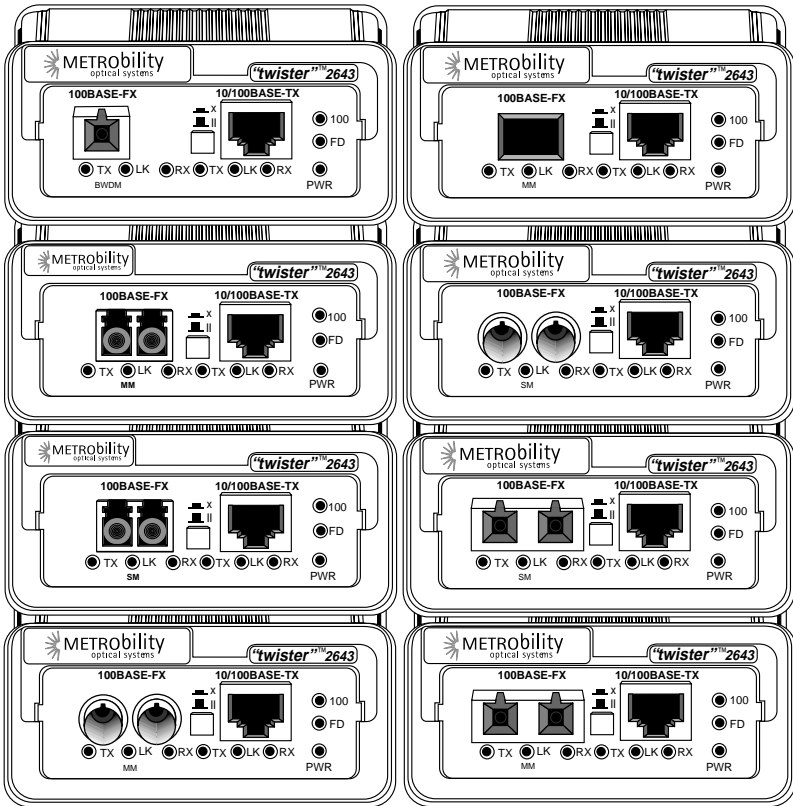


## 10/100 AutoTwister™



### *Installation & User Guide*

Models: 2643-13-01 / 2643-14-01 / 2643-15-01 / 2643-16-01 / 2643-17-01 /  
2643-1G-01 / 2643-1J-01 / 2643-1K-01 / 2643-1M-01 / 2643-1X-01 /  
2643-1Y-01

# **Metrobility 10/100 AutoTwisters**

- 2643-13-01 \_\_\_ 10/100Base-TX to 100Base-FX multimode SC
- 2643-14-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode SC
- 2643-15-01 \_\_\_ 10/100Base-TX to 100Base-FX multimode ST
- 2643-16-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode ST
- 2643-17-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode SC (40km)
- 2643-1G-01 \_\_\_ 10/100Base-TX to 100Base-FX multimode VF-45
- 2643-1J-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode SC (100km)
- 2643-1K-01 \_\_\_ 10/100Base-TX to 100Base-FX multimode LC
- 2643-1M-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode LC
- 2643-1X-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode 1550/1310nm  
bidirectional wavelength division multiplexed (BWDM) SC
- 2643-1Y-01 \_\_\_ 10/100Base-TX to 100Base-FX singlemode 1310/1550nm  
BWDM SC

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# Table of Contents

## 10/100 AutoTwister Installation & User Guide

<b>Overview</b> .....	4
<b>Installation Guide</b> .....	5
STEP 1: Unpack the AutoTwister and Accessories .....	5
STEP 2: Choose an Appropriate Location .....	5
STEP 3: Set the Switches .....	5
STEP 4: Connect to the Network .....	9
STEP 5: Apply Power .....	11
<b>User Guide</b> .....	13
LED Indicators .....	13
Factory Settings .....	14
Link Loss Return (LLR) .....	15
Link Loss Carry Forward (LLCF) .....	16
Auto-Recovery .....	17
Auto-Recovery Application Example .....	18
Topology Solutions .....	19
Technical Specifications .....	20
Product Safety, EMC and Compliance Statements .....	22
Warranty and Servicing .....	23

# Overview

**The Metrobility 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 switch on the twisted-pair interface.
- Half to full duplex conversion.
- Link loss auto-recovery on the fiber optic port.
- Link Loss Return (LLR) functionality to aid in troubleshooting a remote network connection on the fiber optic port.
- Link Loss Carry Forward (LLCF) functionality to aid in troubleshooting a remote network connection.
- An MDI-II to MDI-X switch that eliminates the need for crossover cables on the twisted-pair port.
- Full-duplex flow control on each port.
- 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 1,024 MAC addresses.
- Low last-bit-in to first-bit-out delay.
- Discards packets with CRC or alignment errors, short packets (less than 64 bytes), or long packets (more than 1518 bytes for un-tagged frames and more than 1522 bytes for IEEE 802.3ac tagged frames).
- VLAN tagging support.
- 128K bytes of buffer memory.
- Full compliance with applicable sections of IEEE 802.3, IEEE 802.3u, and IEEE 802.3x.

# Installation Guide

Follow the simple steps outlined in this section of the guide to install and start using the Metrobility 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.

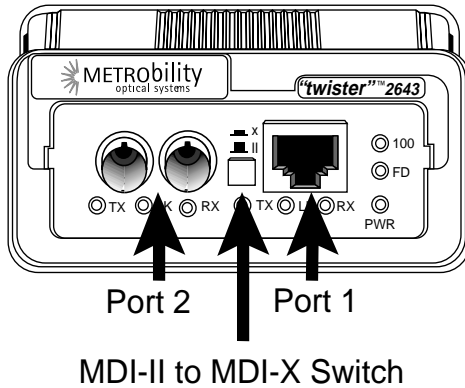
The units may be oriented in any manner which allows you to make physical connection to the power supply and leaves a minimum of six (6) inches of space for proper ventilation.

## 3 **Set the Switches**

### ***MDI-II to MDI-X Switch***

To eliminate the need for crossover cables, the 10/100 AutoTwister includes an MDI-II to MDI-X switch for the twisted-pair port. This push-button 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 out. (*default*)
- The cross symbol (X) indicates a crossover connection. Switch is in.

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
<b>straight through</b>	<b>X</b>
<b>crossover</b>	<b>II</b>

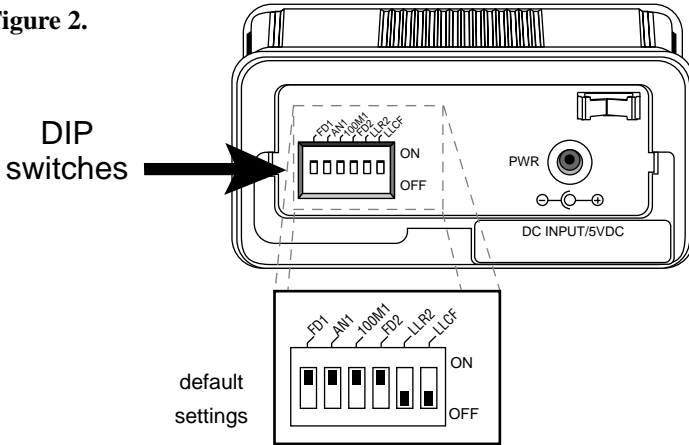
A device that is wired crossover needs a parallel connection:	
If the cable is	the MDI-II to MDI-X Switch Setting should be
<b>straight through</b>	<b>II</b>
<b>crossover</b>	<b>X</b>

## 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 mode best suited to your network's configuration.

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

Figure 2.



### Auto-Negotiation Switch (AN1)\*

Switch AN1 controls the use of auto-negotiation on the copper port. To enable auto-negotiation, set the switch ON. To disable this function, set the switch OFF. By default, auto-negotiation is enabled.

When the copper port has auto-negotiation enabled, it advertises 100Mbps full duplex capabilities. When auto-negotiation is disabled, the port's duplex is determined by the FD1 switch, and its speed is set by the 100M1 switch.

### 10/100Mbps Switch (100M1)\*

Switch 100M1 controls the speed setting for the copper port. If auto-negotiation is disabled, the port speed will be the same as this switch setting, where ON is 100Mbps and OFF is 10Mbps. The default speed setting is 100Mbps. When auto-negotiation is enabled, the 100M1 switch setting is ignored.

### Half/Full Duplex Switch (FD1, FD2)\*

Switch FD1 determines the duplex mode for the copper port if auto-negotiation is disabled. When auto-negotiation is enabled, the FD1 switch setting is ignored. Switch FD2 determines the duplex mode on the fiber optic port. 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.

---

\*Changes to switches AN1, 100M1, FD1 and FD2 only come into effect after the power-cycle initialization.

## Link Loss Return Switch (LLR2)

The 10/100 AutoTwister incorporates Link Loss Return (LLR) functionality as an aid in troubleshooting remote connections on its fiber optic port.

When LLR is enabled, the loss of the inbound link pulses on the 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 not applicable to the copper port.

Link Loss Return is enabled on Port 2 when switch LLR2 is ON. The unit is shipped with LLR disabled. Refer to [Link Loss Return](#) in the User Guide section of this manual for more information.

## Link Loss Carry Forward Switch (LLCF)

In addition to LLR, the AutoTwister supports Link Loss Carry Forward functionality to help with troubleshooting remote connections.

Unlike LLR, which only applies to the fiber port, 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* will stop 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 table to set the DIP switches to obtain specific modes of operation. 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.



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

Set the switches **ON** where indicated.

Set the switches **OFF** for the blank positions.

**NA** indicates the switch setting is not applicable and can be either **ON** or **OFF**.

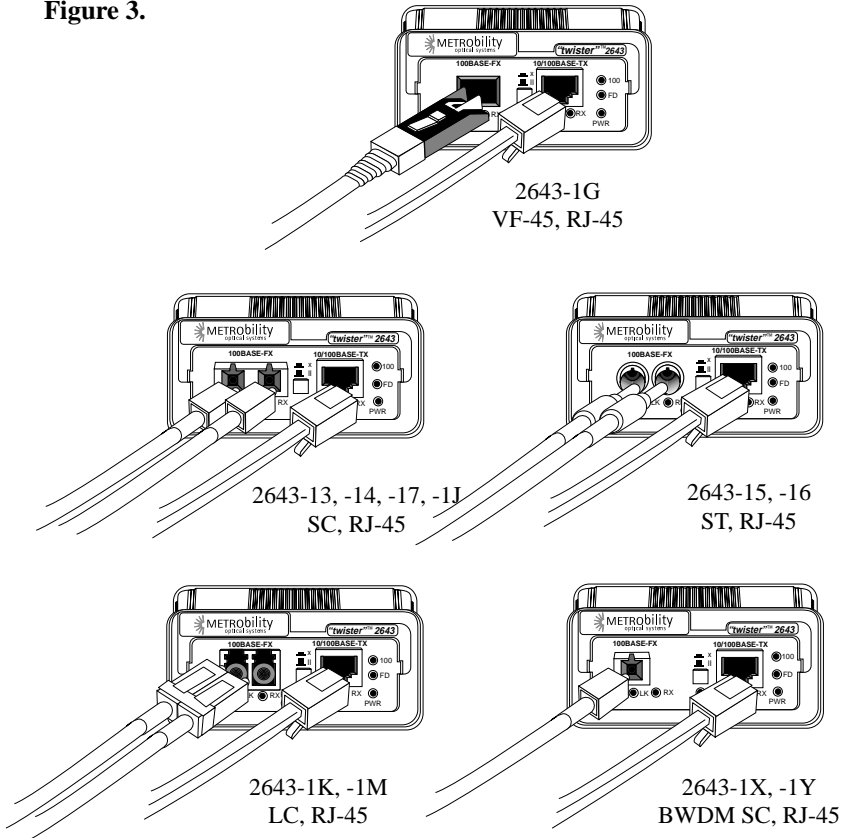
## 4 Connect to the Network

The Metrobility 10/100 AutoTwister offers the ease of plug-and-play installation.

### *Fiber Optic Connections*

- The 2643-13-01, 2643-15-01, 2643-1G-01, and 2643-1K-01 provide one set of FX multimode SC/ST/VF-45/LC connectors, respectively, and support a maximum segment length of up to 2km for remote links.
- The 2643-14-01, 2643-16-01 and 2643-1M-01 provide one set of FX singlemode SC/ST/LC connectors, respectively, and support a segment length of up to 20km for remote links.
- The 2643-17-01 provides one set of FX singlemode SC connectors and supports a maximum segment length of up to 40km for remote links.
- The 2643-1J-01 provides one set of FX singlemode SC connectors and supports a maximum segment length of up to 100km for remote links.

**Figure 3.**



### ***BWDM Connection***

The bidirectional wavelength division multiplexed (BWDM) port provides one singlemode SC connector that supports a maximum segment length of 20km. BWDM line cards must always be used in complementary pairs. That is, a -1X model must be connected to a -1Y. The -1X cards are designed to transmit data at a wavelength of 1550nm and receive at 1310nm. Correspondingly, the -1Y cards transmit data at 1310nm and receive at 1550nm.

### ***Twisted-Pair Connection***

Each AutoTwister provides one shielded RJ-45 connector that supports a maximum segment length of up to 100 meters. Use Category 3, 4 or 5 cables for 10Mbps segments; use only Category 5 or 5E 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

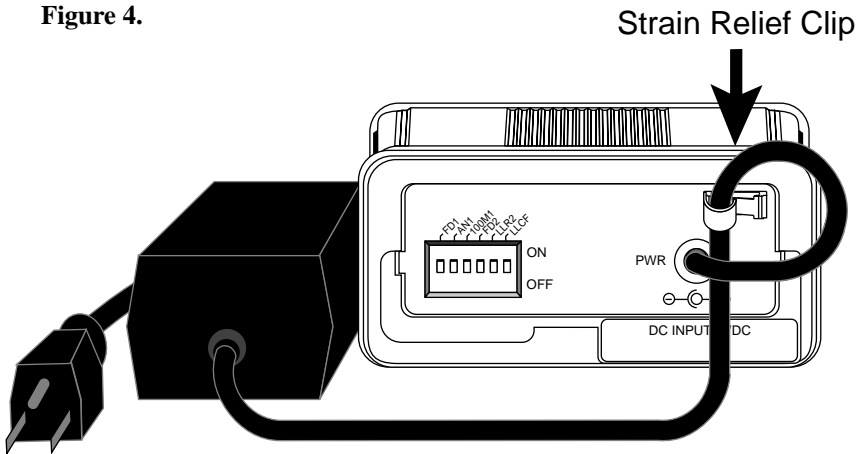
Power is applied to the AutoTwister from the desktop power supply. The power supply is equipped with an S760 hollow-type plug for insertion into the DC jack located on the back panel and the standard IEC 320-type AC power receptacle. All standalone AutoTwisters use a 90-260V universal desktop power supply.

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.

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.

**Figure 4.**



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.

# User Guide

*This section contains information regarding the operating features of the Metro-bility 10/100 AutoTwister.*

## LED Indicators

The Metrobility 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. The twisted-pair port also has a speed LED and a duplex LED.

After power is applied to the AutoTwister, verify correct connectivity via the link LEDs.

LED Label	LED Name	Color (Status)	Function
PWR	power	green (steady)	The unit is ON.
<b>Copper Port LEDs</b>			
100	speed	green (steady)	The speed setting of the port is 100Mbps when lit. It is 10Mbps when not lit.
FD	duplex	green (steady)	The port is in full-duplex mode when lit. It is in half-duplex mode when not lit.
RX	receive	green (blinking)	The port is receiving data.
LK	link	green (steady)	Verifies that the port has a valid link.
TX	transmit	green (blinking)	The port is sending data.
<b>Fiber Port LEDs</b>			
RX	receive	green (blinking)	The port is receiving data, or the port is attempting auto-recovery.
LK	link	green (steady)	Verifies that the port has a valid link.
TX	transmit	green (blinking)	The port is sending data, or the port is attempting auto-recovery.

## **Factory Settings**

This section describes the preset features on the 10/100 AutoTwister. These settings cannot be changed.

### **Full-Duplex Flow Control**

The AutoTwister supports flow control on each port in full duplex only. Full-duplex flow control is provided to avoid dropping packets during network congestion. If there is no buffer space available for incoming packets, the AutoTwister will issue a PAUSE frame. Full-duplex flow control is only applicable to ports operating in full duplex with auto-negotiation enabled. Additionally, during auto-negotiation, the port's link partner must advertise that it supports PAUSE frames.

For ports operating at half duplex, the AutoTwister does not support any type of flow control. If there are not enough buffers available, incoming packets will be dropped.

### **Auto-Recovery**

The AutoTwister includes an auto-recovery circuit that allows you to transparently connect a pair of AutoTwisters between two network devices. This enables you to design a redundant path between 10Mbps and 100Mbps devices, allowing both end devices to lose link if any part of the connection is broken.

To activate auto-recovery, all of the following conditions must be met:

- Auto-negotiation is disabled.
- LLR is enabled.
- LLCf is enabled.

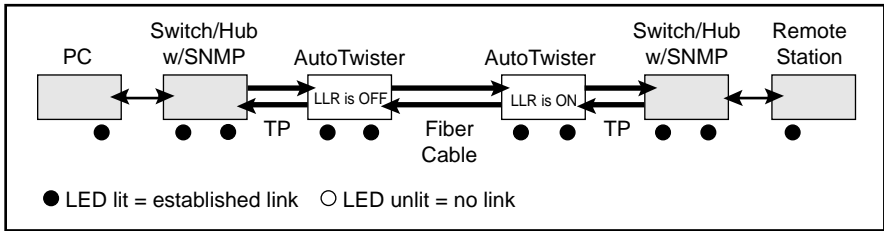
When auto-recovery is enabled, the AutoTwister attempts to establish the fiber link between two back-to-back units. Because LLR is enabled on both AutoTwisters, auto-recovery is needed to prevent the two fiber ports from ending up in a deadlock situation with each fiber port waiting for the other to transmit first. Auto-recovery allows the deadlock to be broken by periodically sending out pulses from the fiber port allowing the AutoTwister to reestablish its fiber link if the line is intact.

## Link Loss Return (LLR)

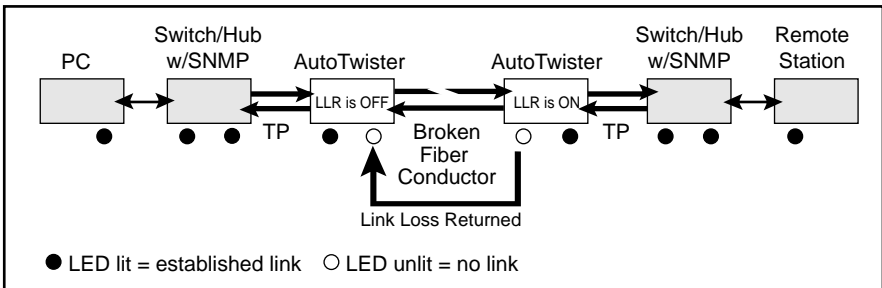
The fiber optic ports of the Metrobility AutoTwister have been designed with LLR\* functionality for troubleshooting a remote connection.

When LLR is enabled, the fiber port's transmitter shuts down when its receiver fails to detect a valid receive link. LLR is normally enabled on one end of the link and is typically enabled on either the unmanaged or remote device. Setting LLR on both ends of the link necessitates auto-recovery. See [Auto-Recovery](#) on page 17.

The diagram below shows a typical network configuration with 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.

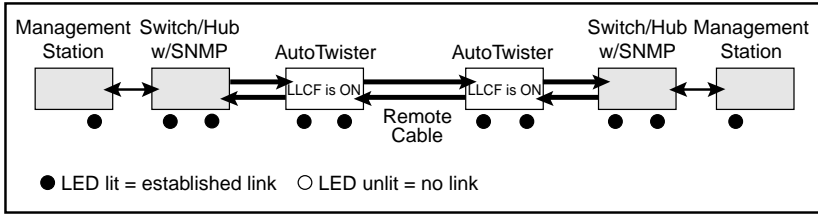


\*Units are shipped with the LLR function disabled (OFF).

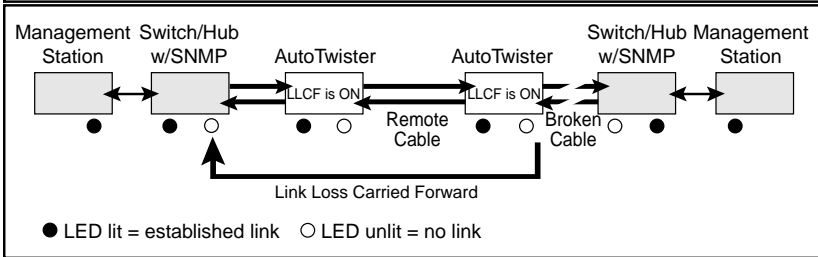
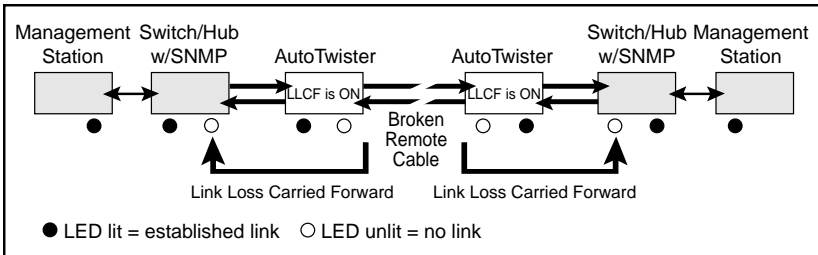
## Link Loss Carry Forward (LLCF)\*

The AutoTwister incorporates LLCF for troubleshooting remote connections. 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 good link status using Metrobility 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.

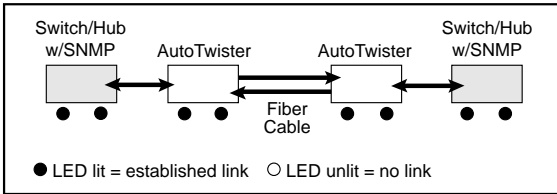


\* Units are shipped with LLCF disabled (OFF).



# Auto-Recovery

A typical application of the 10/100 AutoTwister is to use it in pairs to extend a network's reach between two distant devices.



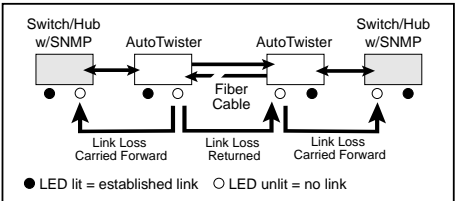
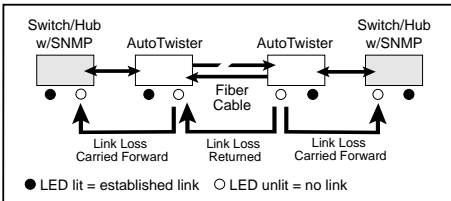
In this back-to-back setup, it may be desirable to see the entire link down if any of the connecting segments fails. This means that both copper ports must relay a no link condition to the switch/hub when any of the cables is broken.

For proper operation in this configuration, auto-recovery must be enabled. In the standalone AutoTwister, auto-recovery is enabled only when all of the following switches are set as indicated:

AN1 = disabled (OFF)      LLR2 = enabled (ON)      LLCF = enabled (ON)

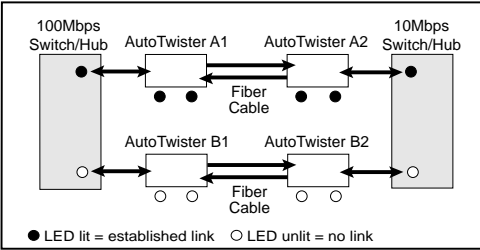
Because LLR is enabled on both units, auto-recovery is required to prevent the two fiber ports from ending up in a deadlock situation, with each waiting for the other to transmit first. Auto-recovery allows the deadlock to be broken by periodically sending out pulses from the fiber port forcing the AutoTwister to establish its fiber link if the line is intact.

The diagrams below show how the two switch/hubs are alerted to a broken fiber cable. Notice that both LLR and LLCF must be enabled under this condition.



# Auto-Recovery Application Example

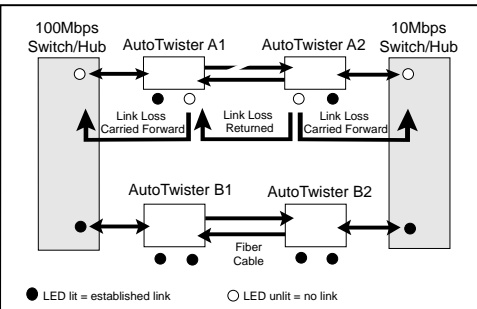
A set of four AutoTwisters can be used to provide the redundancy necessary to ensure that data from a 100Mbps device reaches its destination in a 10Mbps device, as illustrated in the diagram below. In this example, the main link, which includes AutoTwisters A1 and A2, must be seen as a single connection. If any of the cables in the main link fails, both switch/hubs must be notified of the failure so they can activate the backup link, which includes AutoTwisters B1 and B2.



Since the entire main link must appear down if any of its connecting segments fails, the copper ports of AutoTwisters A1 and A2 must be able to indicate a no-link condition to their corresponding switch/hubs. To do this, auto-recovery must be enabled on both AutoTwisters.

To enable auto-recovery on the AutoTwisters, make sure that on each unit AN1 is disabled, LLR2 is enabled, and LLCF is enabled.

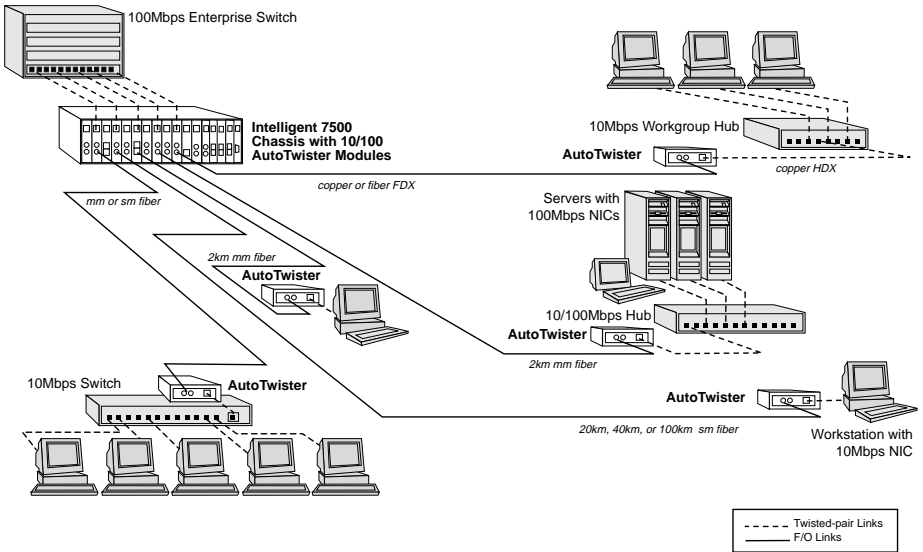
The diagram below illustrates how the two switch/hubs are alerted to a broken fiber cable in the main link, thus activating the backup link with AutoTwisters B1 and B2.



### Sequence of events:

- AutoTwister A1 stops transmitting data to AutoTwister A2.
- AutoTwister A2 senses the loss of link and stops transmitting link pulses to AutoTwister A1 and the 10Mbps switch/hub.
- AutoTwister A1 receives the no link condition and stops transmitting link pulses to the 100Mbps switch.
- The 100Mbps and 10Mbps switch/hubs detect that the main link is down and switch traffic to the backup link.
- Traffic resumes via the backup path with AutoTwisters B1 and B2.
- Because auto-recovery is enabled, AutoTwisters A1 and A2 try to reestablish the fiber link by periodically sending out pulses from their fiber ports.

# Topology Solutions



# Technical Specifications

## Network Connections

### Twisted-Pair Interface

Connector \_\_\_\_\_ Shielded RJ-45, 8-pin jack  
Impedance \_\_\_\_\_ 100 Ohms nominal  
Signal Level Output (peak differential) \_\_\_\_\_ .95 to 1.05V (100Mbps)  
\_\_\_\_\_ 2.2 to 2.8V (10Mbps)  
Signal Level Input \_\_\_\_\_ 200mV minimum (100Mbps)  
\_\_\_\_\_ 585mV minimum (10Mbps)  
Supported Link Length \_\_\_\_\_ 100m  
Cable Type (10Mbps segments) \_\_\_\_\_ Category 3, 4 or 5 UTP/STP  
(100Mbps segments) \_\_\_\_\_ Category 5 or 5E UTP/STP

### Multimode Fiber Optic Interface

(2643-13-01, 2643-15-01, 2643-1G-01, 2643-1K-01)

Connector \_\_\_\_\_ SC, ST, VF-45, LC  
Wavelength \_\_\_\_\_ 1310nm  
RX Input Sensitivity \_\_\_\_\_ -31 dBm maximum  
Output Power \_\_\_\_\_ -23.5 dBm to -14 dBm (50/125  $\mu$ m)  
\_\_\_\_\_ -20 dBm to -14 dBm (62.5/125  $\mu$ m)  
Supported Link Length \_\_\_\_\_ up to 2km full duplex  
Cable Type \_\_\_\_\_ 50/125, 62.5/125  $\mu$ m F/O

### Singlemode Fiber Optic Interface

(2643-14-01, 2643-16-01, 2643-1M-01)

Connector \_\_\_\_\_ SC, ST, LC  
Wavelength \_\_\_\_\_ 1310nm  
RX Input Sensitivity \_\_\_\_\_ -31 dBm maximum  
Output Power \_\_\_\_\_ -15 dBm to -8 dBm (9/125  $\mu$ m)  
Supported Link Length \_\_\_\_\_ up to 20km full duplex  
Cable Type \_\_\_\_\_ 9/125  $\mu$ m F/O

### Singlemode Fiber Optic Interface — long haul distance support

(2643-17-01)

Connector \_\_\_\_\_ SC  
Wavelength \_\_\_\_\_ 1310nm  
RX Input Sensitivity \_\_\_\_\_ -31 dBm maximum  
Output Power \_\_\_\_\_ -5 dBm to 0 dBm (9/125  $\mu$ m)  
Supported Link Length \_\_\_\_\_ up to 40km full duplex  
Cable Type \_\_\_\_\_ 9/125  $\mu$ m F/O

*Singlemode Fiber Optic Interface — extended long haul distance support*

(2643-1J-01)

Connector \_\_\_\_\_ SC  
Wavelength \_\_\_\_\_ 1550nm  
RX Input Sensitivity \_\_\_\_\_ -37 dBm minimum  
Output Power \_\_\_\_\_ -3 dBm to 0 dBm (9/125  $\mu$ m)  
Supported Link Length \_\_\_\_\_ up to 100km full duplex  
Cable Type \_\_\_\_\_ 9/125  $\mu$ m F/O

*Singlemode BWDM Fiber Optic Interface*

Connector \_\_\_\_\_ SC  
Supported Link Length \_\_\_\_\_ up to 20km full duplex  
Cable Type \_\_\_\_\_ 9/125  $\mu$ m F/O  
RX Input Sensitivity \_\_\_\_\_ -32 dBm minimum  
Output Power \_\_\_\_\_ -15 dBm to -8 dBm (9/125  $\mu$ m)  
(2643-1X-01)

TX Wavelength \_\_\_\_\_ 1550nm  
RX Wavelength \_\_\_\_\_ 1310nm

(2643-1Y-01)

TX Wavelength \_\_\_\_\_ 1310nm  
RX Wavelength \_\_\_\_\_ 1550nm

**Data Rate**

Data Rate \_\_\_\_\_ 100Mbps half duplex; 200Mbps full duplex (Fast Ethernet)  
\_\_\_\_\_ 10Mbps half duplex; 20Mbps full duplex (Ethernet)

**Power**

Input \_\_\_\_\_ 90-260V AC 50/60 Hz  
Output \_\_\_\_\_ + 5V @ 1Amp, 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 (including power supply) \_\_\_\_\_ 3 lbs, 1.36 kg

## ***Product Safety, EMC and Compliance Statements***

This equipment complies with the following requirements:

- UL
- CE
- FCC Part 15, Class B
- EN55024: 1998 (immunity)
- IEC 825-1 Classification (eye safety)
- CSA
- EN60950 (safety)
- EN55022 Class B (emissions)
- DOC Class B (emissions)
- Class 1 Laser Product (eye safety)

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 B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

***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 B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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

## **Warranty and Servicing**

### ***Three-Year Warranty for Metrobility AutoTwisters***

Metrobility Optical Systems, Inc. warrants that every 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](http://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.

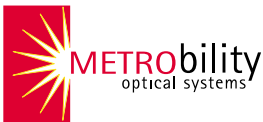
### **Product Manuals**

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.asp>



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[www.metrobility.com](http://www.metrobility.com)