



E-100BTX-FX-06

Stand-Alone Media Converter

User Guide

Intellectual Property

© 2022, 2023 Lantronix, Inc. All rights reserved. No part of the contents of this publication may be transmitted or reproduced in any form or by any means without the written permission of Lantronix.

Lantronix is a registered trademark of Lantronix, Inc. in the United States and other countries.

All other trademarks and trade names are the property of their respective holders.

Patented: patents.lantronix.com; additional patents pending.

Warranty

For details on the Lantronix warranty policy, go to <http://www.lantronix.com/support/warranty>.

Contacts

Lantronix Corporate Headquarters

48 Discovery, Suite 250
Irvine, CA 92618, USA
Toll Free: 800-526-8766
Phone: 949-453-3990
Fax: 949-453-3995

Technical Support

<https://www.lantronix.com/technical-support/>

Sales Offices

For a current list of our domestic and international sales offices, go to www.lantronix.com/about/contact.

Disclaimer

All information contained herein is provided "AS IS." Lantronix undertakes no obligation to update the information in this publication. Lantronix does not make, and specifically disclaims, all warranties of any kind (express, implied or otherwise) regarding title, non-infringement, fitness, quality, accuracy, completeness, usefulness, suitability or performance of the information provided herein. Lantronix shall have no liability whatsoever to any user for any damages, losses and causes of action (whether in contract or in tort or otherwise) in connection with the user's access or usage of any of the information or content contained herein. The information and specifications contained in this document are subject to change without notice.

Revision History

Date	Rev	Note
7/25/19	A	Initial release.
3/9/22	B	Initial Lantronix rebrand.
2/14/23	C	Update graphics and text.

Contents

Product Description.....	4
Ordering Information.....	4
Accessories	4
Features	5
Family Portrait.....	5
Installation	6
4-Position DIP Switch	6
Installing the Fiber Cable	7
Installing the Copper Cable	7
Powering the Media Converter	8
Operation	8
Status LEDs.....	8
Auto-Negotiation	8
Pause Control	8
Auto MDI/MDIX.....	8
Active Link Pass-Through (ALPT)	9
Far-End Fault.....	10
Specifications	10
Cable Specifications	10
Technical Specifications	12
Troubleshooting	13
Compliance Information	14
Declaration of Conformity	14

Product Description

The E-100BTX-FX-06 is a stand-alone media converter that provides an interface between 100Base-TX ports and 100Base-FX ports, allowing users to integrate fiber optic cabling into 100Base-TX copper environments. Operating at Layer 1, the physical layer, data is passed through the converter at line speed, making it ideal for applications where low latency is essential.

Ordering Information

Part Number	Description
E-100BTX-FX-06(SFP)	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-X SFP Slot (empty)
E-100BTX-FX-06	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-FX 1300nm multimode (ST) [2 km/1.2 mi.] Link Budget: 11.0 dB
E-100BTX-FX-06(SC)	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-FX 1300nm multimode (SC) [2 km/1.2 mi.] Link Budget: 11.0 dB
E-100BTX-FX-06(LC)	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-FX 1300nm multimode (LC) [2 km/1.2 mi.] Link Budget: 11.0 dB
E-100BTX-FX-06(SM)	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-FX 1310nm single mode (SC) [20 km/12.4 mi.] Link Budget: 16.0 dB
E-100BTX-FX-06(SMLC)	100Base-TX (RJ-45) [100 m/328 ft.] to 100Base-FX 1310nm single mode (LC) [20 km/12.4 mi.] Link Budget: 17.3 dB

* Typical maximum cable distance. Actual distance depends on the physical characteristics of the network installation. For more information, see <https://www.lantronix.com/>.

Accessories

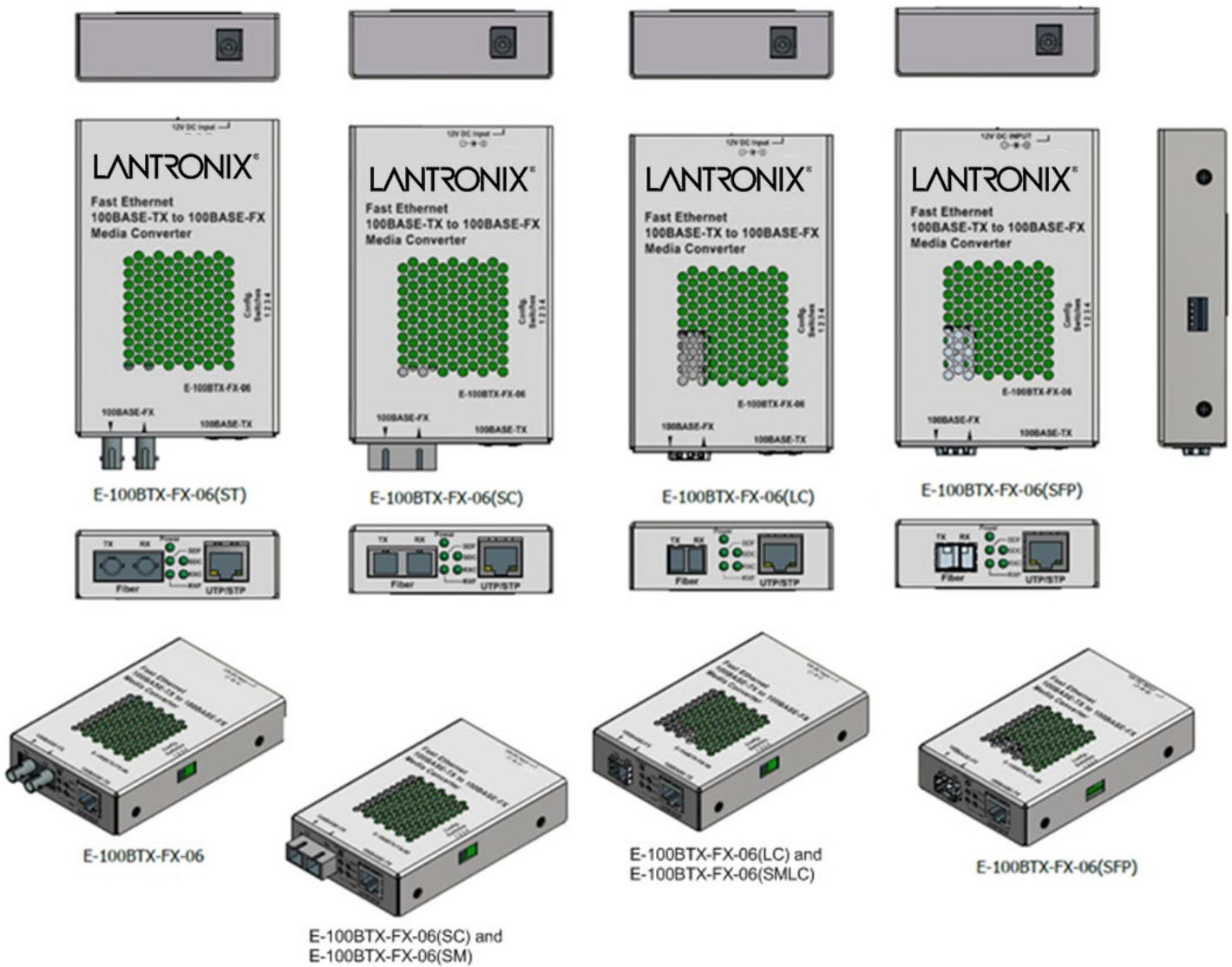
Accessories are sold and packaged separately.

Part Number	Description
SPS-2460-SA	Optional External Power Supply; 24-60 VDC and 24-42 VRMS Stand-Alone Wide-Input; Output: 12.25 VDC, 1.0 A
E-MCR-05	12-Slot Media Converter Rack (<i>includes universal internal power supply</i>) 17 x 15 x 5 in. (432 x 381 x 127 mm)
RMS19-SA4-02	4-Slot Media Converter Shelf
WMBL	Optional Wall Mount Brackets; 4.0 in. (102 mm)
WMBV	Optional Vertical Mount Bracket; 5.0 in. (127 mm)
WMBD	Optional DIN Rail Mount Bracket; 5.0 in. (127 mm)
WMBD-FS	Optional DIN Rail Mount Bracket (flat, small); 3.1in. (79 mm)
SFPs	See the Lantronix SFP webpage for our full line of SFPs

Features

- Used in pairs or as a single unit to integrate fiber into a 100base copper environment
- Low latency, layer 1 design
- Auto-negotiation
- Auto-MDI/MDIX
- Active link pass through
- Far-End-Fault (FEF)
- Pause
- Automatic link restoration
- Supports all 100Mbps SFP Modules

Family Portrait

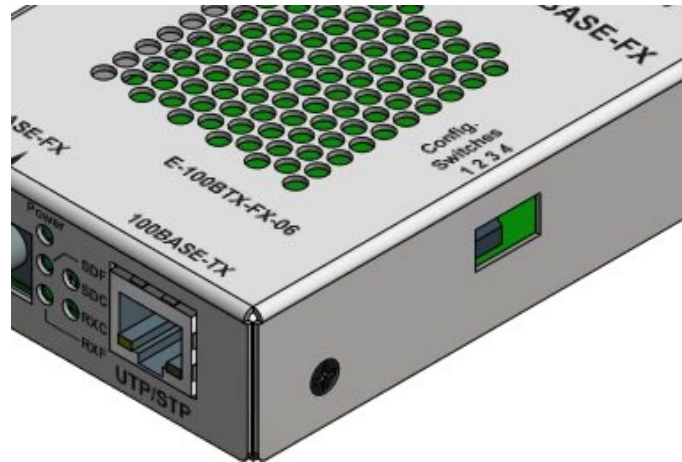


Installation

Caution: Wear a grounding device and observe electrostatic discharge precautions when setting the 4-position DIP switch and jumpers. Failure to observe this caution could result in failure of the media converter.

4-Position DIP Switch

The 4-position DIP switch is located on the side of the media converter. Use a small flat-blade screwdriver or a similar tool to set the recessed switches.



1. Auto-Negotiation

Up Enables Auto-Negotiation for the copper connection.

Down Disables Auto-Negotiation for the copper connection.

2. Pause Control

Up Enabled

Down Disabled

3. Active Link Pass-Through

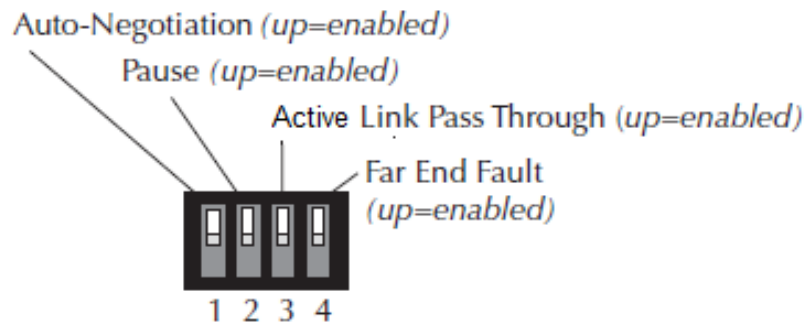
Up Enabled

Down Disabled

4. Far-End Fault

Up Enabled

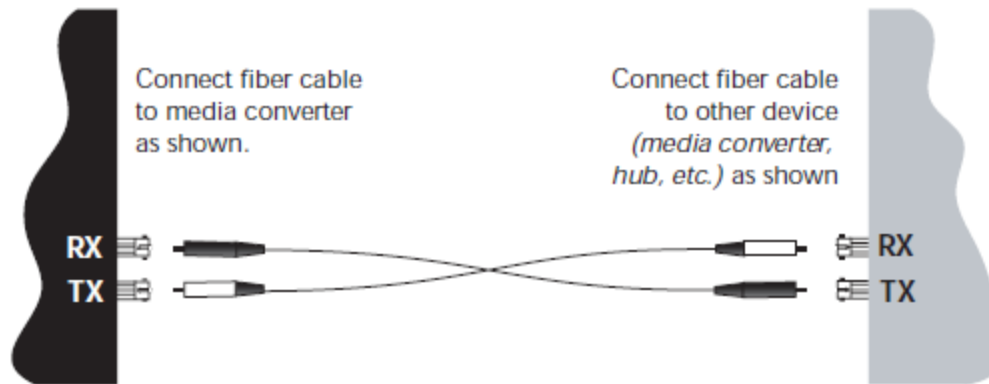
Down Disabled



Note: The media converters are shipped from the factory with all DIP switches in the Up (Enabled) position.

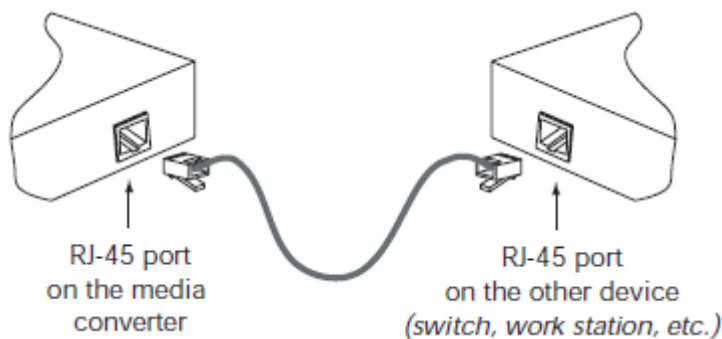
Installing the Fiber Cable

1. Locate a 100Base-FX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the media converter as described:
 - Connect the male TX cable connector to the female TX port.
 - Connect the male RX cable connector to the female RX port.
3. Connect the fiber cables to the other device (*another media converter, Ethernet Switch, etc.*) as described:
 - Connect the male TX cable connector to the female RX port.
 - Connect the male RX cable connector to the female TX port.



Installing the Copper Cable

1. Locate a 100Base-TX compliant copper cable with male, RJ-45 connectors installed at both ends.
2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device (*switch, workstation, etc.*).



Powering the Media Converter

Power Cord Included: to order the corresponding country-specific AC power cord, add the Country Code extension to the end of the SKU; NA = North America, LA = Latin America, EU =Europe, UK = United Kingdom, SA = South Africa, JP = Japan, OZ = Australia, BR = Brazil.

AC

1. Install the power cord barrel connector into the back of the media converter.
2. Connect the power adapter plug into AC power.
3. Verify that the media converter is powered up by noting that the power LED is lit.

DC

See the SPS-2460-SA DC External Power Supply [User Guide](#) 33455 for more information.

Operation

Status LEDs

Use the status LEDs to monitor the E-100BTX-FX-06 media converter operation in the network:

LED	Description	Meaning
Power	Power	On = Connected to external AC power.
SDF	Signal Detect/Fiber	On = Fiber link is detected.
SDC	Signal Detect/Copper	On = Copper link is detected.
RXC	Receive/Copper	Flashing = A signal is being received on the copper link.
RXF	Receive/Fiber	Flashing = A signal is being received on the fiber link.

Auto-Negotiation

When the Auto-Negotiation feature is activated, the media converter configures itself to achieve the best possible mode of operation over a link, automatically. The media converter broadcasts its speed (*100 Mb/s*) and duplex capabilities (*either full or half-duplex*) and negotiates the best mode of operation between the two devices.

Pause Control

The Pause feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

Note: If the Pause feature is available on ALL network devices attached to the media converter(s), enable the Pause feature on the media converter(s); otherwise, disable the Pause feature.

Auto MDI/MDIX

The Auto MDI/MDIX feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to devices such as hubs, transceivers, or network interface cards (NICs). AutoCross determines the characteristics of the cable connection and automatically configures the unit to link up, regardless of the cable configuration.

Active Link Pass-Through (ALPT)

Link Pass-Through is a troubleshooting feature that allows the media converter to monitor both the fiber and copper RX ports for loss of signal. With the loss of RX signal on one media port, the converter will automatically disable the TX signal of the other media port, thus “passing through” the link loss.

- End device automatically notified of link loss
- Prevents loss of valuable data unknowingly transmitted over invalid link

Active LPT is a form of LPT that requires the links to become Active before LPT becomes Active.

With Active LPT there are 2 states: **Diagnostic** and **Active**.

The media converter enters the **Diagnostic** state when either of the following conditions is met:

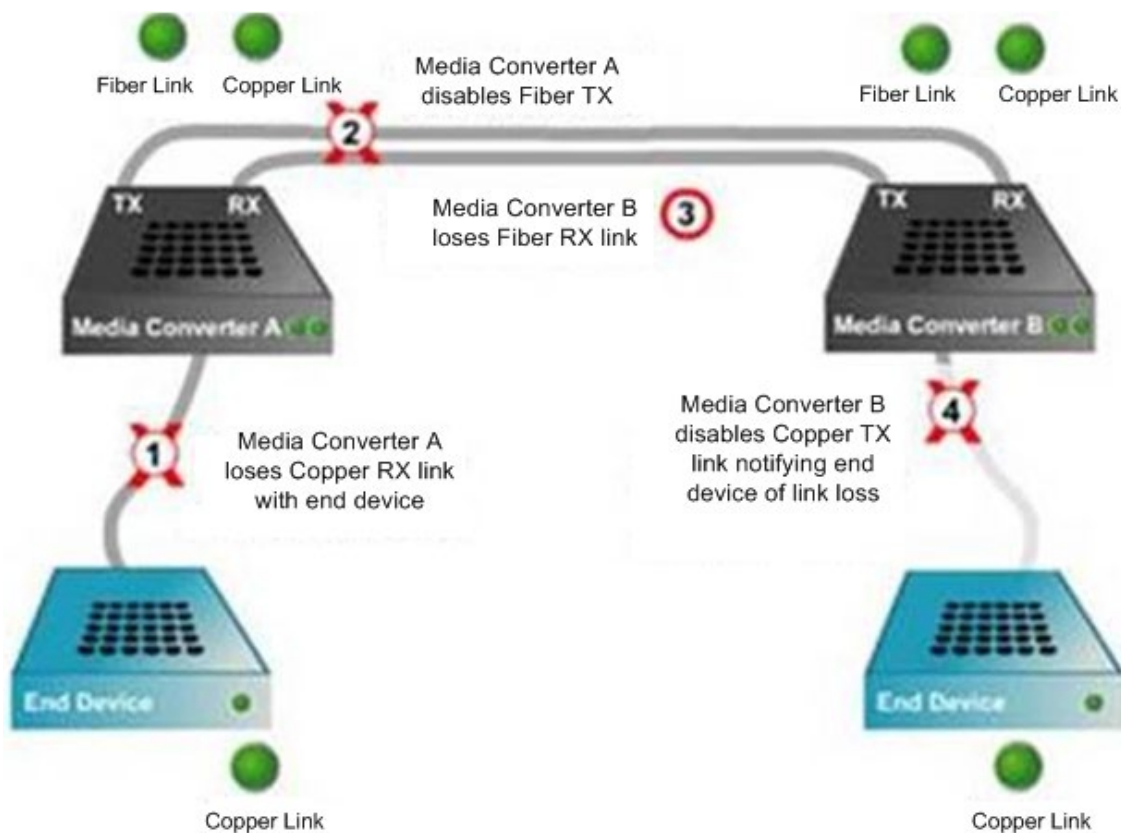
- Upon power-up of the converter.
- Upon losing Link on either the copper or fiber ports.

In the **Diagnostic** state, the link for each of the media converter’s ports can come up independently of each other, just like a converter that has no LPT functionality, or a converter that has LPT is disabled. The Diagnostic state is helpful during first power up, before all links of a circuit are connected, as it allows the installer to see each link turn on as the cables are plugged in. It’s also helpful for finding the location of a fault, if one exists.

The media converter remains in the Diagnostic state until the following condition is met:

- The link status for both media converter’s ports is up, simultaneously.

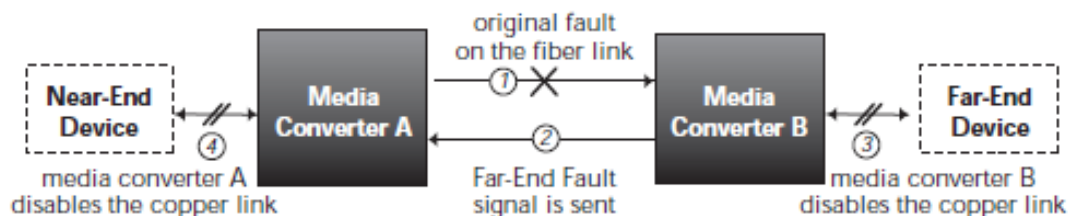
After that condition is met, ALPT enters the **Active** state. It remains in the Active state until the converter is either powered down, or either the copper port or the fiber port loses Link. In the Active state, Active LPT works as shown below (the same as when regular LPT is enabled).



Far-End Fault

Far-End Fault is a valuable feature used in a media converter when it loses Receive Fiber link, but still has a valid Fiber Transmit link.

When a fault occurs on an incoming fiber link (1), the media converter transmits a Far-End Fault signal on the outgoing fiber link (2). In addition, the Far-End Fault signal also activates the Link Pass-Through, which in turn disables the link on the copper portion of the network (3) and (4).



Specifications

The fiber optic cable physical characteristics must meet or exceed IEEE 802.3ae specification.

Cable Specifications

The physical characteristics must meet or exceed IEEE 802.3™ specifications.

Copper Cable

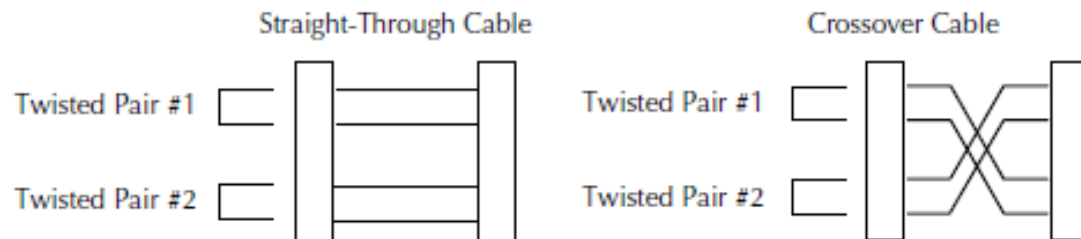
Category 5: (minimum requirement)

Gauge: 24 to 22 AWG

Attenuation: 22.0 db /100m @ 100 MHz

Maximum Cable Distance: 100 meters

- Straight-through or crossover cable may be used.
- Shielded twisted-pair (STP) or unshielded twisted-pair (UTP) may be used
- Pins 1&2 and 3&6 are the two active pairs in an Ethernet network
- RJ-45 Pin-out: Pin 1 = TD+, Pin 2 = TD-, Pin 3 = RD+, Pin 6 = RD-
- Use only dedicated wire pairs for the active pins: (e.g., blue/white & white/blue, orange/white & white/orange, etc.)
- Do not use flat or silver satin wire.



Fiber Cable

Bit Error Rate:	<10 ⁻⁹	
Single mode fiber (recommended):	9 μm	
Multimode fiber (recommended):	62.5/125 μm	
Multimode fiber (optional):	100/140, 85/140, 50/125 μm	
E-100BTX-FX-06	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dbm	
E-100BTX-FX-06(SC) & (LC)	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dbm	
E-100BTX-FX-06(SM)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dbm	
E-100BTX-FX-06(SMLC)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -15.2 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.5 dBm	max: -3.0 dBm
Link Budget:	17.3 dbm	

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Technical Specifications

Standards	IEEE 802.3
Data Rate	100 Mb/s
DIP Switch	SW1: Auto-Negotiation On/Off SW2: Pause TX On/Off SW3: LPT On/Off SW4: FEF On/Off
Status LEDs	PWR (Power): Lit for normal operation SDF (Signal Detect Fiber): Lit for fiber link SDC (Signal Detect Copper): Lit for copper link RXF (Receive Fiber): Flashing = RX data RXC (Receive Copper): Flashing = RX data
Dimensions	Width: 3" [76 mm] x Depth: 4.7" [119 mm] x Height: 1" [25 mm]
Power Supply	External AC/DC required; Output: 12 VDC. 0.41Amps; input 120-240VAC, unregulated; standard
Power Input	9-14VDC
Power Consumption	1.75 Watts (Fixed optics models) 1 Watt plus the SFP (SFP models)
Environment	Tmra* (Standard temp): 0°C to 50°C (32 to 122°F) Storage Temperature: -15°C to 65°C (5 to 149°F) Humidity: 5% to 95% (non-condensing) Altitude: 0 – 10,000 ft.
Weight	6 oz. (181 g) approximately
Compliance	Safety: Wall Mount Power Supply: UL Listed, cUL Listed (Canada). FCC Part 15 Class A, EN 55032:2012, EN 55024:2010 Directive 2014/30/EU Low-Voltage Directive 2014/35/EU IEC /EN 60950-1:2006+A2:2013 2011/65/EU EN 50581:2012 CE Mark
MTBF	Greater than 46,768 hours (MIL-HDBK-217F) Greater than 123,861 hours (Bellcore7 V5.0)
Warranty	Lifetime

* Manufacturer's rated ambient temperature.

CAUTION: Visible and invisible laser radiation when open. Do not stare into beam or view directly with optical instruments.

CAUTION: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION: Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intrabuilding (inside plant) link segments that are not subject to lightning transients or power faults. Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building (outside plant) link segments that are subject to lightning transients or power faults. Failure to observe this caution could result in damage to equipment.

Troubleshooting

If the media converter fails, isolate and correct the fault by answering the following questions and then taking the indicated action. **Note:** DIP switch positions 3 and 4 must be DOWN before starting the troubleshooting process.

1. Is the Power LED lit?

NO

- Is the power adapter the correct model (check I/O voltage and Hz)?
- Verify the voltage and frequency of the AC outlet.
- Are the power barrel connector and wall plug of the power adapter properly inserted in the media converter and plugged into a live AC wall outlet?
- Contact Tech Support.

YES: Proceed to step 2.

2. Is the SDC (signal detect/copper) LED lit?

NO

- Check the twisted-pair cables for proper connection.
- Contact Tech Support.

YES: Proceed to step 3.

3. Is the SDF LED (signal detect/fiber) illuminated?

NO

- Check the fiber cables for proper connection.
- Verify that the TX and RX cables on the media converter are connected to the RX and TX ports, respectively, on the other device.
- Contact Tech Support.

YES: Proceed to step 4.

4. Is the RXC (receive/copper) LED flashing?

NO

- If there is no activity on the UTP/STP port, proceed to step 5.
- If there is activity on the UTP/STP port, disconnect and reconnect the twisted-pair cable to restart the initialization process.
- Contact Tech Support.

YES: Proceed to step 5.

5. Is the RXF (receive/fiber) LED flashing?

NO

- If there is no activity on the fiber port, contact Tech Support.
- If there is activity on the fiber port, disconnect / reconnect the fiber cable to restart initialization process.
- Contact Tech Support.

YES: Contact Tech Support.

Compliance Information

Declaration of Conformity

Manufacture's Name: Lantronics, Inc.

Manufacture's Address: 48 Discovery, Suite 250, Irvine, California 92618

Declares that the products: E100BTX-FX-06, E100BTX-FX-06(SFP), E100BTX-FX-06(SC), E100BTX-FX-06(LC), E100BTX-FX-06(SM), E100BTX-FX-06(SMLC)

Conform to the following Product Regulations:

FCC Part 15 Class A, EN 55032:2015/AC:2016 Class A, EN 61000-3-2:2014, EN 61000-3-3:2013 and EN 55024:2010/A1:2015 (IEC 61000-4-2 Edition 2.0 2008-12, IEC 61000-4-3 Edition 3.2 2010-04, IEC 61000-4-4 Edition 3.0 2012-04, IEC 61000-4-5 Edition 3.1 2017-08, IEC 61000-4-6 Edition 4.0 2013-10, IEC 61000-4-8 Edition 2.0 2009-09, IEC 61000-4-11 Edition 2.1 2017-05), Australian Standard AS/NZS CISPR 32:2015. IEC 60950-1:2005 (2nd Edition)+ Am 1:2009 +Am 2:2013; and/or EN 60950-12006+A11:2009+ A12010+A12:2013. UL listed, IEC62368-1/EN62368-1 and NEMA TS-2.

With the technical construction on file at the above address, this product carries the CE Mark.

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place: Irvine, California

Date: June 20, 2022

Signature: *Fathi Hakam*

Full Name: Fathi Hakam

Position: Vice President of Engineering

FCC regulations

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 the user's own expense.

Canadian regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European regulations

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung ! : Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten. In diesem Fall ist der Benutzer für Gegenmaßnahmen verantwortlich.

Attention ! : Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.



In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Lantronix will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.



CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentliches Telekommunikationsnetz in den EGMitgliedstaaten verstößt gegen die jeweiligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

**Lantronix Corporate Headquarters**

48 Discovery, Suite 250
Irvine, CA 92618, USA
Toll Free: 800-526-8766
Phone: 949-453-3990
Fax: 949-453-3995

Technical Support

<https://www.lantronix.com/technical-support/>

Sales Offices

For a current list of our domestic and international sales offices, go to the Lantronix web site at www.lantronix.com/about/contact.