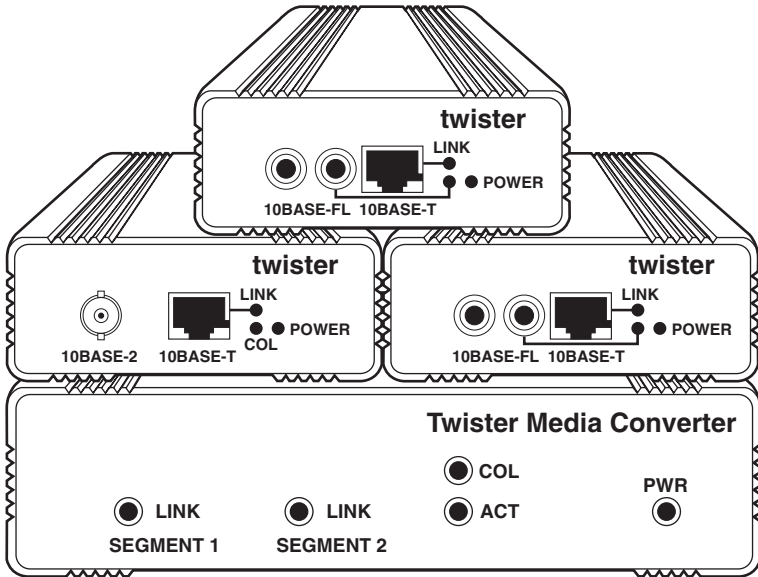




LE611A-SMA
LE611A-ST-R2
LE611A-ST-R3
LE612A-R2
LE612A-R3
LE613A
LE613A-R2

APRIL 1998
LE614A-ST
LE614A-ST-R2
LE614A-SMA
LE614A-SMA-R2
LE615A-R2
LE615A-R3
LE681A

Twister Media Converter Media Converter Extender



**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 J 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 la 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 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.

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.

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1. Specifications

Indicators — (3) Unit LEDs: Power, Collision, Activity; (2) Segment LEDs: Link

Interface —

Twisted Pair:

Connector: Shielded RJ-45, 8-Pin jack

Impedance: 100 ohms nominal

Cable Type: 22-24 AWG (0.5 mm) shielded or unshielded twisted-pair cable

Link length: 100 m or 328 ft. maximum

Signal level output: 2.2 V to 2.8 V

Signal level input: 350 mV minimum

Fiber, Single Mode:

Connector: Single mode FO ST or SC connector for 25 km links over 8.3/125, 8.7/125, 9/125, or 10/125 μm segments RX

Input Sensitivity: -30.5 dBm peak

Output Power: -21 dBm into 9/125 μm fiber

Link Length: Up to 25 km

Fiber, Multimode:

Connector: (2) ST or SMA fiberoptic connectors RX Input

Sensitivity: FOIRL 27.5 dBm peak minimum;

10BASE-FL: -29.5 dB peak minimum

Output Power: -15.8 dBm peak (50/125 μm) typical, -12 dBm peak (62.5/125 μm) typical, -6.5 dBm peak (100/140 μm) typical

Link Length: up to 2 km (1.2 mi)

Cable Type: 50/125, 62.5/125, and 100/140 μm multimode duplex fiber

ThinNet (BNC):

Connector: BNC receptacle, use with BNC type plug

Internal transceiver: IEEE 802.3 type transceiver built-in

Termination: Internally connected to a 50-ohm terminator; switch-selectable

Segment length: RG-58 coaxial cable, 185 m (607 ft.) max.

Minimum spacing between transceivers: 0.5 m (1.6 ft.)

Maximum devices per segment: 8

ThickNet (AUI):

Connector: DB15 female connector with slide latch

Impedance: 78 ohms nominal

Transceiver cable: IEEE 802.3 AUI cable, 50 m (164 ft.) max.

Environmental — Operating temperature: 32 to 131° F (0 to 55° C);

Storage temperature: -13 to 194° F (-25 to 90° C);

Relative humidity: 5 to 95% noncondensing

Power — Twister Media Converter: 100-240 VAC, 50-60 Hz with removable cord; Media Converter Extender: 115-VAC, 60 Hz external power supply

Size — LE611A-SMA: 1.2"H x 7.3"W x 3.7"D (3 x 18.5 x 9.4 cm);
LE611A-ST-R2, LE614A-ST, LE615A-R2: 1.8"H x 3.8"W x 3.7"D
(4.5 x 9.7 x 9.4 cm); LE612A-R2, LE613A, LE614A-SMA,
LE681A: 1.8"H x 3.8"W x 4.5"D (4.5 x 9.7 x 11.4 cm)

Weight — LE611A-SMA: 4 lb. (1.8 kg); LE611A-ST-R2, LE614A-R2,
LE615A-R2: 1.4 lb. (0.6 kg), including power supply; LE612A-R2,
LE613A, LE614A-SMA, LE681A: 0.8 lb. (0.4 kg)

2. Introduction

2.1 Overview

The Media Converters and Media Converter Extender interconnect IEEE 802.3 twisted-pair LANs and Ethernet LANs of differing configurations. They fully comply with their associated 10BASE-T, 10BASE2, 10BASE5, 10BASE-FL, and FOIRL standards.

A variety of available connector combinations provide the ultimate in twisted-pair network design flexibility and capability. Each translator directly connects two network devices, of similar or differing types. Table 2-1 lists the available models.

If you ordered the LE611A-ST-R3, LE612A-R3, LE613A-R2, LE614A-ST-R2, LE614A-SMA-R2, or LE615A-R3, you should have received cables with it.

Table 2-1. Twister Media Converter and Twister-10 Models.

Model Number	Product Name
LE611A-ST-R2	Twister Media Converter 10BT/Fiber-ST
LE611A-SMA	Twister Media Converter 10BT/Fiber-SMA
LE612A-R2	Twister Media Converter 10BT/BNC
LE613A	Twister Media Converter 10BT/AUI
LE614A-ST	Twister Media Converter BNC/Fiber-ST
LE614A-SMA	Twister Media Converter BNC/Fiber-SMA
LE615A-R2	Twister Media Converter UTP/Fiber-ST
LE681A	Media Converter Extender 10BT/10BT

These compact, completely compatible devices are simple to use and require minimal hardware and no software changes. Use them to connect any shielded or unshielded twisted-pair device to your choice of coaxial, thicknet, or fiberoptic Ethernet LAN or LAN device. The translator does the rest.

All signal activity, including collision data, is reliably translated assuring accurate communication and collision data detection in any combination of connected segments or devices.

These units do not inflict any repeater delay and are totally transparent to normal network operation. Because the incoming signals from either medium are restored by these units, the distance limitation imposed by each medium is not affected. Therefore, normal maximum media lengths may be achieved on both sides of these units.

Network Interface Connectors

The shielded RJ-45 connector provides transparent integration into twisted-pair or 10BASE-T environments. The coaxial/BNC port provides manual termination through a user-selectable switch, so that media can be directly attached to the translator without the need for a “tee” connection, as long as the converter is at the beginning or end of a segment. The fiberoptic ports allow complete support of either a FOIRL or a 10BASE-FL link through a user selectable switch. Up to 2 kilometers (1.24 mi) of fiberoptic cable can be used on a remote link. The AUI port offers additional interfacing capability and flexibility.

2.2 Features

The Twister Media Converters and Media Converter Extender offer the following features:

- *Flexibility and Convenience*

The wide variety of available connector combinations suits any network environment while supporting multiple segment types.

- *Compatibility*

Supports Ethernet and IEEE 802.3 standards for 10BASE-5, 10BASE-2, 10BASE-T, 10BASE-FL and FOIRL.

- *Built-in Diagnostic LED Indicators*

The Twister Media Converters and Media Converter Extender provide a full complement of LED indicators to visually verify proper device functioning and aid in overall network diagnosis and management.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER

- *High Performance and Reliability*

- Supports both shielded and unshielded twisted pair
- Minimal hardware and no software changes required.
- Accurately translates all signal activity including collision data.
- Built-in selectable termination eliminates costly additional coax terminators.

2.3 Unpacking Your Unit

Open and unpack your unit. If possible, retain the original packing materials for future storage or shipment. Your package should contain:

- One Twister Media Converter or Media Converter Extender
- One Power Module
- Four Rubber Mounting Feet
- This User's Manual

Each unit has the safest possible packaging, but shipping damage does occasionally occur. If you suspect that your unit has been damaged in shipment, please contact your shipping agent and file a proper claim.

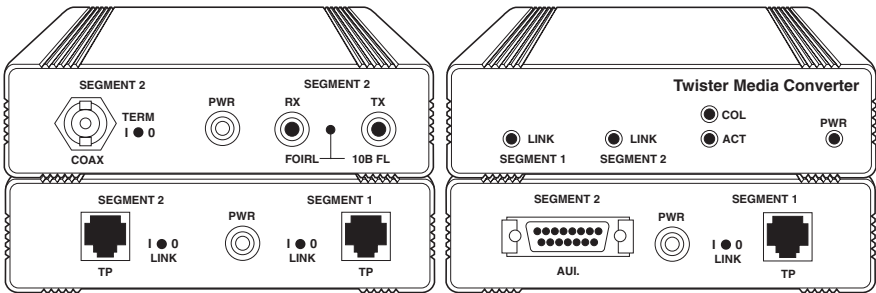


Fig. 2-1. Twister Media Converters.

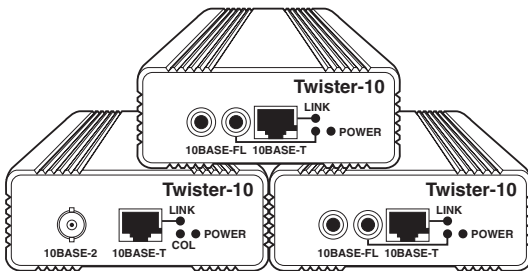


Fig. 2-2. Twister Media Converters.

3. Configuration and Installation

3.1 Placement

The Twister Media Converters and the Media Converter Extender are intended for use in a normal office or factory environment. The units may be mounted in any orientation that permits the use to make physical connection to the power module. Installation is as simple as plugging in the segment connections. Minimal hardware and no software changes are required.

The translator must be located within six feet of an AC power source into which you insert the wallmounted power module. Although there are few restrictions on location, it should be placed in a well-ventilated area as far away as possible from electrical-noise-generating equipment such as copiers, electrostatic printers, and other motorized equipment. When you use exposed twisted-pair wiring, you should route the wiring as far away as possible from power cords and data cables to minimize interference.

3.2 Network Connections

All connections are made through the back panel for the Twister Media Converters. Twister connections are made through the front panel connectors.

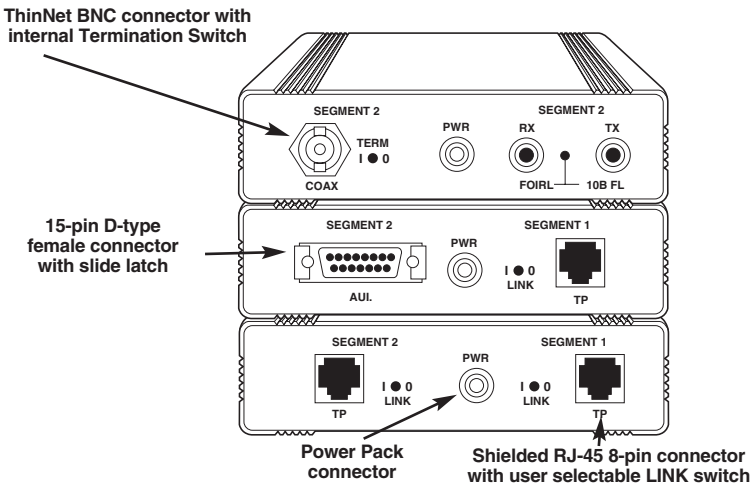


Fig. 3-1. Network Connections for the Twister Media Converters.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER

3.2.1 MEDIA CONVERTER EXTENDER 10BT/10BT

The LE681A attaches to the twisted-pair network via a shielded RJ-45 connector designated TP. The maximum supported link length is 100 meters or 328 feet.

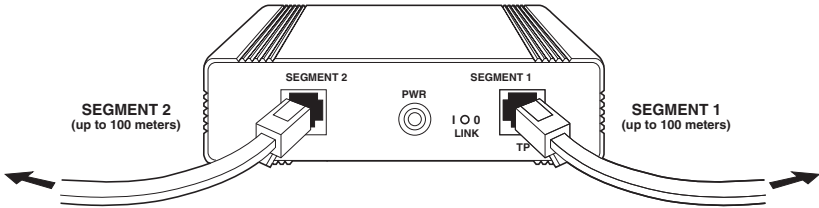


Fig. 3-2. Media Converter Extender 10BT/10BT.

Switch Settings

Configure the unit for 10BASE-T or pre-10BASE-T operation via the Link (Link Status) switch. Use a paperclip to slide the switch to the correct position:

- 0 position: Link status disabled (backward compatibility with pre-10BASE-T products)
- 1 position: Link status enabled for 10BASE-T operation (checks link integrity from one device to another)

NOTE

If you are connecting from a twisted pair port on the Twister directly to a 10BASE-T hub, use a straight through 10BASE-T cable.

3.2.2 TWISTER MEDIA CONVERTER 10BT/FIBER SMA AND TWISTER MEDIA CONVERTER 10BT/FIBER-ST

The LE611A-ST-R2 provides ports for ST® fiberoptic cable and the LE611A-SMA provides ports for SMA fiberoptic cable. Both models allow for complete support of either FOIRL or 10BASE-FL link through a user selectable switch. You can use up to 2 km of fiberoptic cable on a remote link.

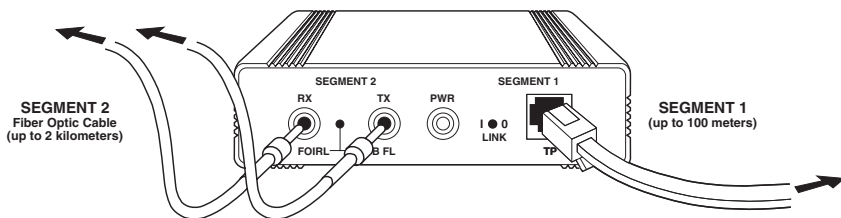


Fig. 3-3. Twister Media Converter 10BT/Fiber SMA.

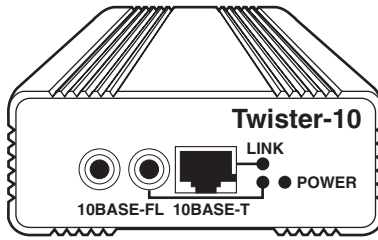


Fig. 3-4. Twister Media Converter 10BT/Fiber-ST.

Switch Settings

Configure the unit for 10BASE-T or pre-10BASE-T operation via the Link (Link Status) switch. Use a paperclip to slide the switch to the correct position:

- 0 position: Link status disabled (backward compatibility with pre-10BASE-T products)
- 1 position: Link status enabled for 10BASE-T operation (checks link integrity from one device to another)

NOTE

If you are connecting from a twisted pair port on the Twister directly to a 10BASE-T hub, use a straight through 10BASE-T cable.

3.2.3 TWISTER MEDIA CONVERTER UTP/BNC

The unit attaches to the ThinNet coaxial cable via a standard BNC connector designated COAX, and supports a maximum segment length of 185 meters for RG-58 ThinNet cable.

Switch Settings

You can manually terminate the BNC port through a user-selectable switch on the back panel, marked TERM, so you can directly attach media without the need for a “tee” connection. Use a paperclip to slide the switch to the correct position:

- 0 position: Disable termination (for use in the middle of the segment, when you have a T connector on the unit with devices on either side of the unit)
- 1 position: Terminate enable (for use at the beginning or end of a coax ThinNet run into the converter)

Configure the unit for 10BASE-T or pre-10BASE-T operation via the Link (Link Status) switch. Use a paperclip to slide the switch to the correct position:

- 0 position: Link status disabled (backward compatibility with pre-10BASE-T products)
- 1 position: Link status enabled for 10BASE-T operation (checks link integrity from one device to another)

NOTE

If you are connecting from a twisted pair port on the Twister directly to a 10BASE-T hub, use a straight through 10BASE-T cable.

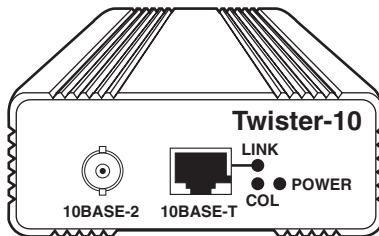


Fig. 3-5. Twister Media Converter UTP/BNC.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER

You can connect the unit to the coax cable as a daisy-chained unit or as a terminating unit. The TERM switch set in the “0” position selects daisy-chained mode. Use termination mode when the unit is connected to the end of the coax cable. Use daisy-chain mode when the unit is connected through a “tee.”

This device was shipped from the factory with the internal termination disabled. The unit will not operate correctly if the termination switch is set incorrectly.

Please note that the coaxial cable of a LAN must be properly terminated at each end regardless of the device used at the end of each cable. A BNC terminator must be attached to each end of each trunk segment. One of the two terminators on each segment must be grounded. See Fig. 3-6.

The “0” position disables internal termination, so that an external “T” connector may be used, and the “1” position enables internal termination for use without an external “T” connector when the converter is at the beginning or end of a Thin Ethernet segment.

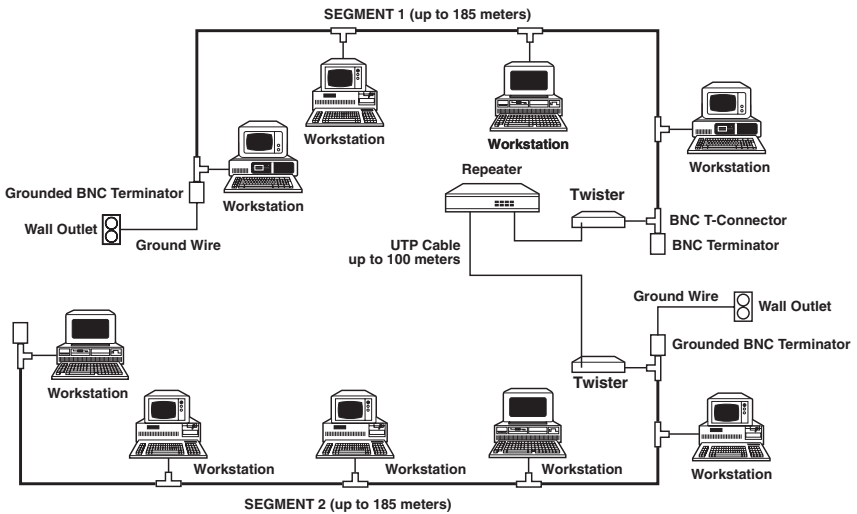


Fig. 3-6. Typical Configuration Using Twister Media Converter UTP/BNC.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER

3.2.4 TWISTER MEDIA CONVERTER 10BT/AUI

The unit provides a 15-pin AUI D-type connector for attaching a DCE device and supports a maximum segment length of 50 meters.

NOTES

1. This unit is not compatible with Ethernet V.1.
2. When attaching a Version 2 or 802.3 transceiver to the AUI port, you must disable the SQE function.

Switch Settings

Configure the unit for 10BASE-T or pre-10BASE-T operation via the Link (Link Status) switch. Use a paperclip to slide the switch to the correct position:

- 0 position: Link status disabled (backward compatibility with pre-10BASE-T products)
- 1 position: Link status enabled for 10BASE-T operation (checks link integrity from one device to another)

NOTE

If you are connecting from a twisted pair port on the Media Converter directly to a 10BASE-T hub, use a straight through 10BASE-T cable. See Fig. 5-1.

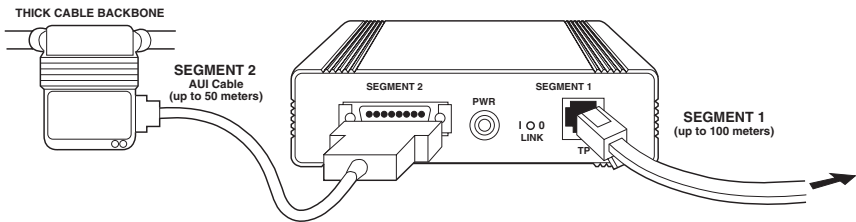


Fig. 3-7. Twister Media Converter 10BT/AUI.

3.2.5 TWISTER MEDIA CONVERTER BNC/FIBER-ST AND SMA

The LE614A-ST provides ports for ST® fiberoptic cable and the LE614A-SMA provides ports for SMA fiberoptic cable. Both models allow for complete support of either FOIRL or 10BASE-FL link through a user selectable switch. You can use up to 2 km of fiberoptic cable on a remote link.

The unit attaches to the ThinNet coaxial cable via a standard BNC connector designated COAX, and supports a maximum segment length of 185 meters for RG-58 ThinNet cable.

Switch Settings

You can manually terminate the BNC port through a user-selectable switch on the back panel, marked TERM, so you can directly attach media without the need for a “tee” connection. Use a paperclip to slide the switch to the correct position:

- 0 position: Disable termination (for use in the middle of the segment, when you have a T connector on the unit with devices on either side of the unit)
- 1 position: Terminate enable (for use at the beginning or end of a coax ThinNet run into the converter)

You can connect the unit to the coax cable as a daisy-chained unit or as a terminating unit. The TERM switch set in the “0” position selects daisy-chained mode. Use termination mode when the unit is connected to the end of the coax cable. Use daisy-chain mode when the unit is connected through a “tee.”

This device was shipped from the factory with the internal termination disabled. The unit will not operate correctly if the termination switch is set incorrectly.

Please note that the coaxial cable of a LAN must be properly terminated at each end regardless of the device used at the end of each cable. A BNC terminator must be attached to each end of each trunk segment. One of the two terminators on each segment must be grounded.

The “0” position disables internal termination, so that an external “T” connector may be used, and the “1” position enables internal termination for use without an external “T” connector when the converter is at the beginning or end of a Thin Ethernet segment.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER

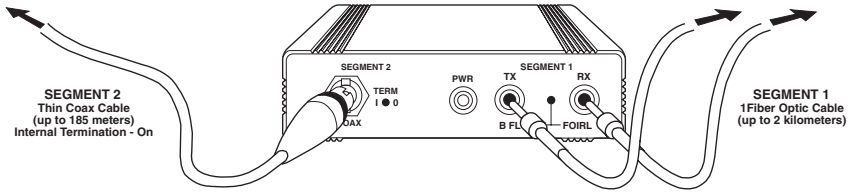


Figure 3-8. Twister Media Converter BNC/Fiber-ST or SMA.

3.2.6 TWISTER MEDIA CONVERTER UTP/FIBER-ST

The LE615A-R2 provides ports for ST® fiberoptic cable. It allows for complete support of either FOIRL or 10BASE-FL link through a user selectable switch. You can use up to 2 km of fiberoptic cable on a remote link.

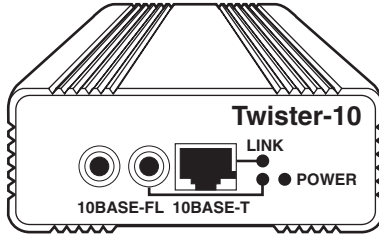


Fig. 3-9. Twister Media Converter UTP/Fiber-ST.

Switch Settings

Configure the unit for 10BASE-T or pre-10BASE-T operation via the Link (Link Status) switch. Use a paperclip to slide the switch to the correct position:

- 0 position: Link status disabled (backward compatibility with pre-10BASE-T products)
- 1 position: Link status enabled for 10BASE-T operation (checks link integrity from one device to another)

NOTE

If you are connecting from a twisted pair port on the Twister directly to a 10BASE-T hub, use a straight through 10BASE-T cable.

4. Operation

4.1 System LEDs

The green POWER LED indicates that proper power is being provided to the unit through the power module.

The ACTIVITY (ACT) LED indicates global network functioning. Incoming signals from the receive twisted pair are detected, amplified, and translated into signals appropriate for the other segments. Likewise, signals that originate on the other segments are detected, amplified, and translated into signals that are presented to the transmit pair of the twisted-pair segment. The restored/translated signal is then imposed on the other segment. Any signal activity originating on a particular segment will cause the ACTIVITY LED (ACT) to light, indicating data activity on that segment.

The COLLISION (COL) indicator lights when the unit detects a collision condition and subsequently originates jam packets to both segments.

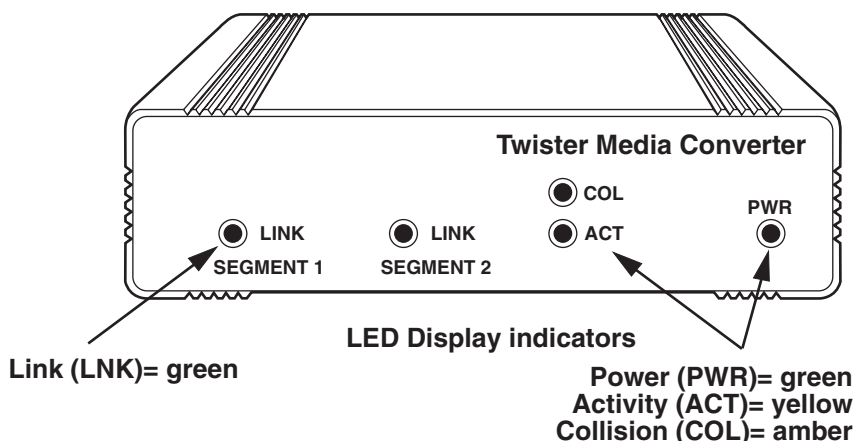


Fig. 4-1. LED Display Indicators on the Twister Media Converter.

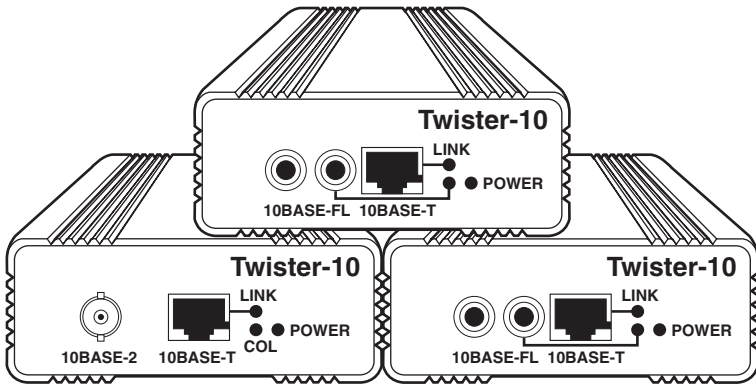


Fig. 4-2. LED Display Indicators on the Twister Media Converter.

4.2 Power

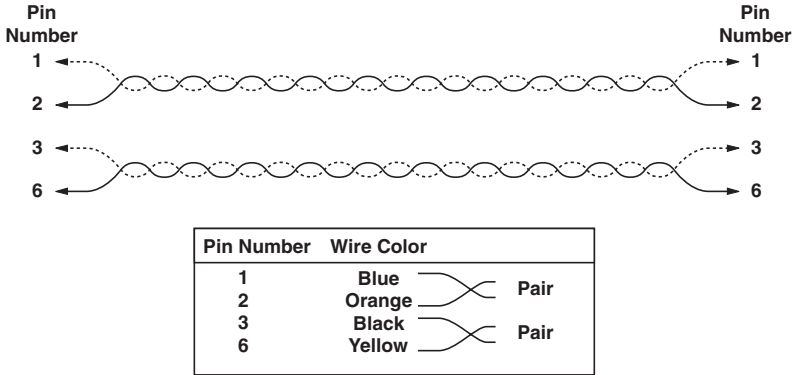
An in-line, 100-240 VAC power module provides power to the Twister Media Converter via a coaxial-type power connector designated POWER. The Twister-10 is powered by a 3 W, 5 VDC, 110 VAC single input, desktop-mounted power supply via a power connector on the rear of the unit.

The unit will operate as specified when you apply power to it. There is no power switch. When the unit receives power, it will go into normal operation mode and automatically provide the appropriate signal translation between the connected network segments.

NOTE

The unit may show false activity if you power it up without properly connecting the appropriate segments.

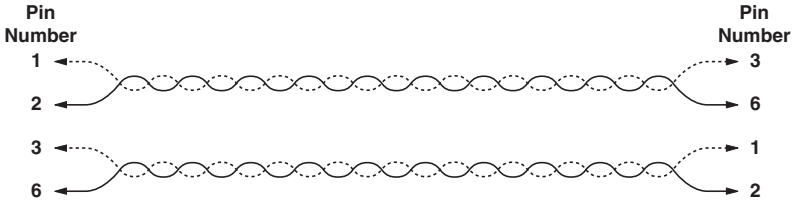
5. Cable Pinning



Note: Wire colors may be different from those represented here. Pinning, pairing, and color of any wires on pins 4, 5, 7, and 8 are irrelevant.

Fig. 5-1. Straight-Through Cable Pinning and Pairing.

TWISTER MEDIA CONVERTER AND MEDIA CONVERTER EXTENDER



Pin Number	Wire Color		Wire Color	Pin Number
1	Blue	Pair	Blue	3
2	Orange		Orange	6
3	Black	Pair	Black	1
6	Yellow		Yellow	2

Note: Wire colors may be different from those represented here. Pinning, pairing, and color of any wires on pins 4, 5, 7, and 8 are irrelevant.

Fig. 5-2. Crossed Cable Pinning and Pairing.



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