Fiber Optical Multiplexer

8x E1, 1x Fast Ethernet, Hotline, 1x Fiber optic

XL-FMUX8E1F

User's Manual

Thank you for using XtendLan's product. This manual provides most of the information; please do read up the technical setup and safe keep the manual for future usage.

1 Product Description

1.1 Function Description

XTENDLAN Fiber Optical Multiplexer product family provides ideal solutions for building fiber base E1 or T1 networks.

FMUX8E1F is a staff of Fiber Optical Multiplexers, this model it can multiplex to 8 E1 signals for transmission over an optical fiber, resulting in reaching a longer distance without a repeaters and superior performance compared to copper media.

FMUX8E1F is the 8E1 point-to-point optical transport equipment that uses the FPGA chips and it is easy to upgrade. It is single board structure and the largest transmission capacity is 8E1. The outer design use the standard 19 inches rack, so the volume is little, weight is light and operation is convenient and credit.

8E1 fiber Optical Mulitplexer uses the PDH fiber transmission technologies. The 2M (E1) interfaces can connect with the exchanger, light loop device and multi-diplexer directly to form the micro, midi or the special network. Complete alarm function for FMUX8E1F, it is stable and easy to maintenance, install and small in size. It has one digital service telephone.

1.2 Features

Below lists the features for FMUX8E1F:

- Offer 8 X 2Mb/s digital interfaces
- Up to 8 E1 links on one fiber
- Management through Console port
- The supervisory control interface implements centralized monitoring and export the monitor and control information of this port and opposite port.
- One link to service telephone for duty contract
- 90-260VAC & -48VDC power options and the positive and negative of DC-48V can be optional because there is the self-test circuit for the polarity inside thıe device
- Standard 19 inches rack, little volume, light weight, steady capacity and convenient setup
- Digital clock recovery circuit and digital smooth DPLL adopted for 2.048Mb/s port
- LED indicators

1.3 Application

XtendLan FMUX8E1F can be used a high-speed baseband modem for point to point that connects two DTE over a lease Line. From Router → CSU/DSU → FMUX8E1F → Fiber optical→ FMUX8E1F→ CSU/DSU→ DTE as illustrated in the Following Diagram.

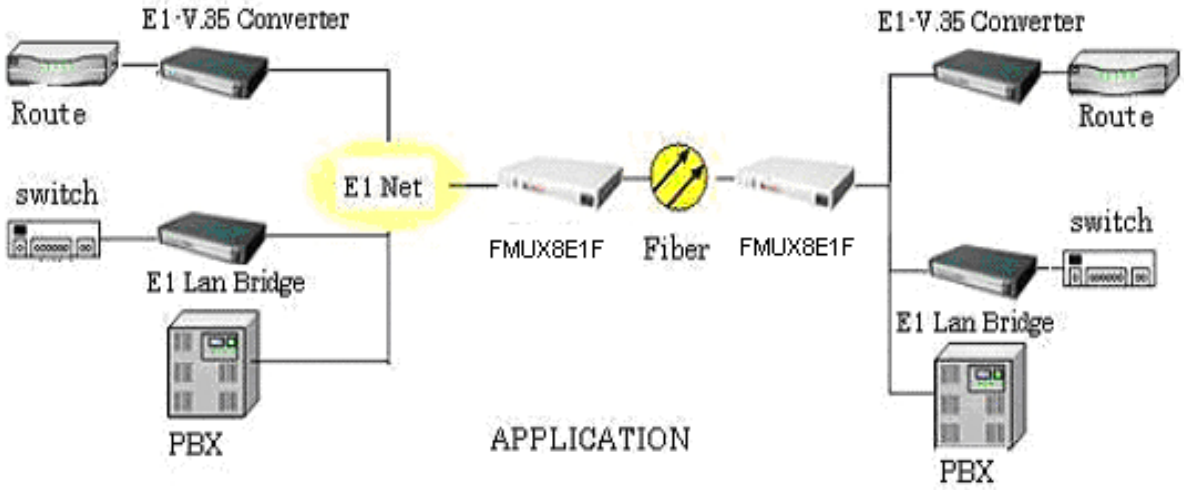


Diagram 1.1

1.4 Specification

E1 line Interface

Number of E1	8 E1's	Interface Standard	ITU-T G.703
Line Rate	2.048Mbps±50ppm	E1 Impedance	120 ohm (balanced)
Line Code HDB3	HDB3	Connector Type	RJ-45
Jitter tolerance	Better than G.742,G.823		

Optical Fiber Interface

Wavelength	1310nm	Connector Type	SC
Light Source	MLM Laser	Detector PIN	Photodiode
System Gain	26 dB (Min.)	Input Sensitivity	-38dBm (Ber<10e-10)
Line Code	Scrambled NRZ	Output power	-6 dBm

Physical/Electrical

Dimension	Height 44 mm / 1.7 in (1U), Width 485 mm /19
	In Depth 160 mm / 6.3 in
Mounting	Stand-alone,19" inch rack mount, wall mount also available
Power Source	100 – 240 VAC (50H/60Hz)
Power consumption	< 5 W
Temperature Range	0°C - 50°C (32° to 122°F)
Relative Humidity	0% - 90%, non-condensing

Management

- RS485, with the two-string cable, one computer can supervise the 256pair fiber modem. It can be manage by our SNMP NMS device, which has a RS485 interface.

Timing

- Timing derived from incoming E1

Diagnostics Test

- Loop-back testing for 8 x E1 (Local and remote)
- Loop-back testing for fiber optical (Local and Remote)

Indicators

- Local optical signal indications for all E1s.
- Remote optical signal receive indication, working and loss.
- Loop-back indication.
- Alarm indication, on or off.
- Power on indication.

Front panel

From left to right – 1x NMS RS-485 port, LED indicators, diagnostics and phone push buttons, phone line port RJ-11

Rear panel

From left to right – power switch, power supply port, LAN port RJ-45 10/100Base-TX, fiber optics port SC duplex connector, 8x RJ-45 balanced E1 port.

2 INSTALLATION

2.1 Site Selection

This is a guideline for FMUX8E1F installation. The following list indicates a site selection guideline. User needs to follow this guideline for the select a proper installation site.

- For the FMUX8E1F unit, the location should be part of the Central Office (CO) equipment layout design. The entrance cable routing should be consider.
- The installation should provide a proper room for the adequate ventilation and cable routing at site. At least 0.5 m should be reserve at the rear of the unit for the human access, cable, and airflow.
- The site should provide a stable environment. The Ops Area (Operating Area) should be free from extremes temperature, humidity, shock and vibration.
- Do not expose the unit under the rain because FMUX8E1F is not a waterproof unit.
- Relative humidity should stay between 0 and 95%.
- Survey the site (power supply) before install the unit.

2.2 Mechanical Installation

FMUX8E1F is a desktop and 19” rack mount unit. Unit supports AC power supply.

2.2.1 Light indicators

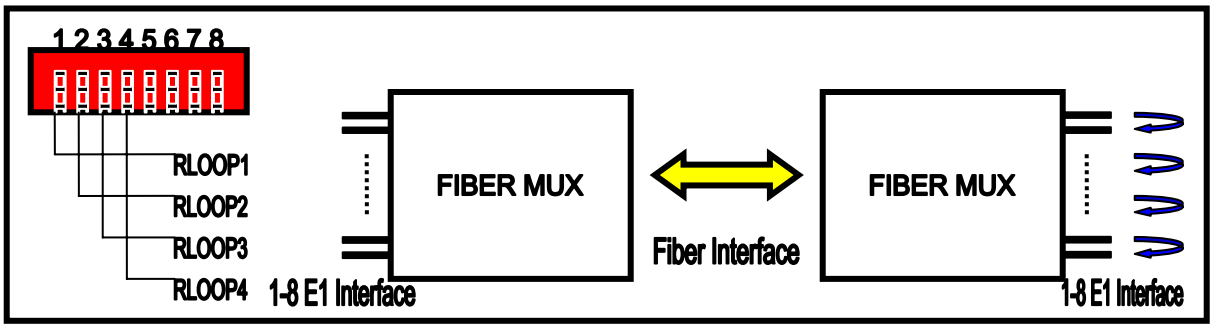
	Name	Color	Status	Describe
1	LOS1	Red	Active	E1 port 1 loss
2	LOS2	Red	Active	E1 port 2 loss
3	LOS3	Red	Active	E1 port 3 loss
4	LOS4	Red	Active	E1 port 4 loss
5	LOS5	Red	Active	E1 port 5 loss
6	LOS6	Red	Active	E1 port 6 loss
7	LOS7	Red	Active	E1 port 7 loss
8	LOS8	Red	Active	E1 port 8 loss
9	E6	Red	Active	Optical BER≥10-6
10	E3	Red	Active	Optical BER≥10-3
11	OPLOS	Red	Active	Optical signal Lost
12	OPLOF	Red	Active	Optical SYNC loss
13	LE	Red	Active	Local device have any error(E1 and Opt)
14	RE	Red	Active	Remote device have any error(E1 and Opt)
15	PWR	Green	Active	Power on
Remark：Equipment Can Monitor the remote device				
LRS	UP	The led indicate local device status		
	DOWN	The Led indicate remote device status		
If the Device Have Lan Interface				
16	LNK/ACT	Green	Active	LAN Link and Active
17	FDX	Green	Active	ON :full duplex,OFF:half duplex
18	SPD	Green	Active	ON :100M,OFF:10M

2.2.2 Front panel DIP definition:

Bit 1-4 (RLOOP1-4): 1-8E1 remote loop.

RLOOP1-4 as 1 to 8 port's E1 it is to indicate loop back.

If the RLOOP1 is ON, this means that at the far end the is doing a E1 loop-back



In the following table 0 means ON,1 means OFF

The Remote NO x E1 Loop	Bit1	Bit2	Bit3	Bit4
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
ALL 8E1 Loop	0	0	0	0

Remark: Bit 5-8: Reserved

2.2.3 Front panel PUSH button definition:

In the front panel are four push buttons. It is MSK, SMSK, LRS, PH

The function described following table

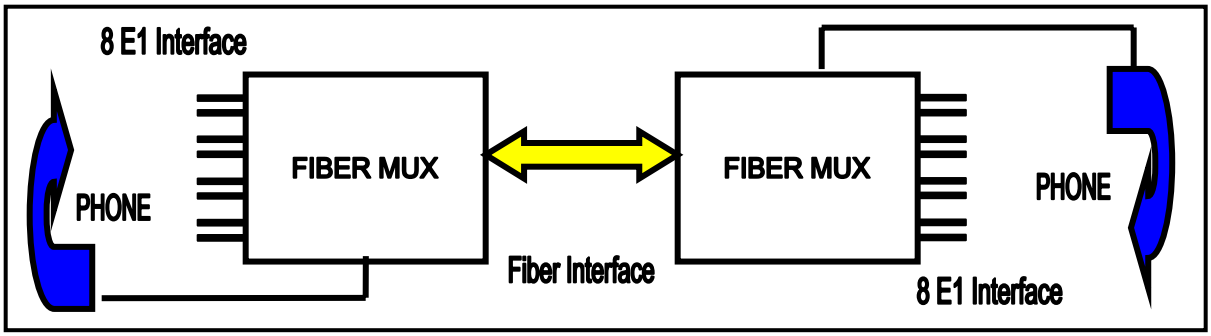
PUSH	OFF (button up)	ON (button down)
MAK	Normal LED Display	LED Alarm OFF
SMSK	Sound Alarm	Sound Alarm ShutDown
LRS	LED Means Local	LED means Remote
PH	Hot line phone not used	use Hot line phone

2.2.4 Hot line phone

Hot line phone, not occupy 2Mbps channel transmission.

On the front panel there is a “PH” button, press on the “PH” button on the remote site it will sound. To answer it the remote site just need to press the “PH” button on the remote unit, the alarm will cut off and just plug in the phone both side able to do the communication.

Setting of the manage phone.



It does not occupy the 2M circuits!

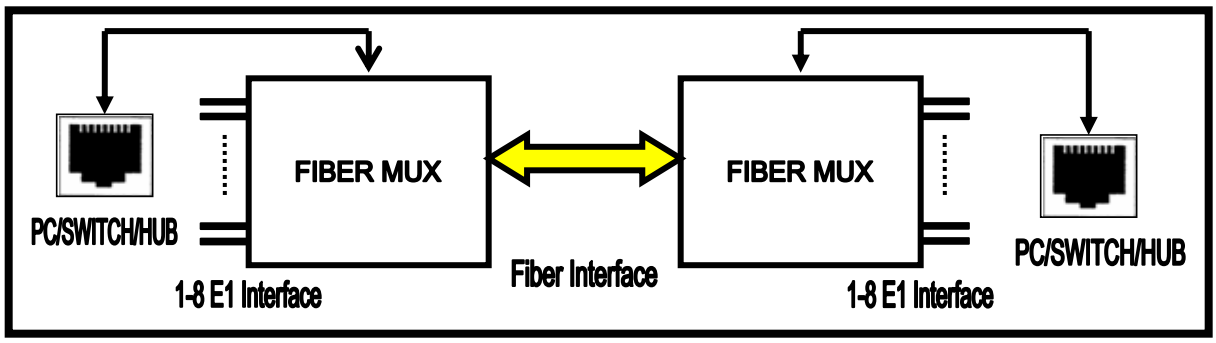
2.2.5 Ethernet

FMUX8E1F can offer a channel for 10/100M, full/duplex auto-negotiation LAN interface, support VLAN protocol, this interface can continuous learn MAC addresses in the LAN that connected with it, and send the address as frame in another LAN. Transparence to TCP/IP protocol, offers security connection between different equipments in the network, used widely in network connection and monitor between WAN and LAN.

- 10/100 Base-T Ethernet port parameter
- Rate: 10M or 100M, full/semi duplex auto-negotiation
- **Ethernet rate in optical line: 2.048 Kbps.**

- Protocol: support IEEE 802.3, IEEE 802.1Q(VLAN)
- MAC address table: can learn 4096 MAC address
- Ethernet buffer memory: 64 Mbits SDRAM
- Physical interface: RJ45 slot, support AUTO-MDIX

Ethernet operating diagram:



2.2.7 Power supply

FMUX8E1F Fiber Optical Multiplexer supports 3 type powers: AC220V, -48V and +24V. If the power of DC-48V is used, the positive and negative terminal can be optional because there is the self-test circuit for the polarity inside the Fiber Optical Multiplexer.

3 Operation

3.1 Equipment installation

After unpacking and before installation, make sure checking the following:

- Make sure the package is well. If the package is damaged, contact service office of XTENDLAN quickly for solution.
- Check the package according to the product list, if find equipment severe damaged or lack of some components, please contact installation worker or service office of XTENDLAN.
- Check whether the equipment type is meet with the type you ordered.
- Check whether the component is integrity.
- Check the power supply type.

3.1.2 Quick installation

- Fasten the Equipment in 19 inch. rack with the screws in the equipment package.
- Use reliable ground connection at GND point of the equipment

- Use power tab to connect power according to the manual, don't exchange the polarities.
- Create user equipment connecting wire according to your demand (2M, V.35 and 10 Base-T), then connected, don't exchange receive and transfer wires.
- Connect receive and transfer optical with optical receive and transfer port of the equipment. Don't exchange receive and transfer wire, make sure the optical fiber head is clean, insert optical jumper, make sure connection well. (fiber bending radius≥50 mm)
- Use multimeter to test power polarity and voltage, make sure it match with equipment requirement.
- After complete installation and make sure it's ok, power on the switch. Check indicator light meet with practice situation (see related part of manual).
- A clean, steady environment and firm installation should provided for independent or wall hanging equipment.

3.1.3 Cautions about installation

- Avoid severe libration and mechanical damage during the process of transfer and installation.
- Arrange fiber appropriately, fiber bending radius≥50 mm.
- Check voltage and polarity meet with back panel, or it will cause permanent damage to the equipment.
- Fiber connector can't contaminate, wipe optical fiber head slightly using alcohol, or it will affect transmission. If the fiber connector not butt joint well, it may be cause power decline, adjust fiber connector according to practical situation.
- The installation position should convenience for personal pass and equipment movement.
- The environment should dry, clean and ventilation well.
- Essential static-protective is needed during the installation and maintenance, ground the chassis to increase anti-interference capability and prevent lightning strike. Before use the equipment, independence work ground and protect ground should provided, make sure it ground well.

3.2 Power on the equipment

- Check indicators and alarms according to manual after power on.
- If both local and remote work well, fiber interface connect ok, the alarm light OPLOS and OPLOF off, POWER indicator light is green.
- Light LOSX (X=1-8) is red and voice alarm is on because of not connecting E1 signal. After connect E1 signal, light LOSX (X=1-8) will off, voice alarm will off until all light LOSX is off.

- Branch shield: shield no using branch alarm, no red light is on when all alarm is off.
- Hot line phone: after Fiber Optical Multiplexer works normally, insert microphone to hot line phone port, press button PHONE to call remote user, then can communication after the remote user press button PHONE and hold up the microphone. Buzzer rings when remote terminal call local terminal, press button PHONE and hold up microphone, then communicate with remote terminal. Back the button PHONE to norm after communication is completed.
- Branch loop: when system work normally and no branch alarm happen, loop test is available with SW. Put the SW switch to ON in local terminal, can control remote corresponding 2 Mb/s branch to loop, then can test corresponding output signal at local 2 Mb/s output port. Use this function you can realize loop of all the branches, and it's easy for detect.
- Use bit error instrument to analyzing performance of 2M branch, and record it.
- Close voice alarm: voice alarm on when following situation happened:

  A. Optical disconnected cause OPLOS alarm.

  B. Signal not steady cause OPLOF alarm.

  C. Some branches not use and not shielded.

Push down SW5 at local terminal, can control closing voice alarm.

Note: After failure is removed, set the button to norm, validate the alarm function

3.3 Troubleshooting

Best status is configured to this equipment before out of factory, all the functional interfaces are at the front and back panel, don't open the chassis yourself. If have failure, you can determine the range of failure using single loop, and contact our corporation.

The following table list common failure and alarm, the reason may cause these alarm and solution to this alarm for you to reference.

Equipment alarm and corresponding solution

	Alarm	Possible reason	Solution
1	POWER off	not power on	Power connect not well, polarity exchanged
2	OPLOS on	Not receive optical signal	Optical disconnected; remote having no optical output
3	OPLOF on	Not receive normal frame signal	Receive signal not steady，check fiber line and equipment
4	E1 alarm	Not receive 2M signal	Check wire; receive and transfer are exchanged
5	Voice alarm	Local alarm happened	Shield when process failure