OptiMux 16E1 PDH

User Manual

E1/ETH/RS232 TO Optical

Table of Contents

1. Introduction

1.1 Overview

16E1 OPTIMUX is a point-to-point transmission unit operating at 150 Mb/s bit rate compatible with existing plesiochronous systems. The embedded mixed multiplexer realizes transmitting 16 E1 and fast Ethernet data over optical system. 16E1 OPTIMUX provides two RS232 interfaces, one is for user's purpose and the other is for network management. Alarms, performance monitor are available through the interface.

The unit is featured by very compact, minimum cost and low power consumption. It is ideal for application areas such as remote transmission in point-to-point links with small capacity and LAN extension.

1.2 Features

- Line bit rate is 150Mb/s, 50Km transmission without repeater
- 1+1 line protection with ALS facility for eye safety
- Provides 16 E1s comply with ITU-T G.703 on interface and G.742, G.823 on jitter performance; Local/Remote loopback is supported
- Provides a 100Mb/s fast Ethernet interface complies with IEEE 802.3u 100BASE-TX, supports auto-negotiation and flow control (pause)
- Alarms, performance monitor, and information about the local/remote equipment status are available
- Provides Engineering Order Wire (EOW), customer RS232 data channel and RS232 interface (NMS) for equipment management
- Both AC 220 and DC-48 are available
- Single board design, 1U high, and 19 Inch wide

1.3 Application

Fig 1-3-1 illustrates a typical application in which 16E1 OPTIMUX transmits remote 16 E1 and 100Mb/s Ethernet data with optical fiber.

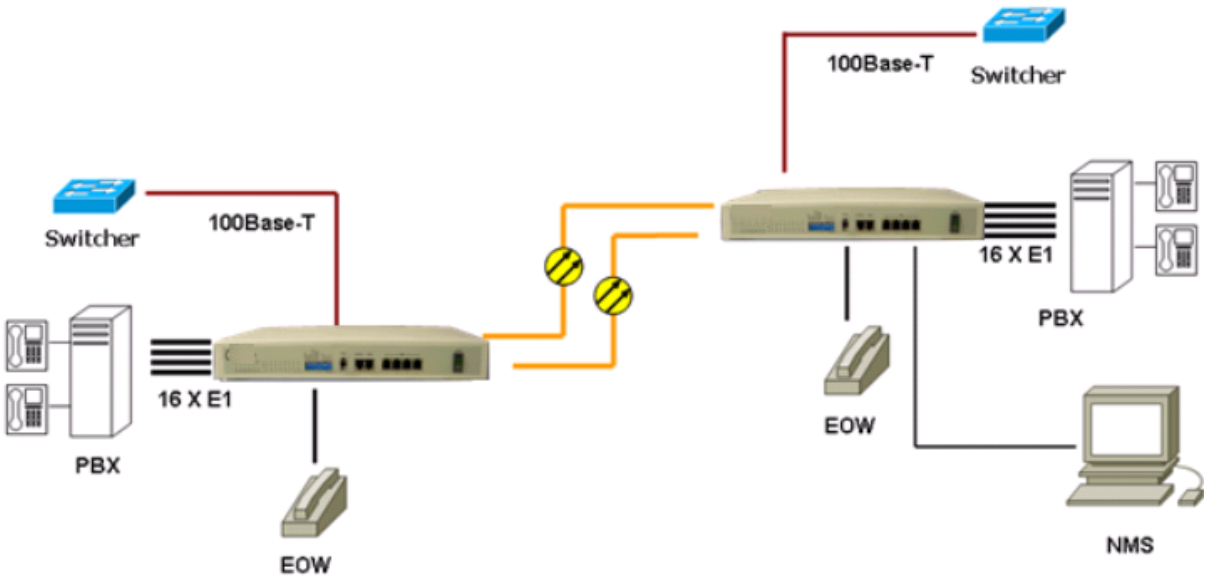


Fig 1-3-1 Point to Point Application

2. Physical Description

16E1 OPTIMUX is a 1U high standalone or rack mountable device.

Fig 2-1 illustrates a three-dimensional view of the 16E1 OPTIMUX 。

Fig 2-1 16E1 OPTIMUX

3. Function Description

3.1 Front panel

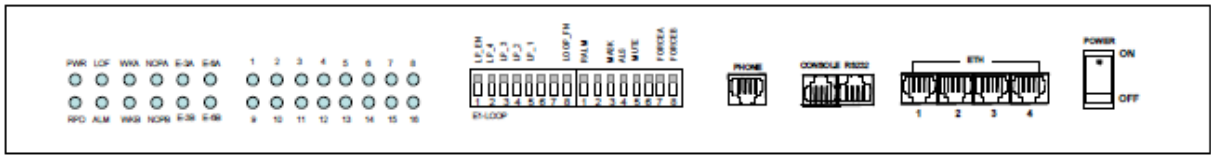


Fig 3-1-1 Front Panel

3.1.1 LED Indication

Table 3-1-1 LED Indication

Name	Color	Function
PWR	Green	On -- Unit is powered Off -- Unit is off
ALM	Red	On -- Alarm of local detected Blinking -- Alarm of Remote detected Off – No alarm currently detected The alarm of local take priority of the alarm of remote
WKA	Green	On – Optical A work indication. Optical B indication (WORKB) is off at the same while. Off – Optical A is not work
WKB	Green	On -- Optical B work indication. Optical A indication (WORKA) is off at the same while. Off – Optical B is not work
NOPA	Red	On -- Optical signal loss is detected at port A Off – No loss
NOPB	Red	On - Optical signal loss is detected at port B Off – No loss
LOFA	Red	On – Loss Of Frame (LOF) is detected at port A Off – No loss
LOFB	Red	On –Loss Of Frame (LOF) detected at port B Off – No loss
E-3A	Red	On -- Line bit error rate is over 10-3 at port A
E-3B	Red	On -- Line bit error rate is over 10-3 at port B
E-6A	Yellow	On -- Line bit error rate is over 10-6 at port A
E-6B	Yellow	On -- Line bit error rate is over 10-6 at port B
E1-LOSS 1-16	Red	On -- E1 signal loss happened at the corresponding tributary Off – No loss
LINK	Yellow	On – Ethernet link is up Off – Ethernet link is down
ACT	Green	On – 10/100M Ethernet data transmission Off –No 10/100M Ethernet data transmission

Note: The priority of the optical line alarms, from high to low, are arranged as:

NOPx→LOFx→E-3x→E-6x (x means port A or port B)

3.1.2 Ethernet Interface

16E1 OPTIMUX provide a 100Mb/s fast Ethernet interface complies with IEEE 802.3u

100BASE-TX, which supports auto-negotiation and flow control (pause).

3.1.3 EOW interface

16E1 OPTIMUX supplies a RJ-11 socket for the ordinary telephone set connection.

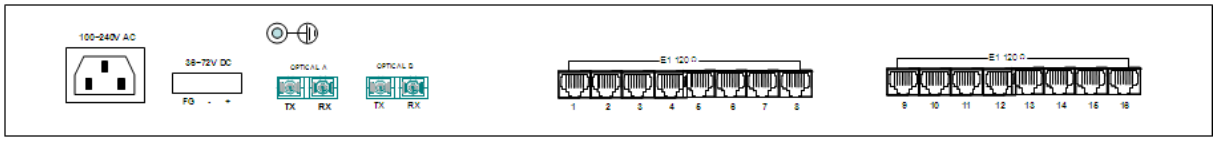
The EOW adopts the simple signaling to connect each other for point-to-point application. The ring will be generated at remote when phone set is off-hook, when the user at remote is off-hooks, conversation goes on. When anyone hooks, the other will receive engaged tone,

The EOW interface is optional.

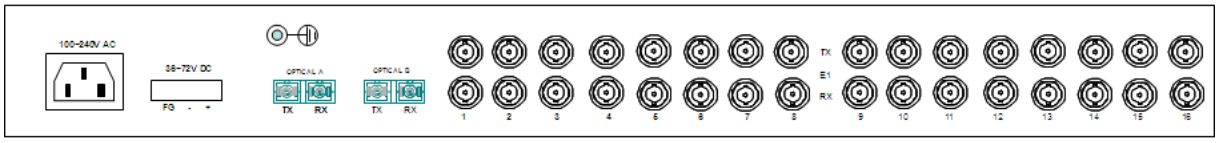
3.1.4 Power Switch

As shown in fig 3-1-1, the symbol “o” is for power off and “I” for power on.

3.2 Rear Panel



120ohm Panel



75ohm Panel

Fig 3-2-1 Real Panel

3.2.1 Power connector

There are both AC220V and DC-48V power connecters on the rear panel of the 16E1 OPTIMUX. User can select one power according to the field conditions. In the design of power supply, over voltage and over current protection technique are adopted. For DC power, there is a protection for polarity reverse due to careless connection.

As shown in Fig.3-2-1, PGND is already connected internally to the cabinet. Whatever AC or DC is selected, the PGND should be well connected to the earth grounding and the resistance should be less than 4Ω. In case of no earth grounding, the PGND should connect to the GND.

3.2.2 Optical Interface

There are two optical interfaces, A and B. The 1310nm wavelength and FC type connecter are selected as default for 50Km transmission without repeater.

3.2.3 E1 Interfaces

E1 interface has a bit rate of 2.048 Mbps, un-frame, and are ITU-T G.703 compliant. The connector support balanced (120ohm) or unbalanced (75ohm).

3.2.4 DIP Switch

3.2.4.1 Automatic Laser Shutdown

To protect eyes, the 16E1 OPTIMUX provides the Automatic Laser Shutdown (ALS) function. In in case of optic fiber disconnection, the optical port will reduce the power of the transmit signal automatically.

When ALS is active by DIP Switch 'ALSEN', the luminous power of the transmitter will be 20 db lower on average than normal. Please refer to Table 3-2-4-1 for more.

Table 3-2-4-1 DIP Switch

Name	Function Description
LP_EN	Loopback enabled switch, "ON" means E1 loopback, "OFF" means canceling E1 loopback.
LP_4~LP_1	16 E1 loopback choosing switch, choose E1 channel that needs to loopback through combining LP_4~LP_1.
LOOP_FN	Local or remote loopback choosing switch, "ON" means local loopback, "OFF" means remote loopback.
R_ALM	Remote alarm choosing switch, "ON" means showing remote alarm, "OFF" means showing local alarm. Alarm information of remote: NOP，LOF，E-3，E-6，E1 LOS1～8.
MASK	E1 loss alarm mask, "ON" means that all current E1 loss alarms will be masked. After masking, alarms will be triggered if new event of E1 signal loss happened even this button is pushed.
ALS	ALS, "ON" means choosing ALS function.
MUTE	Alarm sound mute, "ON" means masking alarm sound. This switch won't affect official phone.
FORCEA FORCEB	Choosing switch of optical working mode, confirm working mode of optical A and optical B through combining FORCEA and FORCEB.

3.2.4.2 Automatic Protect Switching

Installing two optical interfaces, 16E1 OPTIMUX supports APS function. The receiving data will be switched to the backup fiber line if any accident detected on the working line. If APS function is not required, the operators can use only one optical interface by setting DIP switches while the other optical interface still exists and the status are displayed by LEDs. In this case, operators need to disable all the alarms of this removed interface by Dip switch 'FORCEB' and 'FORCEA'. Please refer to table 3-2-4-2 for more.

Table 3-2-4-2 Optical interface configuration

FORCEB	FORCEA	DESCRIPTION
OFF	OFF	Auto protection switch enable
OFF	ON	Interface A working and B off
ON	OFF	Interface B working and A off
ON	ON	Disable alarms of interface B

3.2.4.3 E1 tributary loopback

For the sake of device diagnose facility, the 16E1 OPTIMUX provides local and remote loopback capability for each E1 tributaries. Refer to Table 3-2-4-3

Table 3-2-4-3 The configuration of E1 loopback

LP_EN	LP4	LP3	LP2	LP1	The looped E1
OFF	X	X	X	X	Normal
ON	OFF	OFF	OFF	OFF	1
ON	OFF	OFF	OFF	ON	2
ON	OFF	OFF	ON	OFF	3
ON	OFF	OFF	ON	ON	4
ON	OFF	ON	OFF	OFF	5
ON	OFF	ON	OFF	ON	6
ON	OFF	ON	ON	OFF	7
ON	OFF	ON	ON	ON	8
ON	ON	OFF	OFF	OFF	9
ON	ON	OFF	OFF	ON	10
ON	ON	OFF	ON	OFF	11
ON	ON	OFF	ON	ON	12
ON	ON	ON	OFF	OFF	13
ON	ON	ON	OFF	ON	14
ON	ON	ON	ON	OFF	15
ON	ON	ON	ON	ON	16

3.2.5 Customer Channels

The 16E1 OPTIMUX provides two 32 low-speed asynchronous serial channels for functional expansion named as CONSOLE and RS232. The CONSOLE is for equipment management and the RS232 is for customer's channel. Both interfaces are introduced by RJ45 connector. CONSOLE works at 9600b/s while RS232 can be up to 250b/s. Refer appendix for pinouts.

4. Installation and Setup

I Open the package, check out the package contents such as equipment and parts according to the packing list; for any damage, contact with the supplier instantly;

II Mount the unit in a 19-inch rack with screwdriver;

III Connect the interfaces

- ✓ Connect the E1 lines with RJ48or BNC
- ✓ Connect the optical lines with optical fiber cable
- ✓ Connect the user LAN to the RJ-45 connectors designated 10/100 Base-TX Ethernet
- ✓ Connect the control terminal to the rear panel CONSOLE connector with a serial cable.

IV connect the power

- ✓ Always set the power switch at OFF position first and then connect the power.
- ✓ The AC voltage is in the rang of 165V～265V ;The DC voltage is in rang of -36V to -72V. We strongly recommend you to make sure to connect the PGND connector of the device on the back panel to the earth of the telecommunication house in a reliable way. Also be careful of the connector's polarity, no reverse connection is permitted.

5. Technical Paraments

5.1 Optical Interface

- ◆ Bit rate: 150Mb/s ± 50ppm
- ◆ Wave length: 1310nm (1550nm optional)
- ◆ Fiber: Single mode
- ◆ Output power: -2 to -11dBm
- ◆ Sensitivity: Better than -36dBm
- ◆ Connecter: FC (SC is optional, and SC for ALS)
- ◆ Output power less than -49dBm when ALS enabled.

5.2 E1 Interface

- Bit rate: 2.048Mb/s,±50ppm
- Impedance: 75Ω unbalanced or 120Ω balanced
- RJ48 wire sequence: 1 and 2 are transmitting lines, 4 and 5 are receiving lines
- Coding: HDB3, according to ITU-T G.703
- Jitter: complies with ITU-T G.823 and G.742.

5.3 Ethernet Interface

- 10M/100M through auto-negotiation
- Full/Half duplex through auto-negotiation.
- Connector: RJ-45

5.4 Order Wire Interface

- Phone set: Standard 2-wire phone set
- Bandwidth: 64Kb/s
- Coding: PCM

5.5 RS232 For Management

- Bit rate: 9600b/s
- Data width: 8bits
- Stop bit: 1bit
- Parity check bit: None
- Connector: RJ45

5.6 RS232 For Customer Data Channel

- Bit rate: ≤250kb/s
- Connector: RJ45

5.7 APS

- Duration for optical line switching: <1.5ms
- Number of bit error during switching: <2.5kbits

5.8 Mechanical Dimension

- Dimension: 483mm(Width)×44mm(Height)×200mm(Depth)
- Net weight: 2.5kg

- Power consumption: 10W±10%

5.9 Operating Condition

- Temperature: 0℃to 45℃
- Humidity: 95％, No condensation