FMUX03/V35

E1/T1 DSU/CSU Digital Access Units

STANDALONE TYPE

Fiber Optical Multiplexer

INSTALLATION and OPERATION MANUAL

Version 1.0

CTC union CTC Union Technologies Co., Ltd.

Table of Content

Chapter 1 Introduction

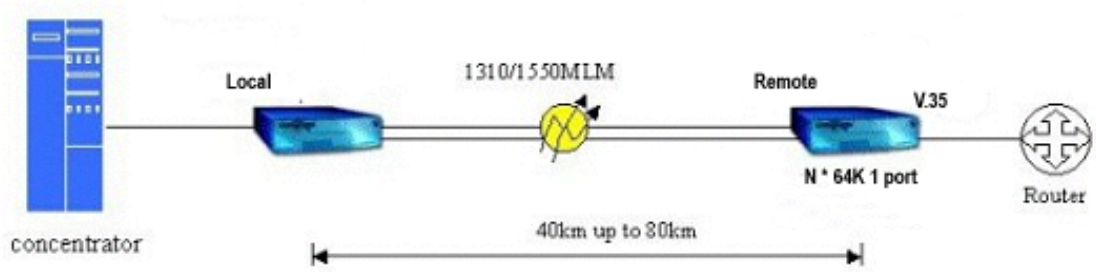
1-1 Functional Description

The CTC Union FMUX03/V35 utilizes V.35 interface to convert electric signal into optical signal and extends its transmission distance up to 80 kilometers. FMUX03/V35 provides user-friendly functions for monitoring, maintaining, and configuring the unit using LCD panel and VT-100 remote terminal access. Its DC / AC selectable power source insures a quality and reliable power supply. CTC Union FMUX03/V35 provides the telecommunication industry a multipurpose and easy to use high quality fiber optics modem.

- ✧ Operating from either AC or DC power module , backup power supply is available.
- ✧ Mountable on either 19-inch or 23-inch rack.

1-2 Application of FMUX03/V35

FMUX03/V35 is mainly used to extend the transmission distance of optical signal by multiplexing individual channels into a single optical stream using V.35 interface. In addition, FMUX03/V35 can connect a client equipment to a Central Office using V.35 interface.



Application of FMUX03/V35

1-3 Technical Specification

◆ **V.35/V.36/EIA530A/RS232(V.28)/V.10/V.11/X.21/RS449 Interface**

- Bit Rate: N*64K (N=1 to 32) up to 2M
- Number of Input Ports: V.35 ports
- Clock Source: Internal, DTE (selectable), Line

◆ **Optical Interface**

- Optical Source: 1310/1550 nm MLM Laser
- Number of Optical Links: 2 (1+1 auto protection switch)
- Output Power: > -12dBm at 9/125 (Laser 1310 nm)
  > -12dBm at 9/125(Laser 1550 nm)
- Receiver Sensitivity: -34dBM (1310nm/1550 Laser)
- System Gain: 20-30dB
- Fiber Type: Single Mode (9/125um)
- Optical Connector: FC/PC；ST

◆ **Alarm Detection and Indication**

- **Data port Interface**
  - TxD (Transmit data):DTE transmit data to DCE
  - RxD(Receive data):DCE transmit data to DTE
  - CTS(Clear to send):DCE to DTE
  - RTS(Request to send):DTE to DCE
- **Optical Interface**
  - LOS (Loss of Signal)：The loss of optics signal
  - Laser On: Laser On indicator
- **Alarm Indication**
  - Major alarm: loss of frame,loss of clock,loss of signal
  - Minor alarm: one of power modules fail or receive RDI signal from Optical link
- **Alarm Connector**
  - DB-9 female connector
  - Connect to an external BUZZER to receive visible and audible alarm.

- **Diagnostic Capabilities and Loopback Function**
  - Optical Interface: Local Loopback and Remote Loopback
  - Data port Interface: Local Loopback and Remote Loopback
  - ACO: Alarm cut off
  - RST: Rest button

- **Configuration**
  - Use the 3 control buttons and the LCD front panel to configure and monitor the system
  - Craft port with DCE appearance
    - Bits per second (baud): 9600bps
    - Parity: None
    - Data Bits: 8 bits
    - Stop Bit: 1
- **Power**
  - DC: -36V ~ -72VAC: 90V ~ 288V(57Hz ~ 63Hz)
- **Physical Specifications**
  - FMUX03/V35 Dimensions:
    - Depth: 220 mm
    - Width: 285 mm
    - Height: 44.5 mm
  - Optical Link: FC/PC or ST, Electrical Link: DB-25 female connector
  - Alarm Connector: DB-9 connector

- **Environment**
  - Operating Temperature: 0 ~ 40℃ Indoor Version
    -25 ~ 70℃ Storage
  - Humidity: 5 ~ 95%

1-4 FMUX03/V35 Ordering Information

Options for Ordering information

Optical Module	
1310S	1310 nm single-mode, loop reach up to 45km (Single OE Module) > -12dBm
1550S	1550 nm single-mode, loop reach up to 75km (Single OE Module) > -12dBm
1310D	1310 nm single-mode, loop reach up to 45km (Dual OE Module) > -12dBm
1550D	1550 nm single-mode, loop reach up to 75km (Dual OE Module) > -12dBm

System Gain	
L(Low power)	System Gain ＞16dB
M(Low power)	System Gain ＞20dB
H(Low power)	System Gain ＞25dB

Power Module	
AC-1	Single 90 ~ 288 VAC power supply
DC-1	Single –34 ~ -72 VDC power supply
AC-2	Dual 90 ~ 264 VAC power supply
DC-2	Dual –34 ~ -72 VDC power supply
AC-1, DC-1	AC / DC dual power supply

Optical Connector	
F	FC type fiber connector
T	ST type fiber connector

V.35 Connector	
1 Ch	1 set of V.35 connector

Chapter 2 - Installation

2-1 Description

This chapter provides the information needed to install FMUX03/V35. It is important to follow the installation instruction to insure normal operation of the system and to prevent damage due to human error.

2-2 Unpacking

If there is a possibility for future relocation of the FMUX03/V35 unit, please save the cartons and protection packaging material. The following items are shipped with your FMUX03/V35:

- One FMUX03/V35 User's Manual
- One FMUX03/V35 Unit
- V.35 Cable (DB25 to M34)

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

2-3 Site Requirements

The FCC requires telecommunication equipment to withstand electrical surge that may result from lighting strikes. This equipment has been tested and found to comply with the FCC requirement. Users should follow the precaution below to insure the safety and minimize the risk of damage to the equipment:

- Make sure that the power outlet is properly grounded. Please refer to article 250 of the National Electrical Code (NEC) Handbook.
- Proper grounding should include a minimum of:
  1) A grounded rod buried outside the building at least 8 feet (2.44 meters) deep.
  2) It is preferred that the building uses metal water pipe and cooper connector at the joint.

3) Any device either connected to FMUX03/V35 directly or indirectly should use the same set of power outlet.

2-4 Site Selection

For best performance, install the FMUX03/V35 within 50 feet (15.24 meters) from the data terminal equipment and 6 feet (1.83 meters) from the AC power outlet. To allow easy access to the equipment, leave at least 36 inches (90 cm) clearance in 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 FMUX03/V35. Also, do not stack another equipment on top of FMUX03/V35.

2-5 AC or DC Electrical Outlet Connection

For safety and to prevent damage to FMUX03/V35, make sure that the power requirement matches those of your electric outlet. Connect power to FMUX03/V35 and power on the equipment.

Chapter 3 – Operating Instructions

3-1 Front Panel

There are four parts to the front panel of FMUX03/V35:

(1) Fiber Optics Connectors and Indicators: Notifies user of a problem such as LOS (Loss of Signal) and Laser LED (LSR). Includes a pair of input/output connector

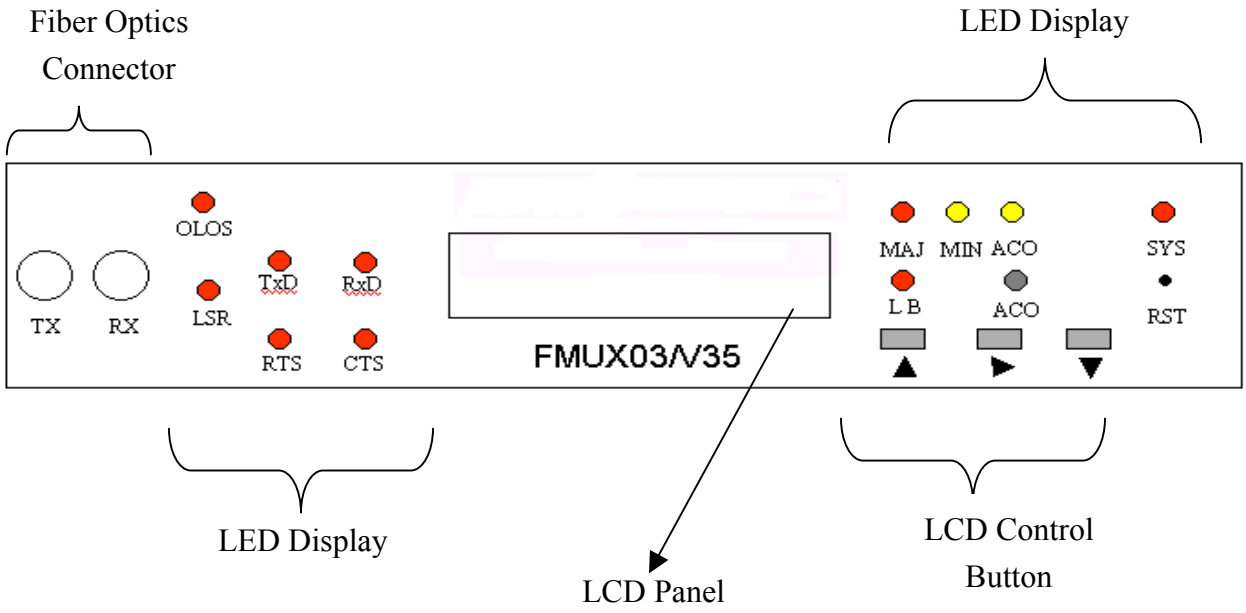
(2) Alarm LED Display: Notifies users of a problem such as a Major Alarm (MAJ), Minor Alarm (MIN), and System Alarm (SYS).

(3) LCD Control Buttons: The three buttons, ▲, ▼, and ▶ are used for system configuration and for the loopback test.

(4) V.35 Port Status LED: Four LEDs, representing TXD, RXD, CTS, and RTS.

Each of the LED indicators is described below in detail:

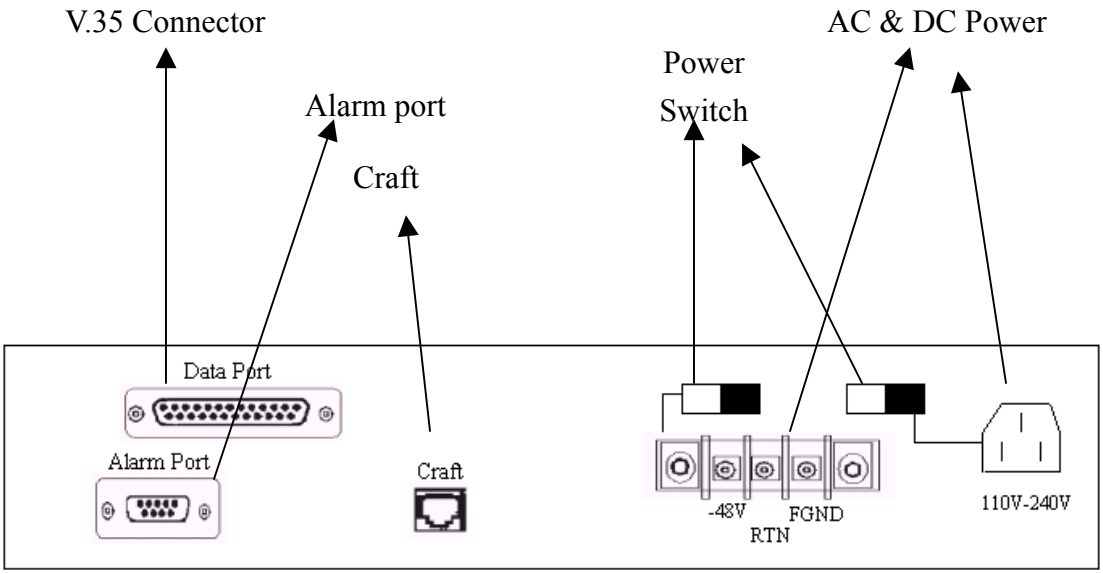
Front panel



3-2 Rear Panel Control and LED Indicator Function

#	Control or LED Indicator	Function
1	**OLOS** **LSR**	Red light when there is a loss of in Yellow light signals an alarm in Laser sending out energy normally
2	**TxD/RxD** **CTS/RTS**	Yellow light when received signal from remote unit
3	**MAJ**	Red light when there is a Major Alarm present
4	**MIN**	Yellow light when there is a Minor Alarm present
5	**SYS**	System normal or System failure
6	**ALARM**	Alarm Connector: D-Type 9 pin
7	**ACO**	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	**RST**	Restart the system
9	▼ ▲ ▶	These three buttons serve as the control and configure buttons of FMUX03/V35

Rear panel



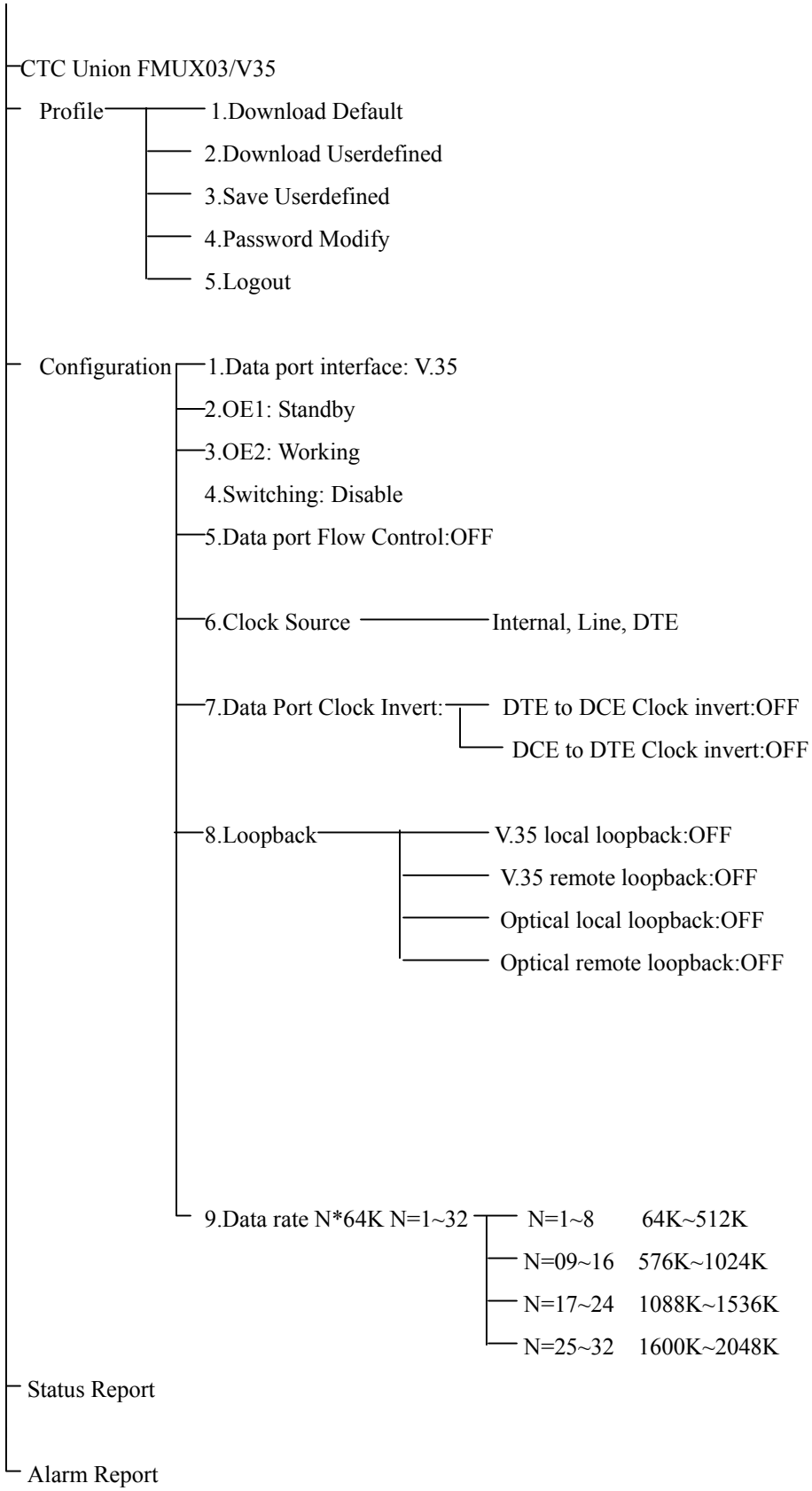
I. V.35 Connector: Connects to V.35 interface.

II. Craft: Craft terminal port.

III. Power Switch: Controls On/Off of the equipment

IV. There are 5 different power supply combinations with the SC/AC dual module power supply: AC only, DC only, dual AC, dual DC, AC/DC redundancy. (Reference to Order Information)

3-3 Menu Tree


CTC Union FMUX03/V35
Profile
1.Download Default
2.Download Userdefined
3.Save Userdefined
4.Password Modify
5.Logout
Configuration
1.Data port interface: V.35
2.OE1: Standby
3.OE2: Working
4.Switching: Disable
5.Data port Flow Control:OFF
6.Clock Source
Internal, Line, DTE
7.Data Port Clock Invert:
DTE to DCE Clock invert:OFF
DCE to DTE Clock invert:OFF
8.Loopback
V.35 local loopback:OFF
V.35 remote loopback:OFF
Optical local loopback:OFF
Optical remote loopback:OFF
9.Data rate N*64K N=1~32
N=1~8 64K~512K
N=09~16 576K~1024K
N=17~24 1088K~1536K
N=25~32 1600K~2048K
Status Report
Alarm Report

Chapter 4 - Operating and Setup Instructions

FMUX03/V35 provides easy to use LCD control for easy configuration, maintenance, and testing. Button functions are as follows:

▶ Menu select

▲ Go back to the upper level of the menu

▼ "Enter" key to go to a sub-menu

When logged in to the VT-100 terminal, the screen will show two sets of "Alarm Report" at the button of the screen, one for local alarm and the other for remote alarm:

SYS: System normal / System failure

O/E1 and O/E2: Status of O/E modules

V.35: Status of V.35 connector port

- Under normal operation, the LCD display will show that the optical module in use as "Working," and the backup optical module as "Standby."
- If a loss of signal is detected, the LOS LED will light up. In addition, the LCD display will also show that there is a "Loss of signal" in optical module.

4-1 Profile

a. **Download Default**
b. **Download Userdefault**
c. **Save Userdefined**
d. **Password Modify**
e. **Logout**

Download and Save Profiles:

Download Default: Download factory default settings

The system will reset itself before downloading the factory default settings.

Download Userdefault: Download user defined values

The system will reset itself before downloading the user-defined settings.

Modify Password:

To prevent unauthorized login, user must enter a set of password to login to the system.

The password for FMUX03/V35 is a combination of the buttons below, for left to right:

Button	Right →	Up ↑	Down ↓	Up ↑
Password	R	U	D	U

User can change the password using this function after verifying the current password. Password can also be changed from the craft terminal using the same procedure.
Note that the password for operating the craft can be different from that of LCD menu driven.

Note: In case the user forgets the login password, the universal password for FMUX03/V35 "1234" can be used.

4-2 System Configuration

a. Data port interface: data input interface
b. Data rate N*64 (N=1~32): Select bit rate (64K~1024K)
c. Clock source: There are four different clock sources: Internal, Line, DTE, and External
d. Data port clock invert
e. Data port Flow control OFF/ON: On/Off control of data port flow
f. Loopback: Loopback test
g. OE module: Status of OE module

4-3 Alarm Status Report

Operator can view the status of alarm using this function.

4-4 Craft Port Operation

Craft port allows user to monitor and configure FMUX03/V35 through a remote terminal emulator, such as VT-100.

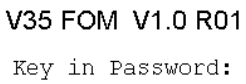
4-5 How to connect and setup the craft port

- Connect the craft port to a remote terminal using DB-9 cable.
- VT100 terminal settings:
  Bit Rate: 9600bps
  Data Bit: 8 bit
  Parity: No Parity
  Stop Bit: 1 Stop bit

Set the emulation mode to"VT100" or "Auto Detect".

4-6 Operating from the Craft Port

After properly connecting the craft port to a terminal, the system will prompt the user for password. The universal password is “1234.”



User can access a function by typing its corresponding number into the remote terminal. To go back to the previous menu, press the ‘Backspace” key. Refer to the Menu Tree for navigation.

After enter, select from one of the following functions:

1) Profile
2) Configuration
3) Status Report
4) Alarm Report

Main Menu

```
                    V35 FOM  V1.0 R01

                     1. Profile
                     2. Configuration
                     3. Status Report
                     4. Alarm Report



          Please select the item or Backspace to previous menu:_
   ======================================================================
Alarm
Sys: P1_fail P2_fail OE_card_fail                    O/E1:LOS
V.35:Unequip                                         O/E2:Unequip
```

Profile

```
                              Profile


                     1. Download Default
                     2. Download Userdefined
                     3. Save Userdefined
                     4. Password Modify
                     5. Logout


          Please select the item or Backspace to previous menu:_
   ======================================================================
Alarm
Sys: P1_fail P2_fail OE_card_fail                    O/E1:
V.35:Unequip                                         O/E2:Unequip
```

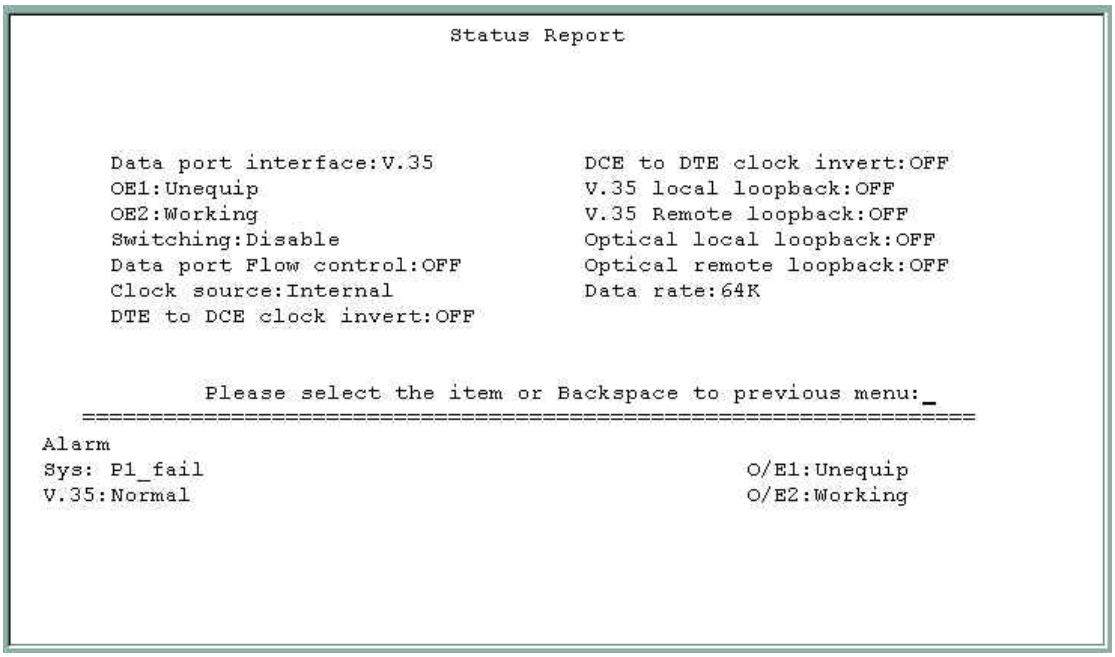
Configuration

```
                              Configuration


                        1. Data port interface:V.35
                        2. OE1:Equip
                        3. OE2:Unequip
                        4. Swithcing:Disable
                        5. Data port Flow control:OFF
                        6. Clock source:Internal
                        7. Data port clock invert
                        8. Loopback
                        9. Data rate N*64K N=1~32
                Please select the item or Backspace to previous menu:_
    ================================================================
  Alarm
  Sys: P1_fail P2_fail OE_card_fail                    O/E1:
  V.35:Unequip                                         O/E2:Unequip
```

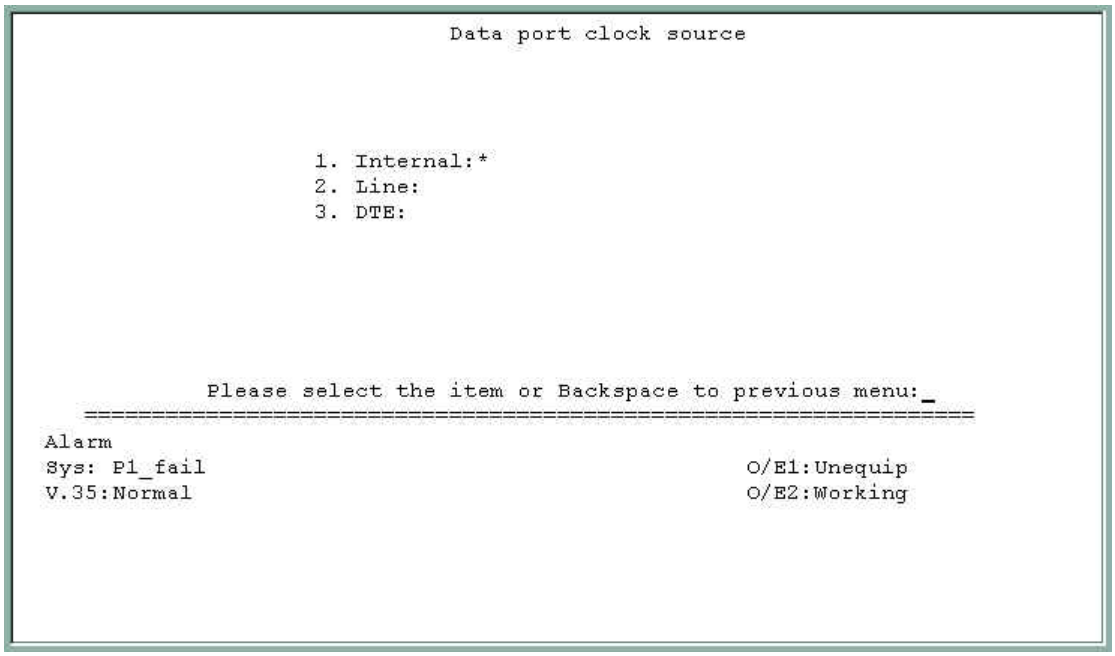
Alarm Status Report

```
                              Alarm Report


                          E_Code     Alarm
                             3     V35card Unequip
                             6     OE1 LOS
                             8     sys power1 fail
                             9     sys power2 fail
                             10    sys OEcard fail



            Please select the item or Backspace to previous menu:_
    ================================================================
  Alarm
  Sys: P1_fail P2_fail OE_card_fail                    O/E1:LOS
  V.35:Unequip                                         O/E2:Unequip
```

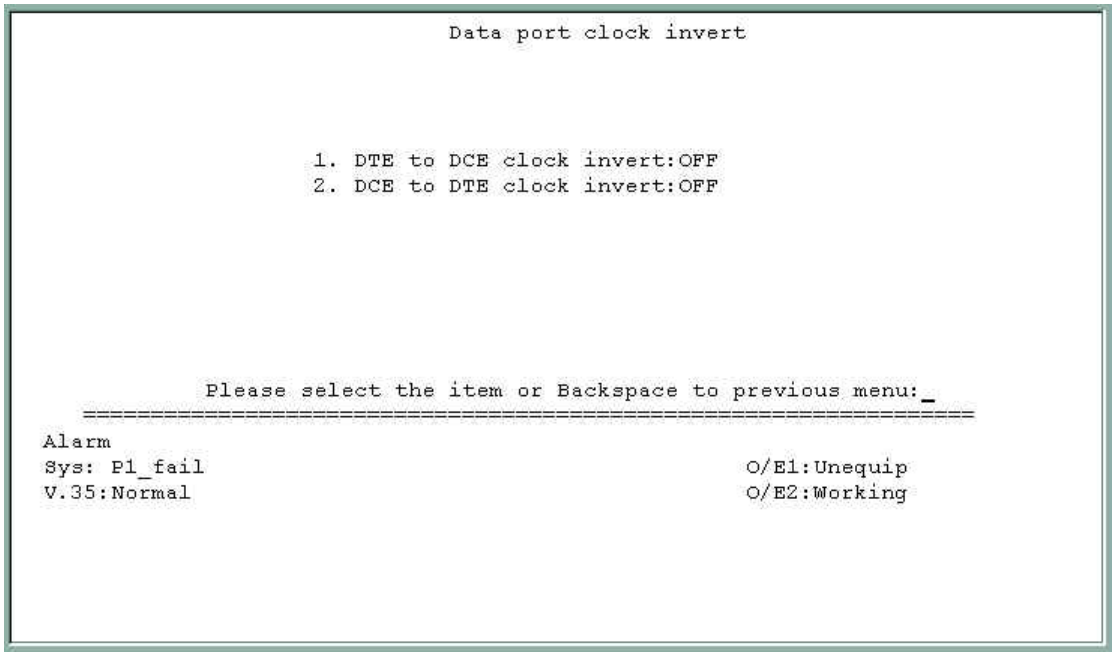
Status Report



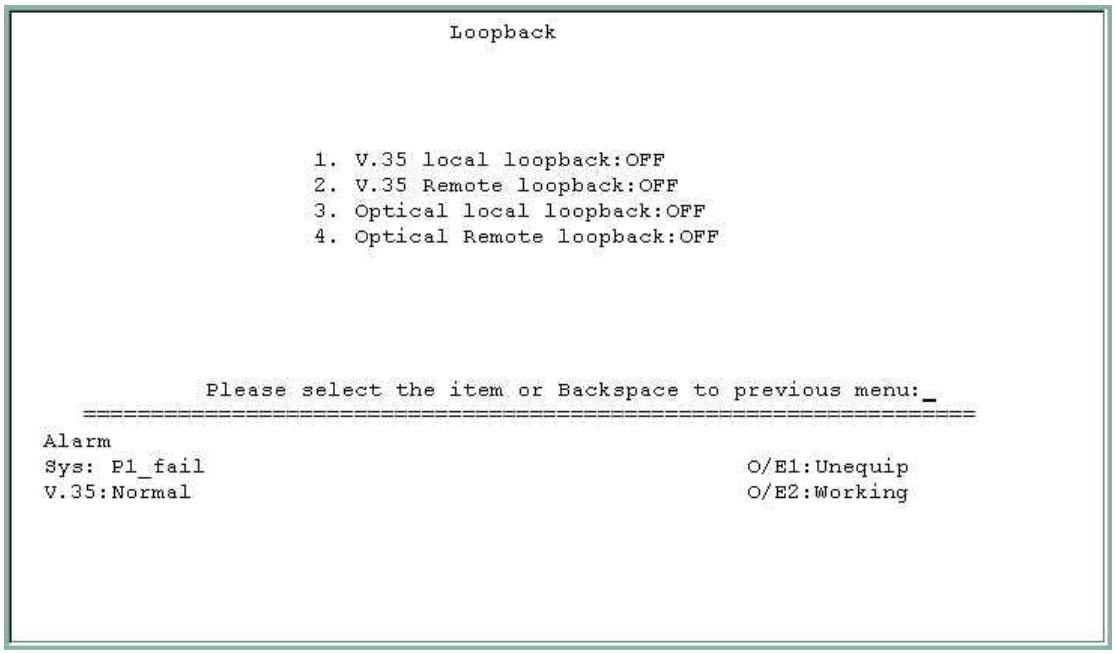
Data port clock source



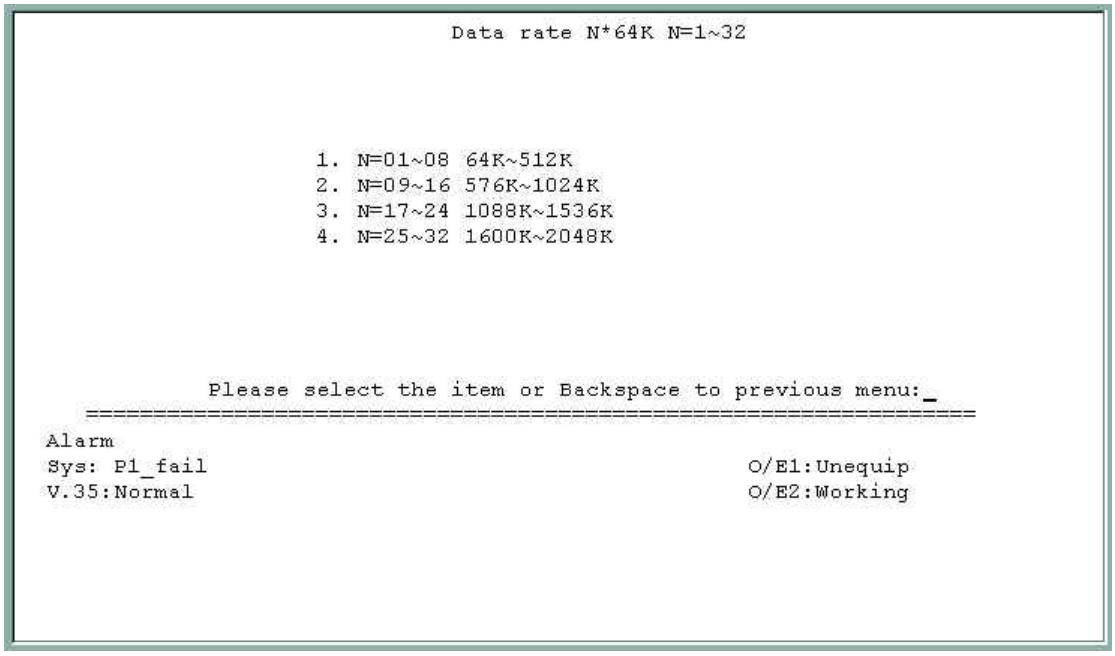
Data port clock invert



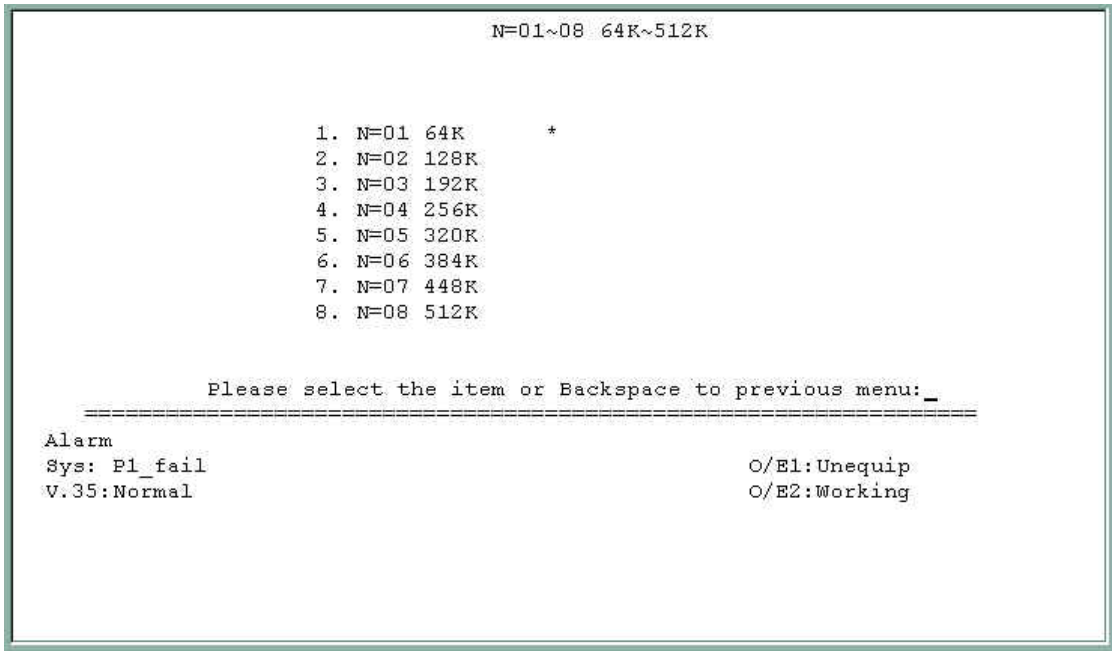
Loopback



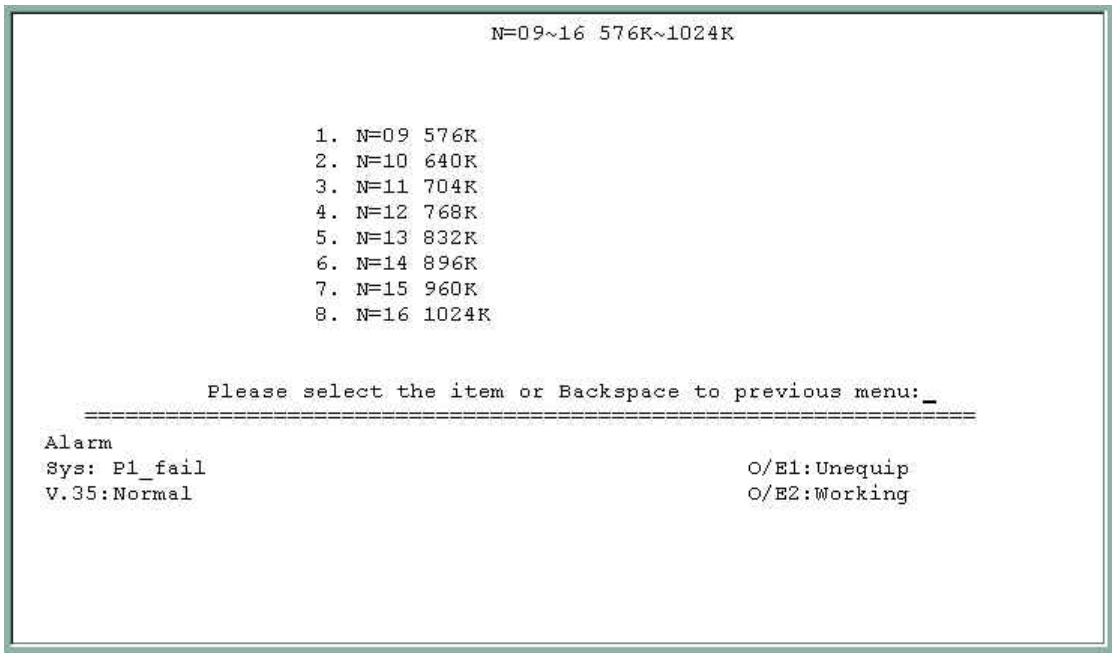
Data rate N*64K N=1~32



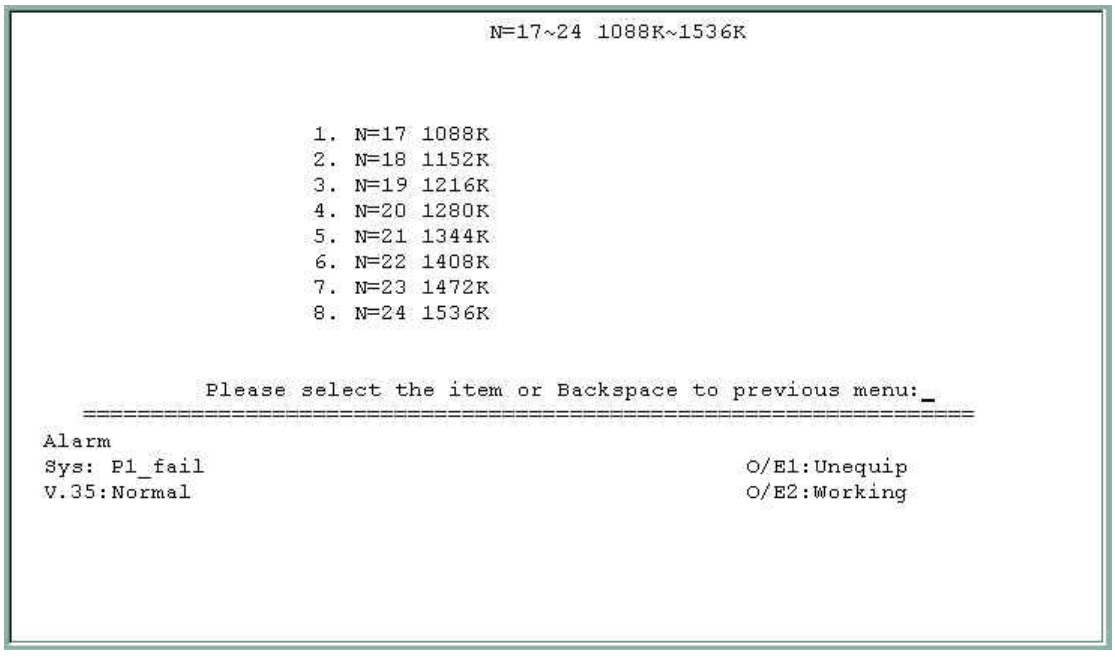
N=01~08 64K~512K



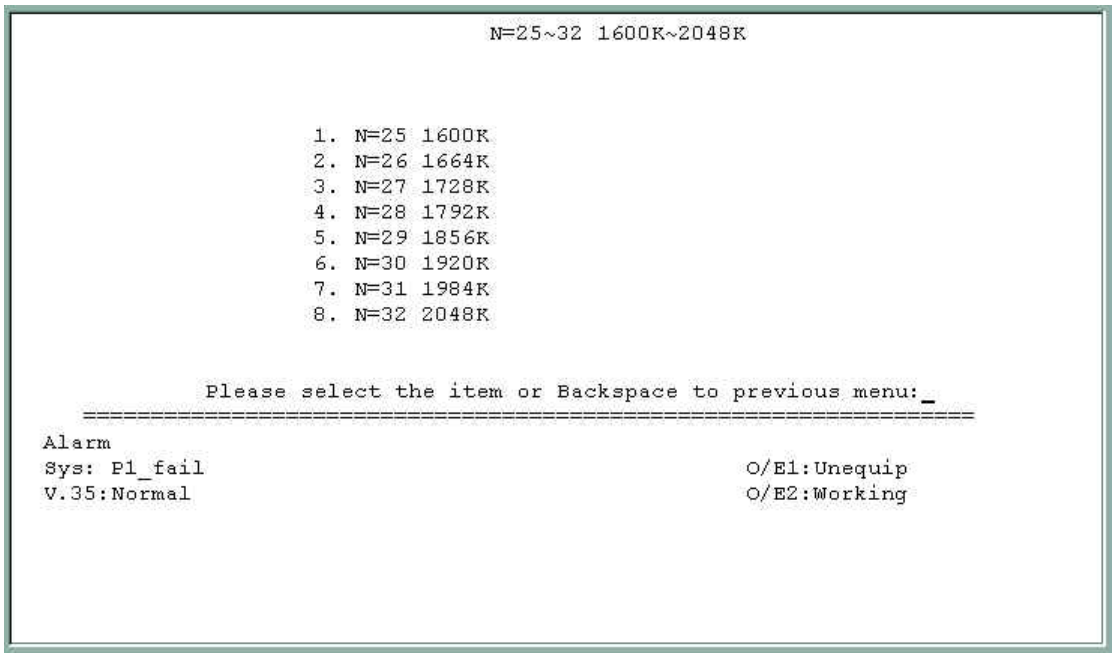
N=09~16 576K~1024K



N=17~24 1088K~1536K



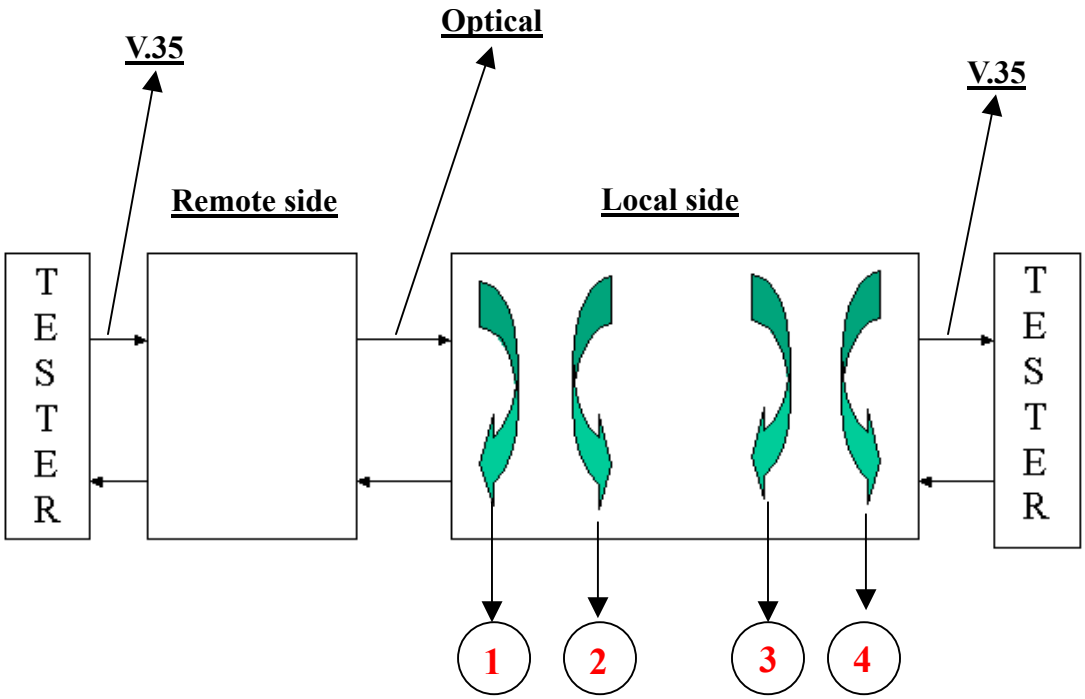
N=25~32 1600K~2048K



Chapter 5 – Loopback Test

5-1 General Information

This chapter contains detailed information on the loopback tests of the FMUX03/V35 equipment. User can activate the loopback function to diagnose the full service.



5-2 Loopback Test (For V.35 Tributary)

There are four types of lookback functions for the optical module: optical local loopback and remote loopback & V.35 data port local loopback and remote loopback. Under the “Loopback” selection menu, user can select the channels to perform the loopback test.

Please refer to the diagram on the previous page for an explanation of the different loopback tests:

Path 1: Optical Remote Loopback
Path 2: Optical Local Loopback

Path 3: V.35 data port Local Loopback
Path 4: V.35 data port Remote Loopback

Appendix A

DB25 male connector To M34 female connector

Pin number		Signal	Source
M34 Female	DB25 Male		
A	1	Cable Shield	
P	2	Transmit Data	DTE
R	3	Receive Data	DCE
C	4	Request To Send	DTE
D	5	Clear To Send	DCE
E	6	Data Set Ready	DCE
B	7	Signal Ground	
F	8	Data Carrier Detect	DCE
X	9	Receive Clock Return	DCE
	10	Unassigned	
W	11	External Clock Return	DTE
AA	12	Transmit Clock Return	DCE
	13	Unassigned	
S	14	Transmit Data Return	DTE
Y	15	Transmit Clock	DCE
T	16	Receive Data Return	DCE
V	17	Receive Clock	DCE
L	18	Local Loop-back	DTE
	19	Unassigned	
H	20	Data Terminal Ready	DTE
N	21	Remote Loop-back	DTE
	22	Unassigned	
	23	Unassigned	
U	24	External Clock	DTE
NN	25	Test Mode	DCE

M34:J,K,M,Z,BB,CC,DD,EE,FF,HH,JJ,KK,LL,MM **pin**: Unassigned

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