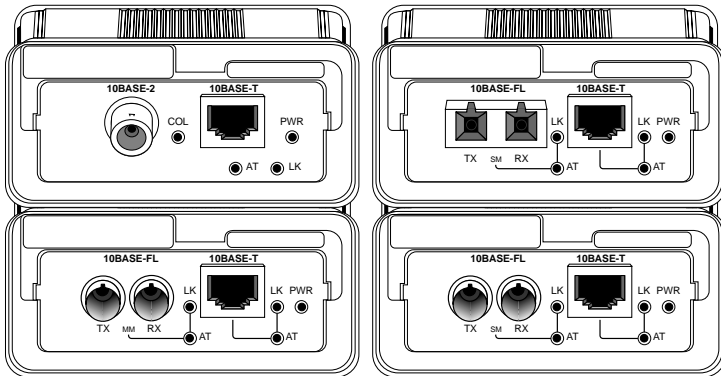




JULY 1999
LE612A-R4
LE612A-R5
LE611A-ST-R4
LE611A-ST-R5
LE615A-R4
LE615A-R5
LE611A-SMA-R4
LE611A-SC-R4

“twister”™

10MBPS MEDIA CONVERTERS



Installation & User Guide

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INFORMATION**

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Introduction

Thank you for choosing “twister” media converters.

Media converters represent the hottest technology available for extending Ethernet and Fast Ethernet networks. “twister” media conversion has become a standard for providing a cost-effective means of integrating a mixed media environment. As LANs grow and evolve, this technology provides an ideal solution for building effective migration strategies.

These IEEE 802.3 compliant media converters are compatible with Ethernet devices from other leading network technology providers. This increases the flexibility of your network configuration by ensuring reliable data transmission in multi-vendor as well as mixed media environments.

The information in this guide will help you to install and start using your “twister” media converter.

Overview

The “twister” 10Mbps media converters provide seamless

integration of 10BASE-T Category 3, 4 and 5 twisted-pair with singlemode and multimode 10BASE-FL fiber optic segments as well as thinnet coax in Ethernet environments.

To optimize your Ethernet network, the media converter provides seamless operation in half-duplex or full-duplex environments. Full signal restoration—with a low bit delay — ensures accurate data transmission to and from LANs within an organization. All signal activity is completely converted ensuring accurate communication and collision detection in connected segments and allowing maximum media length to be achieved on either side of the device.

The “twister” provides the following key features:

- A Link Loss Carry Forward (LLCF) enable/disable switch* is included to provide an easy means for troubleshooting a remote network connection. Refer to the section of this guide titled *Link Loss Carry Forward* for more information.
- All twisted-pair ports are equipped with an MDI-II to MDI-X switch eliminating the need for crossover cables.
- Auto polarity support on all twisted-pair ports.

Whether you are updating or expanding your existing network, the line of “twister” media converters supports a wide range of configuration needs. The “twister” includes the following media conversion combinations:

Universal Power Supply (90-250V)

LE612A-R4	RJ-45 to BNC
LE612A-R5	RJ-45 to BNC CABLE IN A BOX
LE611A-SC-R4	RJ-45 to FL multimode SC
LE611A-ST-R4	RJ-45 to FL multimode ST
LE611A-ST-R5	RJ-45 to FL multimode ST CABLE IN A BOX
LE615A-R4	RJ-45 to FL singlemode ST
LE615A-R5	RJ-45 to FL singlemode ST CABLE IN A BOX
LE611A-SMA-R4	RJ-45 to FL multimode SMA

* Does not apply to the LE612A-R4, R5 (BNC).



Installation Guide

Follow the simple steps outlined in this section of the guide to install and start using your “twister” media converter.

1

Unpack the “twister” and any accessories.

Check that the following components have been included with your order:

- “twister” media converter
- Power Supply
- Power Cord
- Four (4) Rubber Feet

Your order has been provided with the safest possible packaging, but shipping damage does occasionally occur. Inspect your order carefully. If you discover any shipping damage, notify the carrier and follow their instructions for damage and claims. Save the original shipping carton in case return or storage of the unit is necessary.

2

Choose an appropriate location.

The “twister” media converter is intended for use in either office or industrial environments. The unit must be located within six (6) feet of the AC power source being used and placed as far away as possible from electrical noise generating equipment such as copiers, electrostatic printers and other motorized equipment. If exposed twisted-pair wiring is used nearby, the wiring should be routed as far away as possible from power cords and data cables to minimize interference.

The units may be oriented in any manner which permits the user to make physical connection to the power supply and leaves a minimum of six (6) inches of space for proper ventilation.

TUV Compliance Note. *For pluggable equipment, the socket outlet must be installed near the equipment and be easily accessible. Bei Geräten mit Steckanschluß muß die Steckdose nahe dem Gerät angebracht und leicht zugänglich sein.*

3

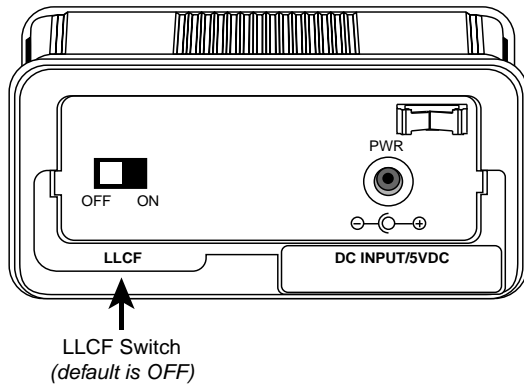
Set the Switches.

Link Loss Carry Forward (LLCF) Switch.*

The media converter incorporates Link Loss Carry Forward (LLCF) functionality as an aid in troubleshooting a remote connection.

A switch for enabling/disabling LLCF is located on the rear panel of the converter. When LLCF is enabled, the fiber optic ports as well as the twisted-pair ports on the “twister” media converter do not transmit a link signal until they receive a link signal from the opposite port. Refer to the page titled *Link Loss Carry Forward* in the *User Guide* section of this manual for more detailed information.

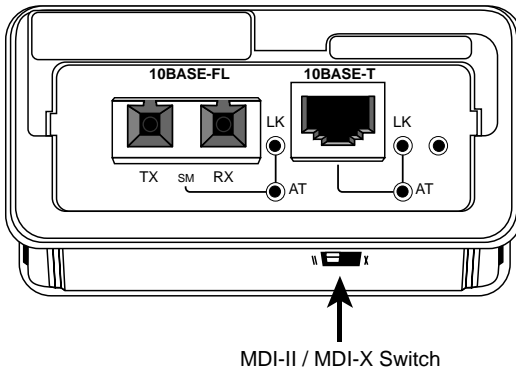
The unit is shipped with the LLCF disabled. To re-set the LLCF, simply slide the switch to the appropriate setting.



* Does not apply to the LE612A-R4, R5 (BNC).

MDI-II to MDI-X Switch.

All “twister” media converters with twisted-pair ports have an MDI-II to MDI-X switch that eliminates the need for crossover cables. This switch is located on the bottom of the unit directly below the RJ-45 connector and allows simple setup in either straight through or crossover configurations. Refer to the illustration below.



When setting the MDI-II to MDI-X switch, observe the positioning of the following symbols:

- the parallel symbol (||) indicates a straight through or parallel connection.
- the cross symbol (X) indicates a crossover connection.

These symbols are clearly marked on the bottom of the unit. Using a pointed object, simply slide the switch in the direction of the appropriate symbol. Use the following table as a guide:

A device that is wired straight through, needs one crossover connection:	
If the cable is...	... the MDI-II to MDI-X Switch Setting should be
straight through	X
crossover	

A device that is wired crossover, needs a parallel connection:	
If the cable is...	... the MDI-II to MDI-X Switch Setting should be
straight through	
crossover	X

4

Connect to the network.

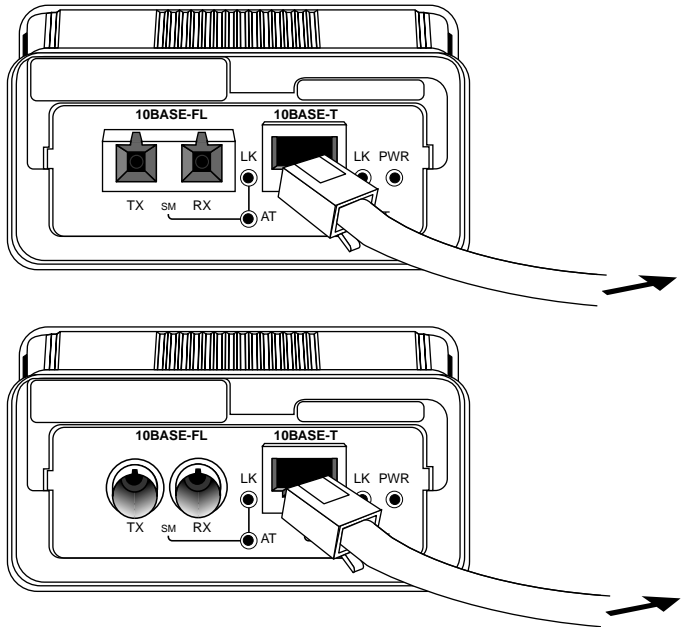
The “twister” media converter offers the ease of plug-and-play installation. Please refer to the appropriate section below for more information and guidelines regarding specific network connections.

Twisted-pair Connections (all models).

The “twister” provides one shielded RJ-45 connector for Category 3, 4 or 5 twisted-pair segments and supports a maximum link length of 100 meters.

NOTE: Be sure you have set the MDI-II to MDI-X switch located on the bottom of the unit to the proper configuration. Refer back to STEP 3 if necessary.

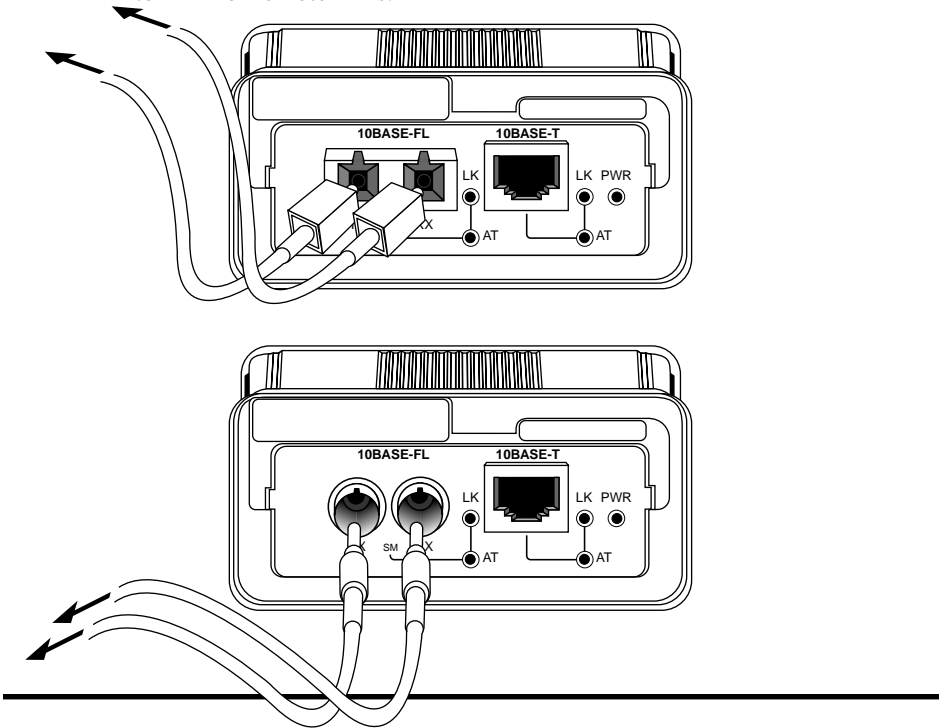
Once power is applied to the unit, correct connectivity can be verified via the LK (link) LED.



Fiber Optic Connections

These “twister” models support 10BASE-FL segments via ST, SMA or SC connectors:

- the LE611A-SC-R4 provides one set of FL multimode SC connectors and support a maximum segment length of up to 2km for remote links.
- the LE611A-ST-R4, -R5 provides one set of FL multimode ST connectors and support a maximum segment length of up to 2km for remote links.
- the LE615A-R4, -R5 provides one set of FL singlemode ST connectors and support a maximum segment length of up to 15km for remote links.
- the LE611A-SMA-R4 provides one set of FL multimode SMA connectors and support a maximum segment length of up to 2km for remote links.

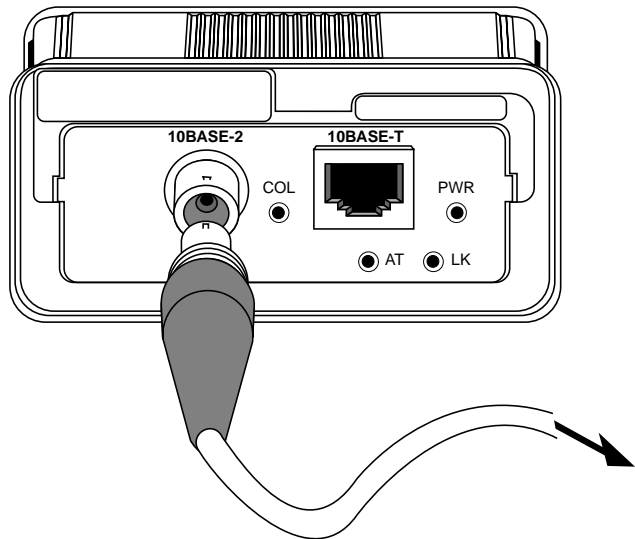


When making fiber optic connections, be sure that the transmit (TX) port of the “twister” connects to the receive (RX) port of the connected device; and be sure that the transmit (TX) port of the connected device connects to the receive (RX) port of the “twister” unit.

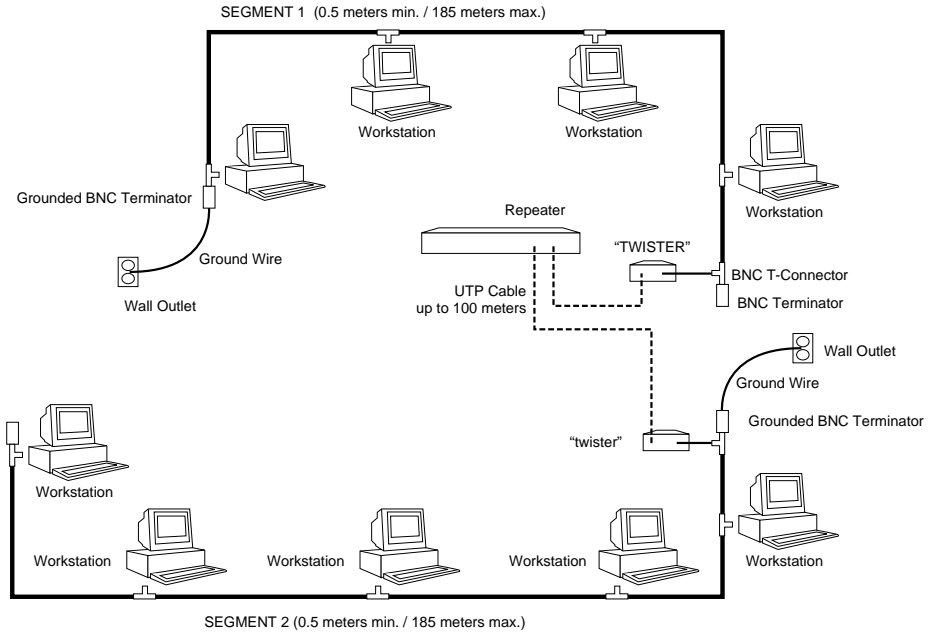
Once power is applied to the unit, correct connectivity can be verified via the LK (Link) LED.

BNC Connections

The LE612A-R4, -R5 attaches to thinnet coaxial cable via a standard BNC connector and supports a maximum segment length of 185 meters. The unit is shipped from the factory with the termination disabled. Use the unit in a daisy-chain configuration or use a T-connector for proper termination.



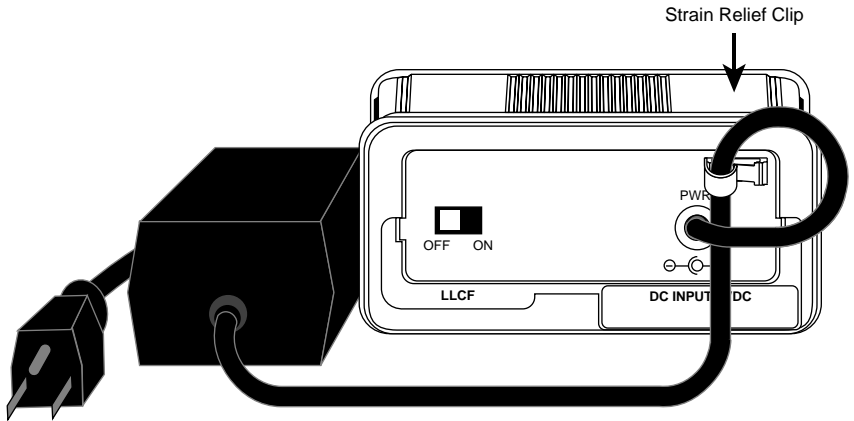
IMPORTANT: The coaxial cable of a LAN must be properly terminated at each end regardless of the device used at the end of each cable. A BNC terminator must be attached to each end of each trunk segment. One of the two terminators on each segment must be grounded. Refer to the illustration below:



5 **Apply power.**

Power is provided to the “twister” unit from the desktop power supply module. This power module is equipped with a S760 hollow-type plug for insertion into the DC jack located on the back of the “twister” unit and standard IEC 320-type AC power receptacle.

When making power connections, it is recommended that the DC power cord be connected to the DC input jack located on the back of the “twister” media converter *before* making the AC connection to the outlet. Be sure to seat the power cord into the strain relief clip to ensure against accidental disconnection.



Upon receiving power, the “twister” media converter goes into normal operation mode and automatically provides the appropriate signal translation between the connected network segments.

Be sure to verify correct segment connectivity via the LK (link) LEDs on the front of the unit.

If an additional extension cord is used to connect the power module to the power source, the following guidelines must be followed:

While one end of the AC power cord can be fitted with whatever plug is standard for the country of operation, the end that connects to the “twister” power supply module must have a female plug that fits this type of AC receptacle.

- AC 115V (North American): use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, type SVT or SJT three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15A, 125V.
- AC 230V (USA): use a UL-listed cord set consisting of a minimum No. 18 AWG, type SVT three-conductor cord, a maximum of 15 feet in length and a Tandem blade grounding-type attachment plug rated 15A, 250V.
- 240V (outside USA): use a cord set consisting of a minimum No. 18 AWG cord and grounding-type attachment plug rated 15A, 250V. The cord set should have the appropriate safety approvals for the country in which the “twister” is installed and should be marked HAR.

User Guide

This section contains more detailed user information regarding certain operating features for your “twister” Media Converter.

System LEDs

The “twister” media converter provides LEDs for the visible verification of unit status and proper functionality as well as aiding in troubleshooting and overall network diagnosis and management.

LEDs indicate the following:

- PWR (power): the unit is ON and functioning in normal operation mode.
- LK: (link; twisted-pair and fiber optic ports): satisfactory link status on the respective port.
- AT (activity): the port is receiving data.
- COL* (collision): detection of a collision condition and subsequent JAM packets generated on both segments.

Once power is applied to the unit, correct connectivity can be verified via the LK LED.

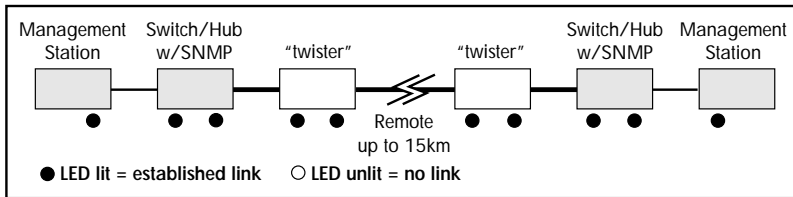
* Applies to the LE612A-R4, R5 (BNC) only.

Link Loss Carry Forward (LLCF)*

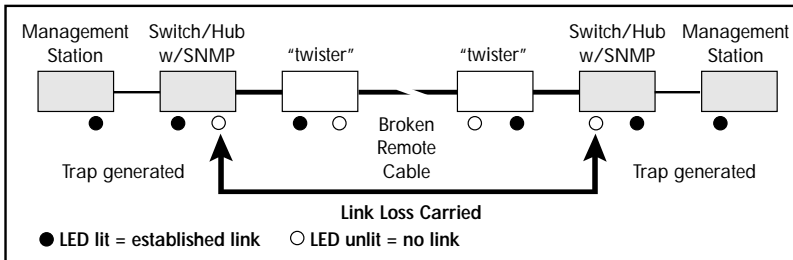
The “twister” has been designed with an LLCF function for troubleshooting a remote connection. The unit is shipped with the LLCF disabled.

When LLCF is enabled, the fiber optic ports as well as the twisted-pair ports on the “twister” do not transmit a link signal until they receive a link signal from the opposite port. For example, if LLCF is enabled and two “twister” media converters are connected via a fiber cable with nothing else connected to them, the Link LED does ***not*** illuminate. When a valid link is established at the twisted-pair port, a complete connection is accomplished.

The diagram below shows a typical network configuration using a “twister” media converter for remote connectivity:



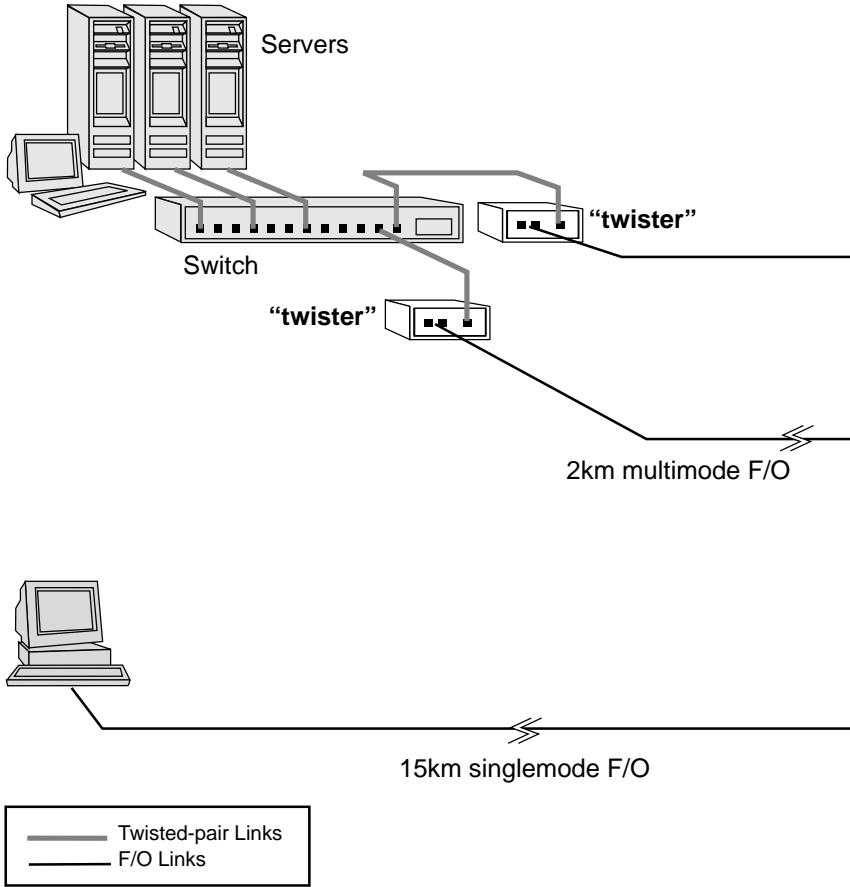
If the fiber connection breaks, or the remote device fails, the “twister” media converter carries that link loss all the way to the switch/hub which generates a trap to the management station. The administrator can then look at the media converter to determine the source of the loss.

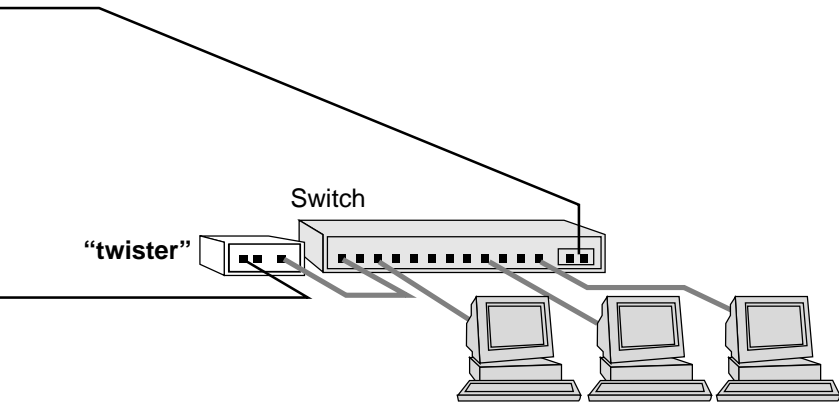
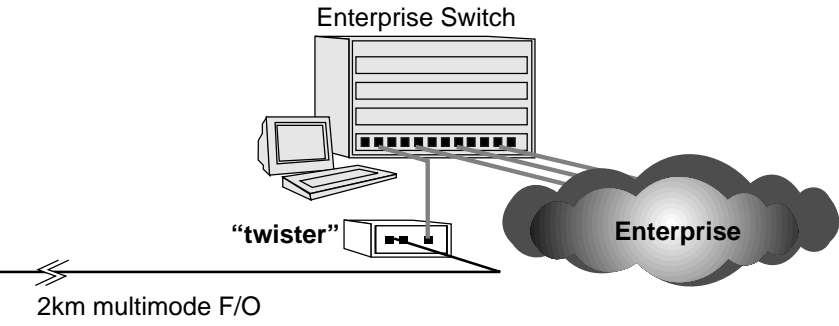


IMPORTANT: When connecting a “twister” media converter to a port that supports auto-negotiation, it is strongly recommended to fix the port setting to the appropriate speed (100Mbps or 10Mbps) and to either full or half-duplex. This allows the media converter to sense receive link and select the active port.

* Does not apply to the LE612A-R4, R5 (BNC).

Topology Solutions





Technical Specifications

Data Rate _____ 10Mbps half-duplex; 20Mbps full-duplex
Bit Delay _____ < 5 bits
Power Input _____ 90-260V AC 50/60 Hz
Power Output _____ +5VDC @ 1.2 A

Network Connections

Twisted-Pair Interface

Connector _____ Shielded RJ-45, 8-pin jack
Impedance _____ 100 Ohms nominal
Signal Level Output (differential) _____ 2.0 to 2.8V
Signal Level Input _____ 350mV minimum
Supported Link Length _____ 100m
Cable Type _____ Category 3, 4, or 5 UTP

Multimode Fiber Optic Interface

Connector _____ ST, SMA or SC
RX Input Sensitivity _____ -32.5 dBm peak minimum
Output Power _____ -21.8 dBm to -16.8 dBm (50/125 μ m)
_____ -19 dBm to -14 dBm (62.5/125 μ m)
Supported Link Length _____ up to 2km full duplex
Cable Type _____ 50/125, 62.5/125, 100/140 μ m F/O

Singlemode Fiber Optic Interface

Connector _____ ST
RX Input Sensitivity _____ -32.5 dBm peak minimum
Output Power _____ -17 dBm to -23 dBm (9/125 μ m)
Supported Link Length _____ up to 15km full duplex
Cable Type _____ 8.3/125, 8.7/125, 9/125, 10/125 μ m F/O

Thinnet Coax Interface

Connector _____ BNC receptacle
Internal Transceiver _____ IEEE 802.3
Termination _____ disabled
Supported Link Length _____ up to 185m
Cable Type _____ RG-58 coaxial cable

Environmental

Operating Temperature _____ 0° — 55° C
Storage Temperature _____ -25° —70° C
Relative Humidity _____ 5% — 95% non-condensing
Physical Case _____ Fully enclosed metal construction
Dimensions _____ 4.83" L x 3.26" W x 1.71" H
Weight _____ 3 lbs (including power supply)

Product Safety, EMC and Compliance Statements

This equipment complies with the following requirements:

- UL
- CSA
- EN60950 (safety)
- FCC Part 15, Class A
- EN55022 Class A (emissions)
- EN50082-1 (immunity)
- IEC 802.3
- IEC 825-1 Classification
Class 1 Laser Product

Radio Frequency Interference Statement

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital 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 case the user will be required to correct the interference at his own expense.

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

Canadian Radio Frequency Interference Statement

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Electrical Safety Statement
Normas Oficiales Mexicanas (NOM)

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.



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