

## Compact Media Converter Installation Guide

LHC001A-R2 - LHC002A-R2 - LHC003A - LHC004A  
LHC005A-R2 - LHC006A-R2 - LHC008A  
LHC009A - LHC007A-MT

Black Box's *Compact Media Converter* is a low-cost, IEEE 802.3 single-conversion media converter that converts between 100Base-TX twisted pair and 100Base-FX multi-or single-mode fiber. It is available with one RJ-45 connector for the twisted pair port and one pair ST or SC connectors for the fiber port.

*Compact Media Converter* is a 1U high, standalone unit that includes diagnostic LEDs for each port and a universal (100-240 VAC) power supply. The following *Compact Media Converter* versions are available:

**100B TX - 100B FX** — 100Base-TX twisted pair/100Base-FX 1300 nm multi-mode fiber; includes one RJ-45 connector and one pair ST (LHC001A) or SC (LHC002A) connectors or one MT (LHC007A) connector.

**100B TX - 100B SX** — 100Base-TX twisted pair/100Base-SX 1850 nm multi-mode fiber; includes one RJ-45 connector and one pair ST (LHC008A) or SC (LHC009A) connectors

**100B TX - 100B FX SM** — 100Base-TX twisted pair/100Base-FX 1300 nm single-mode fiber; includes one RJ-45 connector and one pair ST (LHC003A) or SC (LHC004A) connectors

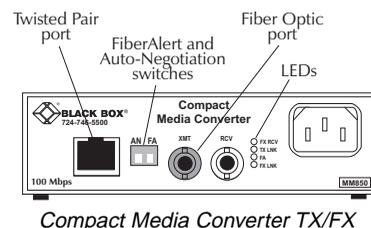
**100B TX - 100B FX SM/PLUS** — same as above with higher power budget; includes one pair ST (LHC005A) or SC (LHC006A) connectors

### Installing Compact Media Converter

*Compact Media Converter* comes ready to install. The only adjustments that may need to be made come after installation. To install *Compact Media Converter*, first make sure that the unit is placed on a suitable flat surface. Attach the cables between the *Compact Media Converter* and each device that will be interconnected, then plug the unit into a reliable, filtered power source.

### Configuring Compact Media Converter

The following diagram shows the switches and connections on *Compact Media Converter*.



Once installed, you can configure *Compact Media Converter* for:

- *Auto-Negotiation* (default = DOWN/Disabled)
- *FiberAlert* (default = DOWN/Disabled)

*Note: LinkLoss is an additional feature that can be enabled before installation. LinkLoss is disabled as a factory default. Refer to Enabling TX and FX LinkLoss on page 4 for more information.*

### AutoCross Feature for Twisted Pair Connection

The twisted pair port of the *Compact 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

*Compact Media Converter* comes with the following features:

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

*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).

*NOTE: 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 *Compact 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 "LINK" LED is lit to indicate this. The *Compact 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.

### 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.

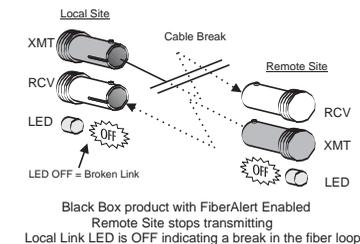
### What Is TX LinkLoss?

*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, resulting in a loss of link on the device connected to the fiber port.

*NOTE: Refer to the "Enabling TX and FX LinkLoss" section.*

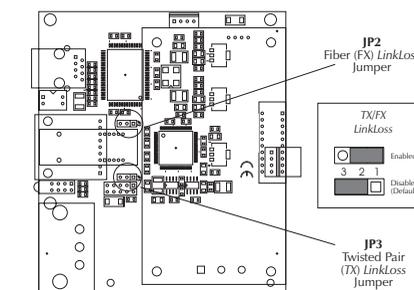
### What Is FiberAlert?

*FiberAlert* minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the *Compact 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.



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

### Enabling TX and FX LinkLoss



In order to enable *TX* and/or *FX LinkLoss*, remove the cover from the *Compact Media Converter* and place the jumpers accordingly. To do this:

- 1) Make sure there is no power going to the unit by **unplugging the power cord!**
- 2) Using a phillips screwdriver, remove the screws on the corners of the cover.
- 3) Remove the cover. After doing so, find the three-pin jumpers *JP1* and *JP2*. *JP1* toggles the *TX LinkLoss* feature and *JP2* toggles the *FX LinkLoss* feature. Adjust jumper pins accordingly.
- 4) Replace the cover and tighten the screws to secure the cover.

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

### Enabling FiberAlert

Configure *FiberAlert* on *Compact Media Converter* by adjusting the switch located on the faceplate next to the fiber connectors and labeled "FA". Enable this feature by moving the switch to the up (ON) position. Disable (default) by moving the switch to the down (OFF) position.

## Using FiberAlert and LinkLoss

In a typical main site to remote site media conversion, Black Box recommends enabling your media converters' troubleshooting features as follows:

<b>FiberAlert:</b>	Remote Site
<b>TX LinkLoss:</b>	Remote Site
<b>FX LinkLoss:</b>	Main Site

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

## Auto-Negotiation on Compact Media Converter

When *Auto-Negotiation* is enabled, the media converter negotiates as a 100 Mbps Full-Duplex device; if the device the *Compact 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 *Compact Media Converter* must be disabled. Half- and Full-Duplex settings must be manually set and match on both devices to which *Compact Media Converter* is connected. The diagram below shows a typical application, followed by a table with three possible configurations.



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

## Enabling Auto-Negotiation

Configure *Auto-Negotiation* on Compact Media Converter by adjusting the switch located on the faceplate next to the fiber connectors and labeled "AN." Enable this feature by moving the switch to the up (ON) position. Disable (default) by moving the switch to the down (OFF) position.

## 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 *Compact Media Converter* by itself, you must have an appropriate fiber patch cable. First, connect *Compact 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 *Compact Media Converter*.

## LED Operation

*Compact Media Converter* features four diagnostic LEDs. LED functions are:

<b>FX RCV</b>	Blinks yellow when module is receiving data.
<b>TX LNK</b>	Glows green when a twisted pair link is established.
<b>FA</b>	Glows green when <i>FiberAlert</i> is enabled.
<b>FX LNK</b>	Glows green when a fiber link is established.

## Specifications

### Environmental

Operating Temperature: 32° - 104° F (0° - 40° C)  
 Storage Temperature: 20° - 160° F (-20° - 70° C)  
 Humidity: 5 - 95% (non-condensing)

### Power

AC Input Load: 100/240V± ~ 50/60 Hz, 0.1/0.05A  
 Heat generated: 25 BTU/hr.

### Dimensions

1.50"H x 4.65"W x 4.43"D (3.8 cm x 11.8 cm x 11.3 cm)  
 1.3 lbs. (0.6 kg)

## Black Box Customer Service Information

**Order toll-free in the U.S.:** Call 877-877-BBOX  
 (outside U.S. call 724-746-5500)

FREE technical support, 24 hours a day, 7 days a week:

Call 724-746-5500 or Fax 724-746-0746

**Mail order:** Black Box Corporation, 1000 Park Drive, Lawrence, PA  
 15055-1018

**Web site:** www.blackbox.com

**E-mail:** info@blackbox.com

## 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 by the manufacturer 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.



Please contact Black Box for complete warranty, FCC and Safety Certification information.



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