Omnitron Systems Technology, Inc.

iConverter® *10/100M*

10/100Tx UTP to 100Fx Fiber Media Converter
Self-Managed Network Interface Device (NID)

FEATURES

- 10/100Base-Tx UTP to 100Base-Fx Fiber Self-Managed Converter with 1536 bytes maximum frame size
- Supports multimode, single-mode and single-fiber with ST, SC, LC and MT-RJ connector options
- Supports the IEEE 802.1Q VLAN (including Q-in-Q multi-tagging) and the IEEE 802.1p QoS standards
- Supports Bandwidth Control, Access Control and port MIB Statistics
- Manageable over IP using SNMP and Telnet, or via the serial console port locally or remotely with a modem
- Management provides remote monitoring, configuration and trap notification
- Supports commercial (0 to 50°C) and wide (-40 to +60°C) temperature ranges
- Features user-selectable link fault detection modes for quick fault detection and isolation
- Available as a plug-in module or standalone models (wall-mountable or tabletop with optional DIN-Rail mount)
- Plug-in module can operate as a chassis management master or as a regular 10/100 slave module
- Lifetime warranty with 24x7 technical support

DESCRIPTION

Overview

The *iConverter* 10/100M Network Interface Device (NID) media converter provides 10Base-T or 100Base-Tx (10/100) unshielded twisted pair (UTP) to 100Base-Fx fiber conversion with integrated management.

Specifically designed as a Network Interface Device for Fiber-to-the-X (FTTx) metropolitan broadband over fiber as well as enterprise and industrial network applications, the *iConverter* 10/100M supports a commercial temperature range of 0 to +50 degrees C or a wide hardened temperature range of -40 to +60 degrees C.

The 10/100M's internal design features a 5-port architecture. The five ports consist of one front-plane 10/100 UTP port, one front-plane 100Mbps fiber port, two backplane 10/100 ports and a fifth internal management port that connects to the internal built-in management processor. When the 10/100M is mounted in a multi-module *iConverter* chassis (such as a 19, 5 or 2-Module chassis), the backplane ports can be enabled to connect to adjacent modules in the chassis. The internal management port enables in-band management operation.

The 10/100M is available as a plug-in module or a standalone fixed-configuration unit.

When used as a plug-in module, the 10/100M is hot-swappable and can be mounted in a 19-Module (2U, 3.5 inch high) or a 5-Module (1U, 1.75 inch high) rack mountable chassis (19-inch

or 23-inch) with any combination of redundant AC and DC power supplies. It can also be mounted in a 2-Module AC or DC powered chassis or in a 1-Module AC powered chassis.

When used as a fixed-configuration standalone unit, the 10/100M is available as a tabletop or as a wall-mountable unit. The tabletop model can be DIN-Rail mounted using an optional DIN-Rail mounting kit. Both the tabletop and the wall-mountable models are DC powered and are available with an external AC/DC power adapter or with a field wireable terminal connector for user provided DC power.

Fiber Port

10/100M models are available with multimode (MM) dual-fiber, single-mode (SM) dual-fiber and single-mode single-fiber (SF) options. They support ST, SC, LC and MT-RJ connectors with distances up to 5km over MM fiber, 120km over SM fiber and 40km over SF.

When using multimode and single-mode dual-fiber models with distances of up to 60km, the 10/100M uses the IEEE 802.3 standard 1310nm fiber wavelength technology. For single-mode dual-fiber with a distance of 120km, the 10/100M uses 1550nm fiber technology.

When using single-mode single-fiber models, the 10/100M uses Wavelength Division Multiplexing (WDM) with 1310nm(Tx)/1550nm(Rx) and 1550nm(Tx)/1310nm(Rx) technology. The SF converters must be used in pairs where the transmit (Tx) wavelength of one converter matches the receive (Rx) wavelength of the other.

10/100 UTP Ethernet Port

The UTP port supports speed (10/100) and duplex (half/full) auto-negotiation, enabling it to automatically sense and match the speed and duplex mode of a connected device. Hardware DIP-switches are provided to force the speed or half/full duplex to a user-required mode.

The UTP port supports an automatic crossover feature. This feature enables the 10/100M UTP port to connect to switches or workstations without the need of a crossover cable.

Link Modes

The 10/100M features multiple, user-selectable link fault detection modes for quick fault detection and isolation. These modes operate independently of the network management and monitor the state of the cabling hardware:

Link-Segmentation (LS) - The normal and default mode where the UTP and fiber ports establish their links to other connected devices independently of each other.

Link-Propagation (LP) - In this mode (sometimes called "Link-Loss-Carry-Forward"), link-out from the UTP port is generated only when a link-in to the fiber port is present, and a link-out from the fiber port is generated only when a link-in to the UTP port is present. When in LP mode, a cable or link fault is propagated in a "domino" fashion to the core or edge switch equipment to which the 10/100M is connected.

Remote-Fault-Detection (RFD) - In this mode link faults are propagated from the fiber to the UTP port and also "Looped-Back" to the fiber port. This mode provides rapid reporting of any cable faults to the network core.

Symmetrical-Fault-Detection (SFD) - This mode is similar to the RFD mode and provides a "Loop-Back" of a fiber link fault. When connecting two SFD configured converters "back-to-back", this mode facilitates fiber fault notification to both ends of the network.

TagVLAN, PortVLAN and QoS

The *iConverter* 10/100M supports the IEEE 802.1Q TagVLAN packet tagging and un-tagging (including Q-in-Q multi-tagging) and the 802.1p priority standards.

The TagVLAN technology enables the service provider to support tagged or untagged customer traffic thus eliminating the constraint on the customer's data type and enabling customers to "tunnel" their enterprise VLAN networks transparently through the service provider's network. Up to 64 unique VLAN tags can be assigned.

This 10/100M VLAN technology enables service providers to offer their customers secure Ethernet Virtual Private Line LAN "tunnels" which are isolated from other customer's data as well as from the service provider's management traffic. This provides customer data privacy as well as intrusion protection to the service provider.

The 10/100M also features PortVLAN which enables the service provider to specify and restrict traffic flow between the module's fiber, UTP, backplane and management ports thereby providing security and intrusion protection.

The 802.1p prioritization standard enables delivery of Quality of Service (QoS) to high-priority real-time applications such as voice or video over Ethernet.

Bandwidth and Port Access Control

The 10/100M supports Bandwidth and Port Access Control.

Bandwidth Control enables the service provider to selectively deliver eight different levels of bandwidth between the fiber and UTP ports, thereby limiting the bandwidth allocated to the end user. Different levels of data bandwidth can be selected for the upstream and downstream traffic for each port, thereby enabling the service provider to optimize the network's available bandwidth resources and to provide services that meet the user's term of service.

The 10/100M features Port Access Control for the front-panel ports. The Port Access Control enables the service provider to easily control user access while maintaining port configuration for easy disabling or enabling of service.

Port Statistics

The 10/100M supports reporting of port statistics. Statistics are available for 32 different variables for the fiber and UTP ports enabling performance and operational monitoring.

MANAGEMENT SYSTEM

Overview

The *iConverter* 10/100M includes a built-in management processor that enables it to be managed over IP networks using SNMP and Telnet clients. The 10/100M can also be managed locally via a serial console port, which can be remotely accessed when connected to a modem.

When using SNMP, the 10/100M can be managed using Omnitron's *NetOutlook*™ graphic interface network management software, or any other third-party SNMP software. When managed using Telnet or via the serial console port, the 10/100M provides an easy to use menu-driven user interface.

When used as a plug-in module, the 10/100M can be configured to operate as a Chassis Master module or as a Chassis Slave module.

When used as a Chassis Master module, the 10/100M monitors and controls other modules in the chassis.

When used as a Chassis Slave module, the 10/100M behaves as a simple managed module that cannot monitor and control other modules in the chassis. If a Chassis Master is present in the same chassis, the Chassis Master controls the 10/100M slave module.

When multiple 10/100M modules configured as Chassis Master are in the same chassis, or when other Network Management Modules (NMM) are present, they provide "hot standby" management redundancy.

Access to the 10/100M is protected via password authentication. Different passwords can be selected for access via SNMP, Telnet or the serial console port.

To keep current with new standards and to provide new features, software updates and upgrades can be loaded to the 10/100M via FTP or the serial console port.

The 10/100M management system offers status monitoring, remote configuration and trap notification.

Management Features - Monitoring

The parameters that can be monitored include LED status, link and data activity status, modes of operation, DIP-switch configuration and current configuration including TagVLAN, PortVLAN, Port Access and QoS.

MIB Statistics for each port can be monitored and 32 parameters are available for each monitored port.

Also monitored are module specific parameters such as serial number, model number, description, hardware and software revision levels.

Management Features - Configuration

Remote configuration allows overriding of hardware DIP-switch settings and assignment of parameters that can be configured only via software. Some of these include TagVLAN, PortVLAN, Bandwidth Control, Access Control and QoS.

A unique user-definable identifier text field is available for each module. This field can be used to maintain any user-defined information. Typical applications for this field include a module's physical location, connect-to-address information, customer name, address, contact person and inventory control number. This identifier field can be displayed whenever a module's status or traps are displayed.

Software-assigned configuration is saved in the 10/100M's flash memory and can be reloaded into the module upon power-up. When the "Soft-switch Reload" option is enabled, the configurations of the 10/100M and other *iConverters* managed by the 10/100M are restored to their last powered state. If the "Soft-switch Reload" option is disabled, the configurations of the converters are reset to their hardware DIP-switch configured state.

Management Features - Trap Notification

When operating as a Chassis Master plug-in module or when operating as a standalone unit, the 10/100M can send SNMP trap notifications upon the occurrence of different events. The trap notifications can be sent to eight different user-specified Trap-host servers.

Some of the events that are monitored and cause trap notification include module insertion and removal, port link-up and link-down, module hardware or software configuration changes, power failure and temperature range violation conditions.

Power and power supply failures are reported via traps according to the following criterion. When using a 19-Module or 5-Module chassis equipped with redundant power supplies, the management software reports any single power supply failure. When using a 2-Module chassis with "Dying Gasp" support or as any standalone chassis, the 10/100M sends a Dying Gasp Trap (sometimes referred to as "Power Loss Trap") which reports its loss of power.

To increase security and warn about potential intrusion, the 10/100M sends a trap whenever a Telnet or FTP session starts or ends.

The 10/100M can be configured to send a periodically scheduled *KeepAlive*™ trap which notifies the network administrator that the 10/100M is alive and connected to the network. The time interval between the *KeepAlive* traps is user selectable.

The 10/100M logs any reported traps in its internal flash memory. This log of up to 1024 most recent traps can be downloaded via FTP.

Management System - Summary

The 10/100M can be managed in-band using SNMP and Telnet, or managed via the serial console port. These flexible management options make the 10/100M the ideal solution for edge and customer premises applications.

Its ability to remotely report status, facilitate remote configuration and report different conditions via traps, makes the 10/100M easy to use and cost effective to operate for enterprise users and service providers.

10/100M CONVERTER SPECIFICATIONS

	Module	Tabletop	Wallmountable
			
Description	10/100 UTP to 100 Fiber Converter with integrated management		
Protocols	10Base-T, 100Base-Tx,100Base-Fx with 1536 bytes max. frame size		
Cable Types			
UTP	EIA/TIA 568A/B, Category 5 and higher		
Fiber	Multimode: 50/125, 62.5/125, 100/140 um, Single-mode: 9/125 um		
Serial	RS-232, 22 to 24 AWG, 12 to 50 pF/ft.		
Connector Types			
UTP	RJ45		
Fiber	Dual fiber: SC, ST, LC, MT-RJ Single fiber: SC		
Serial	Mini DIN-6 female, mini DIN-6 male to DB-9 female adapter included		
Controls			
DIP-Switches	LS/LP, RFD, SFD, AN/MAN, 10/100, HD/FD, Master/Slave, BPA-EN, BPB-EN, SNMP-EN, Soft Reload	LS/LP, RFD, SFD, AN/MAN, 10/100, HD/FD	
Other	-	Disable External DIP-Switches option	
Display	Pwr, PS[1-3], FO-Lk/Act, UTP-Lk/Act, UTP-10/100, BP-Lk, HD/FD	Pwr, FO-Lk/Act, UTP-Lk/Act, UTP-10/100, HD/FD	
Power Requirements			
DC Power	3.3VDC/0.9Amp	8-16VDC/0.7Amp 5-16VDC/0.7Amp*	
DC Power Connector	Power supplied by backplane	2.5mm Barrel Connector or Field-wireable Terminal Connector	
AC Power Adapter [US]	N/A	100-120VAC/60Hz/60ma	
AC Power Adapter [International]	N/A	100-240VAC/50-60Hz/60ma	
Dimensions	W:4.6"xD:3.3"xH:0.85"	W:4.7"xD:3.5"xH:1.0"	W:4.7"xD:3.8"xH:1.0"
Weight			
without power adapter	8 oz.	1 lb.	
with power adapter	N/A	1.5 lb.	
Compliance	UL, CE, FCC Class B		
Temperature			
Operational - Commercial	0 to +50°C		
Operational - Wide Range	-40 to +60°C		
Storage	-40 to +80°C		
Humidity (non-condensing)	0-90%		
Altitude	0-10,000ft.		
MTBF [hrs]			
without power adapter	850,000		
with power adapter	N/A	250,000	
MTTR	5 min.		

* Note: Operation below 8VDC results in degraded functionality of the "Power Loss Trap".

ORDERING INFORMATION

The model number of the 10/100M follows the following format:

M N 8 9 x x - x

The "89xx-x" represents the base model of the 10/100M converter including the fiber type, connector and distance.

The prefix "M" letter represents the temperature range of the converter.

The prefix "N" letter represents the unit type (module, tabletop, wall-mount etc.), power connector type and power source type (US Power Adapter, International Power Adapter or no Adapter included).

To Select a product follow the following FOUR (4) steps:

Step 1. Select the **base model (the 89xx-x part)** from the following table based on the required fiber type, fiber connector type and fiber distance.

Fiber Type / Dual Fiber [DF] or Single-Fiber [SF]	Distance	Connector Types				Tx Lambda [nm]	Rx Lambda [nm]	Min. Tx Power [dBm]	Max. Tx Power [dBm]	Min. Rx Sense [dBm]	Max. Rx Power [dBm]	Link Budget
		ST	SC	MT-RJ	LC							
MM/DF	5km	8900-0	8902-0	8904-0	-	1310	1310	-24	-14	-31	-14	7
SM/DF	30km	8901-1	8903-1	8905-1	8907-1	1310	1310	-15	-5	-31	-5	16
SM/DF	60km	8901-2	8903-2	-	8907-2	1310	1310	-5	0	-31	-3*	26
SM/DF	120km	-	8903-3	-	8907-3	1550	1550	-5	0	-31	-3*	26
SM/SF	20km	-	8910-1	-	-	1310	1550	-15	-5	-30	-3	15
SM/SF	40km	-	8910-2	-	-	1310	1550	-8	0	-30	-3*	22
SM/SF	20km	-	8911-1	-	-	1550	1310	-15	-5	-30	-3	15
SM/SF	40km	-	8911-2	-	-	1550	1310	-8	0	-30	-3*	22
* Note: When using these models in pairs, a minimum attenuation of 3db is required												

Step 2. Select the **"M" letter prefix** from the following table based on the required temperature range. Note that when selecting the commercial temperature range, the "M" prefix remains "blank" and no letter is used.

Prefix "M" Letter	Temperature Range	Range
blank	Commercial	0 to +50°C
W	Wide Range	-40 to +60°C

Step 3. Select the **"N" letter prefix** from the following table based on the desired unit type (plug-in module, tabletop, wall-mountable), the desired power connector type (barrel connector, field-wireable terminal connector) and the AC power adapter type.

Notes: (a) When selecting a plug-in module, the "N" prefix remains "blank".

(b) No AC/DC power adapter is provided with plug-in module models, or with any tabletop and wall-mountable models equipped with the terminal connector power option.

ORDERING INFORMATION (Continued)

	Plug-in Module	Tabletop		Wall-Mountable	
					
Power Adapter Type		Barrel Connector 	Terminal Connector 	Barrel Connector 	Terminal Connector 
None, power is supplied by the *iConverter* chassis	blank	-	-	-	-
US 110VAC / 60Hz	-	A	-	D	-
International 100-240VAC / 50-60Hz	-	B	-	E	-
DC Power (8-16VDC) (must be provided by user)	-	-	C	-	F

Examples:

(a) 8901-1 — 10/100M Plug-in module, ST/SM/1310nm/30km

(b) A8903-1 — 10/100M Tabletop, SC/SM/1310nm/30km, with barrel-type power connector, and US 110VAC Power Adapter

(c) WF8910-1 — 10/100M Wall-mountable, Wide temperature, SC/SM/SF/1310nm-1550nm/20km, with terminal power connector, no Power Adapter included.

Step 4. Select a chassis or other accessories from the following table.

Configuration	19-Module		5-Module		2-Module		1-Module		Tabletop
	AC	DC	AC	DC	AC	DC	US	Universal	
One [1] Power Supply	8200-1	8205-1	8220-1	8225-1	8230-0	8235-0	8240-1	8240-2	-
One [1] Power Supply w/ Dying Gasp Support	-	-	-	-	8230-1	8230-1	-	-	-
Two [2] Power Supplies	8200-2	8205-2	8220-2	8225-2	-	-	-	-	-
Three [3] Power Supplies	8200-3	8205-3	-	-	-	-	-	-	-
Spare Power Supply	8200-9	8205-9	8220-9	8225-9	-	-	-	-	-
23" Rack Mounting Kit	8091-2	8091-2	8092-2	8092-2	-	-	-	-	-
Blank Module Panel	8090-0	8090-0	8090-0	8090-0	8090-0	8090-0	-	-	-
Wall-Mounting Hardware Kit	-	-	-	-	8249-0	8249-0	8249-0	8249-0	-
DIN-Rail Mounting Kit	-	-	-	-	-	-	8250-0	8250-0	8250-0

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