

FMUX01

F. O. M. Series

Fiber Optical E1/T1, Datacom & Ethernet Multiplexer



The **FMUX01** is a single unit (1U), 19" rack mountable, E1/T1, Datacom & Ethernet Bridge multiplexer that transmits over a single fiber optic link. The **FMUX01** features a modular design that provides a wide variety of customized user configurations. The optical fiber interface module is available in a number of standard fiber connections and with standard or optional redundant optical connections. The **FMUX01** chassis is available in five different power configurations : single AC, single DC, dual AC, dual DC or AC+DC. The AC supplies operate from 90~260VAC while DC supplies operate from 20~60VDC. From the rear of the chassis, one to four quad E1 or T1 line cards, datacom (V.35, X.21, RS-530), or Ethernet Bridge cards are supported. All line cards provide completely transparent transmission of E1, T1, datacom, or Ethernet regardless of frame mode or timeslot assignment. Optional hardware cards are also available for external clock and SNMP. The standard **FMUX01** configuration may be viewed or set via the front panel LCD/menu keys, serial VT-100 terminal connection or Telnet/SNMP with SNMP option.

Features

- Channel Capacity : 4,8,12 or 16 channels
- Auto Laser Shutdown (ALS) to prevent hazardous laser radiation to personnel
- Real Time Clock (RTC) run by backup battery to avoid time setting loss caused by power disruption.
- Configuration data can be stored into flash buffer to avoid any loss caused by power disruption.
- System performance : Less than 1 error in 10¹⁰ bits
- Modularized interface : G.703 E1 and T1
Datacom (V.35/RS-449,530/X.21)
Ethernet Bridge 10/100Base-T
- Alarm relay contacts provided which can offer major and minor alarms with audible and visible alarm output.
- TFTP remote software upgradable (for SNMP option)
- Local and Remote Loop-Back Functions.
- Redundant Fiber 1+1 Protection. (Optional)
- Management : Local side can be managed via Key pad, Terminal and Telnet ; Remote side can be managed via Inband Terminal, Telnet & optional SNMP

Specifications

E1/T1 Interface

Bit rate	(E1) 2.048Mbps +/- 50ppm (T1) 1.544Mbps +/- 50ppm
Line Code	(E1) HDB3/AMI (T1) B8ZS/AMI
Line Impedance	(E1) 120 Ohms/ 75 Ohms +/- 5% (T1) 100 Ohms +/- 5%
Jitter Performance	(E1) complies with G.823 (T1) complies with G.824
Pulse Mask	Complies with ITU-T G.703
Connector	RJ-45 or BNC (75 Ohms E1)

Ethernet Interface

Compliance:	IEEE 802.3/802.3u
Connector:	Shielded RJ-45
DataRate:	10/100Mbps; Half Duplex (20/200Mbps; Full duplex)
Filtering and Forwarding:	90,000 packets/sec
Delay:	1 frame
WAN Protocol:	HDLC

Datacom Interface

Card Type	V.35 interface RS-530 interface (Include X.21 and RS-449) RS-232 interface
Bit rate	n x 64K, n = 1 to 32 V.35 & RS-530 up to 2Mbps RS-232 up to 128Kbps (SYNC)
Line Code	NRZ
Clock Mode	Transparent, Recovery, External (From data port) Internal (From oscillator)
Control Signal	1. CTS always On or follows RTS 2. DSR constantly ON, except during test loops (RS-530 DSR always connect to DTR) 3. DCD constantly ON, except during fiber signal loss
Test Loops	Local loop back, Remote loop back, V.54
Connector Type	Uses HD-68 pin D type Female with adapter cables

Specification (Cont.)

Datacom Interface

Standard Cables
 HD-68 to four V.35 (MB34) female connector
 HD-68 to four X.21 (DB15) female connector
 HD-68 to four RS-530 (DB25) female connector
 HD-68 to four RS-232 (DB25) female connector
 HD-68 to four RS-449 (DB37) female connector

Power

(May be single/dual DC or single/dual AC in one set or one AC plus one DC in one set)

DC 20 ~ 60VDC
 AC 90 ~ 260VAC@47-63Hz
 Consumption 40VA
 MTBF Figure 65,181 hours

Craft interface

Interface RS-232C Asynchronous
 Bit rate 19200,8,N,1

SYSTEM

EMI FCC, Part 15, Sub B (Class A)
 Alarm 4 relay contacts
 Temperature 0~60°C, 32~140°F (operating)
 Humidity Up to 95% (non-condensing)
 Weight 4.5 kg (10 lb.) Net
 Dimensions 45 x 436 x 257 mm (HxWxD)
 1.75 x 17 x 10.125 inch (HxWxD)

Optical interface

Optical Specifications (redundant fiber has identical specifications as primary)

		Standard Types					WDM Types*			
Type		M-M	S-M	S-M	S-M	S-M	S-M	S-M	S-M	S-M
Distance (Km)		2	15	30	50	120	20(A)*	20(B)*	40(A)*	40(B)*
Wavelength (nm)		1310	1310	1310	1310	1550	Tx:1310	Tx:1550	Tx:1310	Tx:1550
							Rx:1550	Rx:1310	Rx:1550	Rx:1310
BER		<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰	<10 ⁻¹⁰
Sensitivity		-31dBm	-32dBm	-35dBm	-36dBm	-35dBm	-32dBm	-32dBm	-32dBm	-32dBm
Output Power		-20dBm	-20dBm	-15dBm	-8dBm	-7dBm	-18dBm	-15dBm	-10dBm	-7dBm
Power Margin		11dBm	12dBm	20dBm	28dBm	28dBm	14dBm	17dBm	22dBm	25dBm
Return Loss		-12dBm	-12dBm	-12dBm	-12dBm	-12dBm	-14dBm	-14dBm	-14dBm	-14dBm
Conn. Types	ST	v	v	v	v	v				
	SC	v	v	v	v	v	v	v	v	v
	LC	v	v	v	v	v				
	MT-RJ	v	v	v	v	v				
	FC	v	v	v	v	v				

M-M: multi-mode S-M: single-mode

* WDM types must match (A) with (B) in pairs

Ordering Information

FMUX01- XXX / XXXX / X XX XXX

Power Module Type	
AC	one AC module
DC	one DC module
AC2	two AC modules
DC2	two DC modules
AD	one AC & one DC module

Line Card I/F Type	
0	Empty slot
A	Quad E1 BNC I/F
B	Quad E1 RJ-45 I/F
C	Quad T1 RJ-45 I/F
D	Quad V.35 I/F
E	Quad RS-232 I/F
F	Quad RS-530 I/F
G	Single Port Fast Ethernet 10/100 I/F
H	Quad X-21 I/F
I	Quad RS-449 I/F

Distance Connectivity	
002:	2Km [multi-mode only]
015:	15Km
030:	30Km
050:	50Km
120:	120Km
*20A:	20Km [WDM only]
*20B:	20Km [WDM only]
*40A:	40Km [WDM only]
*40B:	40Km [WDM only]
*020A must be coupled with 020B	
*040A must be coupled with 040B	

Connector Type	
SC	SC Type
ST	ST Type
FC	FC Type
LC	LC Type
MT	MT-RJ Type

Fiber Redundant Type	
S:	Standard
R:	Redundant

Options

External Clock Option

FMUX-EXT/CLK I/F Fiber MUX optional external clock I/F

SNMP Management Option

FMUX-SNMP Fiber MUX SNMP management option

Examples

FMUX01-AC2/AABB/SSC120

FMUX01 unit with dual AC power, 8-port E1 BNC & 8-port E1 RJ-45 connectors, one single mode 120 Km, SC type connector optical interface

FMUX01-AD/ADG0/RSC2

FMUX01 unit with AC & DC power modules, 4-port E1 BNC connectors, 4-port V.35 DTE module & single port Ethernet bridge, dual multi-mode 2 Km, SC type connector optical interface for redundant use

Ordering Information for Extra Module

E1/T1 Interface Card

FMUX01-E1/BNC I/F	4 Channel 75 ohm E1 Port Card
FMUX01-E1/RJ45 I/F	4 Channel 120 ohm E1 Port Card
FMUX01-E1/BNC I/F	4 Channel 100 ohm T1 Port Card

Ethernet Interface Card

FMUX01-Ethernet I/F	Single Channel Fast Ethernet Bridge Card
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Datacom Interface Card (including cable)

FMUX01-V35 I/F	4 Channel V.35 Port Card
FMUX01-232 I/F	4 Channel RS-232 Port Card
FMUX01-X21 I/F	4 Channel X.21 Port Card
FMUX01-449 I/F	4 Channel RS-449 Port Card
FMUX01-530 I/F	4 Channel RS-530 Port Card

Optical Transceiver Interface

FMUX01- X XX XXX

Fiber Redundant Type

S: Standard
R: Redundant

Connector Type

SC SC Type
ST ST Type
FC FC Type
LC LC Type
MT MT-RJ Type

Distance Connectivity

002: 2Km [multi-mode only]
015: 15Km
030: 30Km
050: 50Km
120: 120Km
*20A: 20Km [WDM only]
*20B: 20Km [WDM only]
*40A: 40Km [WDM only]
*40B: 40Km [WDM only]
*020A must be coupled with 020B
*040A must be coupled with 040B

Example:

FMUX01-SSC002

Optical I/F SC type, Multi-Mode 2Km

FMUX01-RST050

Optical I/F ST type, Single mode, 50Km, Redundant

External Clock

FMUX01-EXT/CLK I/F

Optional external clock I/F

SNMP Management

FMUX01-SNMP I/F

SNMP management