

iConverter® Modular T1/E1 Multiplexer T1/E1 and Ethernet Managed Multiplexer System

The iConverter Modular T1/E1 Multiplexer transports up to sixteen T1/E1 circuits and 10/100/1000 Ethernet over point-to-point 1000Mbps fiber, CWDM/DWDM channel or Ethernet Virtual Connection (EVC). This flexible and scalable system is comprised of an iConverter Fiber Transport module, and one or more iConverter 4xT1/E1 MUX modules installed in a 2, 5 or 19-module chassis.

Each iConverter Fiber Transport module and up to four contiguous iConverter 4xT1/E1 MUX modules combine to form a MUX group. A MUX group connects with another MUX group at the opposite end of a dedicated fiber link or EVC. A MUX group can also interoperate with a Managed iConverter fixed-configuration T1/E1 Multiplexer.

Multiple MUX groups can be installed in a chassis, enabling high-density, star-topology deployments.

There are three Fiber Transport modules available: the iConverter TM3, the iConverter GM3 NID plug-in module and the iConverter GM4 NID plug-in module. The TM3 supports Ethernet Link OAM with IEEE 802.3ah. The GM3 and GM4 NID modules support Carrier Ethernet Service OAM with IEEE 802.1ag Connectivity Fault Management and ITU-T Y.1731 Performance Monitoring.

The Fiber Transport module is available with fixed-fiber or Small Form Pluggable (SFP) transceivers, and feature two Ethernet backplane ports for additional Ethernet connectivity to adjacent modules. A common application of this feature is to combine a 4-Port switch module in the adjacent slot to provide a solution with four additional 10/100/1000 ports.

The iConverter 4xT1/E1 MUX module supports four copper RJ-48 ports for balanced T1/E1 applications. Adapter cables are available to convert each RJ-48 interface to a BNC interface for unbalanced E1 transport applications.

The 4xT1/E1 MUX module features an optional external clock port that can be configured as a clock input or output. As an input, the port can be connected to an external clock source, such as a GPS receiver, to provide a common reference clock for the module. As an output, the port can provide the recovered T1/E1 clock from port 1 to other TDM equipment at the site.

The T1/E1 Multiplexer modules are part of the iConverter multi-service platform, and can be installed in a chassis equipped with iConverter Network Interface Devices, media converters, transponders and CWDM multiplexers. The multi-service platform is capable of delivering Ethernet, TDM, SONET and other services across a Wide Area Network. iConverter modules can be added to this scalable architecture to expand bandwidth capacity and add new services.



SFP not included

KEY FEATURES

- Modular system multiplexes up to sixteen T1/E1 circuits and 10/100/1000 Ethernet over fiber or EVC
- Multiple groups of mux modules can be installed in the same chassis
- Optional connectivity to adjacent Ethernet switch modules
- Management via local serial port, Telnet or SNMP
- SNMP management via NetOutlook® provides real-time module status, configuration and trap notification
- Commercial (0 to 50° C) and wide (-40 to 60° C) operating temperature ranges
- TAA, BAA and NDAA Compliant, and Made in the USA

iConverter Fiber Transport Modules

- Fiber Transport modules are available for point-to-point Ethernet or Carrier Ethernet Virtual Connection (EVC)
- 1000Mbps Small Form Pluggable (SFP) or fixed fiber transceivers, in standard and CWDM/DWDM wavelengths
- Multimode, single-mode dual fiber and single-mode single-fiber options.

iConverter 4xT1/E1 MUX Modules

- Supports balanced T1/E1 or unbalanced E1
- 24 hour T1/E1 statistic logging
- In-band T1 loop-back
- Out-of-band local loop-back on the copper and fiber ports, remote fiber loop-back and circuit test modes
- Configurable alarm relay contacts for audio/visual fault notification
- Easy configuration of T1/E1 line codes and line build-out
- Optional external I/O clock port

APPLICATIONS

Mobile Backhaul

In this application diagram, iConverter Modular T1/E1 Multiplexers deliver Ethernet and T1 mobile backhaul.

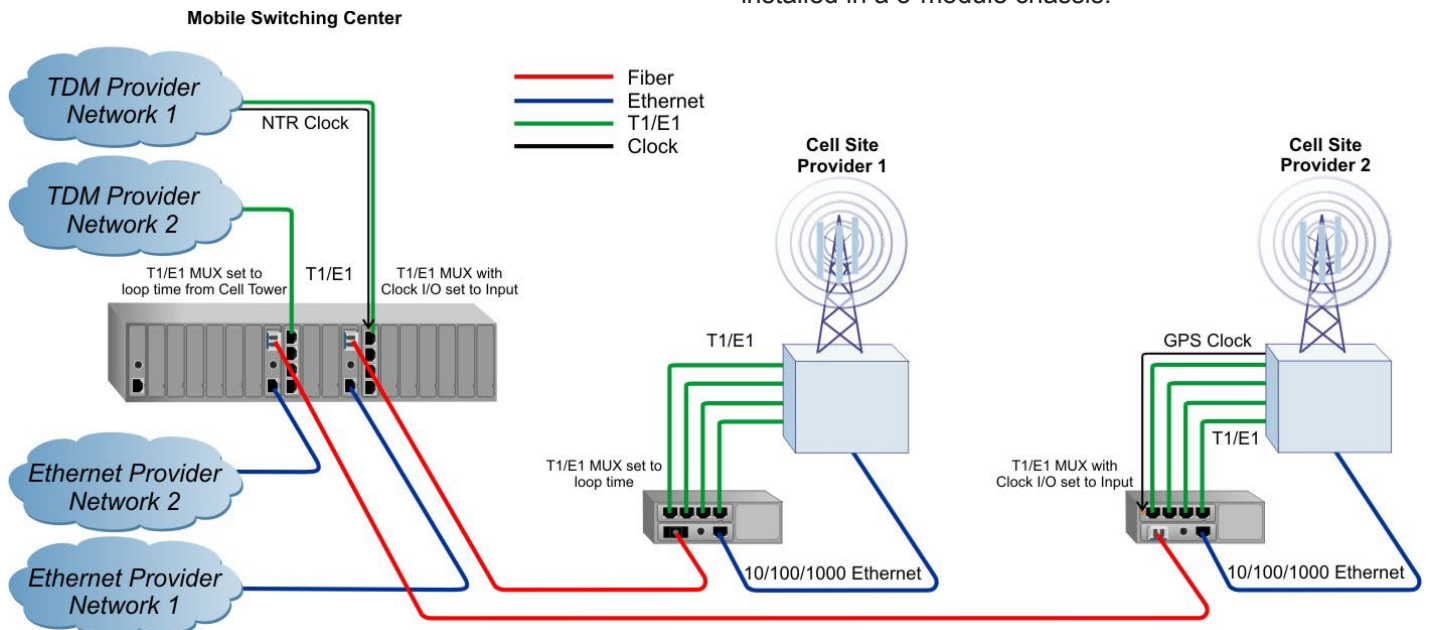
At the Mobile Switching Center, two iConverter MUX groups are installed in a high-density 19-module chassis, and connect to two different Providers. Each Provider is using a different clocking method by using the 4xT1/E1 MUX module with Clock I/O (8486-4). Provider 1 is using the NTR Clock at the Mobile Switching Center as the input clock to the MUX module and all T1/E1 circuits are synchronized to the incoming NTR clock. At the Cell Site 1, all T1/E1 circuits are loop timed. Provider 2 is using the GPS as the input clock

to the MUX module and all T1/E1 circuits are synchronized to the incoming GPS clock. At the Mobile Switching Center, all T1/E1 circuits are loop timed.

The iConverter MUX groups convert RJ-45 Ethernet and T1 interfaces to fiber, and transport the multiplexed data over the fiber links.

At the Cell Sites, MUX groups are installed in 2-module chassis. The fiber link with multiplexed data is converted back to RJ-45 Ethernet and T1 interfaces where they connect to the tower's radio equipment.

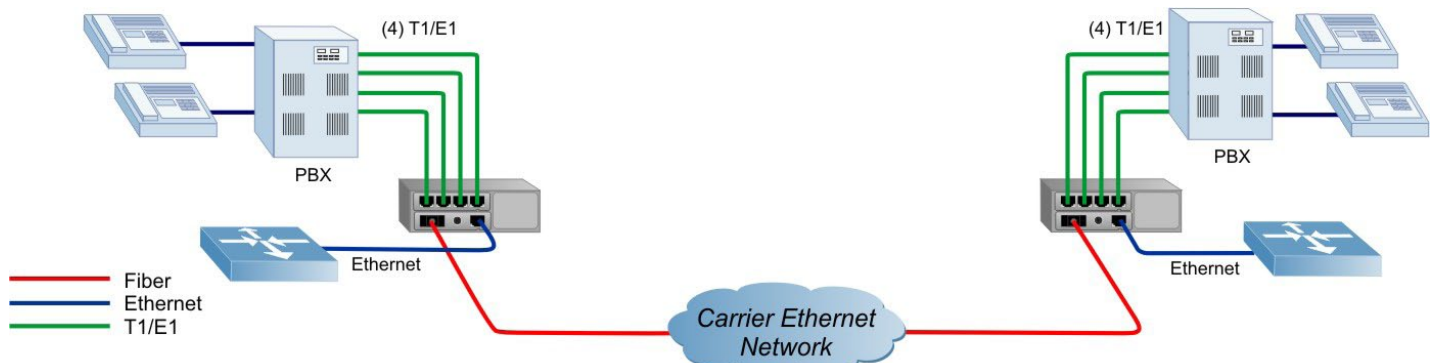
MUX groups support up to 16 T1/E1 circuits and can be installed in a 5-module chassis.



Ethernet and TDM Business Services

In this application diagram, iConverter Modular T1/E1 Multiplexers deliver Ethernet and T1s over an Ethernet Virtual Connection (EVC). A two module chassis with a GM3 or GM4 NID Transport Module and a T1/E1 MUX module are installed at each customer location.

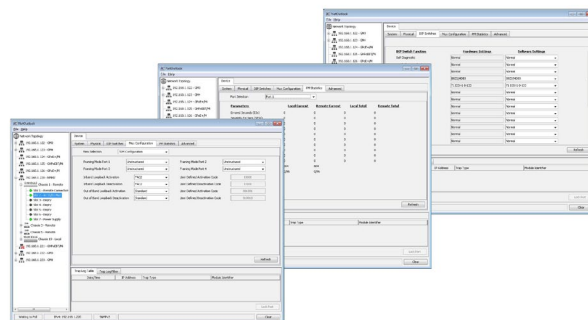
The EVC transports the business Ethernet and four T1 circuits between the two customer locations across a Carrier Ethernet network. The Ethernet transports business data, and the T1s are used for telephony services (PBX to PBX connectivity).



MANAGEMENT

The T1/E1 Multiplexer system features integrated management supporting monitoring, configuration and remote testing. The functions are accessed through the iConverter Fiber Transport module serial console port, IP-based SNMP or IP-less OAM channels. Alarm relays and SNMP traps provide fault notification for loss of power, LOS and AIS.

SNMP management via NetOutlook provides a graphical user interface for real-time port and module information.



SPECIFICATIONS

Description	<i>iConverter</i> TM3 Fiber Transport Module	
Data Rates	10/100/1000Mbps (900Mbps max)	
Standard Compliances	IEEE 802.3	
Regulatory Compliances	Safety:	UL, CE, UKCA
	EMI:	FCC Class A,
	ACT:	TAA, BAA, NDA
Environmental	RoHS, WEEE, REACH	
Management	IPv4 address, Telnet, SNMPv1/v2c/v3 In-Band via Ethernet port, Out-of-band via serial port	
Frame Size	Up to 10,236 bytes	
Port Types	Copper:	10/100/1000BASE-T (RJ-45)
	Fiber:	1000Mbps (ST, SC, Single-fiber SC, SFP)
	Serial:	RS-232 (Mini DIN-6 female) Mini DIN-6 to DB-9 adapter included
Cable Types	Copper:	EIA/TIA 568A/B, Cat 5 UTP and higher
	Fiber:	Multimode: 50/125µm, 62.5/125µm Single-mode: 9/125µm
	Serial:	RS-232, 22 to 24 AWG, 12 to 50 pF/ft
DC Power Requirements	DC Input: (Backplane)	1.6A @ 3.3.VDC
Dimensions W x D x H	0.85" x 4.5" X 2.8" (21.6 mm x 114.3 mm x 71.1 mm)	
Weight	8 oz. (226.8 grams)	
Temperature	Commercial:	0 to 50°C
	Wide:	-40 to 60°C
	Storage:	-40 to 80°C
Humidity	5 to 95% (non-condensing)	
Altitude	-100m to 4,000m	
MTBF (hrs)	340,000	
Warranty	Lifetime warranty with 24/7/365 free Technical Support	

Description	<i>iConverter</i> 4xT1/E1 MUX Module	
Data Rates	1.544Mbps (T1 or ISDN PRI) 2.048Mbps (E1)	
Standard Compliances	ANSI: T1.403, T1.102, AT&T: T62411, ITU: G.703, G.704, G.706, G.736, G.755, G.823, G.824, G.8261, ETSI: ETS 300 166,	
Regulatory Compliances	Safety:	UL, CE, UKCA
	EMI:	FCC Class A,
	ACT:	TAA, BAA, NDA
Environmental	RoHS, WEEE, REACH	
Port Types	Copper: Clock I/O: (8486-4)	T1/E1 RJ-45/RJ-48 Input: 10 MHz, 1.544 MHz, or 2.048 MHz SMB Output: Recovered clock from Port 1 SMB
Cable Types	Copper: Clock I/O:	Category 3 or better for T1/E1 T1: 100 Ohm, E1: 120 Ohm (Active Pairs are Pins 1, 2 and 4, 5) 50 ohm SMB coax
DC Power Requirements	DC Input: (Backplane)	1.6A @ 3.3VDC
Dimensions W x D x H	0.85" x 4.5" X 2.8" (21.6 mm x 114.3 mm x 71.1 mm)	
Weight	8 oz. (226.8 grams)	
Temperature	Commercial:	0 to 50°C
	Wide:	-40 to 60°C
	Storage:	-40 to 80°C
Humidity	5 to 95% (non-condensing)	
Altitude	-100m to 4,000m	
MTBF (hrs)	410,000	
Warranty	Lifetime warranty with 24/7/365 free Technical Support	

For GM3 or GM4 specifications, see the respective data sheets.

SPECIFICATIONS

iConverter Fiber Transport Modules

Feature	TM3	GM3	GM4
IPv6 Addressing			✓
TELNET, SNMP v1, v2c, v3	✓	✓	✓
SSH Secure Management			✓
ITU-T Y.1564 Service Testing			✓
RFC 2544 Throughput Testing			✓
IEEE 802.3ah	✓	✓	✓
IEEE 802.1ag and ITU-T-Y.1731		✓	✓
Tag VLAN (Q-in-Q)		✓	✓
Service Multiplexing (EVPL)		✓	✓

Feature	TM3	GM3	GM4
Rapid Spanning Tree Protocol		✓	✓
G.8031 Linear Protection			✓
G.8032 Ring Protection			✓
1588v2/SyncE			✓
Rate Limiting		✓	✓
MIB Statistics (RMON)	✓	✓	✓
L2CP Policy Manager		✓	✓
L2PT		✓	✓

ORDERING INFORMATION

Step 1: Choose the Base Part Number (xxxx-x-Tt)

iConverter TM3 Transport Module													
Port Configuration		Fiber Type	Distance	Connector Type			Tx / Rx Lambda (nm)	Min. Tx Power (dBm)	Max. Tx Power (dBm)	Min. Rx Power (dBm)	Max. Rx Power (dBm)	Min. Attenuation (dB)	Link Budget (dB)
P1	P2			ST	SC	SFP							
FF	RJ-45	MM/DF	220/550m ¹	2420-0-Tt	2422-0-Tt	-	850 / 850	-10	-4	-17	-3	-	7
FF	RJ-45	SM/DF	12km	2421-1-Tt	2423-1-Tt	-	1310 / 1310	-9.5	-3	-19.5	-3	-	10
FF	RJ-45	SM/DF	34km	2421-2-Tt	2423-2-Tt	-	1310 / 1310	-5	0	-23	-3	3	18
FF	RJ-45	SM/DF	80km	-	2423-3-Tt	-	1550 / 1550	-5	0	-23	-3	3	18
FF	RJ-45	SM/DF	110km	-	2423-4-Tt	-	1550 / 1550	0	5	-24	-3	8	24
FF	RJ-45	SM/DF	140km	-	2423-5-Tt	-	1550 / 1550	2	5	-28	-8	13	30
FF	RJ-45	SM/SF ²	20km	-	2430-1-Tt	-	1310 / 1550	-9.5	-3	-20	-3	-	10.5
FF	RJ-45	SM/SF ²	20km	-	2431-1-Tt	-	1550 / 1310	-9.5	-3	-20	-3	-	10.5
FF	RJ-45	SM/SF ²	40km	-	2430-2-Tt	-	1310 / 1550	-3	0	-20	-3	3	17
FF	RJ-45	SM/SF ²	40km	-	2431-2-Tt	-	1550 / 1310	-3	0	-20	-3	3	17
SFP	RJ-45	-	-	-	-	2439-0-Tt	-	-	-	-	-	-	-
SFP	SFP	-	-	-	-	2499-0-Tt	-	-	-	-	-	-	-

¹ 62.5/125µm, 100/140µm multimode fiber up to 220m. 50/125µm multimode fiber up to 550m.

² When using single-fiber (SF) models, the Tx wavelength on one end has to match the Rx wavelength on the other.

FF - Fixed Fiber, RJ-45 - Ethernet Port, SFP - Small Form Pluggable Transceiver

MM = Multimode, SM = Single-mode, DF = Dual Fiber, SF = Single-fiber

Contact Omnitron for other fiber options. Order the appropriate 1000Mbps SFPs separately. [Visit the Omnitron Optical Transceivers web page.](#)

Step 2: Choose an Operating Temperature Range (xxxx-x-Tt)

<leave blank> = Commercial temperature (0 to 50°C)
W = Wide temperature (-40 to 60°C)

ORDERING INFORMATION

Step 1: Choose the Base Part Number (xxxx-x-t)

iConverter 4xT1/E1 MUX Module	
Model Number	Description
8485-4t	4 Port T1/E1 MUX Plug-in Module
8486-4t	4 Port T1/E1 MUX Plug-in Module with Clock I/O

Step 2: Choose an Operating Temperature Range (xxxx-x-t)

<leave blank> = Commercial temperature (0 to 50°C)
W = Wide temperature (-40 to 60°C)

ACCESSORIES

Accessories	
Model Number	Description
9140-3	RJ-48 to dual BNC plug cable, 3 meters
9142-1	RJ-48 Alarm Breakout Cable
9144-6	Clock I/O Cable, 50 ohm mini-coax plug to BNC, 6"

See chassis and mounting options at: [iConverter Chassis and Mounting Option web page.](#)



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