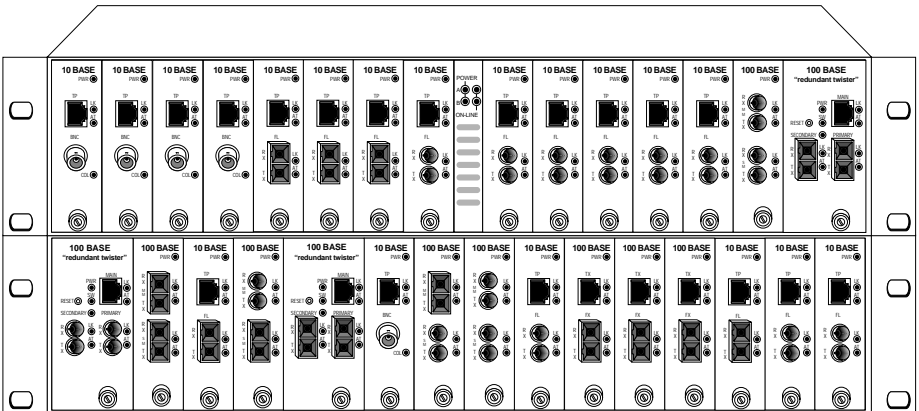# "twister"™
MEDIA CONVERTER 7000

Installation & User Guide

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INFORMATION

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"twister" Media Converter 7000 Chassis:

LE7300A	_____	17-slot 2U chassis with single fixed AC power supply
LE7300A-PS	_____	16-slot 2U chassis with dual fixed AC power supplies
LE7306A	_____	6-slot 2U chassis with power supply and one 50-pin TELCO
LE7312A-R2	_____	12-slot 2U chassis with single load-sharing capable power supply module and two 50-pin TELCO
LE7312A-PS-R2	_____	12-slot 2U chassis with dual (2) load-sharing capable power supply modules and two 50-pin TELCO

100Mbps "twister" Media Converter 7000 Modules:

LH7416C-SX-R2	_____	RJ-45 to SX multimode SC
LH7416C-SXST-R2	_____	RJ-45 to SX multimode ST
LH7402C-TX-R2	_____	RJ-45 to Redundant TX
LH7403C-MMSC-R2	_____	RJ-45 to Redundant FX multimode SC
LH7404C-SMSC-R2	_____	RJ-45 to Redundant FX singlemode SC
LH7403C-MMST-R2	_____	RJ-45 to Redundant FX multimode ST
LH7403C-SMST-R2	_____	RJ-45 to Redundant FX singlemode ST
LH7420C-SCSC-R2	_____	FX multimode SC to FX singlemode SC
LH7420C-SCST-R2	_____	FX multimode SC to FX singlemode ST
LH7421C-STSC-R2	_____	FX multimode ST to FX singlemode SC
LH7421C-STST-R2	_____	FX multimode ST to FX singlemode ST
LH7414C-R2	_____	RJ-45 to FX multimode SC
LH7416C-R2	_____	RJ-45 to FX singlemode SC
LH7415C-R2	_____	RJ-45 to FX multimode ST
LH7416C-ST-R2	_____	RJ-45 to FX singlemode ST
LH7416C-40KM-R2	_____	RJ-45 to FX singlemode SC (40km)

10Mbps "twister" Media Converter 7000 Modules:

LE7402C-TX	_____	RJ-45 to Redundant RJ-45
LE7313C-R2	_____	RJ-45 to Thinnet Coax
LE7313C-SC-R2	_____	RJ-45 to FL multimode SC
LE7314C-R2	_____	RJ-45 to FL multimode ST
LE7316C-R2	_____	RJ-45 to FL singlemode ST
LE7316C-MM-R2	_____	RJ-45 to FL multimode SMA

The information contained in this document is assumed to be correct and current. The manufacturer is not responsible for errors or omissions and reserves the right to change specifications at any time without notice.

Table of Contents

"twister" Media Converter 7000 Installation & User Guide

Introduction

Thank you for choosing the "twister" Media Converter 7000.
The "twister" Media Converter provides a cost-effective means of integrating a mixed media environment. The information in this guide helps you to install and start using your "twister" Media Converter 7000.

Overview

Your "twister" Media Converter 7000 offers transparent media conversion and provides an effective means for integrating coax, Category 3, 4, or 5 twisted pair and singlemode or multimode fiber optic LAN segments into either switched or shared Ethernet and Fast Ethernet environments.

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

All "twister" solutions provide media conversion with a low bit delay. The converter modules reliably translate all signal activity from one cable medium to the other ensuring accurate data flow across the network.

The "twister" Media Converter 7000 offers front accessible network connections for ease of installation and maintenance. The LE7300A is a 17-slot 2U chassis with a single internal power supply; the LE7300A-PS is a 16-slot 2U chassis with dual internal power supplies. This power redundancy ensures continued operation in high-priority traffic and business-critical applications. These rack-mountable models fit standard 19" equipment racks and the 2U chassis height provides housing for the maximum number of "twister" modules.

Whether you are updating or expanding your existing network, the "twister" Media Converter 7000 supports a wide range of configuration needs. Each chassis unit supports multiple 10 and 100Mbps media types—via "twister" modules—in any combination. In addition, the "redundant twister"™ modules and dual power supplies provide redundancy for uninterrupted network

operation. Please refer to the section in this **User Guide** titled *"twister" 7000 Modules* for a complete description of each module.

The "twister" Media Converter 7000 provides the following key features:

- A Link Loss Carry Forward (LLCF) enable/disable switch is installed on all modules (except the BNC connector module, LE7313C-R2). Refer to the section of this guide titled *Link Loss Carry Forward* for more information.

- An MDI-ll/MDI-X switch is installed on all TP ports.

- Fused power on each module protects the rest of the modules in the chassis from a short circuit. The power (PWR) LED on an affected module does not illuminate if the fuse is blown.

- Auto polarity support on all twisted-pair ports.

- "redundant twister" modules can be configured to operate in Dynamic Recovery Mode (DRM) to ensure session integrity and increased uptime, or in Network Select Mode (NSM) to redirect traffic and add security through link isolation.

Related Documentation
Refer to the following documentation for additional specific information on the "twister" Media Converter 7000:

- "redundant twister"™ Media Converter 7000 Installation & User Guide
- "twister" Media Converter 7000 Modules Quick Reference

Installation Guide

**Follow the simple steps outlined in this section of the manual to install
and start using the "twister" Media Converter 7000 chassis.**

1

Unpack the chassis and any accessories.

Check that the following components have been included:
- "twister" Media Converter 7000 chassis
- Power Cord (one each per power supply)
- Rackmounting Hardware

The following items are available separately:
- "twister" Modules
- Blank Panels for unused chassis slots

Your order has been provided with the safest possible packaging,
but shipping damage does occasionally occur. Inspect it 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

Mount the chassis in an appropriate location.

The "twister" Media Converter 7000 chassis is designed to
be mounted in a standard 19-inch equipment rack. Use the
rackmounting hardware included with the unit to secure the
mounting brackets to the unit. Use the separate screws provided
with the equipment rack to mount the chassis on the rack. Be sure
that the mounting of the equipment in the rack does not impose a
hazardous condition due to uneven mechanical loading.

*Caution. Elevated ambient conditions may occur in an enclosed
equipment rack or multi-rack assembly. Consideration should be
taken when installing the chassis to ensure that the exhaust fan at
the rear of the unit is not blocked—improper venting of the exhaust
fan may cause the unit to overheat.*
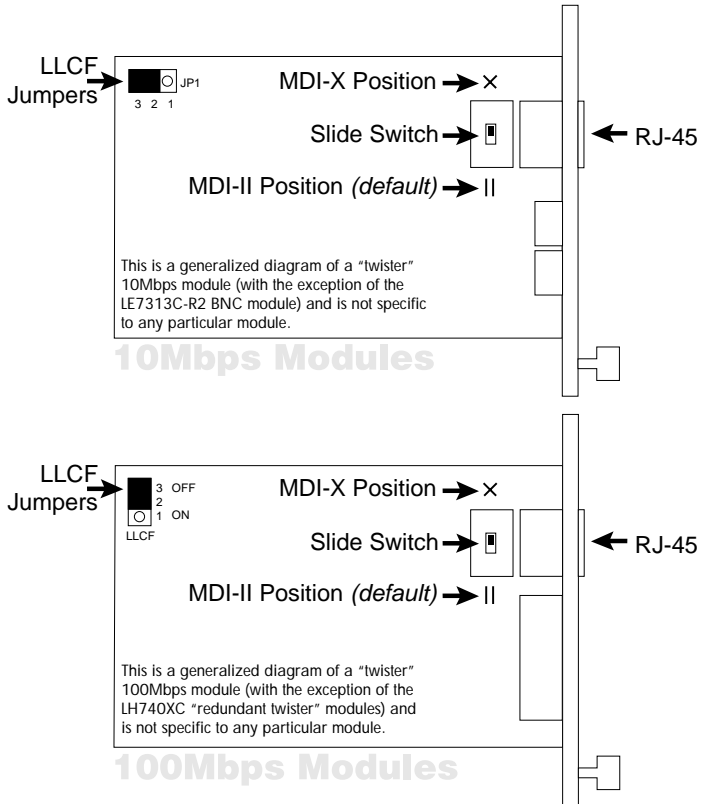
*TUV Compliance Note. For pluggable equipment, the socket outlet
must be installed near the equipment and be easily accessible.
Bei Geräten mit Steckanschluß muß die Steckdose nahe dem Gerät
angebracht und leicht zugänglich sein.*

3 ***Set the Switches and Jumpers.***
Locate the switches and jumpers.
The following illustrations show the orientation of the DIP switches and LLCF jumpers for the 10Mbps and 100Mbps "twister" modules. These illustrations are generalized and not specific to a particular module. Refer to the "redundant twister" module diagrams in the *User Guide* section of this document for more detailed information on the location and setting of the DIP switches for these particular modules.

LLCF Jumpers

MDI-X Position → ×

Slide Switch → ▮

← RJ-45

MDI-II Position *(default)* → ||

This is a generalized diagram of a "twister" 10Mbps module (with the exception of the LE7313C-R2 BNC module) and is not specific to any particular module.

10Mbps Modules

LLCF Jumpers

3 OFF
2
1 ON
LLCF

MDI-X Position → ×

Slide Switch → ▮

← RJ-45

MDI-II Position *(default)* → ||

This is a generalized diagram of a "twister" 100Mbps module (with the exception of the LH740XC "redundant twister" modules) and is not specific to any particular module.

100Mbps Modules

MDI-ll to MDI-X

All "twister" modules with twisted-pair ports have an MDI-ll to MDI-X switch. This switch is positioned directly behind it's associated RJ-45 connector and allows simple setup in either straight through *(default)* or crossover configurations.

When setting the MDI-ll to MDI-X switch, observe the positioning of the following symbols:
- the parallel symbol (**ll**) indicates a straight through or parallel connection (default)
- the cross symbol (**X**) indicates a crossover connection.

These symbols are clearly marked on the printed circuit board. 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	**ll**

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	**ll**
crossover	**X**

Link Loss Carry Forward (LLCF)[*]

LLCF functionality is incorporated on all "twister" modules with the exception of the LE7313C-R2 (BNC) module. Refer to the *User Guide* section titled *Link Loss Carry Forward* for more information.

- LE7313C-SC-, LE7314C-, LE7316C-, LE7316C-MM-R2 and LH741XC-R2 modules have a jumper for setting the LLCF. Refer to the module diagrams in the *User Guide* section of this document for more detailed information regarding configuration of this jumper.

- "redundant twister" modules have a DIP switch for setting LLCF. Refer to the "redundant twister" module diagrams in the *User Guide* section of this document for more detailed information regarding the location and setting of this DIP switch.

[*] The LLCF default setting is: *disabled*.
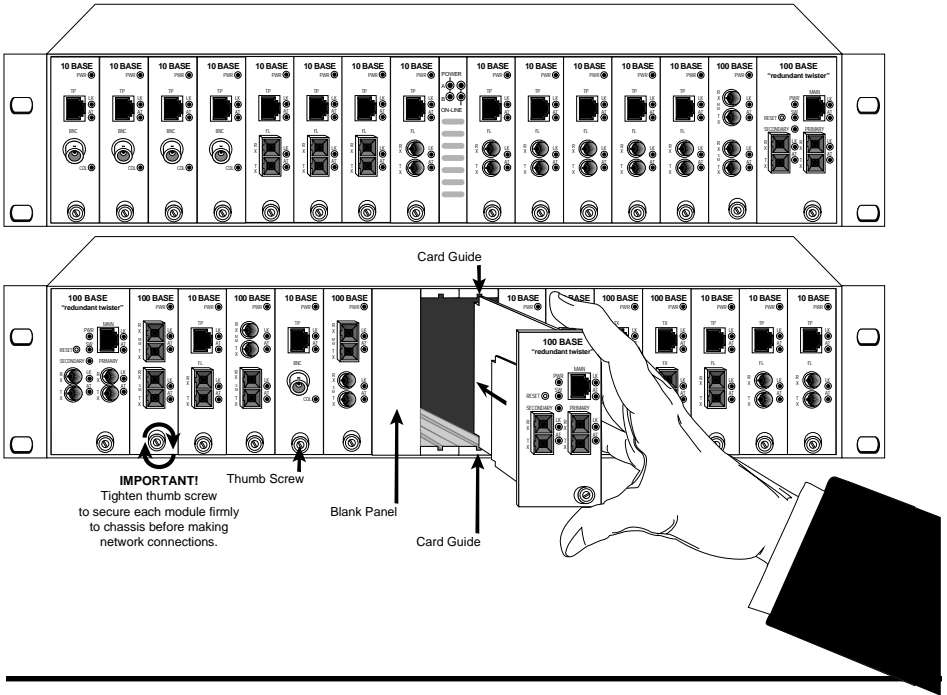
4 ***Install the "twister" 7000 Modules.***
Each chassis supports multiple 10 and 100Mbps media types—
via "twister" modules—in any combination. The modules offer
the ease of plug-and-play installation and are hot-swappable. A
complete listing of available "twister" modules and a short
description of the supported media conversion can be found in
the front of this product guide. Please refer to the section in the
User Guide titled *"twister" 7000 Modules* for a complete
description of each module.

Before installing any module, please make note of the following:
- "redundant twister" modules have a set of DIP switches
  located on the module board for setting user-selectable
  configurability options for several modes of operation.
  These DIP switches must be set before installing the
  modules in the chassis. Please refer to the section in the
  **"redundant twister" Media Converter 7000 Installation &
  User Guide** titled *Set the DIP Switches* for more detailed
  information.

- Because of the size of the "redundant twister" fiber optic
  modules, each TX-to-redundant FX module uses two slots
  in the chassis. The TX-to-redundant TX module uses only
  one slot.

- All "twister" modules must be firmly secured to the
  chassis before network connections are made.

Follow these simple steps to install "twister" modules:

- Grasp a module by the front panel as shown.

- Insert the module into a slot making sure that both the top and bottom of the card edges are lined up with the top and bottom slot guides. Do not force the module into the chassis unnecessarily. It should slide in easily and evenly.

- Slide the module in until the top and bottom edges of the front panel are flush and even with the top and bottom edges of the chassis.

- Secure the module to the chassis by turning the thumb screw clockwise until snug.

- The module is now properly installed and ready for connection to the network.

Card Guide

IMPORTANT!
Tighten thumb screw
to secure each module firmly
to chassis before making
network connections.

Thumb Screw

Blank Panel

Card Guide

5 **Connect to the Network.**

To connect the individual "twister" modules to the network, refer to the appropriate section in the the **User Guide** section of this manual.

• For more detailed information regarding the "redundant twister" module, refer to the *"redundant twister" Media Converter 7000 Installation & User Guide.*

6 **Apply power to the chassis.**

Each power supply includes a standard North American 3-pin power cord which is UL (USA), CSA or CUL (Canada) listed or approved. For installation in regions outside North America, replace the power cord with a cord approved by appropriate safety agencies. Any cord must have a CEE-22 standard V female connector on one end and meet IEC 320-030 specifications. European power cords must be harmonized and designated with a HAR marking on the outside of the cord jacket to comply with the CENELEC Harmonized Document HD-21

Caution. *The fully loaded chassis is rated for 2A AC maximum current. Ensure that the supply current available is sufficient to power the chassis. Refer to front/rear panel text for voltage/ current ratings. Reliable grounding of rackmount equipment should be maintained. Particular attention should be given to power supply connections other than direct connections to the branch circuit (e.g. use of power strips).*

Both the LE7300A-PS and LE7300A are shipped with fixed factory-installed power supplies that provide 150W of power to the chassis. These power supplies are *__not__* field replaceable.

• When making power connections, connect the power cord to the input jack located on the back of the chassis before making the IEC 320 connection to the outlet or appropriate voltage source.

User Guide

This section contains more detailed user information regarding certain operating features and maintenance instructions for your "twister" Media Converter 7000.

"twister" 7000 Modules

"twister" media conversion provides a cost-effective means of integrating various types of Ethernet and Fast Ethernet LAN segments.

"twister" modules provide media conversion with a low bit delay. All signal activity – including collision detection – is reliably propagated from one cable medium to the other ensuring accurate data flow across the network. Maximum segment lengths are supported on either side of the device. Seamless operation in half-duplex or full-duplex environments ensures interoperability with Ethernet and Fast Ethernet devices from other leading network technology providers. This increases the flexibility of network configurations by ensuring reliable data transmission in multi-vendor, as well as mixed media, environments.

An extensive line of plug-and-play, hot-swappable "twister" modules support 10 or 100Mbps operation and provide a variety of connector combinations for flexibility and adaptability.

"twister" Media Converter 7000 Modules:

100Mbps "twister" Modules:
LH7416C-SX-R2 _____ RJ-45 to SX multimode SC
LH7416C-SXST-R2 ____ RJ-45 to SX multimode ST
LH7402C-TX-R2 _____ RJ-45 to Redundant TX
LH7403C-MMSC-R2 ___ RJ-45 to Redundant FX multimode SC
LH7404C-SMSC-R2 ___ RJ-45 to Redundant FX singlemode SC
LH7403C-MMST-R2 ___ RJ-45 to Redundant FX multimode ST
LH7403C-SMST-R2 ____ RJ-45 to Redundant FX singlemode ST
LH7420C-SCSC-R2 ____ FX multimode SC to FX singlemode SC
LH7420C-SCST-R2 ____ FX multimode SC to FX singlemode ST
LH7421C-STSC-R2 ____ FX multimode ST to FX singlemode SC
LH7421C-STST-R2 ____ FX multimode ST to FX singlemode ST
LH7414C-R2 _____ RJ-45 to FX multimode SC
LH7416C-R2 _____ RJ-45 to FX singlemode SC
LH7415C-R2 _____ RJ-45 to FX multimode ST
LH7416C-ST-R2 _____ RJ-45 to FX singlemode ST
LH7416C-40KM-R2 ___ RJ-45 to FX singlemode SC
                    (40km extended distance support)

10Mbps "twister" Modules:
LE7402C-TX _____ RJ-45 to Redundant RJ-45
LE7313C-R2 _____ RJ-45 to Thinnet Coax
LE7313C-SC-R2 _____ RJ-45 to FL multimode SC
LE7314C-R2 _____ RJ-45 to FL multimode ST
LE7316C-R2 _____ RJ-45 to FL singlemode ST
LE7316C-MM-R2 _____ RJ-45 to FL multimode SMA

Caution. *All "twister" modules must be firmly secured to the chassis before network connections are made. Please refer to the section titled* **Installing "twister" 7000 Modules** *for instructions on the proper installation procedure.*

100Mbps "twister" 7000 Modules
Specifications
Data Rate _____ 100Mbps half-duplex
_____ 200Mbps full-duplex
Bit Delay _____ < 40 bits

Twisted-Pair Interface
Connector _____ Shielded RJ-45, 8-pin jack
Impedance _____ 100 Ohms nominal
Signal Level Output (differential) _____ .95 to 1.05V
Signal Level Input _____ 350mV minimum
Supported Link Length _____ 100m
Cable Type _____ Category 5 UTP

Multimode Fiber Optic Interface
Connector _____ ST or SC
RX Input Sensitivity _____ -31 dBm peak minimum
Output Power _____ -14 dBm to -23.5 dBm (50/125 μm)
_____ -14 dBm to -20 dBm (62.5/125 μm)
Supported Link Length _____ up to 2km full duplex
Cable Type _____ 50/125, 62.5/125, 100/140 μm F/O

Singlemode Fiber Optic Interface
Connector _____ ST or SC
RX Input Sensitivity _____ -31 dBm peak minimum
Output Power _____ -8 dBm to -15 dBm (9/125 μm)
Supported Link Length _____ up to 15km full duplex
Cable Type _____ 8.3/125, 8.7/125, 9/125, 10/125 μm F/O

Singlemode Fiber Optic Interface — extended distance support
Connector _____ SC
RX Input Sensitivity _____ -35 dBm minimum
Output Power _____ 0 dBm to -5 dBm (9/125 μm)
Supported Link Length _____ up to 40km full duplex
Cable Type _____ 8.3/125, 8.7/125, 9/125, 10/125 μm F/O

100Mbps "redundant twister" 7000 Modules:
LH7402C-TX-R2   RJ-45 to Redundant RJ-45 _____ 100m/100m
LH7403C-MMSC-R2   RJ-45 to Redundant FX multimode SC __ 100m/2km
LH7404C-SMSC-R2   RJ-45 to Redundant FX singlemode SC   100m/15km
LH7403C-MMST-R2   RJ-45 to Redundant FX multimode ST __ 100m/2km
LH7403C-SMST-R2   RJ-45 to Redundant FX singlemode ST   100m/15km

The "redundant twister" modules provide full redundant data paths for
Fast Ethernet devices. The modules incorporate a MAIN port, a PRIMARY
port and a SECONDARY port. The redundancy is provided between the
PRIMARY and SECONDARY ports.

LED Operation:
- **PWR**: normal operation
- **SW**: SECONDARY port active at some point; functions in
  Dynamic Recovery Mode (DRM) only
- **SECONDARY**: port is active (PRIMARY is inactive)
- (MAIN) **LK**: receiving valid link
- (MAIN) **AT**: receiving data
- (PRIMARY) **LK**: receiving valid link
- (PRIMARY) **AT**: receiving data
- (SECONDARY) **LK**: receiving valid link
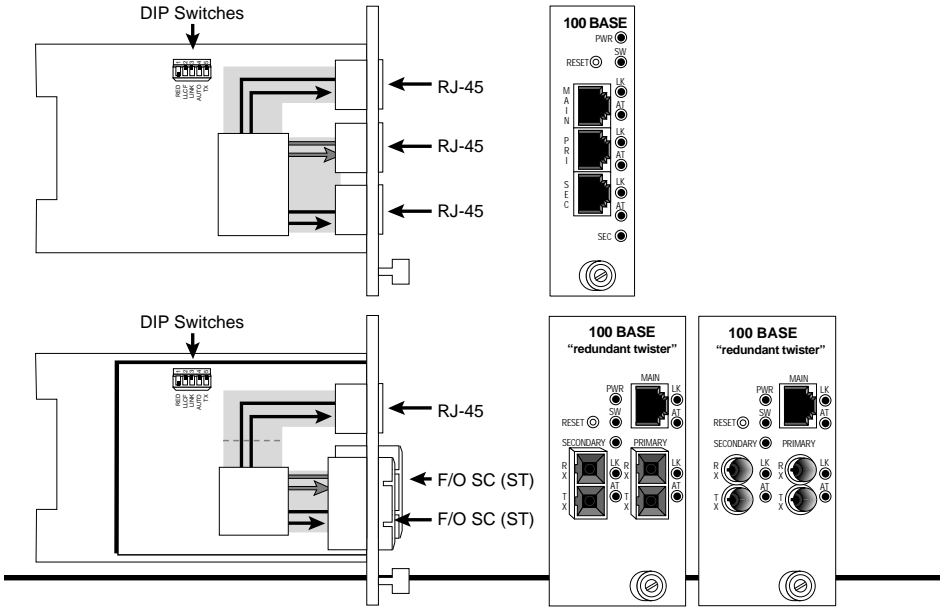- (SECONDARY) **AT**: receiving data

DIP switch[*] settings:
- TX Switch UP: data from the MAIN port is transmitted simultaneously
  on the PRIMARY and SECONDARY ports; data from the active port
  (PRIMARY or SECONDARY) is transmitted on the MAIN port.
  *NOTE: The Link Switch must also be in the UP position in order to
  send data out the inactive port.*

- TX Switch DOWN *(default)*: data received from the MAIN port is
  transmitted on the active port only.

- AUTO Switch UP: the module automatically reverts back to the
  PRIMARY port when the primary link is re-established.

- AUTO Switch DOWN *(default)*: once the SECONDARY port
  has become active, the module ***will not*** revert back to the
  PRIMARY port when the primary link is re-established, unless
  the SECONDARY link is absent.

- LINK Switch UP: the module sends link on both the

---

* When setting the DIP switches, the UP position is when the lever of the DIP switch is pushed
  furthest away from the circuit board. The DOWN position is when the lever of the DIP switch is
  pushed closest to the printed circuit board.

PRIMARY and SECONDARY ports; the end station connected to the module sees a valid link state.

- LINK Switch DOWN *(default)*: the module sends link on the active port only; the end station connected to the module sees a valid link state only if the port on the module is active.

- LLCF Switch UP: Link Loss Carry Forward is enabled.

- LLCF Switch DOWN *(default)*: Link Loss Carry Forward is disabled.

- RED Switch UP *(default)*: redundancy is enabled; the module functions in Dynamic Recovery Mode (DRM).

- RED Switch DOWN: redundancy is disabled; Network Select Mode (NSM) is enabled. *NOTE: In this mode the reset push button toggles the active port between A and B for each switch closure. The AUTO switch selects the initial active port on power-up: UP for SECONDARY; DOWN for PRIMARY. The SW LED remains OFF in NSM.*

For more detailed information regarding the "redundant twister" module, refer to the section titled *Setting the DIP Switches* in the **"redundant twister" Media Converter 7000 Installation & User Guide.**

100Mbps MM-to-SM "twister" 7000 Modules:

LH7420C-SCSC-R2   FX multimode SC to FX singlemode SC __ 2km/15km
LH7420C-SCST-R2   FX multimode SC to FX singlemode ST __ 2km/15km
LH7421C-STSC-R2   FX multimode ST to FX singlemode SC __ 2km/15km
LH7421C-STST-R2   FX multimode ST to FX singlemode ST __ 2km/15km

These modules provide seamless integration between higher bandwidth singlemode and multimode fiber optic segments.
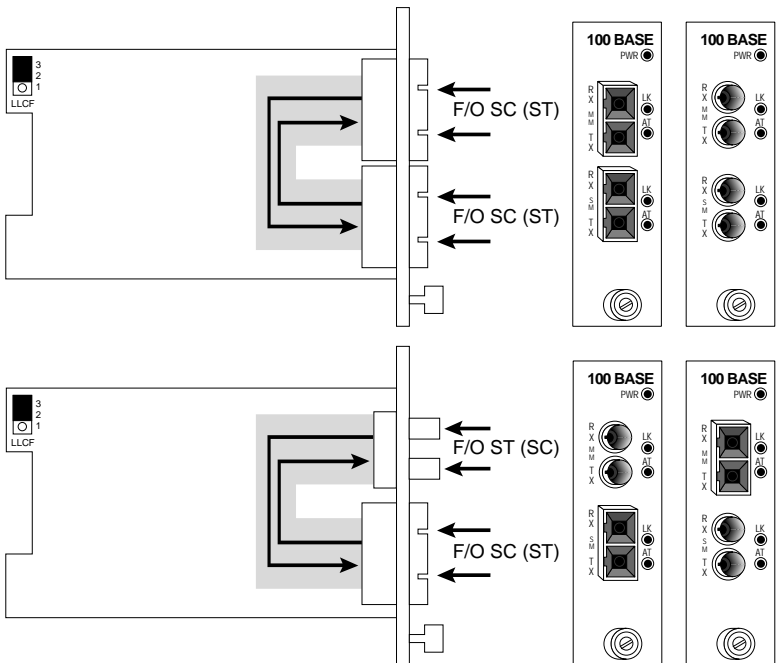
LED Operation:
- **PWR**: normal operation
- **LK**: satisfactory receive link status on respective port
- **AT**: receiving data

Jumper Settings:
Refer to the diagram below for the location of the Link Loss Carry Forward (LLCF) jumper.
- Set the jumper to enable LLCF by connecting pins 1&2
- Set the jumper to disable LLCF by connecting pins 2&3 *(default)*

100Mpbs TX-to-FX "twister" 7000 Modules:

LH7416C-SX-R2	RJ-45 to SX multimode SC	_____	100m/300m
LH7416C-SXST-R2	RJ-45 to SX multimode ST	_____	100m/300m
LH7414C-R2	RJ-45 to FX multimode SC	_____	100m/2km
LH7416C-R2	RJ-45 to FX singlemode SC	_____	100m/15km
LH7415C-R2	RJ-45 to FX multimode ST	_____	100m/2km
LH7416C-ST-R2	RJ-45 to FX singlemode ST	_____	100m/15km
LH7416C-40KM-R2	RJ-45 to FX singlemode SC	_____	100m/40km

These modules provide transparent integration of 100BASE-TX and 100BASE-FX segments in Fast Ethernet environments.
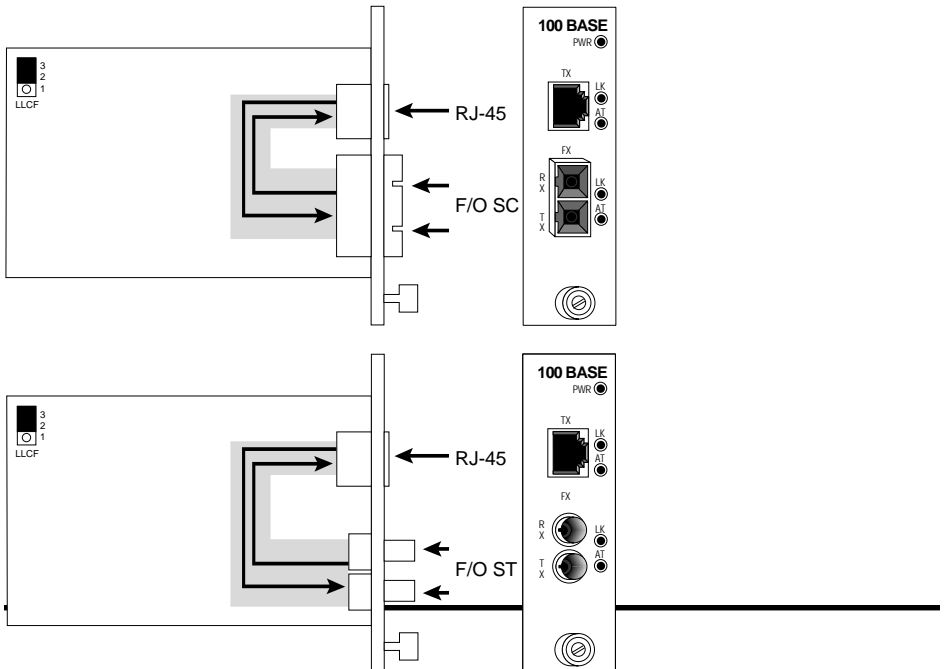
LED Operation:
- **PWR**: normal operation
- **LK**: satisfactory receive link status on respective port
- **AT**: receiving data

Jumper Settings:
Refer to the diagram below for the location of the Link Loss Carry Forward (LLCF) jumper.
- Set the jumper to enable LLCF by connecting pins 1&2
- Set the jumper to disable LLCF by connecting pins 2&3 *(default)*

"twister" Media Converter 7000   **19**

10Mbps "twister" 7000 Modules
Specifications

Data Rate _____ 10Mbps half-duplex
_____ 20Mbps full-duplex
Bit Delay _____ < 5 bits

Twisted-Pair Interface

Connector _____ Shielded RJ-45, 8-pin jack
Impedance_____ 100 Ohms nominal
Signal Level Output _____ 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 or SMA
RX Input Sensitivity _____ 10BASE-FL -32.5 dBm peak minimum
Output Power _____ -21.8 dBm to -16.8 dBm (50/125 µm)
_____ -19 dBm to -14 dBm (62.5/125 µm)
Supported Link Length _____ up to 2km full duplex
Cable Type _____ 50/125, 62.4/125, 100/140 µm F/O

Singlemode Fiber Optic Interface

Connector _____ ST
RX Input Sensitivity _____ 10BASE-FL -32.5 dBm peak minimum
Output Power _____ -17 dBm to -23 dBm (9/125 µm)
Supported Link Length _____ up to 8km full duplex
Cable Type _____ 8.3/125, 8.7/125, 9/125, 10/125 µm F/O

Thinnet Coax Interface

Connector _____ BNC receptacle
Internal Transceiver _____ IEEE 802.3
Termination_____ User Selectable Jumper
Supported Link Length _____ up to 185m
Cable Type _____ RG-58 coaxial cable

10Mbps "redundant twister" 7000 Module:
LE7402C-TX RJ-45 to Redundant RJ-45 _____ 100m/100m

The "redundant twister" module provides full redundant data paths for Ethernet devices. The modules incorporate a MAIN port, a PRIMARY port and a SECONDARY port. The redundancy is provided between the PRIMARY and SECONDARY ports.

LED Operation:
- **PWR**: normal operation
- **SW**: SECONDARY port active at some point; functions in Dynamic Recovery Mode (DRM) only
- **SECONDARY**: port is active (PRIMARY is inactive)
- (MAIN) **LK**: receiving valid link
- (MAIN) **AT**: receiving data
- (PRIMARY) **LK**: receiving valid link
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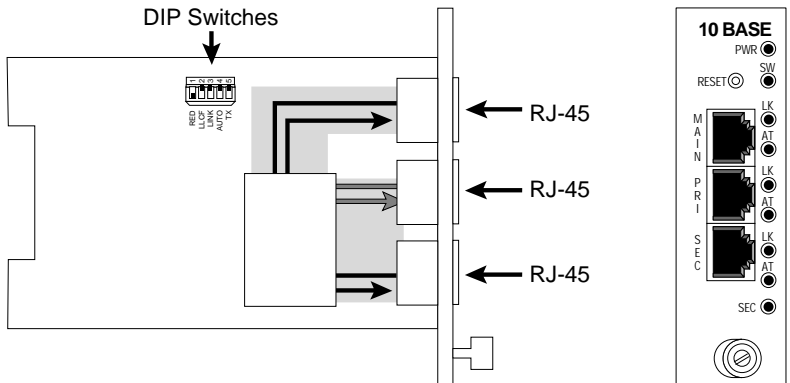- (SECONDARY) **AT**: receiving data

DIP switch[*] settings:
- TX Switch UP: data from the MAIN port is transmitted simultaneously on the PRIMARY and SECONDARY ports; data from the active port (PRIMARY or SECONDARY) is transmitted on the MAIN port. *NOTE: The Link Switch must also be in the UP position in order to send data out the inactive port.*

- TX Switch DOWN *(default)*: data received from the MAIN port is transmitted on the active port only.

- AUTO Switch UP: the module automatically reverts back to the PRIMARY port when the primary link is re-established.

- AUTO Switch DOWN *(default)*: once the SECONDARY port has become active, the module ***will not*** revert back to the PRIMARY port when the primary link is re-established, unless the SECONDARY link is absent.

- LINK Switch UP: the module sends link on both the PRIMARY and SECONDARY ports; the end station connected to the module sees a valid link state.

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* When setting the DIP switches, the UP position is when the lever of the DIP switch is pushed furthest away from the circuit board. The DOWN position is when the lever of the DIP switch is pushed closest to the printed circuit board.

- LINK Switch DOWN *(default)*: the module sends link on the active port only; the end station connected to the module sees a valid link state only if the port on the module is active.

- LLCF Switch UP: Link Loss Carry Forward is enabled.

- LLCF Switch DOWN *(default)*: Link Loss Carry Forward is disabled.

- RED Switch UP *(default)*: redundancy is enabled; the module functions in Dynamic Recovery Mode (DRM).

- RED Switch DOWN: redundancy is disabled; Network Select Mode (NSM) is enabled. *NOTE: In this mode the reset push button toggles the active port between A and B for each switch closure. The AUTO switch selects the initial active port on power-up: UP for SECONDARY; DOWN for PRIMARY. The SW LED remains OFF in NSM.*

For more detailed information regarding the "redundant twister" module, refer to the section titled *Setting the DIP Switches* in the **"redundant twister" Media Converter 7000 Installation & User Guide.**

10Mbps Thinnet Coaxial "twister" 7000 Module:
LE7313C-R2 RJ-45 to BNC _____ 100m/185m

This module provides twisted-pair to Thinnet coax segment integration.
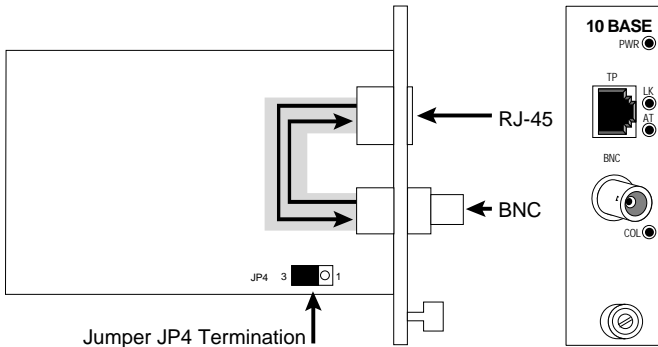
LED Operation:
- **PWR**: normal operation
- **LK**: satisfactory receive link status on TP port
- **AT**: receiving data
- **COL**: detection of collision condition

Jumper Settings:
This interface module is shipped with a user selectable jumper installed at the factory. The jumper is located at JP4 and is used to set either internal or external termination of the BNC port.
- Set the jumper to enable internal 50Ω termination by connecting pins 1&2
- Set the jumper to enable use of external termination by connecting pins 2&3 *(default)*

10Mbps Fiber Optic "twister" 7000 Modules:

LE7313C-SC-R2	RJ-45 to FL multimode SC _____	100m/2km
LE7314C-R2	RJ-45 to FL multimode ST _____	100m/2km
LE7316C-R2	RJ-45 to FL singlemode ST _____	100m/8km
LE7316C-MM-R2	RJ-45 to FL multimode SMA _____	100m/2km

These modules provide transparent integration of 10BASE-T and
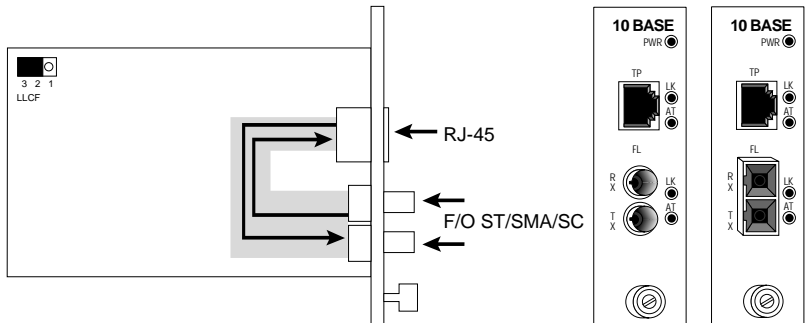10BASE-FL segments in Ethernet environments.

LED Operation:
- **PWR**: normal operation
- **LK**: satisfactory receive link status on respective port
- **AT**: receiving data

Jumper Settings:
Refer to the diagram below for the location of the Link Loss Carry Forward
(LLCF) jumper.
- Set the jumper to enable LLCF by connecting pins 1&2
- Set the jumper to disable LLCF by connecting pins 2&3 *(default)*

Chassis Technical Specifications

Power

Input	90-250V AC 50-60Hz, 2A
Output	5.0V DC, 30A, 150W

Environmental

Operating Temperature	0° — 50° C
Storage Temperature	-30° —70° C
Relative Humidity	5% — 95% non-condensing
Physical Case	Fully enclosed metal construction
Dimensions	11.3" L x 17.0" W x 3.5" H
Weight	20 lbs.

Regulatory

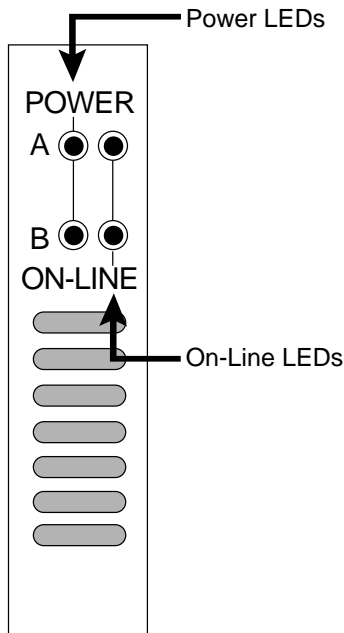|	
Compliance	IEEE 802.3/802.3u (ISO 8802-3): 10BASE-T, 10BASE-2, 10BASE-FL/FOIRL, 100BASE-TX, 100BASE-FX
Safety	UL, C-UL, CSA, EN60950 (TUV)
Emissions	FCC Part 15, Class A, EN55022 a (CISPR)

Operating Features of the Internal Power Supply

The LE7300A/LE7300A-PS chassis are equipped with a fixed power supply that provides 150W of power. The LE7300A is shipped with one factory-installed power supply; the LE7300A-PS is shipped with two factory-installed power supplies.

When a chassis is equipped with two power supplies, the first power supply is the primary power source and the second functions as a back-up. If the power source to one of the supplies should fail, the remaining power supply will be brought on line and provide the power load to the chassis.

Because the input jack for the fixed power supply is located on the back of the chassis, a display module is mounted in the center of the front panel for visible verification of its operating status. It provides two LEDs labeled "A" and "B." When illuminated, the LED indicates the connection of an active power source to that power supply. When two power supplies are installed in a single chassis, both LEDs illuminate simultaneously.

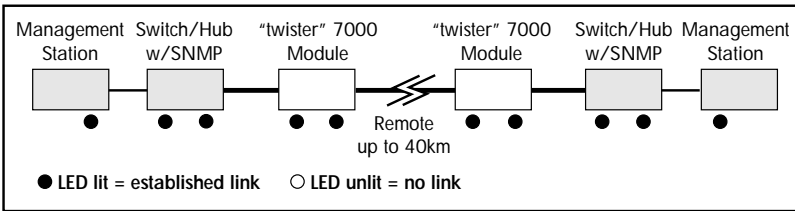These power supplies are *__not__* field replaceable.
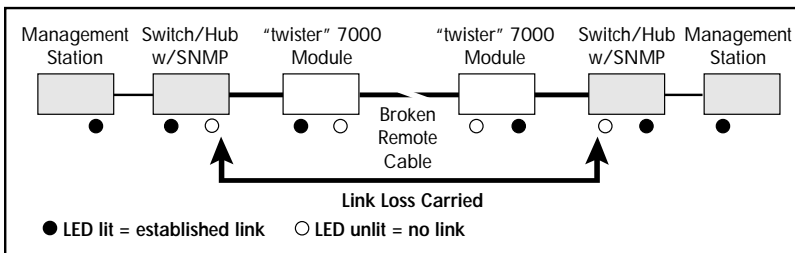
Link Loss Carry Forward (LLCF)

The "twister" modules (with the exception of the LE7313C-R2) have been designed with an LLCF function for troubleshooting a remote connection. The modules are shipped with the LLCF disabled.

When LLCF is enabled, the FX ports as well as the TX ports on the "twister" modules, 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" modules 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.

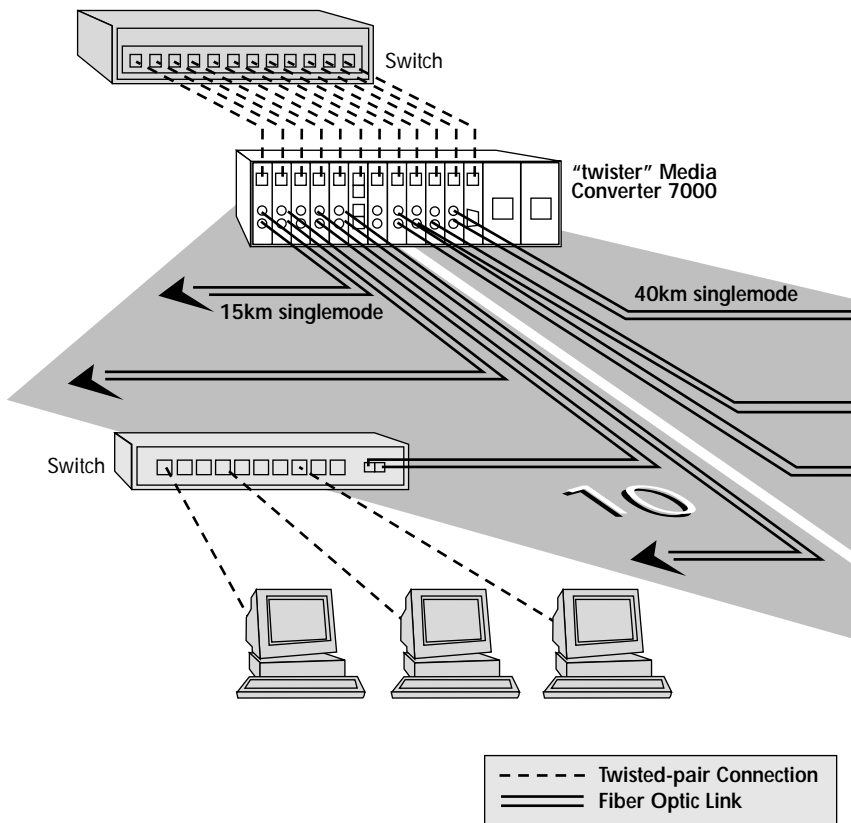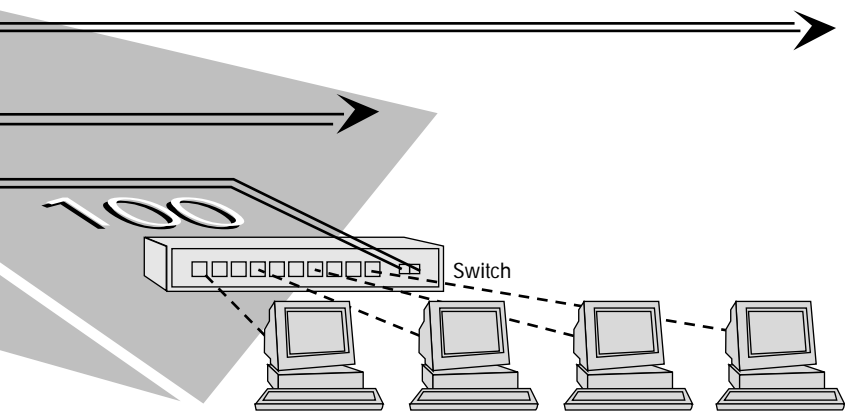The diagram below shows a typical network configuration using a "twister" module for remote connectivity:

If the fiber connection breaks, or the remote device fails, the "twister" module 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 module to determine the source of the loss.

IMPORTANT: When connecting a "twister" module with LLCF enabled to an auto-negotiating device, force both sides of the configuration to either 10 or 100Mbps full or half duplex. This allows the interface module to immediately see link pulses and start passing data.

Topology Solution

Switch

"twister" Media
Converter 7000

15km singlemode

40km singlemode

Switch

10

- - - - -	Twisted-pair Connection
———	Fiber Optic Link

Switch

100

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 825-1 Classification
  Class 1 Laser Product
- TUV

Radio Frequency Interference Statements

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of 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 communication. 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 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 objetos 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.

Black Box Corporation

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