MILAN BY
TRANSITION
NETWORKS ®

Raven Series Standalone
Media Converters

MIL-RC3112 - 10/100BASE-TX / 100BASE-FX ST MMF
MIL-RC3113 - 10/100BASE-TX / 100BASE-FX SC MMF
MIL-RC3113-XX - 10/100BASE-TX / 100BASE-FX SC SMF
MIL-RC31W13 - 10/100BASE-TX / 100BASE-FX SC SMF TX 1310nm WDM
MIL-RC31W15 - 10/100BASE-TX / 100BASE-FX SC SMF TX 1550nm WDM

USER GUIDE

Regulatory Approval

- FCC Class A
- UL 1950
- CSA C22.2 No. 950
- EN60950
- CE
- EN55022 Class A
- EN55024

Canadian EMI Notice

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe A respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

European Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community Compliance with these directives imply conformity to the following European Norms:

- EN55022 (CISPR 22) - Radio Frequency Interference
- EN61000-X - Electromagnetic Immunity
- EN60950 (IEC950) - Product Safety

Trademarks

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To Contact Transition Networks

For prompt response when calling for service information, have the following information ready:
- Product serial number and revision
- Date of purchase
- Vendor or place of purchase

You can reach Transition Networks technical support at:
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Telephone: +1.800.526.9267
Fax: : +1.952.941.2322

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info@ Transition.com

FCC Warning

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

■ Reorient or relocate the receiving antenna.

■ Increase the separation between the equipment and receiver.

■ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

■ Consult the dealer or an experienced radio/TV technician for help.

CE Mark Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case
the user may be required to take adequate measures.

Table of Contents

1. Introduction

The Raven Series Fast Fiber Advanced Media & Rate Converters are standalone units that can be used alone or in a 10-slot rackmount chassis to connect networks with 10/100Base-TX and 100Base-FX cabling.

These advanced media & rate converters extend the cabling distance of 100Base-FX network up to 2 kilometers for multi-mode fiber or 30 kilometers for single mode fiber.

Figure 1-1. The Raven Series Fast Fiber Media Converter Module

Each converter is available with one SC, ST, multi-mode fiber connector or SC single-mode fiber connector, plus one Ethernet RJ-45 port (Auto MDI/MDIX) for your 100Base-TX copper cable connection. DIP-switches allow for setting the operation mode for UTP, Fiber and link loss forwarding function.

The WDM Converter converts signals between 10/100Base-TX and 100Base-FX cabling, and incorporates WDM technology that allows a grouping of different services on existing optical fibers inside. The WDM technology makes transmit (TX) and receive (RX) lines onto a

single fiber, which reduces half of the cabling cost.

WDM converters must be installed in pairs with one 1310nm wavelength converter at one end of the single fiber cable and one 1550nm wavelength converter at the other end. The fiber cabling can extend the connectivity distance up to 20 kilometers.

Features

Fast Fiber Converter Modules

- Comply with IEEE 802.3, 802.3u, and 802.3x standards.
- Convert between UTP cabling and Fiber-optic cabling.
- One RJ-45 connector, Auto-MDI/MDIX for UTP port.
- Support 10/100 Mbps Auto-negotiation for UTP port.
- Fiber cabling connectivity up to 30Km.
- Uses store-and-forward switching to separate two collision domains.
- One fiber connector (SC/ SC single-mode fiber/ST/ MT-RJ/VF-45) for 100Base-FX.
- 4DIP-switches to set the operation mode and Link-
- Loss-Forwarding function.
- LEDs for ach port: 100, Link, Activity, Full, Collision.
- LEDs for each unit: Power.
- External DC power adapter 9V/0.7A.
- Two types of module: Stand-alone and mounted in converter chassis.
- FCC Class A, CE, UL, and CUL Mark certification.

WDM Converter Modules

- Comply with IEEE 802.3, 802.3u, and 802.3x standards.
- Convert between UTP cabling and Fiber-optic cabling.
- WDM (Wavelength Division Multiplexing) supports single fiber converter, transporting Bi-direction full-duplex signal over a
- single fiber simultaneously.
- One RJ-45 connector, Auto-MDI/MDIX for UTP port.
- Support 10/100 Mbps Auto-negotiation for UTP port.
- One Single-SC Style Single-Mode Connector for 100 Base- FX fiber cable.

- Fiber cabling connectivity up to 60Km.
- Uses store-and-forward switching to separate two collision domains.
- 4DIP-switches to set the operation mode and Link-
- Loss-Forwarding function.
- LEDs for each port: 100, Link/Activity, Full/Collision
- LEDs for each unit: Power.
- External DC power adapter 9V/0.7A.
- FCC Class A, CE, UL, and CUL Mark certification

Package Contents

Unpack the contents of the package and verify them against the appropriate checklist below.

- Fast Fiber Converter
- AC-DC Power Supply
- Users Guide
- Rackmount Kit

If any item is missing or damaged, please contact your local dealer for service.

2.
Hardware Description

Front Panel

The Front Panel of the **WDM Converter** consists of one Single SC style single-mode connector, one RJ-45 Port (Auto MDI/MDIX), and 6 LED Indicators (UTP 100, LK/ACT, FDX/COL, Fiber LK/ACT, FDX/COL, and PWR).
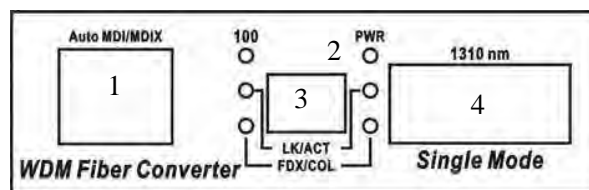
Figure 2-1. Front Panel for Raven Series Fast Fiber WDM Converters

The Front Panel of the **Fast Fiber Converter** consists of one RJ-45 Port (Auto MDI/MDIX), 6 LED Indicators (UTP 100, LK/ACT, FDX, Fiber LK/ACT, FDX and PWR) and one fiber 100Base-FX Port.
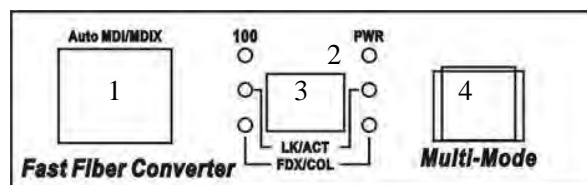
Figure 2-2. Front Panel for Raven Series Fast Fiber Converters

Ports

- **RJ-45 Port (Auto MDI/MDIX):** The Ethernet RJ-45 will auto-sense for 10Base-T or 100Base-TX connections. Auto MDI/MDIX means that you can connect to another Switch or workstation without changing non-crossover or crossover cabling.
- **Fast Fiber Port:** The Fast Fiber port is for 100 Base-FX connections. SC multi-mode, SC single mode, ST, MT-RJ, and VF-45 connections are available.

LED Indicators

There are 6 diagnostic LEDs located on the front panel of WDM Converter. They provide real-time information of system and optional status. The indicator includes Power, UTP 100, LK/ACT, FDX/COL, Fiber LK/ACT; FDX/COL. The following table provides description of the LED status and their meanings.

LED	Status	Meaning
PWR	Green	Power on
100	Green	100Mbps UTP Speed
	OFF	10 Mbps UTP Speed
LK/ACT (UTP)	Green	The unit is linking with it's link partner.
	Blinks	The unit is transmitting or receiving packets from UTP devices.
	Off	No device attached
LK/ACT (Fiber)	Green	The unit is linking with it's link partner.
	Blinks	The unit is transmitting or receiving packets from FX devices.
	Off	No device attached
FDX/COL (UTP)	Orange	The UTP port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached
FDX/COL (Fiber)	Orange	The fiber port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached

Table 2-1. Fast Fiber Converter LED-indicator statuses and meaning

DIP-Switches

The DIP-switches are used to configure operation mode for LLF (**Link Loss Forwarding**) and operation mode for the UTP and Fiber ports.
The default value of each DIP-switch is **OFF**.

S/W No	Status	Description
1	ON	UTP 100Mbps Full Duplex mode
1	OFF	UTP Auto-Negotiation
2	ON	Fiber in Half Duplex
2	OFF	Fiber in Full Duplex
3	ON	Bi-Directional LinkSentry Enable
3	OFF	LLF Disable
4	ON	Pure converter mode
4	OFF	Switch Converter mode

Table 2-2. Fast Fiber Converter DIP-Switch statuses and meaning

Link Loss Forwarding (LLF): Enabling LLF allows UTP link failures to be reported to the fiber side or Fiber link failures to be reported to the UTP side.

Pure Converter mode (DIP-Switch 4): When pure converter mode is enabling (on), it operates with the minimum latency. The transmission flow does not wait until entire frame is ready, but instead it forwards the received data immediately after the data being received. And TP port should be forced at 100M in this application. When DIP-Switch is in Switch Converter mode (off), the converter function is same as Switch Hub.

Note: Data errors may occur if DIP-Switch settings are changed while the UTP or Fiber ports are transmitting or receiving data.

Rear Panel

The rear panel of the converter contains a power socket. This power socket accepts DC9V voltage and minimum 0.7A supplied current.

Figure 2-3. Rear Panel for Raven Series Fast Fiber Converters

3. Installation

Converter Module

A. Remove the blank bracket by rotating thumbscrew counterclockwise. Do not discard the blank bracket.

B. Open the rackmount ear kit. Each kit contains two rackmount ear pieces (with thumbscrews) and four screws.

C. Attach one rackmount ear on each side of the converter using a screwdriver.

Figure 3-1. Attach mounting brackets with screws

Rackmount Chassis

A. Insert the modular converter module into the guides of the
conversion system chassis by sliding it smoothly until it stops.
Press firmly until the power plug in the chassis plugs into the
modular converter module receptacle.
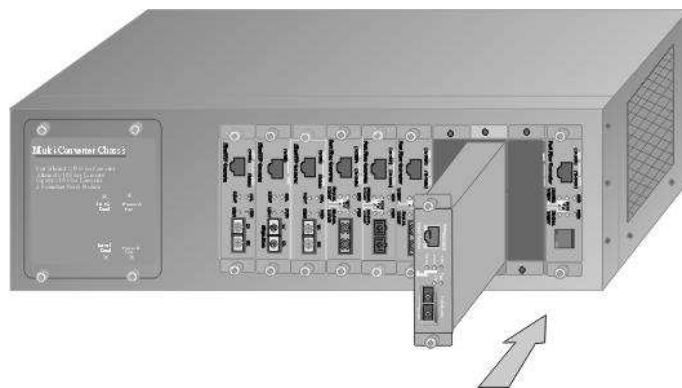
Figure 3-2. Installing Gigabit Fiber Converter into Chassis

B. Gently push the thumbscrews in and turn clockwise to tighten. Do
not over tighten the thumbscrews.

Cabling

Use four twisted-pair, Category 5 cabling for RJ-45 port connections. The cable between the converter and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.

Fiber segments using **single-mode** connector type connections must use 8/125 or 9/125 um single-mode fiber cable. Two devices may be connected up to **10 Kilometers** in full duplex operation. For half-duplex operation, the recommended maximum distance is 412 meters (1,352 ft.)

Fiber segments using **multi-mode** connector type connections must use 50 or 62.5/125 um multi-mode fiber cable. Two devices may be connected up to **550 meters**.

4.
Troubleshooting

This section is intended to help solve some common problems encountered while using the Raven Series Fast Fiber Advanced Media & Rate Converter products.

- Verify that the correct power adapter (DC 9V, 0.7A) is in use. Power adapters with DC output higher than 9V will seriously damage the converter modules.
- Verify the DIP-switch configuration is set to the same operational mode as the link partner.
- Ensure the proper UTP and Fiber cables have been selected to construct the network.

5.
Optical Fiber Specifications

This section provides the optical fiber specifications of the Raven Series Fast Fiber Advanced Media & Rate Converter products.

Module Name	Wavelength (nm)	Avg. Lunch Power (dB)	Avg. Sensitivity (dB)
Modular Fast Fiber Converter (SC)	1310 (nm)	-18 (dB)	-30 (dB)
Modular Fast Fiber Converter (SC-Single Mode, 15km)	1310 (nm)	-20 (dB)	-32 (dB)
Modular Fast Fiber Converter (SC, 30km)	1310 (nm)	-15 (dB)	-34 (dB)
Modular Fast Fiber Converter (SC, 60km)	1310 (nm)	-5 (dB)	-35 (dB)
Modular Fast Fiber Converter(WDM 20km)	1310 or 1550	-8 (dB)	-31 (dB)

Module Name	Avg. Power Loss Budget (dBm)	Max. FDX Fiber Distance (Km)	Fiber Size (um)
Modular Fast Fiber Converter (SC)	12 (dBm)	2 (Km)	62.5/125 50/125
Modular Fast Fiber Converter (SC-Single Mode, 15km)	12 (dBm)	15(Km)	9/125 8/125

			9/125
Modular Fast Fiber Converter (SM, 30km)	19 (dBm)	30 (Km)	8/125
Modular Fast Fiber Converter (SM, 60km)	30 (dBm)	60 (Km)	9/125
			8/125
Modular Fast Fiber Converter (WDM 20km)	23 (dBm)	20 (Km)	9/125
			8/125

Optical Specifications of Transceivers

1310 nm Single Mode	Transmitter (Output Center Wavelength): 1261~1360 nm
	Receiver (Wavelength of Operation): 1100~1600 nm
	Optical Transmit Power: Min. –15 dBm, Max. –8 dBm
	Sensitivity: Min. ---, Max. –31 dBm
1550 nm Single Mode	Transmitter (Output Center Wavelength): 1510~1590 nm
	Receiver (Wavelength of Operation): 1100~1600 nm
	Optical Transmit Power: Min. –15 dBm, Max. –8 dBm
	Sensitivity: Min ---, Max. –31 dBm

6.
Technical Specifications

This section provides the technical specifications of the Raven Series Fast Fiber Advanced Media & Rate Converter products.

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE802.3x Flow Control and Back pressure
Connector	Fiber: Duplex ST/SC/MT-RJ, Simplex SC (WDM single mode) RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support
Switch architecture	Store and Forward
Fiber parameters	**Fiber Core:** Multi-Mode (62.5/125um, 50/125um) Single-Mode (8/125um, 9/125um) **Wavelength:** 850nm(Multi-mode) 　　　　　1310nm(Single-mode) 　　　　　1550nm(WDM, TX), 1310nm(WDM, RX) **Fiber Distance:** Multi-Mode Fiber 2KM 　　　　　Single-Mode Fiber (30 KM) 　　　　　WDM (Single-Mode) 20KM
Transparent packet	64 to 1518 Bytes for Non-VLAN Ethernet packet

Link Loss Forward	UTP Fiber: If UTP port link is down, then the converter will force the fiber port to link down. Fiber UTP: If Fiber port link is down, then the converter will force the UTP port to link down.
DIP Switch	DIP Switch 1: UTP Auto-Nego / 100Mbps Full Duplex mode DIP Switch 2: Fiber Full/Half Duplex DIP Switch 3: LLF (Link Loss Forwarding) Disable/Enable DIP Switch 4: Switch Converter / Pure converter mode
LED	Module: Power, TX (100Mbps, LK/Act, FDX/COL) Fiber (LK/Act, FDX/COL)
Power	Stand-alone (external adapter): DC9V / 0.7A
Dimension	Module: 119mm x 85mm x 26mm
EMI & safety	FCC Class A, CE, UL, CUL

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