XL-FMUX4E1T

XL-FMUX4E1

4-E1 over fiber cable

PDH Fiber Optic Multiplexer

User's Manual

Contents

1 Foreword

XL-FMUX optic multiplexers are the medium and low-capacity PDH optic transferring and access equipments developed and manufactured independently by XtendLan, which apply the latest technology and professional super-sized programmable integrate circuit, and provide multiplexing and de-multiplexing and optic-electric transferring of E1/4E1/8E1/16E1 digital signals. The rich bit overhead provides not only various capacities of main channel business transferring, such as E1/G.703 interface, V.35 based on 2048kbit/s and 10/100Base-T interface, but also RS232 low rate data channel, office communication channel and network administrative channel.

XL-FMUX optic multiplexers have the remote looping function of 2M tributary, facilitating the test and fault positioning. They have perfect fault self-diagnosing function, provide optic transferring link alarm, 2Mbit/s tributary alarm and sound alarm.

The equipment uses 1B1H line coding, and supports dual-fiber bi-directional mode and signal-fiber bi-directional mode. Several types are available to meet different requirements. The equipment is suitable for point to point optic transferring line, able to provide public and special networks with high-quality, flexible and reliable optic transferring digital line.

The multiplexer is high in integration, strong in reliability, low in power consumption, small in size and overall in function. Even in severe environment, the equipment is still stable. The whole equipment requires no adjustment during installation. It is convenient in use and simple in maintenance.

2 Description

XL-FMUX4E1T / XL-FMUX4E1 is a high-performance optic transferring equipment with special chip, providing the multiplexing and de-multiplexing of 4E1 data signals and conversion of optic and electric, and realizing long distance data transferring. The main channel has 4 E1/G.703 interfaces. Meanwhile, it also provides one two channels of 10/100Base-Tx. One channel of office communication uses the two ordinary phone lines to communicate the office business between stations.

The equipment uses special line code with a transferring speed of 125Mbit/s, and supports dual-fiber and single-fiber, meeting different requirements and increasing the utilization of optic fiber.

XL-FMUX4E1T / XL-FMUX4E1T optic multiplexers are high in integration, strong in reliability, low in power consumption, small in size and overall in function, suitable for point to point optic transferring line, and able to provide public and special networks with high-quality, flexible and reliable optic transferring digital line. They are the optimal choice for such network operators as China Telecom and China Mobile, and the special networks for electric power, public security, oil and other industries.

3 Features & Highlights

- According with ITU-T G.703, G.704, G.823 recommendations, could be connected to various digital transition equipments.
- Simple in installation and high in reliability
- Full speed Ethernet 100Mbps supported. 2 RJ-45 ports share the 100Mbps bandwidth. (only XL-FMUX4E1T)
- Complete device bandwidth is 108Mbps (4x 2Mbps + 1x 100Mbps)

- The standard transmission distance is 50Km, the maximum can up to 120Km.
- Provides audible and visual alarm, all the operations can be completed by DIP switch on the front panel.
- Supports 2M tributaries loop back of the local equipment and remote.
- E1 interfaces adopts digital timing recovery circuit and digital flat phase-lock circuit
- Supports single-fiber bi-directional transmission.
- Two power supply modes: -48VDC and 220VAC. (Optional)
- Size: 440 (width) × 220 (depth) × 44.5 mm (height)

4 Specification

Model: XL-FMUX4E1T
E1 interface specifications
- Date Rate: 2.048Mbps
- Line Coding: HDB3
- Physical Connector: Balanced: RJ-45; Unbalanced: BNC
- Impedance: 75Ω unbalanced or 120Ω balanced
- Electrical interface: compliant with ITU-T G.703
- Jitter transfer: compliant with ITU-T G.742
- Jitter tolerance: compliant with ITU-T G. 823

Fiber Optic Interface specifications
- Fiber connector: SC (SC/PC)
- Fiber type: WDM, 1310nm/1550nm, single fiber core
- Interface Rate: 155Mbps
- Transmitter type: LED or Laser (long haul)
- Transmission range: 26dB optical margin, recommended for 50km application on single mode fiber. (RX sensitivity -36dBm, TX power output -10dBm @ fiber 9/125mm)

Other specifications
- Hot-line connector: RJ-11
- Indicators: PWR, RMA, RNL, LFA, BER, CH1-CH4, LINK, FDX, BT
- Button: CALL
- Configuration: One 10-position DIP switches for setting local or remote loop back
- Power: 110~220VAC
- Power Consumption: ＜15W
- Temperature: 0-50°C/32-122°F
- Humidity: UP to 90%, non-condensing
- Dimension: 9.6"Lx 7.8''W x 1.8''H
- Net Weight: 2kg

5 Form of the equipment

5.1 Front Panel

5.1.1 Front panel of XL-FMUX4E1T
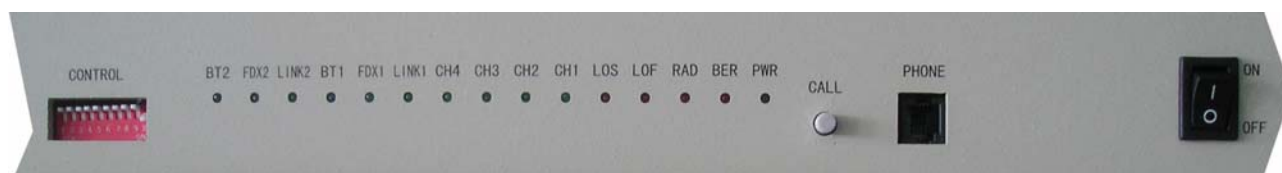
➢ LEDs:

LED Indicators	Color	Status	Description
PWR	Green	ON	Indicator for power supply.
RAD	Red	ON	Remote alarm indicator

LOS	Red	ON	Loss of optical signal.
LOF	Red	ON	Loss of frame
BER	Red	ON	Bit error in 2M lines
CH1-CH4	Green	ON	E1 channels indicator. Green means All the 2M tributaries are working normally
LINK1	Green	ON/OFF	Ethernet rate indicator. ON means 100M on the TP1. OFF means 10M
LINK2	Green	ON	Ethernet rate indicator. ON means 100M on the TP2. OFF means 10M
FDX1	Green	ON/OFF	ON means TP1 under Full Duplex Mode, OFF means Half Duplex mode
FDX2	Green	ON/OFF	ON means TP2 under Full Duplex Mode, OFF means Half Duplex mode
BT1	Green	ON/FLASH	ON means no data on the TP1, Flash means transmit or receive data.
BT2	Green	ON/FLASH	ON means no data on the TP2, Flash means transmit or receive data.

➢ DIP Switches and Buttons

Item	Description	
CALL	Push down to make a call with remote side	
PWR	ON means power on，OFF means power off	
DIP switches	Description	
SW1	1	ON means to loop back from remote 1st E1 tributary
	2	ON means to loop back from remote 2nd E1 tributary
	3	ON means to loop back from remote 3rd E1 tributary
	4	ON means to loop back from remote 4th E1 tributary
	5	NA
	6	NA
SW1	7	NA
	8	NA
	9	OFF means loop back from remote side, ON means loop back from local side
	10	ON means bell cut
PHONE	RJ-11, engineer order wire	

5.1.2 Front panel of XL-FMUX4E1

Description of the LED Indicators

LED	Color	Status	
		On	**Off**
POWER	Green	Power supply is normal.	Power supply is disconnected.
CALL	Yellow	A call from remote terminal	No call
LOS	Red	Loss of optical signal on the terminal	No fault
LOF	Red	Loss of frame synchronization signal on the terminal	No fault
RAD	Yellow	Alarm of remote terminal	No fault
CH1	Red	Loss of 1st 2M tributary input signal	No fault
CH2	Red	Loss of 2nd 2M tributary input signal	No fault
CH3	Red	Loss of 3rd 2M tributary input signal	No fault
CH4	Red	Loss of 4th 2M tributary input signal	No fault

Descriptions of DIP Switches

Switch	Status	Function
DIP SW1-1	ON/OFF	First E1channel loop-back control switch. When it is set ON, the first 2M bit/s data stream of remote terminal will loop-back to local terminal. When the equipment is operating in normal, it is at OFF.
DIP SW1-2	ON/OFF	Second E1channel loop-back control switch. When it is set ON, the first 2M bit/s data stream of remote terminal will loop-back to local terminal. When the equipment is operating in normal, it is at OFF.
DIP SW1-3	ON/OFF	Third E1channel loop-back control switch. When it is set ON, the first 2M bit/s data stream of remote terminal will loop-back to local terminal. When the equipment is operating in normal, it is at OFF.
DIP SW1-4	ON/OFF	Fourth E1channel loop-back control switch. When it is set ON, the first 2M bit/s data stream of remote terminal will loop-back to local terminal. When the equipment is operating in normal, it is at OFF.
DIP SW1-5	ON/OFF	It switches the alarm display of first E1 channel. When it is set ON, the LED CH1 will indicate the loss of E1 input signal. When it is set OFF, the LED CH1 will be shut off, and doesn't Indicate the loss of E1 input signal even if the tributary occurs alarm. When the equipment is operating in normal, it is at OFF.
DIP SW1-6	ON/OFF	It switches the alarm display of second E1 channel. When it is set ON, the LED CH2 will indicate the loss of E1 input signal. When it is set OFF, the LED CH2 will be shut off, and doesn't Indicate the loss of E1 input signal even if the tributary occurs alarm. When the equipment is operating in normal, it is at OFF.
DIP SW1-7	ON/OFF	It switches the alarm display of third E1 channel. When it is set ON, the LED CH3 will indicate the loss of E1 input signal. When it is set OFF, the LED CH3 will be shut off, and doesn't Indicate the loss of E1 input signal even if the tributary occurs alarm. When the equipment is operating in normal, it is at OFF.

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DIP SW1-8	ON/OFF	It switches the alarm display of fourth E1 channel. When it is set ON, the LED CH4 will indicate the loss of E1 input signal. When it is set OFF, the LED CH4 will be shut off, and doesn't Indicate the loss of E1 input signal even if the tributary occurs alarm. When the equipment is operating in normal, it is at OFF.
RALARM	LOCAL (UP)	The LEDs indicate alarm of local terminal.
	REMOTE (DOWN)	The LEDs indicate alarm of remote terminal. In this situation, the LEDs of local terminal will indicate alarms the same as remote terminal. When the terminal is operating in normal, it is at LOCAL (UP) position.
MUTE	ON (UP)	Buzzer works normal. Buzzer will sound when the terminal occur alarm. When the terminal is operating in normal, it is at ON (UP) position.
	OFF (DOWN)	Buzzer will be shut off even if there is any alarm.
CALL	OFF (UP)/ ON (DOWN)	When it is in ON (DOWN) position, the terminal will send a signal to remote terminal, and remote terminal will ring to indicate a call from opposite. When the switch of remote terminal is set to ON, the ring will stop and operators can talk each other by 4-wire handset.
POWER SWITCH	OFF	Turn off the power
	ON	Turn on the power
PHONE		RJ-11 connector uses to connect a 4-wire handset to provide communication service.

➢ Loop back status

Local loop back Remote loop back

E1 s E1 s

E1 s Fiber cable E1 s

Local unit Remote unit
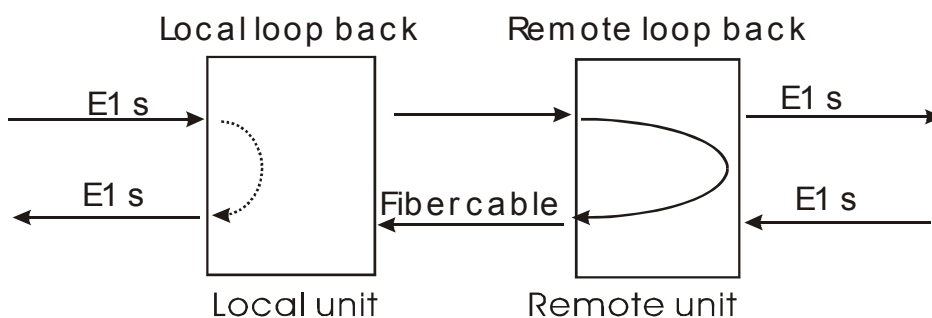
5.2 Rear panel

5.2.1 Rear panel of XL-FMUX4E1T


➢ Interface Description

Interface Type	Description
TP1，TP2	Supports 10/100M, full duplex, half duplex, auto negotiation, RJ-45 interface, Bandwidth:100M
Console	It is available for manufacturer only
E1 75Ω	Unbalanced E1 tributaries
E1 120Ω	Balanced E1 tributaries

➢ Balance E1 interface definition:
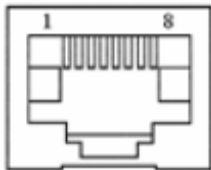
RJ-45 Pinout	Signal	Description
1	TX-	Transmit output, Negative
2	TX+	Transmit output, Positive
3	S1	Transmit Ground
4	RX-	Receive input, Negative
5	RX+	Receive input, Positive
6	S2	Receive Ground

➢ TP1, TP2 interface definition:
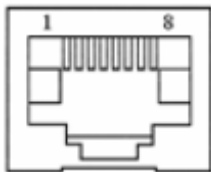
RJ-45	1	2	3	4	5	6	7	8
Function	TX+	TX-	RX+	NC	NC	RX-	NC	NC

5.2.2 Rear panel of XL-FMUX4E1

Connection Descriptions

2M Connector		BNC/75ΩUnbalance or RJ-45/120ΩBalance
Optical Transmitting		TX
Optical Receiving		RX
Power Supply Type	DC+24V	+18VDC～+36 VDC, two-pin parallel receptacle
	DC-48V	-36 VDC～72 VDC, two-pin parallel receptacle
	AC220V	165～265VAC@50～60Hz, clover leaf 3-prong receptacle

Power supply:

For a model with AC power supply, AC power (165~265VAC) is supplied to the XL-FMUX4E1 through

a becoming standard clover leaf 3-prong receptacle, located on the rear of the unit. The XL-FMUX4E1 should always be grounded through the protective earth lead of the power cable in AC installations.

For a model with DC power supply, DC +24V (18~36VDC) or DC -48V (36~72VDC) is connected to the detachable terminal block. Please take extra caution to observe the proper polarity of the DC when wiring the connector. The XL-FMUX4E1 should always be grounded through the protective earth lead via the frame ground connection for DC installations.

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Hot-line phone:

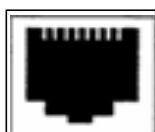4-wire handset interface detail is shown below:

Interface	Microphone		Earphone	
RJ-11	2 (+)	3 (-)	1 (+)	4 (-)

Fiber optic connector:

The standard interface is FC, TX means output, RX means input.

E1 interface:

Unbalance interface: BNC connector, OUT means transmit, IN means

receive. Balance interface: RJ-45 connector, the definition is shown below:

Pin	1	2	3	4	5	6	7	8
Function	NC	TX+	Tx-	NC	NC	RX+	RX-	NC-

1 2 3 4 5 6 7 8 **Note:** NC means " No connection"

6 Installation and maintenance

6.1 Unpacking

After the equipment arrives, unpack and check it before installation. Items to be checked are as follows:

● The external package is in good condition or not. If it is damaged seriously, please contact our after-sale service department immediately for solving.

● Based on the package list, verify the items one by one. If there is any serious damage on the surface or any accessories missed, please contact the installation person or directly contact our after-sale service department.

● Please check carefully whether the equipment type and quantity are in conformity with what you ordered.

● Check the power supply mode.

6.2 Installation

● Fix the equipment on the 19" rack-mount.

● According to the manual, connect power supply with the power cable. Pay attention to the power polarity.

● According to actual situation, make and connect relevant cable (2M, RS-232). Do not connect the TX and RX optic cables wrongly.

● Connect the TX and RX optical fibers (or patch cords) to the optical RX and TX connectors in the equipment. Do not connect the TX and RX fibers wrongly. Check whether the fiber head is clean or not. Insert the optical fiber (or patch cords) and make sure the connection is good. (The bending radius of optical fiber must ≥50mm.)

● Use a multimeter to check the power polarity and voltage is in conformity with equipment requirements or not. This is especially recommended for 48V power supply version.

● After all installation and check, turn on the power supply switch.

● Check whether the equipment indicator light is the same as the actual situation (Refer to relevant chapters in the manual.).

Note: When install single fiber Optic Multiplexers, you must ensure they are same TX and RX wavelength, for example: TX:1550nm, RX:1310nm must match with TX:1310nm, RX:1550nm

6.3 Notices for Installation

1) Avoid strong vibration and mechanical damage during transportation and installation.
2) Place the optical fibers reasonable. The bending radius of optical fiber must ≥50mm.
3) Check whether the voltage and polarity is in conformity with the marks on the rear panel before supplying power. Otherwise, it may cause permanent damage to the equipment.
4) The optical fiber connector cannot be contaminated. Clean the fiber head with alcohol before use. Otherwise, it may affect the transmission distance. If the optical fiber connector is connected wrongly, it may cause more power consumption. Adjust the connector according to the actual situation.

5) The installation position shall be easy for persons to access and transport equipment.

6) The ambient environment shall be dry, clean and good in ventilation.

7 Start Equipment

✧ Turn the power supply switch to ON.

✧ After supplying power, check and verify relevant indicators and alarms according to the manual.

Caution：Please turn power supply off and contact with our after-service engineer once you find any error。

8 Fault Treatment

Before leaving factory, the equipment has been adjusted to optimal status, and all the functional interfaces are all in the front and rear panel. Except our technicians, no one shall open the unit shell freely. When the equipment has fault, use the stand-alone self-loop-back function to decide the fault scope and contact us immediately.

The table below lists the common faults and alarms, the possible causes for alarms and solution, only for reference.

Equipment Alarms and Corresponding Treatment

No	Alarm		Possible Causes	Treatment
1	Primary Alarm	POWER is on.	Cannot supply power.	The power supply is not connected well. The polarities are reversed.
2		Red LOS light is on.	Cannot receive optical signal.	The optical fiber link is not through. There is on optical light from the opposite end.
3		Red LOF light is on.	Cannot receive normal frame signal.	The receiving is not stable. Check the optical link and equipment.
5	Secondary Alarm	Red RAD light is on.	The opposite end alarms.	Check the opposite end.
6		CH# alarm	Cannot receive 2M signals.	Check the quality of fiber cable. The TX and RX fibers are connected in reverse or not.
7		Sound alarm	The local end alarms.	You may screen the equipment when handling fault.