

Installation Guide

LH6601C LH6602C LH6603C
LH6604C LH6605C LH6606C

PC Media Converter TX/FX™ is a fixed-configuration, IEEE 802.3 single-conversion, PC Card media converter designed to convert twisted pair (100Base-TX) connections to ST or SC fiber (100Base-FX single-mode or multi-mode). PC Media Converter TX/FX can be mounted in any PC with a standard ISA or PCI slot. All versions of PC Media Converter TX/FX include diagnostic LEDs for each port and a 4-pin peripheral power supply connector.

The following PC Media Converter TX/FX versions are available:

TX/FX — 100Base-TX twisted pair/100Base-FX 1300 nm multi-mode fiber; includes one RJ-45 connector and one pair ST (LH6601C) or SC (LH6602C) connectors

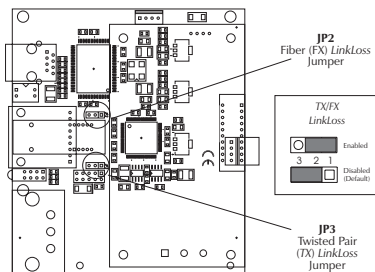
TX/FX-SingleMode — 100Base-TX twisted pair/100Base FX 1300 nm single-mode fiber; includes one RJ-45 connector and one pair ST (LH6603C) or SC (LH6604C) connectors

TX/FX-SingleMode/PLUS — same as above with higher power budget; includes one pair ST (LH6605C) or SC (LH6606C) connectors

Installing PC Media Converter TX/FX

PC Media Converter TX/FX can be configured for TX and FX LinkLoss prior to installation. (Note: More detail on LinkLoss can be found later in this guide.)

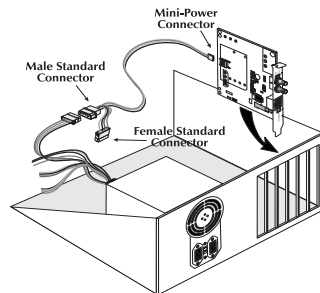
The diagrams to the right and below show the location of the jumpers used to configure LinkLoss on a PC Media Converter TX/FX.



To enable TX or FX LinkLoss, reposition the shunt on the 3-pin jumper indicated over the appropriate pins.

JUMPER CONFIGURATION CHART				
Feature	Jumper Position	ON (pins)	OFF (pins)	Factory Default
FX LINKLOSS	JP2	1-2	2-3	Off
TX LINKLOSS	JP3	1-2	2-3	Off

To install PC Media Converter TX/FX, turn off the power on your PC and remove the cover. Find an empty ISA or PCI slot and align PC Media Converter TX/FX in the slot. Then mount PC Media Converter TX/FX by screwing its bracket to the computer casing.

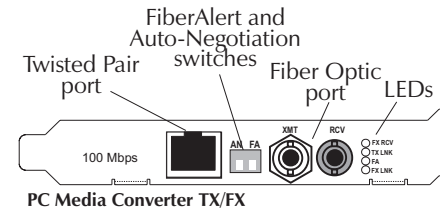


Attach the keyed mini-power connector to PC Media Converter TX/FX. Attach the male end of the "Y" connector to a standard size power connector in your computer. Replace the cover. Attach the cables between PC Media Converter TX/FX and the devices that will be interconnected.

NOTE: PC Media Converter TX/FX does not plug into the mother board. Also, make sure PC Media Converter TX/FX does not extend past the edge of your case. Lastly, PC Media Converter TX/FX only needs power from the computer; no additional power source is necessary.

Configuring PC Media Converter TX/FX

The following diagram shows the bracket for PC Media Converter TX/FX:



After installation, you can configure PC Media Converter TX/FX for the following features, depending on the requirements of your installation:

- FiberAlert
- Auto-Negotiation

AutoCross Feature for Twisted Pair Connection

The twisted pair port of the PC Media Converter includes AutoCross, a feature which automatically selects between a crossover workstation or pass-through/repeater hub connection depending on the connected device.

About FiberAlert and LinkLoss

PC Media Converter comes with the following troubleshooting features:

- FiberAlert
- Twisted Pair LinkLoss (a.k.a. "TX LinkLoss," or just "LinkLoss")
- Fiber LinkLoss (a.k.a. "FX LinkLoss")

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

Installing modules without understanding the effects of FiberAlert and LinkLoss can cause perfectly functioning units to appear flawed or even dead!

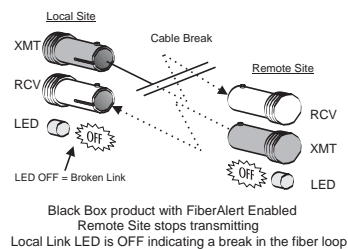
If you are unfamiliar with FiberAlert and LinkLoss, the manufacturer strongly encourages you to read the following information.

About Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When a *PC Media Converter TX/FX* 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 "LINK" LED is lit to indicate this. The *PC Media Converter TX/FX* 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. *FiberAlert* and *LinkLoss* allow this information to be obtained from the fiber, even when physical access to a remote device (and its link integrity LED) is not available.

What Is FiberAlert?

FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the *PC Media Converter TX/FX* 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



NOTE: *FiberAlert* should only be enabled on one side of a media conversion. Enabling it on both sides would keep both transmitters off indefinitely.

notified of a fault and can quickly determine where a cable fault is located.

What Is FX LinkLoss?

FX LinkLoss is a troubleshooting feature. When a fault occurs on the fiber segment of a conversion, *FX LinkLoss* detects the fault and passes this information to the twisted pair segment. If a media converter is not receiving a fiber link, *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.

WHAT IS TX LINKLOSS?

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

FiberAlert/LinkLoss Compared		
Feature	Fault Location	Disabled LEDs
FiberAlert	Fiber	Fiber
TX LinkLoss	Twisted Pair	Fiber
FX LinkLoss	Fiber	Twisted Pair

Configuring Auto-Negotiation on PC Media Converter TX/FX

When *Auto-Negotiation* 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 *Auto-Negotiate*, or if a 100 Mbps Half-Duplex connection is desired, *Auto-Negotiation* on the media converter must be disabled. Half- and Full-Duplex settings must be manually set and match on both devices the media converters are connected to (see below). The diagram below shows a typical application, followed by a table with three possible configurations.



End to End Connection	Switch	PC TX/FX
Half-Duplex	Manually configure HDX	Autonegotiation Off
Full-Duplex	Manually configure FDX	Autonegotiation Off
Full-Duplex	Autonegotiation On	Autonegotiation On

Enabling FiberAlert and Auto-Negotiation

FiberAlert and *Auto-Negotiation* are each configured on *PC Media Converter TX/FX* by adjusting a two-position switch on the faceplate next to the fiber connectors. The switch for *FiberAlert* is labeled "FA" and *Auto-Negotiation* is labeled "AN." Enable these features by moving the corresponding switch to the up (ON) position. Disable (default) by moving the switch to the down (OFF) position.

Using FiberAlert and LinkLoss

In a typical central site to remote site media conversion, the manufacturer recommends you enable your media converters' troubleshooting features as follows:

FiberAlert:	Remote Site Only
TX LinkLoss:	Main and Remote Site
FX LinkLoss:	Remote Site Only

This will ensure that any faults, no matter where they occur, can be detected by an administrator located at the central site.

Installation Troubleshooting

- During installation, first test your 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.
- To test *PC Media Converter TX/FX* by itself, you must have an appropriate fiber patch cable. First, connect *PC Media Converter* to the twisted pair device with a twisted pair cable. Next, loop a single strand of fiber from the transmit port to the receive port of your media converter. Finally, verify that you have both twisted pair and fiber link on your *PC Media Converter*.

LED Operations

PC Media Converter TX/FX features diagnostic LEDs. LED functions are:

- FX RCV** Blinks yellow when fiber port is receiving data.
- TX LNK** Glow green when a twisted pair link is established.
- FA** Glow green when *FiberAlert* is enabled.
- FX LNK** Glow green when a fiber link is established.

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 the factory to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Assure that the fiber is properly terminated, polished and free of any dust or dirt and that the location is as free from dust and dirt as possible.
- 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) Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
- 5) 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.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to your add-in modules. Always observe the following precautions when installing or handling an add-in module or any board assembly.

- 1) Do not remove unit from its protective packaging until you're ready to install it.
- 2) Wear an ESD wrist grounding strap before handling any module or component. If you do not have a wrist strap, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.



WARNING! 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.

- 3) Hold boards by the edges only; 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 board over any surface.

Customer Service Information

Call: (724) 746-5500 Phone orders 24 hours a day, 7:00 AM Monday to midnight Friday; 8:00 AM to 4:00 PM Saturday (EST)

Fax: (724) 746-0746 or in North America **1-800-321-0746**

Mail order: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018
Technical Support and fax orders 24 hours a day

Federal Communications Commission Radio Frequency Interference Statement

This equipment must be installed in equipment that has been tested and found to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is

likely to cause harmful interference in which the chassis user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

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

Safety Certifications

- UL:** Listed to UL1950 and CSA 22.2, No. 950, Safety of Information Technology Equipment, Including Electrical Business Equipment.
- TUV/GS:** Certified to EN 60 950, Safety of Information Technology Equipment, Including Electrical Business Equipment.
- CE:** The products described herein comply with the Council Directive on Electromagnetic Compatibility (89/336/EEC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (73/23/EEC). For further details, contact Black Box Corp.

Warranty

Please contact Black Box Corporation for warranty information.



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www.blackbox.com

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