# FOM16 ™

# Installation and Operation

**VER ：2.0**

# FOM16 Installation Description

## Table of Contents

# 1. Previous Preparation

1.1 Tools and Materials

Ground Strip

Wire cutters

Multi-meter

Power cable (AWG 8, Single-bone): Red and black both

Ground cable (AWG 14, Single-bone): Green

FC/PC Patch cord: FC/PC connectors, 1310mm single mode fiber

FOM16$^{TM}$ Console Port Installation Dsik#1 and Dsik#2

**1.2 Please wear Ground strip during installations to avoid the static electricity.**

## 2. Mechanical Installation

2.1 FOM16 is a standard 1 RU unit, which can be mounted on 19 or 23-inch rack. It also works as a desktop unit. The front view and the rear view are shown in Fig.1 and Fig.2, respectively.


*Fig. 1 FOM16 Front View*

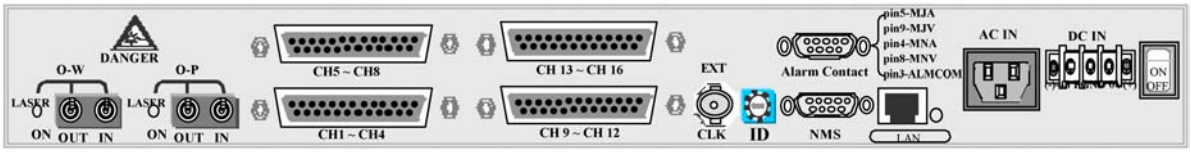



*Fig.2 FOM16 Rear View*

2.2 In order to fit for different size of racks, the brackets can be fastened by means of screws to the two side walls of the case, as shown in Fig. 3.

2.3 After attaching the brackets, FOM16 is ready for installation in the rack. Fasten the brackets to the side rails of the rack by means of four screws, two on each side.

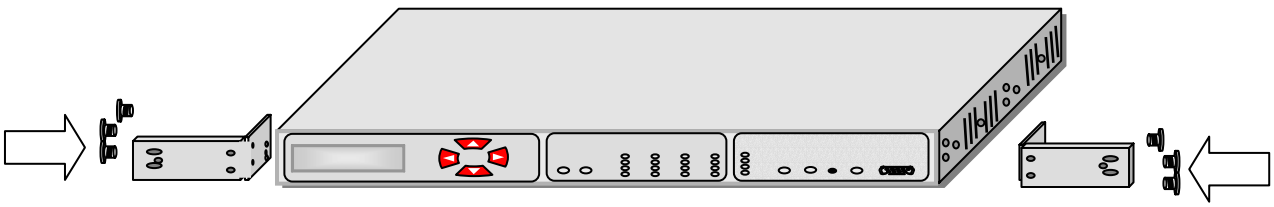


*Fig.3 23-inch rack mountable (I)*

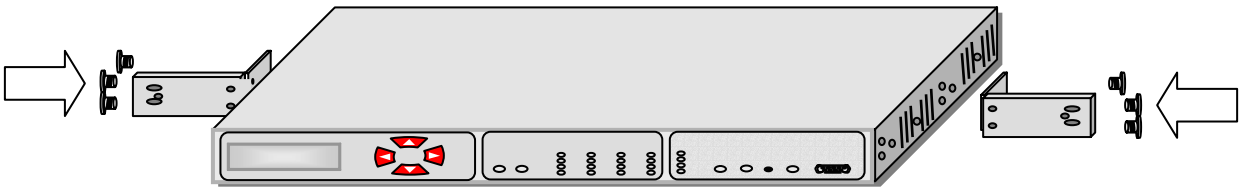


*Fig.4 23-inch rack mountable (II)*

*Fig.5 19-inch rack mountable (I)*

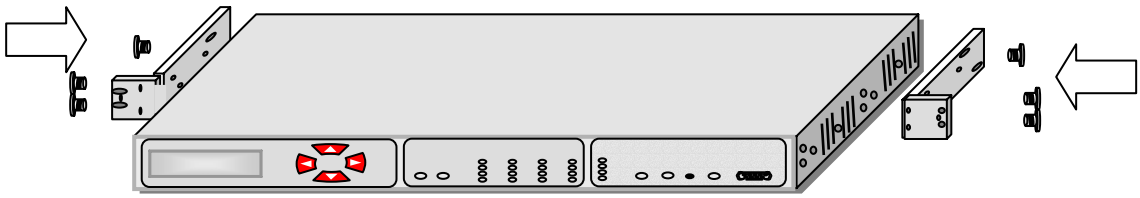


*Fig.6 19-inch rack mountable (II)*

## 3. Electrical Installation

3.1 FOM16 can be either AC- or DC-powered. If both AC and DC are fed at the time, The AC power is selectable internally first and the DC power is used as a back up power source.

3.2 Use the rear left AC power connector to connect to an AC power outlet capable of furnishing a supply voltage for either 110 or 220 VAC.

3.3 Use the rear right DC power connector to connect to a DC power source capable of furnishing a supply voltage -48 VDC.

3.4 FOM16 consists of 16 E1 tributaries, i.e. CH1 ~ CH16. Each E1 tributary uses 4 pins, i.e. Input Tip/Ring and Output Tip/Ring. Each rear DB-25 connector contains a 4-E1-tributary group, that is, there are 16 pins designated for 4 E1 tributaries and 9 pins for frame ground (FGND). The pin assignments are shown in the Fig.7 and Fig.8.

3.5 For the unbalance interface, each E1 tributary has two BNC connectors designated TXTIP (transmit output) and RXTIP (receive input), as shown in Fig.9 and Fig.10.

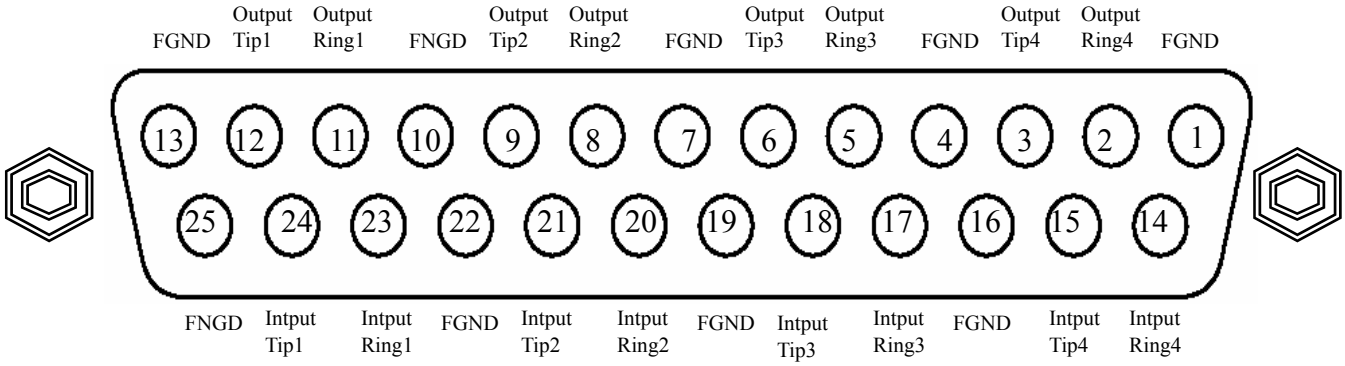



*Fig.7 DB-25 connector and 4 E1 tributaries*

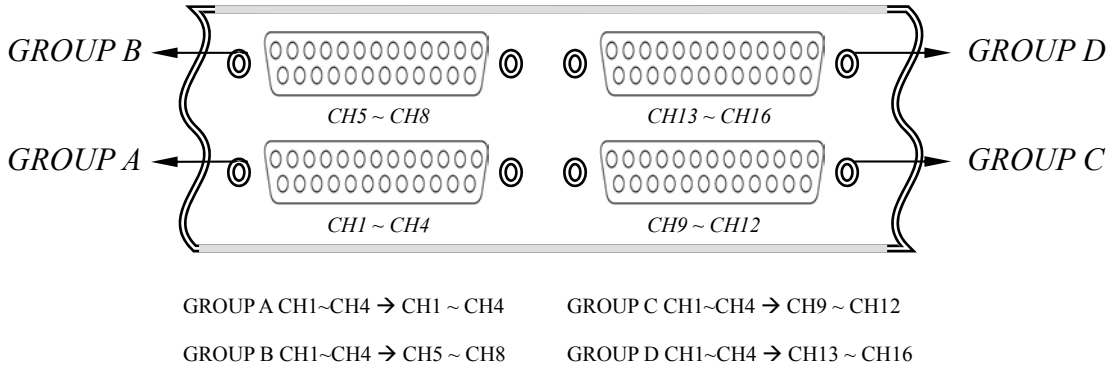



*Fig.8 DB-25 connectors and 16 E1 tributaries*

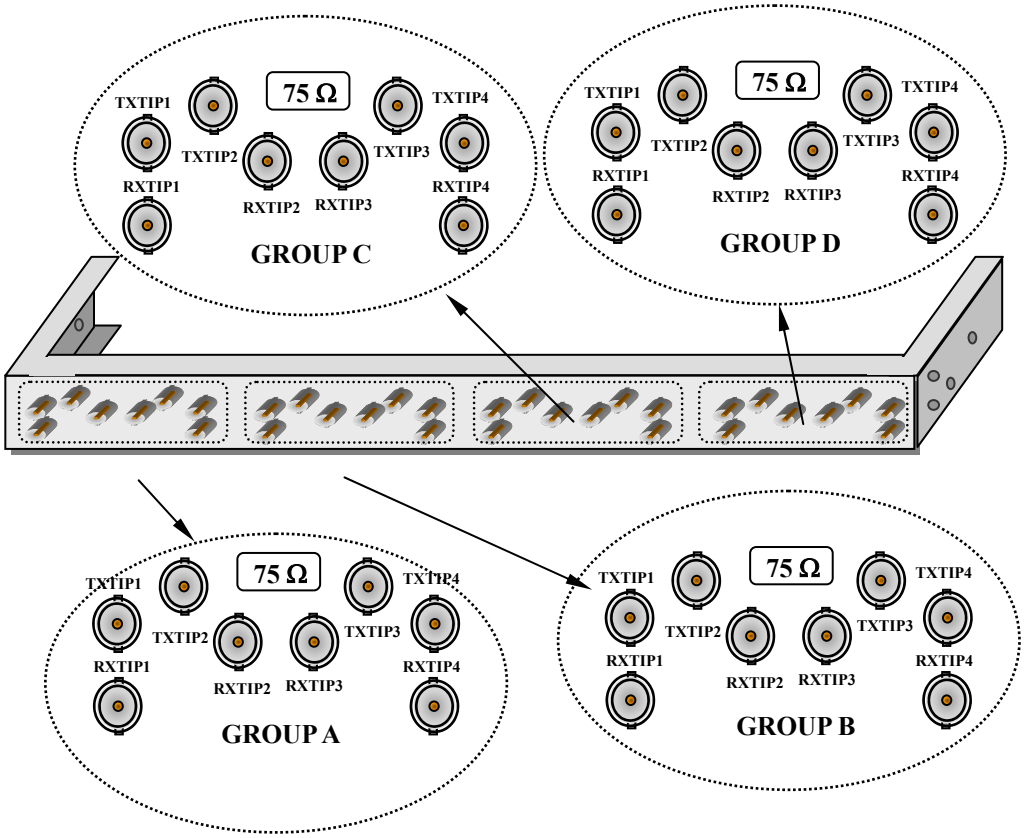



*Fig.9 BNC-connector kit*

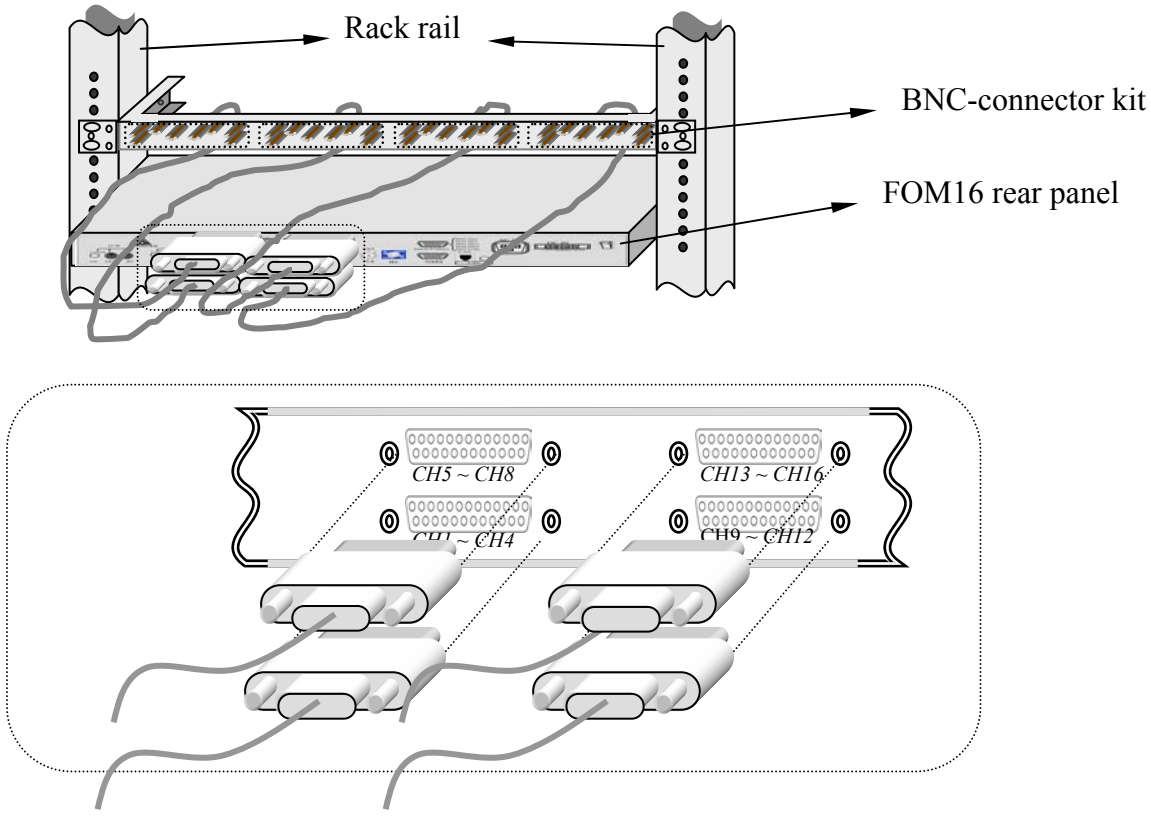



*Fig.10 DB-25 connectors and BNC-connector kit*

3.6 FOM16 provides audible and visual alarm contacts that use relays to activate a circuit loop between each alarm contact point and the common point in case of an alarm. The pin assignments of the rear female DB-9 connector are shown in Fig.11.

MJV: Visual Major alarm
MJA: Audible Major alarm
MNV: Visual Minor alarm
MNA: Audible Minor alarm
ALMCOM Common Point

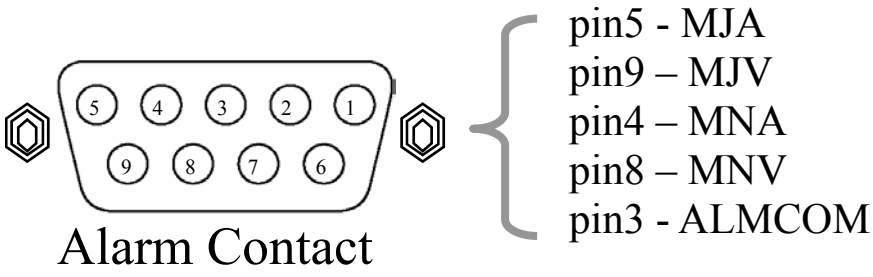
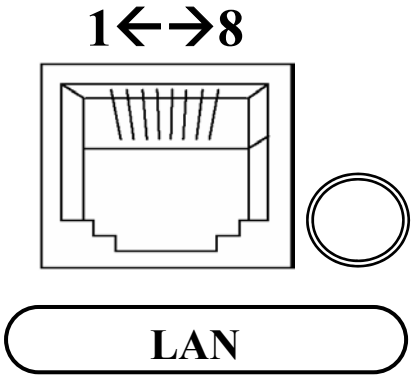



*Fig.11 Alarm contact pin assignment*

3.7 FOM16 is equipped with a rear LAN port that is an RJ-45 connector. This port operates at a rate of 10 Mbps over an ETHERNET cable. Pin assignment is shown in Fig.12.




PIN1 – TX+ (transmit positive out)
PIN2 – TX- (transmit negative out)
PIN3 – RX+ (receive positive in)
PIN6 – RX+ (receive negative in)

*Fig.12 LAN port of an RJ-45 connector*

## 4. Optical Installation

4.1 FC/PC connectors are used for optical interfaces. “IN” and “OUT” are used to indicate the directions of laser beam input and output. ”O-W” means the optical working pair and “O-P” the optical protection pair. The working pair of near end must be connected with that of far end and the same for the protection pair.

**4.2 Eye damage may be caused by a broken fiber or by an unterminated connector if the laser beam is viewed directly or with improper optical instruments.**

4.3 When planning the routing of fiber optic cables, avoid sharp bends.

## 5. Front Panel Indicator

Fig.11 shows the front view of the FOM16, and Table 1 lists the functions of the FOM16 controls, connectors, and indicators, located in the FOM16 front panel. The index numbers in Table 1 correspond to the item numbers in Fig.13.

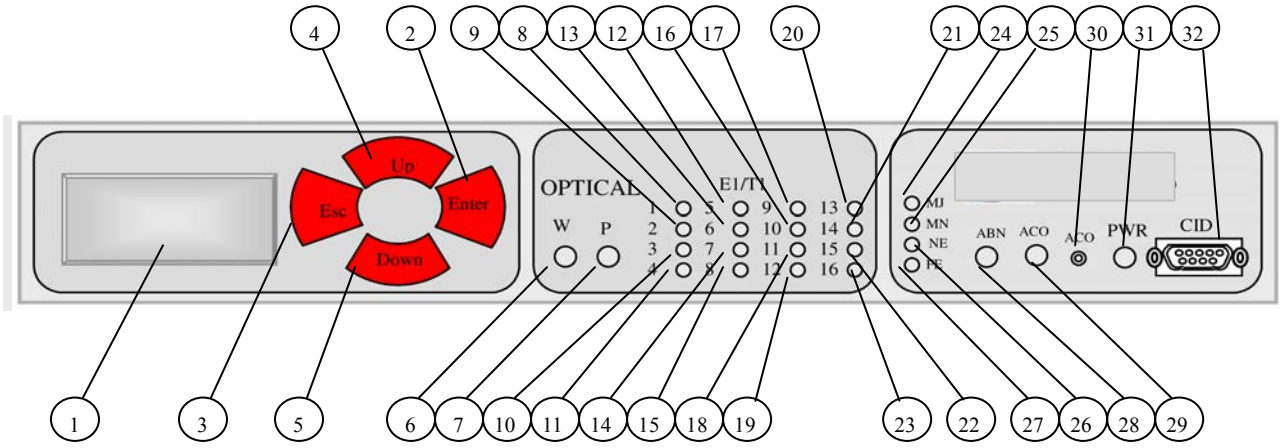



*Fig.13 FOM16 Front View*

*Table.1 FOM16 Controls, Connectors and Indicators*

| NO. | Controls or Indicators | Function Description |
|---|---|---|
| 1 | LCD display window | Two by twenty (2×20) characters LCD to show menu items. |
| 2 | Enter key pad | Used to move down the menu tree or enable a selection. |
| 3 | ESC key pad | Returns the operation to an upper layer menu. |
| 4 | Up key pad | Shows the other menu item in the same level. |
| 5 | Down key pad | Shows the other menu item in the same level. |
| 6 | Optical Working indicator | GREEN: when the optical working link interface is in use.<br>RED: when the optical working link interface reports loss or out-of –frame of input signal.<br>YELLOW: when the optical working link interface is installed but in stand by state. |
| 7 | Optical Protection indicator | Same functions as item 6 for the optical protection link interface. |
| 8 | Ch1 indicator | GREEN: when the corresponding tributary interface is in use.<br>RED: when the corresponding tributary interface reports loss of input signal.<br>OFF: when the corresponding tributary interface is out of service.<br>Blinking GREEN: when the corresponding tributary interface is in abnormal operation, i.e., local loopback or remote loopback is activated. |
| 9 | Ch2 indicator | |
| 10 | Ch3 indicator | |
| 11 | Ch4 indicator | |
| 12 | Ch5 indicator | |
| 13 | Ch6 indicator | |
| 14 | Ch7 indicator | |
| 15 | Ch8 indicator | |
| 16 | Ch9 indicator | |
| 17 | Ch10 indicator | |
| 18 | Ch11 indicator | |
| 19 | Ch12 indicator | |
| 20 | Ch13 indicator | |
| 21 | Ch14 indicator | |
| 22 | Ch15 indicator | |
| 23 | Ch16 indicator | |

*Table.1 FOM16 Controls, Connectors and Indicators (Cont'd)*

| NO. | Controls or Indicators | Function Description |
|---|---|---|
| 24 | Major alarm indicator | ON when any major alarm occurs. |
| 25 | Minor alarm indicator | ON when any minor alarm occurs. |
| 26 | Near End indicator | ON when any near end alarm occurs. |
| 27 | Far End indicator | ON when any far end alarm occurs. |
| 28 | Abnormal operation indicator | ON when FOM16 is in abnormal operation, that is, any of loopbacks of tributaries and optical links is activated. |
| 29 | Alarm-Cut-Off indicator | ON when any of FOM16 alarm events is occurred and ACO push button is pushed. |
| 30 | Alarm-Cut-Off push button | Pushed to disable audible and visible alarms connected to the relay contacts. |
| 31 | Power indicator | OFF when the power supply is not powered.<br>ON when the power supply is turned. |
| 32 | CID connector | Connection to management interface (RS232 / DB9). |

# 6. Front Panel Operation

The front panel consists of a two by twenty (2x20) characters LCD display window and four keypads each labeled with ESC, Enter, Up, Down, as shown in Fig13.

**Enter** key is used to move down the menu tree or to enable a selection.

**Up** and **Down** keys show other menu item in the same level.

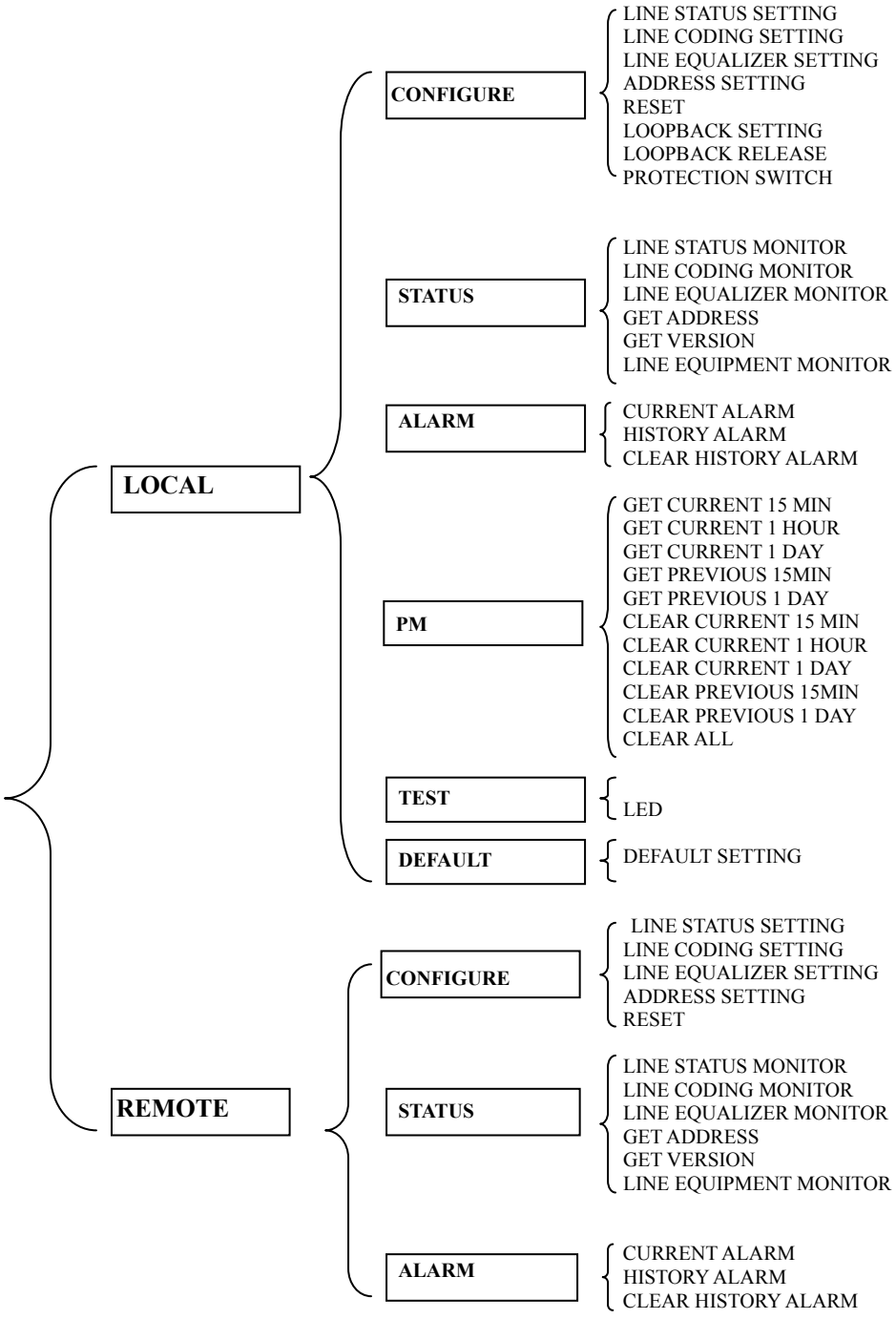
**ESC** key returns the operation to an upper layer menu or to the main menu.

The first line of LCD shows the operation items and selected items are underlines by a "_" in the first character.

The second line displays a help string.

A "<" or a ">" represent the menu is a multi-page.

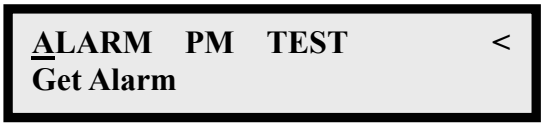
## 6.1 Menu Mapping Tree



The main menu is shown in Fig.13. It is the first menu display after power up.


Fig.13 **Main menu**

The first tier menu includes **LOCAL** and **REMOTE**. Each sub-menu is further broken down into sub-level menu. Subsequent chapters give detailed information regarding these menus.


## 6.2 Configure Menu

The configure group includes **SVC**, **CODE**, **EQU**, **ADDRESS, RESET, LPBK**, **RLSLPBK**, and **PROTSW**. Use the ◄ and the ►keys to cycle through to a proper item and pressing the **Enter** key to select the underlined item.




### 6.2.1 Line Service Setting Menu

**PATH: CONFIGURE→SVC→LS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to elect the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.

```
ALL  1  2  3  4  5  6
>
```

3. Use ◄ and ►key to cycle through to a proper service status and press **Enter** to select.

```
IS   OOS
In Service
```

```
IS   OOS
Out Of Service
```

4. When completed, the button line shows “ **-- -- OK -- --** “ message.

```
IS   OOS
          -- -- OK -- --
```

**PATH: CONFIGURE→SVC→OPT**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.

```
SVC   CODE   EQU
>
```

```
LS   OPT
Optical
```

2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.

```
WORK   PROT
Work(Line1)
```

3. Use ◄ and ► key to cycle through to a proper service status and press **Enter** to select.

```
IS   OOS
In Service
```

```
IS   OOS
Out Of Service
```

4. When completed, the button line shows “ **-- -- OK -- --** “ message.

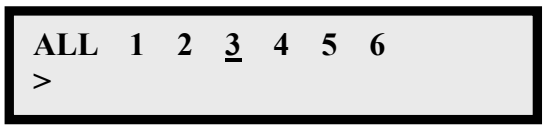
```
IS   OOS
          -- -- OK -- --
```

6.2.2 Line Coding Setting Menu

**PATH: CONFIGURE→CODE**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.


2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.




3. Use ◄ and ► key to cycle through to a proper coding type and press **Enter** to select.



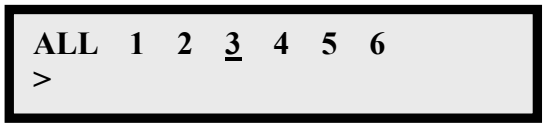
4. When completed , the bottom line shows “ **-- -- OK -- --** “ message.

### 6.2.3 Line Equalizer Setting Menu( T1 TYPE ONLY)

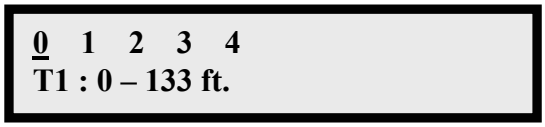
**PATH: CONFIGURE→EQU**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.


2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.




3. Use ◄ and ► key to cycle through to a proper equalization type and press **Enter** to select.




4. When completed , the bottom line shows “ **-- -- OK -- --** “ message.


**NOTE: If card type is E1 , it shows message**

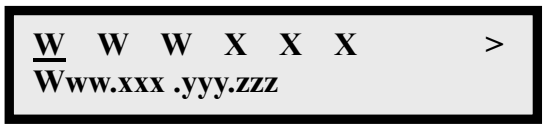
### 6.2.4 Address Setting Menu

**PATH: CONFIGURE→ADDRESS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the address item.

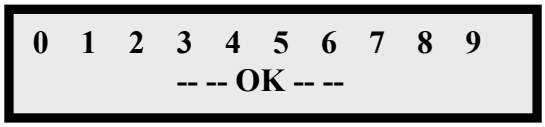


2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the sub-address.

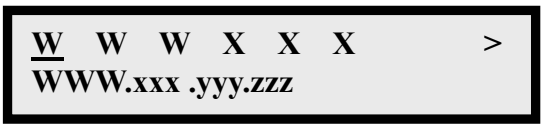



3. Use the ◄ key and ► key to cycle through to a proper sub-address and press the **Enter** key to select the address number. You can use the ► key to cycle through to a proper one and press the **Enter** key.


4. When completed , the bottom line shows " **-- -- OK -- --** " message.




5. Press **Esc** to escape the above state and back to the state below.Press the ► key to select **XXX** and repeat the step 2 through 4 to set subaddress XXX.




6. Use the same procedure to set **YYY, ZZZ.**
7. You may follow the steps below to make sure the address is set correctly:
   **Local → Status → Address → IP**

**8.Note: You have to re-power the FOM16 to enable the address setting.**

### 6.2.5 Reset Menu

**PATH: CONFIGURE→ RESET**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the function.


2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the option.



3. When completed , the bottom line shows " **-- -- OK -- --** " message.

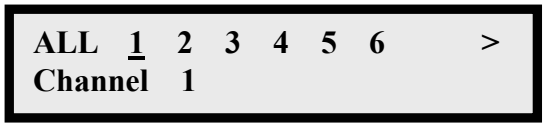

### 6.2.6 Loopback Setting Menu

**PATH: CONFIGURE→LPBK→LS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.




3. Use the ◄ and ► key to cycle through to a proper loopback type and press **Enter** to select.


4. When completed , the bottom line shows “ **-- -- OK -- --** “ message.

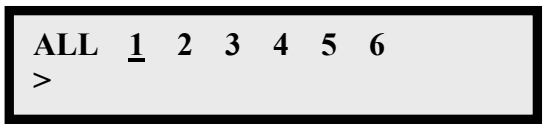

### 6.2.7 Release Loopback Setting Menu

**PATH: CONFIGURE→RLSLPBK→LS**

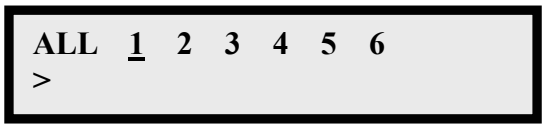
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.




3. When completed , the bottom line shows “ **-- -- OK -- --** “ message.



### 6.2.8 Protection Switch Menu

**PATH: CONFIGURE→ PROTSW**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the function.

```
LPBK  RLSLPBK  PROTSW <
Protect Switching
```

2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the option.

```
AUTO WORK  PROT
Auto  Switching
```

```
AUTO  WORK  PROT
Switch to W(Line1)
```

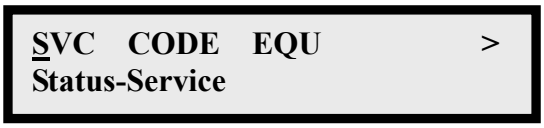
```
AUTO  WORK  PROT
Switch to P(Line2)
```

3. When completed , the bottom line shows “ **-- -- OK -- --** “ message.

```
AUTO  WORK  PROT
        -- -- OK -- --
```

## 6.3 Status Menu

The status group includes **SVC**, **CODE**, **EQU**, **ADDRESS, VERSION**, and **EQP**. Use the ◄ and the ►keys to cycle through to a proper item and pressing the **Enter** key to select the underlined item.

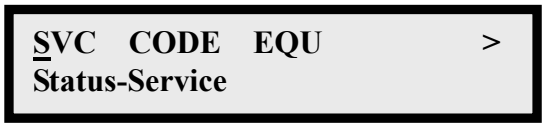





### 6.3.1 Line Service Status Menu

**PATH: STATUS→SVC→LS**

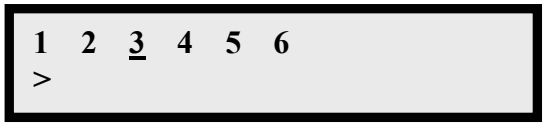
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.





2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. The system reponses the setting message at bottom line.



**PATH: STATUS→SVC→OPT**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.

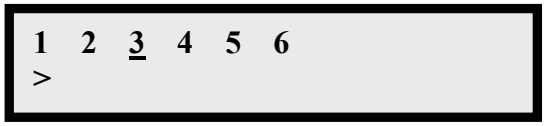

3. The reponse messages are the same as Low speed channel.

### 6.3.2 Line Coding Status Menu

**PATH: STATUS→CODE**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.


2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.



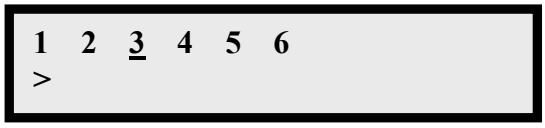

3. The system reponses the setting message at bottom line.


### 6.3.3 Line Equalizer Status Menu

**PATH: STATUS→EQU**

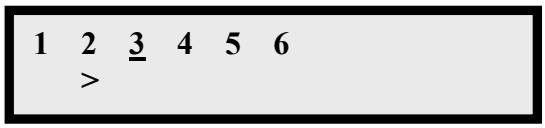
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.

2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.



3. The system reponses the setting message at bottom line.


**NOTE: If channel type is E1 , it shows message**




### 6.3.4 Address Status Menu

**PATH: STATUS→ADDRESS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the address item.



2. The system reponses the setting message at bottom line.

### 6.3.5 Version Status Menu

**PATH: STATUS→VERSION**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the address item.


2. The system reponses the setting message at bottom line.


### 6.3.6 Equipment Status Menu

**PATH: STATUS→EQP**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the address item.


2. The system reponses the setting message at bottom line.


[OPT: 2] means there are two fibers equipped in this system.

[LS: 16] means there are 16 low-speed channels equipped in this system.

## 6.4 Alarm Menu

The alarm group includes **CUR**, **HIS**, and **CLR_HIS**. Use the ◄ and the ►keys to cycle through to a proper item and pressing the **Enter** key to select the underlined item.


### 6.4.1 Get current alarm Menu

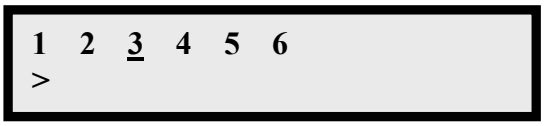
**PATH: ALARM→CUR→LS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. LCD shows the low speed channel alarm message at bottom line.


**PATH: ALARM→CUR→OPT**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. LCD shows the optical channel alarm message at bottom line.

| | |
|---|---|
| **WORK PROT**<br>**LOS** | **WORK PROT**<br>**LOF** |
| **WORK PROT**<br>**FERF** | **WORK PROT**<br>**LFIN** |

**PATH: ALARM→CUR→SYS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.

| | |
|---|---|
| **CUR HIS CLR_HIS**<br>**Get Current ALM** | **LS OPT SYS**<br>**System** |

2. LCD shows the system alarm message at bottom line.

| | |
|---|---|
| **SYS**<br>**MJ MN NE FE** | **SYS**<br>**NO ALARM** |

### 6.4.2 Get History alarm Menu

**PATH: ALARM→HIS→LS**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.

| | |
|---|---|
| **CUR HIS CLR_HIS**<br>**Get History ALM** | **LS OPT SYS**<br>**Low-Speed** |

2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.

**1 2 3 4 5 6**
**>**

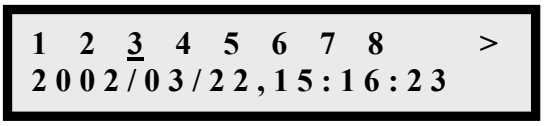
3. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the record.

**1 2 3 4 5 6 7 8 >**
**Record 2**

There are total 30 records.

4. The system reponses the alarm message at bottom line.


Then LCD shows the time of alarm occurred.




**PATH: ALARM→HIS→OPT**
**PATH: ALARM→HIS→SYS**

The getting history alarm of optical module and system module is the same as above.

### 6.4.3 Clear history alarm Menu

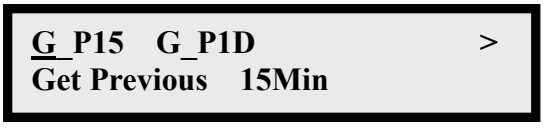
**PATH: ALARM→CLR_HIS**

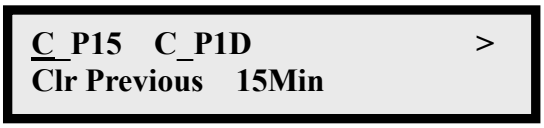
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the option.


2. When completed, the button line shows " **-- -- OK -- --** " message.


## 6.5 Performance Menu

The performance group includes **G_C15, G_C1H, G_C1D, G_P15, G_P1D, C_C15, C_C1H, C_C1D, C_P15, C_P1D and C_ALL**. Use the ◄ and the ►keys to cycle through to a proper item and pressing the **Enter** key to select the underlined item.

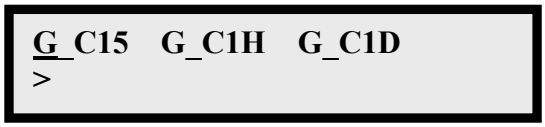





### 6.5.1 Get current 15 minutes PM Menu

**PATH: PM→G_C15**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.





2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the PM items which are Near CV, Near ES, Near SES, Near UAS, Far CV, Far SE, Far SES, Far UAS.


4. LCD shows the PM result at bottom line.

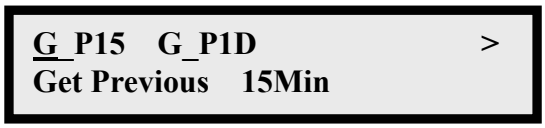

### 6.5.2 Get current 1 day, 1hour PM Menu

**PATH: PM→G_C1H**
**PATH: PM→G_C1D**
The operation step is the same as **PATH:PM->G_C15**

### 6.5.3 Get previous 15 minutes PM Menu

**PATH: PM→G_P15**

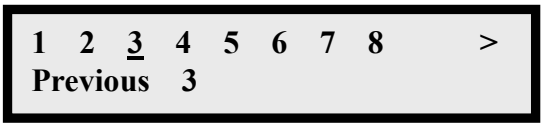
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.





2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. Use the ◄ key and ► key to cycle through to a proper item and press the **Enter** key to select the previous item.




4. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the PM items which are Near CV, Near ES, Near SES, Near UAS, Far CV, Far SE, Far SES, Far UAS.


5. LCD shows the PM result at bottom line.


### 6.5.4 Get previous 1 day PM Menu

**PATH: PM→G_P1D**

The operation step is the same as **PATH:PM->G_P15**

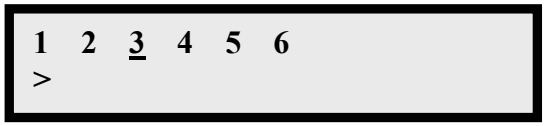
### 6.5.5 Clear current 15 minutes PM Menu

**PATH: PM→C_C15**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.



2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.




3. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the PM items which are Near CV, Near ES, Near SES, Near UAS, Far CV, Far SE, Far SES, Far UAS.


4. When completed, the button line shows “ **-- -- OK -- --** “ message.


### 6.5.6 Clear current 1 hour, 1 day PM Menu

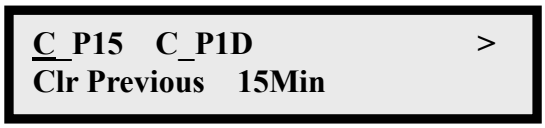
**PATH: PM→C_C1H**
**PATH: PM→C_C1D**

The operation step is the same as **PATH:PM->C_C15**

### 6.5.7 Clear previous 15 minutes PM Menu

**PATH: PM→C_P15**

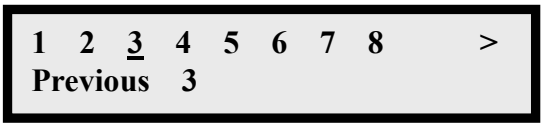
1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.





2. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the channel.


3. Use the ◄ key and ► key to cycle through to a proper item and press the **Enter** key to select the previous item.




4. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the PM items which are Near CV, Near ES, Near SES, Near UAS, Far CV, Far SE, Far SES, Far UAS.


5. When completed, the button line shows “ **-- -- OK -- --** “ message.


### 6.5.8 Clear previous 1 day PM Menu

**PATH: PM→C_P1D**

The operation step is the same as **PATH:PM->C_P15**

### 6.5.9 Clear all PM Menu

**PATH: PM→C_ALL**

1. Use the ◄ key and ► key to cycle through to a proper channel and press the **Enter** key to select the module.


2. When the command is failed, the bottom line shows " **-- FAIL --** " message.


3. When completed, the button line shows " **-- -- OK -- --** " message.


## 6.6 Test Utility Menu

The test utility group includes **LED**. Pressing the **Enter** key to select the underlined item.


### 6.7.1Test LED

**PATH: TEST->LED**

1. Use the ◄ key and ► key to cycle through to a proper item and press the **Enter** key to select the option.

2. When completed, the button line shows “ **-- -- OK -- --** “ message.


All LEDs will light on and off sequentially, if LEDs are good.

# 7. Management Options

## 7.1 Introduction

The use of a terminal is optional for configuration, monitoring and maintenance operations. The FOM16 provides two management interfaces (FOM16 Console and FOM16 SNMP).

Section 7.2 focus details on FOM16 Console. Form details on FOM16 SNMP, please refer to FOM16 SNMP User's Manual.

## 7.2. Graphical User Interface

Graphical User Interface is a user-friendly program in the PC by PC COM port connected to the CID connector of FOM16. The application program is installed by executing SETUP.exe of FOM16 Console Port Disks. The complete form is shown in Fig.1. The form is consisted by four parts: Toolbar, System tree menu, Query Results, and status bar.

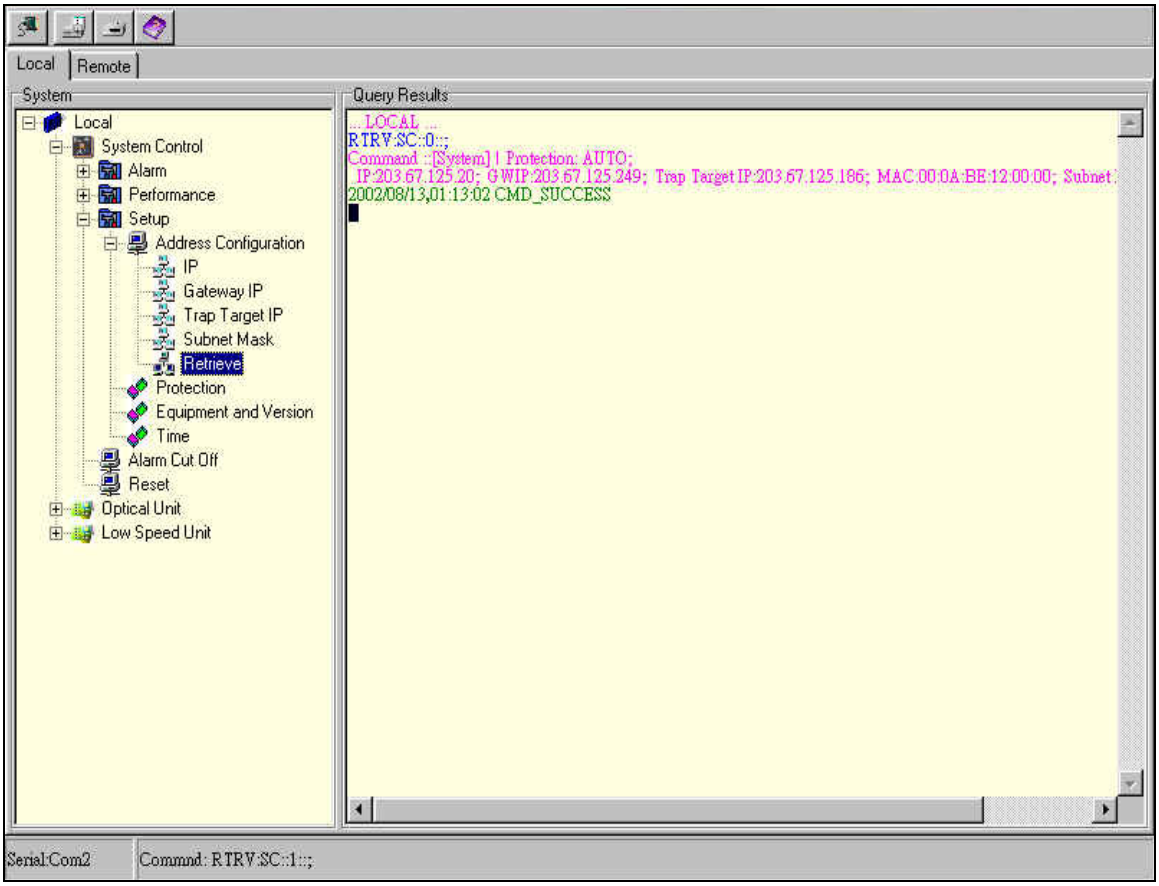



*Fig.15 FOM16 Console*

### 7.2.1 Toolbar

Toolbar consists of four click bottoms.

User chooses a communication port to communicate with FOM16. Set the Communication Port by clicking  bottom. A popup menu is shown as Fig.16. User needs to connect PC COM port to the 9-pin CID connector on the front panel of FOM16.

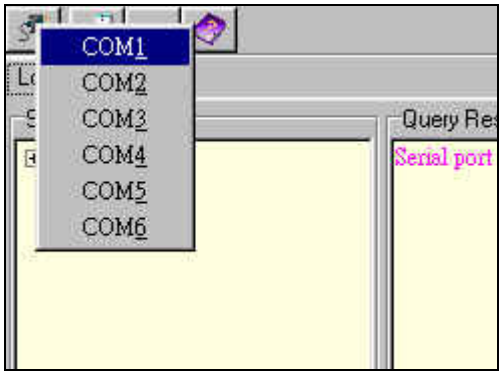



*Fig.16 Communication port setup*

Click the Local Log bottom, and a log file is opened. Log File is run under Text editor or WordPad. If user wants to clean Log file contents, user selects all contents and deletes them. Save the contents by press the “SAVE” bottom on Text editor or WordPad. Log file is saved on PC, not on FOM16. User can check the log file to view the history items.

Remote Log bottom is clicked, and the log file is opened. Text editor or WordPad opens log file. If user wants to clean Log file contents, user chooses all contents and deletes them. And users click “save” bottom on Text editor or WordPad. Log file is saved on PC, not on FOM16. User can check the log file to view the history items of Remote stored in the FOM16.

Help bottom provides an on line help HTML format Document.

### 7.2.2 System tree command window

The system tree command window provides a user friendly command input. User can choose the desired item and click, the response will be shown immediately. The system tree command window is shown in Fig.17. System tree command consists of three main command sets. They are system control, optical unit, and low speed unit.

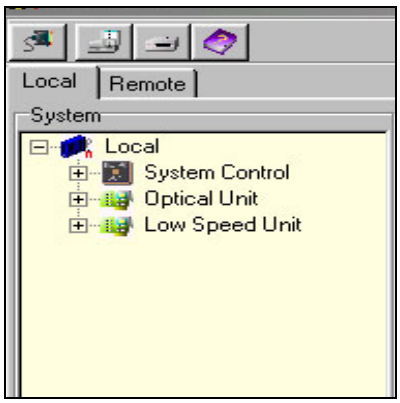



*Fig.17 System tree command*

## System Control

When the system control node is expanded, the form is shown in Fig.18. The system control provides alarm report, performance monitoring, system setup, alarm cut off, and system reset.

*Alarm report* provides system alarm, optical unit alarm, and low speed unit alarm. When the selected node is clicked, the alarm report is listed. The system is able to store up to 30 records. If there are alarms in the FOM16, alarm is displayed by red color to warn the user. The alarm report example is shown in Fig.18.

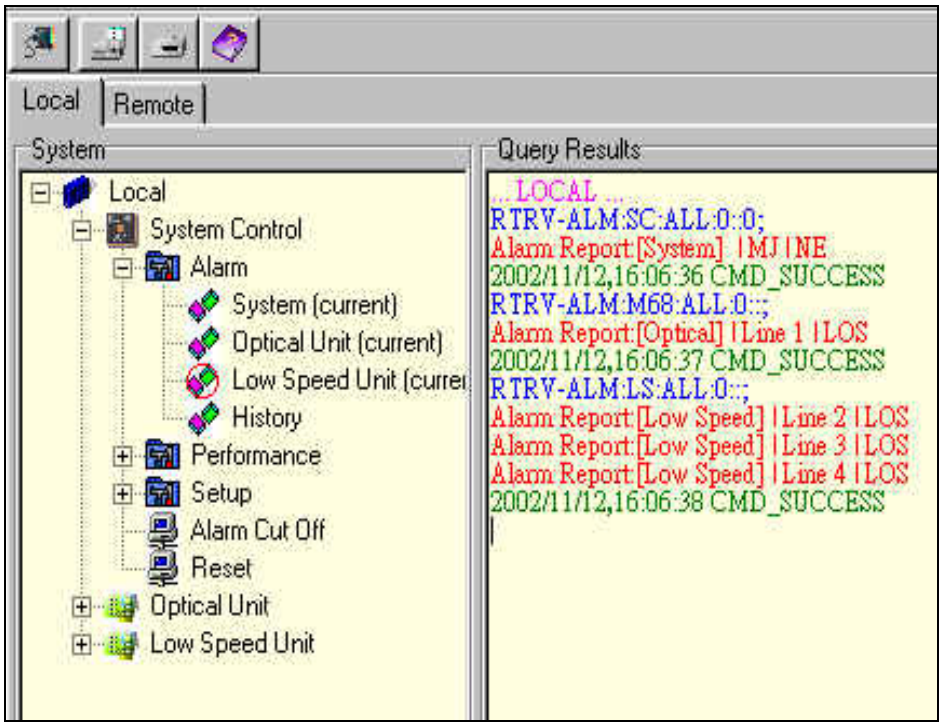



*Fig.18 Alarm report*

*Performance monitoring* provides an interface to monitor performance parameters in the FOM16. It consists of two parts: optical unit and low speed unit. Each unit is selected and the new window is shown in Fig.19. There are monitor, period, type, and item to choose. Monitor Period provides some options to choose current 15 minutes, current 1 hour, current 1 day, previous 15 minutes (24 hours),

previous 1 hour, and previous 1 day (7 days). Performance type includes Near CV, Near ES, Near SES, Near UAS, Far CV, Far ES, Far SES, and Far UAS. The low speed does not support Near SES, Near UAS, Far SES, and Far UAS. The item option provides interface number. Performance monitor response is shown in Fig.20.

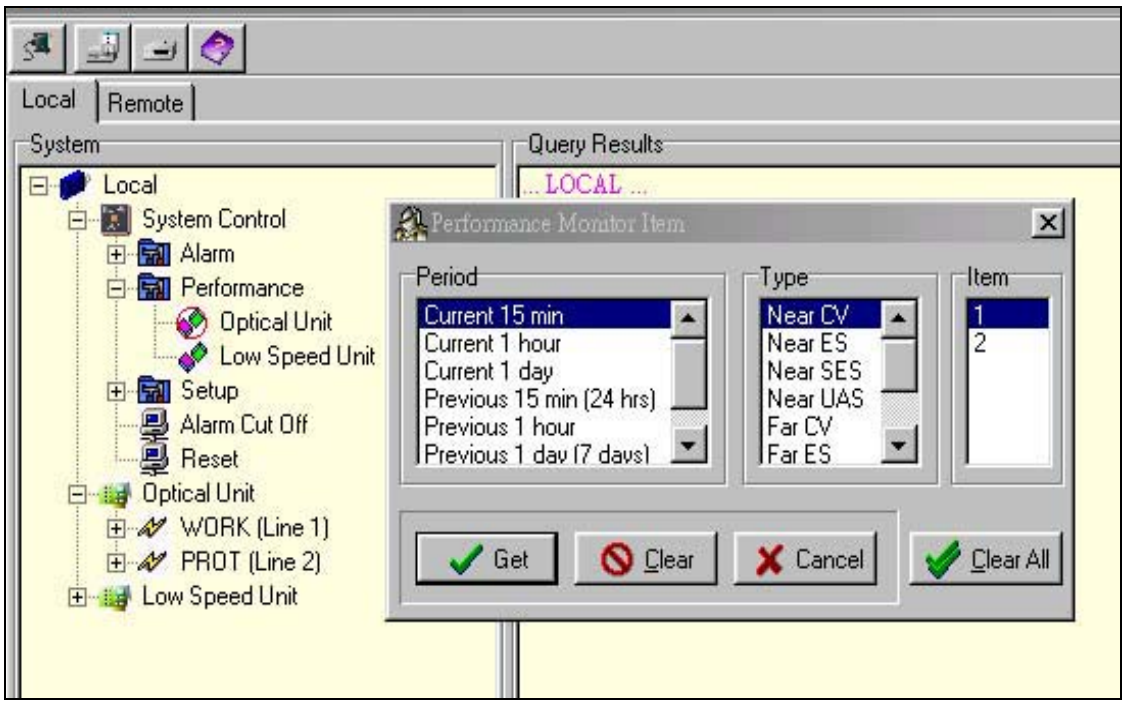



*Fig.19 Performance monitor setting window*

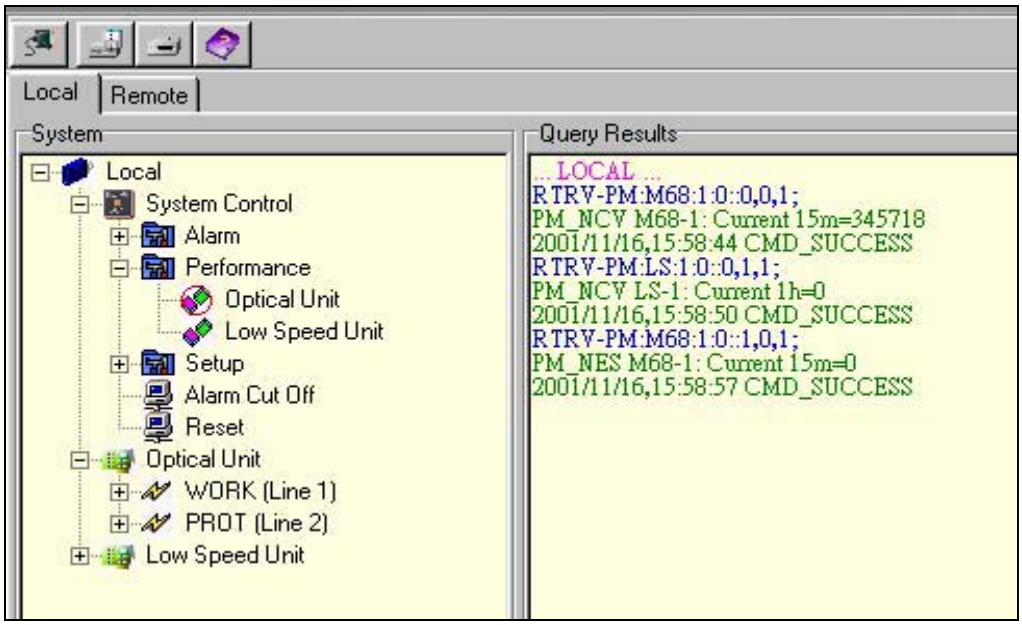



*Fig.20 Performance Monitor Response*

***System Setup*** provides an interface to set up system time, IP address, gateway IP address, Trap target IP and Subnet mask. User selects setup time to update time in FOM16. Users enter IP, GWIP, TRIP and Subnet mask addresses to provide address for the SNMP agent on the FOM16 . IP input command is shown as Fig.7.

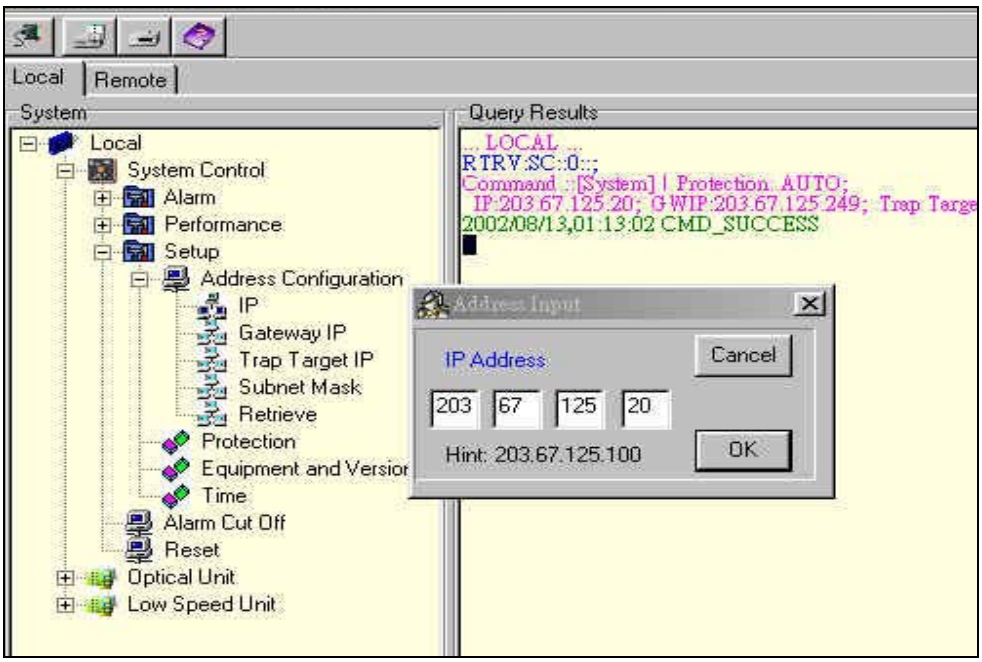



*Fig.21 IP Input Command*

***Protection*** provides optical link manual and auto protection switch function.

***Equipment and Version*** provides information of the system equipment and version.

***Time*** sets PC time to the system time of FOM16.

***Alarm cut off*** provides a cut off mechanism for audio alarm during the alarm period.

***Reset*** command restarts theFOM16.

### *Optical Unit and Low Speed Unit*

Optical unit and low speed units provide the same user interface to control each unit. The general input form is shown as Fig.22.

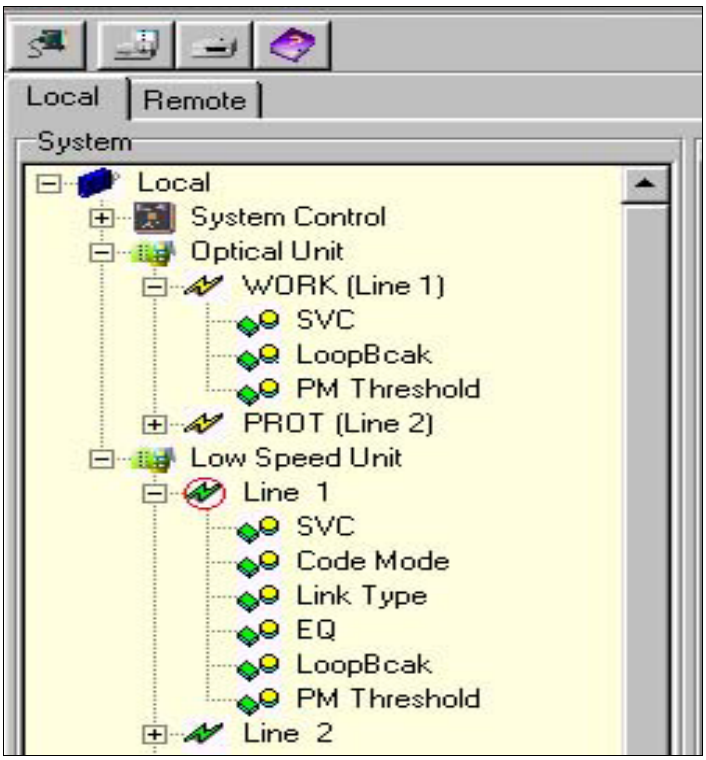



*Fig.22 Optical and Low speed unit control window*

Each node provides some options for SVC (service setting), code mode, loopback setting, and Performance threshold setting. When the SVC is clicked, the popup menu is shown in Fig.23. SVC provides in-service, out-of-service, and retrieve options.

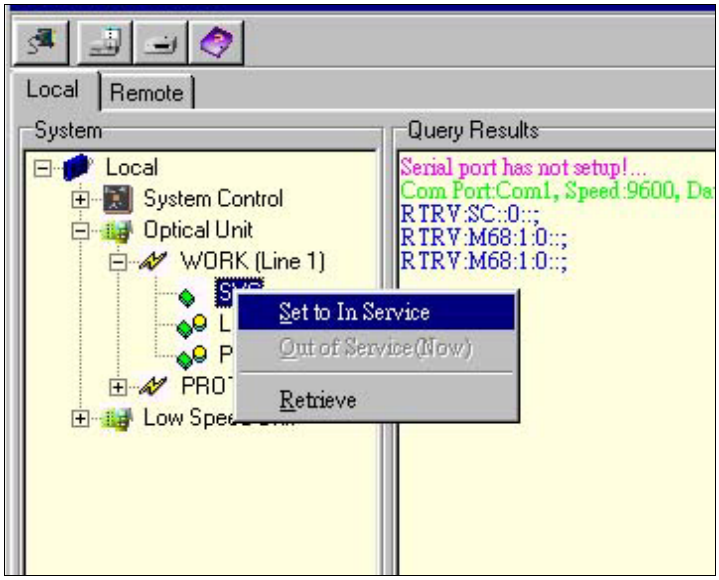



*Fig.23 SVC command popup menu*

Another command is the loopback command. Loopback command provides local loopback, remote loopback, and retrieve options. It is shown in Fig.24.

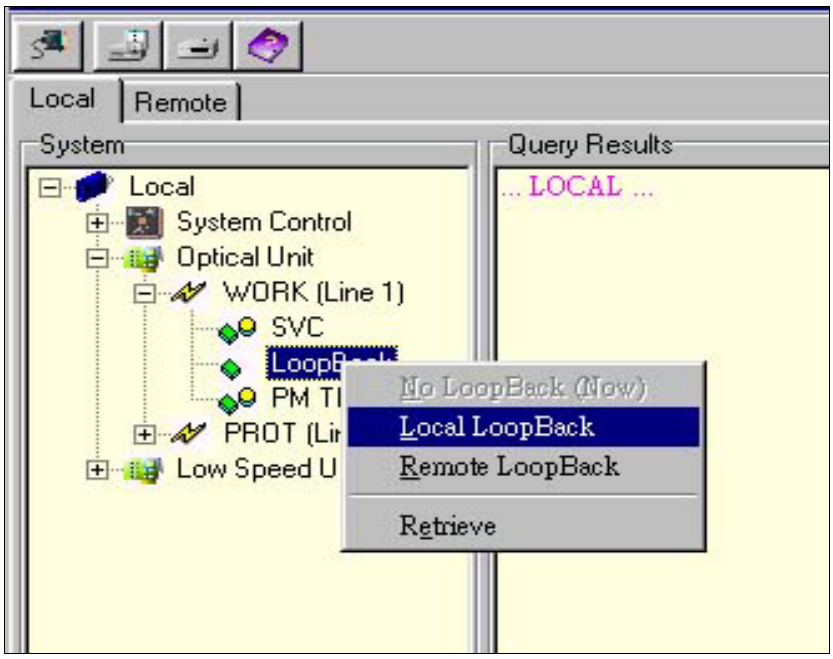



*Fig.24 Loopback Command settings*

The retrieve command gets the unit setting information. For example, Fig.25 will display the optical unit setting information. The response will display working unit index, service state, and loopback setting.

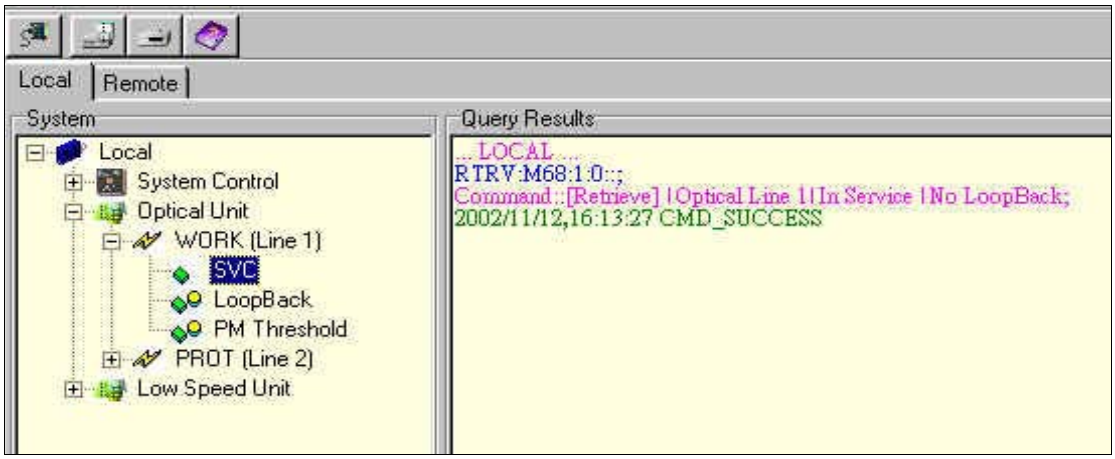



*Fig.25 Optical unit retrieve information*

Users can set performance threshold for performance monitor. If performance monitor parameters are above threshold settings, FOM16 will auto-report the results. The performance threshold dialog is shown as Fig.26. There are three scroll-boxes to input performance thresholds of per 15 minutes, 1 hour, and 1 day periods. Users can choose performance type to monitor. If users have to set the performance thresholds, FOM16 will auto record the threshold parameters in the system. PM retrieve will get the thresholds from the FOM16.

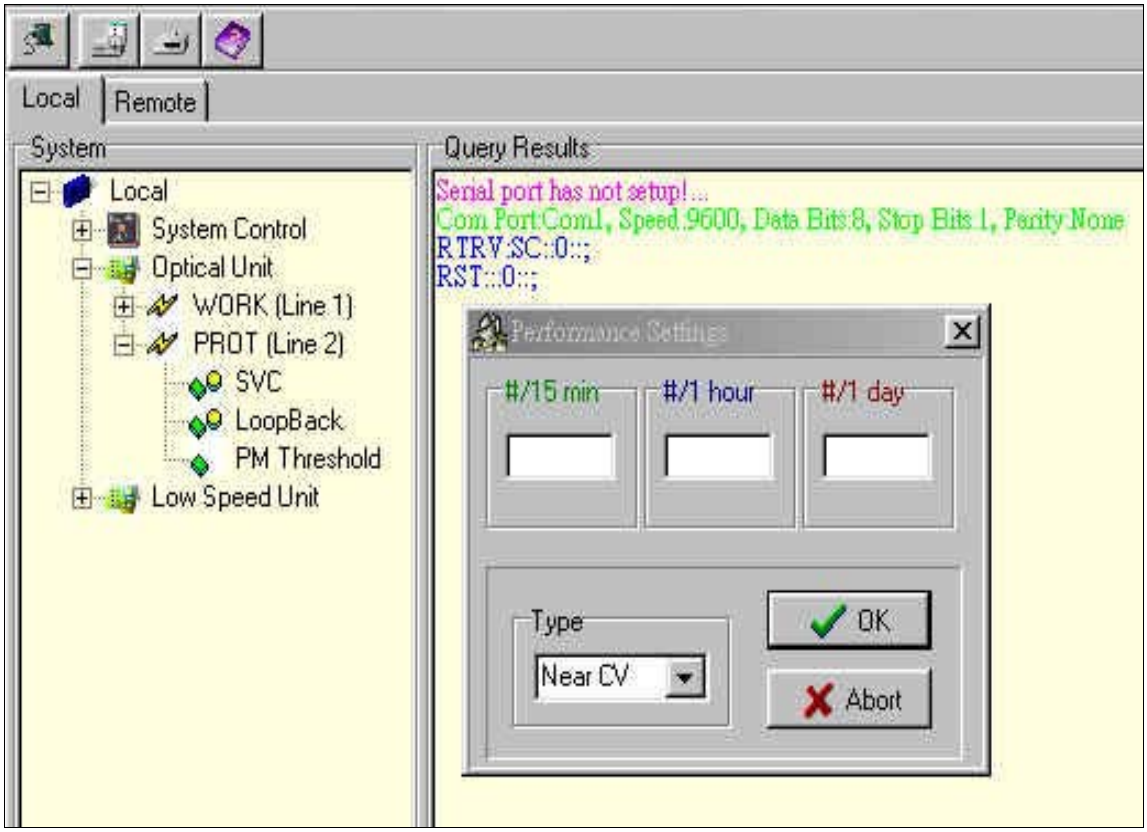



*Fig.26 Performance Thresholds Setting Dialogue*

7.2.3 Query Results

Query Results will display the all responses and send commands. And the results also keep a history in log file. Click mouse right bottom will erases all records in the Query Result window.

7.2.4 Status Bar

Status Bar reflects the Com port setting, and latest send command. It is shown as Fig.27.


*Fig.27 Status Bar*

# 8. Troubleshooting and Diagnostics

This section includes a description of the FOM16 diagnostics test and troubleshooting procedure.

## 8.1 Diagnostics tests

FOM16 supports four types of loopback connections:

Low-speed local loopback in the local FOM16.

Low-sped remote loopback in the remote FOM16.

Optical local loopback in the local FOM16.

Optical remote loopback in the remote FOM16.

Fig.28 ~ Fig.31 will display the loop back connections.

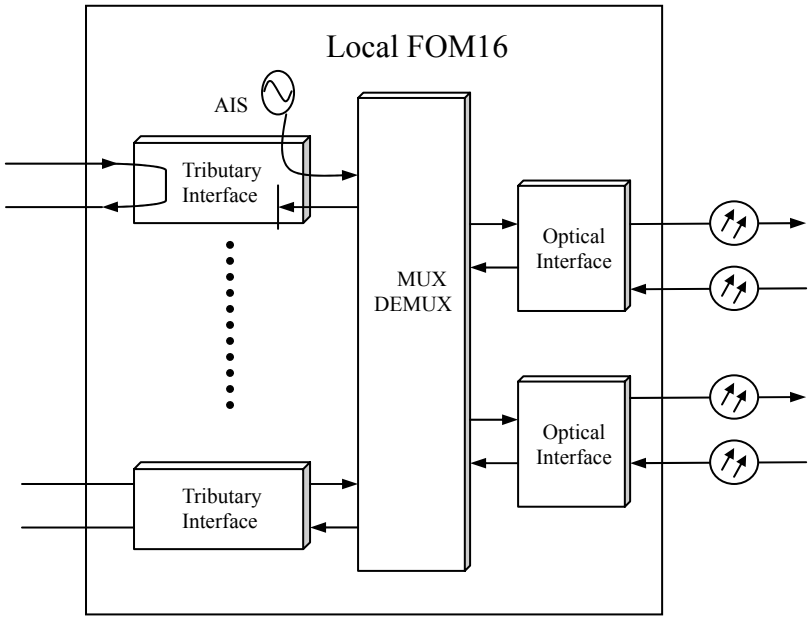



Fig.28 Low-speed local loopback

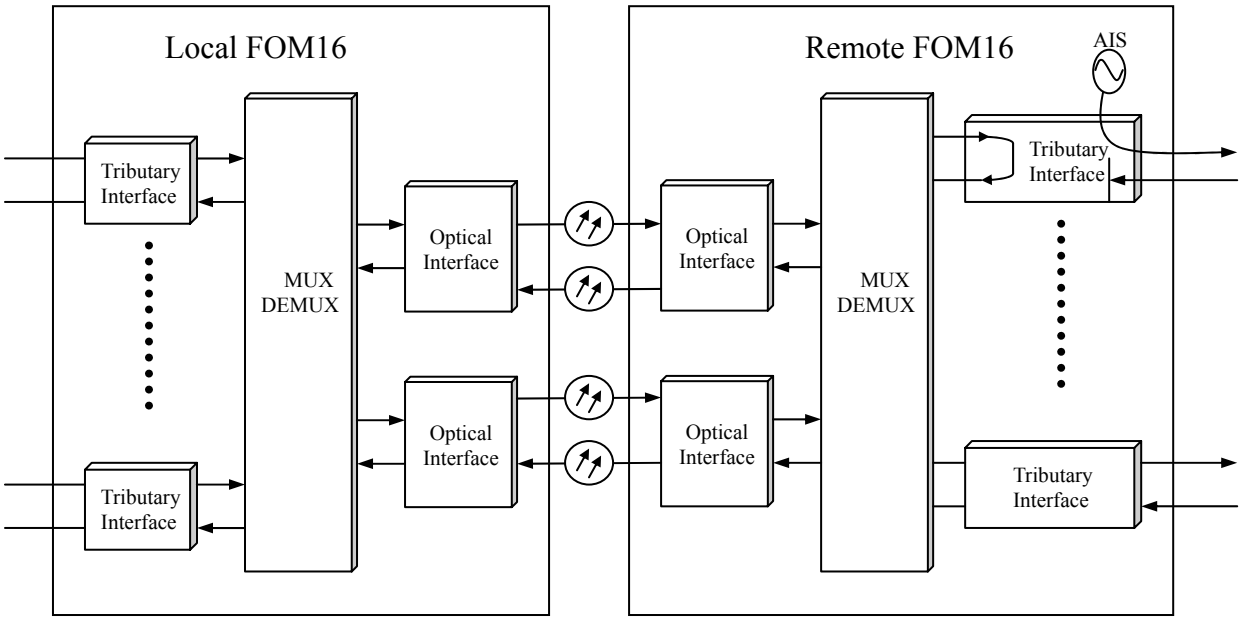



Fig.29 Low-speed remote loopback

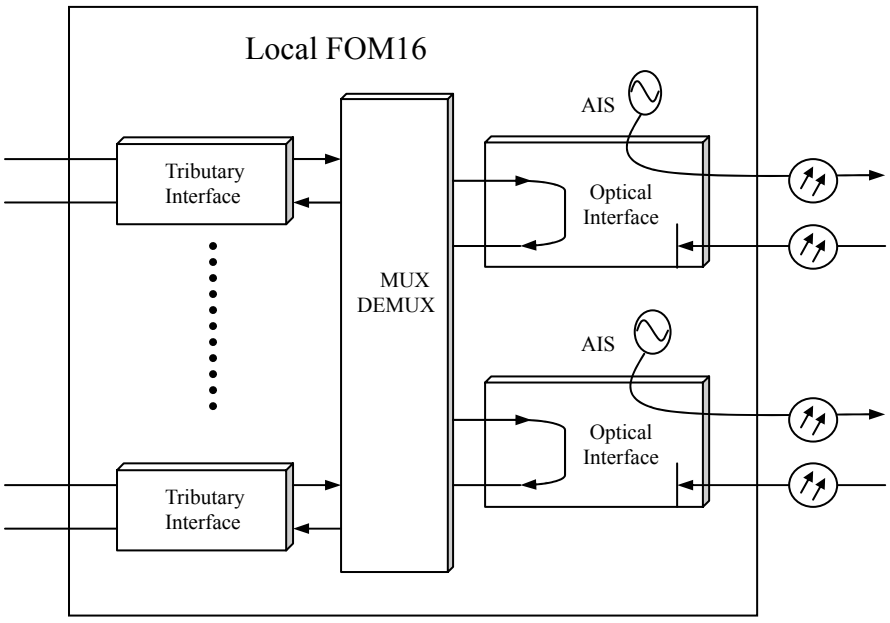



Fig.30 Optical local loopback

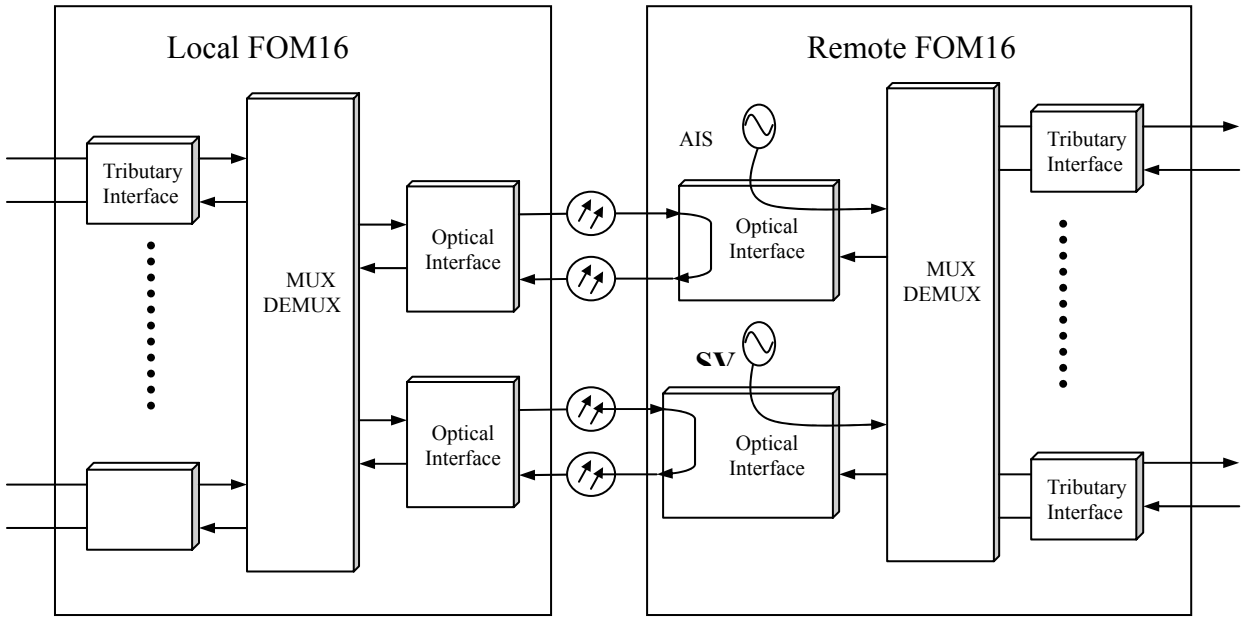



Fig.31 Optical remote loopback

## 8.2 Troubleshooting

In case a problem occurs, check the displayed indications and refer to Section 5 and Table 1 for their interpretation. Identify the trouble symbols and perform the actions listed under Corrective Measures in the order given in Table 2, until the problem is corrected.

*Table.2 Troubleshooting Chart*

| NO. | Trouble Symptoms | Probable Cause | Corrective Measures |
|---|---|---|---|
| 1 | The FOM16 cannot work | 1. No power | 1. Check that both ends of the power cable are properly connected. |
| | | | 2. If the FOM16 is powered from DC, check the polarity of the power connections. |
| | | 2. Blown fuse | Disconnect the power from both ends and replace the fuse with another fuse of the same |
| | | 3. Defective FOM16 | Replace the FOM16. |
| 2. | POEWER indicator off | Defective power supply | Turn the respective power supply off for at least 10 minutes, and then turn it on again. If the POWER indicator is still off, have the FOM16 repaired as soon as possible. |
| 3. | The Optical Working indicator red<br>The Optical Protection indicator red | 1. External problem | Activate the optical local loopback on FOM16. Check the E1 tributaries in use. If E1 tributaries of the FOM16 are OK, check the remote unit, the optical interface connectors, and the optical transmission path to the remote unit. |
| | | 2. Defective FOM16 | Replace the FOM16. |
| 4. | Ch1 ~ Ch16 indicator red | 1. External problem | Activate the E1 local loopback on FOM16. Check the E1 tributaries in use. If E1 tributaries of the FOM16 are OK, check the E1 tributaries interface connectors, and the E1 tributary transmission path. |
| | | 2. Defective FOM16 | Replace the FOM16. |