

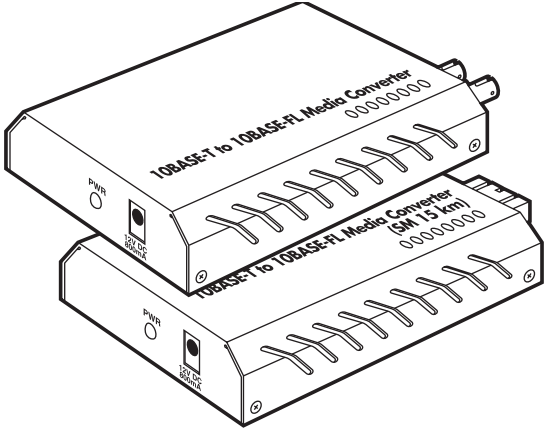

*1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746*

BLACK BOX®
NETWORK SERVICES

MAY 2003

LE1605A-ST-US LE1606A-SC-US
LE1605A-ST-EU LE1606A-SC-EU
LE1605A-ST-UK LE1606A-SC-UK
LE1605A-ST-AU LE1606A-SC-AU
LE1605A-ST-JP LE1606A-SC-JP

# 10BASE-T to 10BASE-FL Media Converters




## CUSTOMER SUPPORT 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**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

# FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

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.

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 Industry Canada.*

*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 Industrie Canada.*

# NORMAS OFICIALES MEXICANAS (NOM)
# ELECTRICAL SAFETY STATEMENT

## INSTRUCCIONES DE SEGURIDAD

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 a 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 bloquea 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 deber 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 connectado 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 fisica 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 lineas de energia.

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 objectos liquidos 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: Objectos 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.

**TRADEMARKS USED IN THIS MANUAL**

ST is a registered trademark of AT&T.

*Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.*

# Contents

# 1. Specifications

**NOTE**

In this manual (except where noted otherwise), LE1605A-ST represents models LE1605A-ST-US, LE1605A-ST-EU, LE1605A-ST-UK, LE1605A-ST-AU, and LE1605A-ST-JP. LE1606A-SC represents models LE1606A-SC-US, LE1606A-SC-EU, LE1606A-SC-UK, LE1606A-SC-AU, and LE1606A-SC-JP.

**Standards:** IEEE 802.3

**Operation:** Half duplex

**Maximum Distance:** Twisted pair: 328 ft. (100 m);
Fiber: LE1605A-ST: 1.2 miles (2 km) 820-nm multimode; LE1606A-SC: 9.3 miles (15 km) 1310-nm single mode

**User Controls:** (1) Pushbutton for twisted-pair MDI/MDI-X connection

**Connectors:** LE1605A-ST: (1) RJ-45, (2) ST®, (1) barrel connector for Power;
LE1606A-SC: (1) RJ-45, (2) SC, (1) barrel connector for Power

**Indicators:** (5) LEDs: (2) Link, (2) Receive, (1) Power

**Temperature Tolerance:**
Operating: 32 to 158°F (0 to 70°C);
Storage: -4 to +158°F (-20 to +70°C)

**Relative Humidity:** Up to 90%, noncondensing

**Power:** All models: External power supply:
Output: 12 VDC @ 0.8 A;
LE1605A-ST-US, LE1606A-SC-US:
Input: 120 VAC, 60 Hz (2-prong);
LE1605A–ST-EU, LE1606A-SC-EU:
Input: 230 VAC, 50 Hz (2-prong);
LE1605A–ST-UK, LE1606A-SC-UK:
Input: 230 VAC, 50 Hz (3-prong);
LE1605A–ST-AU, LE1606A-SC-AU:
Input: 240 VAC, 50 Hz, (3-prong);
LE1605A–ST-JP, LE1606A-SC-JP:
Input: 100 VAC, 50/60 Hz (2-prong)

**Size:** 0.9"H x 2.9"W x 4.9"D (2.3 x 7.4 x 12.4 cm)

**Weight:** 0.3 lb. (0.1 kg)

# 2. Introduction

## 2.1 Description

Use the 10BASE-T to 10BASE-FL Media Converters to connect conventional copper-based networks to fiber-based networks. These converters support both an RJ-45 jack and a pair of ST or SC fiberoptic connectors. They comply with the IEEE 802.3 10BASE-T and 10BASE-FL standards, and are compatible with other 10BASE-T/10BASE-FL and 10/100-Mbps Ethernet devices.

An MDI/MDI-X button allows the media converter to connect directly to either a workstation, switch, or hub using crossover or straight-through cable.

Using 820-nm multimode fiber, the LE1605A-ST converter spans distances up to 1.2 miles (2 km). With 1310-nm single-mode fiber and the LE1606A-SC, the distance between a LAN switch and another switch or a file server can be up to 9.3 miles (15 km).

Figures 2-1 and 2-2 show the available models.

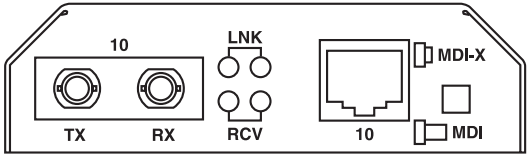



**Figure 2-1. 10BASE-T to 10BASE-FL Media Converter with ST connectors.**

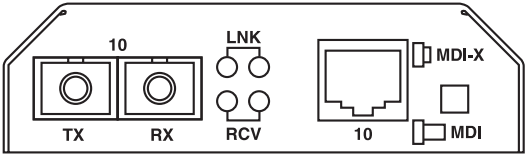



**Figure 2-2. 10BASE-T to 10BASE-FL Media Converter with SC connectors.**

## 2.2 What the Package Includes

- (1) 10BASE-T to 10BASE-FL Media Converter
- (1) AC power adapter
- (4) Non-skid rubber feet
- (2) Mounting screws
- This users' manual

If anything is missing or damaged, please contact Black Box at 724-746-5500.

# 3. Installation

## 3.1 MDI/MDI-X Connection

Before plugging in and installing your media converter, you'll need to set the MDI/MDI-X button. This button selects whether you need to use crossover or straight-through twisted-pair cabling to connect the RJ-45 ports on the 10BASE-T portion of your network. (See Figure 3-1.) Simply set the button as described in Table 3-1.

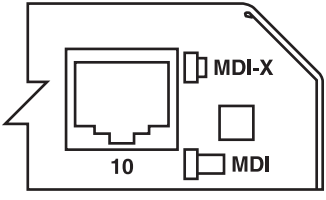



**Figure 3-1. MDI/MDI-X button.**

**NOTE**

When the button is pressed in, MDI-X is selected. When the button is out, MDI is selected.

**Table 3-1. Crossover selection.**

| Connected Device | Cable Configuration | Setting |
|---|---|---|
| Hub or switch | Straight-through | MDI-X |
| Hub or switch | Crossover | MDI |
| DTE (NIC) | Straight-through | MDI |
| DTE (NIC) | Crossover | MDI-X |

## 3.2 Typical Applications

Once you've set the MDI/MDI-X button, you'll need to determine which application you'll use.

In Examples 1 through 3 (see Figures 3-2 through 3-4), two media converters are used to extend the distance via fiberoptic cable between two 10BASE-T devices. In Example 4 (see Figure 3-5), one media converter is used to connect a 10BASE-T network to a 10BASE-FL device via fiberoptic cable.

## EXAMPLE 1: TWO LAN SWITCH WORKGROUPS

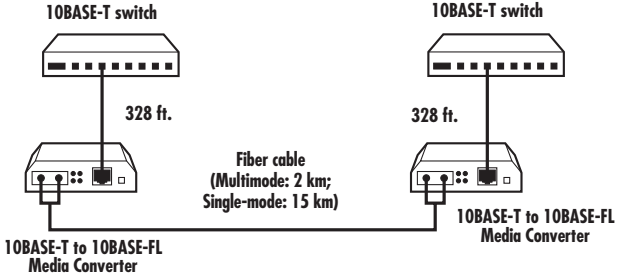



**Figure 3-2. Converters connecting two LAN switch workgroups.**

## EXAMPLE 2: LAN SWITCH AND A NETWORK SERVER

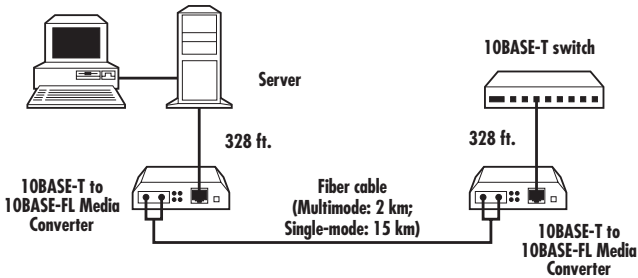



**Figure 3-3. Converters connecting a LAN switch and a network server.**

### EXAMPLE 3: 10BASE-T HUB AND A WORKSTATION

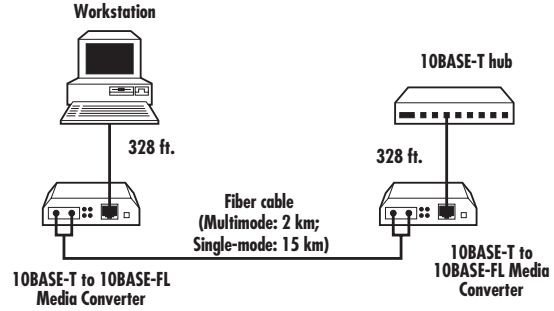



**Figure 3-4. Converters connecting a 10BASE-T hub and a workstation.**

### EXAMPLE 4: 10BASE-T NETWORK AND A 10BASE-FL DEVICE

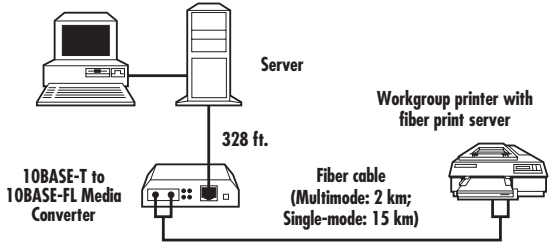



**Figure 3-5. Converter connecting a 10BASE-T network and a 10BASE-FL device.**

## 3.3 Installing the Converter

After you set the MDI/MDI-X button as described in **Section 3.1** and determine how you will use your converter as shown in **Section 3.2**, you'll need to place the converter on a desktop or mount it on a wall. Next, power on the converter. Connect the converter to a 10BASE-T device or network segment. Finally, connect the converter to a 10BASE-FL device or to another media converter via fiberoptic cable. Follow the steps listed below:

1. For desktop installation, affix the four non-skid rubber feet to the bottom of the converter.

   For wallmount installation, use the underside of the converter as a template to measure and mark out the position of the holes onto the surface where you will install the converter. Then use the two mounting screws provided to mount the converter firmly in place.

2. Connect the appropriate power supply for your country to the power connector on the side of the converter. Plug the power supply into a suitable power outlet.

3. Power on the converter. The power LED should light. If it does not, make sure that the power cable is plugged in properly.

**NOTE**

When the converter is connected to a 10/100BASE-T device, it will run at 10 Mbps, half-duplex mode.

4. Make sure that the Category 5 straight-through twisted-pair cable between the 10BASE-T device (hub or switch) and the converter is no longer than 328 ft. (100 m).

5. Connect one end of the cable to the RJ-45 jack on the converter.

6. Connect the other end of the cable to the RJ-45 jack on the 10BASE-T device.

7. Connect one end of a fiber cable to the ST or SC connectors on the converter.

8. Connect the other end of the fiber cable to the ST or SC connectors on the other converter or 10BASE-FL device.

Installation is complete.

# 4. LED Indicators

Once your 10BASE-T to 10BASE-FL Media Converter is properly installed, it operates maintenance-free.

Several LEDs tell you the status of the converter and the network at a glance. See Figure 4-1.

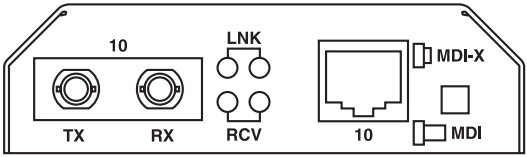



**Figure 4-1. LED location.**

- The Power LED (located on the side of the converter) lights to indicate normal operation.
- (2) Link LEDs light when receiving link pulses from a compliant device.
- (2) Receive LEDs flash or light when data packets are being received.

# 5. Troubleshooting

## 5.1 Calling Black Box

If you determine that your 10BASE-T to 10BASE-FL Media Converter is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

## 5.2 Shipping and Packaging

If you need to transport or ship your 10BASE-T to 10BASE-FL Media Converter:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the media converter for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.