USER MANUAL

Fiber Optical Multiplexer with 100M Ethernet

Stand-alone / Rack Type

4, 8, 12, 16 channel modular design

G.703 E1, T1 (DS1), Datacom (RS-530, X.21, V.35), Voice FXO, FXS

LEGAL

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WARNING :

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference in which case the user will be required to correct the interference at his own expense. NOTICE : (1) The changes or modifications not expressively approved by the party responsible for compliance could void the user's authority to operate the equipment. (2) Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

CISPR PUB.22 Class A COMPLIANCE :

This device complies with EMC directive of the European Community and meets or exceeds the following technical standard. EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

WARNING :

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE NOTICE

Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards : EN 55022 :1994/A1 :1995/A2 :1997 Class A and EN61000-3-2 :1995, EN61000-3-3 :1995 and EN50082-1 :1997

Fiber Multiplexer

16 Channel Fiber Optical Multiplexer with 100M Ethernet
Stand-alone / Rack Type
4, 8, 12, 16 Channel E1, T1, FXO, FXS, Datacom

User Manual

Version 1.0 Sep 2008 Release

This manual supports the following models :
Fiber Multiplexer

This document is the first official release manual. Please check our website for any updated manual or contact us by E-mail. Please address any comments for improving this manual or to point out omissions or errors to our Marketing Department. Thank you.

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Chapter 1 Introduction

1.1 Product Description

The Fiber Multiplexer is a powerful optical multiplexer which can aggregate up to four different types of services into a pair of fibers. Any combination of five types (4xE1, 4xT1 4xV.35, 4xX.21, 4xFXO, 4xFXS) of tributary cards are allowed to be plugged into the system. Along with a maximum tributary capacity of 16 E1 channels, the Fiber Multiplexer also provides two integrated 10/100M Ethernet interfaces, 1xRS-232 data port, and an Order Wire voice channel. The multiplexer supports 1+1 hot-swappable optical protection. The Fiber Multiplexer can be managed through SNMP, VT-100 serial port or local LCD/menu keys. It has provision for two sets of external alarm inputs and outputs. The Fiber Multiplexer is 1RU, 19" rack mountable chassis or it may be placed on a desktop or shelf.

1.2 Application Diagram

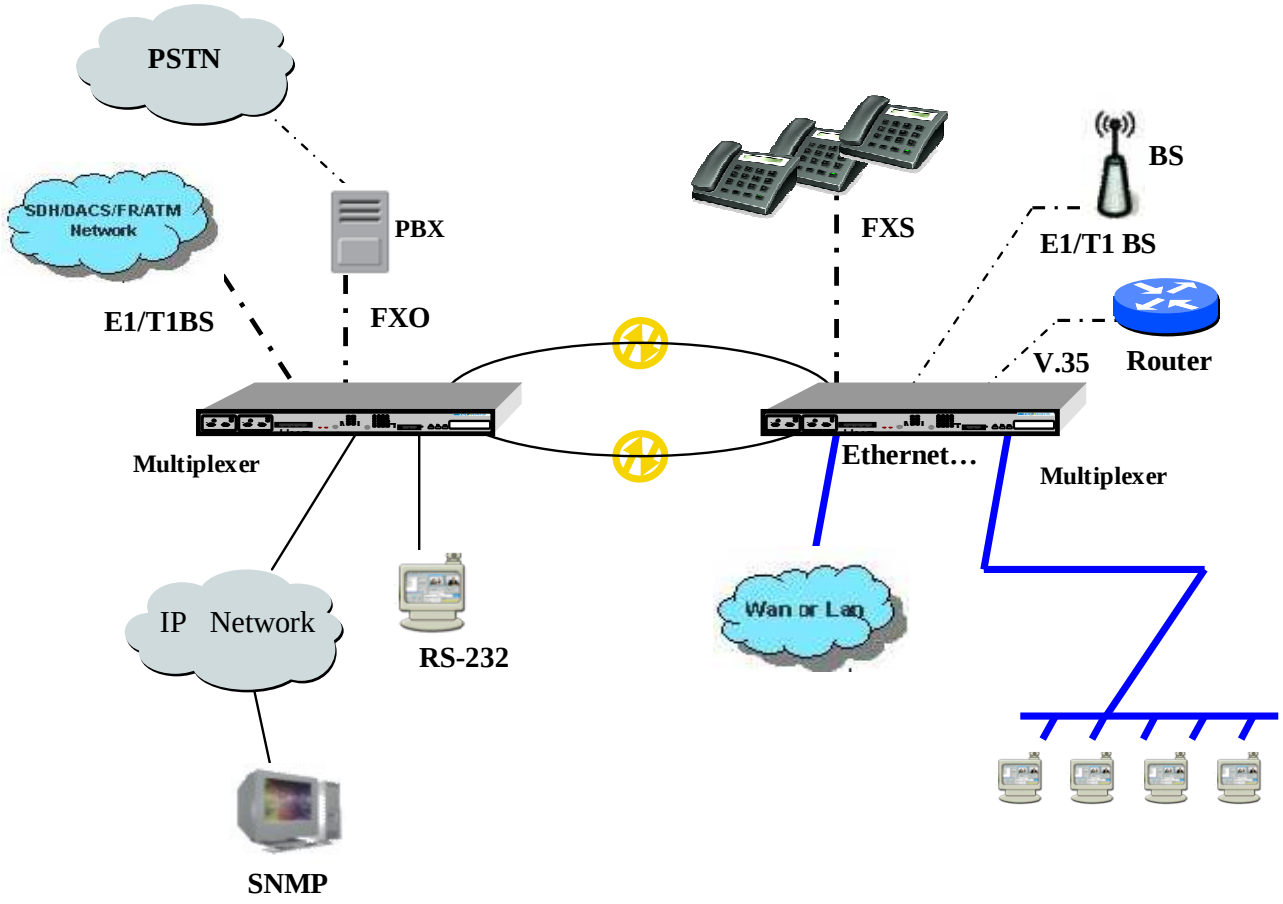


Figure 1-1 Application of Fiber Multiplexer

1.3 Product Features

- Channel Capacity :4, 8, 12, 16 E1, T1, or data communication service
- Tributary card types : E1 interface (75ohms or 120ohms)
  T1 interface (100 ohms)
  Datacom interface (V.35/ RS-530/ X.21)
  Voice interface (FXO or FXS)
- Optical module :Auto Laser shutdown, hot swappable 1+1 protection
- Alarm relay contact : major and minor alarms
  (audible and visible alarm output)
- Supports SNMP management, TFTP remote software upgrade
- Performance monitor : E1/T1 line performance CV, CRC, ES, SES.
- Configurations can be backed up to non-volatile memory.
- Provides the optical line local loopback and remote loopback function.
- Low speed (E1,T1, datacom) local and remote loopback function
- OE module : Class 1 Laser product. Safety Standard IEC 825 compliant.
- Management interface : LCD / push button keys, VT-100 (RS-232 RJ-45), SNMP (Ethernet RJ-45)
- External clock : E1 external TTL clock or PCM data Input through RJ-45 connector
- 10/100M Ethernet : 2 x Ethernet ports (100M full rate total)
- 1 RS-232 data port : clear asynchronous channel
- External alarm : 2 sets of external alarm detection

1.4 Technical Specifications

1.4.1 Optical Interface

- Optical Source : MLM 1310/1550nm
- Wavelength : 1310/1550 ± 50nm
- System Gain : 19～30dB
- Fiber connector types : SC,FC, or ST type
- Bi-directional Fiber Optical Module (WDM Option on SC type)

1.4.2 E1S module

- Channel Capacity : 4 channels per module
- Bit Rate : 2.048Mbps ± 50ppm
- Line Code : HDB3 / AMI
- Frame Format : Unframed (clear channel)
- Electrical Interface : Compliant with international standards ITU-T G.703
- Jitter Tolerance : Compliant with ITU-T G.823
- Jitter Transfer : Compliant with ITU-T G.742, G.823
- Line impedance :120Ω (DB25 Wire Wrap or RJ-45) or 75Ω (BNC)
- Surge protection : Compliant with (or better than) IEC 1000-4-5 class 2 or FCC part 68

1.4.3 T1 module

- Channel Capacity : 4 channels per module
- Bit Rate : 1.544Mbps ± 32ppm
- Line Code : B8ZS / AMI
- Frame Format : Unframed (clear channel)
- Electrical Interface : Compliant with international standards ITU-T G.703
- Jitter Tolerance : Compliant with ITU-T G.824
- Jitter Transfer : Compliant with ITU-T G.742, G.824
- Line impedance : 100Ω (DB25 Wire Wrap or RJ-45)
- Surge protection : Compliance with (or better than) IEC 1000-4-5 class 2 or FCC part 68
- Cable Compensation :5 segments Line Build Out
  LBO1 :0~133feet / LBO2 :133~266feet / LBO3 :266~399feet
  LBO4 :399~533feet / LBO5 :533~655feet

1.4.4 Datacom module

(Datacom module supports one channel (V35U1) or four channels (V35U) on each card)

- Card types : V.35, RS-530, X.21
- Data rates : n*64K, n=1~32 (64~2048kb/s)
- Clock mode : Internal, DTE, Recovery.
- Control signal : CTS follows RTS, DSR always ON except at test loop mode, DCD always ON except at fiber loss of signal condition.
- Loop-back : local loop back, remote loop back, V.54 (request remote loop back)
- Connector : HD-68 (SCSI-III) Female with optional cables
  HD-68 to 4*V35 (MB34 female) cable
  HD-68 to 4*RS-530 (DB25 female) cable
  HD-68 to 4*X.21 (DB15 female) cable

1.5 Physical Specifications

- Alarm contact : 4 relay contacts (DB-9 connector) --Reference Page 100 (A.1)
- External alarm : 2 sets external alarm detection for central office monitoring
- 1xRS-232 asynchronous clear channel. (9.6k~115.2K)
- Order wire : Earphone jack, microphone jack
- Operate condition : 0 ~ 60°C, 5% ~ 95% without condensing
- EMI : Comply with CISPR 22 class A (EN55022), FCC part 15 class A subpart B.
- MTBF : 48,000 hours minimum

1.6 Dimensions & Weight

W x D x H : 440 x 285 x 44.5 mm (17 3/8" x11 1/4" x 1 3/4")
3.7KG net (~ 8 lb.)

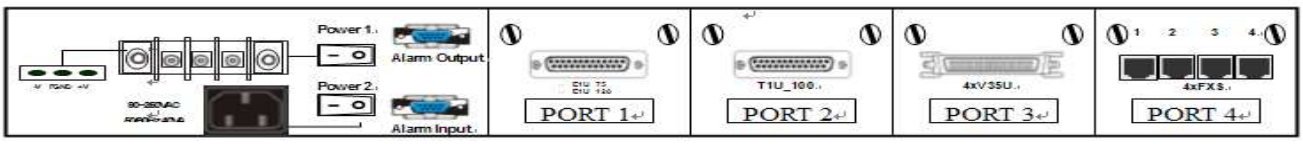
1.7 Power Supply

AC :90 ~ 240 V (47Hz ~ 63Hz)
DC :-36 ~ -72 V
Power consumption 20W maximum

1.8 Ordering Information

Classification	Item
Optical Link Type	Single Hot Swap Optical Link
	Dual Hot Swap Optical Link (1+1 auto protection)
Laser Module Types	1310nm Multi-Mode FP Laser Module, 2Km
	1310nm Single-Mode FP Laser Module, 30Km
	1310nm Single-Mode FP Laser Module, 50Km
	1310nm Single-Mode DFB Laser Module, 80Km
	1550nm Single-Mode DFB Laser Module, 120Km
	1310nmTx/1550nmRx Single Fiber, Single-Mode FP Laser Module, 20Km
	1550nmTx/1310nmRx Single Fiber, Single-Mode FP Laser Module, 20Km
	1310nmTx/1550nmRx Single Fiber, Single-Mode FP Laser Module, 40Km
	1550nmTx/1310nmRx Single Fiber, Single-Mode DFB Laser Module, 40Km
	1310nmTx/1550nmRx Single Fiber, Single-Mode FP Laser Module, 60Km
	1550nmTx/1310nmRx Single Fiber, Single-Mode DFB Laser Module, 60Km
Laser Module Connector Types	FC/PC Type Laser Module Connector
	SC Type Laser Module Connector (BiDi only has SC type)
	ST Type Laser Module Connector
Power Module Type	Single AC Power Module
	Dual AC power Module
	Single DC Power Module
	Dual DC Power Module
	One AC and One DC Power Module
Power Cord (1.8 M)	NEMA (USA)
	Schuko (Germany)
	UK
	Australia
E1 Card Adaptor (Performance Monitor Option)	4E1 120 Ohm Balanced, Wire Wrap Adapter
	4E1 120 Ohm Balanced, Wire Wrap Adapter with surge protection
	4E1 120 Ohm Balanced, Twist Pair Adapter Cable
	4E1 120 Ohm Balanced, Twist Pair Adapter Cable with surge protection
	4E1 120 Ohm Balanced, RJ-45 Adapter Cable
	4E1 120 Ohm Balanced, RJ-45 Adapter Cable with surge protection
	4E1 75 Ohm Un-Balanced, BNC Adapter Box
	4E1 75 Ohm Un-Balanced, BNC Adapter Box with surge protection
T1 Card Adaptor (Performance Monitor Option)	4T1 100 Ohm Balanced, Wire Wrap Adapter
	4T1 100 Ohm Balanced, Twist Pair Adapter Cable
4-X.21 Card	4x X.21
FXO/FXS Card	4x FXO/FXS voice interface
Ethernet Card	10/100 Fast Ethernet
4-V35 Card	4xV35
External clock(Option)	With External clock
	Without External clock

1.9 Rear Panel View



Chapter 2 Installation

This chapter provides the information needed to install the Fiber Multiplexer. It is important to follow the installation instruction to ensure normal operation of the system and to prevent damages due to human error.

Only trained and qualified personnel should be allowed to install or replace this equipment.

2.1 Unpacking

If there is a possibility for future relocation of the Fiber Multiplexer system, please save the cartons and protective packaging materials. The following items are shipped with your Fiber Multiplexer :
One Fiber Multiplexer user's manual (CDROM), AC power cord(s) and DB9-RJ45 console cable.
One (or numerous units of) Fiber Multiplexer chassis system

Please carefully unpack and inspect the unit and accessories for potential damage or missing parts. Contact your shipper immediately if you suspect any damage during transit. Contact our nearest sales representative or our company directly if you are missing any parts. Improper handling during shipment may cause early failure.

2.2 Site Requirements

The FCC (Federal Communications Commission, USA) requires telecommunication equipment to withstand electrical surge that may result from lighting strikes. This equipment has been tested and found to comply with those FCC requirements. Users should follow the precautions below to insure safety and minimize the risk of damage to the equipment or personnel:

- Make sure that the power outlet is properly grounded.
- Proper grounding should include a minimum of :
  A ground rod buried outside the building at least 8 feet (2.44 meters) deep.

2.3 Site Selection

In order to allow easy access to the equipment, leave at least 36 inches (90 cm) clearance in the front and at least 4 inches (10.2 cm) at the rear.

To avoid overheating, leave at least 1 inch (2.5 cm) on either side of Fiber Multiplexer. Also, do not stack other equipment on top of Fiber Multiplexer.

2.4 DC Electrical Outlet Connection

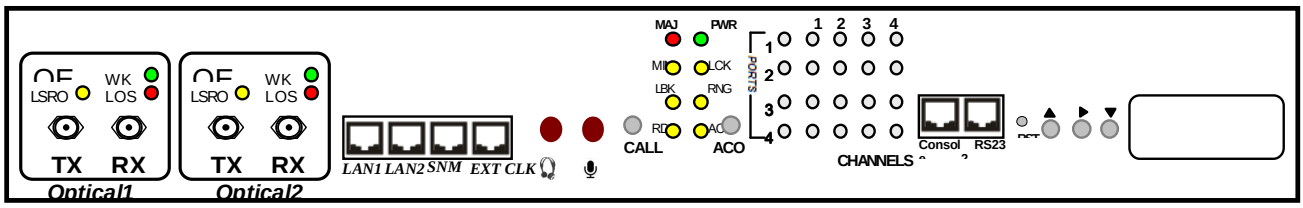
For safety and to prevent damage to the Fiber Multiplexer, make sure that the power requirements match those of your electric outlets. Connect power and ground to the Fiber Multiplexer. Connect all cables before powering on the equipment.

2.5 Laser Safety

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to this direct or indirect radiation.

Chapter 3 Panel Description

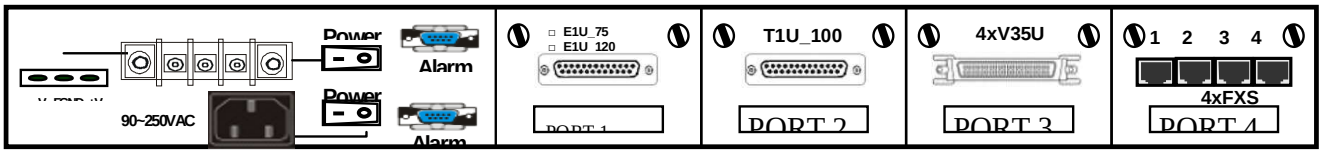
3.1 Front Panel



(1) Optical 1/2 :	LSRON LED	Yellow light when the laser is on
	LOS LED	Red light when there is a loss of optical signal
	WK LED	Working path indicator
	RX	Optical Receiver Port
	TX	Optical Transmitter Port
(2) LAN1/2 port :	100M full rate ports	
(3) SNMP Port :	RJ-45 connector to SNMP management system	
(4) EXT CLK Port(Option) :	External clock input; 2,048 MHz TTL CLOCK or E1 PCM	
(5) Order Wire Port :	Earphone and Microphone jack for order wire application	
(6) CALL Button :	Activate/deactivate the order wire	
(7) ACO Button :	Alarm Cut Off; Yellow light when the ACO button is pressed to manually disable the audible alarm when a problem occurs. If any newer alarm is reported after the ACO button has been pressed, the external alarm will activate again.	
(8) MAJ LED :	Red light when there is a Major Alarm present	
(9) MIN LED :	Yellow LED lights when there is a Minor Alarm present	
(10) LBK LED :	Yellow LED lights when there is a loopback function presents.	
(11) RDI LED :	Remote Defect Indication; Indicates a failure in the remote terminal	
(12) PWR LED :	Green LED lights when power module active.	
(13) LCK LED :	Optical link Lock; Locks the system if switched to protect line 6 times within 10 minutes	
(14) RNG LED :	Yellow LED lights when the order-wire function is active.	
(15) ACO LED :	Alarm Cut Off function indicator	
(16) Console Port :	For VT-100 screen setup	
(17) RS232 :	clear channel RS-232 data transmission and receive port.	
(18) RST Button :	Restart the system	
(19) Push Buttons :	▲ ▶ ▼ Three control and configuration buttons for Fiber Multiplexer	

3.2 Rear Panel

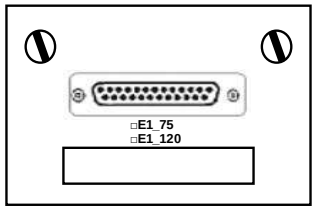
Power Switches : On/Off switch for each power main



The Fiber Multiplexer provides three major types of tributary interfaces cards (E1/T1, Datacom, & Voice) and five different power supply combinations (Single AC, Single DC, Dual AC, Dual DC, & AC+DC)

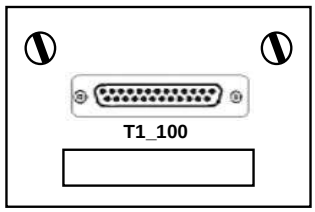
(a) E1 tributary card

One DB-25 pin female connector for input/output of 4 channels E1 signal. There are two types of E1 cards, 75Ω with BNC adapter or 120Ω with RJ-45 or wire-wrap adapter.



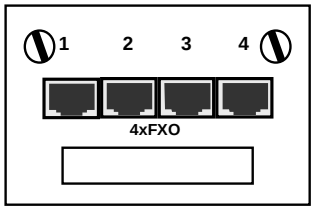
(b) T1 tributary card

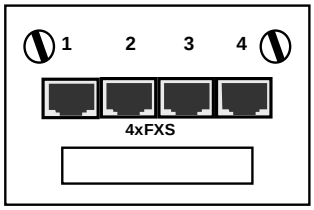
One DB-25 pin female connector for input/output of 4 channels T1 (DS1) signal. The T1 has a single card type, 100Ω, with RJ-45 or wire-wrap adapter.



(c) FXO/FXS tributary cards

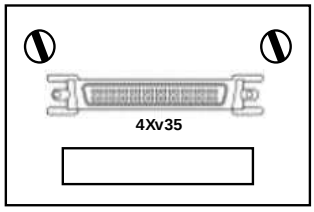
FXO or Foreign Exchange Office, is a telephone signaling interface that receives POTS, or "plain old telephone service". The FXO interface connects to central office or PBX. Foreign Exchange Station, or FXS, is a telephone interface which provides battery power, sends dial tone, and generates ringing voltage. A standard telephone plugs into such an interface to receive telephone service. There are 4 channels on each tributary card with each channel providing 64kbps voice bandwidth. The connectors are all RJ-45, which also readily accept RJ-11 connectors as well.





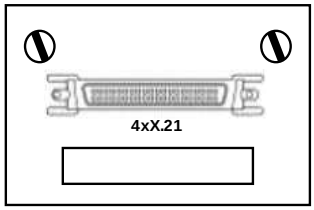
(d) V.35 tributary card

This 4 channel V.35 card, also requires HD68 to 4xMB34F adapter cable to connect to V.35 interface.



(e) X.21 tributary card

This 4 channel X.21 card, also requires HD68 to 4xDB15F adapter cable to connect to X.21 interface.



Any of the above cards may be plugged into any tributary slot 1 ~ 4. (Port 1 ~ Port 4)

Chapter 4 Quick Start

The Fiber Multiplexer control interface provides two modes of operation. First, a serial console port, for local provisioning; and second, a LAN port for remote provisioning of the system.

4.1 Console Port

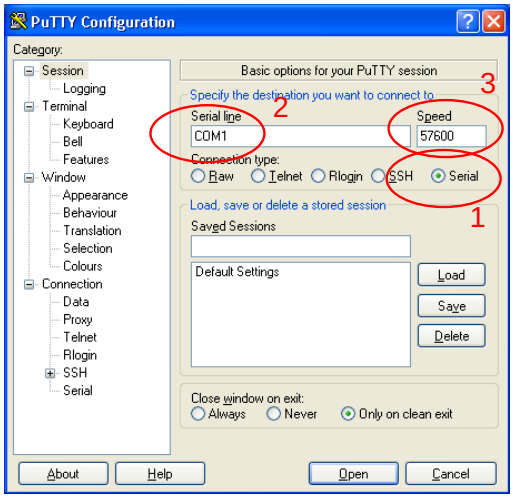
Prerequisites :

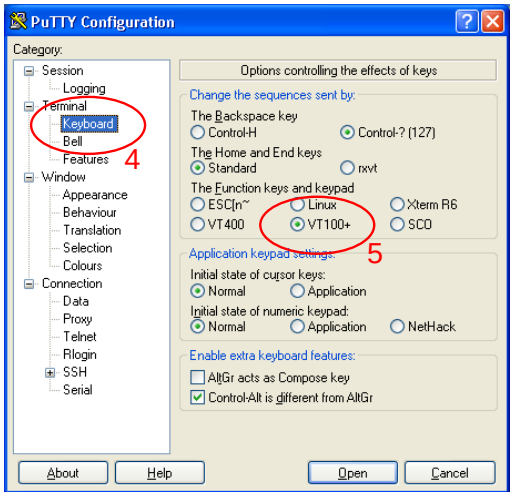
Any PC running Windows 98/2000/XP can be used as a console. Use the supplied DB9F to RJ-45 RS-232 cable and connect the console port to the COM port of PC to be used as a terminal. Connect the RJ-45 to the port on the face of the Fiber Multiplexer, labeled "Console".

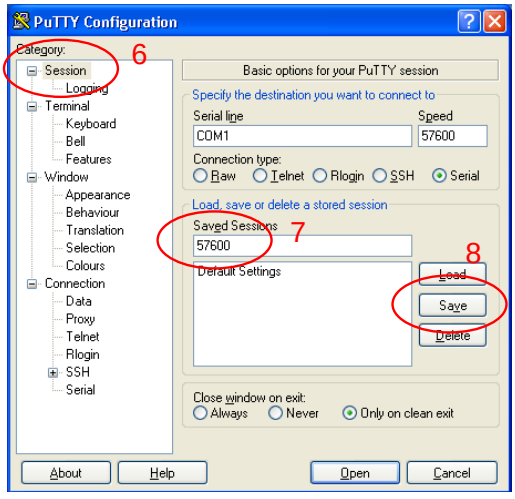
Windows® HyperTerminal™ program has known issues when it comes to using function keys. If you use HyperTerminal, only the function keys F1~F4 will operate properly. To avoid this problem, we strongly recommend using other free terminal software, such as PuTTY or TeraTerm (search Google™).

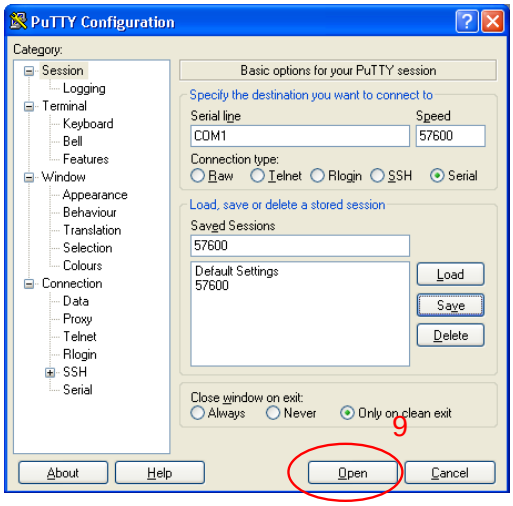
4.1.1 PuTTY Settings

Getting PuTTY : The program is copyright by Simon Tatham, the developer's website is at;
http://www.chiark.greenend.org.uk/~sgtatham/putty/
go to the download section and get the item under "A Windows installer for everything except PuTTYtel"
Special considerations : none, PuTTY has a free license to use, copy, modify, merge, distribute, etc.

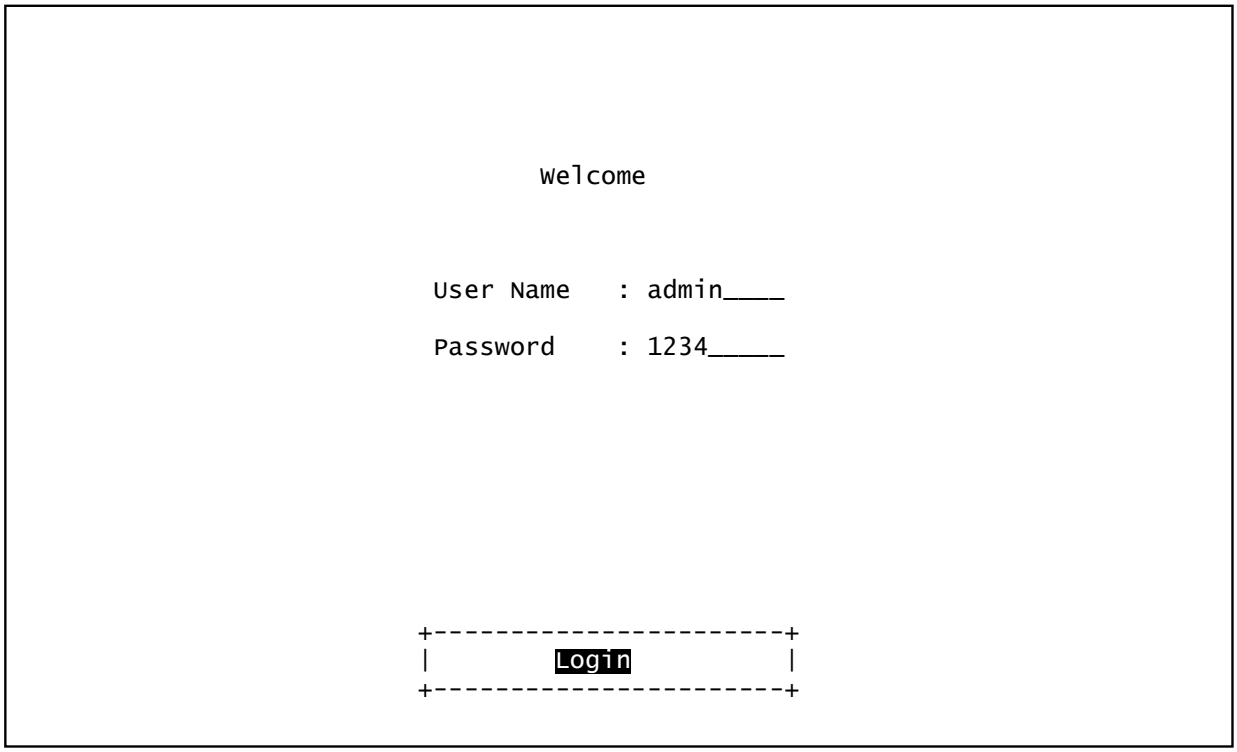






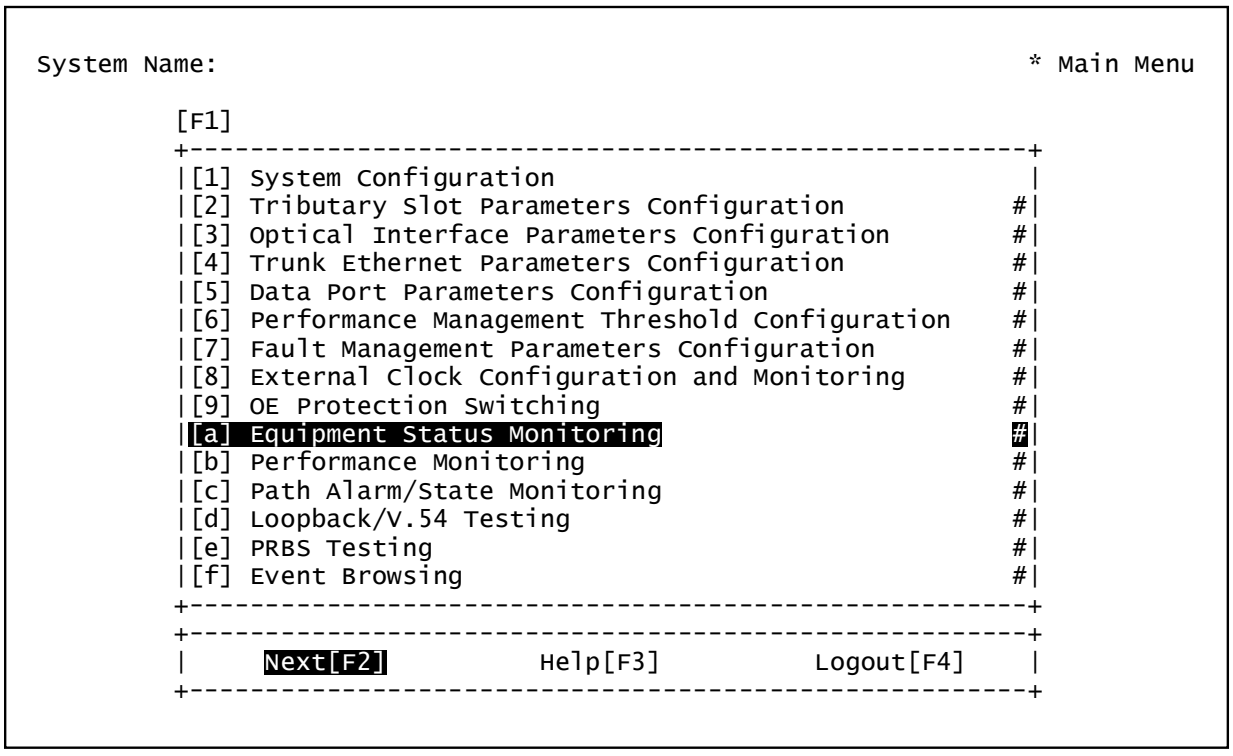


4.1.2 Console Login



The factory default username is 'admin' and password is '1234'.

4.1.3 Main Menu



Press 'a' or arrow down to Equipment Status Monitoring. Press function key F2.

4.1.4 Equipment Status

```
 System Name:                                        Equipment Status Monitoring
+-----------------------------------------------------------------------------+
|<Lo> HwVer: 1.0.3|    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN: -   LCK: - | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK: -   RNG: - | LOS: -  LOS: -  | LAN M             -      -      -      - |
| RDI: -   ACO: - |  WK: G   WK: -  | TB1/G  4xT1S      G      G      G      G |
|-----------------------------------| TB2/G  4xFXO      -      -      -      - |
| [PWR1]: F [FAN]: -  [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]: -           [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-----------------------------------------------------------------------------+
|<Re> HwVer:      |    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1                                   |
| MIN:     LCK:   | LSR: Y  LSR: Y  | LAN 2                                   |
| LBK:     RNG:   | LOS:    LOS:    | LAN M                                   |
| RDI:     ACO:   |  WK: G   WK:    | TB1/G  4xT1S      G      G      G      G |
|-----------------------------------| TB2/G  4xFXS                            |
| [PWR1]: F [FAN]:    [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]:             [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-----------------------------------------------------------------------------+
+-----------------------------------------------------------------------------+
|Lo->Re[F1]  TB1 Edit[F2]  TB2 Edit[F3]  TB3 Edit[F4]  TB4 Edit[F5]  Back[ESC]|
+-----------------------------------------------------------------------------+
```

The screen is divided horizontally, displaying the local unit <Lo> on top and the remote unit <Re> on the bottom. Each horizontal screen is again divided vertically, with alarm indicators, optical and power statuses on the left and the Fast Ethernet trunk and tributary cards on the right. Use [F1] to toggle between local and remote unit. Use the [F2], [F3], [F4] or [F5] to edit the tributary card settings.

4.1.5 E1/T1 Tributary Card Configuration

In this example we have a 4xT1 in slot 1, FXO/FXS Voice card in slot 2, and 4xE1 cards in slots 3 & 4. Press the [F2] key to edit slot 1.

```
 System Name:                                        T1 Parameters Slot Editing


                Location :  Local /Slot 1

                 All channels will be set as:

                [F1] Service Mode       :   OOS

                [F3] Frame Type         :   ESF

                [F4] Line Coding        :   B8ZS

                [F5] LBO Setting        :   0-133 ft




  +-------------------------------------------------------------------+
  |            Confirm[F2]                          Back[ESC]          |
  +-------------------------------------------------------------------+
```

Use the function keys [F1], [F3]~[F5] to select the configuration menu items, use the "space bar" to toggle the different parameters for each setting. Press [F1] for 'Service Mode' and press "space" to toggle service between "OOS" and "IS" (OOS=Out of Service, IS=In Service). Press [F2] and "space" until the parameter is "Unframed". Finally press [F2] to confirm.

The following shows the screen after setting service mode "in service" (IS), setting unframed, line code B8ZS and LBO (Line Build Out).

```
System Name:                                        T1 Parameters Slot Editing


                Location :  Local /Slot 1

                 All channels will be set as:

                [F1] Service Mode       :   IS

                [F3] Frame Type         :   Unframed

                [F4] Line Coding        :   B8ZS

                [F5] LBO Setting        :   533-655 ft




  +-----------------------------------------------------------------------+
  |            Confirm[F2]                          Back[ESC]             |
  +-----------------------------------------------------------------------+
```

Press [F2] to confirm the settings and exit back to the Equipment Status menu.
Repeat the same for the remote unit.

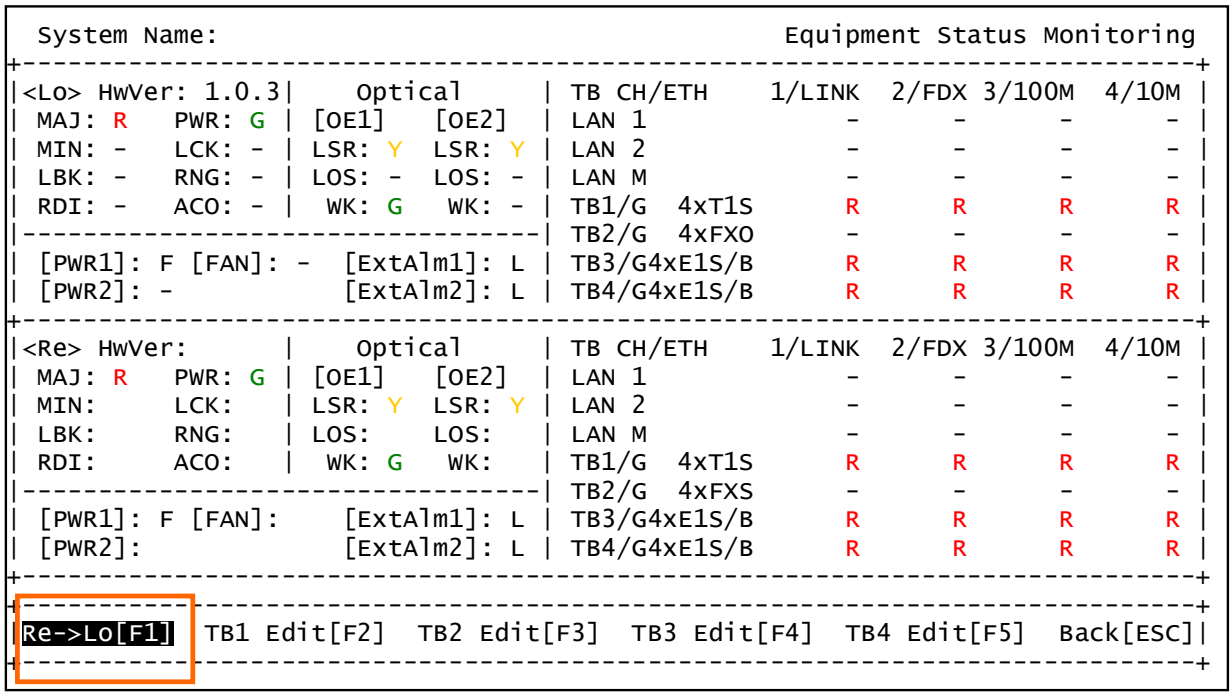
The following is an example of T1 and E1 channels with alarm. The channels have Red LED alarm. If the T1 or E1 lines are not connected to the multiplexer, this would be a normal condition, i.e. Signal Loss.

```
 System Name:                                        Equipment Status Monitoring
+-----------------------------------------------------------------------------+
|<Lo> HwVer: 1.0.3|    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN: -   LCK: - | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK: -   RNG: - | LOS: -  LOS: -  | LAN M             -      -      -      - |
| RDI: -   ACO: - |  WK: G   WK: -  | TB1/G  4xT1S      R      R      R      R |
|-----------------------------------| TB2/G  4xFXO      -      -      -      - |
| [PWR1]: F [FAN]: -  [ExtAlm1]: L | TB3/G4xE1S/B      R      R      R      R |
| [PWR2]: -           [ExtAlm2]: L | TB4/G4xE1S/B      R      R      R      R |
+-----------------------------------------------------------------------------+
|<Re> HwVer:      |    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN:     LCK:   | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK:     RNG:   | LOS:    LOS:    | LAN M             -      -      -      - |
| RDI:     ACO:   |  WK: G   WK:    | TB1/G  4xT1S      R      R      R      R |
|-----------------------------------| TB2/G  4xFXS      -      -      -      - |
| [PWR1]: F [FAN]:    [ExtAlm1]: L | TB3/G4xE1S/B      R      R      R      R |
| [PWR2]:             [ExtAlm2]: L | TB4/G4xE1S/B      R      R      R      R |
+-----------------------------------------------------------------------------+
+-----------------------------------------------------------------------------+
|Lo->Re[F1]  TB1 Edit[F2]  TB2 Edit[F3]  TB3 Edit[F4]  TB4 Edit[F5]  Back[ESC]|
+-----------------------------------------------------------------------------+
```

Next we need to configure the tributary in the Remote Fiber Multiplexer.

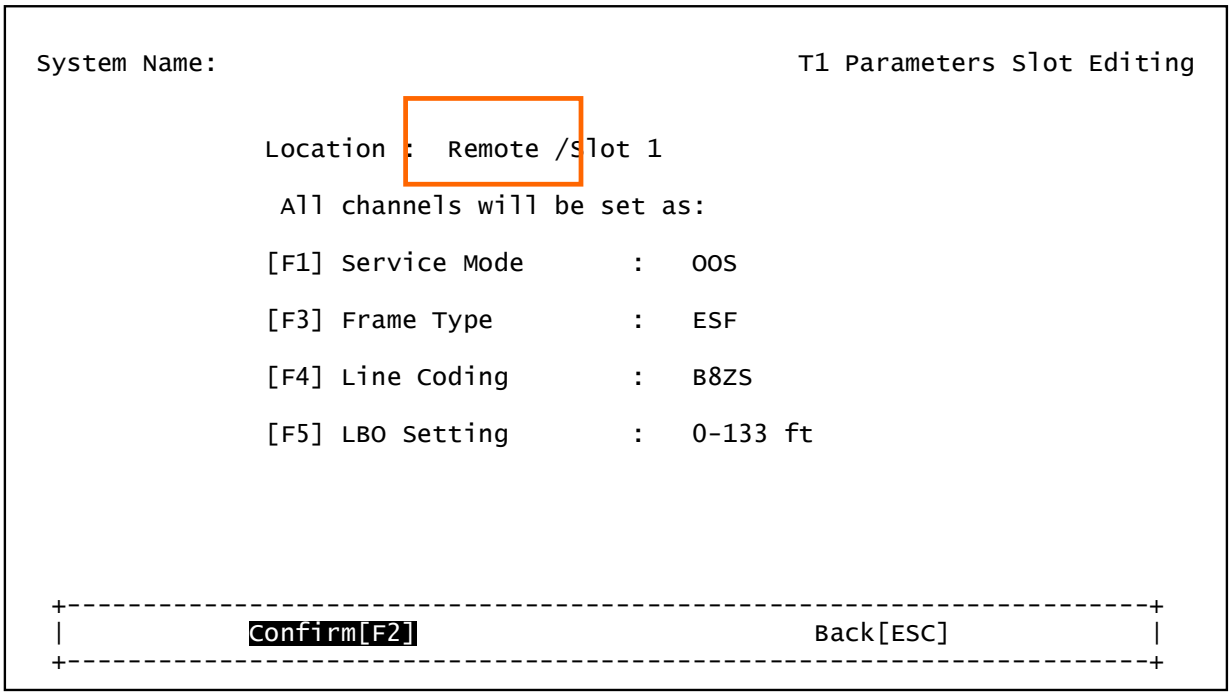
Press [F1] to toggle to the Remote unit.

The menu bar at the bottom of the screen now selects the tributary cards for the remote unit.



Use the function keys again to select the appropriate tributary card for configuration. In our example we'll use the T1 card in slot 1. So press [F2]. (For TB1 or tributary slot 1)

Remote tributary slot 1 screen will display.



Follow the same procedure to use the function keys [F1], [F3]~[F5] to select the configuration menu items, use the "space bar" to toggle the different parameters for each setting. Press [F1] for 'Service Mode' and press "space" to toggle service between "OOS" and "IS" (OOS=Out of Service, IS=In Service). Press [F2] and "space" until the Frame Type is "Unframed". Finally press [F2] to confirm.

The following screen shows that T1 and E1 for both local and remote units are in-service and without alarms. The "G" indicates the front panel is showing the green LED.

```
 System Name:                                        Equipment Status Monitoring
+-------------------------------------------------------------------------------+
|<Lo> HwVer: 1.0.3|    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN: -   LCK: - | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK: -   RNG: - | LOS: -  LOS:    | LAN M             -      -      -      - |
| RDI: -   ACO: - |  WK: G   WK:    | TB1/G  4xT1S      G      G      G      G |
|----------------------------------| TB2/G  4xFXO      -      -      -      - |
| [PWR1]: F [FAN]: -  [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]: -           [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-------------------------------------------------------------------------------+
|<Re> HwVer: 1.0.3|    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN: -   LCK: - | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK: -   RNG: - | LOS: -  LOS:    | LAN M             -      -      -      - |
| RDI: -   ACO: - |  WK: G   WK:    | TB1/G  4xT1S      G      G      G      G |
|----------------------------------| TB2/G  4xFXO      -      -      -      - |
| [PWR1]: F [FAN]: -  [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]: -           [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-------------------------------------------------------------------------------+
+-------------------------------------------------------------------------------+
|   Re->Lo[F1]         TB1 Edit[F2]         TB2 Edit[F3]         Back[ESC]    |
+-------------------------------------------------------------------------------+
```

Continue the same logical configuration method until all the E1/T1 tributary cards are configured for local and remote units.

4.1.6 FXO/FXS Configuration

The FXO/FXS cards have only one setting, the in or out of service setting. Use F1 to select the service mode and then use the "space bar" to toggle between IS or OSS.

```
 System Name:                                  FXO/FXS Parameters Slot Editing

                Location : Local/Slot 2

                 All channels will be set as:

                [F1] Service Mode  :   IS

  +-----------------------------------------------------------------------+
  |            Confirm[F2]                          Back[ESC]             |
  +-----------------------------------------------------------------------+
```

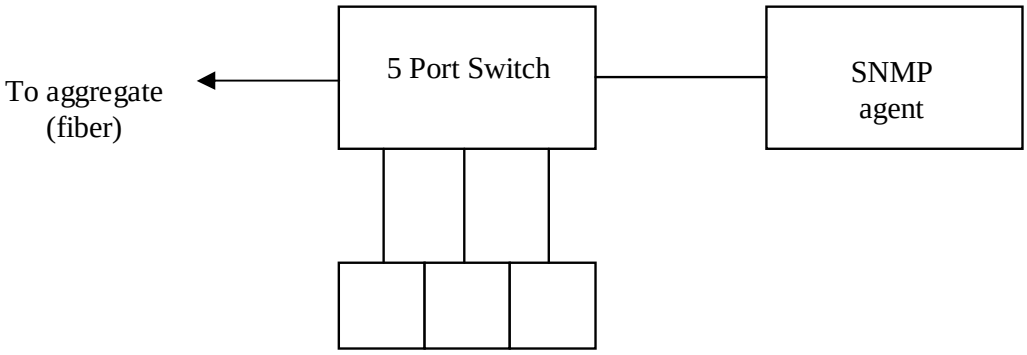
Confirm the settings by keying [F2].

4.1.7 Ethernet Trunk Configuration

4.1.7.1 Introduction

The trunk Ethernet refers to the 100Mbps trunk speed within the 155M fiber link reserved for the dedicated Ethernet channel. The remaining link speed is utilized for the tributary card transmissions (E1, T1, V.35, FXO/FXS), embedded operations channel, asynchronous RS-232 channel, order wire and proprietary framing overhead. The trunk Ethernet terminates in each multiplexer at a 5-Port 10/100 Ethernet Switch Controller. Three Ethernet LAN ports are available by RJ-45 connection on the front panel.

The following figure shows how the switch is incorporated into the multiplexer. The SNMP agent is internally connected to the 5 port switch.



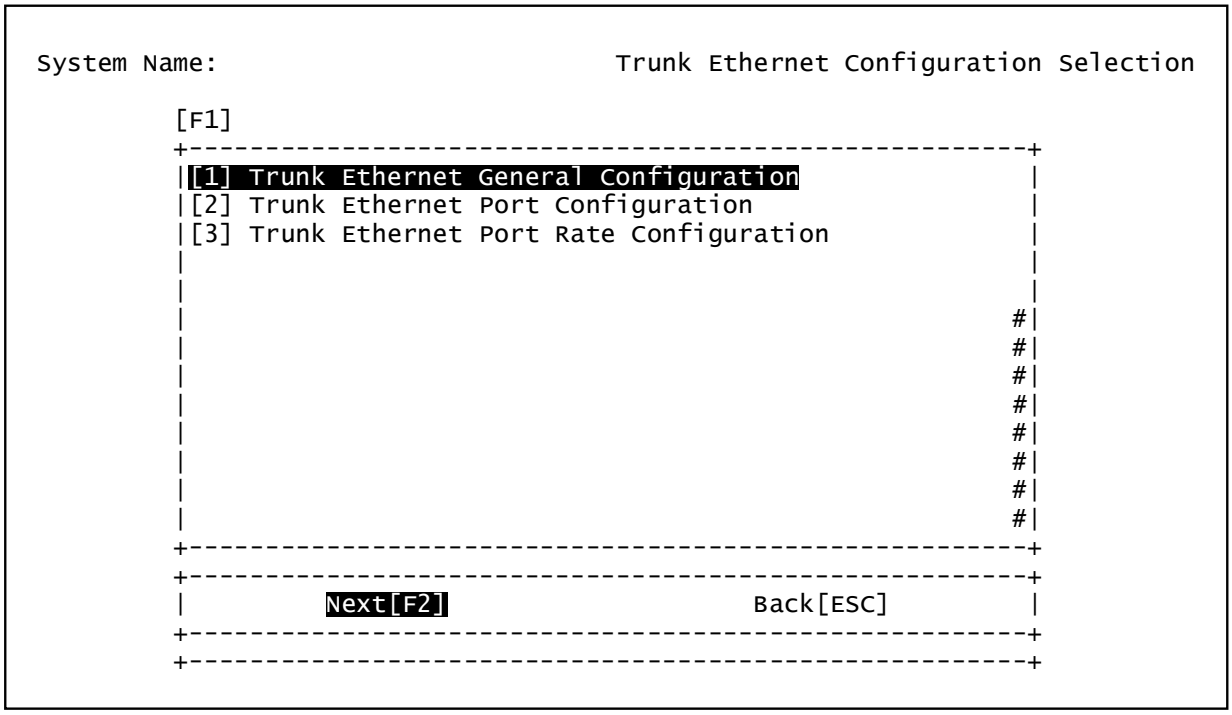
LAN1 LAN2 SNMP (front panel)

4.1.7.2 Configuration

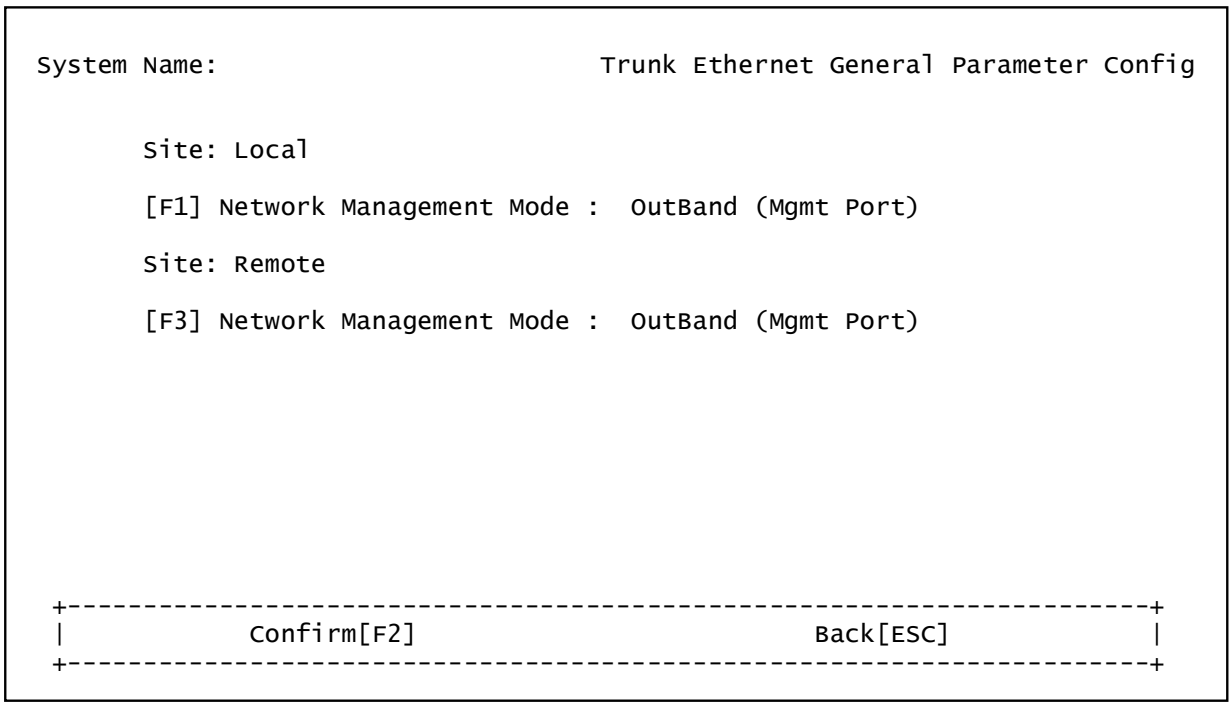
From the main menu, arrow down or keyin '4' to select the ***Trunk Ethernet Parameters Configuration*** menu item, then press [F2].

```
System Name:                                                    Main Menu

          [F1]
          +-----------------------------------------------------+
          |[1] System Configuration                            #|
          |[2] Tributary Slot Parameters Configuration         #|
          |[3] Optical Interface Parameters Configuration      #|
          |[4] Trunk Ethernet Parameters Configuration         #|
          |[5] Data Port Parameters Configuration              #|
          |[6] Performance Management Threshold Configuration  #|
          |[7] Fault Management Parameters Configuration       #|
          |[8] External Clock Configuration and Monitoring     #|
          |[9] OE Protection Switching                         #|
          |[a] Equipment Status Monitoring                     #|
          |[b] Performance Monitoring                          #|
          |[c] Path Alarm/State Monitoring                     #|
          |[d] Loopback/V.54 Testing                           #|
          |[e] PRBS Testing                                    #|
          |[f] Event Browsing                                  #|
          +-----------------------------------------------------+
          +-----------------------------------------------------+
          |     Next[F2]          Help[F3]          Logout[F4]  |
          +-----------------------------------------------------+
```

The Trunk Ethernet Configuration menu is displayed below. There are three options. The first option, ***General Configuration***, sets up one of five different schemes of port mirroring and will be explained in detail later. The ***Ethernet Port Configuration*** sets the service (IS or OOS), negotiation, speed, duplex and flow control per port. The third menu ***Port Rate Configuration***, provides ingress/egress bandwidth configuration per port.

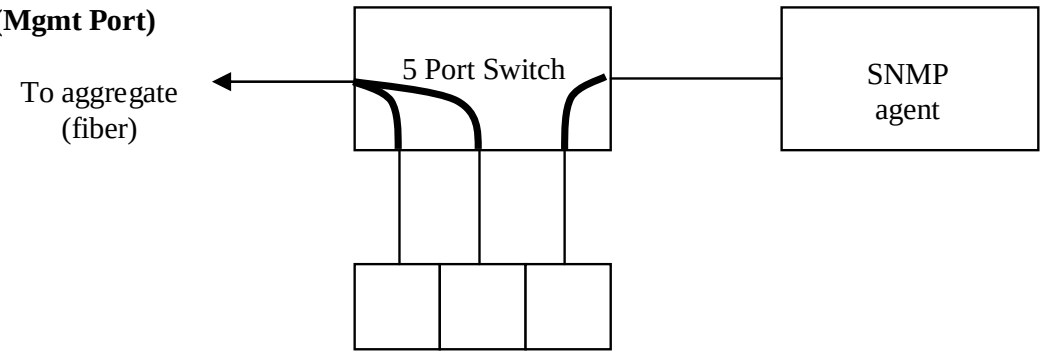


Press [F2] to enter the ***General Configuration*** menu.



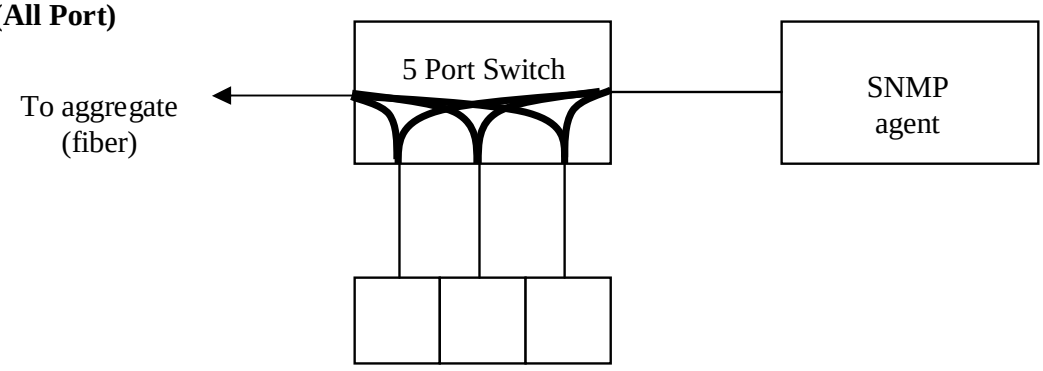
Function key [F1] selects the local unit while [F3] selects the remote unit. Use the 'space' key to toggle the five different setting options.

Outband (Mgmt Port)



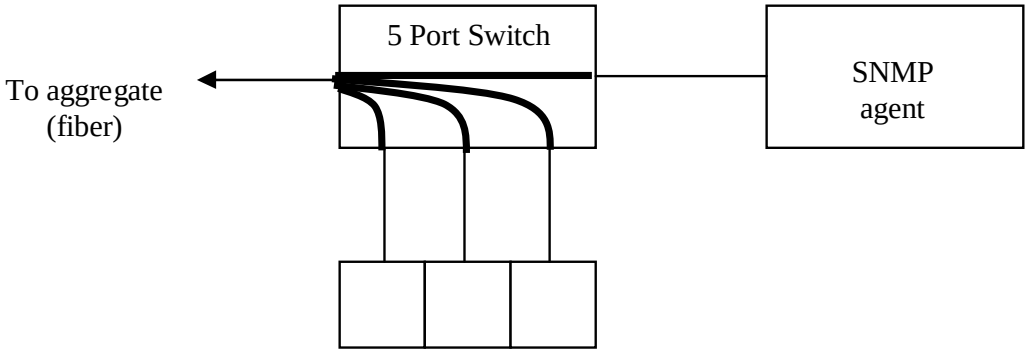
In this scenario, the two ports LAN1 and LAN2 will link to the aggregate channel. The management port, SNMP, links directly to the SNMP agent (out-band) and cannot pass traffic to the aggregate. Any connection to the LAN ports or from the remote multiplexer will not be able to access the SNMP agent or SNMP front panel port. This is the default setting.

Outband (All Port)



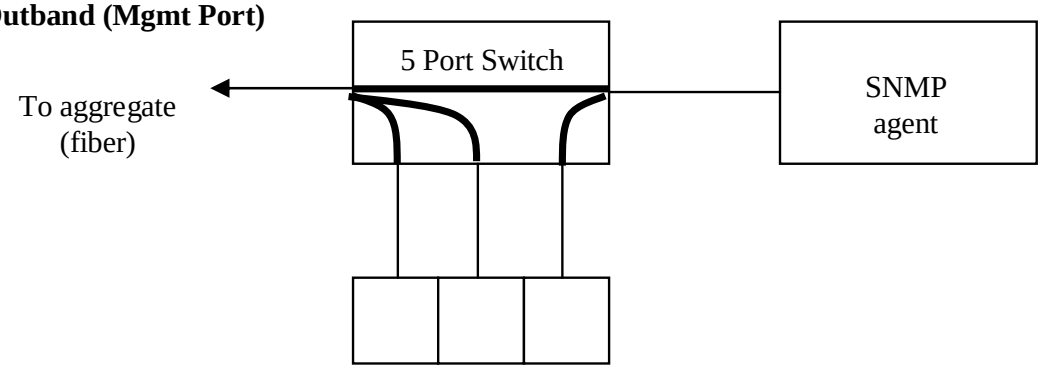
In this scenario, all three ports may connect directly to the SNMP agent (out-band) and to the aggregate link. There is no link between the aggregate and the SNMP agent. The remote multiplexer cannot access the SNMP agent.

Inband



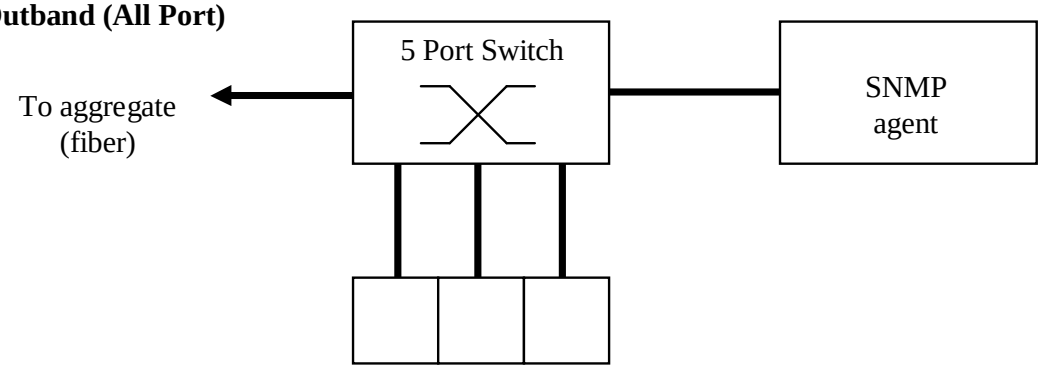
In this scenario, all three local ports will link to the aggregate channel. The SNMP agent is managed remotely through the aggregate channel (in-band). There is no local access to the SNMP agent.

Inband+Outband (Mgmt Port)



In this scenario, the two front panel ports, LAN1 and LAN2, connect to the fiber aggregate. The front panel SNMP port connects directly to the SNMP agent. The SNMP agent is also accessible from the aggregate (in-band) for remote management.

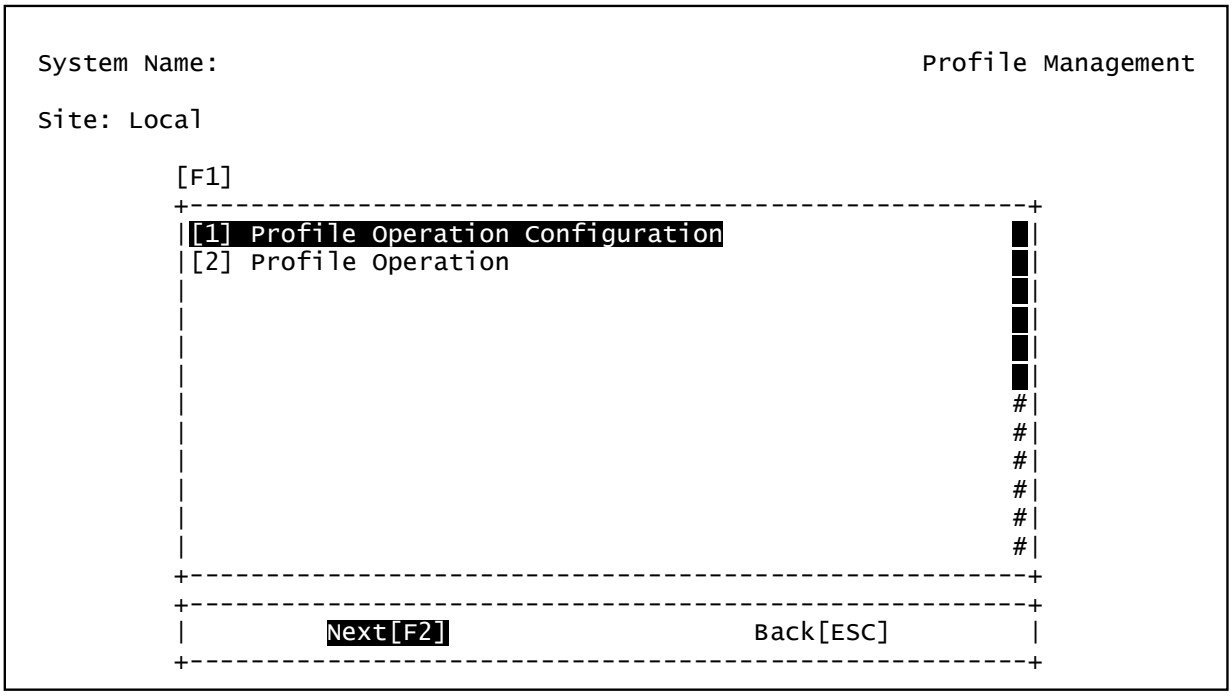
Inband+Outband (All Port)



In this scenario, all ports are connected together as a normal switching HUB. Both in-band and out-band management are supported (local and remote) and all three front panel ports may be used as LAN1, LAN2 and LAN3 freely.

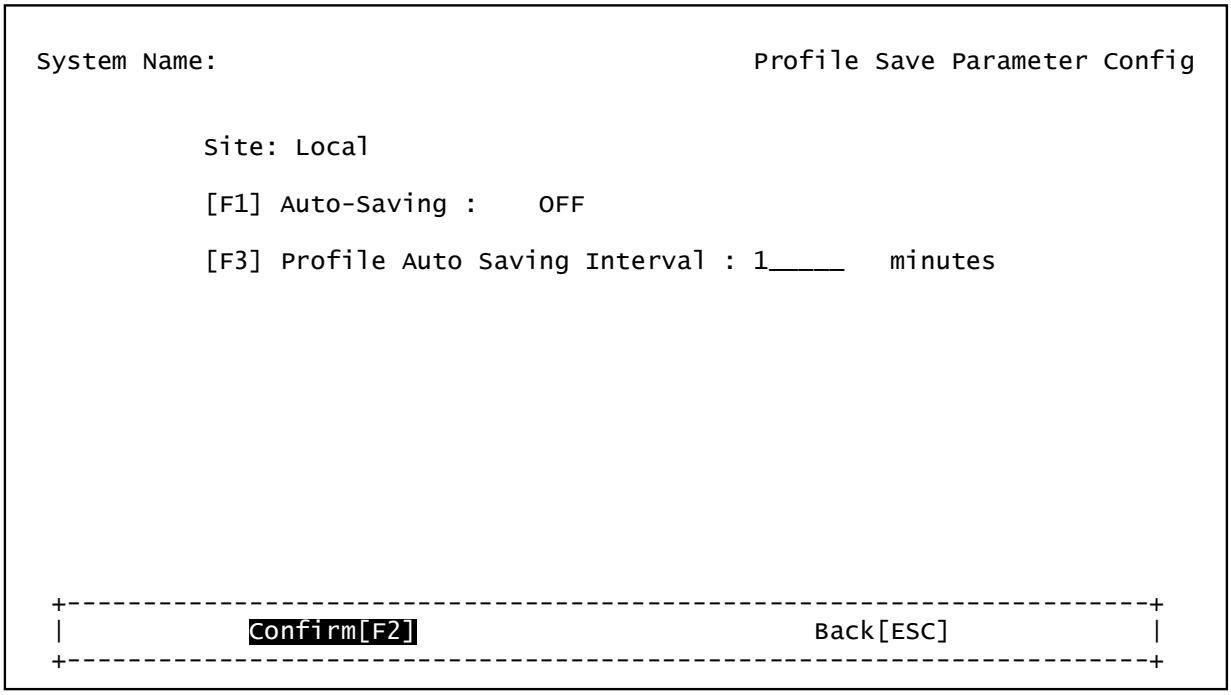
4.1.8 Profile Management

The active changes need to be saved if they are to be used during next power up or reboot. Use [ESC] to return to the ***Main Menu***, select item "1" and press [F2] to go to ***System Configuration***. Select item 'd', ***System Profile Management***, and press [F2]. The following screen will be displayed.



4.1.8.1 Profile Save Parameter Config

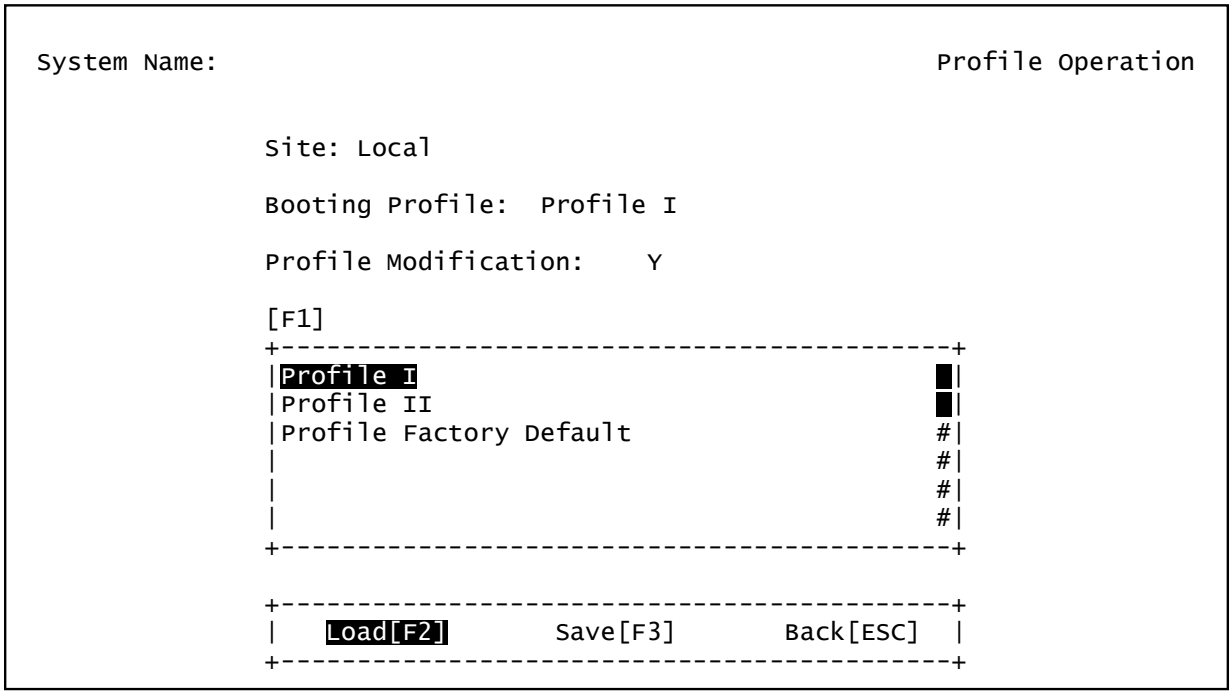
Pressing [F2] from the ***Profile Management*** page will bring up the ***Profile Save Parameter Config*** page. Use this page to enable or disable the "auto save" function and the set the "auto save interval". When auto save is enabled, changes made to the configuration by any means (LCD, Console, Web, etc.) will automatically be saved to Profile I at the predefined time interval.



The Fiber Multiplexer provides an Auto-Saving function, and auto saving interval.

4.1.8.2 Profile Operation

The Fiber Multiplexer has three profile locations in non-volatile memory. Profile I and Profile II may contain user configured profile data. The factory default profile is read-only and set at factory. Loading this profile will restore all settings of the multiplexer back to their factory default originals.



The profile settings can be selected between the local or remote multiplexer. The default boot profile may be configured so that this is the profile automatically loaded when the multiplexer is cold started.

If the active profile had been changed during the configuration process, the "Profile Modification" will show "Y". This reminds the user that in order to keep settings, the profile must be saved.

You may select profile I or II then press [F3] function to save the current active configuration to it. The next subsequent boot process will automatically configure the system with the saved profile. You may also select either profile I or II then press [F2] function to immediately load the previously saved profile into active configuration.

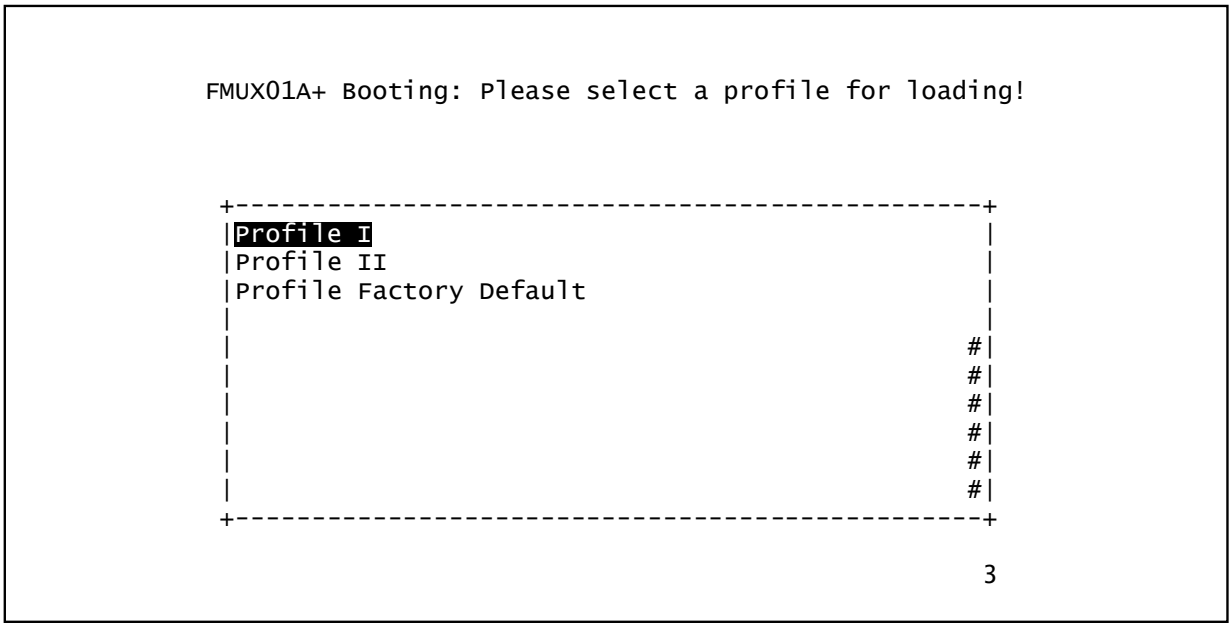
To restore to factory default, simply use the up/down arrow keys to highlight the ***Profile Factory Default***, then press [F2] and confirm the load with <OK>. If you want to reboot with factory defaults, then you need to load the factory default and then save it to the default boot profile.

Chapter 5 Operation

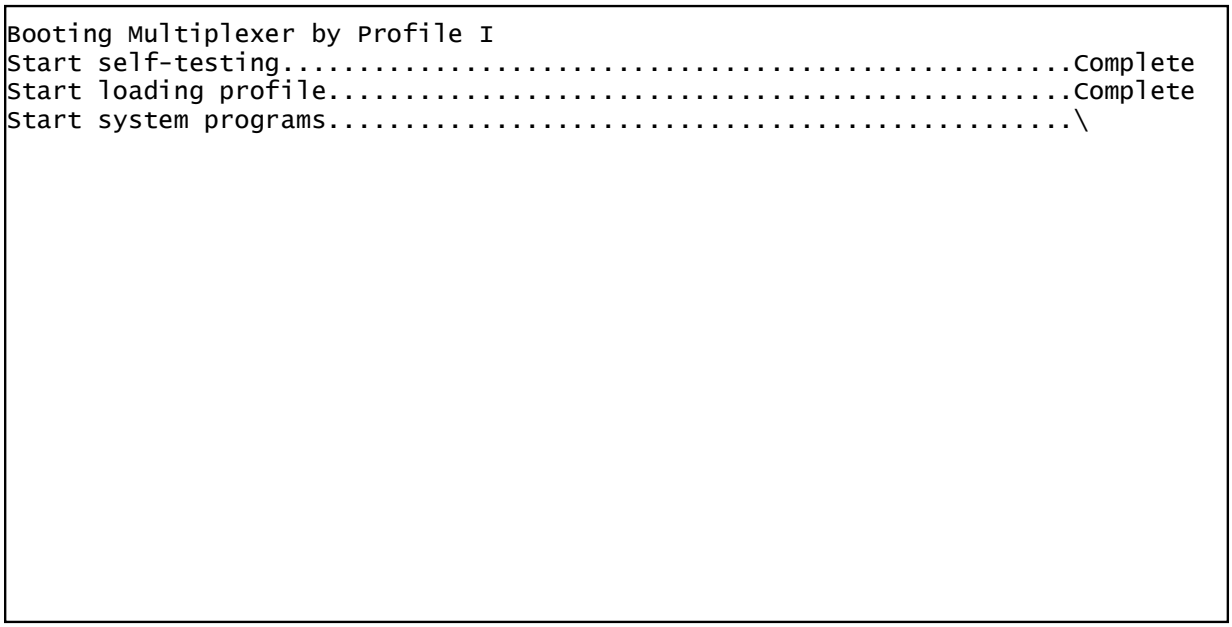
This chapter will describe in more detail all the operational menu screens and functions of the Fiber Multiplexer.

5.1 Startup Loading / Booting and Login Screen

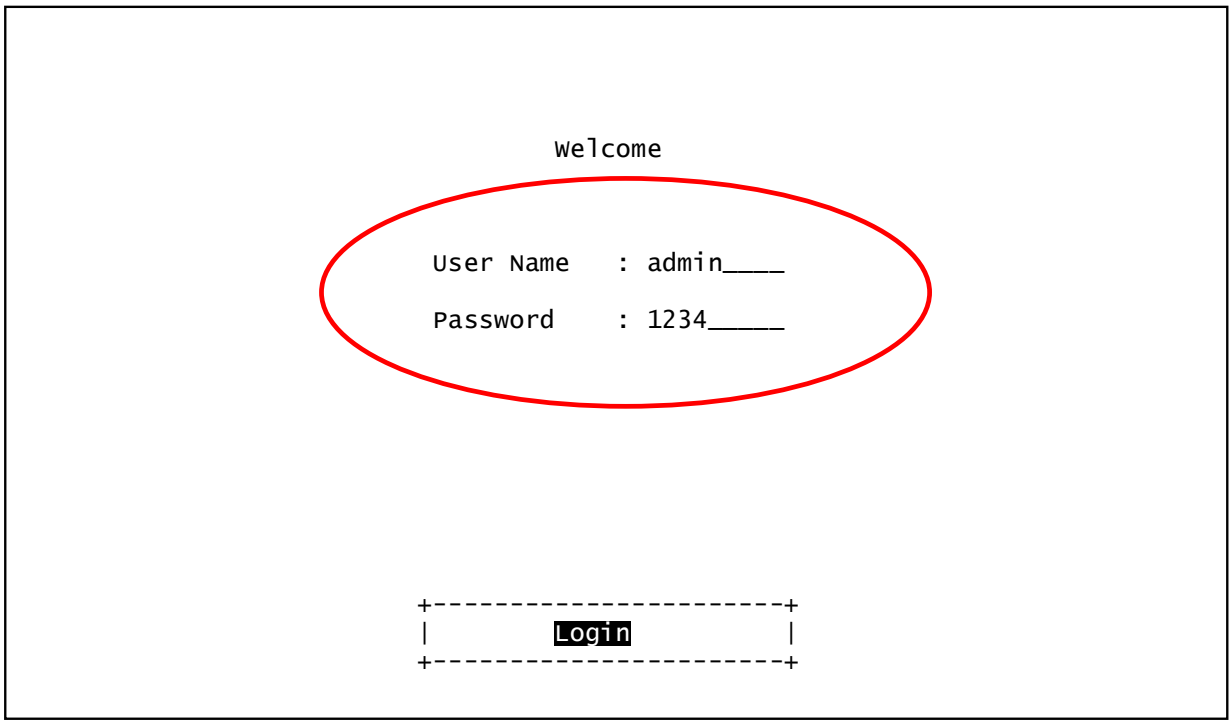
When user first starts up the Fiber Multiplexer equipment, the profile loading screen will be displayed briefly. With no other user intervention, the Profile I will be automatically loaded. The user may also select Profile II or factory default to be loaded at startup.



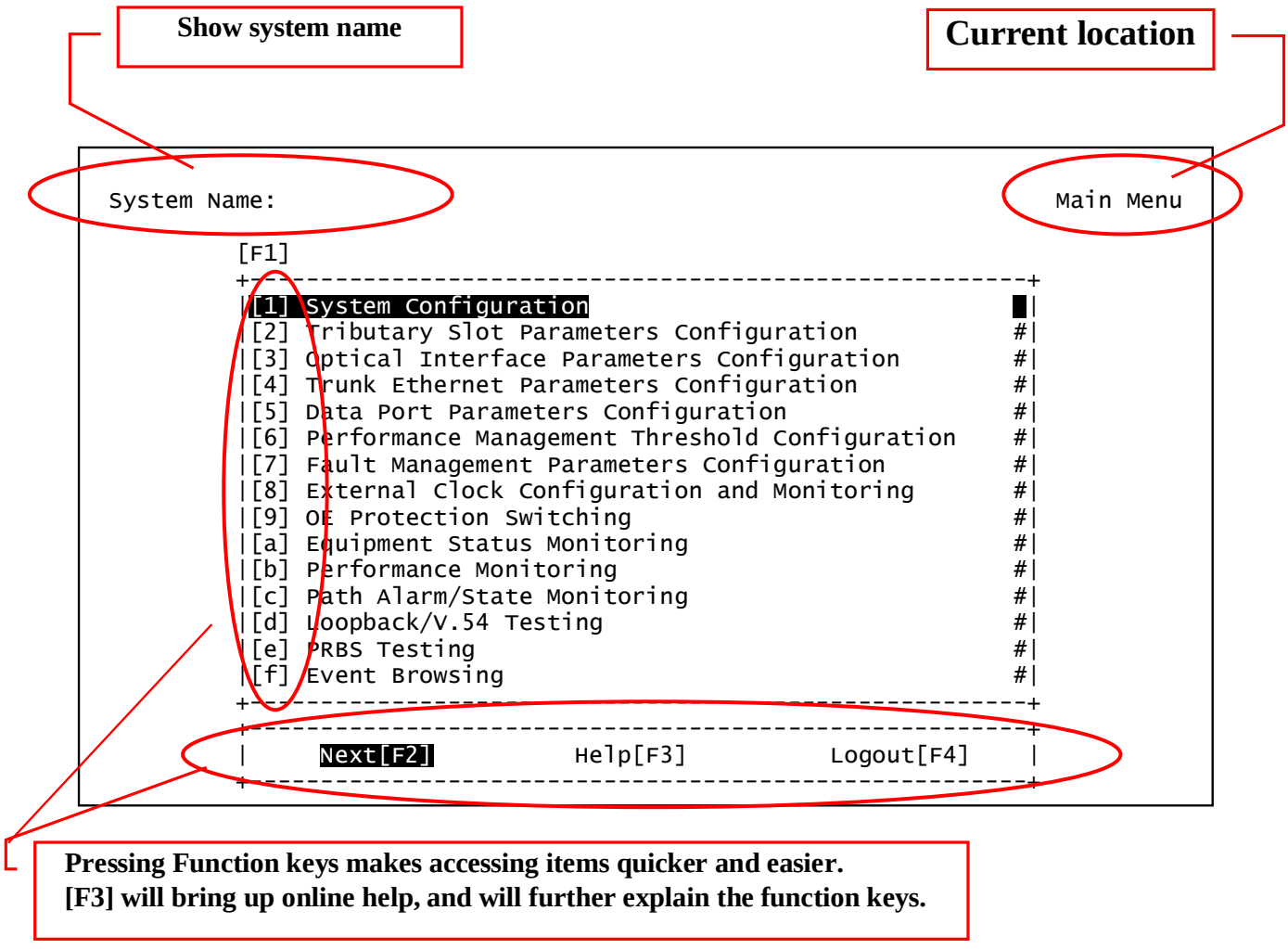
The system has built in self-diagnostic functions that are performed during the booting procedure. The self-diagnostic function includes system memory access test, system main clock test and tributary card access test. The boot test screen will be shown before the user login screen.



Enter Fiber Multiplexer Login Screen through the console port. Please key in the User Name and User Password. The default username is **admin** and the password is **1234**.



5.2 Main Menu

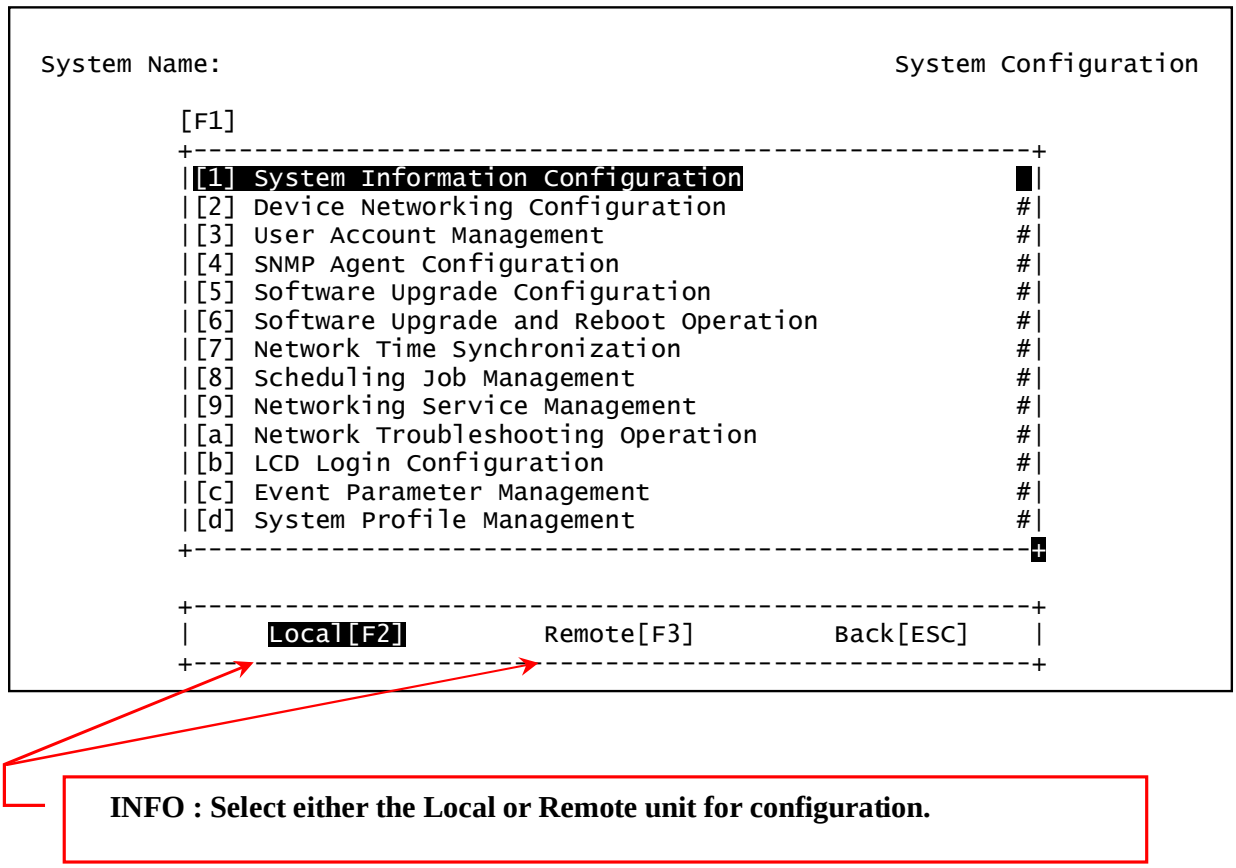


Note : **Not all terminal emulation programs support the use of function keys**. Therefore, we recommend using free third party programs such as PuTTY, TeraTerm, or HyperTerminal Personal Edition (HyperTerminal PE). See the Quick Start chapter for configuration of PuTTY.

After entering the main menu, select one of nine functions.

1. System Configuration (see 5.3)
2. Tributary Slot Parameters Configuration (see 5.4)
3. Optical Interface Parameters Configuration (see 5.5)
4. Trunk Ethernet Parameters Configuration (see 5.6)
5. Data Port Parameters Configuration (see 5.7)
6. PM Threshold Configuration (see 5.8)
7. Fault Management Parameters Configuration (see 5.9)
8. External Clock Configuration and Monitoring (see 5.10)
9. OE Protection Switching (see 5.11)
a. Equipment Status Monitoring (see 5.12)
b. Performance Monitoring (see 5.13)
c. Path Alarm /State Monitoring (see 5.14)
d. Loopback/V.54 Testing (see 5.15)
e. PRBS Testing (see 5.16)
f. Event Browsing (see 5.17)

5.3 System Configuration

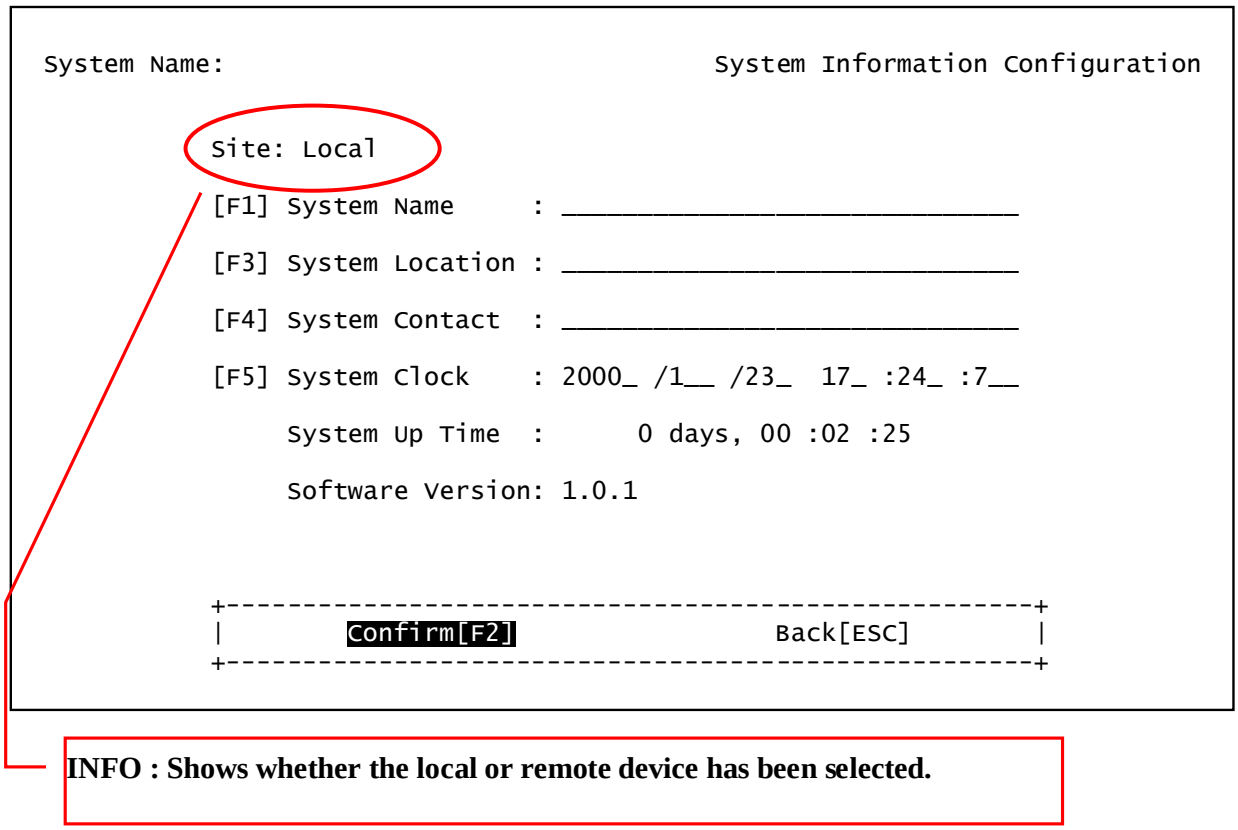


System Configuration the menu includes the following selections.

System Information Configuration (name, location, contact, time settings)
Device Networking Configuration (device IP, netmask, and gateway)
User Account Management (assign users to one of three management groups)
SNMP Agent Configuration (configure SNMP managers, community strings, traps)
Software Upgrade Configuration (set upgrade server, upgrade image file)
Software Upgrade and Reboot Operation (perform local and/or remote upgrade and reboot)
Network Time Synchronization (setup NTP)
Scheduling Job Management (manage CRON operations)
Networking Service Management (enable/disable SNMP, Telnet, FTP services)
Network Troubleshooting Operation (Ping testing)
LCD Login Configuration (LCD password)
Event parameter Management (view/clear event log)
System Profile Management (configuration saving, factory reset, profile manager)

Press [F1] function key to select item 1 ~ item d, and use the up or down key to shift the items. Please select the item or [ESC] to previous menu.
The detail description of each item will be mentioned in the following sections.

5.3.1 System Information Configuration

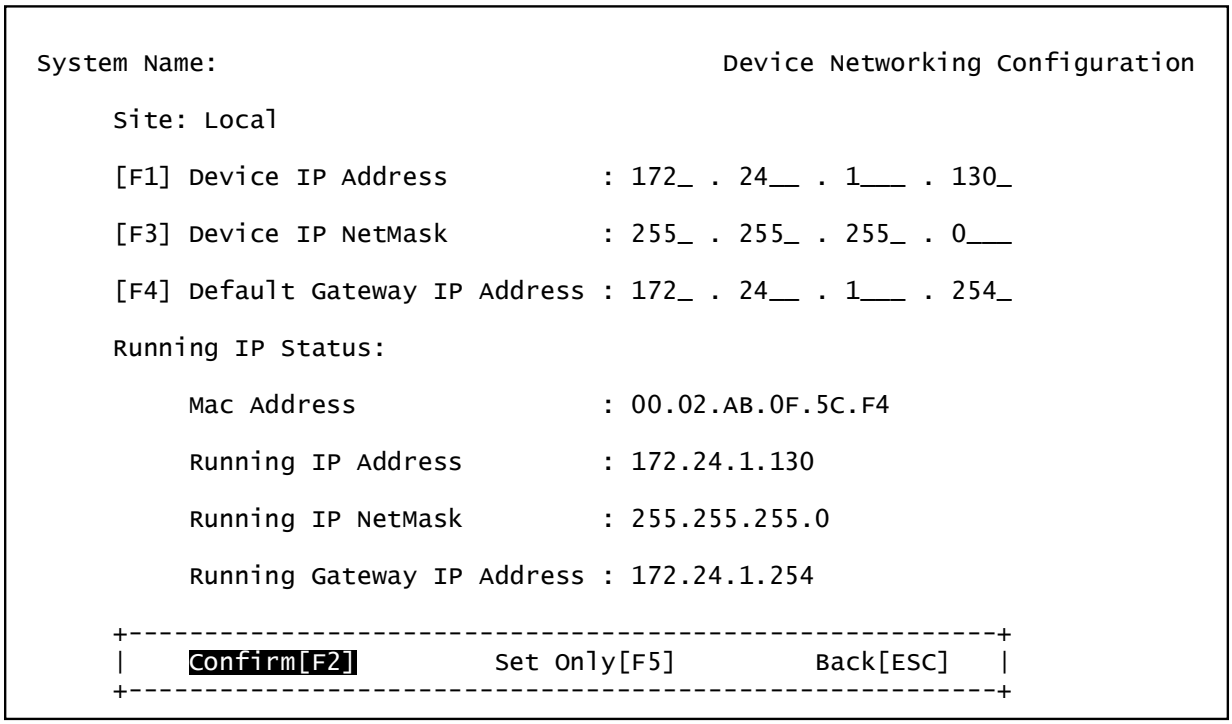


The system administrator can key in the System Name with less than 255 characters, the location of the system, and the contact person.

The system clock can be set by entering the correct time. This screen can show the running time of the system and the software version.

After the setting any of above items, please make sure to press [F2] to save them.

5.3.2 Device Networking Configuration

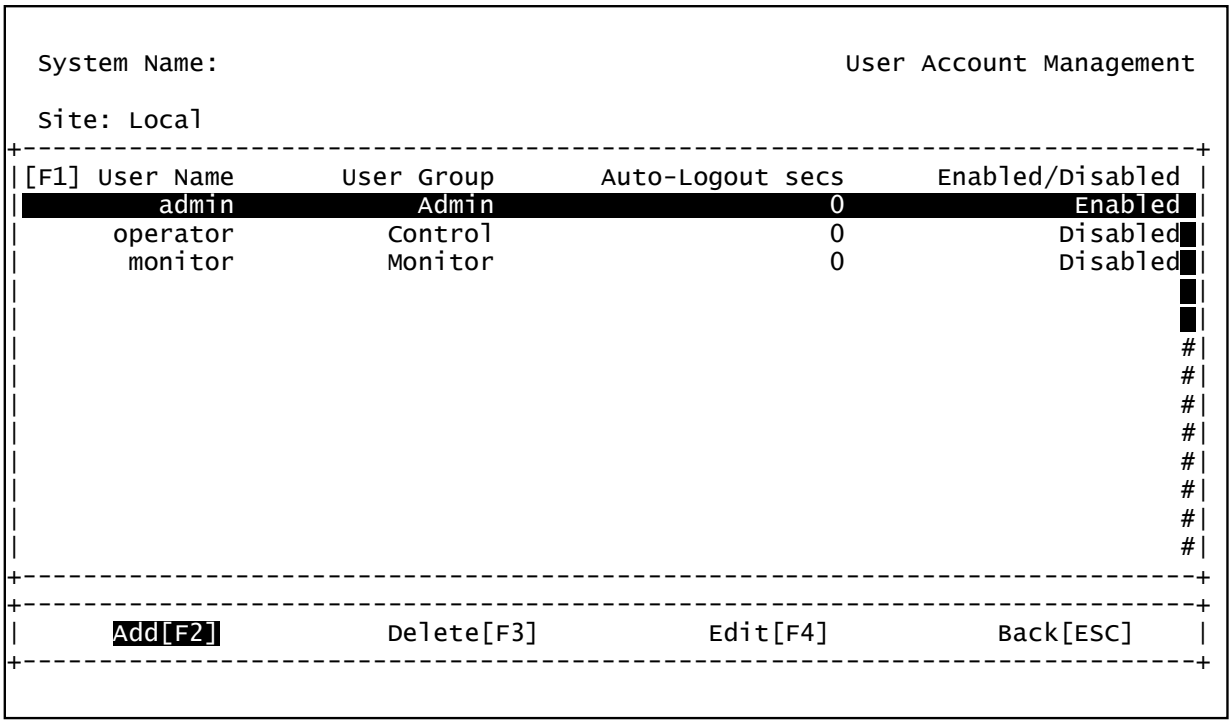


The system administrator can set the system device IP, subnet mask and default gateway on this screen.

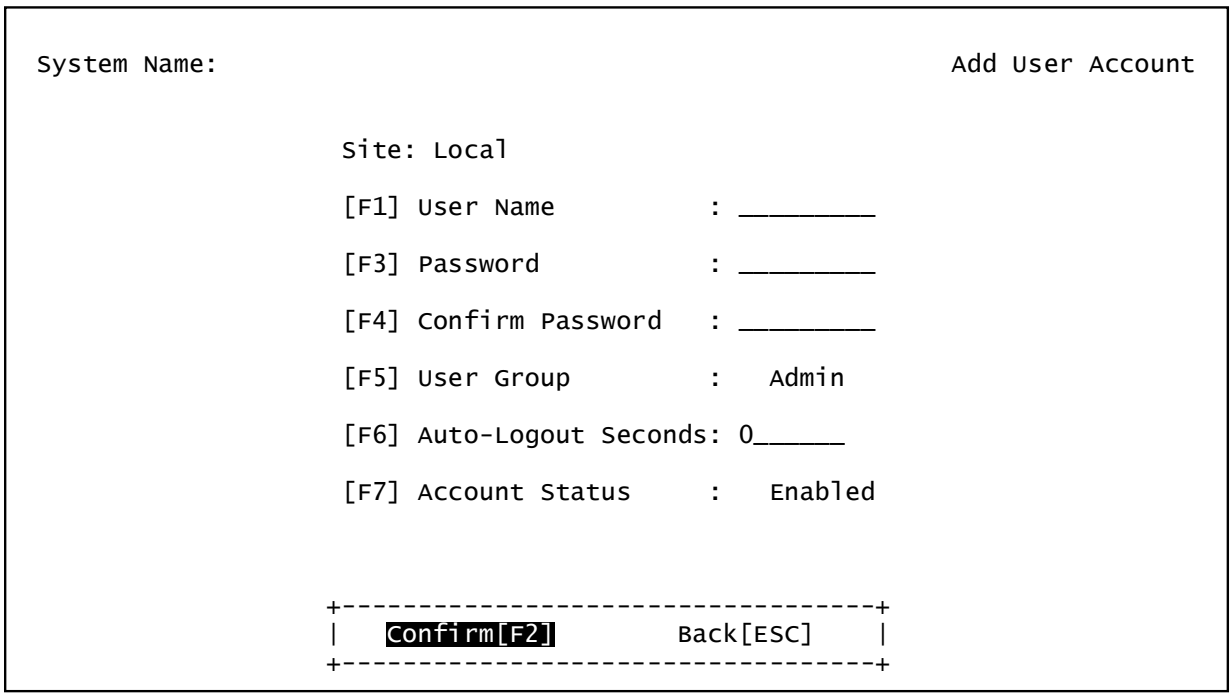
[F2] Confirm : When administrator changes any IP related data, press [F2]function and the system will directly execute and the settings will become the new running IP status.

[F5]Set Only : When administrator changes any IP related data, press [F5] to storage in temporary memory. The system will wait until [F2] is pressed before becoming running IP status.

5.3.3 User Account Management



Fiber Multiplexer provides three levels of the user groups.
Admin :the administrator group account can execute all functions.
Control :the controller group account can execute all functions except the System Configuration.
Monitor :the monitor group account only can monitor the system except that execute setting command.



The default Auto-Logout Seconds is 0, which means the auto-logout function is disabled.

Administrator can also disable the account status.

5.3.4 SNMP Agent Configuration

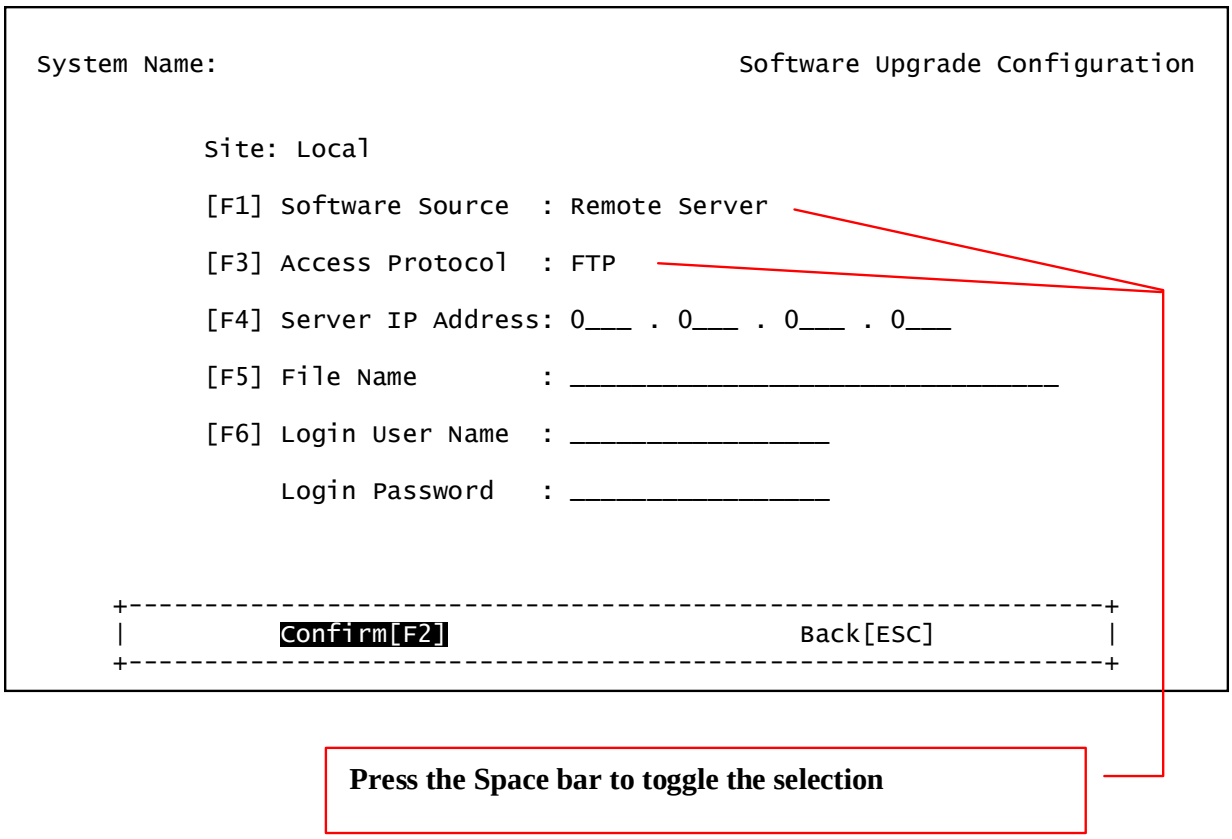
```
System Name:                                        SNMP Agent Configuration

              Site: Local

              [F1] Trap IP Address 1   : 0___ . 0___ . 0___ . 0___

              [F3] Trap IP Address 2   : 0___ . 0___ . 0___ . 0___

              [F4] Trap IP Address 3   : 0___ . 0___ . 0___ . 0___

                   Trap IP Address 4   : 0___ . 0___ . 0___ . 0___

              [F5] Read Community Name : public____________________

              [F6] Write Community Name: private___________________

              [F7] Trap Community Name : public____________________

              [F8] Send Snmp Authentication Failure Trap : N

              +-------------------------------------------------+
              |       Confirm[F2]                Back[ESC]      |
              +-------------------------------------------------+
```

The Fiber Multiplexer can assign four sets of the Manager IP address to send Traps.
The default Read Community is public.
The default Write Community is private.
The default Trap Community is public.

Enable the "Send SNMP Authentication Failure Trap" function to send trap when the user authentication fails.

5.3.5 Software Upgrade Configuration

5.3.5.1 Remote Server Method

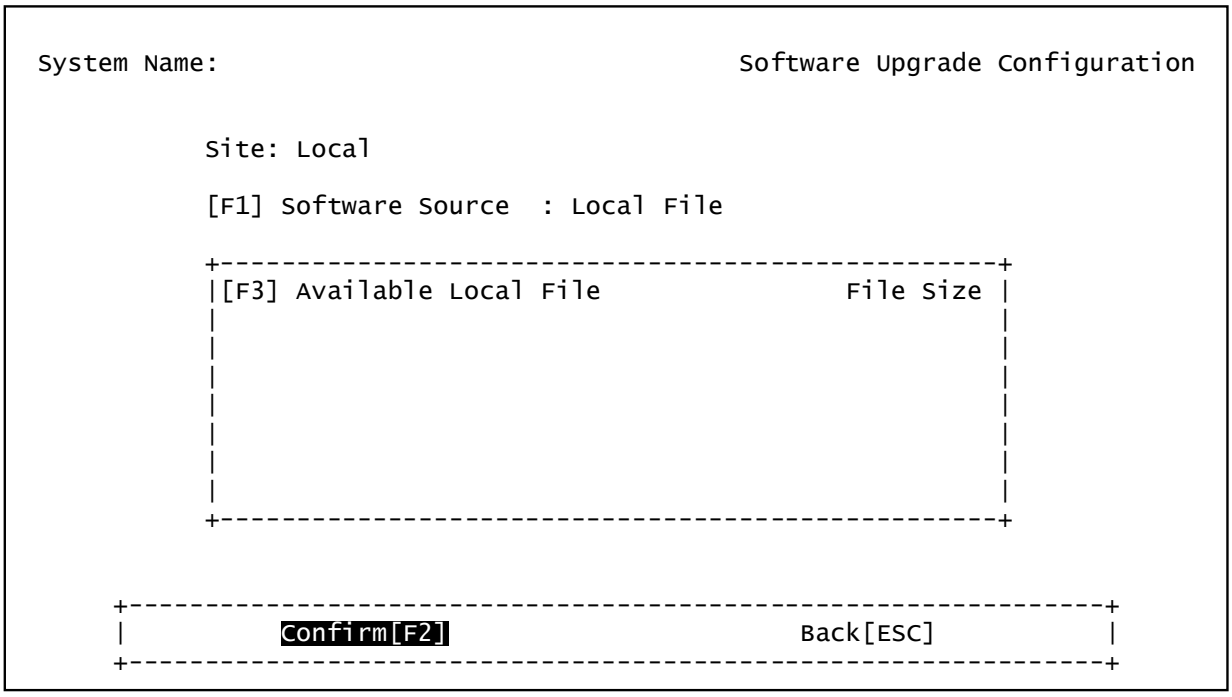


Fiber Multiplexer can support System Software Upgrade using one of two different methods.
Remote Server or Local File

For Remote server source selection :
Access Protocol : select the protocol you want to use, i.e. TFTP or FTP
Server IP Address : the server IP address where the new firmware is saved.
File Name : the filename of new firmware. (ex : *.cmp)
Login User Name : key in the remote server's user name (for FTP only).
Login Password : key in the remote server's password (for FTP only).

Press [F2] to start the upgrade.

5.3.5.2 Local File Method



For Local File source selection : The screen will show the available file stored in the system.

When you place an image file in the local unit, if you restart or power cycle re-boot, that image will no longer be available.

5.3.6 Software Upgrade and Reboot Operation

```
System Name:                          Software Upgrade and Reboot Operation

           Site: Local

           [F1] Operation Target: Local+Remote

                Software Boot Status:

                           Local: Idle

                          Remote: Idle

                Software Upgrade Status:

                           Local: Idle!

                          Remote: Idle!

     +-----------------------------------------------------------------+
     |     Upgrade[F2]            Reboot[F3]            Back[ESC]      |
     +-----------------------------------------------------------------+
```

This function is used to upgrade the local and/or remote unit, or reboot the unit. To run upgrade the user must first complete the setting of the ***Software Upgrade Configuration***.

When user selects the [F3] Reboot command item in local or remote side, the display will show the message :

"Start rebooting!",
"Ongoing!",
"Complete, Bye-!",
"None"

When user executes the Upgrade command item in local or remote side, the display will show the status :

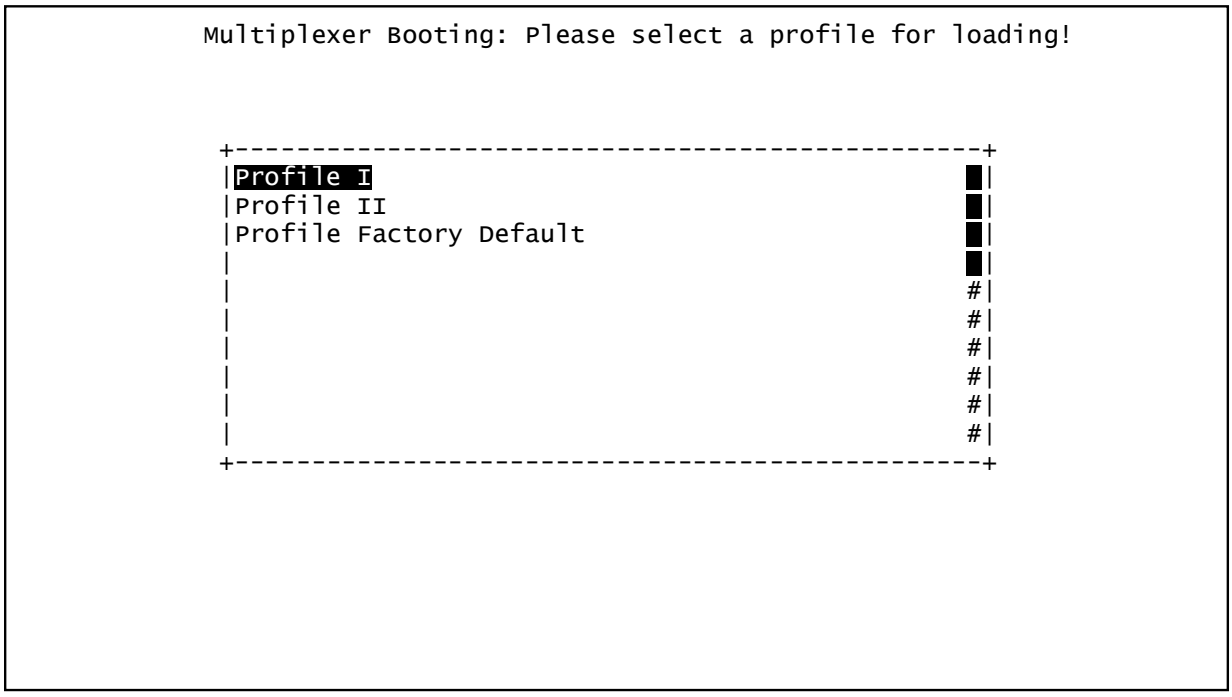
"Start upgrading!",
"Connecting!",
"Transferring!",
"Loading!",
"DeCompressing!",
"Flash writing!",
"Sending!",
"Upgrading complete!",
"Error!",
"None"

When there is a software upgrade error, the display will show one of the following error messages :

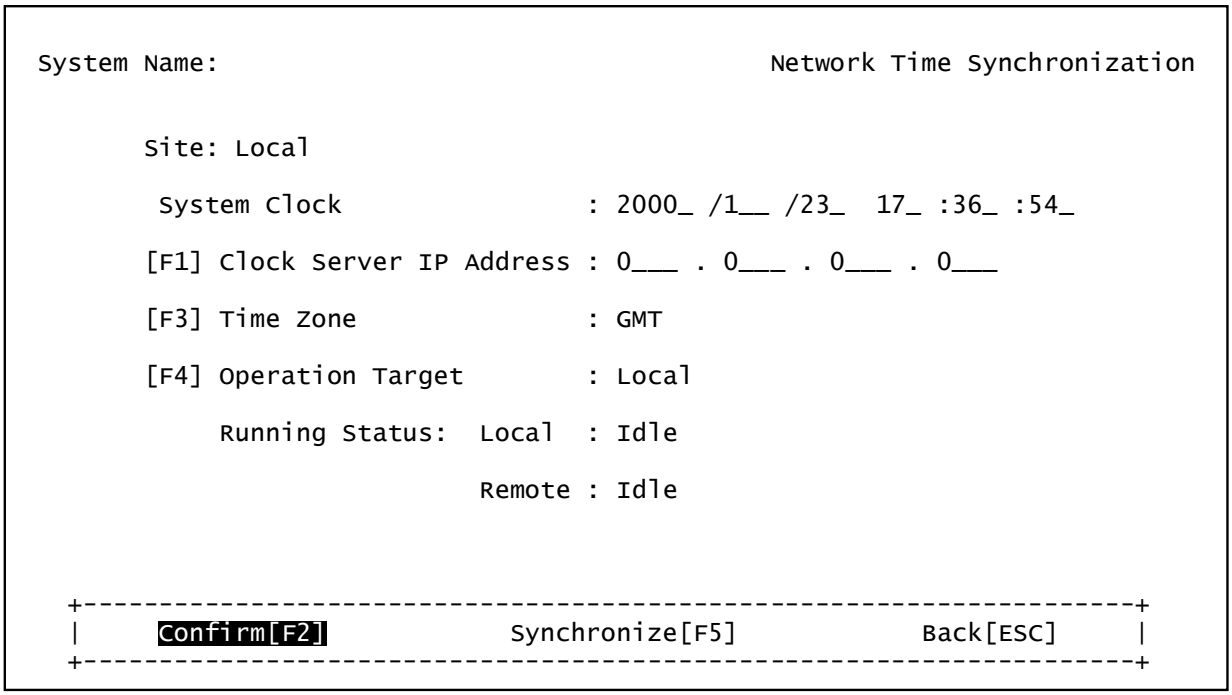
"Internal error!",
"Local file not found!",
"Information incomplete!",
"Upgrading is running!",
"Connect failed!",
"Transfer failed!",
"Read failed!",
"Image file too large!",
"Disconnect failed!",
"Decompress code failed!",
"Invalid image format!",
"Abort by user!",
"None!"

When the unit first boots, the profile selection screen will be displayed. Profile I will load by default without any user interaction after three seconds. Please select a profile to be loaded by using up/down arrow keys.

If you want to hold the screen, please press any key.



5.3.7 Network Time Synchronization



The system provides the ability to synchronize time to time server using standard NTP protocol. Setup the time server's IP address and set the time zone. Then execute the Start synchronizing command [F5]. The system clock will be automatically corrected via Network Time Protocol.

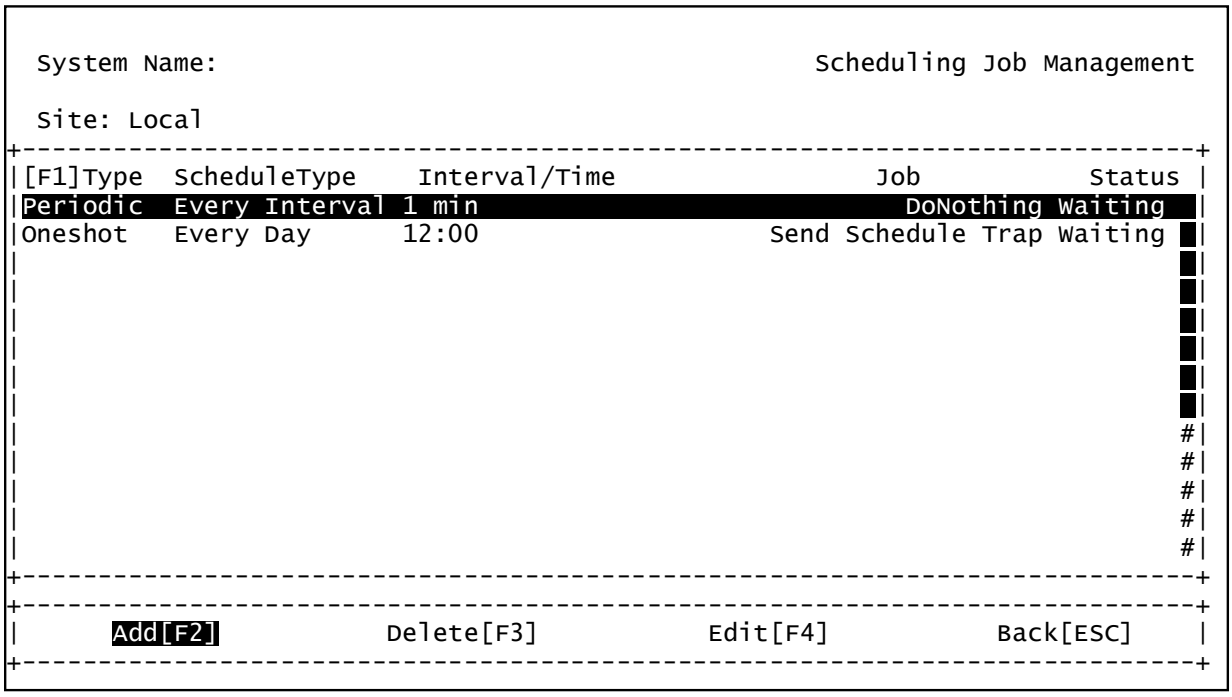
When user selects the synchronization command item in local or remote side, and "running status" will show the following messages :

"Start Synchronizing!"
"Synchronizing!",
"Synchronizing Complete!",
"Synchronizing Error!",

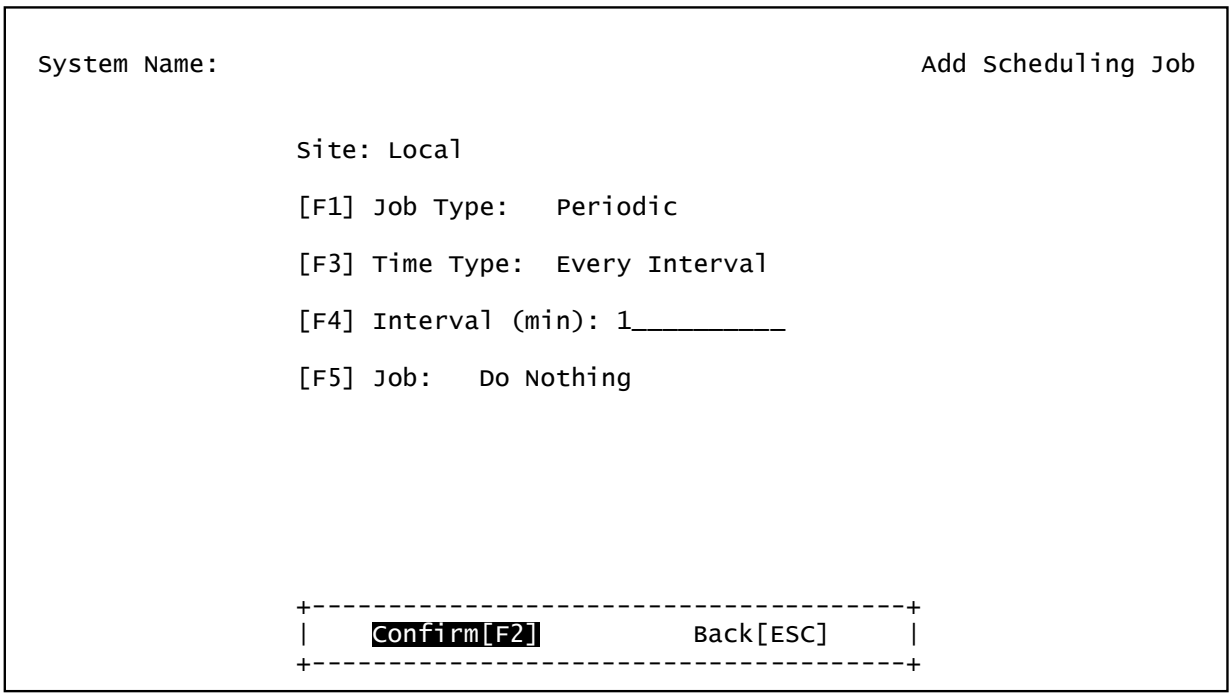
When any error of synchronization occurs, one of the below error messages will shown :

"Internal Error!",
"Information Incomplete!",
"Synchronization is running!",
"Time Get Error!",
"Abort by user!",
"Timeout!",
"No Error"

5.3.8 Scheduling Job Management



The Scheduling Job Management function provides the automatic timely reporting capability. The system administrator can arrange the schedule for every kind of job. The job description is following as below.



Job Type :

Periodic (set a time period to do some scheduled task)
One shot (perform a scheduled task just one time)
Booting (perform a task at boot time)

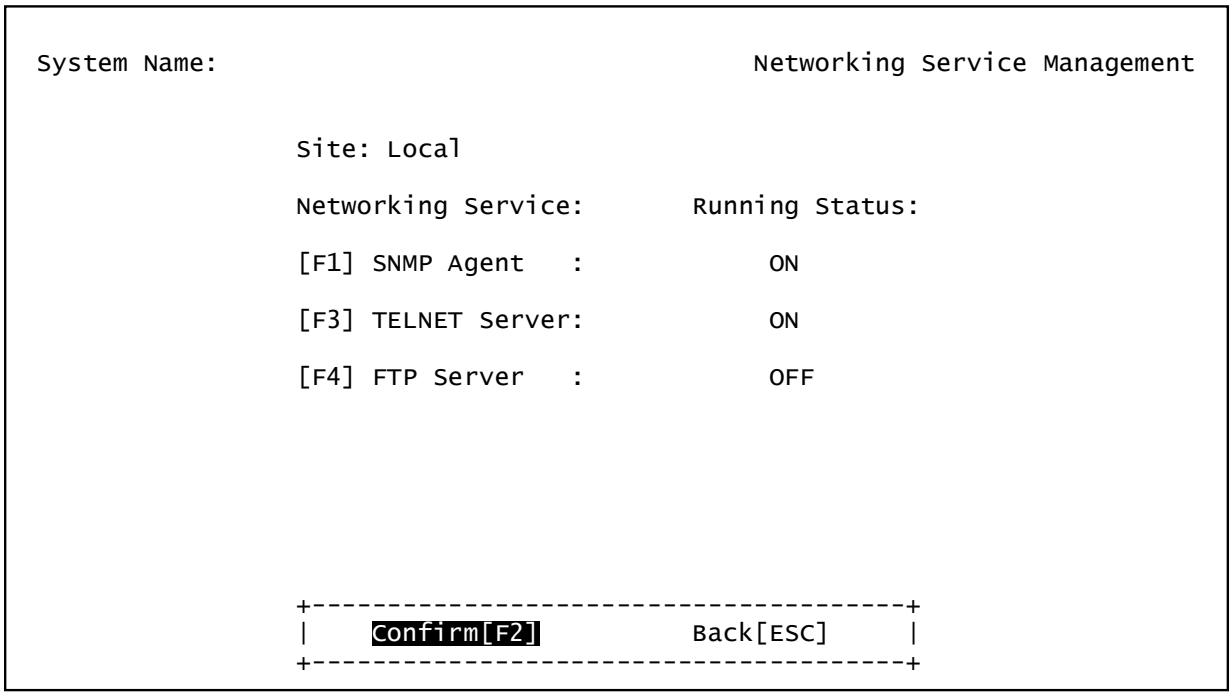
Schedule Type : Every Interval / Every Day

Interval/Time : Setting the interval time in minutes
Set specific time for every day schedule

Job : Send Schedule Trap, Send Time Sync Request Trap, Software Upgrade, Network Time Synchronization, System Reboot, or Do Nothing.

Press [F2] to confirm.

5.3.9 Networking Service Management

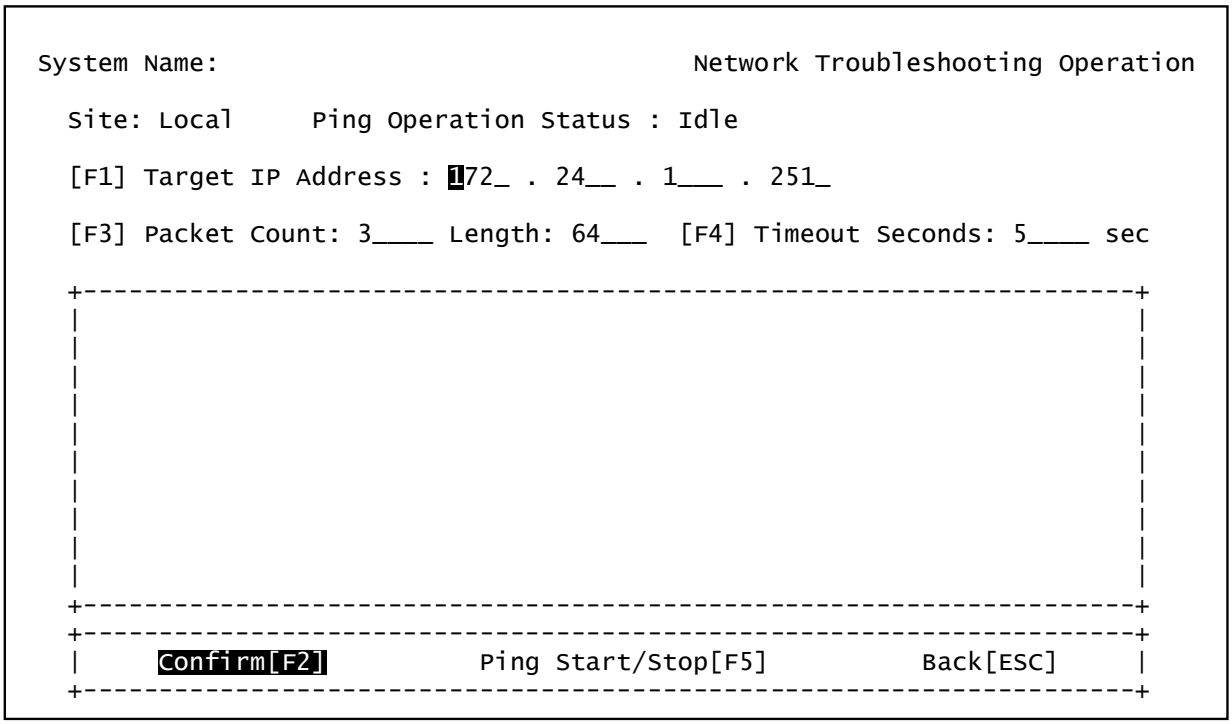


The system can turn on or turn off the functions of the SNMP Agent, TELNET Server, and FTP Server.

When FTP Server starts up, the device can act as a client or server. However there is only a small amount of memory storage, enough for user to do software upgrade and save EventLog.

Info :When you place the upgrade image file locally, if you restart or power cycle, the image will disappear.

5.3.10 Network Trouble Shooting Operation

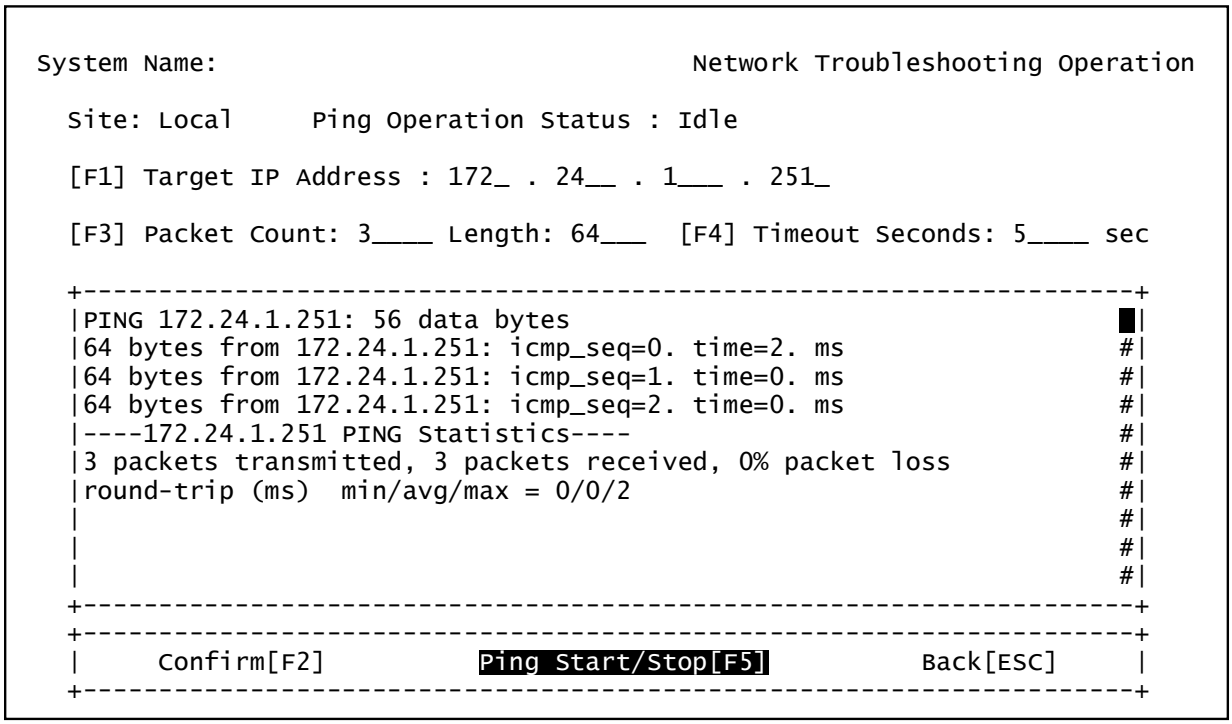


This function can provide tests to determine whether links to the network work or not. The system provides the following Network troubleshooting functions.

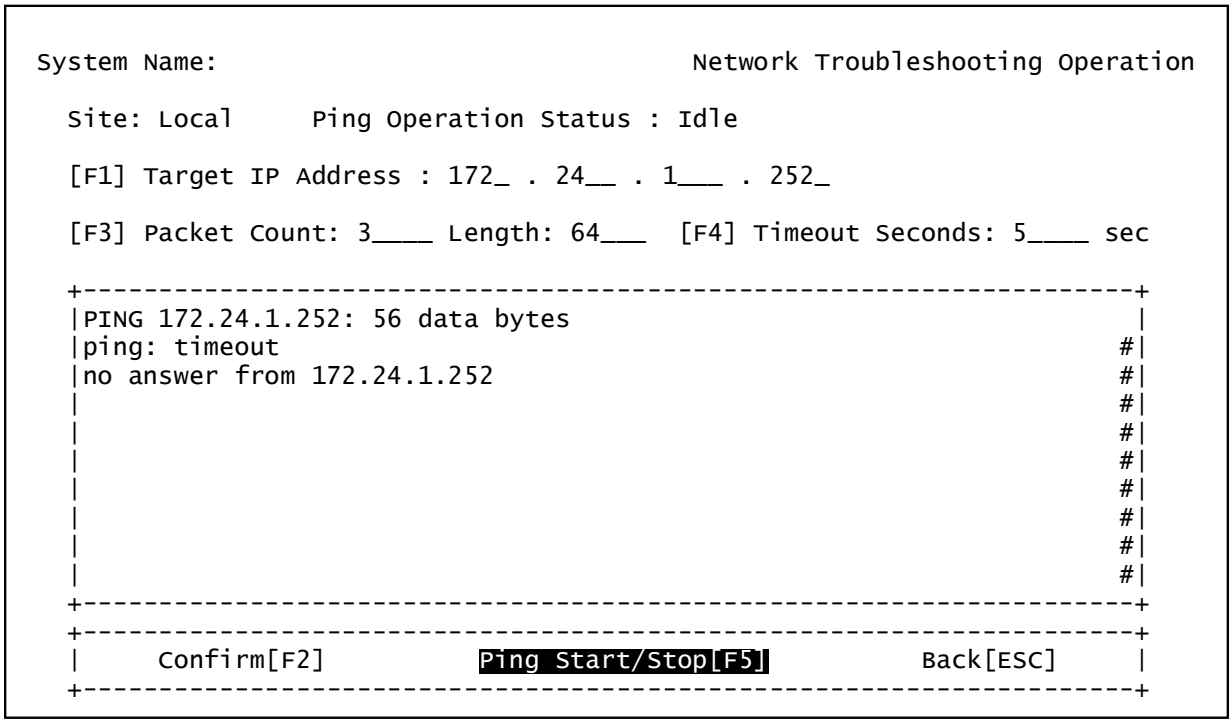
A Ping function is available with settings for the Target IP address, Packet Count, Packet Length and Timeout Seconds. First execute to Confirm [F2] command and then execute Ping start [F5].

Info : The system device IP is must be set up

When target IP ping succeeds, the display will show the following :



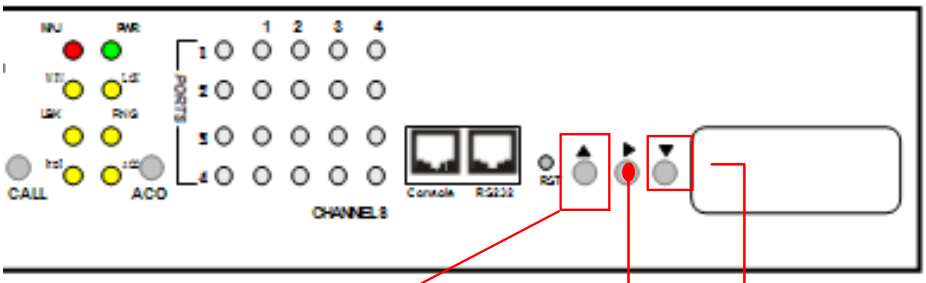
When target IP ping fails, the display will show the following :



5.3.11 LCD Login Configuration

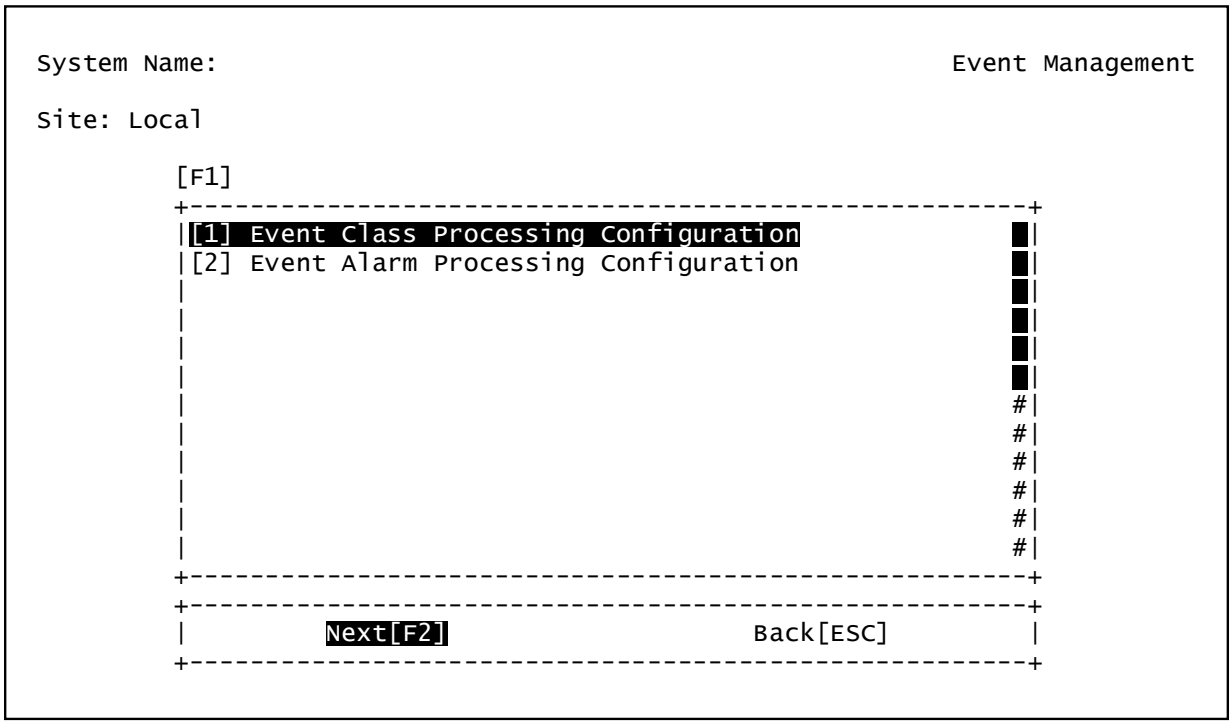
```
System Name:                                        LCD Login Configuration

              Site: Local

              [F1] Auto LCD Logout Seconds   : 0_____

              [F3] Auto Backlight Off Seconds: 600____

              [F4] LCD Pass Key 1 :   Up

              [F5] LCD Pass Key 2 :   Right

              [F6] LCD Pass Key 3 :   Down

              [F7] LCD Pass Key 4 :   Up


              +-------------------------------------+
              |    Confirm[F2]          Back[ESC]   |
              +-------------------------------------+
```

User can define the 'key combination' login password for the LCD front panel login sequence.
Enter the sequence for key 1 to key 4 using function keys [F4]~[F7] and Space bar.
Confirm by using function key [F2].



"Up" the first key, with up arrow
"Right" the second key, with right arrow
"Down" the third key, with down arrow

5.3.12 Event Management



Fiber Multiplexer provides Event Management function which includes Event Class Processing Configuration and Event Alarm Processing Configuration. See the following page.

5.3.12.1 Event Class Processing Configuration

```
System Name:                              Event Class Processing Configuration

Site: Local

                     Event Class   Save Flash:   Send Trap:

                [F1] Config   :        N             N

                [F3] Alarm    :        N             N

                [F4] Operation:        N             N









                +--------------------------------------+
                |    Confirm[F2]          Back[ESC]    |
                +--------------------------------------+
```

The event class processing configuration function can set the events of configuration, alarm, and operation to be saved in the flash or sent by trap message.

"N" : do not save in the flash or send by trap
"Y" : save in the flash or send by trap

If NMS system has not received alarm trap, please confirm the send trap function is enabled.

5.3.12.2 Event Alarm Processing Configuration

```
System Name:                          Event Alarm Processing Configuration

Site: Local

                     Alarm Severity   Save Flash:  Send Trap:

               [F1] Critical:          N            N

               [F3] Major   :          N            N

               [F4] Minor   :          N            N

               [F5] Warning :          N            N




               +--------------------------------------+
               |    Confirm[F2]          Back[ESC]    |
               +--------------------------------------+
```

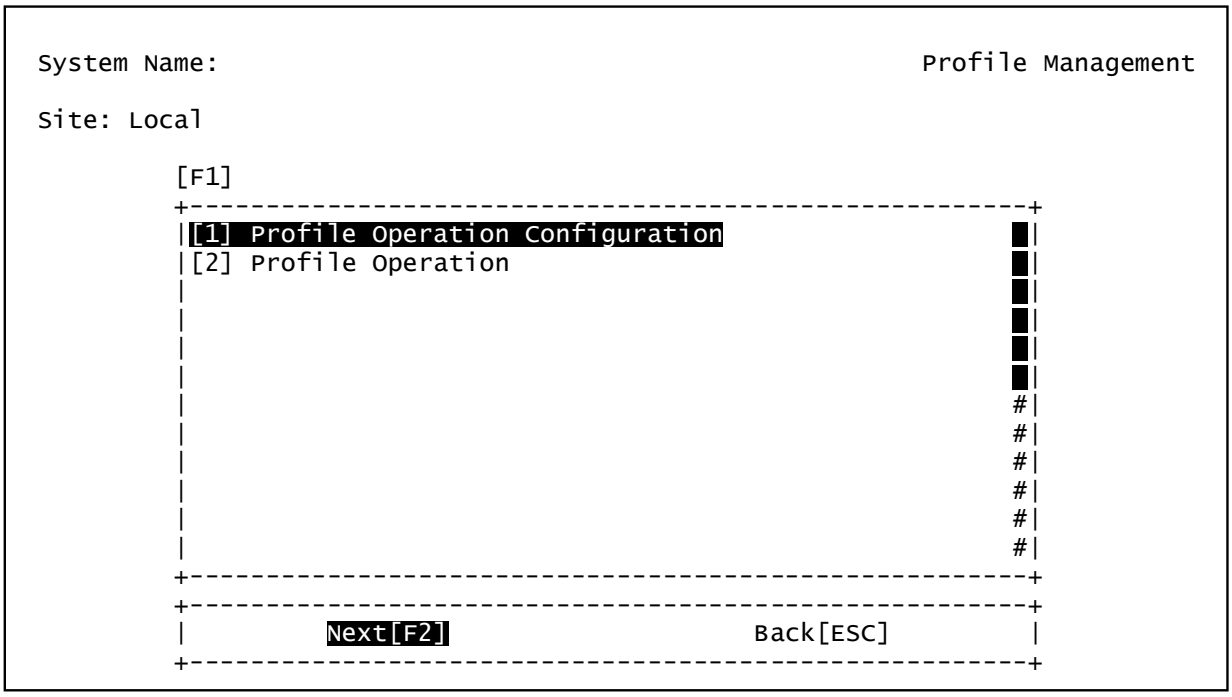
The event alarm processing configuration function can set different severity for the events to save in the flash or to send by trap.

There are four classes of the alarm severity :
Critical
Major
Minor
Warning

If the NMS system has not received alarm trap, please confirm the send trap function is enabled.

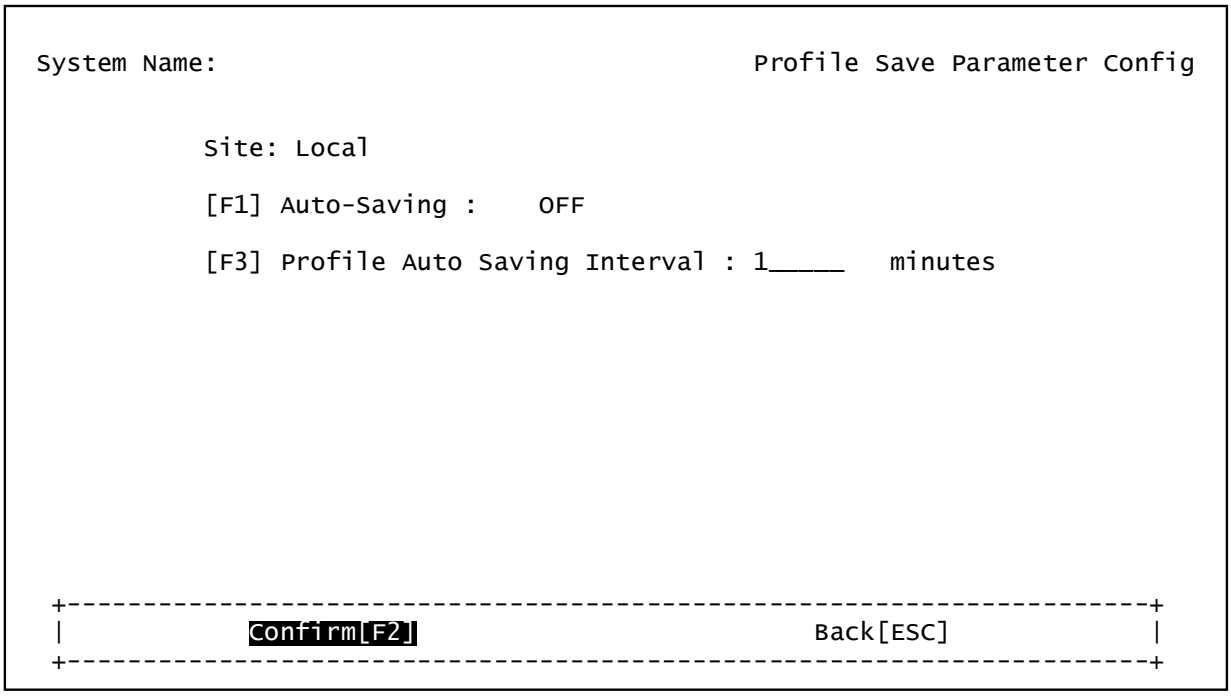
5.3.13 System Profile Management

Use 'ESC' to return to the ***Main Menu***, select item "1" and press [F2] to go to ***System Configuration***. Select item 'd', ***System Profile Management***, and press [F2]. The following screen will be displayed.



5.3.13.1 Profile Save Parameter Config

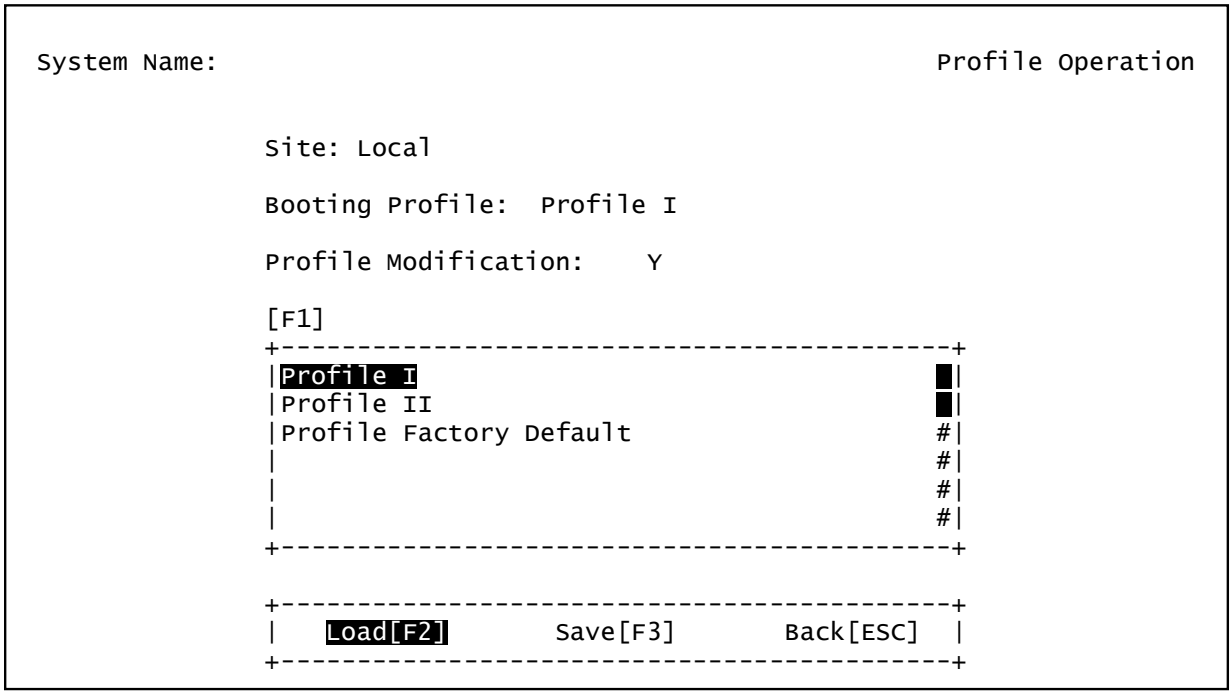
Pressing [F2] from the ***Profile Management*** page will bring up the ***Profile Save Parameter Config*** page. Use this page to enable or disable the "auto save" function and set the "auto save interval". When auto save is enabled, changes made to the configuration by any means (LCD, Console, Web, etc.) will automatically be saved to Profile I at the predefined time interval.



The Fiber Multiplexer provides an Auto-Saving function, and auto saving interval.

5.3.13.2 Profile Operation

The Fiber Multiplexer has three profile locations in non-volatile memory. Profile I and Profile II may contain user programmed profile data (i.e. configuration). The factory default profile is read-only and set at factory. Loading this profile will restore all settings of the multiplexer back to their factory originals.



The profile settings can be selected between the local or remote multiplexer. The default boot profile may be configured so that this is the profile automatically loaded when the multiplexer is cold started.

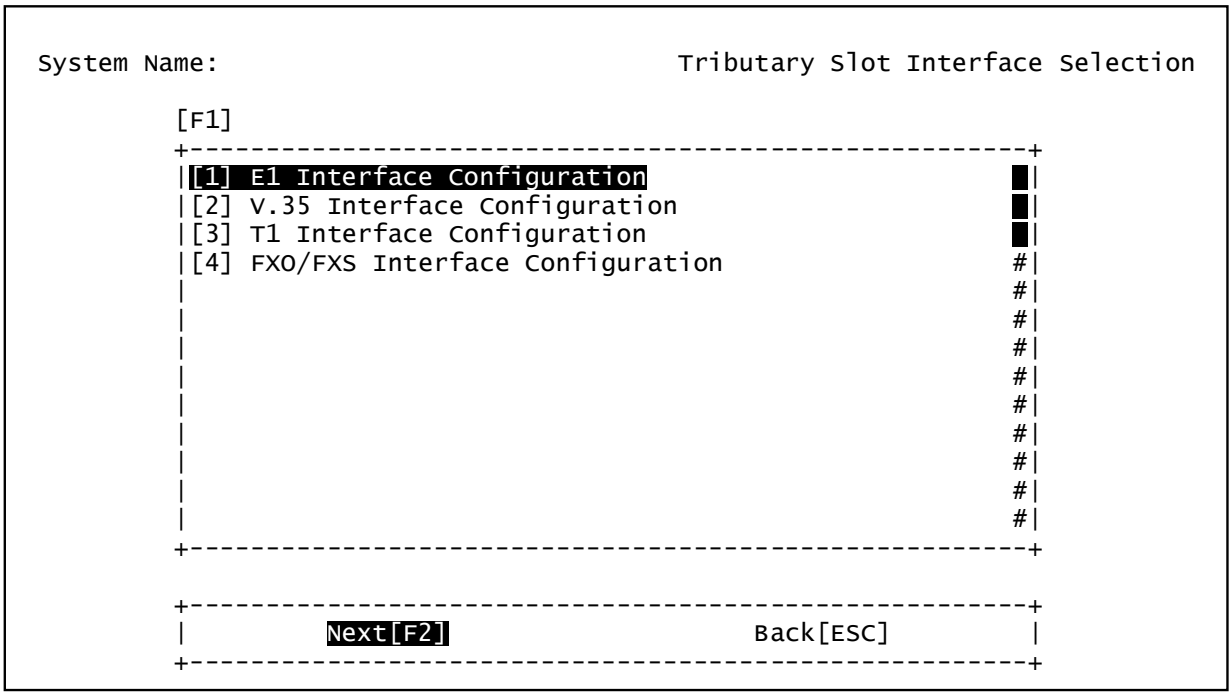
If the active profile had been changed during the configuration process, the "Profile Modification" will show "Y". This reminds the user that in order to keep settings, the profile must be saved.

You may select profile I or II then press [F3] function to save the current active configuration to it. The next subsequent boot process will automatically configure the system with the saved profile. You may also select either profile I or II then press [F2] function to immediately load the previously saved profile into active configuration.

To restore to factory default, simply use the up/down arrow keys to highlight the ***Profile Factory Default***, then press [F2] and confirm the load with <OK>. If you want to reboot with factory defaults, then you need to load the factory default and then save it to the default boot profile.

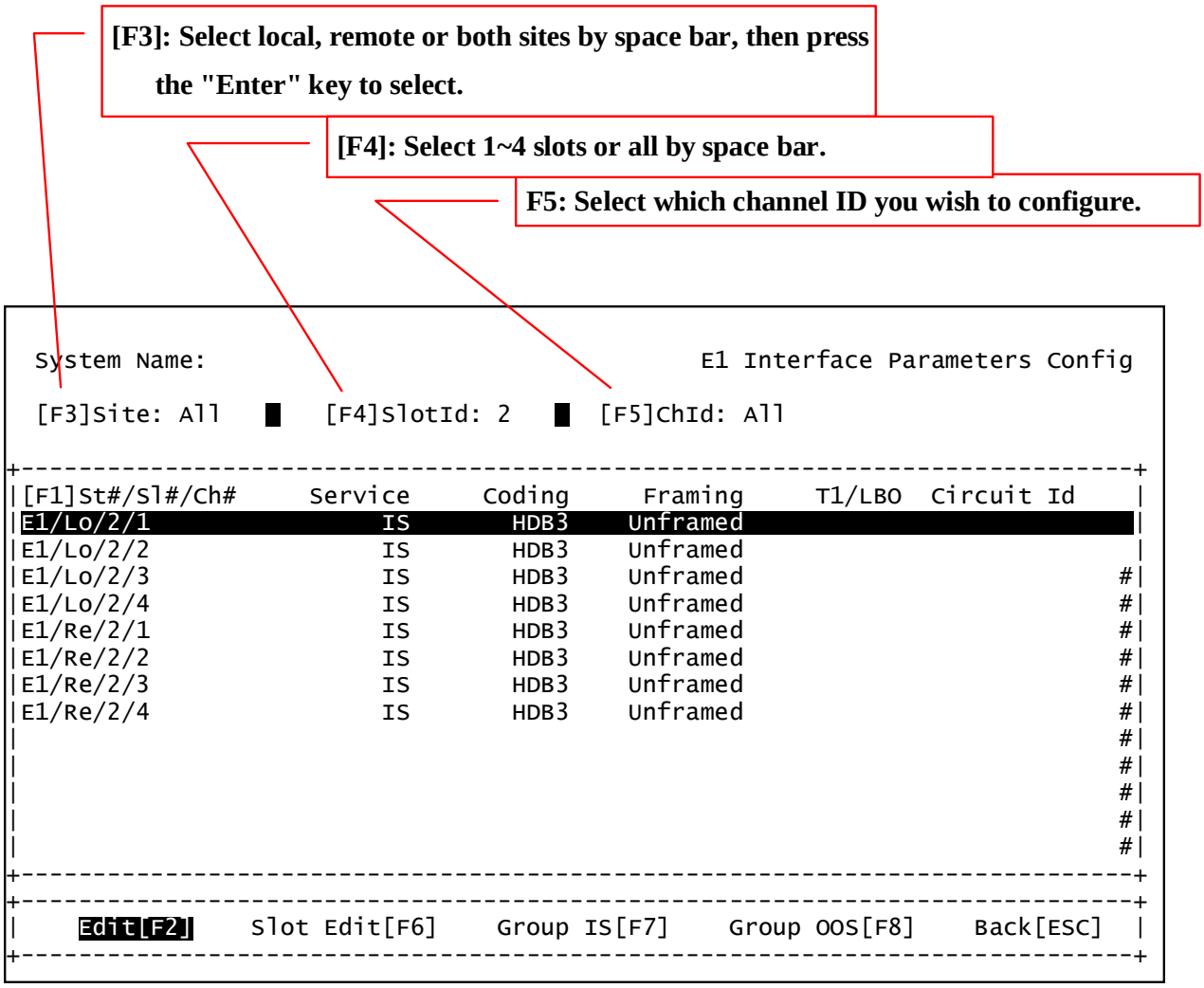
5.4 Tributary Slot Interface Selection

There are two ways to configure these tributary cards one is in this screen and the other is in Chapter 5.12 ***Equipment Status Monitoring*** screen.



Fiber Multiplexer provide four tributary interfaces :
(1) E1 Interface Configuration
(2) V.35 Interface Configuration
(3) T1 Interface Configuration
(4) FXO/FXS Interface Configuration

5.4.1 E1 Interface Configuration



You can edit E1 Parameters for each channel or all channels of the selected slot.

[F6] Slot Edit- Edit the parameters of all channels in the same slot.
[F7]/ [F8]- You can just press [F7] or [F8] to let the selected channel in the screen go into the In-service state or out of service

If the EOC connection is lost, a symbol "-" will be shown for each remote unit configuration.

If user uses "4xE1S" (Simple) E1 card, it does not support framing function (it is unframed ONLY).

[F2] Edit channel screen is shown below :

```
System Name:                                    E1 Parameters Channel Editing

               Location : Local/Slot 1/Ch 1

               [F1] Circuit Identifier : ________________

               [F3] Service Mode       :   IS

               [F4] Frame Type         :   Unframed

               [F5] Line Coding        :   HDB3




 +-----------------------------------------------------------------------+
 |            Confirm[F2]                          Back[ESC]             |
 +-----------------------------------------------------------------------+
```

The Fiber Multiplexer has two service modes which can select : OOS (Out of service) or IS (In service)

There are three types of E1 services : FAS+CRC, FAS only, Unframed. For 4xE1S module, Unframed is the only supported frame type.

There are two types of E1 Line Coding : HDB3 or AMI

5.4.2 V.35 Interface Configuration

```
 System Name:                                V.35 Interface Parameters Config

 [F3]Site: All       [F4]SlotId: 4      [F5]ChId: All

+-------------------------------------------------------------------------------+
|[F1]St#/Sl#/Ch# Serv   ClkSrc Frame/PCM DataRate  TxClk  RxClk  Circuit Id    |
|V.35/Lo/4/1       IS Internal  Unframed    2048K Normal Normal                 |
|V.35/Lo/4/2       IS Internal  Unframed    2048K Normal Normal                  |
|V.35/Lo/4/3       IS Internal  Unframed    2048K Normal Normal                #|
|V.35/Lo/4/4       IS Internal  Unframed    2048K Normal Normal                #|
|V.35/Re/4/1       IS Internal  Unframed    2048K Normal Normal                #|
|V.35/Re/4/2       IS Internal  Unframed    2048K Normal Normal                #|
|V.35/Re/4/3       IS Internal  Unframed    2048K Normal Normal                #|
|V.35/Re/4/4       IS Internal  Unframed    2048K Normal Normal                #|
|                                                                             #|
|                                                                             #|
|                                                                             #|
|                                                                             #|
|                                                                             #|
+-------------------------------------------------------------------------------+
+-------------------------------------------------------------------------------+
|    Edit[F2]    Slot Edit[F6]    Group IS[F7]    Group OOS[F8]    Back[ESC]   |
+-------------------------------------------------------------------------------+
```

If the EOC (Embedded Operations Channel) connection is closed, a symbol "-" will be shown for each Re (remote) configuration. (for example, if fiber link is down it will effect EOC)

[F2] Edit channel screen is shown below :

```
 System Name:                                  V.35 Parameters Ch Editing

               Location : Local/Slot 4/Ch 1

               [F1] Circuit Identifier : ___________________

               [F3] Service Mode  :   IS

               [F4] Clock Source  :   Internal

               [F5] Tx Clock      :   Normal

               [F6] Rx Clock      :   Normal

               [F7] Data Rate     :   2048K

               [F8] Frame Mode    :   Unframed

  +-------------------------------------------------------------------------+
  |            Confirm[F2]                              Back[ESC]           |
  +-------------------------------------------------------------------------+
```

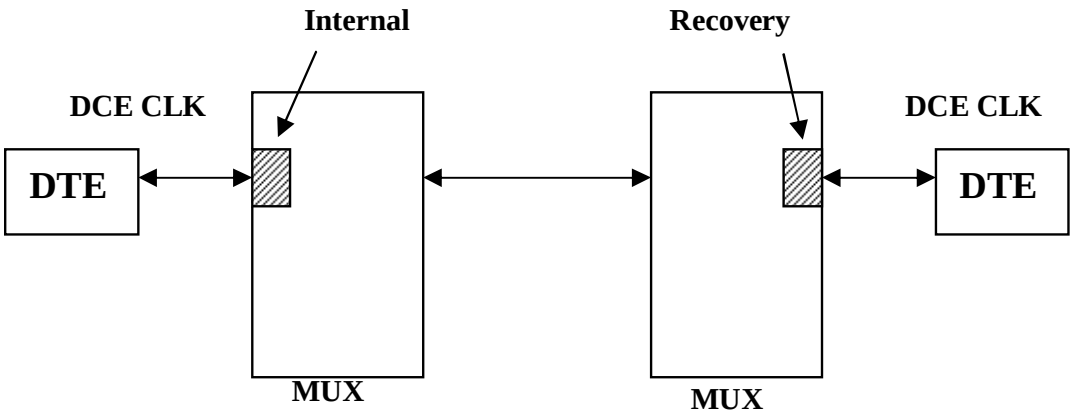
You can set the clock source for TC/RC as well as the polarity of TC and/or RC clock to fit the requirements of different DTEs and varying data cable lengths.

Date Rate

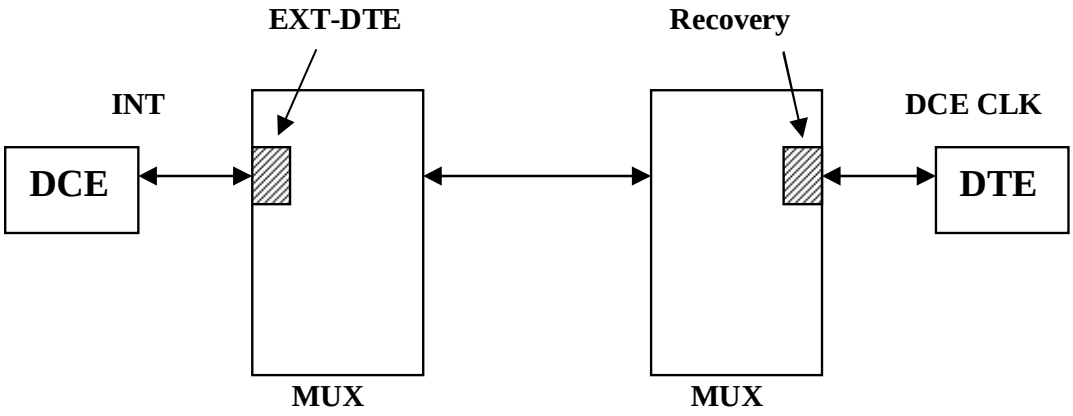
- PCM31 : 64K~1984K
- PCM30 : 64K~1920K
- Unframed : 2048K

To have stable V.35 data transmission performance, you must make sure to set the correct clock mode. The following are two examples of setting.

(1)



(2)



5.4.3 T1 (DS1) Interface Configuration

```
 System Name:                                  T1 Interface Parameters Config

 [F3]Site: All       [F4]SlotId: 2      [F5]ChId: All

+-------------------------------------------------------------------------+
|[F1]St#/Sl#/Ch#     Service     Coding     Framing     T1/LBO  Circuit Id   |
|T1/Lo/2/1                IS       B8ZS    Unframed   0-133 ft              |
|T1/Lo/2/2                IS       B8ZS    Unframed   0-133 ft              |
|T1/Lo/2/3                IS       B8ZS    Unframed   0-133 ft             #|
|T1/Lo/2/4                IS       B8ZS    Unframed   0-133 ft             #|
|T1/Re/2/1                IS       B8ZS    Unframed   0-133 ft             #|
|T1/Re/2/2                IS       B8ZS    Unframed   0-133 ft             #|
|T1/Re/2/3                IS       B8ZS    Unframed   0-133 ft             #|
|T1/Re/2/4                IS       B8ZS    Unframed   0-133 ft             #|
|                                                                         #|
|                                                                         #|
|                                                                         #|
|                                                                         #|
|                                                                         #|
+-------------------------------------------------------------------------+
+-------------------------------------------------------------------------+
|    Edit[F2]    Slot Edit[F6]    Group IS[F7]    Group OOS[F8]    Back[ESC]  |
+-------------------------------------------------------------------------+
```

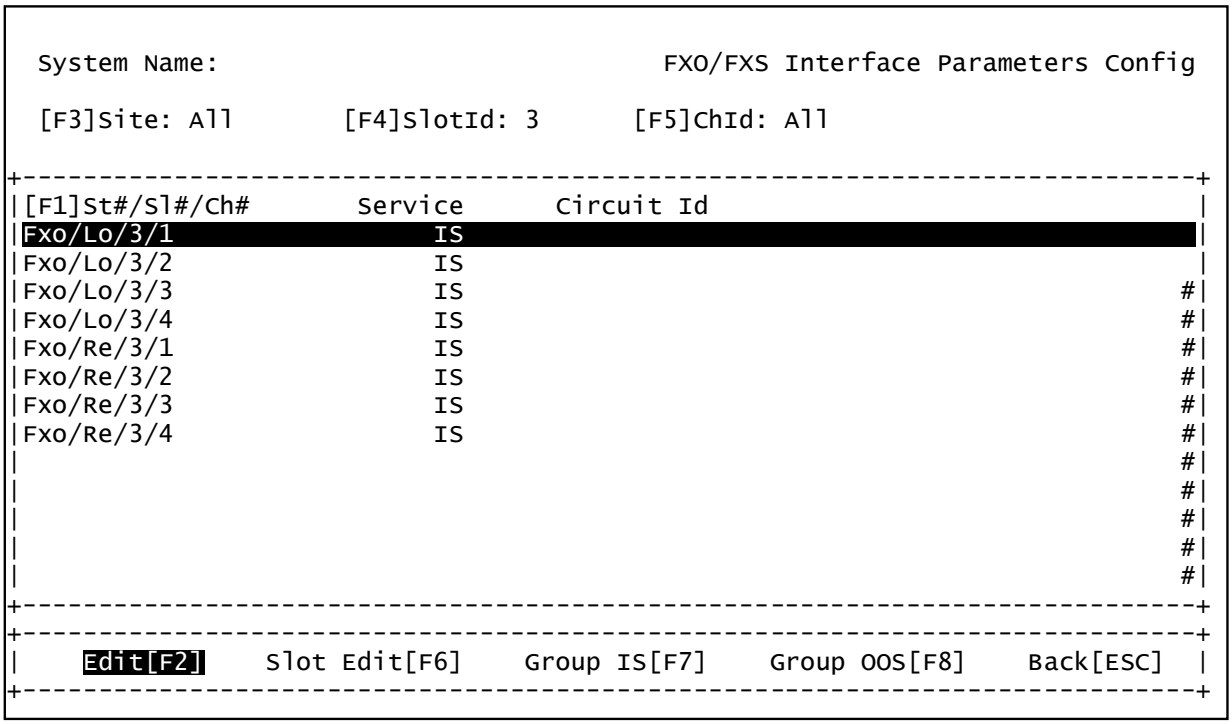
If the EOC (Embedded Operations Channel) connection is closed, a symbol "-" will be shown for each Re (remote) configuration. (for example, if fiber link is down it will effect EOC)

[F2] Edit channel screen is shown below :

```
 System Name:                                  T1 Parameters Channel Editing


                Location : Local/Slot 1/Ch 1

                [F1] Circuit Identifier : ________________

                [F3] Service Mode       :   IS

                [F4] Frame Type         :   Unframed

                [F5] Line Coding        :   B8ZS

                [F6] LBO Setting        :   0-133 ft




  +-----------------------------------------------------------------------+
  |            Confirm[F2]                          Back[ESC]             |
  +-----------------------------------------------------------------------+
```

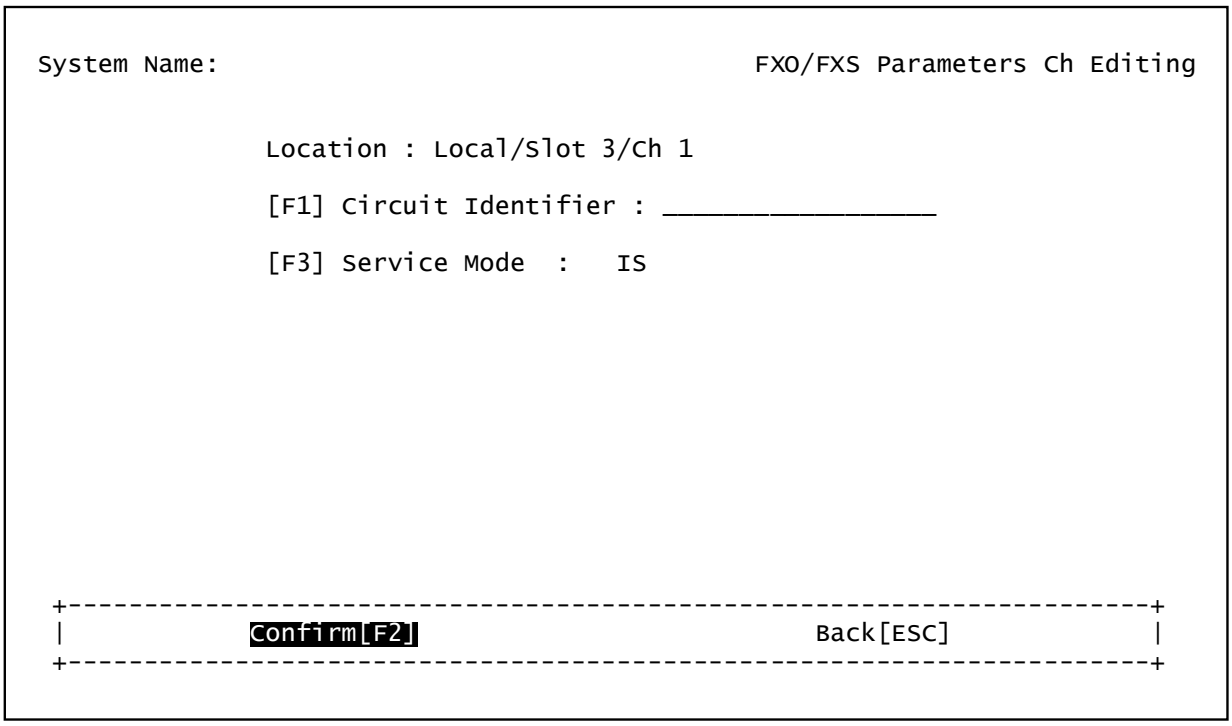
There are two T1 Line Codings : B8ZS or AMI
There are five LBO (Line Build Out) settings : 0-133ft / 133-266ft / 266-399ft / 399-533ft / 533-655ft .
4xT1 card modules supports unframed, clear channel T1 (DS1) only.

5.4.4 FXO/FXS Interface Configuration



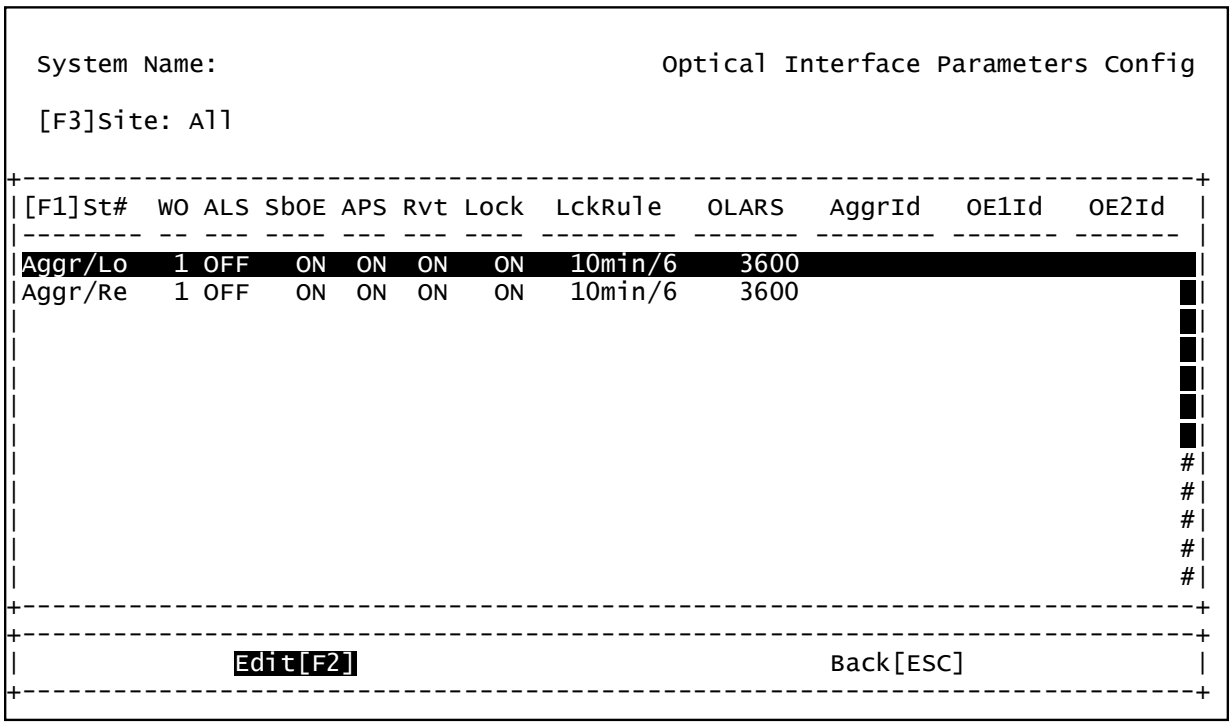
If the EOC (Embedded Operations Channel) connection is closed, a symbol "-" will be shown for each Re (remote) configuration. (for example, if fiber link is down it will effect EOC)

[F2] Edit channel screen is shown below :

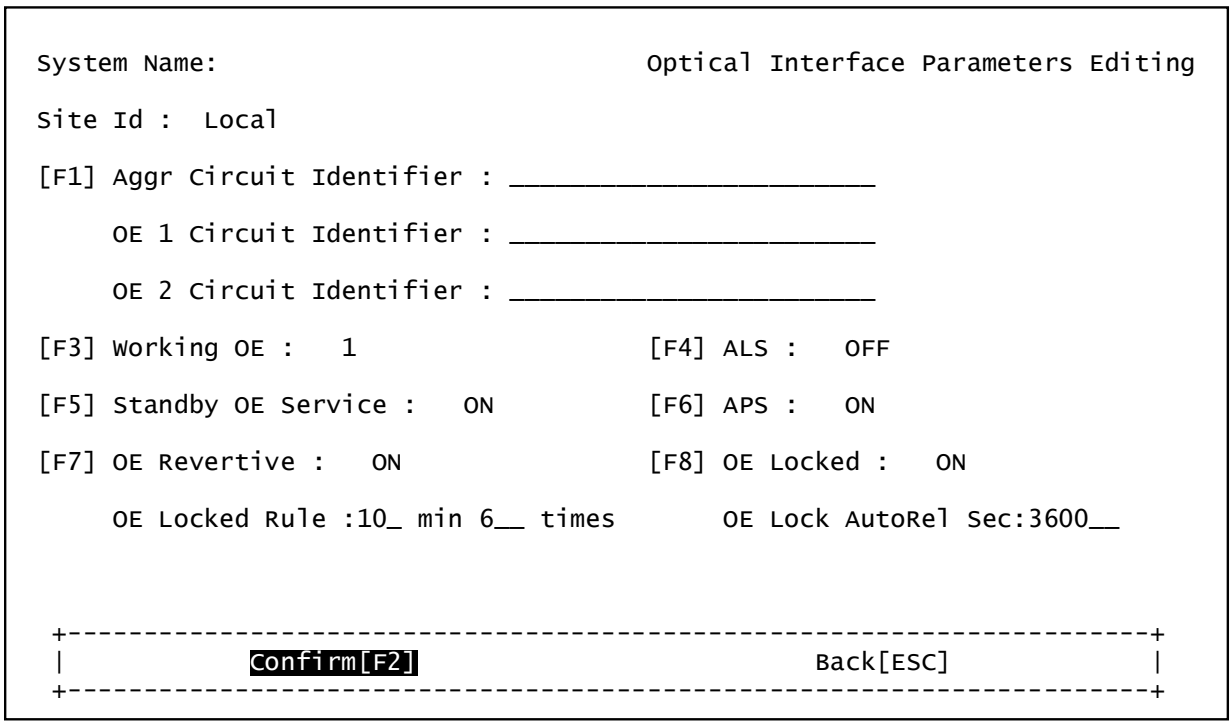


The only setting for FXO/FXS tributary is In-Service / Out-Of-Service setting.

5.5 Optical Interface Parameters Configuration



[F2] Edit channel screen is shown below :



[F4]ALS (Auto Laser Shutdown) : Please refer to the definition of ITU-T G.664, when Fiber Multiplexer detects " LOS " and the " ALS " function is enabled at the same time, then OE will shutdown the signal of Tx. It will try to re-detect the signal automatically every 100 seconds. If the alarm of LOS is not removed immediately, the device needs to wait another 100 seconds before turning the optical Tx on again. If the LOS status is cleared, the system will return to normal state and transmit laser signal again.

[F6] APS (Auto Protection Switch) : While "OFF" is selected, "OE Revertive/ OeLocked/ OeLocked Rule/ OE Lock AutoRel Sec" will disappear from the menu.

[F7] OE Revertive : When [F7] set to "OFF", "OeLocked/ OeLocked Rule/ Oe Lock AutoRel Sec" will disappear from the menu.

[F8] OE Locked : When [F8] set to "OFF", "OeLocked Rule/ Oe Lock AutoRel Sec" will disappear from the mneu.

When [F8] is set to "ON" :

OE Locked Rule : Locks the optical system if switched to protect line " m " times with in " n " minutes. ("n" and "m" depends on user's definition) (Default : m=6 ; n=10)

OE Locked AutoRel Sec : If the function of OE Locked is enabled, it will be auto-release after " x " seconds. (Default : x=3600)

Info : If the function of the OE Locked is activate, then it needs to be released as in the example screen of " 5.9 ***OE Protection Switching*** "

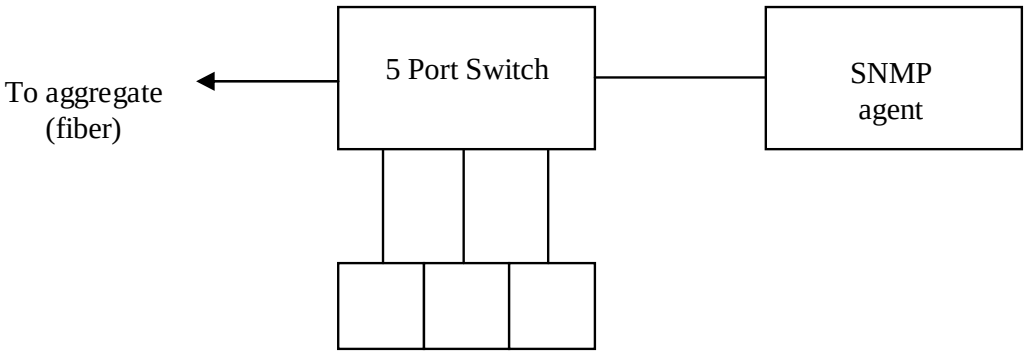
Info : User cannot configure the functions not showing on the menu. When user reboots the equipment, the setting reloads the default value.

5.6 Trunk Ethernet Parameters Configuration

5.6.1 Introduction

The trunk Ethernet refers to the 100Mbps trunk speed within the 155M fiber link reserved for the dedicated Ethernet channel. The remaining trunk speed is utilized for the tributary card transmissions (E1, T1, V.35, FXO/FXS), Embedded Operations Channel, asynchronous RS-232 channel, order wire and proprietary framing overhead. The trunk Ethernet terminates in each multiplexer at a 5-Port 10/100 Ethernet Switch Controller. Three Ethernet LAN ports are available by RJ-45 connection on the front panel.

The following figure shows how the switch is incorporated into the multiplexer. The SNMP agent is internally connected to the 5 port switch.



LAN1 LAN2 SNMP (front panel)

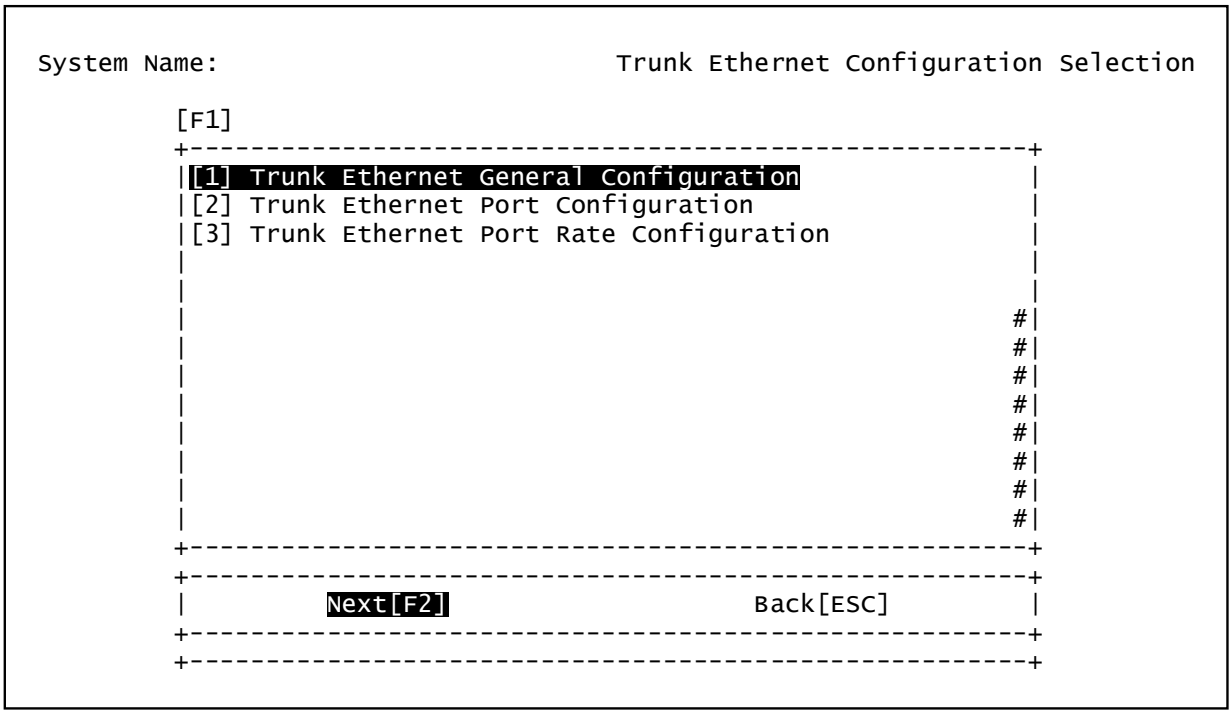
5.6.2 Configuration

From the main menu, arrow down or keyin '4' to select the ***Trunk Ethernet Parameters Configuration***. Press [F2].

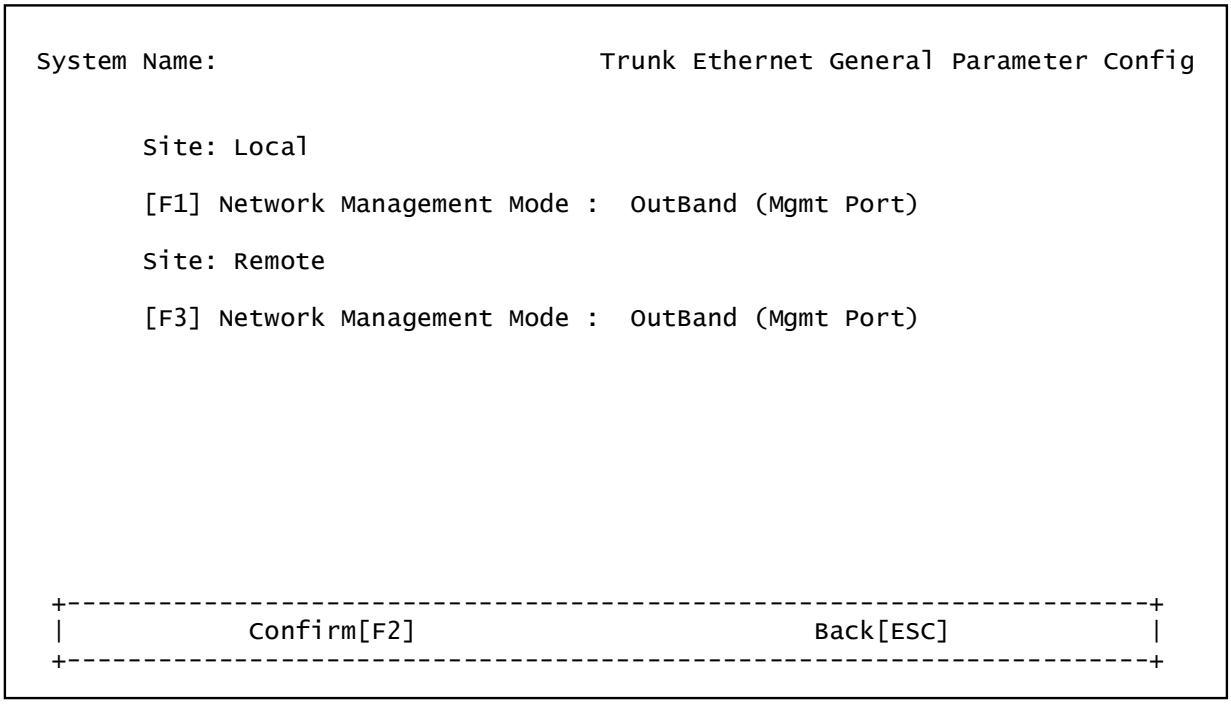
```
System Name:                                                    Main Menu

          [F1]
          +-----------------------------------------------------+
          |[1] System Configuration                            #|
          |[2] Tributary Slot Parameters Configuration         #|
          |[3] Optical Interface Parameters Configuration      #|
          |[4] Trunk Ethernet Parameters Configuration         #|
          |[5] Data Port Parameters Configuration              #|
          |[6] Performance Management Threshold Configuration  #|
          |[7] Fault Management Parameters Configuration       #|
          |[8] External Clock Configuration and Monitoring     #|
          |[9] OE Protection Switching                         #|
          |[a] Equipment Status Monitoring                     #|
          |[b] Performance Monitoring                          #|
          |[c] Path Alarm/State Monitoring                     #|
          |[d] Loopback/V.54 Testing                           #|
          |[e] PRBS Testing                                    #|
          |[f] Event Browsing                                  #|
          +-----------------------------------------------------+
          +-----------------------------------------------------+
          |     Next[F2]          Help[F3]          Logout[F4]  |
          +-----------------------------------------------------+
```

5.6.3 Trunk Ethernet General Parameter Config

The Trunk Ethernet Configuration menu is displayed below. There are three options. The first option, ***General Configuration***, sets up one of five different schemes of port mirroring and will be explained in detail later. The ***Ethernet Port Configuration*** sets the service (IS or OOS), negotiation, speed, duplex and flow control per port. The third menu ***Port Rate Configuration***, provides ingress/egress bandwidth configuration per port.

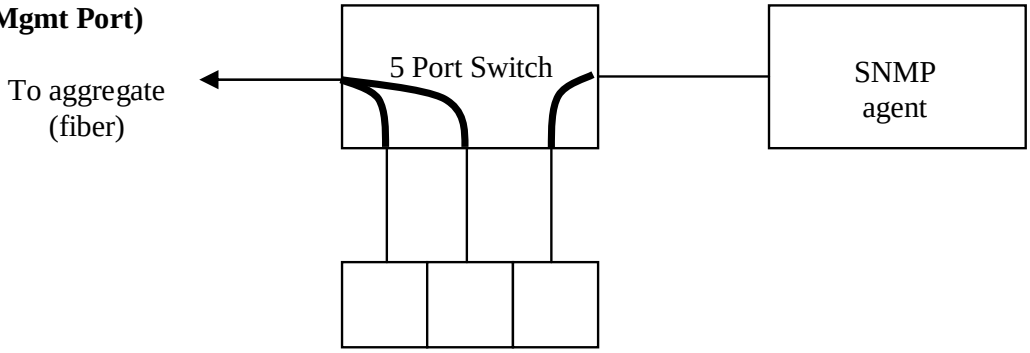


Press [F2] to enter the ***General Configuration*** menu.



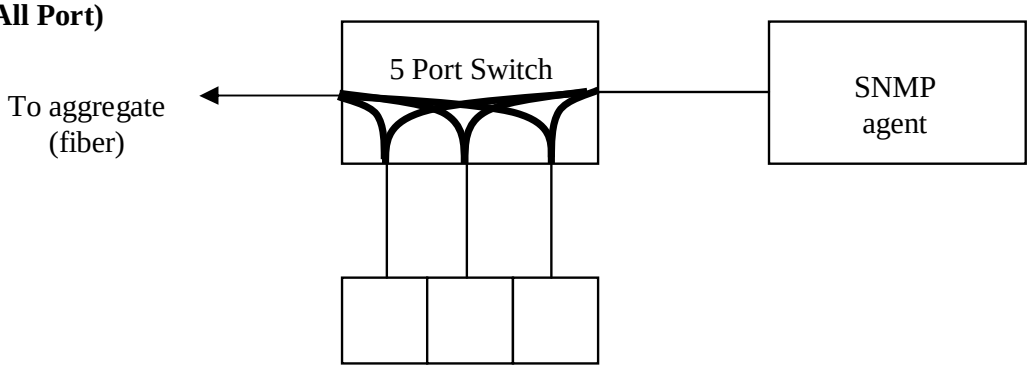
Function key [F1] selects the local unit while [F3] selects the remote unit. Use the 'space' key to toggle the five different setting options.

Outband (Mgmt Port)



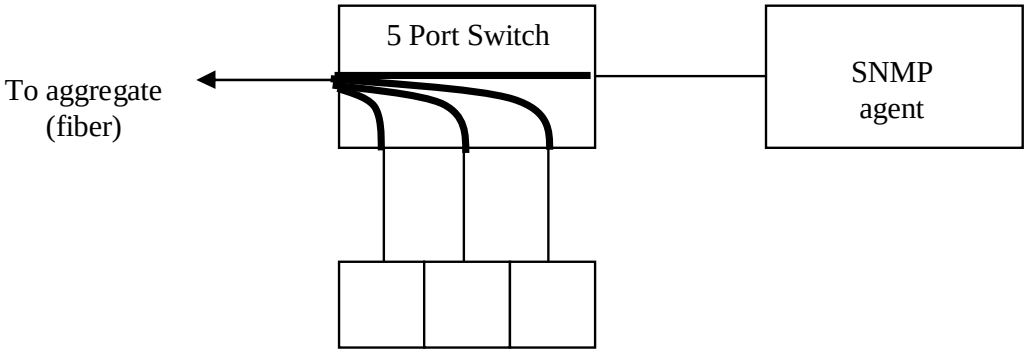
In this scenario, the two ports LAN1 and LAN2 will link to the aggregate channel. The management port, SNMP, links directly to the SNMP agent (out-band) and cannot pass traffic to the aggregate. Any connection to the LAN ports or from the remote multiplexer will not be able to access the SNMP agent or SNMP front panel port. This is the default setting.

Outband (All Port)



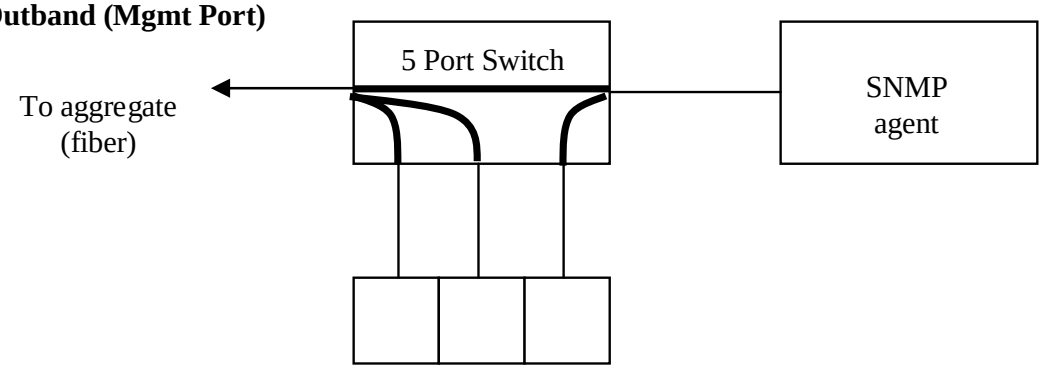
In this scenario, all three ports may connect directly to the SNMP agent (out-band) and to the aggregate link. There is link between the aggregate and the SNMP agent. The remote multiplexer cannot access the SNMP agent.

Inband



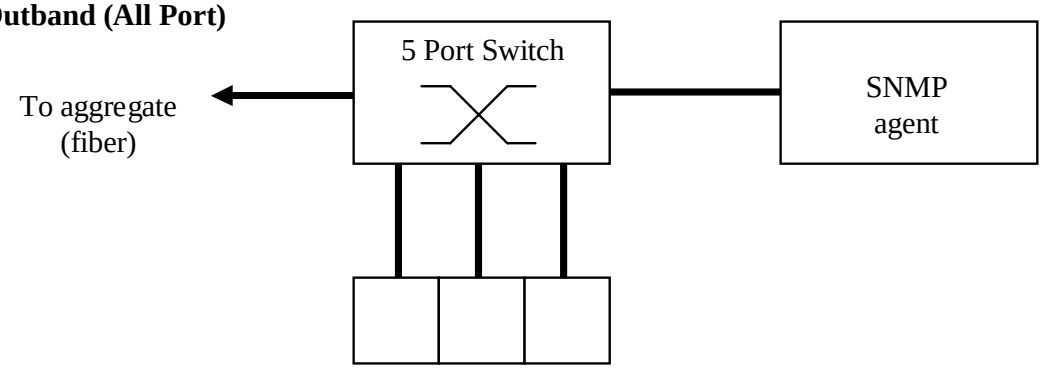
In this scenario, all three local ports will link to the aggregate channel. The SNMP agent is managed remotely through the aggregate channel (in-band). There is no local access to the SNMP agent.

Inband+Outband (Mgmt Port)



In this scenario, the two front panel ports, LAN1 and LAN2, connect to the fiber aggregate. The front panel SNMP port connects directly to the SNMP agent. The SNMP agent is also accessible from the aggregate (in-band) for remote management.

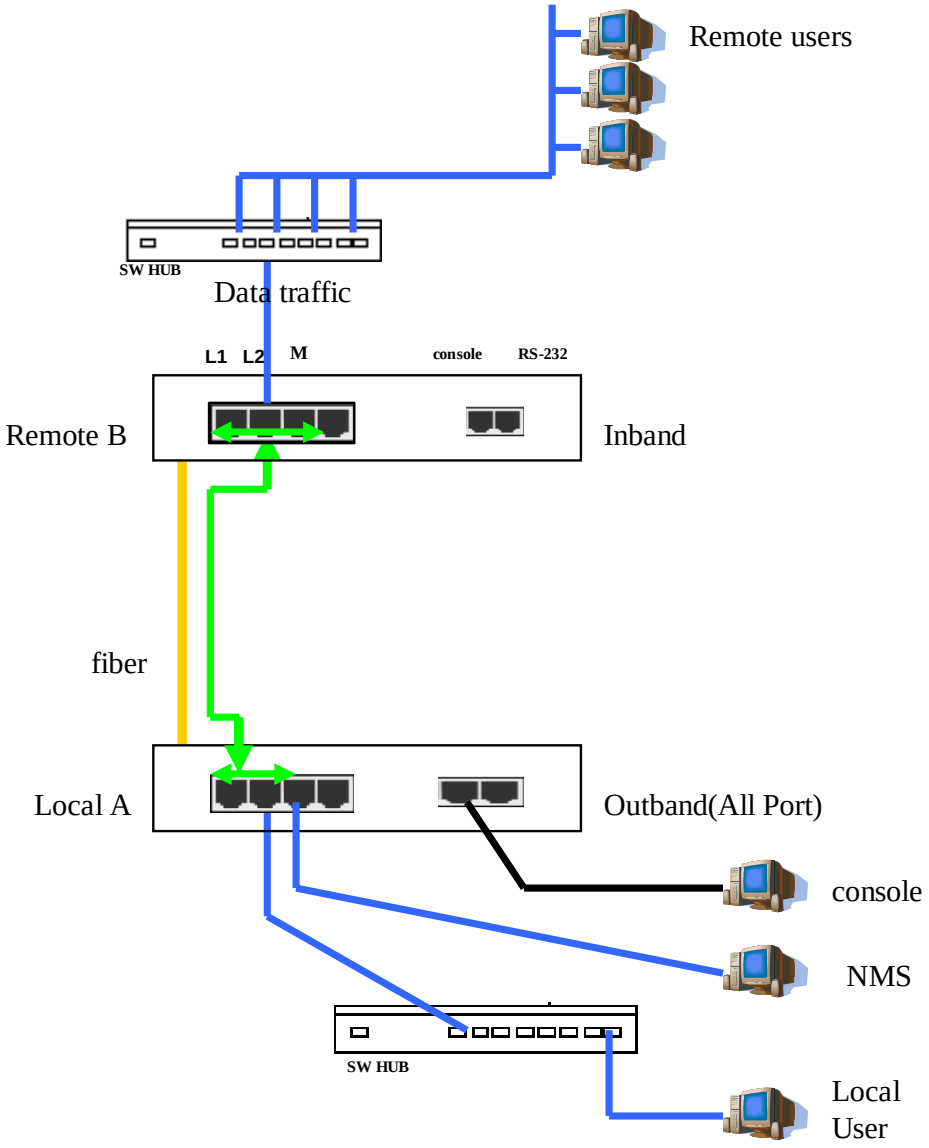
Inband+Outband (All Port)



In this scenario, all ports are connected together as a normal switching HUB. Both in-band and out-band management are supported (local and remote) and all three front panel ports may be used as LAN1, LAN2 and LAN3 freely.

The following shows how the Management Modes can be used to secure and isolate the management traffic.

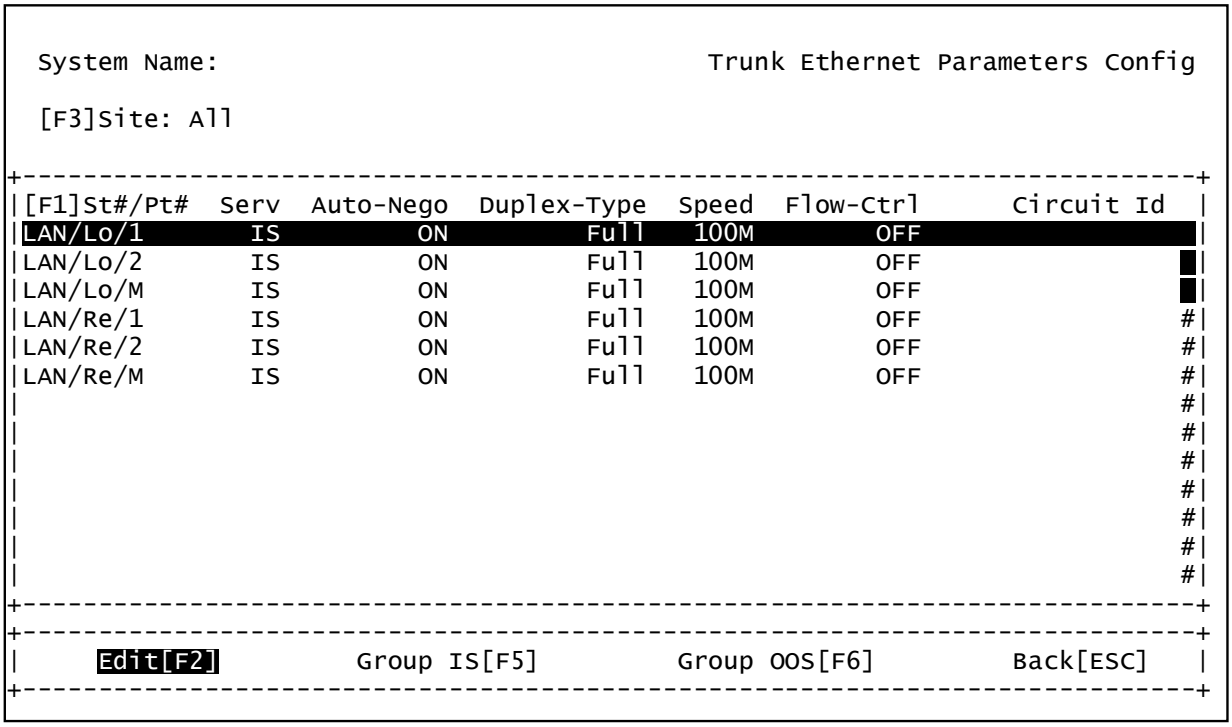
In the following scenario, the remote multiplexer has set the trunk Ethernet to "Inband". All three Ethernet ports, LAN1, LAN2, and SNMP can be used by the remote users for aggregate traffic. No remote user is able to access the SNMP management interface.



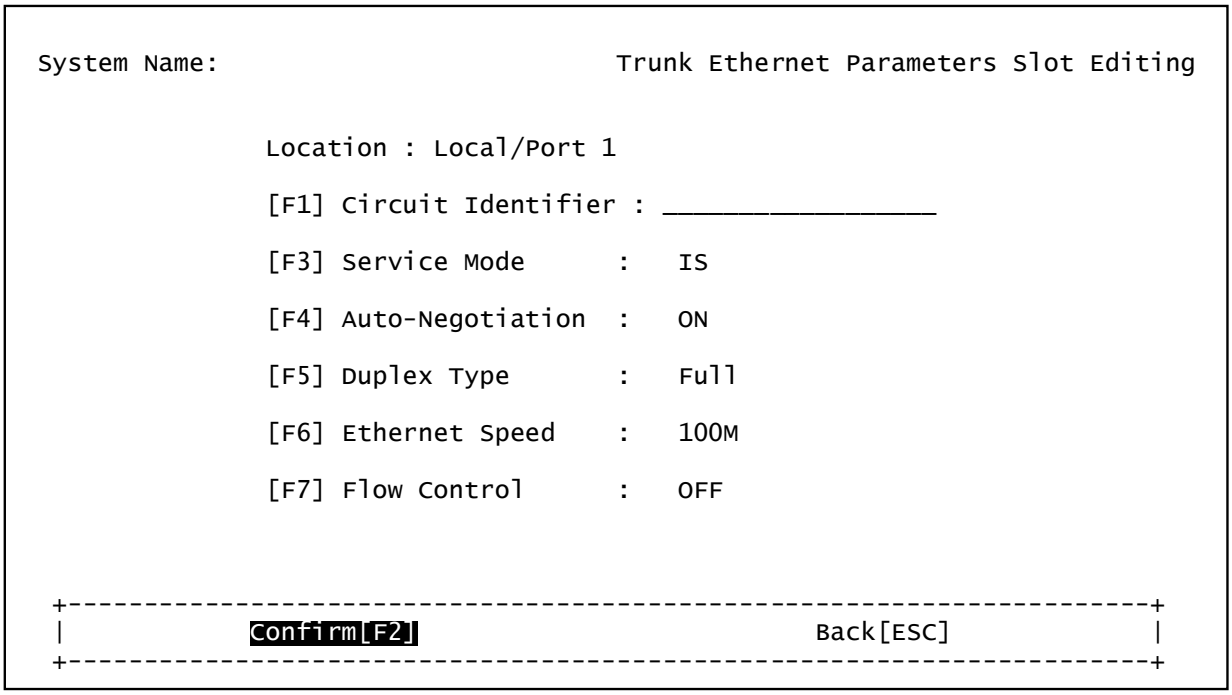
The local multiplexer has configured the trunk Ethernet to "Outband(All Port)". In this way any local (trusted) user on any of the three Ethernet ports can connect to the remote user and to both the local and remote SNMP interface.

5.6.4 Trunk Ethernet Parameter Config

The ***Trunk Ethernet Parameters Config*** screen will show the LAN1, LAN2 and SNMP management (M) ports for both local (Lo) and remote (Re) multiplexers.

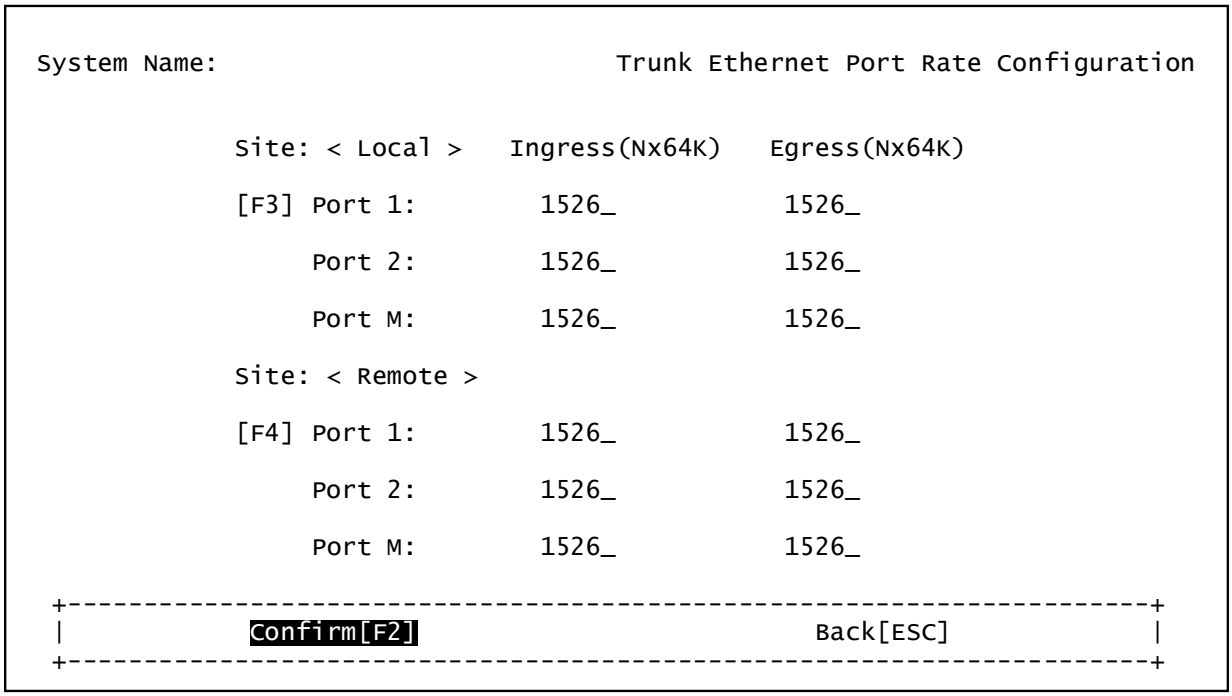


Each port can set an identifier reference "name", set the service mode, enable or disable auto-negotiation, configure speed and duplex in forced mode (auto disabled) and enable or disable Ethernet flow control.



5.6.5 Trunk Ethernet Rate Configuration

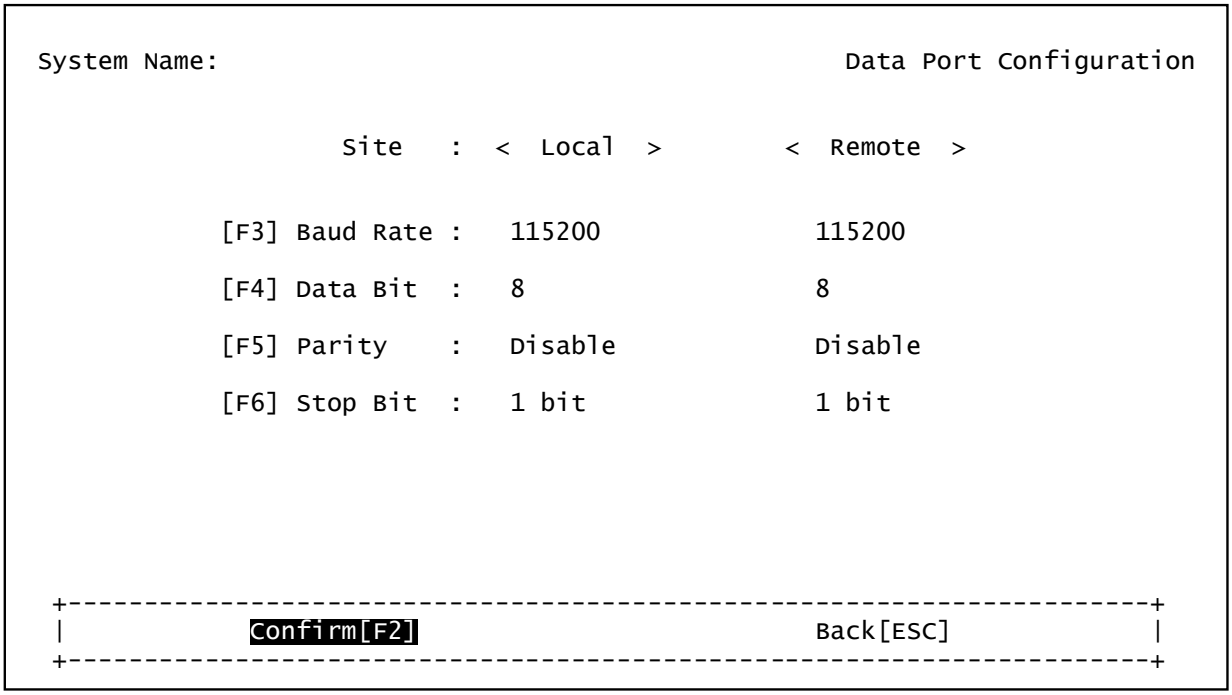
Each of three ports, LAN1, LAN2 and SNMP support individual bandwidth control for ingress and egress in 64K increments, up to 100M. From the main ***Trunk Ethernet Configuration*** menu page, select item number 3, ***Trunk Ethernet Port Rate Configuration***.



100M=1526
10M=152
Ingress (RX)
Egress (TX)

5.7 Data Port Parameter Configuration

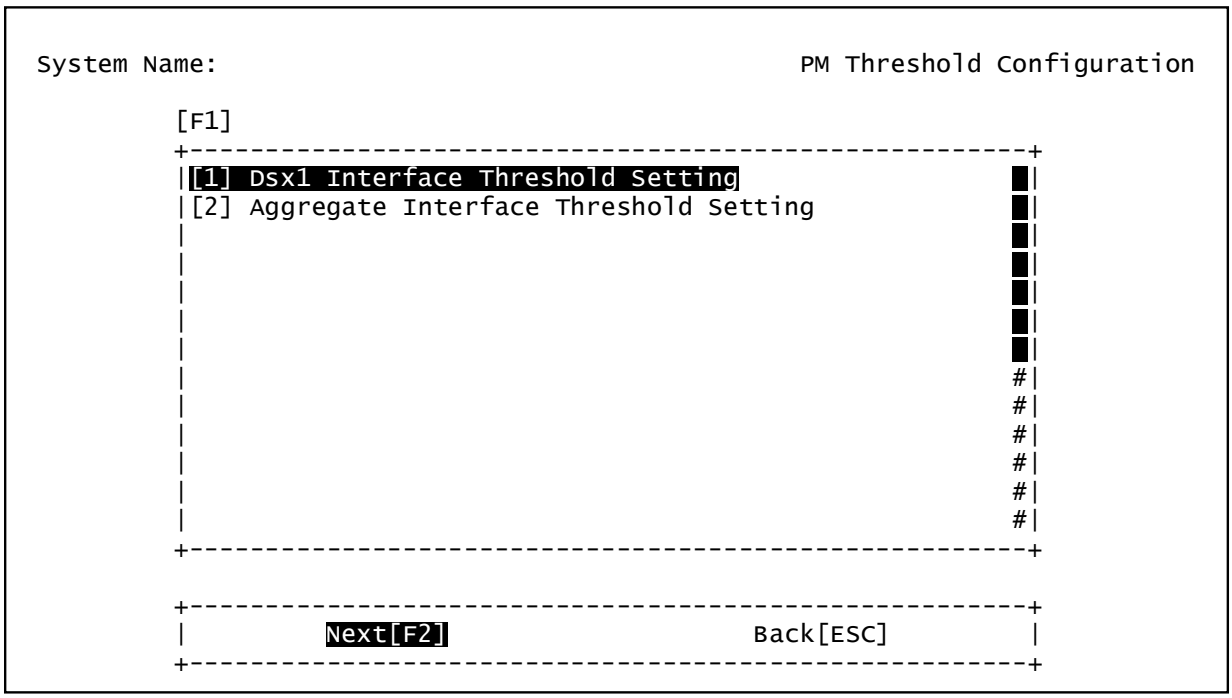
On the front panel of the Fiber Multiplexer is an RJ-45 port labeled 'RS-232'. This port is just to the right of the 'Console' port and provides an asynchronous RS-232 tributary clear channel between the local and remote multiplexers. The following screen is used to configure the communication parameters.



Use [F3] to select baud rate and toggle the different rates with the "space" bar.
Use [F4] to set the data bit length for the asynchronous data.
Use [F5] to set the parity, use "space" to toggle between Odd, Even, or No parity.
Use [F6] to set the stop bit length. Again, use "space" to toggle through the parameter settings.

Confirm settings by pressing [F2].

5.8 PM Threshold Configuration



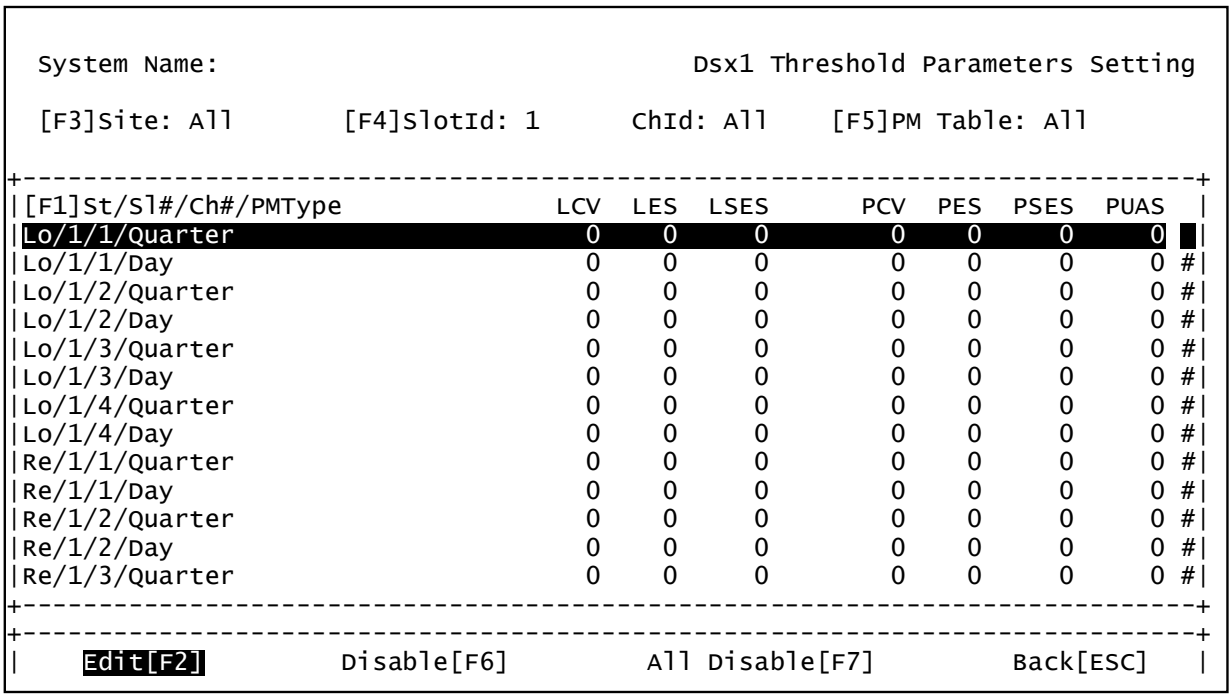
This function is used to setup the threshold values that meet the requirement to issue an actual alarm.

If TCA alarm is enabled, the alarm of TCA will be released after min/day.

If the value is " 0 ", the TCA will be disabled.

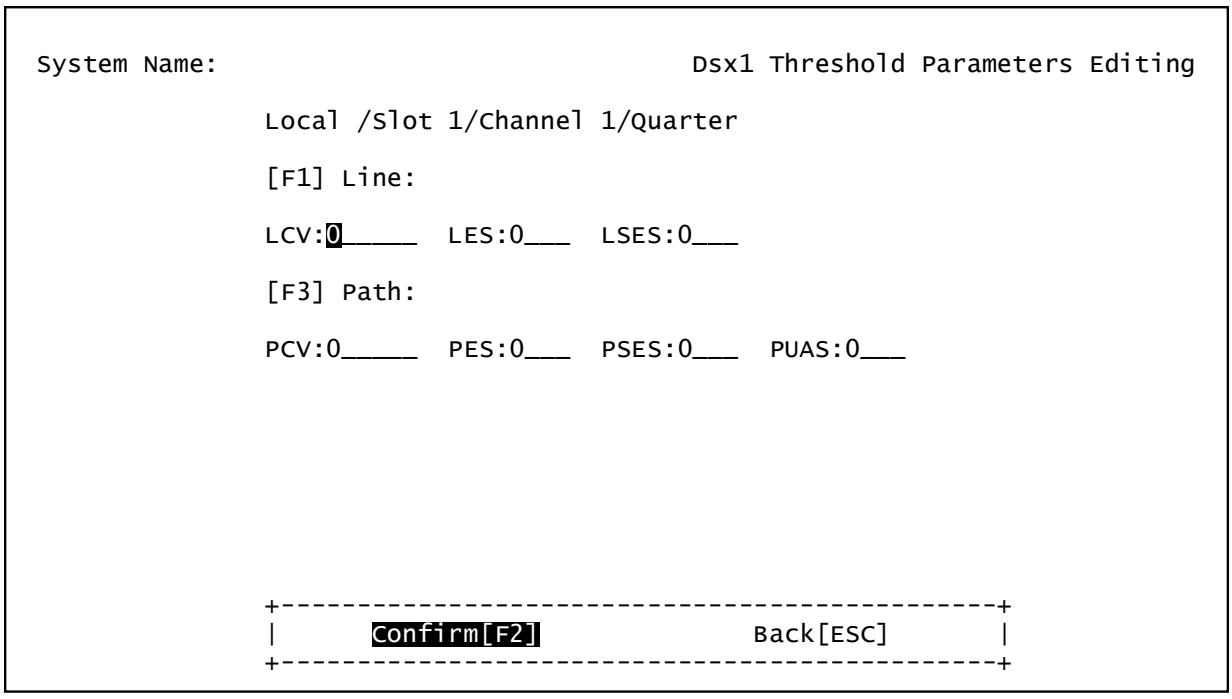
E1 Interface Threshold Setting : Electrical interface threshold setting.
Aggregate Interface Threshold Setting : Optical interface threshold setting.

5.8.1 E1 Interface Threshold Setting



You can use the function keys to modify the selected traffic link. There are two PM types that may be chosen : Quarter (15 minute interval) or day (24 hour interval).

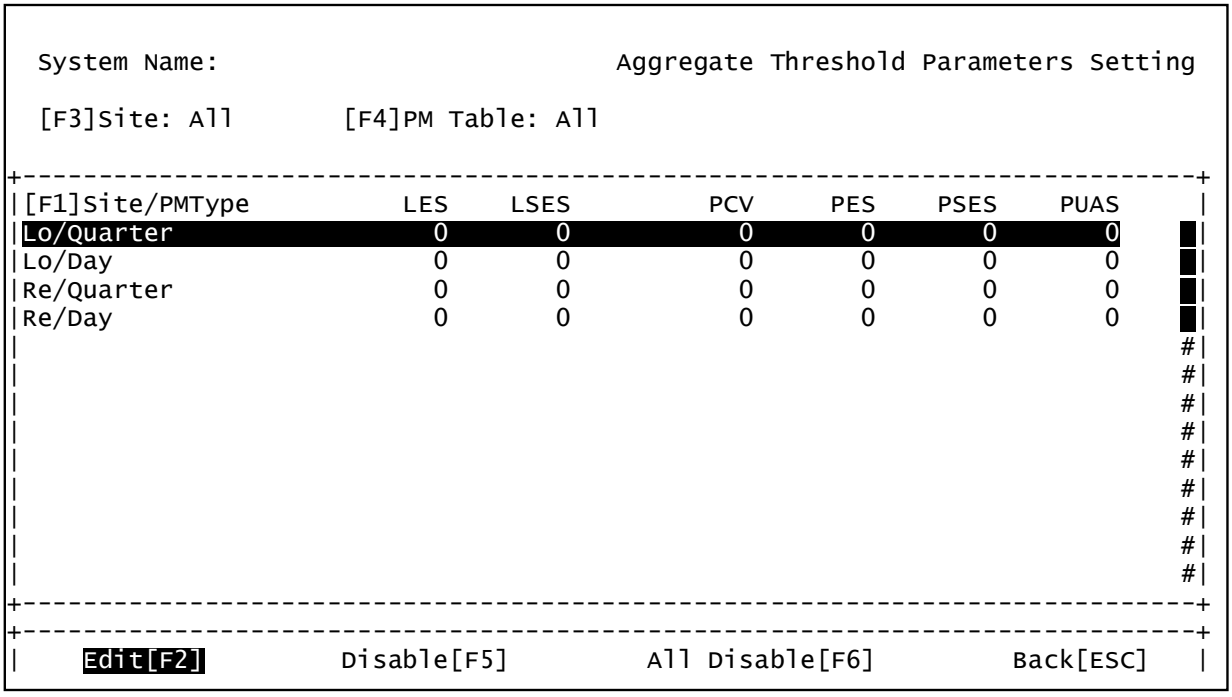
[F6] Disable :Disable the PM TCA alarm on the selected E1 path selected by highlight.
[F7] All Disable :Disable the PM TCA alarm on all selected E1 paths by the selection filters.



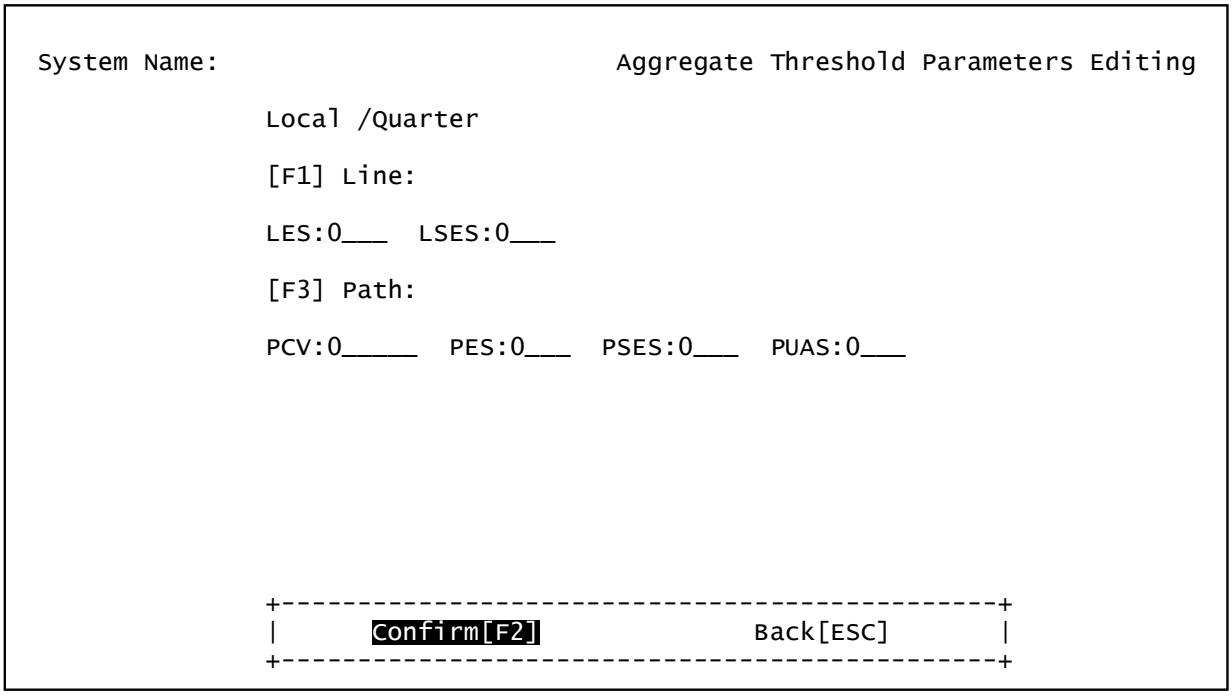
[F1] Line :
LCV : Line Code Violation
LES : Line Error Second
LSES : Line Several Error Second

[F3] Path :
PCV : Path Code Violation
PES : Path Error Second
PSES : Path Several Error Second

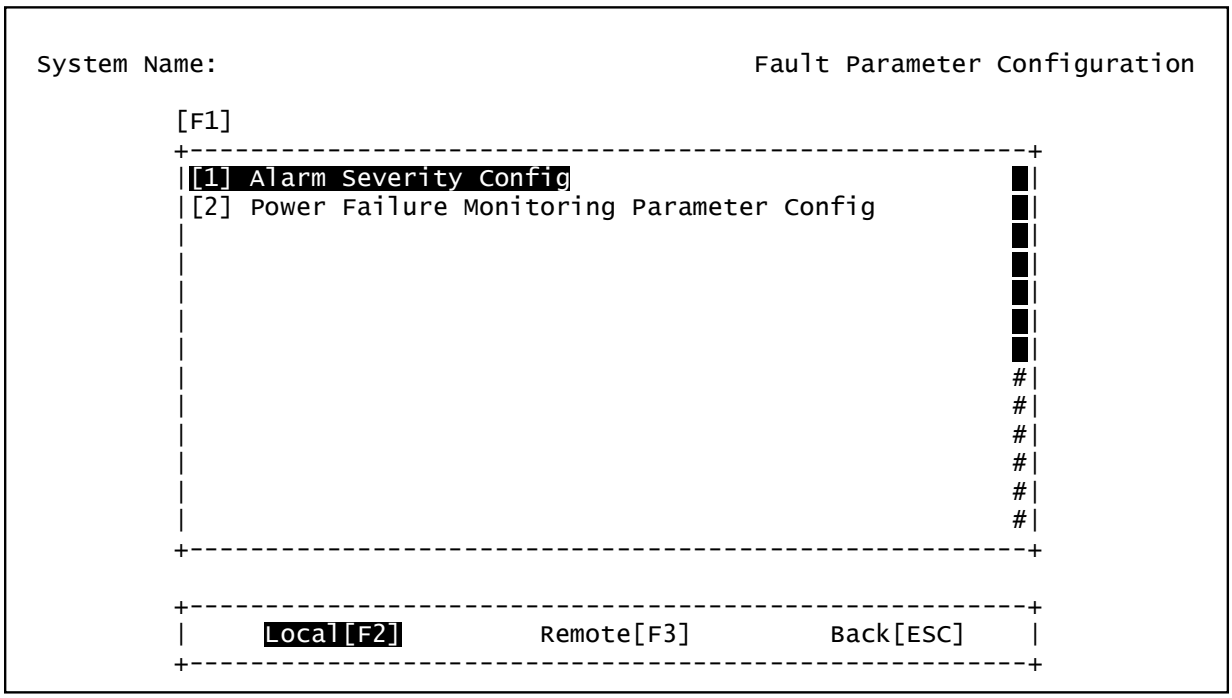
5.8.2 Aggregate Interface Threshold Setting



You can use the function keys to modify the selected traffic link. There are two PM types that can be selected : Quarter (15 minute interval) or day (24 hour interval).

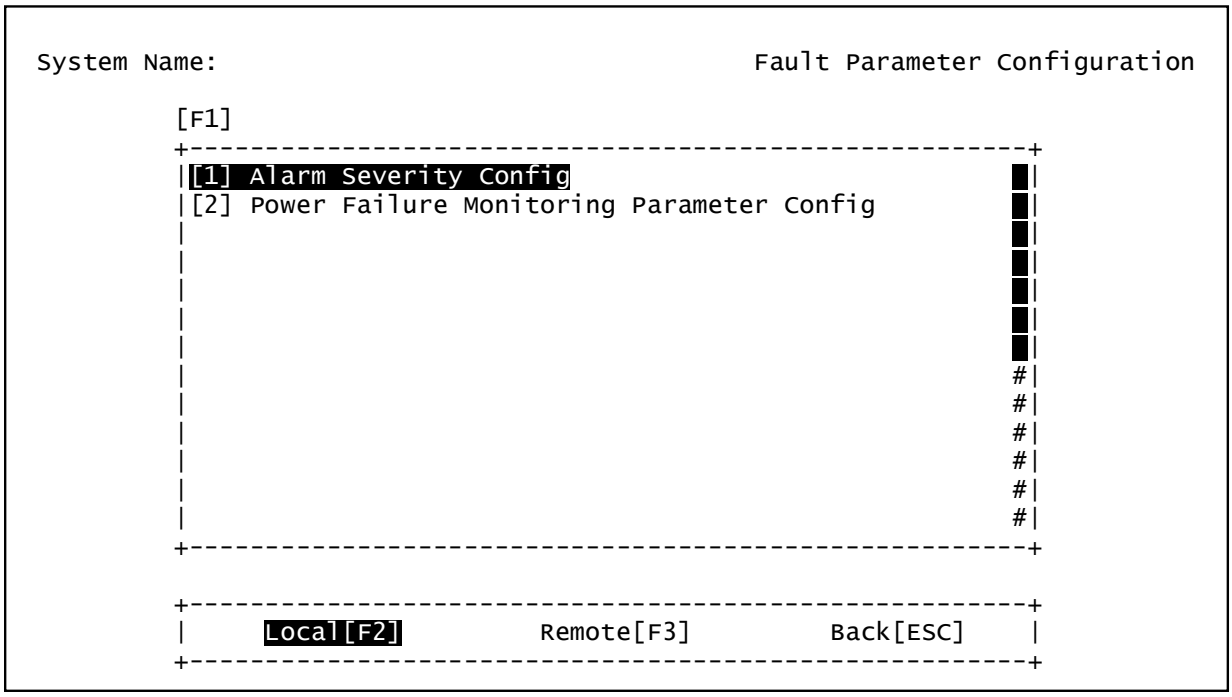


5.9 Fault Management Parameters Configuration



Fiber Multiplexer provides fault management function by setting the alarm severity for each failure alarm.

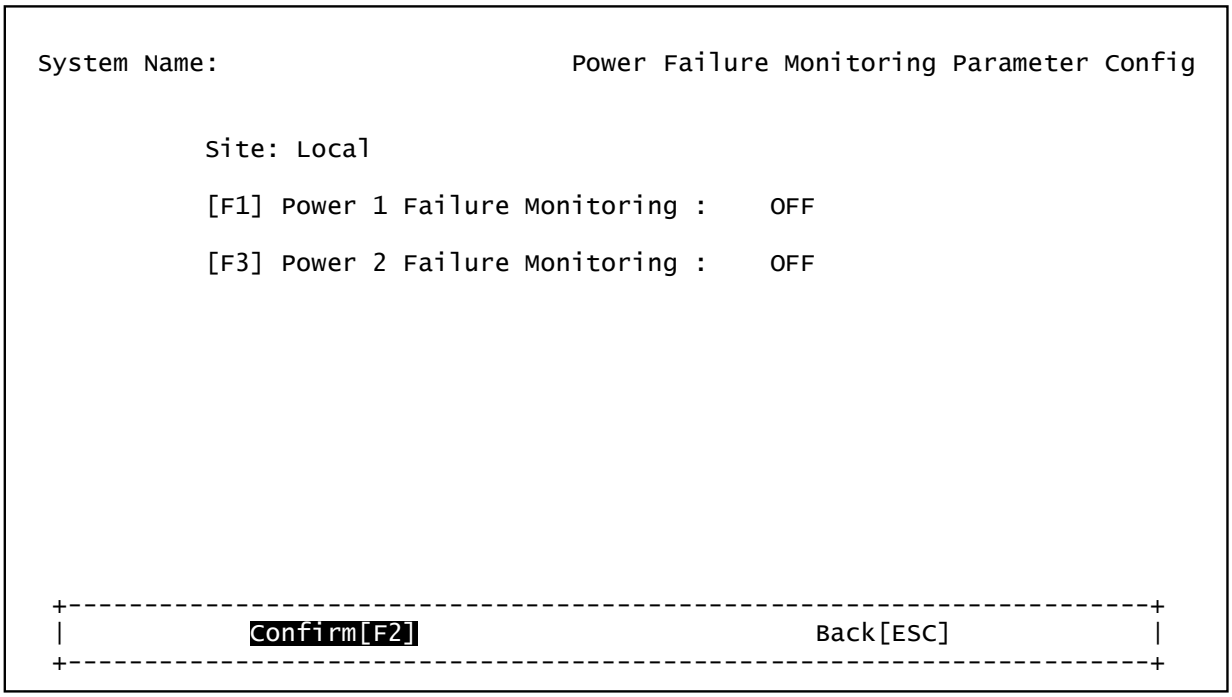
5.9.1 Alarm Severity Config



The administrator can define alarm severity and easily manage alarm status.

If the alarm severity is configured as Critical or Major, the MAJ LED will be turned to red when an alarm occurs. Otherwise, Minor and Warning alarms will make MIN LED turn to yellow.

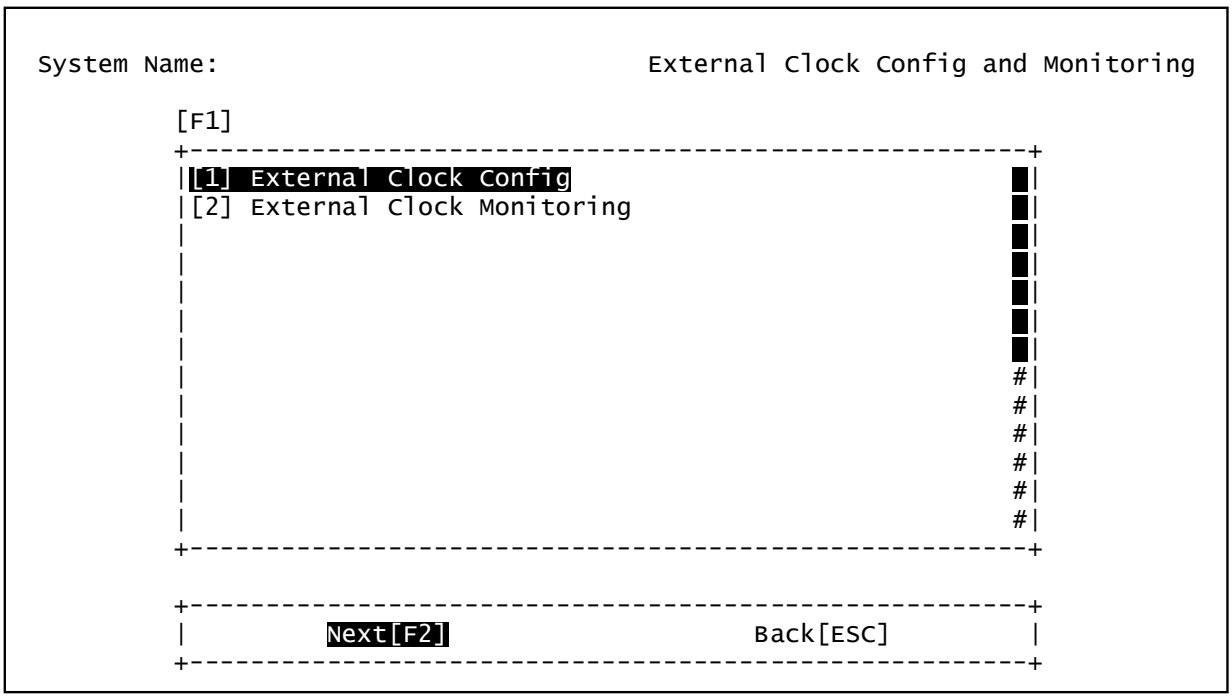
5.9.2 Power Failure Monitoring Parameter Config



This provides the function for power monitoring. When "ON" is selected and the power module fails, the alarm will be issued.

5.10 External Clock Configuration and Monitoring

The external clock is an optional component of the multiplexer and is not a standard item. You cannot use the external clock input connector or configure, if the option is not installed at the factory.



To provide more stable sync for the system, you can use the optional external clock module.

This provides an extra external clock input for the whole system's reference.

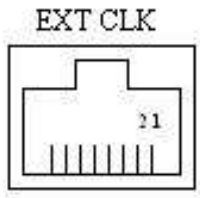
5.10.1 External Clock Config

```
System Name:                          External Clock Config and Monitoring

     [F1]   <Local>

            External Clock Module Service :    OOS

     [F3]   <Remote>

            External Clock Module Service :    OOS




         +-------------------------------------------------------+
         |         Next[F2]                   Back[ESC]          |
         +-------------------------------------------------------+
```

User can select OOS or IS to turn on or off the external clock input.

If the EOC connection fails or the External clock module is not installed, the configuration settings will not appear.

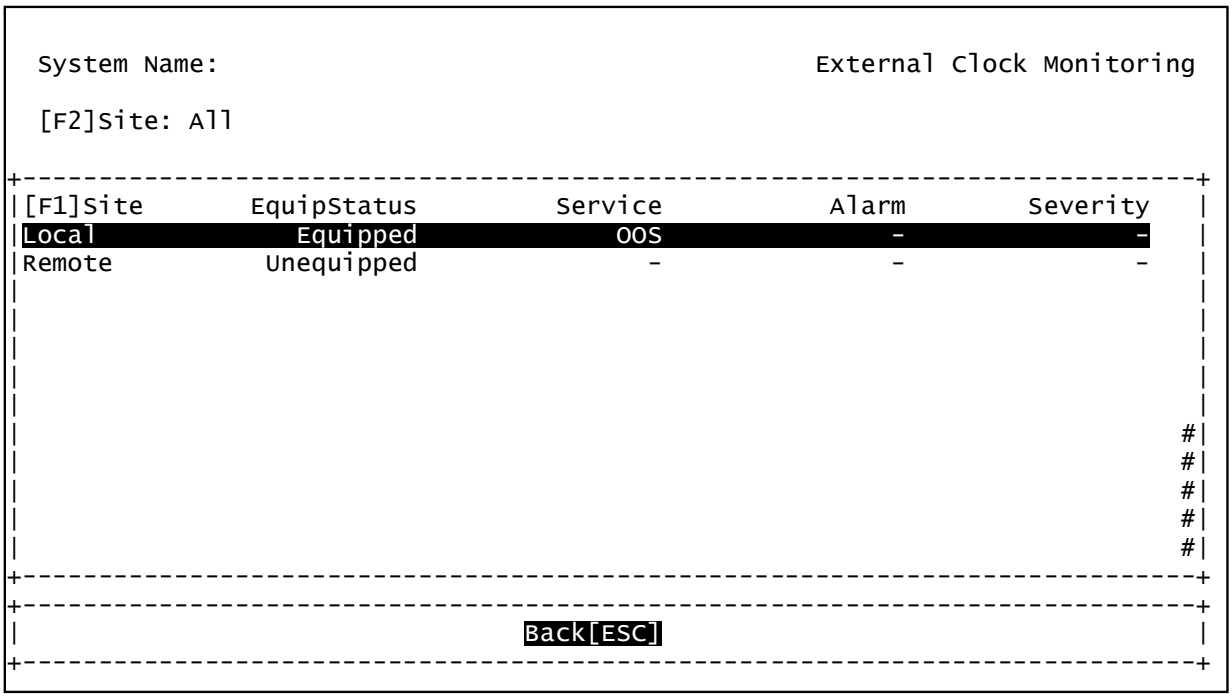
EXT CLK pin assignment



(front view of RJ45 type connector of multiplexer)

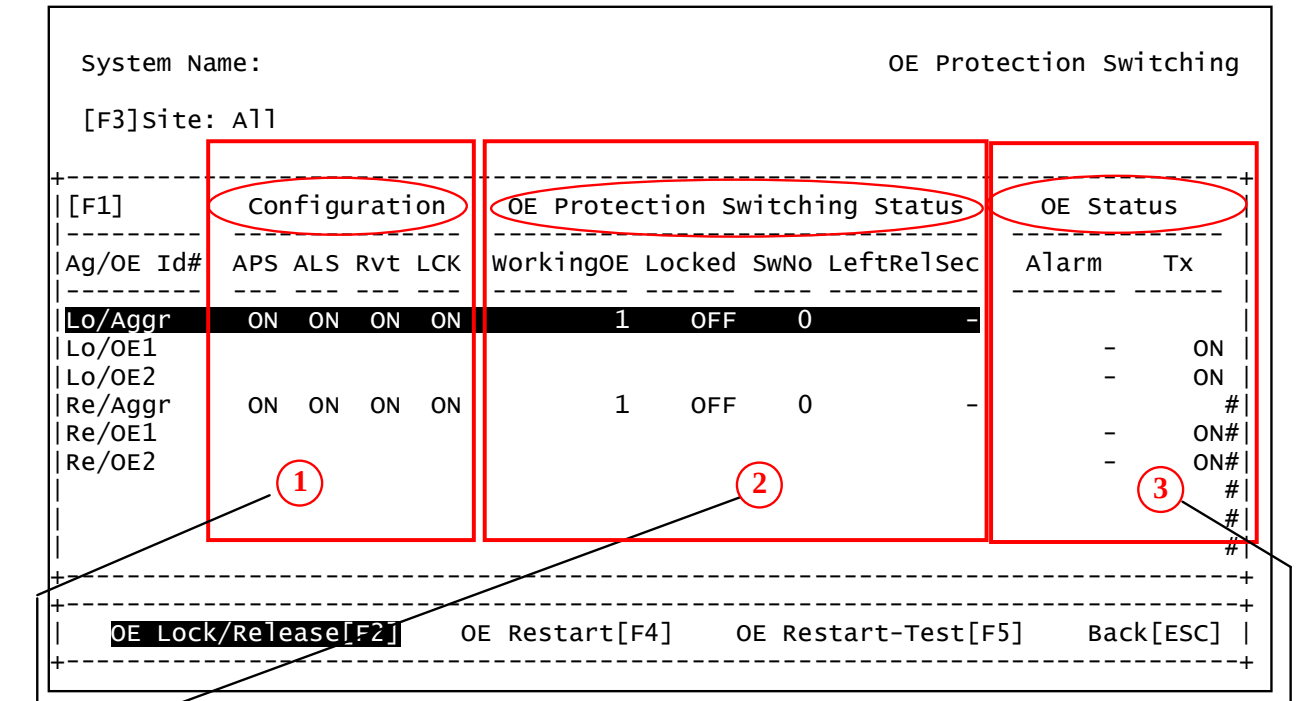
Pin 1 and Pin 2 of RJ-45 are used for E1 PCM data or TTL Clock input

5.10.2 External Clock Monitoring



If the External Clock Module is found, the EquipStatus will show as "Equipped". If no module is installed in the system, "Unequipped" will be shown on the display.

5.1 OE Protection Switching



User can configure the active OE module as either locked or as released. The OE module manual restart is also accomplished from this screen.

1.Configuration :

Shows the configuration of APS (Automatic Protection Switching), ALS (Automatic Laser Shutdown), Rvt (revertive operation), LCK (lockout the active OE module) from section 4.5 "Optical Interface Parameters Configuration".

2.OE Protection Switching Status :

Shows the current status of active OE module, the status of Lock-out mechanism, the OE module switched times by automatic or manually, and the seconds left for release after locked state. The Lock-out mechanism can be activated or deactivated by command "OE Lock/Release [F2]" on the aggregate interface. Some parameters are configured at 5.5 "Optical Interface Parameters Configuration".

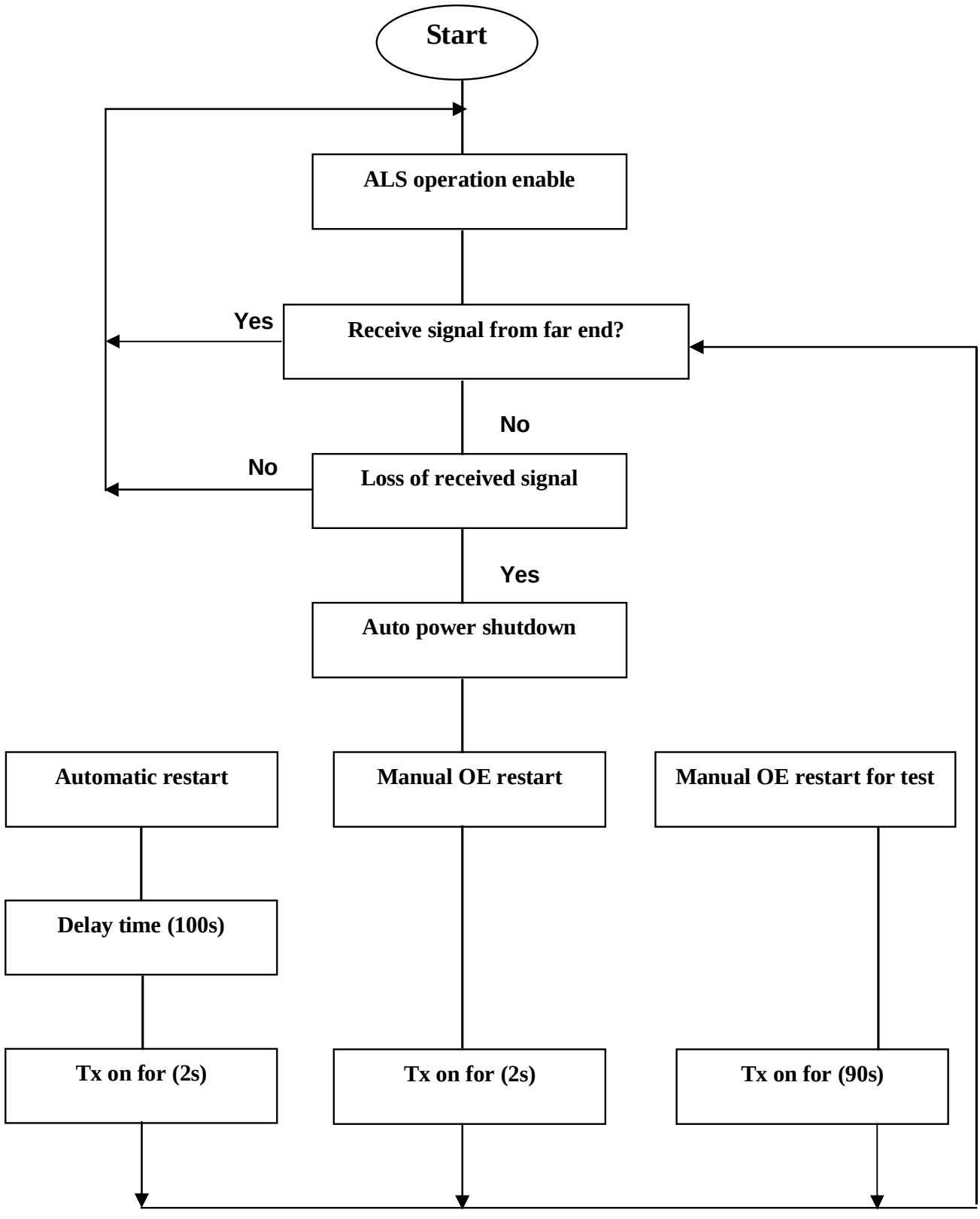
3.OE Status :

Shows the alarm and laser status of the OE modules. The shut down lasers can be restarted by command "OE Restart [F4]" and "OE Restart-Test [F5]" on the OE interfaces.

Automatic laser shutdown and restart concept

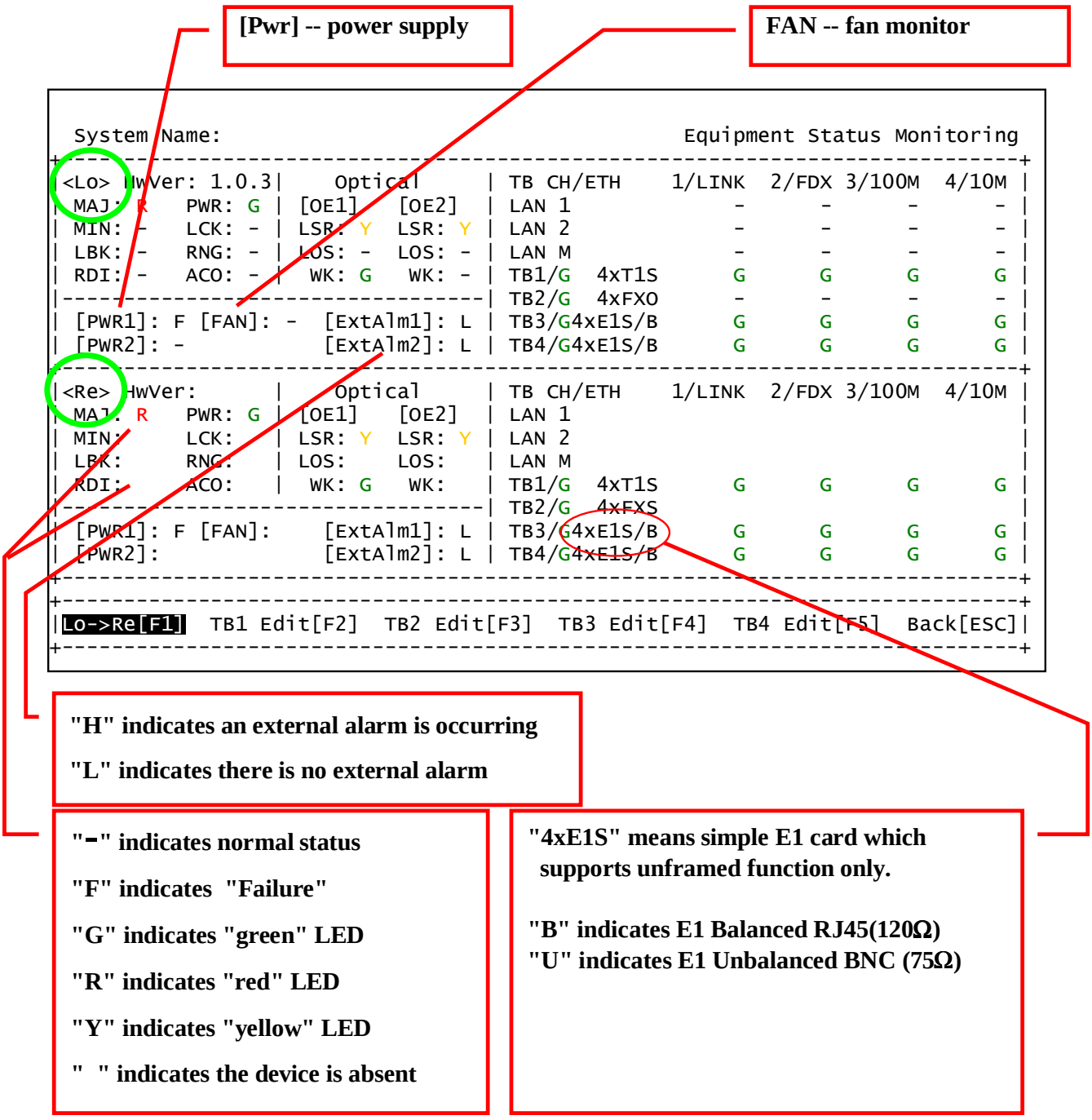
The ALS mechanism implemented in Fiber Multiplexer is compliant with ITU Recommendation ITU-T G.664. The ALS mechanism can be enabled or disabled in 5.5 Optical Interface Parameters Configuration.

<< Flow Chart>>



5.12 Equipment Status Monitoring

On the equipment status monitoring screen, the user can get an overall view of the alarm status of the interlinked rack systems. This screen also provides an easy way for operator to provision tributary cards.



Local site tributary card setup :

```
 System Name:                                        Equipment Status Monitoring
+-----------------------------------------------------------------------------+
|<Lo> HwVer: 1.0.3|    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1             -      -      -      - |
| MIN: -   LCK: - | LSR: Y  LSR: Y  | LAN 2             -      -      -      - |
| LBK: -   RNG: - | LOS: -  LOS: -  | LAN M             -      -      -      - |
| RDI: -   ACO: - |  WK: G   WK: -  | TB1/G  4xT1S      G      G      G      G |
|-----------------------------------| TB2/G  4xFXO      -      -      -      - |
| [PWR1]: F [FAN]: -  [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]: -           [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-----------------------------------------------------------------------------+
|<Re> HwVer:      |    Optical      | TB CH/ETH    1/LINK  2/FDX 3/100M  4/10M |
| MAJ: R   PWR: G | [OE1]   [OE2]   | LAN 1                                   |
| MIN:     LCK:   | LSR: Y  LSR: Y  | LAN 2                                   |
| LBK:     RNG:   | LOS:    LOS:    | LAN M                                   |
| RDI:     ACO:   |  WK: G   WK:    | TB1/G  4xT1S      G      G      G      G |
|-----------------------------------| TB2/G  4xFXS                            |
| [PWR1]: F [FAN]:    [ExtAlm1]: L | TB3/G4xE1S/B      G      G      G      G |
| [PWR2]:             [ExtAlm2]: L | TB4/G4xE1S/B      G      G      G      G |
+-----------------------------------------------------------------------------+
+-----------------------------------------------------------------------------+
|Lo->Re[F1]  TB1 Edit[F2]  TB2 Edit[F3]  TB3 Edit[F4]  TB4 Edit[F5]  Back[ESC]|
+-----------------------------------------------------------------------------+
```

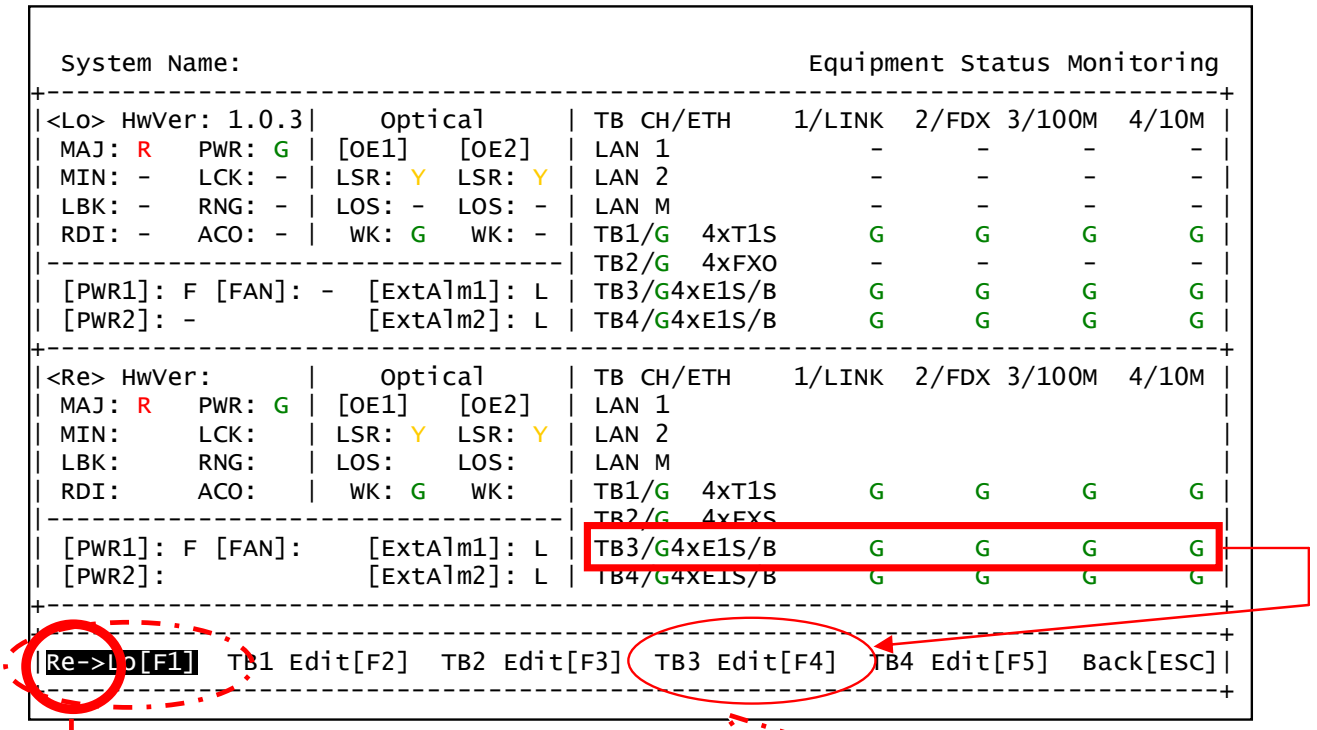
Lo is Local site, use [F1] to toggle

When user plugs any card in TB3, this row will show TB card data here. User can check and or configure by pressing [F4] key.

card parameters setting screen:

```
 System Name:                                    E1 Parameters Channel Editing

                Location : Local/Slot 3/Ch 1

                [F1] Circuit Identifier : ________________

                [F3] Service Mode       :   IS

                [F4] Frame Type         :   Unframed

                [F5] Line Coding        :   HDB3

  +-----------------------------------------------------------------------+
  |            Confirm[F2]                          Back[ESC]             |
  +-----------------------------------------------------------------------+
```

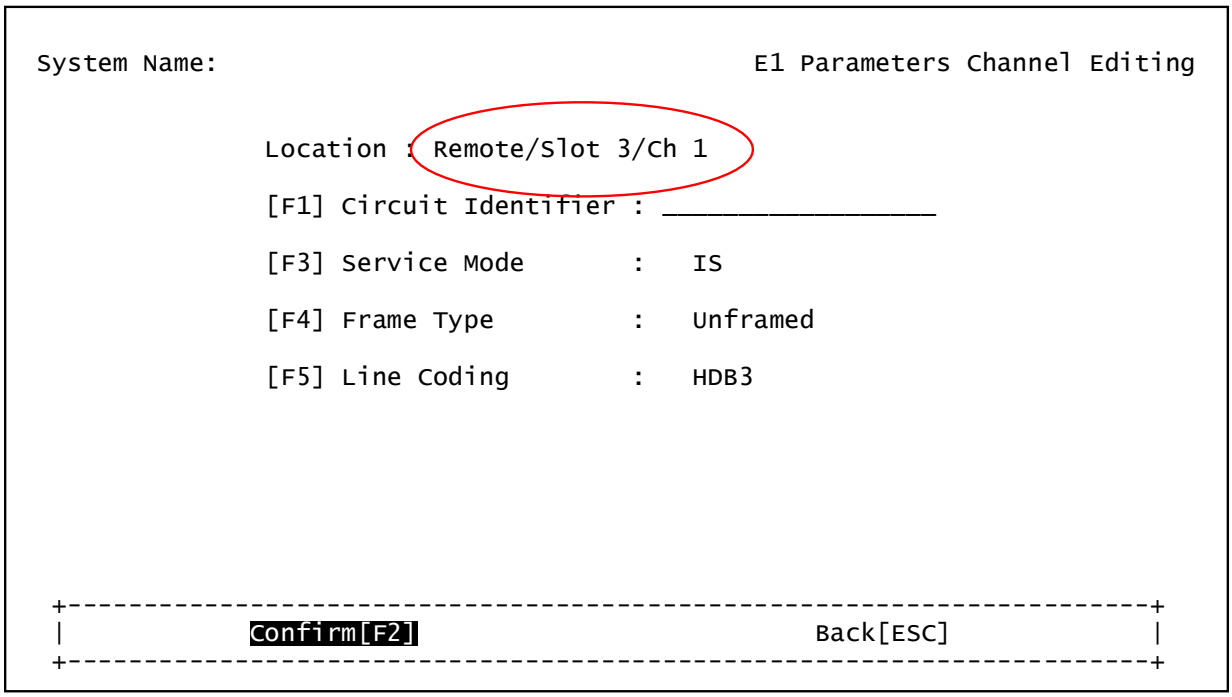
Remote site tributary card setup :



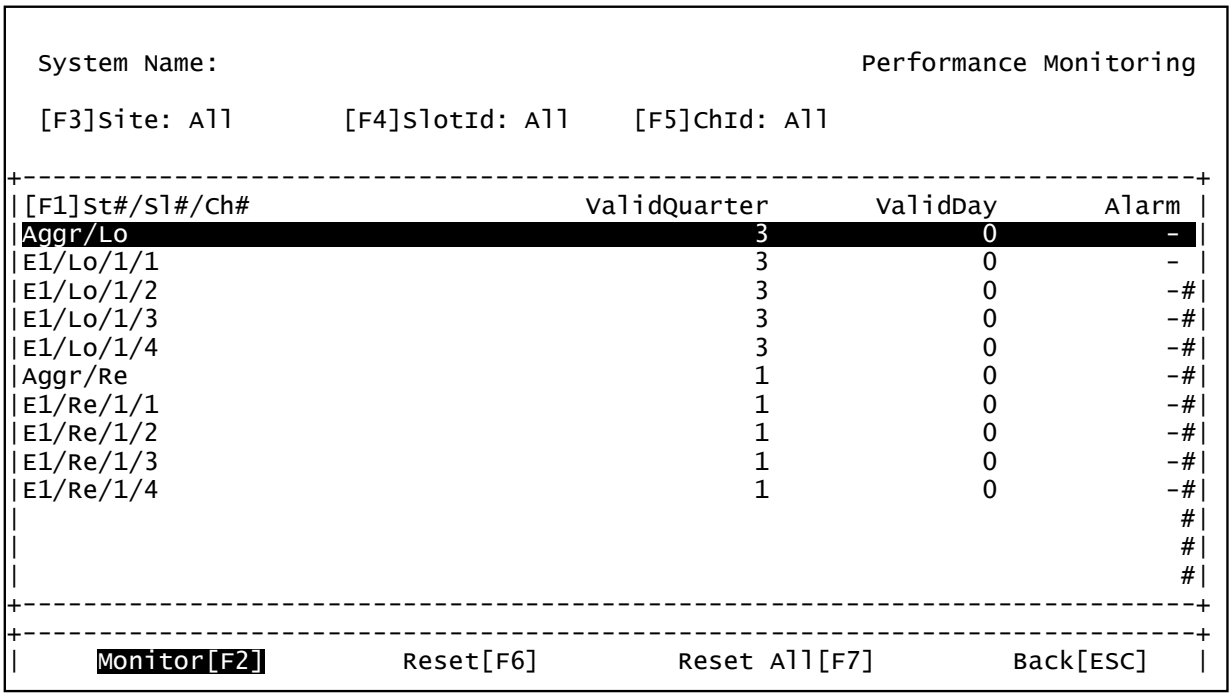
Re is Remote site, use [F1] to toggle

When user plugs any card in TB3, this row will show TB card data here. User can check and or configure by pressing [F4] key.

card parameters setting screen:



5.13 Performance Monitoring

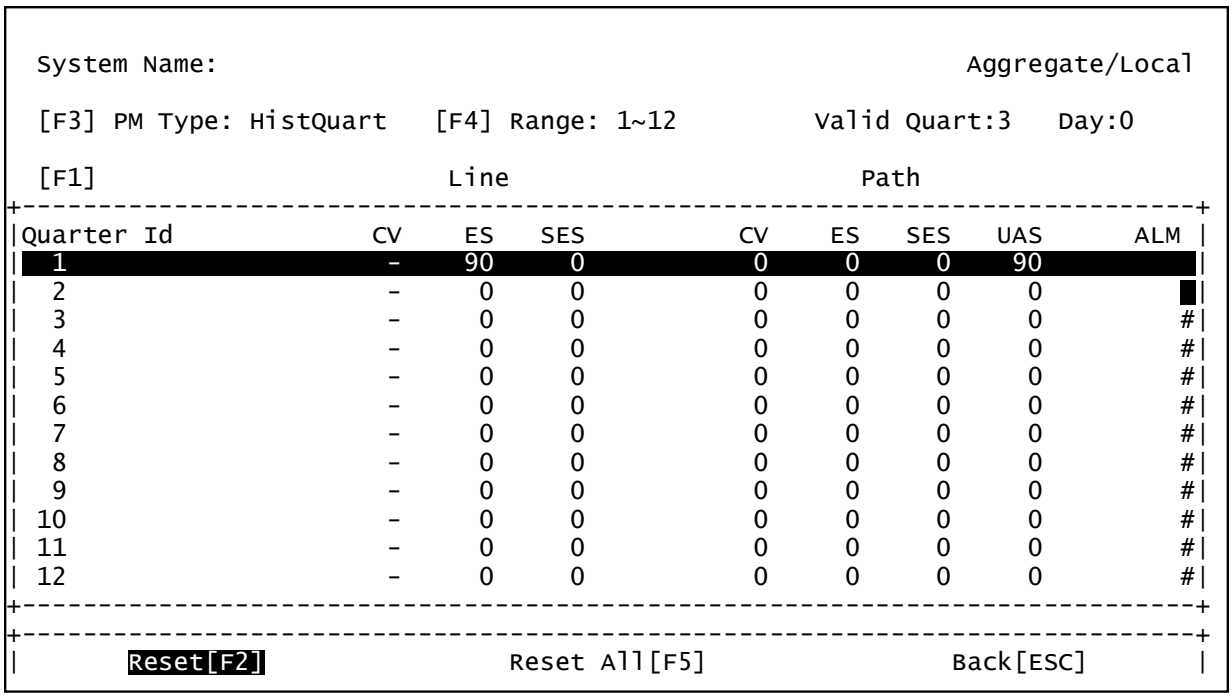


The performance monitoring screen will show the valid quarters (15 minute intervals) and valid days (24 hour intervals) that have been counted for each card (Fiber Aggregate; E1 or T1 type card). Select the card and access the next screen to see the detail performance data by pressing [F2].

[F6] Reset : to clear all PM counters on the selected monitoring path

[F7] Reset All : to clear all PM counters on the All monitoring paths

Performance monitoring is only supported on E1 or T1 card. The E1S card (unframed) only supports BPV error but cannot support CRC4 error monitoring (framed mode card is required for that).



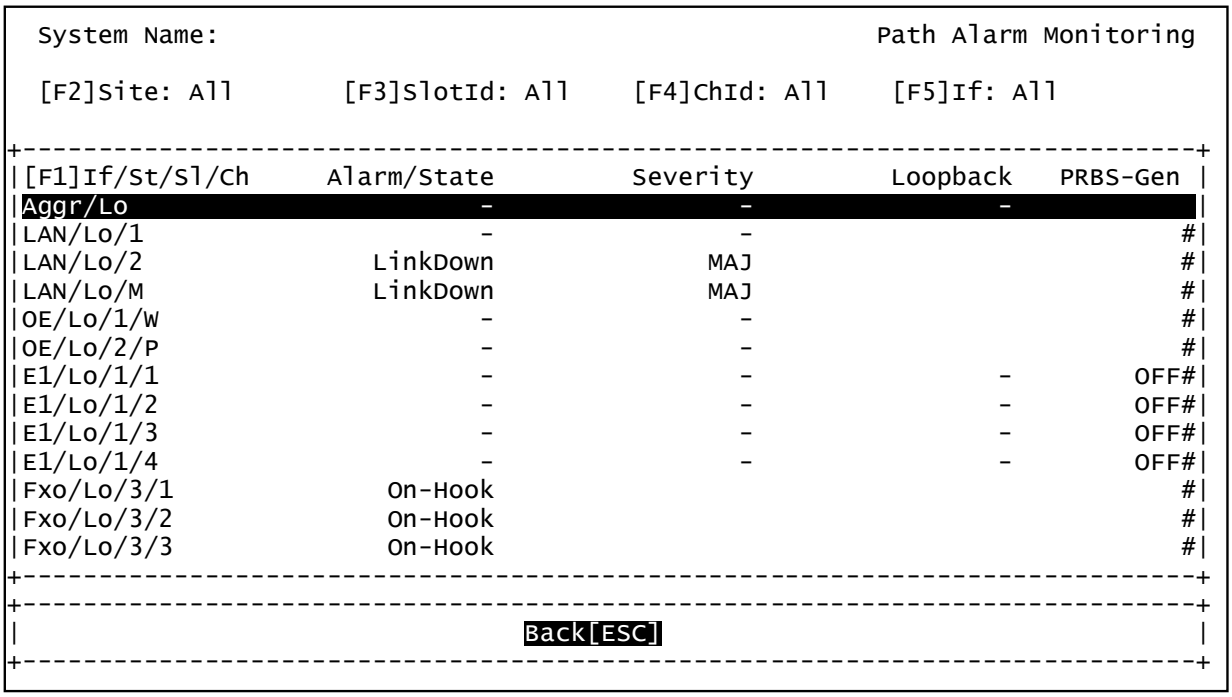
There are five types of PM:
1. CurrQuart (Current 15 minute interval)
2. HistQuart (History Quarter)
3. CurrDay (Current 24 hour Day)
4. HistDay (History Day)
5. Quarter (15 minute interval)

[F2] Reset : to clear the selected PM type

[F5] Reset All : to clear all the PM type

CV = Code Violation
ES = Errored Seconds
SES = Severely Errored Seconds
UAS = UnAvailable Seconds

5.14 Path Alarm Monitoring

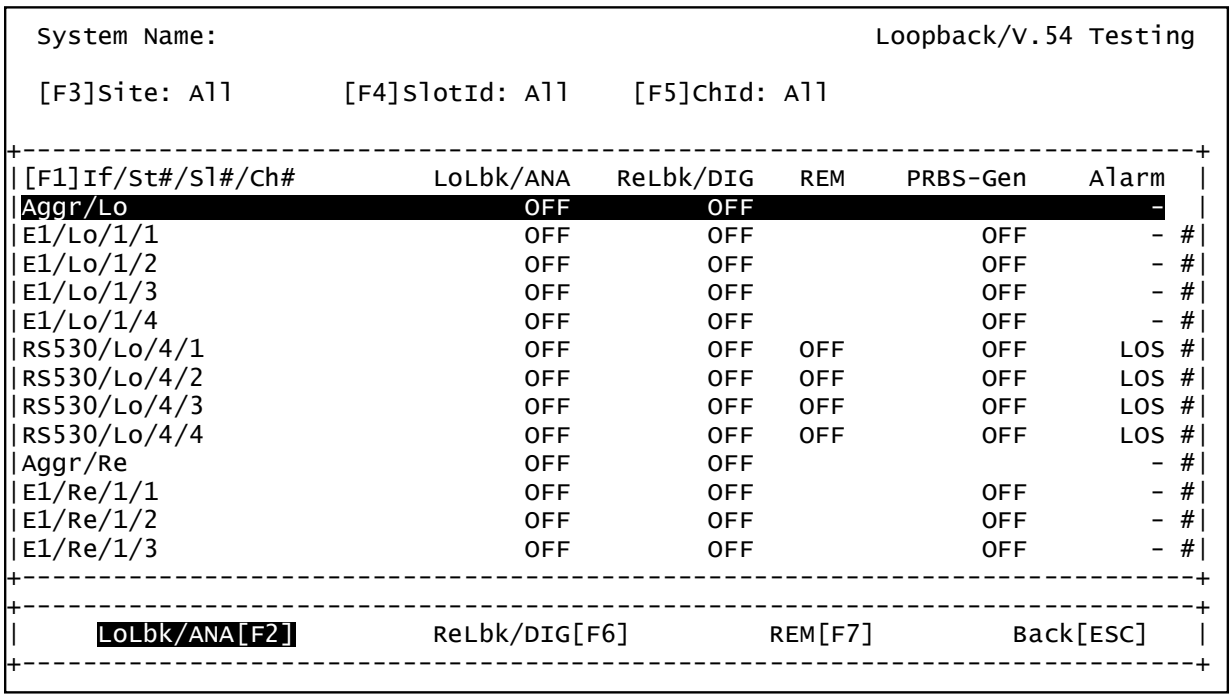


This screen shows all of alarm status for all monitored paths. Some diagnostic testing work will cause alarms to occur. The status of loopback (V.54) and PRBS action are shown as well.

The possible alarm for each interface are :
OE : LOS
Aggregate : LOF/RDI/AIS
E1 : LOS/LOF/RDI/AIS
T1 : LOS/LOF/RDI/AIS
V35 : LOS
Ethernet : LINK

LOS = Loss Of Sync
LOF = Loss Of Framing
RDI = Remote Defect Indicator
AIS = Alarm Indication Signal

5.15 Loopback/V.54 Testing



For diagnostic purposes, low speed E1 or V.35 data channels and high speed aggregate signals can be locally looped back or remotely looped back.

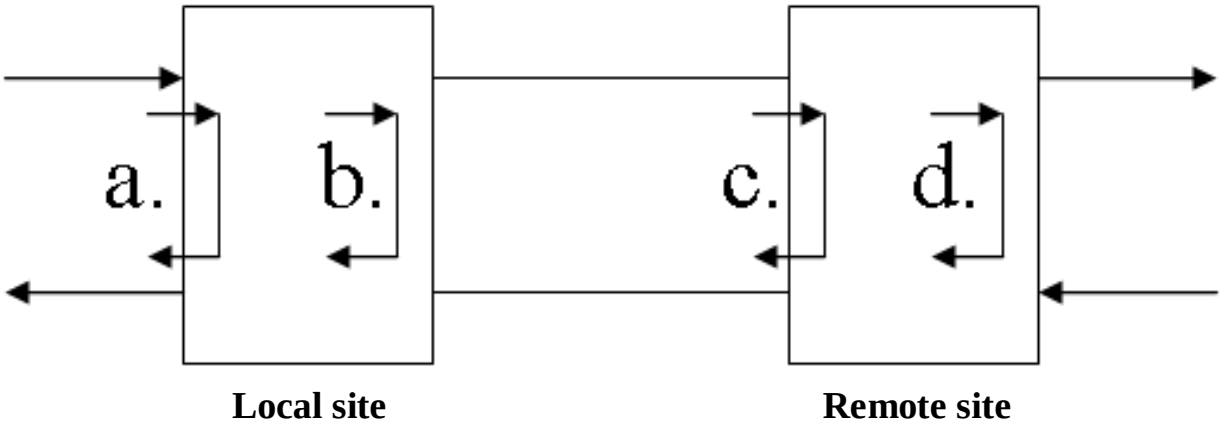
5.15.1 Loopback Testing

Introduction

There are four types of loopback functions for the E1/T1 Module :

Tributary Local Loopback (for each E1 signal)
Aggregate Local Loopback (for all multiplexed E1 signals)
Aggregate Remote Loopback (for all multiplexed E1 signals)
Tributary Remote Loopback. (for each E1 signal)

Users can select whether to diagnose a specific channel or all channels under the loopback / V.54 Testing.



a. Tributary Local Loopback : In the Loopback / V.54 Testing screen, select the slot ID which is on the tributary card in the local site, then choose "LoLbk / ANA" item.

b. Aggregate Local Loopback : In the Loopback / V.54 Testing screen, select the aggregate item ("Aggr/Lo") in the local site then choose "LoLbk / ANA" item.

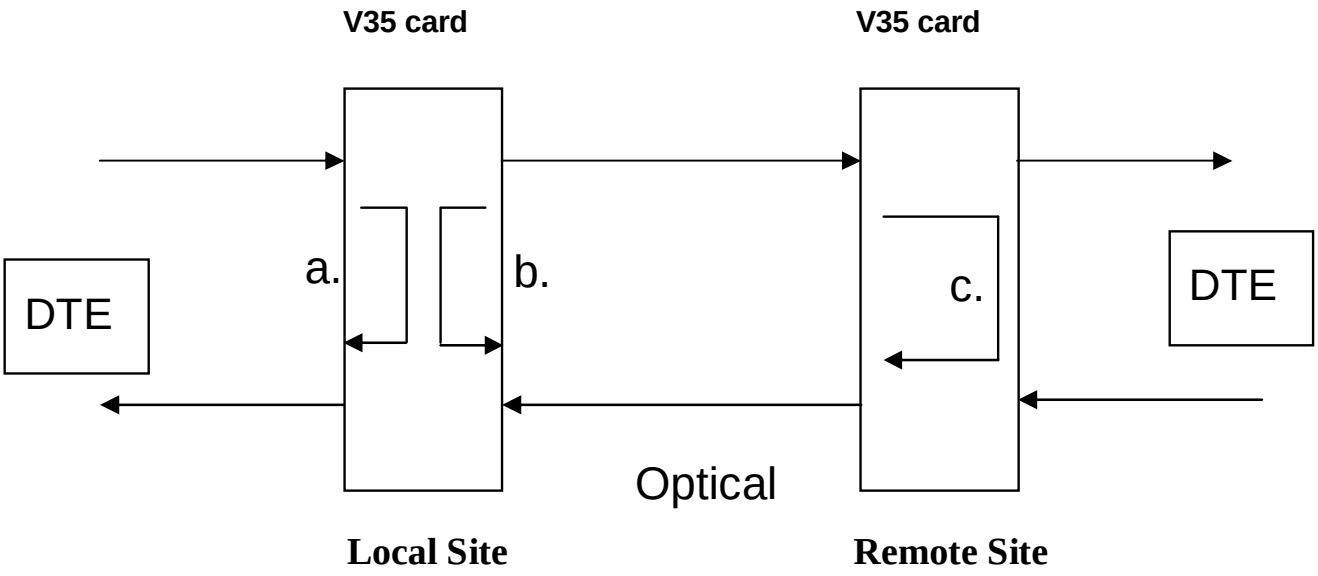
c. Aggregate Remote Loopback : In the Loopback / V.54 Testing screen, select the aggregate item ("Aggr/Re") in the remote site then choose "ReLbk / DIG" item.

d. Tributary Remote Loopback : In the Loopback / V.54 Testing screen, select the slot ID which is on the tributary card in the remote site then choose "ReLbk / DIG" item.

Info : In the E1/T1 module, the "REM" loopback is not available. It is only for the V.35 module.

There are three types of loopback functions for the V.35 Module :

a. Analog (ANA) Loopback :
b. Digital (DIG) Loopback
c. Request Remote (REM) Loopback



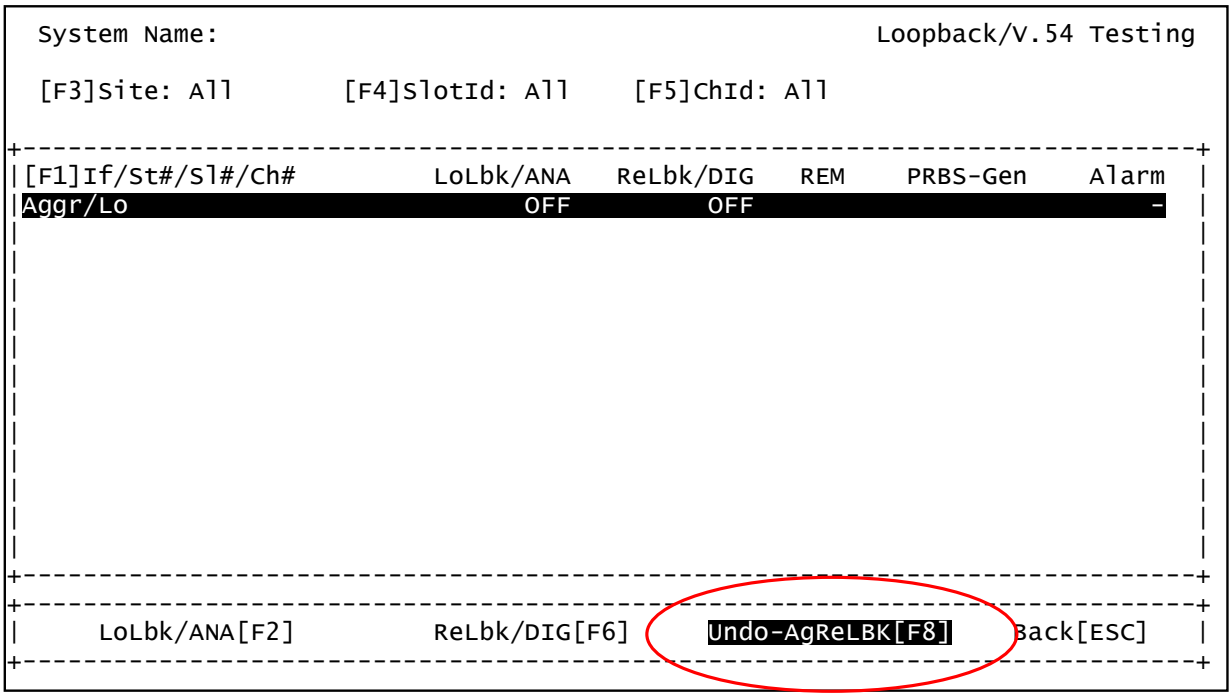
a. Analog (ANA) Loopback : In the Loopback / V.54 Testing screen, select the slot ID which is on the tributary card in the local site, then choose "LoLbk / ANA" item.

b. Digital (DIG) Loopback : In the Loopback / V.54 Testing screen, select the slot ID which is on the tributary card in the local site, then choose "ReLbk / DIG" item.

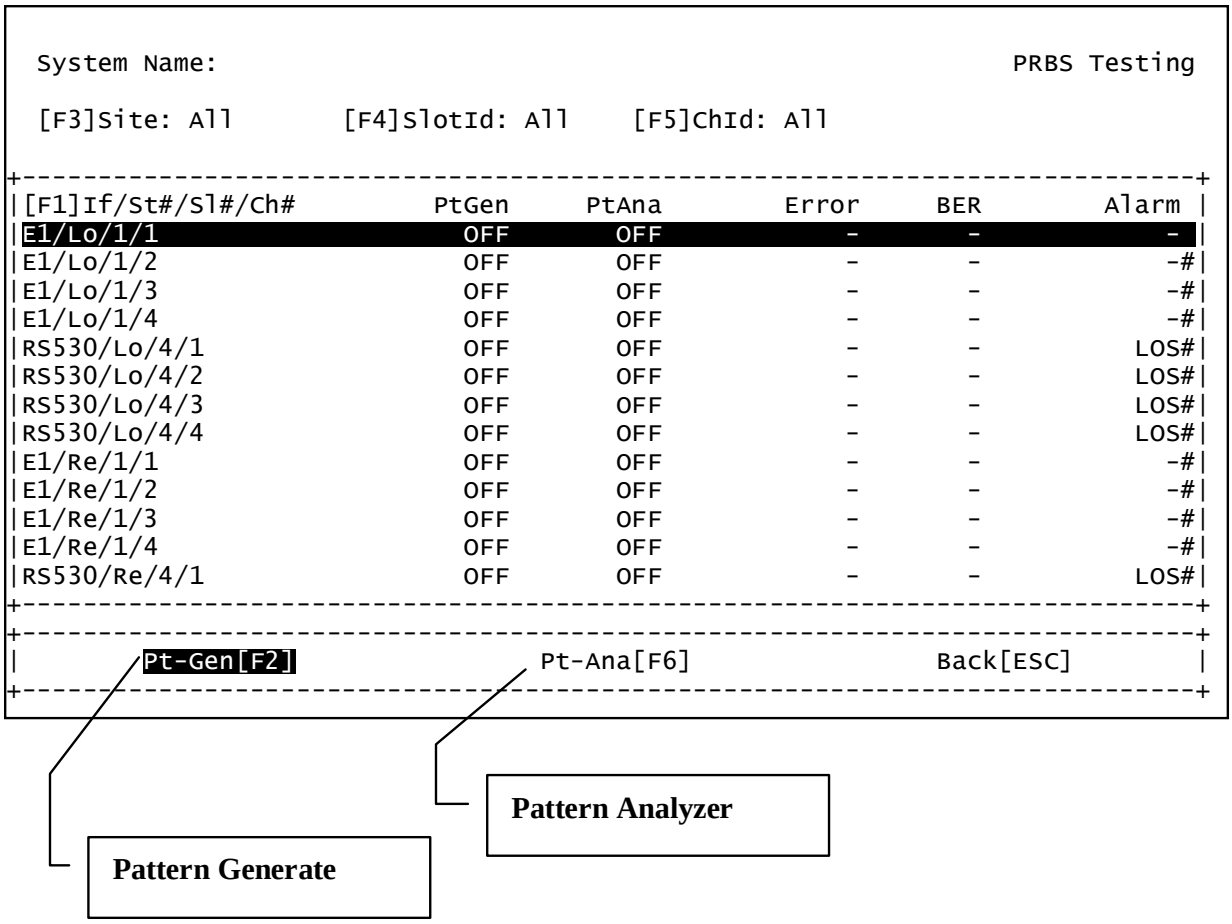
c. Request Remote (REM) Loopback : In the Loopback / V.54 Testing screen, select the slot ID which is on the tributary card in the local site, then choose "REM" item.

Info :function key [F8]

If the EOC (embedded operations channel) is broken, such as when running the aggregate remote loopback from the remote, the [F8] Undo-AgReLBK key can be used to rebuilt the EOC channel. However, if optical signal is lost, this function will not be enabled.



5.16 PRBS Test



The PRBS (pseudo- random binary sequence) pattern is 2^{15}-1(unframed). E1, T1 and V.35 are all able to have this Bit Error Rate testing performed.

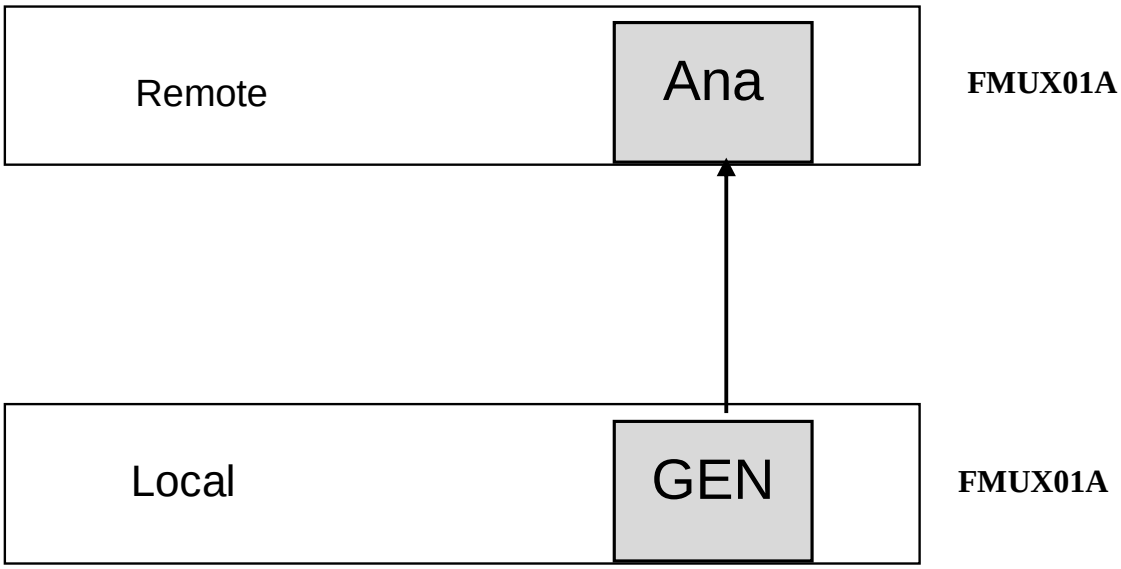
In order to do the test, any E1 data link can be selected to have a PRBS test. The test results will be shown in the number of error bits as well as the calculated bit error ratio.

You can only choose one channel to generate or analyze at one time.

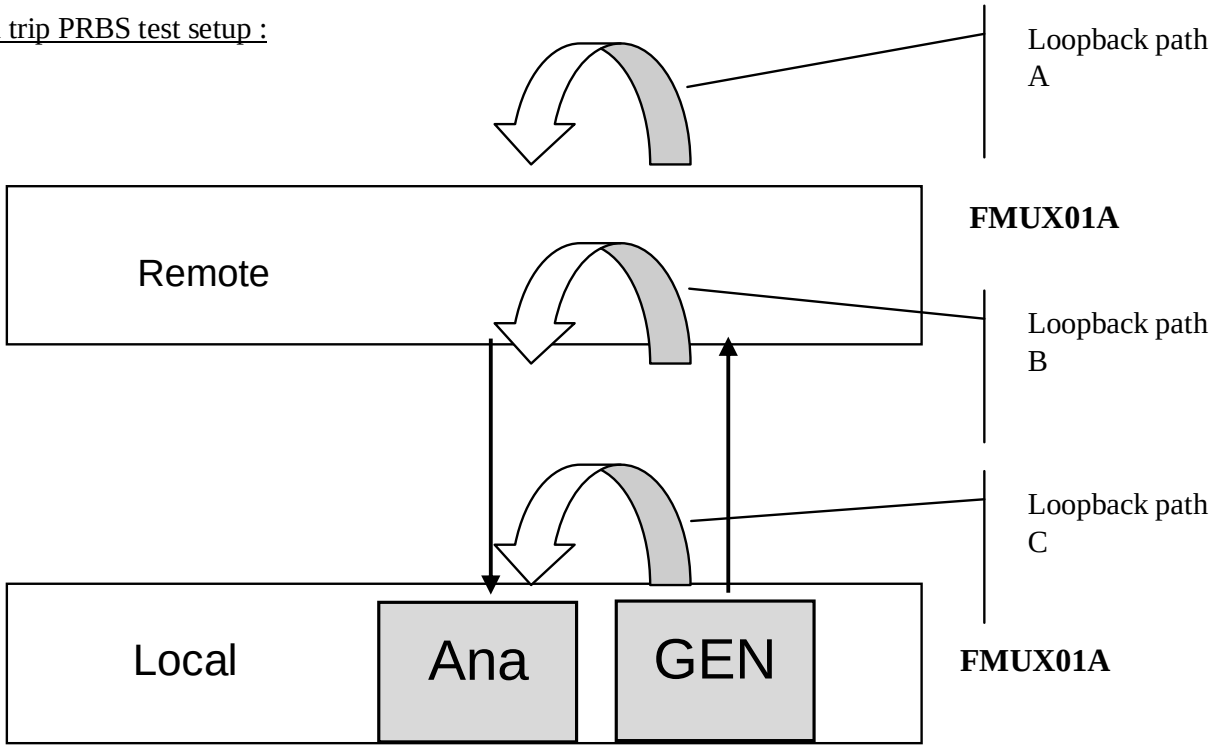
Info : The PRBS function is only used in unframed line cards or in framed cards set for unframed.

Regarding the PRBS test mode, please refer to the following :

One way PRBS test setup :

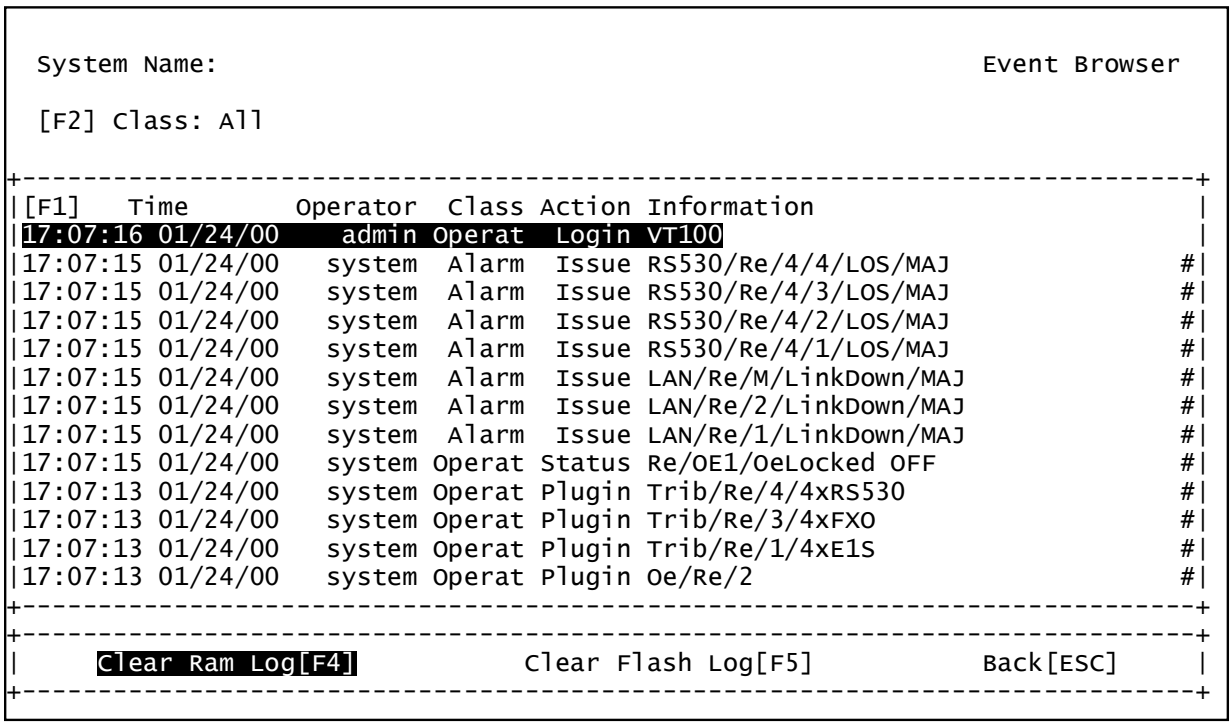


Round trip PRBS test setup :



When user wants to do the PRBS test, first the remote side needs to set the loopback path (loop A, Loop B, or Loop C). The local device will generate a test pattern and send to the remote device. Then local device's analyzer will receive the test pattern through the loopback path. The user will get the test results on the terminal display.

5.17 Event Browser



The Event Browser is used to view all of the alarm events in both current memory and those stored in flash.

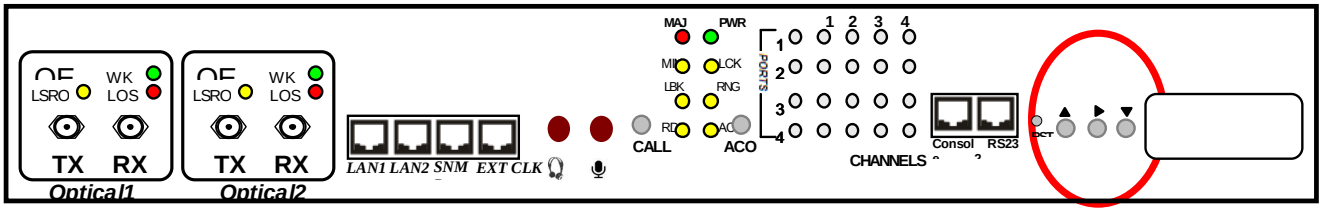
Clear Ram Log [F4] : clears all history events after the system boot.

Clear Flash Log[F5] : If the event-saving function is enabled, then [F5] will clear all history events store in non-volatile memory.

Refer to : 5.3.12.1 Event Class Processing Configuration and
5.3.12.2 Event Alarm Processing Configuration

Chapter 6. LCD Operating Instructions

Fiber Multiplexer provides an easy way to set the configuration, do maintenance, and conduct testing, by LCD and pushbutton.



The default password for Fiber Multiplexer is a combination of the buttons as below, from left to right :

Button	Up ▲	Right ▶	Down ▼	Up ▲

Note : the password for login in LCD menu can be changed via VT100 setting as section 5.3.11.

Button functions are as follows :

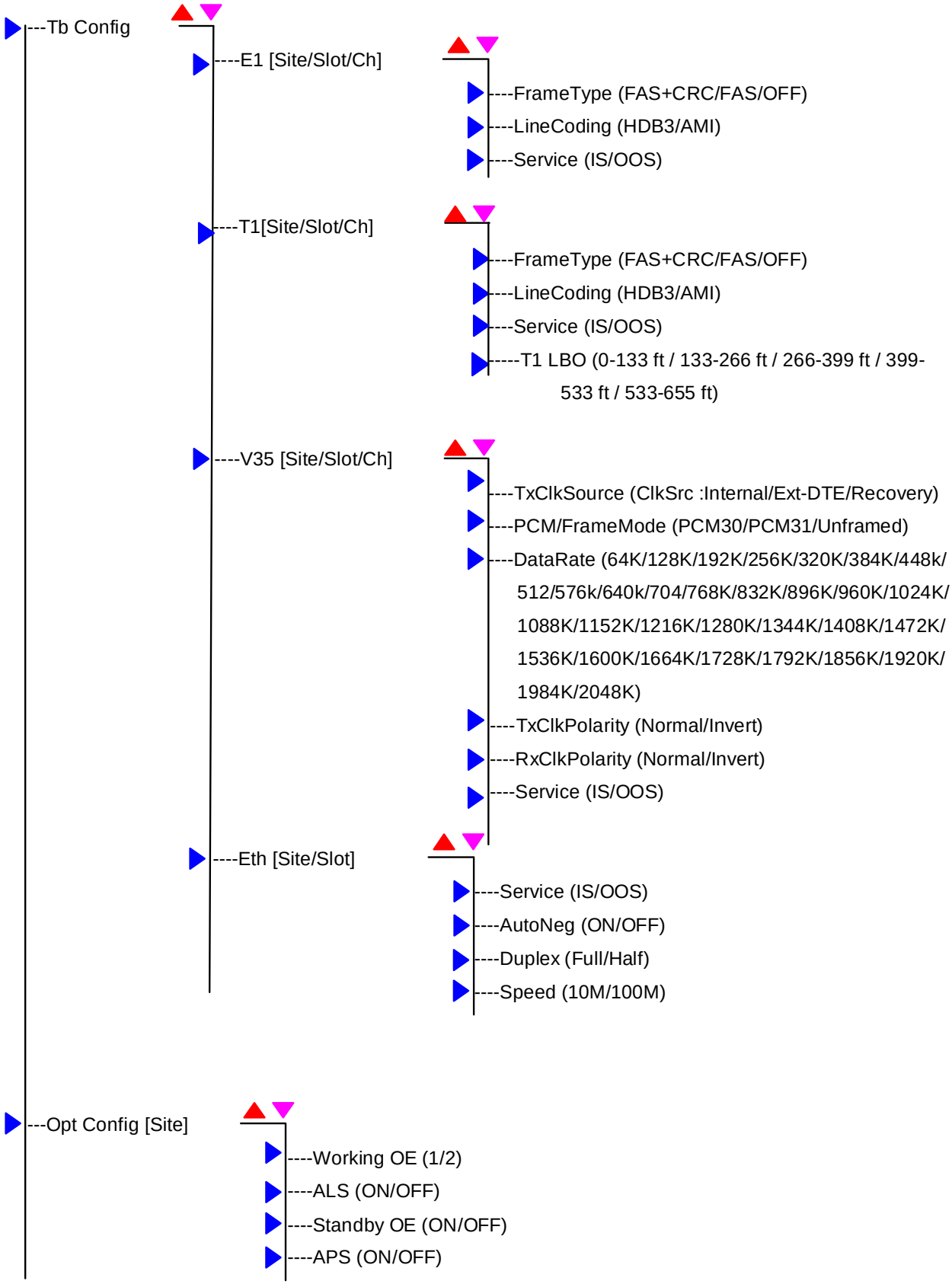
▲ Go back to the upper level of the menu

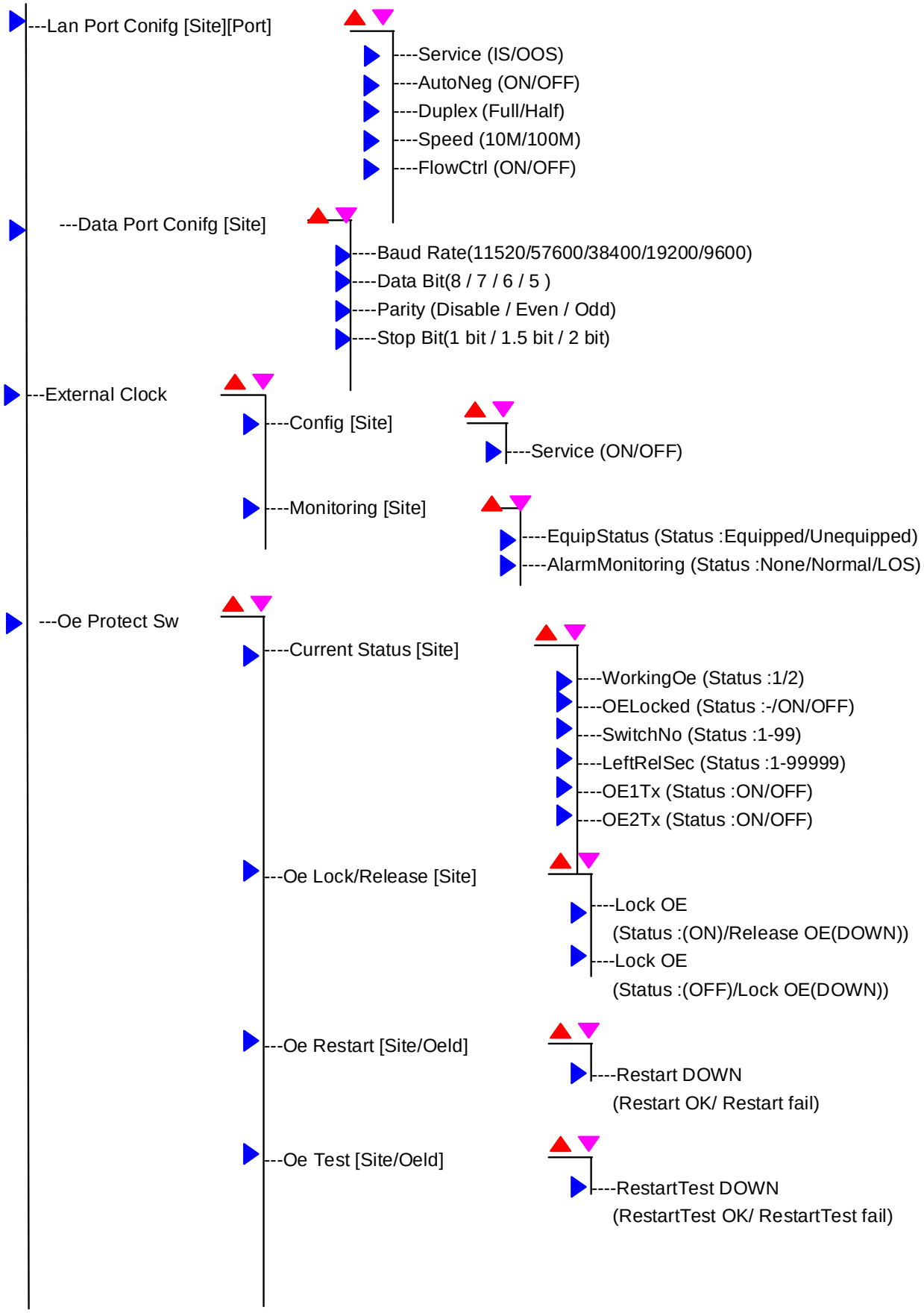
▶ Item select

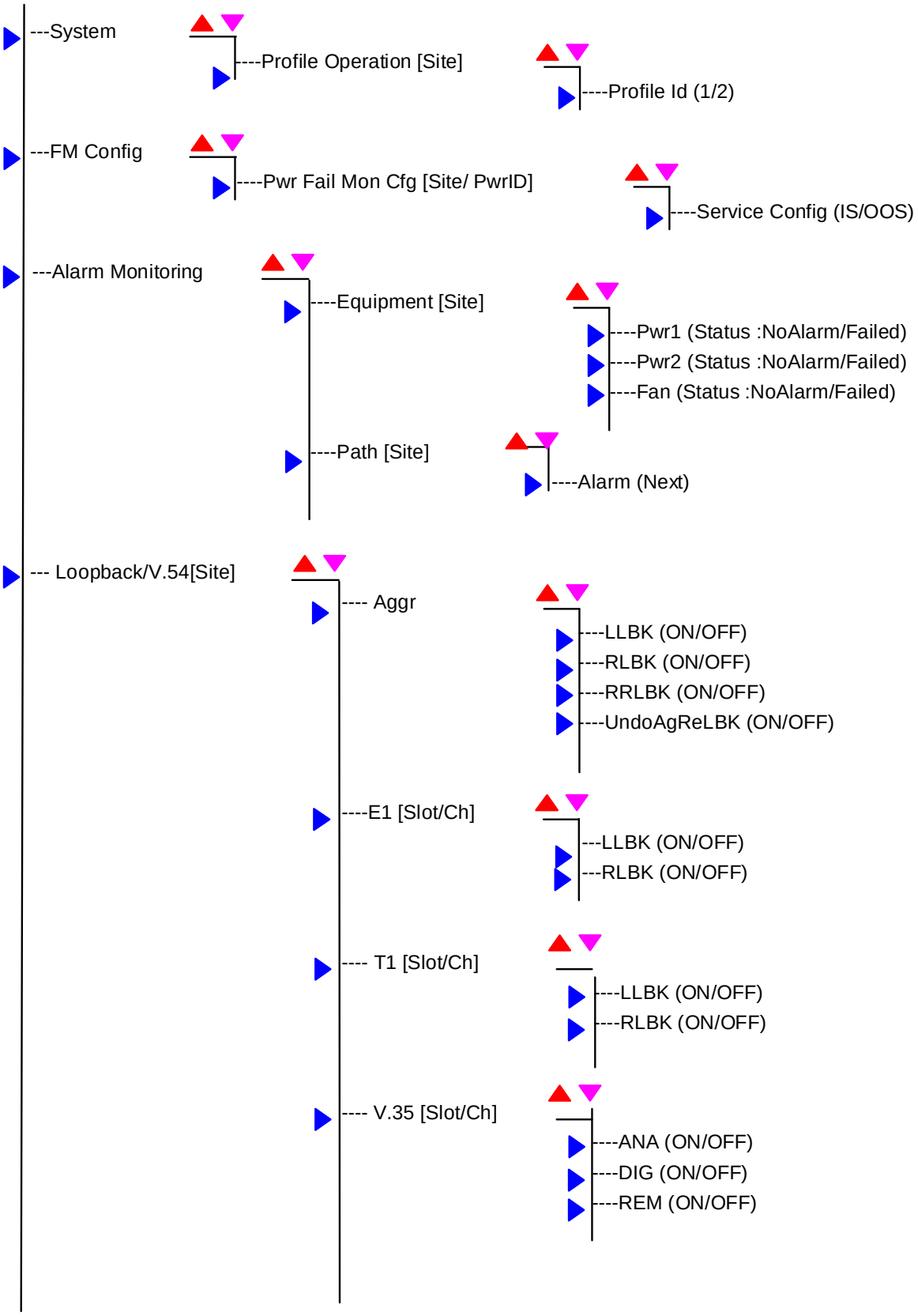
▼ "Enter" key to go to a sub-menu or enable selected action

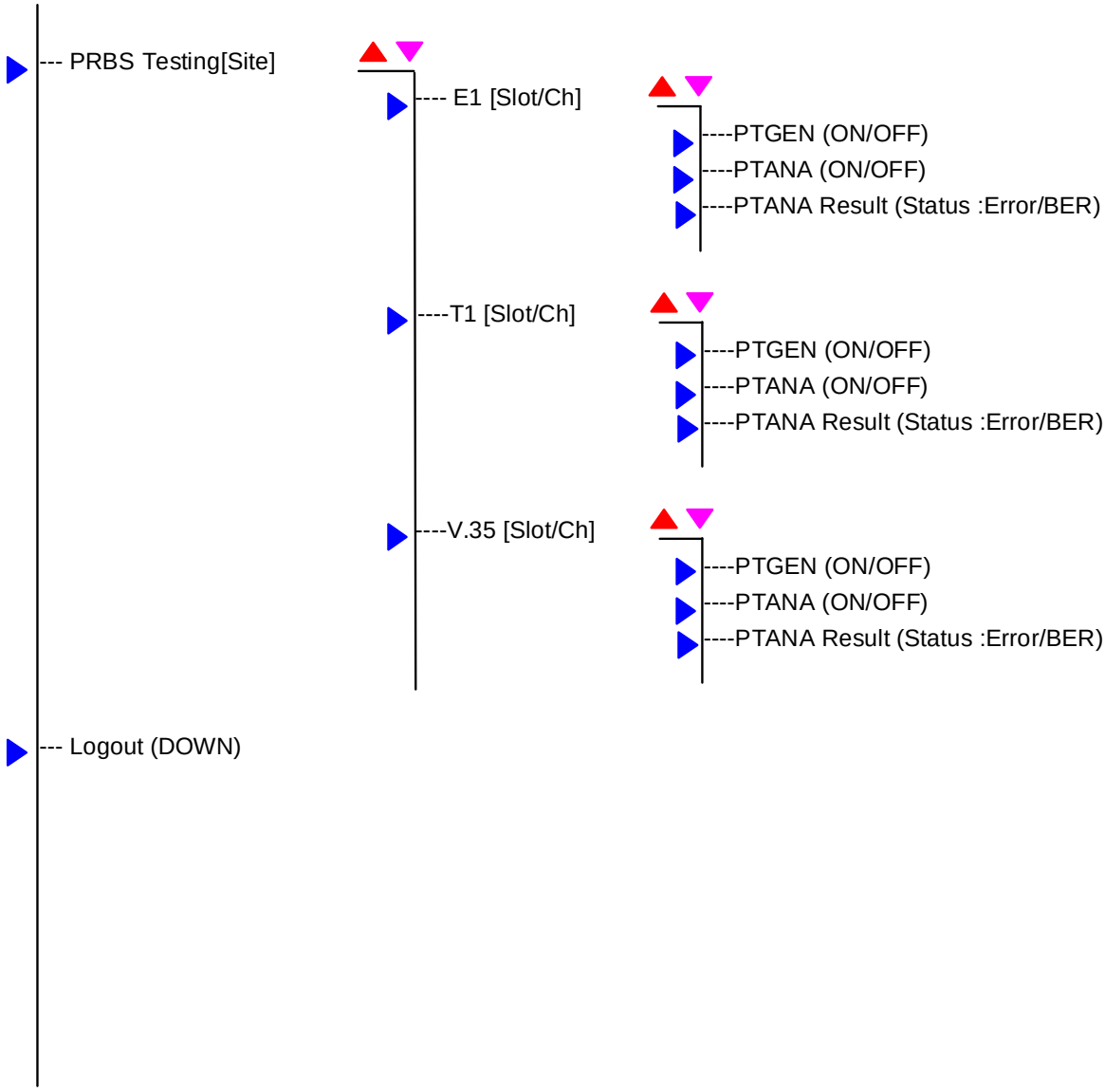
6.1 LCD Menu Tree

Password : _ _ _ _ (Modify Password refer to 5.3.10)




---Lan Port Conifg [Site][Port]
----Service (IS/OOS)
----AutoNeg (ON/OFF)
----Duplex (Full/Half)
----Speed (10M/100M)
----FlowCtrl (ON/OFF)
---Data Port Conifg [Site]
----Baud Rate(11520/57600/38400/19200/9600)
----Data Bit(8 / 7 / 6 / 5)
----Parity (Disable / Even / Odd)
----Stop Bit(1 bit / 1.5 bit / 2 bit)
---External Clock
----Config [Site]
----Service (ON/OFF)
----Monitoring [Site]
----EquipStatus (Status :Equipped/Unequipped)
----AlarmMonitoring (Status :None/Normal/LOS)
---Oe Protect Sw
----Current Status [Site]
----WorkingOe (Status :1/2)
----OELocked (Status :-/ON/OFF)
----SwitchNo (Status :1-99)
----LeftRelSec (Status :1-99999)
----OE1Tx (Status :ON/OFF)
----OE2Tx (Status :ON/OFF)
---Oe Lock/Release [Site]
----Lock OE
(Status :(ON)/Release OE(DOWN))
----Lock OE
(Status :(OFF)/Lock OE(DOWN))
---Oe Restart [Site/OeId]
----Restart DOWN
(Restart OK/ Restart fail)
---Oe Test [Site/OeId]
----RestartTest DOWN
(RestartTest OK/ RestartTest fail)

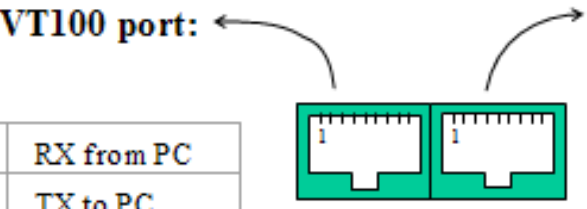

---System
----Profile Operation [Site]
----Profile Id (1/2)
---FM Config
----Pwr Fail Mon Cfg [Site/ PwrID]
----Service Config (IS/OOS)
---Alarm Monitoring
----Equipment [Site]
----Pwr1 (Status :NoAlarm/Failed)
----Pwr2 (Status :NoAlarm/Failed)
----Fan (Status :NoAlarm/Failed)
----Path [Site]
----Alarm (Next)
--- Loopback/V.54[Site]
---- Aggr
----LLBK (ON/OFF)
----RLBK (ON/OFF)
----RRLBK (ON/OFF)
----UndoAgReLBK (ON/OFF)
----E1 [Slot/Ch]
---LLBK (ON/OFF)
---RLBK (ON/OFF)
---- T1 [Slot/Ch]
----LLBK (ON/OFF)
----RLBK (ON/OFF)
---- V.35 [Slot/Ch]
----ANA (ON/OFF)
----DIG (ON/OFF)
----REM (ON/OFF)


--- PRBS Testing[Site]
---- E1 [Slot/Ch]
----PTGEN (ON/OFF)
----PTANA (ON/OFF)
----PTANA Result (Status :Error/BER)
----T1 [Slot/Ch]
----PTGEN (ON/OFF)
----PTANA (ON/OFF)
----PTANA Result (Status :Error/BER)
----V.35 [Slot/Ch]
----PTGEN (ON/OFF)
----PTANA (ON/OFF)
----PTANA Result (Status :Error/BER)
--- Logout (DOWN)

Appendix

A.1 External User Interface : Async Serial / RS-232

User VT-100 interface / RS232 interface :



4	RX from PC
6	TX to PC

4	RX from PC
6	TX to PC

Signal Ground connects to pins 2,5,7, and 8. Pins 1 & 3 have no connection.

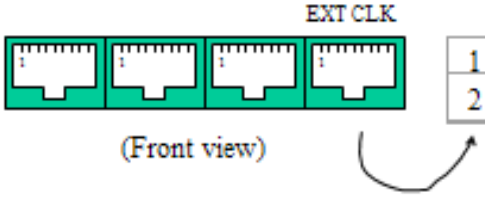
Alarm relay contact :

DB9 Female	
1	MIN_LED_B
2	MIN_BUZ_B
3	MAJ_LED_B
4	MAJ_BUZ_B
5	NC
6	MIN_LED_A
7	MIN_BUZ_A
8	MAJ_LED_A
9	MAJ_BUZ_A

External alarm port :

DB9 Female	
1	(IN1P)
2	(IN1N)
3	(IN2P)
4	(IN2N)

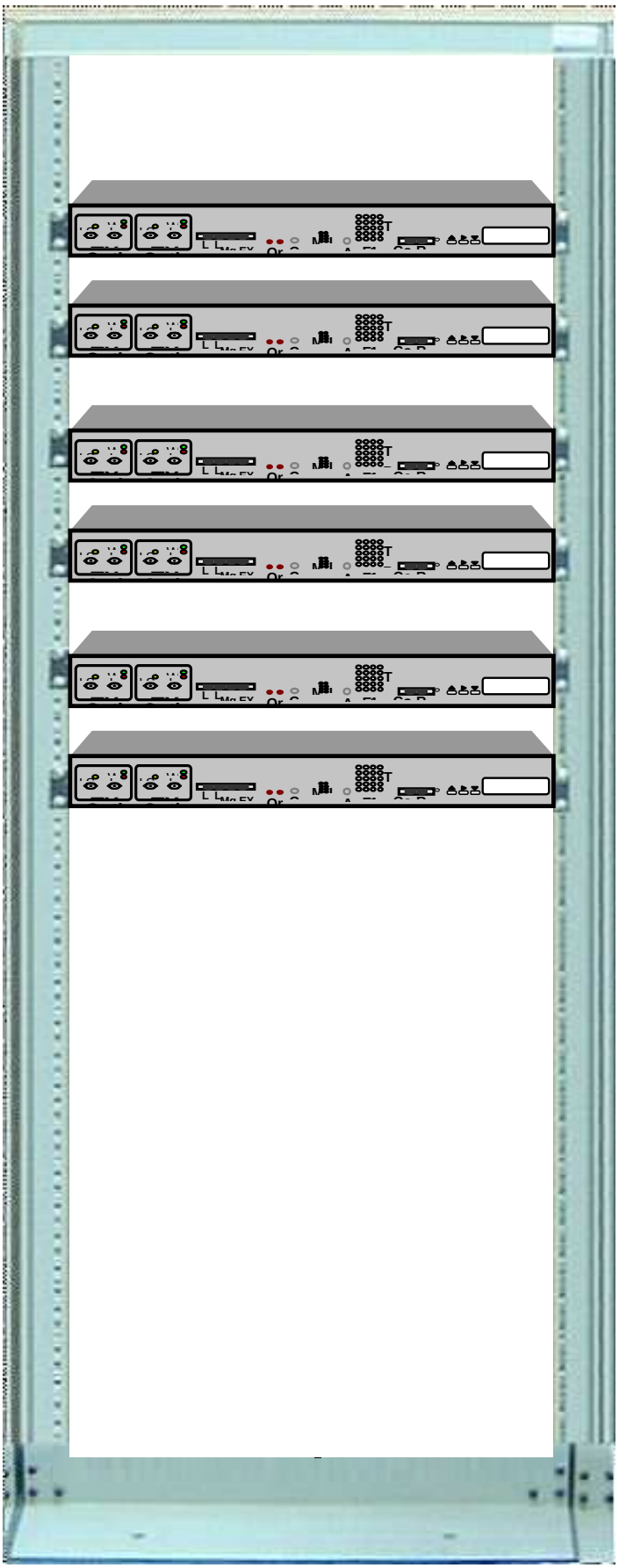
External Clock input port :



1	EXT_RTIP
2	EXT_RRING

A.2 Troubleshooting Guide

No.	Symptom	Probable Cause	Corrective Actions
1	VT-100 can not login	▪Serial cable connection invalid. ▪Baud Rate set incorrect or COM port selected incorrectly ▪Input wrong account or password	▪Check cable link. ▪Check Baud Rate and COM port ▪Check account and password
2	The equipment screen alarm indicators are different from physical indicators or network hang	▪Check related configuration and physical connectors	User can confirm tributary slot parameters configuration and trunk Ethernet parameters configuration item by item : ▪Check service mode ▪Ethernet port contact ▪Change the Ethernet cable ▪Check the duplex matching
3	Ethernet transmit has serious data package loss	The RJ-45 connector has a bad contact FULL/HALF duplex is not matching Trunk Ethernet port service off	▪Check the duplex matching ▪Check Auto-neg mode ▪Check Data forwarding mode ▪Check Trunk Ethernet port all configuration function
4	Ping fail or can't transfer data or cannot remote Telnet	▪Trunk Ethernet port service off ▪Fiber fail ▪The RJ-45 connector has a bad contact ▪Networking service management telnet function turned off ▪Trunk Ethernet general parameters setting error	▪Check the duplex matching ▪Check Trunk Ethernet port all configuration function ▪Check the fiber contact ▪Change optical cable ▪Check networking service management function, diagnostic & loopback test item : (service mode must be on) ▪Execute Autolbk to check optical connection
5	The unit is reset or powered off, all the configuration settings are lost	▪ The user selected wrong save configuration or select incorrect profile load.	▪This equipment will reboot according your last saved state by loading the profile. ▪ If your last boot was loading factory default value, when you restart unit, it will still load factory default .

No.	Symptom	Probable Cause	Corrective Actions
6.	Device can not be managed	▪Networking service management SNMP may be off ▪Device IP incorrect ▪SNMP agent configuration : read/write community incorrect	▪Check networking service management ▪Check device IP ▪Check SNMP agent configuration
7.	Power indicator is off	Power supply is not available; The mains switch of the power supply is not closed; The connection of the power supply is not tight;	Change the power supply; Close the switch of the power supply; Screw down the power supply
8.	Optical LOS alarm indicator is on	If self loop of the optical ports is normal and the connection of the optical cables is right, the optical cables has trouble or the distance is too long; Otherwise the TX and RX optical interface connection may be reversed;	Change the optical cables; Change a long distance optical module; Exchange the TX and RX fiber cables
9.	The equipment at one side of the optical connection is normal, and other has LOS alarm	Self loop separately, the equipment that has LOS alarm has trouble Otherwise the RX fiber cable has trouble	Contact with your support representative Change the optical cables
10.	E1 interface alarms	Coaxial connector has trouble The E1 equipment is powered off The E1 TX and RX interface connection is reverse; The alarm of tributary E1 is not masked	Adjust the coaxial connector Power on the E1 equipment that connects to the unit; Exchange the TX and RX interface connectors; Press the "MASK" button to mask the tributary E1 alarm;
11.	V.35 interface alarms	Clock settings do not match The V.35 connector has a bad contact	Check V.35 interface configured
12.	OE module cannot switch	Check OE module setting for startup lock function.	Check Optical interface parameters under config Check OE switching protection status
13.	PRBS test shows error bits or test is ok but always showing red indicators.	Not comply use framing in unframed type module. The user lookup PRBS test result in the wrong location	Configured correct type in unframed. In general, user should check the results in PRBS testing screen.
14	LCD key cannot login and set	Check that input key priority button is correct. Check console screen item "LCD Login Configuration" whether it has defined.	Check "LCD Login Configuration".
15	E1 interfaces have bit errors	Impedance is not matched or E1 cables are too long. The E1 connector has a bad contact, 120Ω connect cable is not twisted;E1 terminal unit is not common earthed with the optical multiplexer	Confirm the impedance of the E1 equipment is same of the optical multiplexer; Confirm the distance of the E1 cable is no longer than 200 meters; Adjust the E1 connector Confirm the 1,2 pin of the RJ-45(120Ω) is twisted, and the 4,5 pin is another twist; Confirm the earth ground of the E1 terminal unit and the optical multiplexer is according to the electrician standard;

A.3 Rack Mount Installation Guide