

FMUX01A

Fiber Optical E1/T1, Datacom & Ethernet Multiplexer

Features **HOT SWAPPING REDUNDANT**
Optical modules



The **FMUX01A** is a single unit (1U), 19" rack mountable, E1/T1, Datacom & Ethernet Bridge multiplexer that transmits up to 16 channels over a single fiber optic link. The **FMUX01A** features a modular design that provides a wide variety of customized user configurations. The optical fiber interface modules are available in single mode or multi-mode fiber connections and a number of connector types. The **FMUX01A** 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 **FMUX01A** 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
- ▶ Optical modules are hot swappable even during unit operation
- ▶ 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.
- ▶ Modularized interface : G.703 E1 and T1
Datacom (V.35/RS-449,530/X.21)
Ethernet Bridge 10/100Base-T
- ▶ End to end propagation delay is less than 2 μ sec
- ▶ 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 Keypad, Terminal and Telnet ; Remote side can be managed inband via keypad, Terminal, Telnet & optional SNMP

Specifications:

E1 module specification

• Ports	4 port
• Standards	ITU-T G.703, G.704, G.706, G.732, G.823
• Framing	Unframed, CAS, CCS
• Data rate	2.048 Mbps
• Line Code	HDB3
• Receive Level	Short haul - 15dB
• Line impedance	75 ohms 120 ohms
• Connector	RJ-45 for 120 ohms BNC for 75 ohms

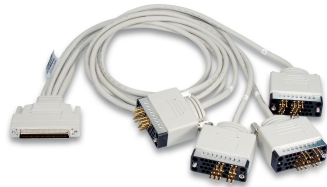
T1 module specification

• Ports	4 port
• Standards	ITU-T G.703, G.704, AT&T TR-62411, ANSI T1.403
• Framing	Unframed, D4, ESF
• Data rate	1.544 Mbps
• Line Code	B8ZS AMI
• Receive Level	Short haul - 15dB
• Line impedance	100 ohms
• Connector	RJ-45

Specifications:

Ethernet module specification

- Compliance: IEEE 802.3/802.3u
- Connector: Shielded RJ-45
- Data Rate: 10/100Mbps; Half Duplex (20/200Mbps; Full duplex)
- Filtering and Forwarding: WAN speed
- Delay: 1 frame
- WAN Protocol: HDLC



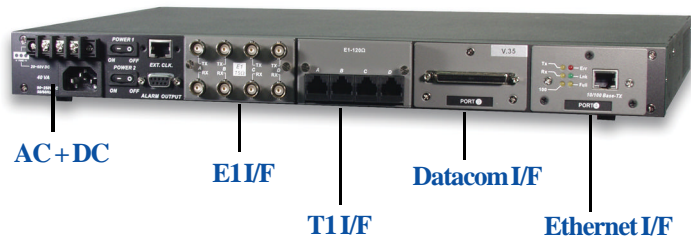
Optional Cables for other Datacom I/F

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

Datacom module specification

- 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

Rear View of FMUX01A



General Specifications:

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 50,000 hours

Craft interface

Interface : RS-232D(RJ-45) Asynchronous
Bit rate : 19200,8,N,1

SYSTEM

EMI : FCC, Part 15, Sub B (Class A)
European standard EN55022:1994/A1:1995/A2: 1997 Class A,
EN61000-3-2:1995, EN61000-3-3:1995 and EN50082-1:1997
Alarm : 4 relay contacts
Temperature : 0~60°C, 32~140°F (operating)
Humidity : Up to 95% (non-condensing)
Dimensions : 45 x 436 x 257 mm (HxWxD)
1.75 x 17 x 10.125 inch (HxWxD)
Weight : 3.58Kg
(empty chassis without any I/F & optical module)

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 Rx:1550	Tx:1550 Rx:1310	Tx:1310 Rx:1550	Tx: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:

FMUX01A-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
 (also support X.21 & RS-449 I/F)
 G Single Port Fast Ethernet 10/100 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

FMUX01A-AC2/AABB/SSC120

FMUX01A 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

FMUX01A-AD/ADG0/RSC2

FMUX01A 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

For Individual Purchasing for the Extra Module

E1/T1 Interface Card

FMUX01A-E1/BNC I/F 4 Channel 75 ohm E1 Port Card
 FMUX01A-E1/RJ45 I/F 4 Channel 120 ohm E1 Port Card
 FMUX01A-T1/RJ45 I/F 4 Channel 100 ohm T1 Port Card

Ethernet Interface Card

FMUX01A-Ethernet I/F Single Channel Fast Ethernet Bridge Card

Datacom Interface Card

FMUX01A-V35 I/F 4 Channel V.35 Port Card
 FMUX01A-232 I/F 4 Channel RS-232 Port Card
 FMUX01A-X21 I/F 4 Channel X.21 Port Card
 FMUX01A-449 I/F 4 Channel RS-449 Port Card
 FMUX01A-530 I/F 4 Channel RS-530 Port Card

Optical Transceiver Interface

FMUX01A-S / XX XXX

Fiber Module Type

S: Standard

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:

FMUX01A-S/SC002

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

FMUX01A-S/ST050

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

External Clock

FMUX-EXT/CLK I/F

Optional external clock I/F

SNMP Management

FMUX-SNMP I/F

SNMP management

GUI Management S/W

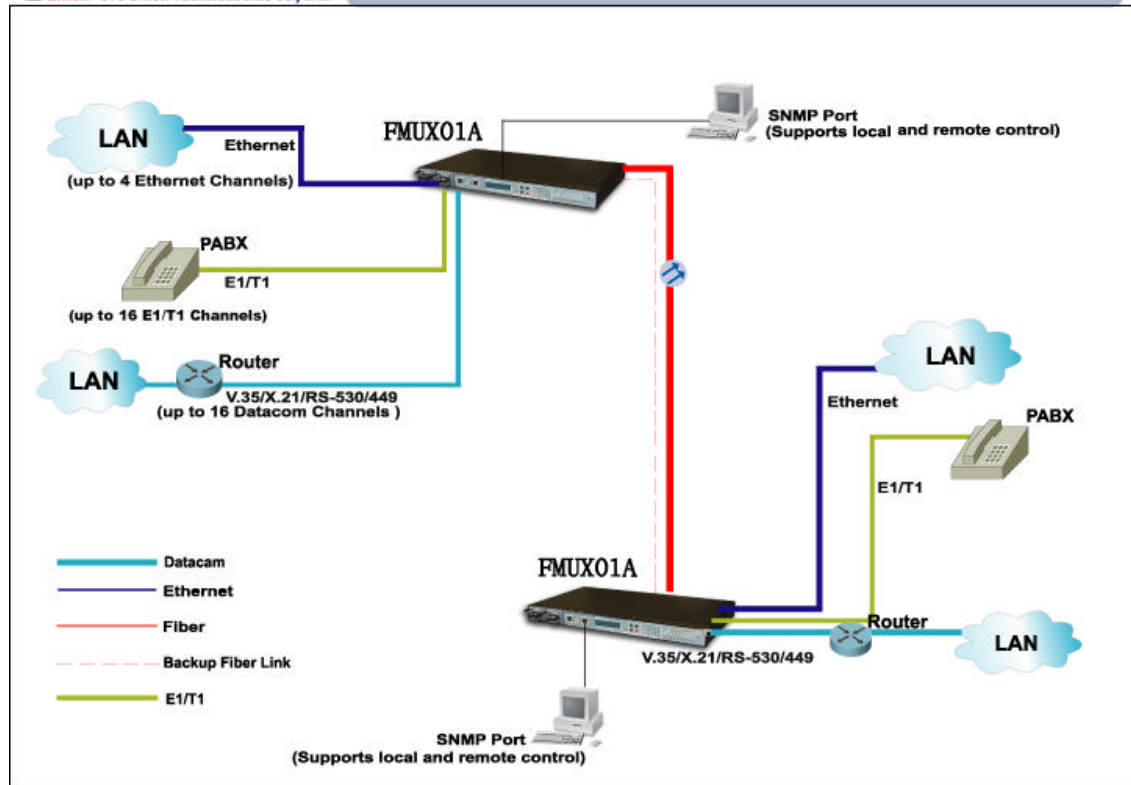
FMUX-GUI S/W

Optional MS-Windows(r) Based GUI (Graphic User Interface management software)

Application

FIBER MULTIPLEXER APPLICATION

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All specification subject to change without notice

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ISO 9001