



LE7401A-R2	LE740-TPSTM-R2	LH740-TPSCM-R3	LH741-TPSCSXM	LG741-TXSXSC
LE7404A	LH742-TPSTM-SX	LH740-TPSTS20-R3	LH741-TPSTM	LG741-TXLXSC
LE7408A	LH740-TPSTM-R3	LH740-TPSCS20-R3	LH741-TPSCM	PS7412A
LE7412A	LH742-TPSCM-SX	LH741-TPSTSXM	LH741-TPSM	

Modular Media Converters

User Manual

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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.



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Instrucciones de Seguridad (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá de lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquear la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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Chapter 1: Specifications

1. Specifications

Power	
AC Input Load	LE7401A-R2: 115/230 or 12-240 VAC, 50/760 Hz, 0.15 A; LE7404A: 120/240 VAC, 50/60 Hz, 1 A/0.5 A; LE7408A: 120/240 VACOR 100–240 VAC, 50/60 Hz, 1.6 A/0.8 A; LE7412A: 115/230 or 120–240 VAC, 50/60 Hz, 1.2/0.6 A
AC Power Supply	LE7401A-R2, LE7404A: 20 Watts; LE7408A, LE7412A: 40 Watts
Environmental	
Operating Temperature	+32 to 122° F (0 to +50° C)
Storage Temperature	-13 to +158° F (-25 to +70° C)
Humidity, Operating and Storage	5 to 95% (non-condensing)
Altitude	0 to 10,000 ft. (0 to 3048 m)
Efficiency	
Maximum Heat Generated	LE7401A-R2: 51 BTU/hour; LE7404A: 67 BTU/hour; LE7408A, LE7416A: 137 BTU/hour
Physical	
Connectors	Modules: 10BASE-T/100BASE-TX ports: RJ-45; Fiber ports: ST® or SC single- or multimode, depending on the module
Dimensions	LE7401A-R2: 1.6"H x 4.8"W x 4.5"D (54 x 12.1 x 11.5 cm); LE7404A: 1.7"H x 9.1"W x 5"D (4.4 x 23.1 x 12.6 cm); LE7408A: 1.7"H x 17.4"W x 5"D (4.4 x 44.2 x 12.8 cm); LE7412A: 1.7"H x 19"W x 9"D (4.4 x 48.3 x 22.9 cm)

2. Overview

2.1 About the Modular Media Converters and Chassis

The Modular Media Converter Series includes modules that convert copper to single-mode or multimode fiber at Ethernet, Fast Ethernet, and Gigabit speeds. All modules are unmanaged media converters, to allow simple installation.

Modular Media Converter series chassis provide power to media converter modules, and are available with one, four, eight, or twelve slots for installing any combination of 10-Mbps Ethernet Modular Media Converters, 100-Mbps Fast Ethernet modules, 10-/100-Mbps TP-TX/FX switching modules, and 1.25-Gbps Ethernet modules. All chassis include internal AC power and a country-specific power cord.

2.1.1 Chassis

Four Modular Media Converter chassis sizes are available:

- 1-Slot (LE7401A-R2)
- 4-Slot (LE7404A)
- 8-Slot (LE7408A)
- 12-Slot (1U High) (LE7412A)

2.1.2 Conversion Modules

Media Converter Port Interface Modules are 10-Mbps Ethernet modules that perform a single conversion between 10BASE-T twisted pair and 10BASE-FL single-mode or multimode fiber. Port Interface Modules include one RJ-45 connector and one pair of ST or SC fiber optic connectors. Each module requires one slot in a media converter chassis.

One 10-Mbps version is available:

- 10BASE-T/Multimode, ST (LE740-TPSTM-R2): Media Converter Link Interface Modules are 100-Mbps Fast Ethernet modules that provide a single-conversion between 100BASE-TX twisted pair and 100BASE-FX or 100BASE-SX fiber and support half or full-duplex.

Six 100-Mbps versions are available:

- 100BASE-TX/Multimode, ST, 300 m (LH642-TPSTM-SX)
- 100BASE-TX/Multimode, ST, 2 km (LH740-TPSTM-R3)
- 100BASE-TX/Multimode, SC, 300 m (LH742-TPSCM-SX)
- 100BASE-TX/Multimode, SC, 2 km (LH740-TPSCM-R3)
- 100BASE-TX/Single-Mode Plus, ST, 40 km (LH740-TPSTS20-R3)
- 100BASE-TX/Single-Mode Plus, SC, 40 km (LH740-TPSCS20-R3)

Five 10/100-Mbps Copper to 100-Mbps Duplex Fiber Modules are available:

- 10/100BASE-TX/Multimode, 850-nm, ST, 300 m (LH741-TPSTSXM)
- 10/100BASE-TX/Multimode, 850-nm, SC, 300 m (LH741-TPSCSXM)
- 10/100BASE-TX/Multimode, 1300-nm, ST, 2 km (LH741-TPSTM)
- 10/100BASE-TX/Multimode, 1300-nm, SC, 2 km (LH741-TPSCM)
- 10/100BASE-TX/Single-Mode, 1310-nm, SC, 40 km (LH741-TPSM)

Two Gigabit Copper to Duplex Fiber Modules are available:

- Multimode, 850-nm, 1000BASE-SX, SC, 300 m (LG741-TXSXSC)
- Single-Mode, 1310-nm, 1000BASE-LX, SC, 10 km (LG741-TXLXSC)

2.1.3 Redundant Power Supply Module

A redundant power supply module is available:

- Redundant Power Supply Module for 1U, 12-Slot Chassis, 40 Watts, 120/240-VAC (PS7412A)

2.4 What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com.

Chassis:

LE7401A-R2:

- 1-Slot Modular Media Converter Chassis
- Power cord
- This user manual

LE7404A:

- 4-Slot Modular Media Converter Chassis
- Power cord
- This user manual

LE7408A:

- 8-Slot Modular Media Converter Chassis
- Power cord
- This user manual

LE7412A:

- 12-Slot Modular Media Converter Chassis
- Power cord
- This user manual

Conversion Modules:

- (1) 10-Mbps, 10-/100-Mbps, 100-Mbps, or 1000-Mbps Copper to Fiber Module per part number (as described on page 7, Section 2.1.2)
- This user manual

3. Configuration

3.1 Configuring Media Conversion Modules

The port interface modules and link interface modules can be configured for a variety of features before installation (see board Diagrams/Configuration Table for specific information). The TP-TX/FX link interface modules and Gigabit interface modules have plug-and-play operation and require no configuration. The illustrations show the location of the configuration jumpers and switches on the various Media Conversion Modules.

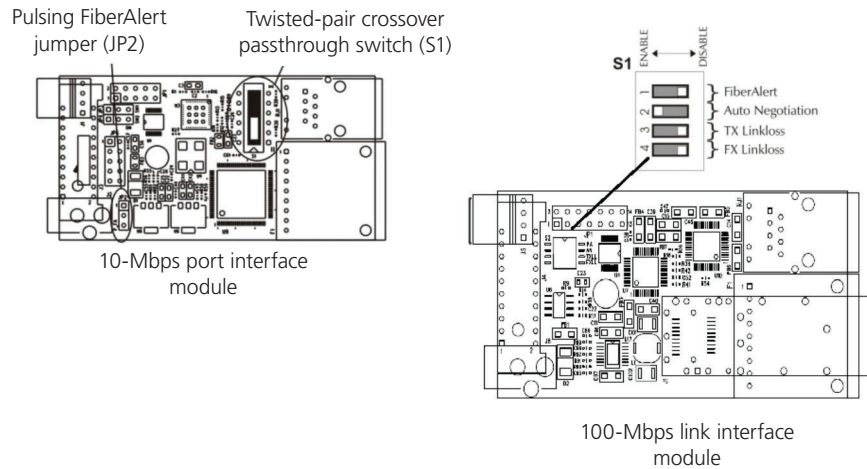


Figure 3-1. Board Diagrams and Jumper/Switch Settings.

NOTE: Jumper settings apply only to 10-Mbps and 100-Mbps boards. 10/100 Switching modules and Gigabit modules sets do not require any configuration and are not shown above.

Table 3-1. Jumper/DIP switch settings.

Module/Board	Feature	Jumper Position	ON (pins)	OFF (pins)	Factory Default
Port interface module with 10 Mbps with pulsing FiberAlert jumpers.	Pulsing FiberAlert	JP2	1–2	2–3	OFF
	TP LinkLoss	N/A	Always ENA	N/A	Always ENA
	FO LinkLoss	N/A	Always ENA	N/A	Always ENA
Link interface module with auto-cross MDI-II/MDI-X DIP switch	FiberAlert	S1	N/A	N/A	OFF
	Auto"	S2			ON
	Negotiation	S3			OFF
	TX LinkLoss	S4			OFF
	RX LinkLoss				

Chapter 3: Configuration

Whether using crossover or straight-through CAT5 twisted-pair cabling, all switching modules will support both types of connections by one of the following methods:

AutoCross	TX/FX (100 Mbps) link interface modules and Gigabit modules include AutoCross, a feature that automatically selects between a crossover workstation or straight-through connection depending on the connected device.
MDI-II/MDI-X Switch	<p>All port interface modules (10 Mbps) feature a two-position switch, located at position S1 (see table for location on boards) for selecting a crossover workstation connection or straight-through connection.</p> <p>The switch is labeled with "X" for a crossover connection (factory default) and an "II" for a straight-through connection. Select the appropriate setting by moving the switch to the proper position before installing the media conversion module. If you are uncertain whether crossover or straight-through is needed, set the switch to the position that makes the link LED glow.</p>

3.2 LinkLoss, FiberAlert, and Link Fault Pass-Through

TP/FO port interface modules, and TX/FX and TX/SX link interface modules include the following features:

- FO/FX LinkLoss (Fiber LinkLoss)
- TP/TX LinkLoss (Twisted Pair LinkLoss)
- FiberAlert and Pulsing FiberAlert

FiberAlert and LinkLoss are advanced troubleshooting features that can help you locate "silent failures" on your network. However, it is vital to understand exactly how FiberAlert and LinkLoss work, and how they will react in the network configuration, before attempting to install the enclosed module(s).

CAUTION: Installing modules without understanding the effects of FiberAlert and LinkLoss can cause perfectly functioning units to appear flawed or non-functional.

Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When a media converter receives valid link pulses, it knows that the device to which it is connected is up and sending pulses, and that the copper or fiber cable coming from that device is intact. The appropriate "LNK" (link) LED is lit to indicate this.

The media converter also sends out link pulses from its copper and fiber transmitters, but normally has no way of knowing whether the cable to the other device is intact and the link pulses are reaching the other end. The combination of FiberAlert and LinkLoss allows this information to be obtained, even when physical access to a remote device (and its link integrity LED) is not available.

FO/FX LinkLoss

FO/FX LinkLoss is a troubleshooting feature. When a fault occurs on the fiber segment of a conversion, FO/FX LinkLoss detects the fault and passes this information to the twisted pair segment. If a media converter is not receiving a fiber link, FO/FX LinkLoss disables the transmitter on the media converter's twisted pair port. This results in a loss of link on the device connected to the twisted pair port.

TP/TX LinkLoss

TP/TX LinkLoss is another troubleshooting feature. When a fault occurs on the twisted pair segment of a conversion, TP/TX LinkLoss detects the fault and passes this information to the fiber segment. If a media converter is not receiving a twisted pair link, TP/TX LinkLoss disables the transmitter on the media converter's fiber port. This results in a loss of link on the device connected to the fiber port.

Link Fault Pass Through

Link Fault Pass Through (LFPT) is a troubleshooting feature that combines TX and FX LinkLoss from both the local and remote media converter modules (only available on the link interface module, 100 Mbps TX/FX). LFPT is enabled by turning on both FX and TX LinkLoss on each module if installed as a pair. This feature allows both end segments of the conversion to detect link faults occurring in the media conversion chain.

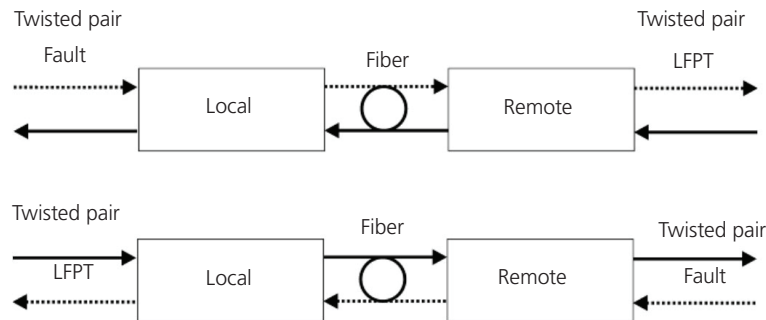


Figure 3-2. FX and TX LinkLoss enabled on both modules will enable LFPT.

FiberAlert

FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the media converter at the receiver end notes the loss of link. The device will then stop transmitting data and the link signal until a signal or link pulse is received. The result is that the link LED on BOTH sides of the fiber connection will go out indicating a fault somewhere in the fiber loop. Using FiberAlert, a local site administrator is notified of a fault and can quickly determine where a cable fault is located.

NOTE: Enable FiberAlert on ONE side of a media conversion only; enabling it on both sides will keep both transmitters off indefinitely.

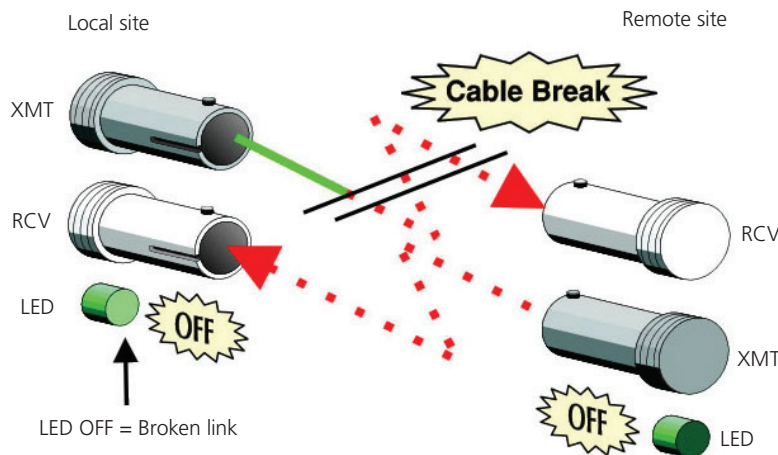


Figure 3-3. Product with FiberAlert enabled. Remote site stops transmitting, local link LED blinks, indicating a break in the fiber loop.

Pulsing FiberAlert

Pulsing FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the device at the receiver end notes the loss of link. The device will stop transmitting data and start sending link pulses. Until a valid link is received, the fiber link LED will be OFF on the device on the receiver side of the fiber strand with the fault while the fiber Link LED on the other unit will blink. Pulsing FiberAlert notifies a local site administrator of a fault, allowing quick determination of where a cable fault resides.

NOTE: Pulsing FiberAlert can be enabled on BOTH sides of a conversion.

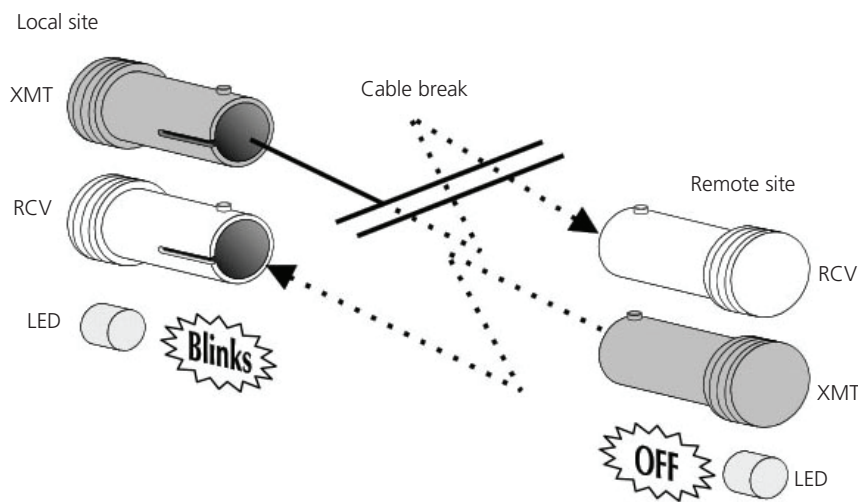


Figure 3-4. Product with Pulsing FiberAlert enabled. Remote site stops transmitting, Local Link LED blinks, indicating a break in the fiber loop.

Auto Negotiation

The following chart states the availability of the Auto Negotiation feature on media conversion modules.

Table 3-2. Autonegotiation product comparison.

Module	Feature	Availability
10 Mbps modules	Autonegotiation	N/A
100 Mbps modules	Autonegotiation	DIP switch selectable
10/100 Mbps modules	Autonegotiation	Always Enabled

Auto Negotiation on 100 Mbps, 10/100 Mbps Modules

When autonegotiation is enabled, the media converter negotiates as a 100 Mbps full-duplex device; if the device the media converter is connected to can operate at 100 Mbps full-duplex, a link will be established. If the twisted pair port on the other device does not have the ability to autonegotiate, or if a 100 Mbps half-duplex connection is desired, autonegotiation on the media converter must be disabled. Half- and full-duplex settings must be manually set and match on both end devices to which the media converters are connected. The diagram below shows a typical application, followed by a table with three possible configurations.

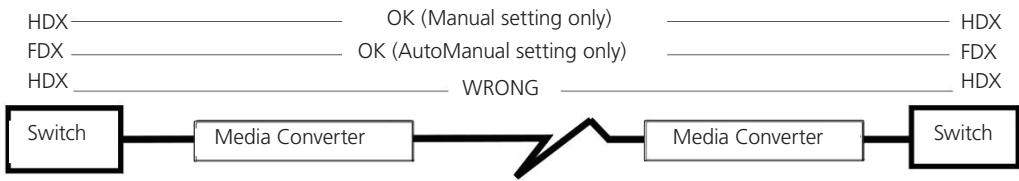


Figure 3-5. Autonegotiation application.

Table 3-3. Auto Negotiation flow control settings.

End-to-end connection	End Device	Media Converter
Half-duplex	Manually configure HDX	Auto Negotiation OFF
Full-duplex	Manually configure FDX	Auto Negotiation OFF
Full-duplex	Auto Negotiation ON	Auto Negotiation ON

4. Installation

4.1 Installing Media Converter Modules

The media conversion modules can be installed in any available slot in a media converter chassis. Media conversion modules are hot-swappable.

Media conversion modules include screws on the faceplate for securing them to the media converter chassis. To install a module, simply unscrew the blank bracket converting the slot where the module is installed. Slide the module into the chassis, via the card guides, until the module is seated securely in the connector. Hand-tighten the thumb screw until snug. Finish tightening the thumb screw using a screw driver, being careful to not over-tighten.

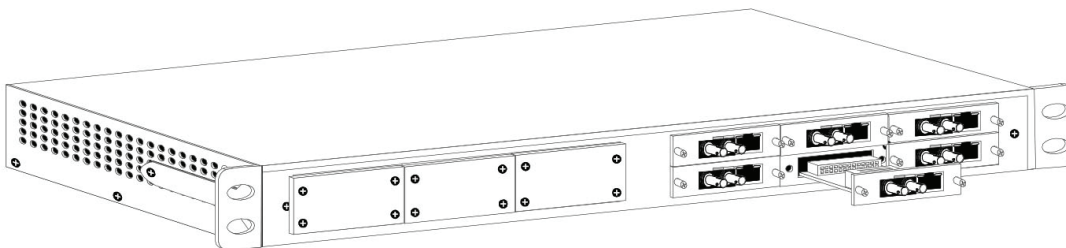


Figure 4-1. Installing module in chassis.

NOTE: Media converter chassis ship with all but one media conversion module slot covered with “blank” brackets. Be sure to keep unused slots covered for EMI containment. Save any “blanks” removed during installation for future use if configuration requirements change.

Installation Tip: Since single-strand fiber products use optics that transmit and receive on two different wavelengths, the single-strand fiber products must be deployed in pairs, or connect two compatible media converter single-strand fiber products. For example, connect Compact Media Converter, TX/SSFX-SM1310-SC (which has 1310 xmt and 1550 rcv) to a product which has 1550 xmt and 1310 rcv, e.g. 100 Mbps TX/SSFX-SM1550-SC Module. The two connected products must also have the same speed and distance capabilities (i.e. both are single-mode [20 km] or both are single/PLUS [40 km]).

4.2 Installing a Power Supply

When installing a redundant power supply module into a powered-on 12-Slot chassis, we recommend setting the ON/OFF switch on the module (if present) to OFF. After installing the power supply, turn its switch ON.

If the redundant power supply module does NOT have an ON/OFF switch, we recommend powering-down the chassis before installing the power supply. Turn the chassis back ON after installing the power supply.

5. LED Operation

Each media conversion module features diagnostic LEDs (see diagrams below) that provide information on features and ports.

LEDs on port interface module TP/FO

The LED functions for port interface module TP/FO with fiber ports are as follows.

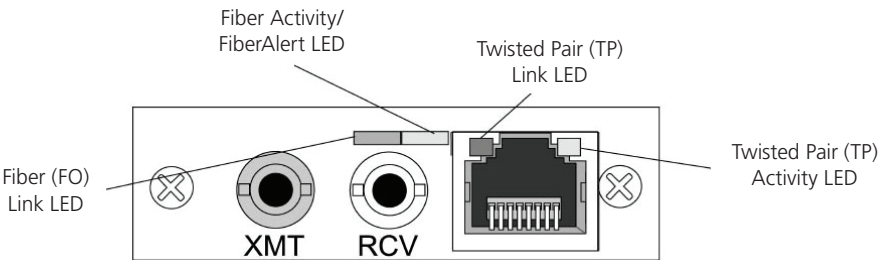


Figure 5-1. LEDs on TP/FO port interface module.

Table 5-1. TP/FO port interface module LED functions.

LED	Function
FO LINK	Glow green when link is established on the fiber port.
FiberAlert	Glow green when link is established on the fiber port.
TP Link	Glow green when link is established on the TP port.
Activity	Blink amber when data is being passed on either port.

LEDs on port interface module TP/FO (10 Mbps)

The LED functions on the port interface module TP/FO are described in Table 5-2.

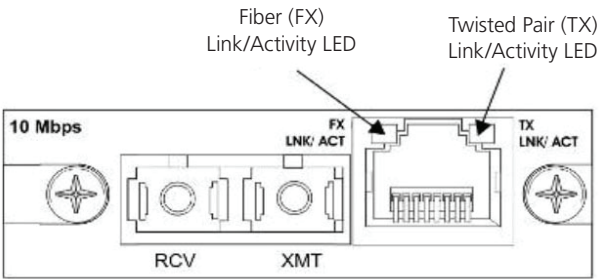


Figure 5-2. LEDs on port interface module TP/FO.

Table 5-2. Port interface module TP/FO LED functions.

LED	Function
FO Link/Act	Glow green when link is established on the FO port; blink green when activity is detected on the port.
TP Link/Act	Glow amber when link is established on the TP port; blink amber when activity is detected on the port.

LEDs on link interface module TP-TX/FX (10/100Mbps)

The LED functions on link interface module TP-TX/FX are described in Table 5-3.

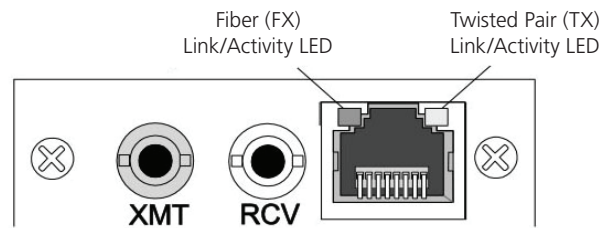


Figure 5-3. Link interface module TP-TX/FX LEDs.

Table 5-3. Link interface module TP-TX/FX LED functions.

LED	Function
FX Link/Act	Glow green when link is established on the FX port; blink green when activity is detected on the port.
TX Link/Act	Glow green when link is established on the TP/TX port; blink green when activity is detected on the port.

LEDs on link interface module TX/FX and TX/SX

The LED functions on link interface module TX/FX are as follows.

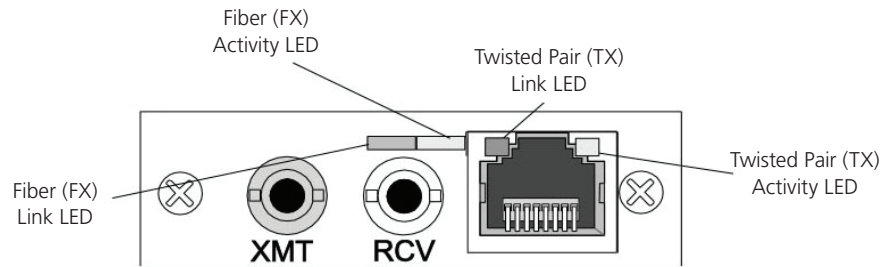


Figure 5-4. Link interface module TX/FX LEDs.

Table 5-4. Link interface module TX/FX LEDs functions.

LED	Function
FX Link	Glow green when link is established on the FX port.
FX Activity	Glow amber if data is being passed on the FX port.
TX Pair Link	Glow green if link is established on the TX port.
TX Activity	Glow amber when data is being passed on the TX port.

LEDs on Gigabit module

The LED functions on Gigabit and link interface TX/FX and TX/SX Modules are as follows.

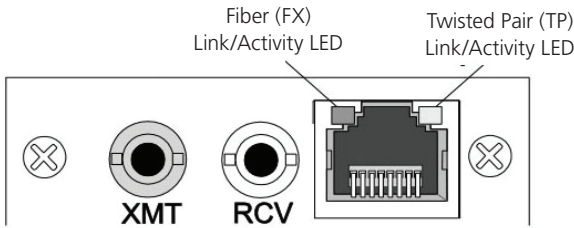


Figure 5-5. Gigabit module LEDs.

Table 5-5. Gigabit module LED functions.

LED	Function
FX Link/Act	Glows green when link is established on the FX port; blinks green when activity is detected on the port.
TX Link/Act	Glows amber when link is established on the TX port; blinks amber when activity is detected on the port.
Activity	Glows green in normal operation.

Media Converter Series Chassis

The Media Converter Series Chassis are available in one, four, eight, and twelve slot chassis. The one, four, and eight chassis include one power supply. The twelve slot chassis includes one power supply and has an available slot to purchase and populate a second slot for redundant power.

All modules, port interface, link interface 10/100 and Gigabit, can be installed in the chassis and in any combination.

LEDs on MediaConverter Chassis

4-Slot and 8-Slot chassis include LEDs on the back of the chassis. The LEDs will only light if a 10-Mbps port interface module is installed. All modules offer port interface LEDs for link and activity; do not rely on the chassis LEDs other than the power LED.

LEDs on Power Supplies

Power supplies include the following LEDs.

Table 5-6. Power supply LEDs functions.

LED	Function
Power	Glows green when chassis has power.
Activity	This LED blinks green when data is being passed on either port of a module that does not include Link/Activity LEDs; applicable to modules only.

6. Troubleshooting

The following information assists in troubleshooting the Modular Media Converters:

- During installation, first test the fiber and twisted pair connections with all troubleshooting features disabled, then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.
- When working with units where the features cannot be connected, establish BOTH the twisted pair and fiber connections in order to establish link LEDs.
- To test a media converter by itself, have an appropriate fiber patch cable, then follow these steps to test:
 1. Connect the media converter to the twisted pair device with a twisted pair cable.
 2. Loop a single strand of fiber from the transmit port to the receive port of the media converter.
 3. Verify that both the twisted pair and the fiber link LEDs (see LEDs, below) on the media converter are on.

NOTE: Use caution when conducting a loopback test; it is possible to create a network loop if connecting the twisted pair port to an active network switch. We recommend connecting the twisted-pair cable to a PC for this type of test.

- Use the appropriate twisted pair cable, and have the crossover/straight-through switch set correctly if the media converter does not include AutoCross.
- If using a high powered device (which is designed for long distance installations) for a short distance installation, the fiber transmitters may overdrive the receivers and cause data loss. In this case, you may need to add an optical attenuator to the connection.

Rackmount Instructions

Elevated Operating Ambient	If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Install the equipment in an environment compatible with the maximum ambient temperature (T _{ma}) specified by the manufacturer.
Reduced Air Flow	When you install the equipment in a rack, make sure that the amount of air flow required for safe operation of the equipment is not compromised.
Circuit Overloading	When you connect the equipment to the supply circuit, make sure you do not overload circuits. This might affect over current protection and supply wiring. Consider equipment nameplate ratings.
Reliable Grounding	Be sure to ground rackmounted equipment properly. Pay attention to supply connections other than direct connections to the branch circuit (e.g., using power strips).

Appendix A. Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at Black Box to ensure factory-clean optical devices. Do not remove these protective caps until you connect the fiber cable to the device. If you need to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Appendix B. Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or standalone units, containing electronic components. Always observe the following precautions when installing or handling these kinds of products

1. Do not remove unit from its protective packaging until ready to install.
2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold the units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad, or in a proper ESD bag. Do not slide the modules or chassis over any surface.

CAUTION: Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

UL/CUL: Listed to Safety of Information Technology Equipment, including Electrical Business Equipment.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (2006/95/EC). Certified to Safety of Information Technology Equipment, Including Electrical Business Equipment. For further details, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com.

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, contact local authorities, waste disposal services, or the point of purchase for this equipment.

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About Black Box

Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 60 seconds or less.

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