- Before running the device, read carefully the present technical description and service instructions. Take care about all Warnings inside this manual! Remember that the guarantee and the free-of-charge repair will not be granted under the following conditions:
  a) If the device or any of its parts fails due to improper installation, testing or operation.
  b) damages resulting from:
  1) Misuse and improper installation, including but not limited to:
  - not to use the product for its normal purpose or in accordance with the all the instructions for the proper use and maintenance,
  - installation and use of the product in a conflicting way with the actual technical or safety standards in the country where it is installed, as well as the connection of the device to any other power supply source, that fulfil the required technical or safety standards.
  2) Maintenance or repair performed by unauthorized service centers and dealers.
  3) Operation of a malfunctioning device.
  4) Accidents, lightning strokes, flooding, water, fire, improper ventilation, voltage drops, ingress of moisture and insects inside the equipment as well as other reasons, for example, electromagnetic and other interferences which are beyond the supplier control and do not correspond to specified technical conditions.
  5) Transportation except when the shipping is performed by an authorized dealer or a service center.
  7) Defects of the system into which this product is included.
- If the equipment should be powered from a primary DC source (36 … 72 V), please us it with the grounded “+”.
- Environment requirements: Temperature: from 0 to +60 °C; Relative air humidity: from 5% to 90% at +25 °C. Exceptions are units that are specified from the manufacturer to differ from these requirements, because there is a special application.
- It is strictly prohibited:
  a) to alter, delete, remove or make illegible the serial number of the device.
  b) to adapt, adjust and change the equipment in order to improve it or extend its applications without the prior written consent of the manufacturer.
  c) to alter or to adjust the equipment without the consent of the manufacturer.

7 APPENDICES

7.1 Equipment installation

7.1.1 Site Preparation

Prior to installing the FG-FOM16,V3, evaluate the installation site first. We recommend that the FG-FOM16,V3 equipment will be installed in a restricted area, such as telecommunication equipment room, telecommunication street cabinets, or offices.
Make sure the site can provide DC (-48V or -60V) power and has good grounding. The power consumption of the FG-FOM16,V3 is 30W nominally. The FG-FOM16,V3 can also be powered by AC.

Warning! It is important to ground telecommunication equipment properly. If not grounded the low performance such as high bit error rate or even malfunction could occurre.

The FG-FOM16,V3 is designed to operate reliably at ambient temperature range of 0 to 60°C. Airflow around the equipment, particularly rack-mounted unit, must be sufficient to maintain proper operating temperatures. The need for additional spacing between adjacent equipments or the use of heat buffers should be evaluated.
equipment.

Warning! It is important to reserve 1U space between two units to be mounted in the same rack due to air ventilation and cooling. Without good ventilation the unit can be overheated.

7.1.2 Installation to 19” or 23” Rack

The FG-FOM16,V3 is equipped with mounting ears. It is possible to mount the unit in 19” or 23” rack by turning the mounting ears by 90° angle. It is also possible to mount the unit in two different horizontal positions closer and further from the rack front surface. Installation examples are shown below:

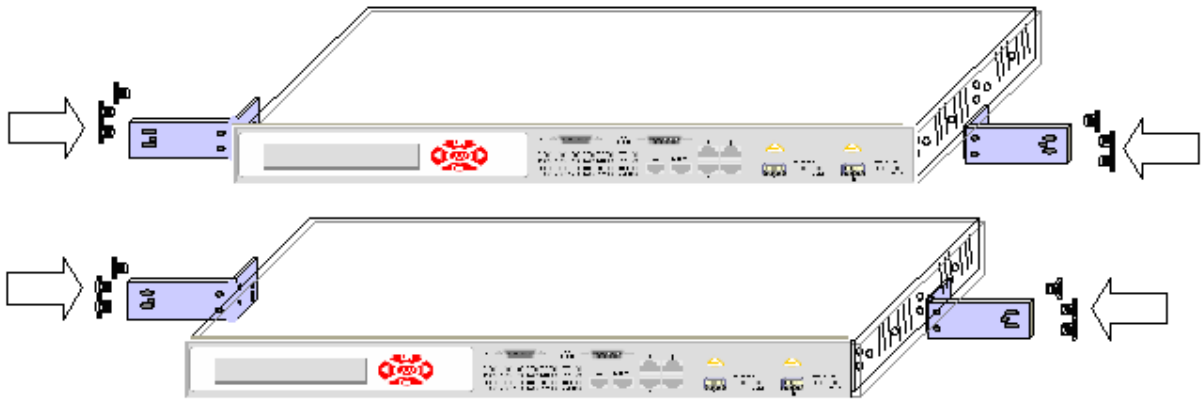


Figure 7.1 Mounting ears position for 23” Rack

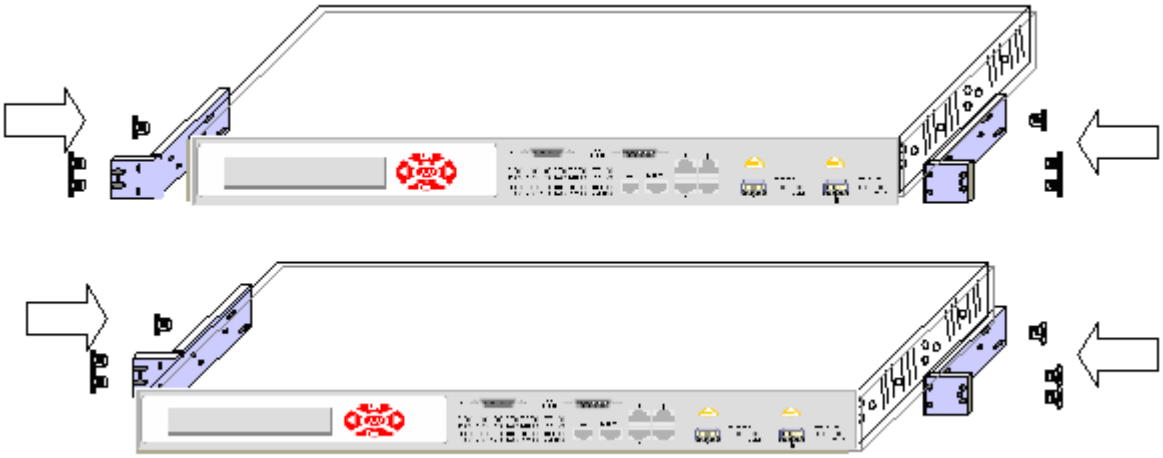


Figure 7.2 Mounting ears position for 19” Rack

7.1.3 Installation on the wall

The FG-FOM16,V3 can also be installed on a wall:

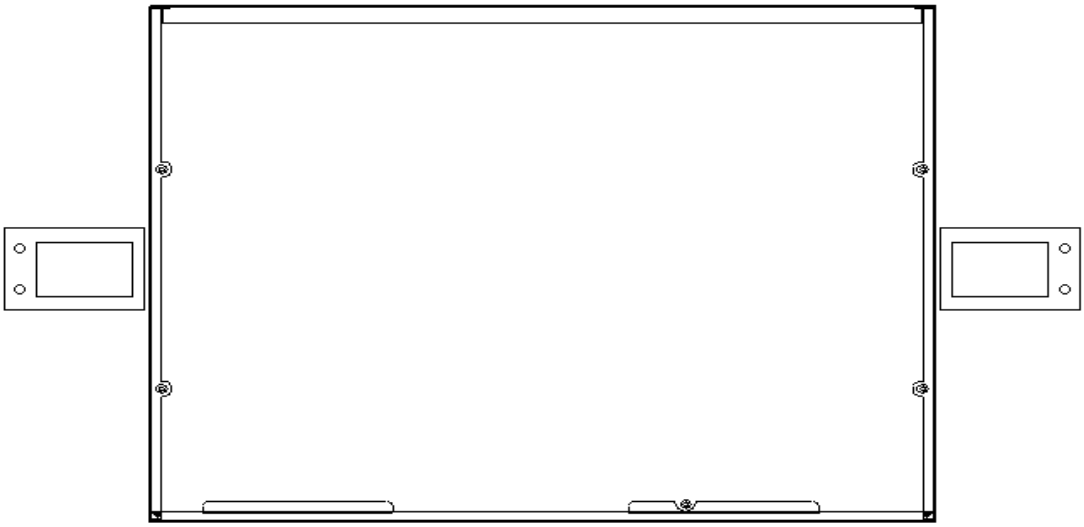
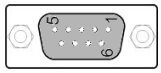
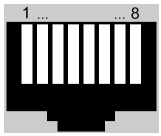
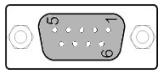
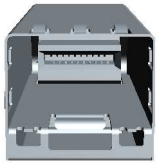
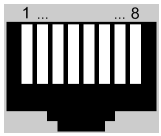
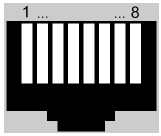
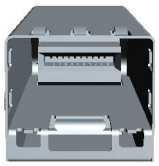
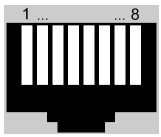
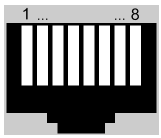


Figure 7.3 Wall mounting ears position

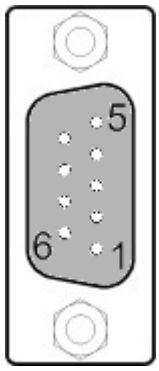
7.2 Connection to the Device (Connector Decription)

The FG-FOM16,V3 unit has the following connectors:

Iteml	Interface	Connector Type	Connector Overview
Front Panel	Supervisory (CIT)	DB-9 (female)	
	NMS SNMP	RJ-45 (female)	
	Alarm Contact	DB-9 (female)	
	Optical (OUT IN)	SFP cage	
Rear Panel (Base Unit)	DC Power (DC IN)	Wire Terminal	
	AC Power (AC IN)	AC Plug	
FG-FOM16-Trib4xE1B,V3	E1 (120Ω)	RJ-48C (female)	
FG-FOM16-Trib4xE1U,V3	E1 (75Ω)	BNC	
FG-FOM16-Trib2xETH,V3	10/100/1000Base-T	RJ-45 (female)	
	1000Base-X	SFP cage	
FG-FOM16-Trib4xE1B-2xETH,V3	E1 (120Ω)	RJ-48C (female)	
	10/100/1000Base-T	RJ-45 (female)	

7.2.1 Supervisory Port (CIT)

Type – DB-9 (D-Sub, female), 9 pins.



Pin No.	Signal	Description
1	NC	Not Connected
2	TXD	Transmit data (to the modem)
3	RXD	Receive data (from the modem)
4	NC	Not Connected
5	SGND	Signal ground
6	NC	Not Connected
7	NC	Not Connected
8	NC	Not Connected
9	NC	Not Connected

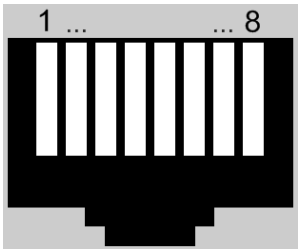
The FG-FOM16,V3 provides one front-panel RS232 supervisory port for the connection to a terminal or a terminal-emulating PC. The supervisory port is female (plug) DB9 connector. This port is DCE. To implement a supervisory connection, connect the appropriate cable between the supervisory port and the terminal or a PC.

You must make the following settings in your favourite Terminal Emulation software:

Parameter	*Value*
Data Rate:	115200
Data bits:	8
Stopbits:	1
Flow Control:	Xon /Xoff

7.2.2 Out Band Ethernet Management Port (NMS)

Type – RJ-45 (female), 8 pins.

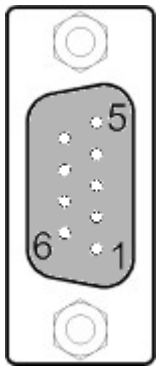


Pin No.	Description
1	Tx+ (transmit data)
2	Tx- (transmit data)
3	Rx+ (receive data)
4	NC (not used)
5	NC (not used)
6	Rx- (receive data)
7	NC (not used)
8	NC (not used)

The Ethernet port is a standard 10/100 Base-T female (socket) RJ-45 connector. The cable between the FG-FOM16,V3 and a 10/100 Base-T Ethernet hub/switch should be UTP category 3 for 10Mb/s and UTP category 5 for 100Mb/s operations (Purchased separately).To connect FG-FOM16,V3 to the Ethernet LAN, install the appropriate cable between the FG-FOM16,V3 Ethernet port and the LAN hub/switch.

7.2.3 Alarm Relay Contacts

Type – DB-9 (D-Sub, female), 9 pins.

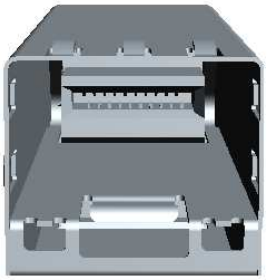


Pin No.	Signal	Description
1	FGNG:	Frame Ground
2	NC	Not Connected
3	NC	Not Connected
4	MNA:	Audible Minor alarm
5	MJA:	Audible Major alarm
6	MJV:	Visual Major alarm
7	ALMCOM:	Common point
8	NC	Not Connected
9	MNV:	Visual Minor alarm

The FG-FOM16,V3 provides audible and visual alarm contacts that use relay contacts to active a circuit loop between each alarm contact point and the common point in case of an alarm.

7.2.4 Fiber Optic Connector

Type –SFP cage



Pin No.	Signal	Description
1,17,20	TGND	transmit ground
2	TxFault	Transmit fault indication
3	TxDisable	transmit disable
4	MOD-DEF(2)	SDA line (I2C)
5	MOD-DEF(1)	SCL line (I2C)
6	MOD-DEF(0)	Module absent
7	RateSelect	rate select
8	LOS	Loss of signal indication
9,10,11,15	RGND	receive ground
12	RD-	receive data -
13	RD+	receive data +
15	RX_VCC	receive VCC
16	TX_VCC	transmit VCC
18	TD+	transmit data +
19	TD-	transmit data -

The optical SFP fiber plug-in consists of an LC connector. This interface conforms to the FG-FOM16,V3 interface standards for transmission equipment, and should be connected only to equipment which is designed to the same interface standard.

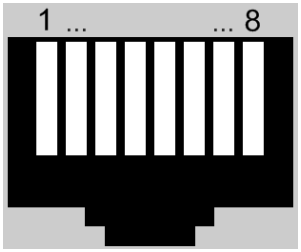
Figure 7.4 SFP Optical Module with LC Connector

Connectors between the optical port and the ODF (Optical Distributor Frame) are made with a customer-provided duplex fiber optic cable. To connect the FG-FOM16,V3 to the ODF, perform the following steps:

1. Obtain the required duplex fiber optic cable with an appropriate connector on each end. For a typical installation, one duplex cable is required per port.
2. Install the duplex fiber optic cable between the FG-FOM16,V3 LC connector and the ODF.
3. During installation, it is important to limit the bend radius on the cable to not less than 150mm.

7.2.5 E1 (120Ω) connector

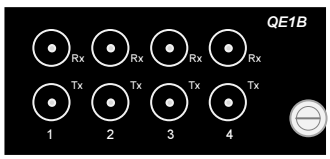
Type – RJ-48C (female), 8 pins.



Pin No.	Description
1	E1 Input → RRING
2	E1 Input → RTIP
3	NC (not used)
4	E1 Output → TRING
5	E1 Output → TTIP
6	NC (not used)
7	NC (not used)
8	NC (not used)

7.2.6 E1 (75Ω) connector

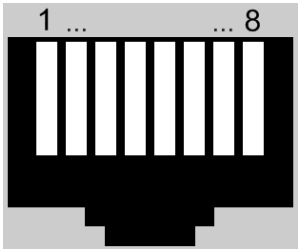
Type – BNC 75Ohm.



BNC No.	Description
Rx1	E1 Input → Channel 1
Rx2	E1 Input → Channel 2
Rx3	E1 Input → Channel 3
Rx4	E1 Input → Channel 4
Tx1	E1 Output → Channel 1
Tx2	E1 Output → Channel 2
Tx3	E1 Output → Channel 3
Tx4	E1 Output → Channel 4

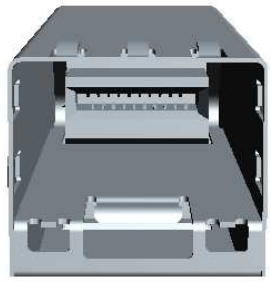
7.2.7 Ethernet Interface

Type – RJ-45 (female), 8 pins.



Pin No.	Description
1	Tx+ (transmit data)
2	Tx- (transmit data)
3	Rx+ (receive data)
4	NC (not used)
5	NC (not used)
6	Rx- (receive data)
7	NC (not used)
8	NC (not used)

Type –SFP cage



Pin No.	Signal	Description
1,17,20	TGND	transmit ground
2	TxFault	Transmit fault indication
3	TxDisable	transmit disable
4	MOD-DEF(2)	SDA line (I2C)
5	MOD-DEF(1)	SCL line (I2C)
6	MOD-DEF(0)	Module absent
7	RateSelect	rate select
8	LOS	Loss of signal indication
9,10,11,15	RGND	receive ground
12	RD-	receive data -
13	RD+	receive data +
15	RX_VCC	receive VCC
16	TX_VCC	transmit VCC
18	TD+	transmit data +
19	TD-	transmit data -

The LAN interface provides 2 Combo Gigabit Ethernet interfaces.

Warning! It is recommended to disconnect Ethernet Cables from the network during the first system startup due to prevent possible IP address conflict.

7.2.8 Power Connection

The DC power connector is provided in the rear panel, which consists of –48V DC Battery (-), Battery Return (+) and chassis Ground.

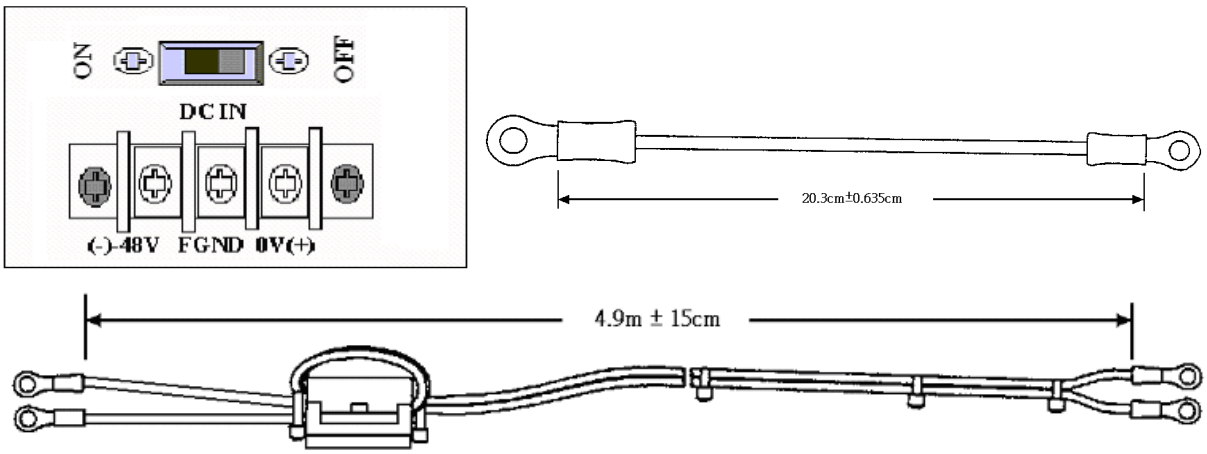


Figure 7.5 FG-FOM16,V3 DC Power Connector, Ground and Power Cables

To connect –48VDC power, perform the following steps:

1. Connect the end of the Ground the FG-FOM16,V3 system ground (marked as FGND or ⏚) in the upper right corner of the front panel.
2. Connect Ground Cable to frame/earth ground with screw, flat washer and lock washer. Be sure in the good contact!
3. Connect the Power Cable properly (be sure in the polarity).

When using AC power please provide system ground connection as described above.

Warning! THE RACK WHERE DEVICE IS ISTALLED HAS TO BE CONNECTED PERMANENTLY TO A RELIABLE PROTECTIVE EARTH CONDUCTOR, WHILE DEVICE ITSELF MUST ALWAYS HAVE SYSTEM GROUND CONNECTED TO THE SAME PROTECTIVE EARTH CONDUCTOR.

7.2.9 Power Self-Test

When FG-FOM16,V3 receives appropriate power, every hardware sub-system performs self-test. The test duration is less then a minute. The fact that test passed successfully means that FG-FOM16,V3 system is ready for operation.
During a self-test all LEDs illuminate temporarily and flash Red, Green and Amber.
If any section or module reports a self-test failure, contact your Sales Representative for assistance.

8 TECHNICAL SPECIFICATION

8.1 Interfaces

8.1.1 Aggregation Optical Interface

Specification	IEEE 802.3, IEC 825-2 Class 1 safety
Module Type	SFP
Connector Type	LC
Line Code	Scrambled NRZ
Bit Rate	1.25Gbit/s
Protection	1+0, 1+1
Wavelength	Defined by SFP module used
Transmit Power	Defined by SFP module used
Input Sencitiviy	Defined by SFP module used

8.1.2 E1 Tributary Interface

Specification	ETS 300 166, ITU-T Rec. G.703, G.704
Number of Interfaces	4 per card
Line Code	HDB3 or AMI
Impedance	either 120Ω or 75Ω (depending on card type)
Jitter	ITU-T Rec. G.823, ETSI TS 101 135
Bit Rate	2048kbit/s ± 50 ppm
Connector Type	either RJ-48C female (120Ω) or two BNC (75Ω)

8.1.3 DS1 Tributary Interface

Number of Interfaces	4 per card
Line Code	B8ZS or AMI
Framing format	SF, ESF or Unframed
Impedance	100Ω
Bit Rate	1544kbit/s ± 32 ppm
Pulse Shape	ITU-T G.703 compliance
Connector Type	either RJ-48C female (100Ω)
Electrical Cable	The cable distance between the DS1 interface and DSX-1 cross-connect frame can be up to 200 meters (655 feet at least). The DS1 interface provides the function for the cable length (from 0 to 200 meters) compensation, where the cable is multi-pair 22 AWG PIC constructions with overall outer shield (i.e. 22 AWG ATAM or equivalent). Provision is made for connecting the outer conductor of the screen of the symmetrical pair to earth at the input port.

8.1.4 Gigabit Ethernet Tributary Interface

Specification	10/100/1000 BASE-T, 1000 Base-X full-duplex flow control ports fully compliant with the applicable sections of IEEE802.3, IEEE802.3u and IEEE802.3x. IEEE 802.1Q VLAN, QinQ, 802.1P QoS, DSCP, 4 priority queues per port, Rate limiting
Number of Interfaces	2 per card
Max Frame Length	9000 bytes
Connector Type	RJ-45 female (120Ω) / SFP cage

8.1.5 Craft Interface (RS-232) Interface

Specification	EIA-232 / V.28
Data Rate	115200 baud, asynchronous
Protocol	8 bit, no parity, 1 stop bit , flowcontrol none, no linefeed with carriage return
Signal Level	V.28
Connector Type	DB9 female connector

8.2 Power Supply

DC:	-36…-72 V
AC:	90…260 V; 47…63 Hz
Power Consumption:	Less then 30W

8.3 Environment and EMI/EMC

EMI/EMC Compliance:	FCC Class A part 15B, EN55082-1, EN55022, CE, RoHS
Operation Temperature:	0… 60°C
Relative Humidity:	5…90%, non-condensing

8.4 Dimensions and Weight

Dimensions:	436mm x 44.5mm x 320mm (W x H x D)
Weight:	3.2/4.0 kg (without/with Tributary Cards)