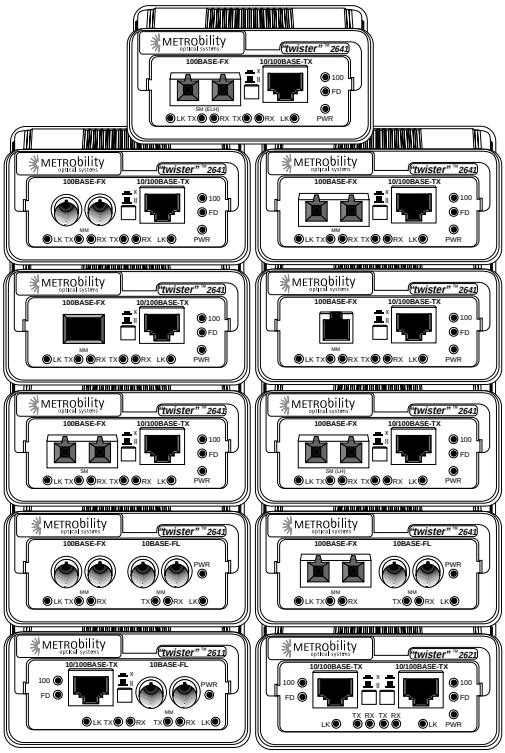
Lancast®

10/100 AutoTwister™



Installation & User Guide

Models: 2621-11-01 / 2611-51-01 / 2641-13-01 / 2641-14-01 / 2641-15-01 / 2641-17-01 / 2641-1E-01 / 2641-1G-01 / 2641-1J-01 / 2641-53-01 / 2641-55-01 / 2612-51-01 / 2642-13-01 / 2642-14-01 / 2642-53-01 / 2642-55-01

METRObility optical systems

Lancast 10/100 AutoTwisters

Stand-alone Units:

2621-11-01 ___ 10/100Base-TX to 10/100Base-TX
2641-13-01 ___ 10/100Base-TX to 100Base-FX multimode SC
2641-14-01 ___ 10/100Base-TX to 100Base-FX singlemode SC
2641-15-01 ___ 10/100Base-TX to 100Base-FX multimode ST
2641-17-01 ___ 10/100Base-TX to 100Base-FX singlemode SC (40km)
2641-1E-01 ___ 10/100Base-TX to 100Base-FX multimode MT-RJ
2641-1G-01 ___ 10/100Base-TX to 100Base-FX multimode VF-45
2641-1J-01 ___ 10/100Base-TX to 100Base-FX singlemode SC (100km)
2611-51-01 ___ 10Base-FL multimode ST to 10/100Base-TX
2641-53-01 ___ 10Base-FL multimode ST to 100Base-FX multimode SC
2641-55-01 ___ 10Base-FL multimode ST to 100Base-FX multimode ST

Stand-alone Units with LLCF:

2642-13-01 ___ 10/100Base-TX to 100Base-FX multimode SC
2642-14-01 ___ 10/100Base-TX to 100Base-FX singlemode SC
2612-51-01 ___ 10Base-FL multimode ST to 10/100Base-TX
2642-53-01 ___ 10Base-FL multimode ST to 100Base-FX multimode SC
2642-55-01 ___ 10Base-FL multimode ST to 100Base-FX multimode ST

Table of Contents

10/100 AutoTwister Installation & User Guide

Overview

The Lancast 10/100 AutoTwister provides seamless migration between Ethernet and Fast Ethernet networks, in addition to built-in media conversion allowing high-speed integration of fiber optic and twisted-pair segments. A complete set of LEDs allows for quick status verification, and a bank of DIP switches provides added versatility on each port. To optimize your Ethernet network, each port operates independently in either half or full duplex.

The 10/100 AutoTwisters offer the following key features:

- Auto-negotiation switches on all twisted-pair interfaces.
- Link Loss Return (LLR) functionality to aid in troubleshooting a remote network connection on all fiber optic ports.
- Link Loss Carry Forward (LLCF) functionality to aid in troubleshooting a remote network connection. (2642-xx-01 and 2612-51-01 only)
- An MDI-II to MDI-X switch that eliminates the need for crossover cables on twisted-pair ports.
- Store-and-forward switching to improve overall network performance by buffering packets during times of heavy congestion and to prevent the forwarding of corrupted packets.
- High-performance switching engine that performs forwarding and filtering at full wire speed (148,800 packets per second).
- The ability to learn up to 8,000 MAC addresses.
- 320 buffers per port with 1,536 bytes each.
- Low last-bit-in to first-bit-out delay.

Installation Guide

Follow the simple steps outlined in this section of the guide to install and start using the Lancast 10/100 AutoTwister.

1 Unpack the AutoTwister and Accessories

Check that the following components have been included:

- 10/100 AutoTwister
- 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 your carrier and follow their instructions for damage and claims. Save the original shipping carton if return or storage of the unit is necessary.

2 Choose an Appropriate Location

The 10/100 AutoTwister 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.

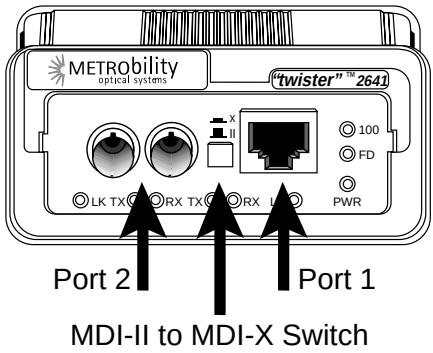
The units may be oriented in any manner which allows you to make physical connection to the power supply and leaves a minimum of six (6) inches of space for proper ventilation.

3 Set the Switches

MDI-II to MDI-X Switch (twisted-pair ports only)

To eliminate the need for crossover cables, the 10/100 AutoTwister includes an MDI-II to MDI-X switch for each twisted-pair port. This push-in switch is located in the center of the front panel and allows setup in either straight-through or crossover configurations. (See Figure 1.)

Figure 1.



When setting the switch, observe the positioning of the following symbols:

- The parallel symbol (II) indicates a straight through or parallel connection. Switch is up. *(default)*
- The cross symbol (X) indicates a crossover connection. Switch is down.

Use the tables below 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	**II**

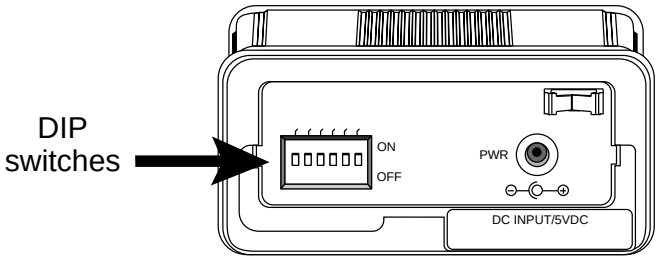
A device that is wired crossover needs a parallel connection:	
If the cable is	the MDI-II to MDI-X Switch Setting should be
straight through	**II**
crossover	**X**

DIP Switches

The 10/100 AutoTwister includes a set of six DIP switches located on the back of the unit. (See Figure 2.) These switches allow you to select the operational modes best suited to your network's configuration.

When setting DIP switches, the ON position is when the lever of the DIP switch is pushed up toward the top of the unit. The OFF position is when the lever is pushed down toward the bottom.

Figure 2.



NOTE: *Not all switches are available on every model. Unmarked switches are reserved and should be left in the OFF (down) position. See the table below for switch locations on the four board types.*

Board Type	DIP Switch Position (left to right)					
	1	2	3	4	5	6
TX-TX	FD1	AN1	100M1	FD2	AN2	100M2
FL-TX	FD1	LLR1	LLCF	FD2	AN2	100M2
FL-FX	FD1	LLR1	LLCF	FD2	LLR2	—
TX-FX	FD1	AN1	100M1	FD2	LLR2	LLCF

Auto-Negotiation Switch (AN)*

Switches AN1 and AN2 control the use of auto-negotiation on their respective copper ports. To enable auto-negotiation, set the switch ON. To disable this function, set the switch OFF. By default, auto-negotiation is enabled.

When a port has auto-negotiation enabled, it advertises 10/100Mbps and full/half duplex capabilities when both its speed (100M) and duplex (FD) switches are also enabled. These are the default settings on a copper port. If the 100M switch is disabled, the port advertises only 10Mbps capability. If the FD switch is disabled, the port advertises only half duplex.

When auto-negotiation is disabled, the port's duplex is determined by its FD switch setting, and its speed is set by its 100M switch.

*Changes to the AN switch setting only come into effect after the power-cycle initialization.

10/100Mbps Switch (100M)*

Switches 100M1 and 100M2 control the speed setting for their respective copper ports. The speed setting determines which speed is advertised when auto-negotiation is enabled. If auto-negotiation is disabled, the port speed is the same as the switch setting, where ON is 100Mbps and OFF is 10Mbps.

When the 100M switch is ON, the port advertises 10/100Mbps capability if auto-negotiation is enabled. This is the default setting. If auto-negotiation is disabled, the port's speed is set to 100Mbps.

When the 100M switch is OFF, the port advertises only 10Mbps capability if auto-negotiation is enabled. If auto-negotiation is disabled, the port's speed is set to 10Mbps.

Half/Full Duplex Switch (FD)*

For copper ports with auto-negotiation disabled and all fiber optic ports, switches FD1 and FD2 determine the duplex mode of their respective ports. A port operates at full duplex when its FD switch is ON. It operates at half duplex when its FD switch is OFF. The default is full duplex enabled.

A copper port with auto-negotiation enabled advertises full/half duplex capability when its FD switch is ON. The port advertises only half duplex when its FD switch is OFF.

Link Loss Return Switch (LLR)

The 10/100 AutoTwister incorporates Link Loss Return (LLR) functionality as an aid in troubleshooting remote connections on its fiber optic ports. When LLR is enabled, the loss of the inbound link pulses on a port stops the transmission of outbound link pulses on the *same* port. For example, if LLR is enabled on port 2 and its receiver (RX) stops detecting link pulses, then port 2's transmitter (TX) will stop sending link pulses. LLR is enabled independently on each fiber port. LLR is not applicable to copper ports.

Link Loss Return is enabled on Port 1 when switch LLR1 is ON, and it is enabled on Port 2 when switch LLR2 is ON. The unit is shipped with LLR disabled on both ports. Refer to "Link Loss Return" in the User Guide section of this manual for additional information.

*Changes to the 100M and FD switch settings only come into effect after the power-cycle initialization.

Link Loss Carry Forward Switch (LLCF)

In addition to LLR, the 2612-51-01 and 2642-xx-01 units support Link Loss Carry Forward to help with troubleshooting remote connections.

Unlike LLR, which only applies to fiber ports, LLCF affects both ports on the AutoTwister. When LLCF is enabled, the loss of inbound link pulses on a port stops the transmission of outbound link pulses on the *opposite* port. For example, if LLCF is enabled, the loss of incoming link pulses at *Port 1* stops the transmission of link pulses out of *Port 2*. Conversely, if *Port 2* stops receiving link pulses, *Port 1* will not transmit link pulses.

Link Loss Carry Forward is enabled on both ports when switch LLCF is ON. The unit is shipped with LLCF disabled. Refer to "Link Loss Carry Forward" in the User Guide section of this manual for further details.

Use the following tables to set the DIP switches to obtain specific modes of operation on the four board types. The configuration column lists the speed and duplex options for Port 1 on the left and Port 2 on the right. "Auto" denotes that auto-negotiation is enabled. Default settings are highlighted.

Table 1. FL to TX

Configuration	Port 1	Port 2		
	FD1	FD2	AN2	100M2
10 Full - Auto	UP	UP	UP	UP
10 Half - Auto		UP	UP	UP
10 Half - 10 Half				
10 Half - 10 Full		UP		
10 Half - 100 Half				UP
10 Half - 100 Full		UP		UP
10 Full - 10 Half	UP			
10 Full - 10 Full	UP	UP		
10 Full - 100 Half	UP			UP
10 Full - 100 Full	UP	UP		UP

Set the switches UP where indicated.

Set the switches DOWN for the blank positions.

Table 2. FL to FX

Configuration	Port 1	Port 2
	FD1	FD2
10 Half - 10 Half		
10 Half - 10 Full		UP
10 Full - 100 Half	UP	
10 Full - 100 Full	UP	UP

Set the switches UP where indicated. Set the switches DOWN for the blank positions.

Table 3. TX to FX

Configuration	Port 1			Port 2
	FD1	AN1	100M1	FD2
Auto - 100 Full	UP	UP	UP	UP
Auto - 100 Half	UP	UP	UP	
10 Half - 100 Half				
10 Half - 100 Full				UP
10 Full - 100 Half	UP			
10 Full - 100 Full	UP			UP
100 Half - 100 Half			UP	
100 Half - 100 Full			UP	UP
100 Full - 100 Half	UP		UP	
100 Full - 100 Full	UP		UP	UP

Table 4. TX to TX

Configuration	Port 1			Port 2		
	FD1	AN1	100M1	FD2	AN2	100M2
Auto - Auto	UP	UP	UP	UP	UP	UP
10 Half - 10 Half						
10 Half - 10 Full				UP		
10 Half - 100 Half						UP
10 Half - 100 Full				UP		UP
10 Full - 10 Half	UP					
10 Full - 10 Full	UP			UP		
10 Full - 100 Half	UP					UP
10 Full - 100 Full	UP			UP		UP
100 Half - 10 Half			UP			
100 Half - 10 Full			UP	UP		
100 Half - 100 Half			UP			UP
100 Half - 100 Full			UP	UP		UP
100 Full - 10 Half	UP		UP			
100 Full - 10 Full	UP		UP	UP		
100 Full - 100 Half	UP		UP			UP
100 Full - 100 Full	UP		UP	UP		UP

4 Connect to the Network

The 10/100 AutoTwister offers the ease of plug-and-play installation. Use the following table to identify the port connectors for your model, then refer to the appropriate section(s) below for more information and guidelines regarding specific network connections. Port 1 is the **right** port on the AutoTwister, and Port 2 is the **left** port.

Model	Port 1 Connector	Port 2 Connector
2621-11-01	RJ-45	RJ-45
264x-13-01	RJ-45	FX multimode SC
264x-14-01 2641-17-01 2641-1J-01	RJ-45	FX singlemode SC
2641-15-01	RJ-45	FX multimode ST
2641-1E-01	RJ-45	FX multimode MT-RJ
2641-1G-01	RJ-45	FX multimode VF-45
261x-51-01	FL multimode ST	RJ-45
264x-53-01	FL multimode ST	FX multimode SC
264x-55-01	FL multimode ST	FX multimode ST

Fiber Optic Connections

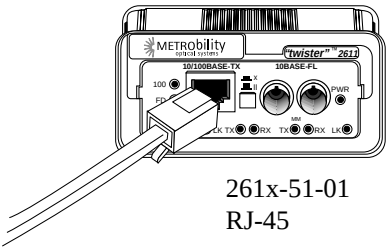
All models except the 2621-11-01 provide one or two fiber optic multimode or singlemode connectors. The 10Base-FL segments are assigned to Port 1, and the 100Base-FX segments are assigned to Port 2.

Multimode fiber optic connectors support a maximum segment length of 2km for remote links.

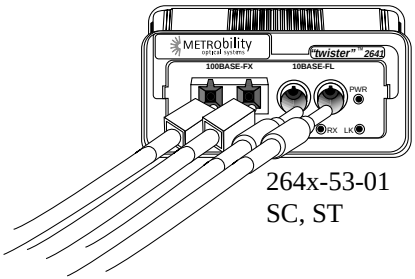
The 264x-14, -17 and -1J provide one set of FX singlemode SC connectors. The 264x-14-01 supports a maximum length of 15km, the 2641-17-01 supports a maximum length of 40km, and the 2641-1J-01 supports a maximum length of 100km for remote links.

Plug in your fiber optic connector(s) as shown in the examples in Figure 3. Once power is applied to the unit, correct connectivity can be verified via the link (LK) LED.

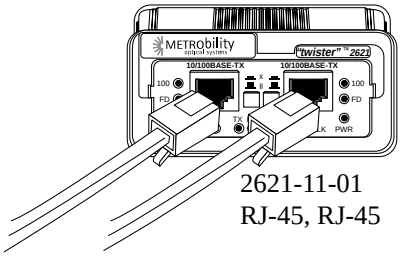
Figure 3.



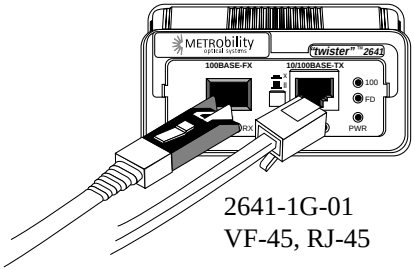
261x-51-01
RJ-45



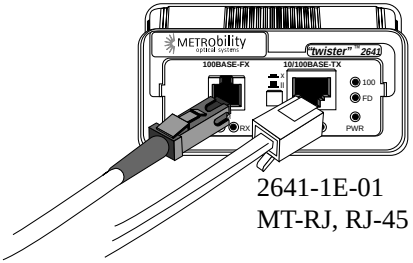
264x-53-01
SC, ST



2621-11-01
RJ-45, RJ-45



2641-1G-01
VF-45, RJ-45



2641-1E-01
MT-RJ, RJ-45

Twisted-Pair Connections

All models, excluding the 264x-53-01 and 264x-55-01, provide one or two shielded RJ-45 connectors which support a maximum segment length of 100 meters. Use Category 3, 4 or 5 cables for 10Mbps segments; use only Category 5 cables for 100Mbps segments.

NOTE: *Be sure to properly set the MDI-II to MDI-X switch located between the two port connectors. Refer back to Step 3 if necessary.*

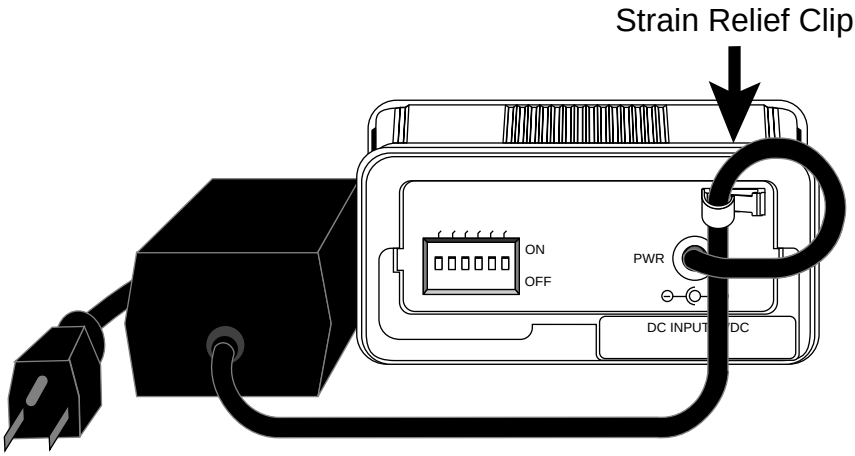
Once power is applied to the unit, correct connectivity can be verified via the link (LK) LEDs if a device is connected to the remote end of the cable.

5 *Apply Power*

Power is applied to the AutoTwister from the desktop power supply. The power supply is equipped with an S760 hollow-type plug for insertion into the DC jack located on the back panel and the standard IEC 320-type AC power receptacle. All standalone AutoTwisters use a 90-260V universal desktop power supply.

Connect the DC input jack located on the back of the AutoTwister before connecting to the AC outlet. Seat the power cord into the strain relief clip to ensure against accidental disconnection.

Figure 4.



Upon receiving power, the AutoTwister goes into normal operation mode and automatically provides the appropriate signal translation between the connected network segments.

Verify valid connections via the link (LK) LEDs on the AutoTwister's front panel.

If an additional extension cord is used to connect the power supply to the outlet, follow the guidelines below.

While one end of the AC power cord can be fitted with a plug standard for the country of operation, the end that connects to the AutoTwister's power supply 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 No. 18 AWG, type SVT or SJT three-conductor cord (15 ft. maximum 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 (15 ft. maximum 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 AutoTwister is installed and marked HAR.

This section contains more detailed user information regarding the operating features of your Lancast 10/100 AutoTwister.

LED Indicators

The Lancast 10/100 AutoTwister provides several LEDs for the visible verification of unit status and proper functionality. The LEDs can assist in troubleshooting and with overall network diagnosis and management. There are separate transmit, receive and link indicators for each port. Each twisted-pair port also has a pair of speed and duplex LEDs.

Once power is applied to the AutoTwister, correct connectivity can be verified via the link LED.

LED Label	LED Name	Color (Status)	Function
PWR	power	Green (steady)	The unit is ON and functioning normally.
LK	link	Green (steady)	Verifies that the port has a valid link.
TX	transmit	Green (blinking)	The port is sending data.
RX	receive	Green (blinking)	The port is receiving data.
FD	duplex	Green (steady)	The port is in full-duplex mode when lit. It is in half-duplex mode when unlit. (Only available for twisted-pair ports.)
100	speed	Green (steady)	The speed setting of the port is 100Mbps when lit. It is 10Mbps when unlit. (Only available for twisted-pair ports.)

Factory Settings

The factory default settings on the 10/100 AutoTwister are preset and cannot be changed.

Backpressure

Backpressure, which forces a collision on a port if there are not enough buffers for incoming packets, is not supported.

1522 Enable

The AutoTwister is preset to pass up to 1522-byte packets, which are used as VLAN tags, through both ports. Packets that are too small (less than 64 bytes) or too large (more than 1522 bytes) are discarded.

Back-Off

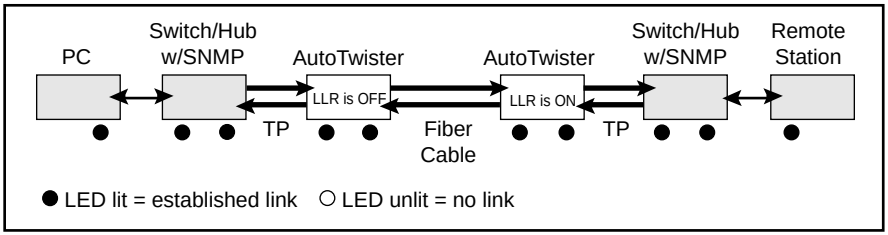
Packet transmission is attempted 16 consecutive times before the AutoTwister restarts its back-off algorithm. After the back-off period ends, the AutoTwister again tries to send the packet up to 16 consecutive times. A packet, which endlessly fails to be sent, will continue to be retransmitted forever, only changing back-off intervals.

Link Loss Return (LLR)

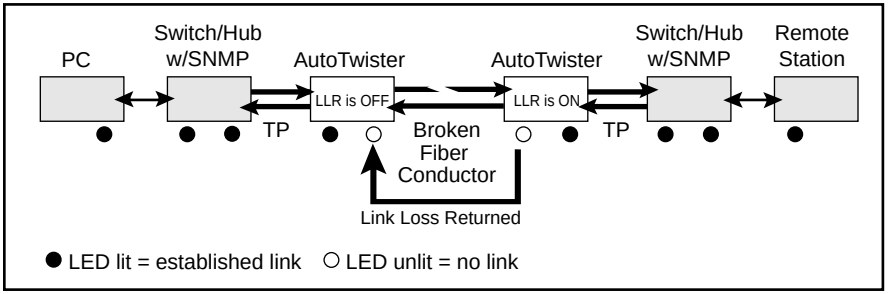
The fiber optic ports of the Lancast AutoTwister have been designed with LLR* functionality for troubleshooting a remote connection.

When LLR is enabled, the fiber port's transmitter shuts down when its receiver fails to detect a valid link. LLR should only be enabled on one end of the link and is typically enabled on either the unmanaged or remote device.

The diagram below shows a typical network configuration with a good link status using AutoTwisters for remote connectivity.



If one of the optical conductors is bad (as shown in the diagram box below), the AutoTwister with LLR enabled will return a no link condition to its link partner. This aids the administrator in determining the source of the loss.



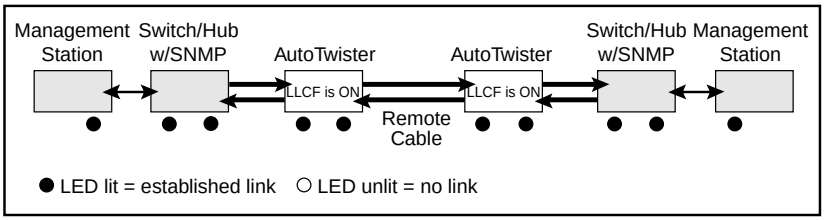
IMPORTANT: *LLR must not be active on both ends of a configuration. If it is, the link can never be established.*

*Units are shipped with the LLR function disabled (OFF).

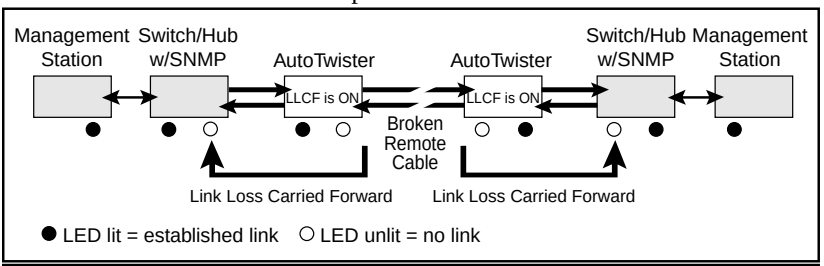
*Link Loss Carry Forward (LLCF)**

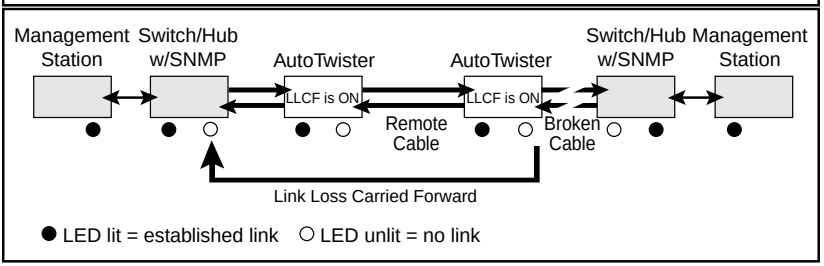
The 2642-xx-01 and 2612-51-01 AutoTwisters incorporate LLCF for troubleshooting a remote connection. When LLCF is enabled, the ports do not transmit a link signal until they receive a link signal from the opposite port.

The diagram below shows a typical network configuration with a good link status using Lancast AutoTwisters for remote connectivity. Note that LLCF is enabled as indicated in the diagram below.



If a connection breaks, the AutoTwisters carry that link loss forward to the switch/hubs which generate a trap to the management stations. A network administrator can then determine the source of the problem.





Important: *When connecting an AutoTwister with LLCF enabled to an auto-negotiating device, force both sides of the configuration to 10Mbps and either full or half duplex. This allows the AutoTwister to immediately see link pulses and start passing data.*

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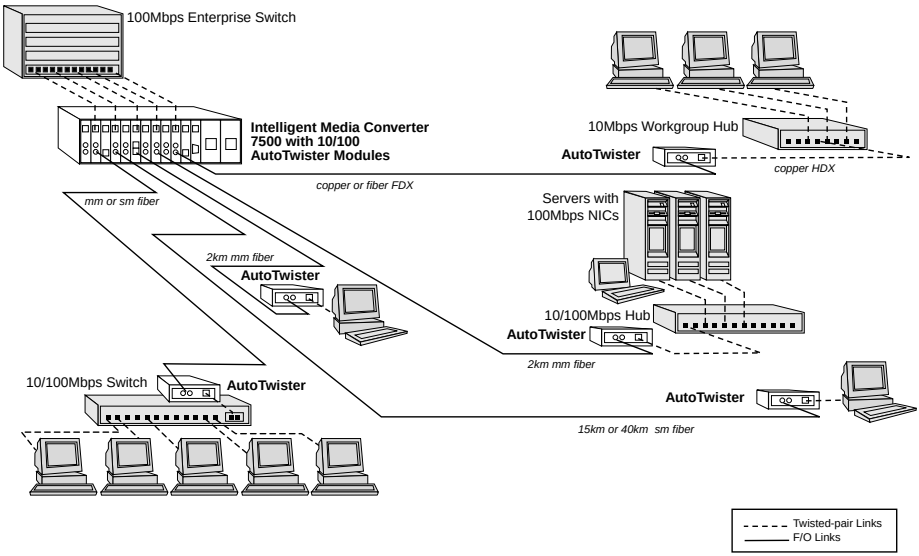
* Units are shipped with LLCF disabled (OFF).

Topology Solutions



Technical Specifications

Network Connections

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 (10Mbps segments)	Category 3, 4 or 5 UTP
(100Mbps segments)	Category 5 UTP
(EN55024:1998 compliance)	Category 5 STP

Multimode Fiber Optic Interface

Connector	ST, SC, MT-RJ or VF-45
Wavelength	1310nm
RX Input Sensitivity	-31 dBm maximum
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	SC
Wavelength	1310nm
RX Input Sensitivity	-35 dBm maximum
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 — long haul distance support

Connector	SC
Wavelength	1310nm
RX Input Sensitivity	-35 dBm maximum
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

Singlemode Fiber Optic Interface — extended long haul distance support

Connector	SC
Wavelength	1550nm
RX Input Sensitivity	-37 dBm minimum
Output Power	0 dBm to -3 dBm (9/125 µm)
Supported Link Length	up to 100km full duplex
Cable Type	8.3/125, 8.7/125, 9/125, 10/125 µm F/O

Data Rate

Data Rate	100Mbps half duplex (Fast Ethernet)
	200Mbps full duplex (Fast Ethernet)
	10Mbps half duplex (Ethernet)
	20Mbps full duplex (Ethernet)
Latency	< 9µs (100Mbps input)*
	<59µs (10Mbps input)*

Power

Input	90-260V AC 50/60 Hz
Output	
2621-11	5V @ 0.7Amps, 3.5W
2641-53, -55, -1J; 2642-53, -55	5V @ 1.1Amps, 5.5W
2611-51; 2641-13, -14, -15, -17, -1E, -1G; 2612-51; 2642-13, -14	5V @ 0.9 Amps, 4.5W

Environmental

Operating Temperature	0° to 50° C
Storage Temperature	-25° to 70° C
Relative Humidity	5% to 95% non-condensing
Physical Case	Fully enclosed metal construction
Dimensions	4.83" L x 3.26" W x 1.71" H
	12.3 cm x 8.3 cm x 4.3 cm
Weight	3 lbs, 1.36 kg (including power supply)

*Only applicable to speeds less than 100% full duplex line rate.

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)
- EN55024: 1998 (immunity)
- IEEE 802.3
- IEEE 802.3u
- DOC Class A (emissions)

This product shall be handled, stored and disposed of in accordance with all governing and applicable safety and environmental regulatory agency requirements.

The following FCC and Industry Canada compliance information is applicable to North American customers only.

USA 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 Réglement sur le matériel brouilleur du Canada.

Warranty and Servicing

Three-Year Warranty for Lancast AutoTwisters

Metrobility Optical Systems, Inc. warrants that every Lancast AutoTwister will be free from defects in material and workmanship for a period of THREE YEARS. This warranty covers the original user only and is not transferable. Should the unit fail at any time during this warranty period, Metrobility will, at its sole discretion, replace, repair, or refund the purchase price of the product. This warranty is limited to defects in workmanship and materials and does not cover damage from accident, acts of God, neglect, contamination, misuse or abnormal conditions of operation or handling, including overvoltage failures caused by use outside of the product's specified rating, or normal wear and tear of mechanical components.

To establish original ownership and provide date of purchase, complete and return the registration card or register the product online at **www.metrobility.com**. If product was not purchased directly from Metrobility, please provide source, invoice number and date of purchase.

To return a defective product for warranty coverage, contact Metrobility Customer Service for a return materials authorization (RMA) number. Send the defective product postage and insurance prepaid to the address provided to you by the Metrobility Technical Support Representative. Failure to properly protect the product during shipping may void this warranty. The Metrobility RMA number must be clearly on the outside of the carton to ensure its acceptance.

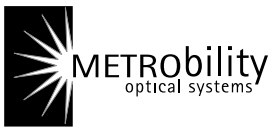
Metrobility will pay return transportation for product repaired or replaced in-warranty. Before making any repair not covered by the warranty, Metrobility will estimate cost and obtain authorization, then invoice for repair and return transportation. Metrobility reserves the right to charge for all testing and shipping costs incurred, if test results determine that the unit is without defect.

This warranty constitutes the buyer's sole remedy. No other warranties, such as fitness for a particular purpose, are expressed or implied. Under no circumstances will Metrobility be liable for any damages incurred by the use of this product including, but not limited to, lost profits, lost savings, and incidental or consequential damages arising from the use of, or inability to use, this product. Authorized resellers are not authorized to extend any other warranty on Metrobility's behalf.

Product Manuals
The most recent version of this manual is available online at
http://www.metrobility.com/support/manuals.htm

To obtain additional copies of this manual, contact your reseller, or call
1.877.526.2278 or 1.603.880.1833

Product Registration
To register your product, go to
http://www.metrobility.com/support/registration.cfm



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