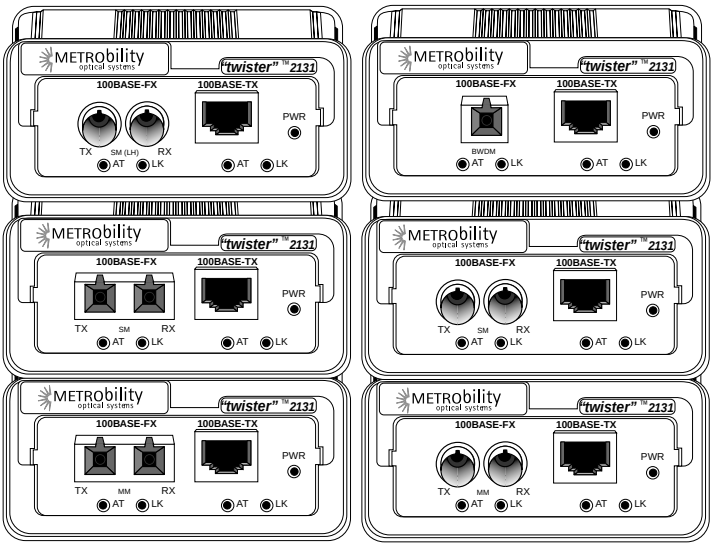
“twister”™ 2131
100Mbps TX-to-FX
Media Converter



Installation & User Guide

Models: 2131-13-01 / 2131-14-01 / 2131-15-01 / 2131-16-01 / 2131-17-01 / 2131-1J-01 / 2131-1X-01 / 2131-1Y-01

Metrobility Media Converters

100Mbps Standalone Units:

2131-13-01 ____ TX to FX multimode SC; universal AC
2131-14-01 ____ TX to FX singlemode SC; universal AC
2131-15-01 ____ TX to FX multimode ST; universal AC
2131-16-01 ____ TX to FX singlemode ST; universal AC
2131-17-01 ____ TX to FX singlemode SC (40km); universal AC
2131-1J-01 ____ TX to FX singlemode SC (100km); universal AC
2131-1X-01 ____ TX to FX singlemode 1550/1310nm bidirectional wavelength division multiplexed (BWDM) SC
2131-1Y-01 ____ TX to singlemode 1310/1550nm BWDM SC

2131-34-01 ____ FX multimode SC to FX singlemode SC; universal AC
2131-36-01 ____ FX multimode SC to FX singlemode ST; universal AC
2131-54-01 ____ FX multimode ST to FX singlemode SC; universal AC
2131-56-01 ____ FX multimode ST to FX singlemode ST; universal AC

10Mbps Standalone Units:

2111-12-01 ____ RJ-45 to BNC; universal AC
2111-12-02 ____ RJ-45 to BNC; domestic AC
2111-13-01 ____ RJ-45 to FL multimode SC; universal AC
2111-13-02 ____ RJ-45 to FL multimode SC; domestic AC
2111-15-01 ____ RJ-45 to FL multimode ST; universal AC
2111-15-02 ____ RJ-45 to FL multimode ST; domestic AC
2111-16-01 ____ RJ-45 to FL singlemode ST; universal AC
2111-16-02 ____ RJ-45 to FL singlemode ST; domestic AC
2111-18-01 ____ RJ-45 to FL multimode SMA; universal AC
2111-18-02 ____ RJ-45 to FL multimode SMA; domestic AC

Table of Contents

"twister" 2131 100Mbps TX-to-FX Media Converter Installation & User Guide

Introduction

Thank you for choosing the Metrobility 2131 media converter.

Metrobility 2131 media converters represent the hottest technology available for extending Ethernet and Fast Ethernet networks. Since Metrobility first developed "twister" media conversion, it has become a standard for providing a cost-effective means of integrating a mixed media environment. As LANs grow and evolve, this technology provides an ideal solution for building effective migration strategies.

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

The information in this guide will help you to install and start using your 2131 media converter.

Overview

The Metrobility 2131 100Mbps TX-to-FX media converter provides seamless high-speed integration of 100BASE-TX twisted-pair and 100BASE-FX fiber optic segments in Fast Ethernet environments. The 2131 supports remote fiber optic links up to 2km over multimode and up to 100km over singlemode fiber optic cable.

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

The Metrobility 2131 provides the following key features:

- A Link Loss Carry Forward (LLCF) enable/disable switch is included to provide an easy means for troubleshooting a remote network connection. Refer to the section of this guide titled “Link Loss Carry Forward” for more information.

- All twisted-pair ports are equipped with an MDI-II to MDI-X switch eliminating the need for crossover cables.

- Auto polarity support on all twisted-pair ports.

Whether you are updating or expanding your existing network, the Metrobility line of media converters supports a wide range of configuration needs. The 2131 includes the following media conversion combinations:

2131-13-01	TX to FX multimode SC
2131-14-01	TX to FX singlemode SC
2131-15-01	TX to FX multimode ST
2131-16-01	TX to FX singlemode ST
2131-17-01	TX to FX singlemode SC (40km)
2131-1J-01	TX to FX singlemode SC (100km)
2131-1X-01	TX to FX singlemode 1550/1310nm BWDM SC
2131-1Y-01	TX to FX singlemode 1310/1550nm BWDM SC

Installation Guide

Follow the simple steps outlined in this section of the guide to install and start using your Metrobility 2131 media converter.

1

Unpack the "twister" Media Converter and Accessories

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

- 2131 media converter
- Power supply
- Power cord
- Four (4) rubber feet

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

2

Choose an Appropriate Location

The 2131 media converter is intended for use in either office or industrial environments. The unit must be located within six (6) feet of the AC power source being used and placed as far away as possible from electrical noise generating equipment such as copiers, electrostatic printers and other motorized equipment. If exposed twisted-pair wiring is used nearby, the wiring should be routed as far away as possible from power cords and data cables to minimize interference.

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

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

3

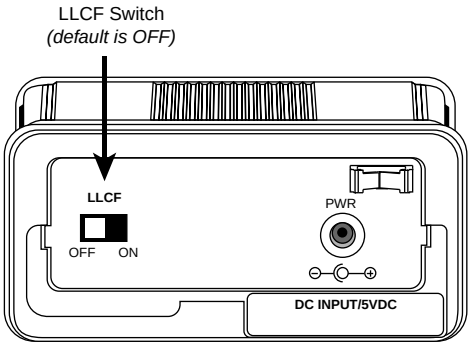
Set the Switches

Link Loss Carry Forward (LLCF) Switch

The 2131 media converter incorporates Link Loss Carry Forward (LLCF) functionality as an aid in troubleshooting a remote connection.

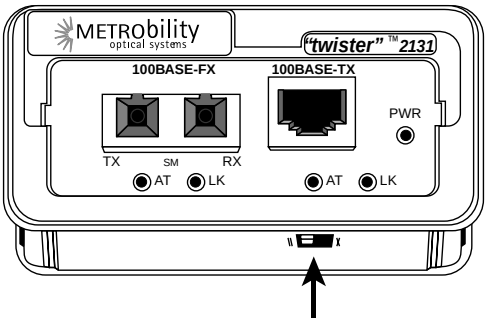
A switch for enabling/disabling LLCF is located on the rear panel of the converter. When LLCF is enabled, the FX ports as well as the TX ports on the media converter do not transmit a link signal until they receive a link signal from the opposite port. Refer to the page titled “Link Loss Carry Forward”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

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



MDI-II to MDI-X Switch

All 2131 media converters with twisted-pair ports have an MDI-II to MDI-X switch that eliminates the need for crossover cables. This switch is located on the bottom of the unit directly below the RJ-45 connector and allows simple setup in either straight through or crossover configurations. Refer to the following illustration.



MDI-II / MDI-X Switch
(default is MDI-II)

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

- the parallel symbol (II) indicates a straight through or parallel connection. *(default)*

- the cross symbol (X) indicates a crossover connection.

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

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

4

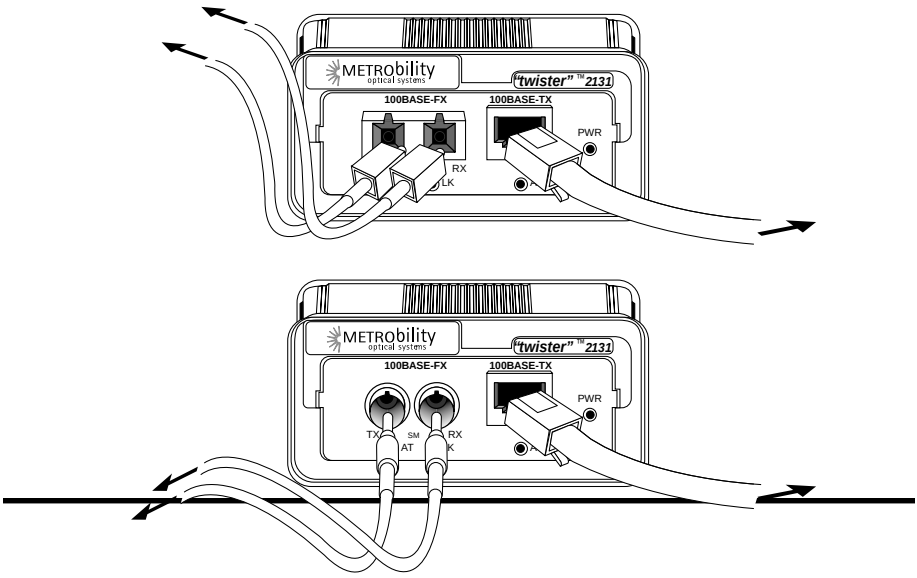
Connect to the Network

The Metrobility 2131 media converter offers the ease of plug-and-play installation.

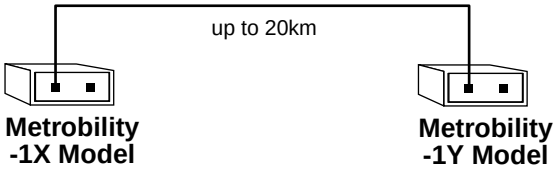
Each 2131 media converter provides one shielded RJ-45 connector and supports a maximum segment length of 100 meters for Category 5 twisted-pair.

The 2131 also comes with the following connectors:

- The 2131-13-01 and 2131-15-01 provide one set of FX multimode SC/ST connectors, respectively, and supports a maximum segment length of up to 2km for remote links.
- The 2131-14-01 provides one set of FX singlemode SC connectors and supports a maximum segment length of up to 15km for remote links.
- The 2131-17-01 provides one set of FX singlemode SC connectors and supports a maximum segment length of up to 40km for remote links.
- The 2131-1J-01 provides one set of FX singlemode SC connectors and supports a maximum segment length of up to 100km for remote links.
- The 2131-16-01 provides one set of FX singlemode ST connectors and supports a maximum segment length of up to 15km for remote links.



- The 2131-1X-01 and 2131-1Y-01 provide one singlemode bidirectional wavelength division multiplexed (BWDM) SC connector which supports a maximum segment length of up to 20km for remote links. BWDM units must always be used in complementary pairs. That is, a-1X model must be connected to a -1Y. The -1X unit is designed to transmit data at a wavelength of 1550nm and receive at 1310nm. Correspondingly, the -1Y unit transmits data at 1310nm and receives at 1550nm.



When making fiber optic connections, be sure that the transmit (TX) port of the 2131 connects to the receive (RX) port of the connected device; and be sure that the transmit (TX) port of the connected device connects to the receive (RX) port of the Metrobility model.

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

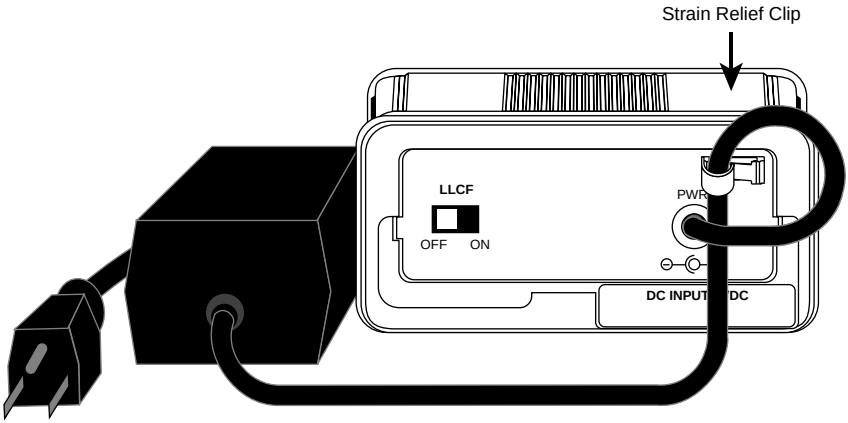
5

Apply Power

Power is provided to the 2131 unit from the desktop universal power supply module. This power module is equipped with a S760 hollow-type plug for insertion into the DC jack located on the back of the 2131 and standard IEC 320-type AC power receptacle.

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

Upon receiving power, the 2131 media converter goes into normal operation mode and automatically provides the appropriate signal translation between the connected network segments.



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

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

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

- AC 115V (North American): use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, type SVT or SJT three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15A, 125V.

- AC 230V (USA): use a UL-listed cord set consisting of a minimum No. 18 AWG, type SVT three-conductor cord, a maximum of 15 feet in length and a Tandem blade grounding-type attachment plug rated 15A, 250V.

- 240V (outside USA): use a cord set consisting of a minimum No. 18 AWG cord and grounding-type attachment plug rated 15A, 250V. The cord set should have the appropriate safety approvals for the country in which the 2131 is installed and marked HAR.

This section contains more detailed information regarding the operating features for the 2131 media converter.

System LEDs

The Metrobility 2131 media converter provides LEDs for the visible verification of unit status and proper functionality as well as aiding in troubleshooting and overall network diagnosis and management.

LEDs indicate the following:

- PWR (power): the unit is ON and functioning in normal operation mode.
- LK (link; twisted-pair and fiber optic ports): satisfactory link status on the respective port.
- AT (activity): the port is receiving data.

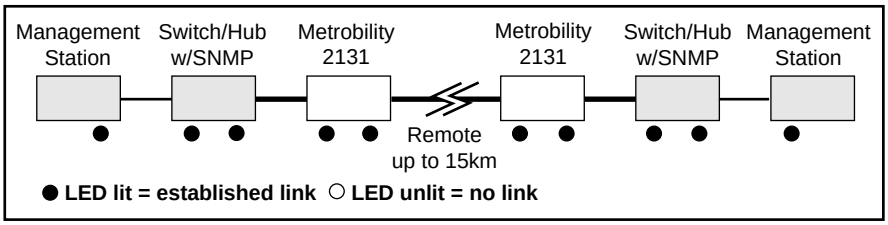
Once power is applied to the unit, correct connectivity can be verified via the LK LED.

Link Loss Carry Forward (LLCF)

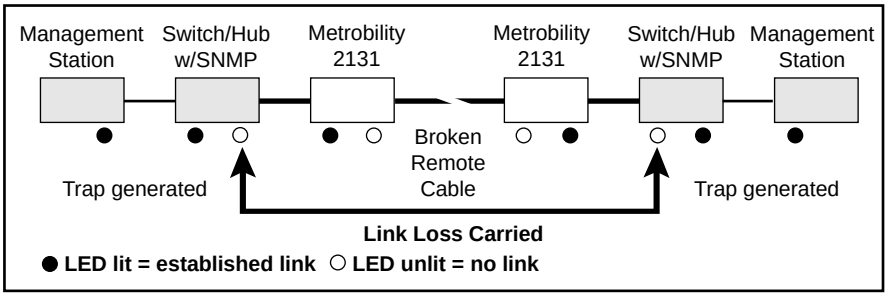
The Metrobility 2131 has been designed with a LLCF function for troubleshooting a remote connection. The unit is shipped with the LLCF disabled.

When LLCF is enabled, the fiber optic ports as well as the twisted-pair ports on the 2131 media converter do not transmit a link signal until they receive a link signal from the opposite port. For example, if LLCF is enabled and two 2131 media converters are connected via a fiber cable with nothing else connected to them, the link (LK) LEDs do 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 2131 media converters for remote connectivity:

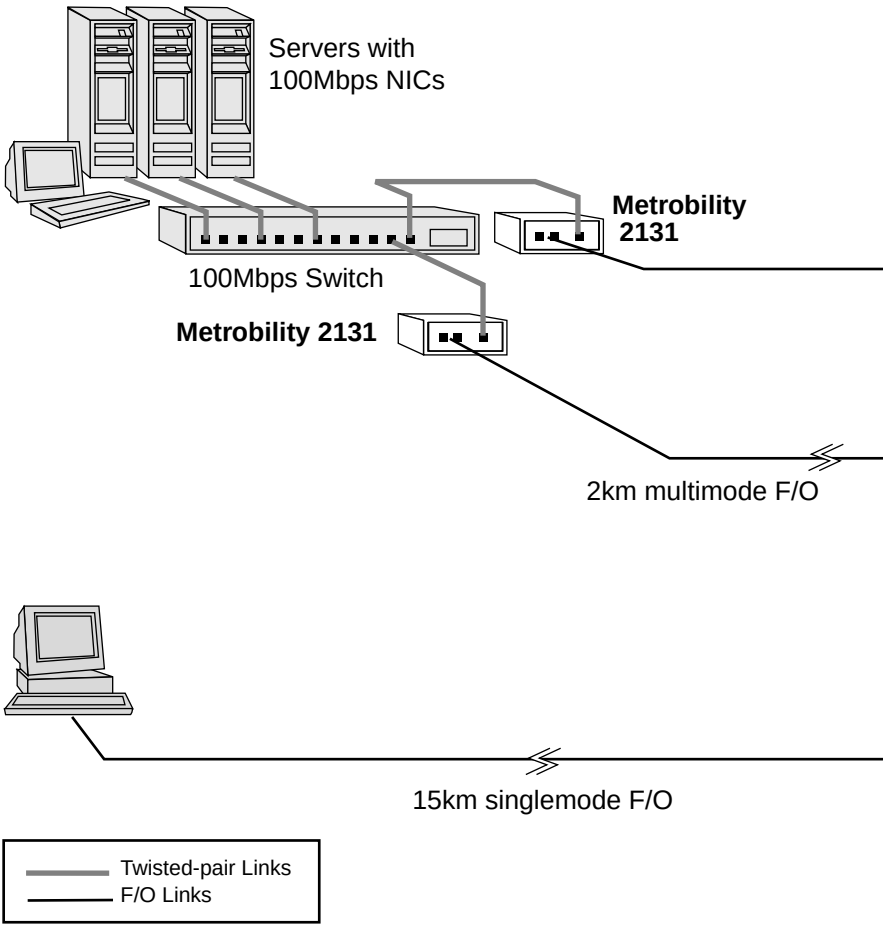


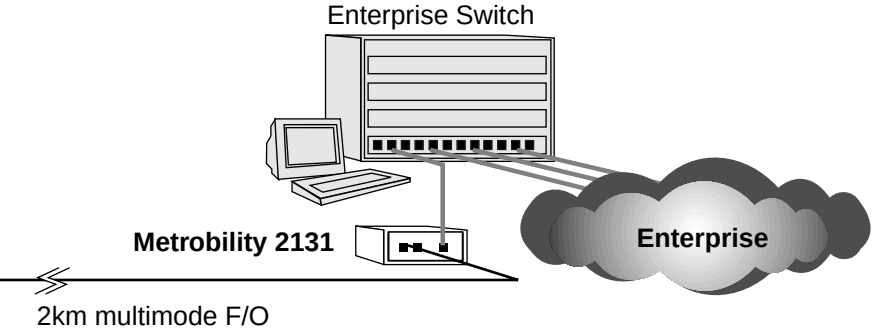
If the fiber connection breaks, or the remote device fails, the 2131 media converter carries that link loss all the way to the switch/hub which generates a trap to the management station. The administrator can then look at the media converter to determine the source of the loss.

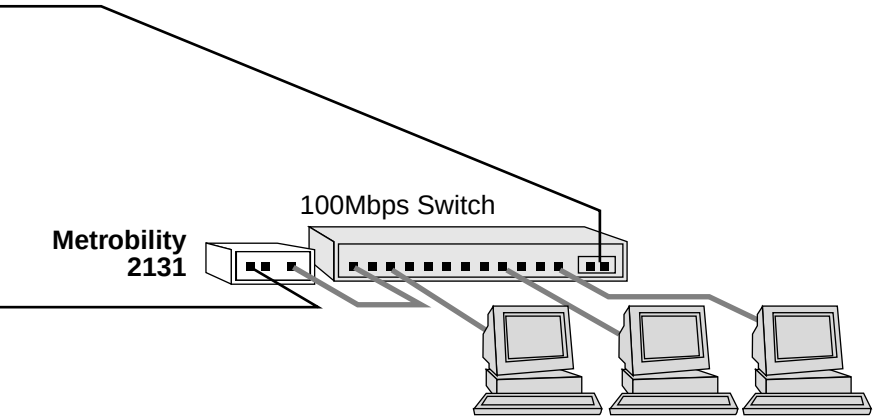


IMPORTANT: *When connecting a 2131 media converter with LLCF enabled to an auto-negotiating device, force both sides of the configuration to 100Mbps full or half duplex. This allows the interface media converter to immediately see link pulses and start passing data.*

Topology Solutions




Enterprise Switch
Metrobility 2131
Enterprise
2km multimode F/O


100Mbps Switch
Metrobility
2131

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 _____ Category 5 UTP
(EN55024:1998 compliance) _____ Category 5 STP

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 — long haul 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

Singlemode Fiber Optic Interface — extended long haul distance support

Connector _____ SC
Wavelength _____ 1550nm
RX Input Sensitivity _____ -31 dBm minimum
Output Power _____ 0 dBm to -3.01 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 SM F/O

Singlemode BWDM Fiber Optic Interface

Connector _____ SC

Supported Link Length _____ up to 20km full duplex

Cable Type _____ 9/125 µm F/O

(2131-1X-01)

TX Wavelength _____ 1550 nm

RX Wavelength _____ 1310 nm

RX Input Sensitivity _____ -32 dBm minimum

Output Power _____ -8 dBm to -15 dBm (9/125 µm)

(2131-1Y-01)

TX Wavelength _____ 1310 nm

RX Wavelength _____ 1550 nm

RX Input Sensitivity _____ -32 dBm minimum

Output Power _____ -8 dBm to -15 dBm (9/125 µm)

Data Rate

Data Rate _____ 100Mbps half duplex

_____ 200Mbps full duplex

Bit Delay _____ < 40 bits

Power

Input _____ 90-260V AC 50/60 Hz

Output _____ +5VDC @ 1.2 A

Environmental

Operating Temperature _____ 0° to 55° 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 lb, 1.36 kg

Regulatory

Compliance _____ IEEE 802.3u 100BASE-FX, 100BASE-TX,

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 802.3u
- IEC 825-1 Classification
- Class 1 Laser Product
- 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 Metrobility "twister" Media Converters

Metrobility Optical Systems, Inc. warrants that every "twister" media converter 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.

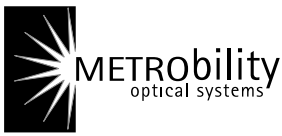
Metrobility will pay return transportation for product repaired or replaced in-warranty. Before making any repair not covered by the warranty, Metrobility will estimate cost and obtain authorization, then invoice for repair and return transportation. Metrobility reserves the right to charge for all testing 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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