Omnitron Systems

iConverter® T1/E1 User Manual

DESCRIPTION

The iConverter T1/E1 media converter provides standard T1 (1.544Mbps) or E1 (2.048Mbps) copper to fiber conversion and can be used to extend the demarcation point between service provider and networking equipment. T1/E1 media converters operate in pairs, extending distances over fiber, which improves noise immunity, quality of service, intrusion protection and network security.

The T1/E1 supports Small Form Pluggable (SFP) transceivers, enabling adaptability to different fiber types, distances and wavelengths, providing maximum flexibility across a variety of network architectures and topologies.

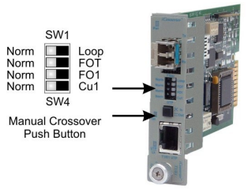
See data sheet for available models.

The T1/E1 modules can be used in an unmanaged or managed applications. To be managed, an Network Management Module (NMM2) or a module with integrated management must be installed in the same chassis.

For more information on management software and hardware options, see Comprehensive Network Management Solution product page.

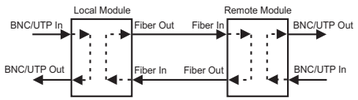
DIP-SWITCH SETTINGS

Front Panel DIP-switches



SW1 - Local Dual Loopback "Loop"

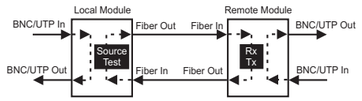
When this DIP-switch is set to the "Loop" position, it sets the module to a dual loopback mode on both the fiber and copper connections. By returning the DIP-switch to the "Norm" position, the module resumes normal operation.



Dual Loopback Mode

SW2 - Fiber Optic Test "FOT"

This DIP-switch will allow the entire fiber segment to be tested at either of the modules without having to set DIP-switches on both modules. When this DIP-switch is set to "FOT", the local module (the module with the DIP-switch in the "FOT" position) is switched into local loopback mode. In addition to the local loopback mode of operation, the fiber TX port is encoded to carry a remote loopback protocol. This remote loopback protocol sets the remote module at the other end of the fiber link to a remote loopback mode of operation and returns a signal to the local module. A slow blinking "Tst" LED on the local module and a fast blinking "Tst" LED on the remote module shows confirmation that the fiber segment is communicating properly between devices. By returning the DIP-switch to the "Norm" position, the module resumes normal operation.



Fiber Optic Test Mode

SW3 - Force 1s to Fiber "FO1"

When this DIP-switch is set to the "FO1" position, an "all ones" pattern is inserted into the data stream being transmitted out of the fiber port on the module. Data being received on the twisted pair is disabled and data being received on the fiber is passed through to the twisted pair side. By returning the DIP-switch to the "Norm" position, the module resumes normal operation.

SW4 - Force 1s to UTP "Cu1"

When this DIP-switch is set to the "Cu1" position, an "all ones" pattern is inserted into the data stream being transmitted out of the twisted pair port on the module. Data being received on the fiber will be disabled and data being received on the twisted pair is passed through to the fiber side. By returning the DIP-switch to the "Norm" position, the module resumes normal operation.

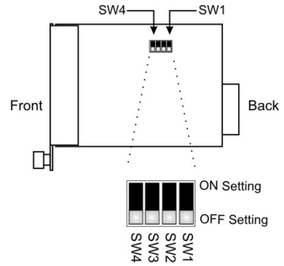
SW1 and SW2 - AMI/B8ZS/HDB3 Mode

B8ZS (T1) or HDB3 (E1) is the default line encoding mode of operation. To select AMI mode, enable both the Local Dual Loopback "Loop" and Fiber Optic Test "FOT" DIP-switches on the front of the module.

Push Button - Manual Crossover "= / X"

The Manual Crossover "= / X" button located on the front panel is used to eliminate the need for crossover and custom cables when connecting devices to the RJ-45/48 port. When the button is in the out "=" position, the port is configured for a straight-through cable. When the button is in the in "X" position, the port is configured for a crossover cable. The twisted pair connection requires two active pairs in a T1/E1 environment. The active pairs are pins 1 & 2 and pins 4 & 5. Only dedicated wire pairs should be used for the active pins.

On Board DIP-Switches



ON and OFF refer to the direction for the settings. Setting the switch to ON would set the switch towards the edge of the board. Setting the switch to OFF would set the switch towards the center of board.

T1/E1 Copper Line Configuration Settings

The T1/E1 copper line codes and line lengths are configured using board mounted DIP-switches. The default setting is all OFF.

SW5	SW6	SW7	SW8	Description
Off	Off	Off	Off	T1 DSX-1: 0' to 133' (default) T1 DS1: 0dB (default)
Off	Off	Off	On	T1 DSX-1: 133' to 266'
Off	Off	On	Off	T1 DSX-1: 266' to 399'
Off	Off	On	On	T1 DSX-1: 399' to 533'
Off	On	Off	Off	T1 DSX-1: 533' to 655'
Off	On	Off	On	T1 DS1: -7.5dB
Off	On	On	Off	T1 DS1: -15dB
Off	On	On	On	T1 DS1: -22.5dB
On	Off	Off	Off	E1 75 Ω Coax/BNC Standard
On	Off	Off	On	E1 120 Ω RJ-45/48 Standard
On	Off	On	Off	E1 75 Ω Coax/BNC Extended/LH
On	Off	On	On	E1 120 Ω RJ-45/48 Extended/LH

MOUNTING AND CABLE ATTACHMENT

The iConverter modules are hot-swappable and can be installed into any iConverter chassis.

Caution: Use proper ESD protection to reduce the risk of damage to your equipment.

1. Carefully slide the module into an open slot in the chassis. Align the module with the installation guides and ensure that the module is firmly seated against the backplane. Secure the module by fastening the front panel thumbscrew (push in and turn clockwise to tighten) to the chassis front. Verify the "Pwr" LED is ON (indicating the chassis is powered).

2. Insert the SFP fiber transceivers into the SFP receptacles on the module.

NOTE: The release latch of the SFP transceiver must be in the closed (up) position before insertion.

3. Connect to the RJ-45/48 connector on the module via a Category 3 or better cable (Category 5 is recommended), and attach the other end to the network equipment (Active Pairs are Pins 1, 2 and 4, 5).

Use the 9140-3 RJ-48 to Coax Adapter cable (3 meters sold separately) to interface with types of equipment requiring a 75 Ohm coax connector.

4. Connect an appropriate multimode or single-mode fiber cables to the fiber ports of the installed module. It is important to ensure that the transmit (TX) is attached to the receive side of the device at the other end and the receive (RX) is attached to the transmit side. Single-fiber (SF) media converter models operate in pairs. The TX wavelength must match the RX wavelength at the other end and the RX wavelength must match the TX wavelength at the other end.

SOFTWARE CONTROLLED SETTINGS

Additional settings are available via software control when a T1/E1 is installed in an iConverter chassis with a Management Module.

The following software settings can be controlled via Serial Console/Telnet Console, NetOutlook Management Software or other third-party SNMP-based clients:

- Loopback Modes
- Fiber/Copper Test Modes
- T1/E1 Line Build Out
- Line Code

Software controlled settings can be selected to override DIP-Switch settings.

For more information on using and configuring the Advanced Features, register for access to the NetOutlook Management Software user manual.

LED INDICATORS

LED	Color	Description
Pwr	Amber	**OFF:** Module is not powered **ON:** Module has power
Fiber "F/O Lk"	Green	**OFF:** No signal detected **ON:** Signal detected **Blinking:** All ones signal received
Test "Tst"	Amber	**OFF:** Test mode disabled **ON:** Loop or All Ones Test Mode **Slow Blinking:** FOT received - Local **Fast Blinking:** FOT received - remote
RJ-45/48 "UTP Lk"	Green	**OFF:** No signal detected **ON:** Signal detected **Blinking:** All ones signal received

SPECIFICATIONS

UTP Cable for T1 and E1	
Gauge	22 to 24 AWG
Impedance	T1: 100 ohms +/- 10% E1: 120 ohms +/- 10% 2.6 dB / 100M @ 1MHz
Maximum Distance	T1: 6,000 ft E1: 8,000 ft

Standard	ANSI: T1.403, T1.102 AT&T: T62411 ITU: G.703, G.704, G.706, G.736, G.755, G.823 ETSI: ETS 300 166	
Regulatory	Safety: EMI: ACT:	UL, CE, NEBS Level 3, UKCA FCC Class A TAA, BAA, NDAA
Environmental	RoHS, WEEE, REACH	
Data Rates	T1 ISDN PRI: E1:	1.544Mbps 1.544Mbps 2.048Mbps
Port Types	Copper: Fiber:	RJ-48C (T1/E1) ST, SC or SFP (depending on model)
Cable Types	Copper: Fiber:	Category 3 or better Balanced twisted pair copper T1: 100 Ohm cable termination Multimode: 50/125µm, 62.5/125µm Single-mode: 9/125µm
DC Power Requirements	DC Input: (Backplane)	3.3VDC, 0.7A @ 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	8.0 oz. (226.8 grams)	
Temperature	Commercial: Wide: Storage:	0 to 50°C -40 to 60°C -40 to 80°C
Humidity	5 to 95% (non-condensing)	
Altitude	-100m to 4,000m	
MTBF (hrs)	580,000	
Warranty	Lifetime warranty with 24/7/365 free Technical Support	

Warranty

This product is warranted to the original purchaser (Buyer) against defects in material and workmanship for a period of two (2) years from the date of shipment. A lifetime warranty may be obtained by the original purchaser by registering this product at www.omnitron-systems.com/support within ninety (90) days from the date of shipment. During the warranty period, Omnitron will, at its option, repair or replace a product which is proven to be defective with the same product or with a product with at least the same functionality.

For warranty service, the product must be sent to an Omnitron designated facility, at Buyer's expense. Omnitron will pay the shipping charge to return the product to Buyer's designated US address using Omnitron's standard shipping method.

Limitation of Warranty

The foregoing warranty shall not apply to product malfunctions resulting from improper or inadequate use and/or maintenance of the equipment by Buyer, Buyer-supplied equipment, Buyer-supplied interfacing, unauthorized modifications or tampering with equipment (including removal of equipment cover by personnel not specifically authorized and certified by Omnitron), or misuse, or operating outside the environmental specification of the product (including but not limited to voltage, ambient temperature, radiation, unusual dust, etc.), or improper site preparation or maintenance.

No other warranty is expressed or implied. Omnitron specifically disclaims the implied warranties of merchantability and fitness for any particular purpose.

The remedies provided herein are the Buyer's sole and exclusive remedies. Omnitron shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

Environmental Notices

The equipment covered by this manual must be disposed of or recycled in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE Directive) of the European Community directive 2012/19/EU on waste electrical and electronic equipment (WEEE) which, together with the RoHS Directive 2015/863/EU, for electrical and electronic equipment sold in the EU after July 2019. Such disposal must follow national legislation for IT and Telecommunication equipment in accordance with the WEEE directive: (a) Do not dispose waste equipment with unsorted municipal and household waste. (b) Collect equipment waste separately. (c) Return equipment using collection method agreed with Omnitron.

The equipment is marked with the WEEE symbol shown to indicate that it must be collected separately from other types of waste. In case of small items the symbol may be printed only on the packaging or in the user manual. If you have questions regarding the correct disposal of equipment go to www.omniton-systems.com/support or e-mail to Omnitron at intlinfo@omnitron-systems.com.

Safety Warnings and Cautions

ATTENTION: Observe precautions for handling electrostatic discharge sensitive devices.

WARNING: Potential damage to equipment and personal injury.

WARNING: Risk of electrical shock.

Customer Support Information

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040-08700-002F 10/23