

PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX/LX

Connect two types of network segments together easily and inexpensively at Gigabit speeds while also supplying power to PoE/PD devices such as VoIP phones.



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### Federal Communications Commission and Industry Canada Radio Frequency Interference Statements

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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## Instrucciones de Seguridad (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
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10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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## 1. Specifications

**Data Transfer Rate:** 1000 Mbps: 1,488,000 pps;

100 Mbps: 148,800 pps;

10 Mbps: 14,880 pps

**Fiber Cable:** 50/125, 62.5/125, or 100/140  $\mu\text{m}$  multimode; 8.3/125, 8.7/125, 9/125, or 10/125  $\mu\text{m}$  single-mode

**Flow Control:** IEEE 802.3x compliant for full-duplex; backpressure flow control for half-duplex

**PSE Power Feeding Supports:** "Endpoint" via twisted-pair Pins 1, 2, 3, 6

**Standards:** IEEE 802.3u 10BASE-T/100BASE-TX, 100BASE-FX; IEEE 802.3z/ab 1000BASE-T ; IEEE 802.3af Power over Ethernet

**UTP Cable:** CAT5 or better cable; up to 328 feet (100 m)

**Indicators:** FX: (2) LEDs: Power, Link/Act;

PSE-TP: (6) LEDs: PoE, SPD, Link/Act, 4W, 7W, 15.4 W

**Power:** 100–240 VAC, 50–60 Hz, 24 W

**Temperature Tolerance:** 32 to 122° F (0 to 50° C)

**Humidity:** 5 to 90%

**Size:** 1.6"H x 6.2"W x 5.3"D (4 x 15.8 x 13.3 cm)

NOTE: To connect this device to a router, bridge, or switch, refer to the corresponding device's user's manual.

## 2. Overview

### 2.1 Introduction

Use the PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX/LX to connect two types of network segments easily and inexpensively. It complies with IEEE 802.3af power over Ethernet (PoE) standard. The AC-powered PoE media converter is power sourcing equipment (PSE) that combines data received over a twisted-pair link with -48 VDC, providing power to an IEEE 802.3af-powered device (PD) over the existing CAT5 UTP cable.

The media converter includes PD signature sensing and power monitoring. It also features overcurrent protection, undercurrent detection, and fault protection input. The Link Fault Passthrough (LFP) allows the media converter to monitor both the fiber and copper RX ports for loss of signal. In case of a loss of RX signal on one media port, the converter will automatically disable the TX signal to the other media port, passing through the link fault. Far End Fault (FEF) enables the converter to stop sending link pulse to the link partner once a loss of the fiber RX signal is encountered. Then the link partner will synchronously stop sending data. FEF prevents loss of valuable data transmitted over an invalid link.

Available models include:

- LPS500A-MM-SC: PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX, SC connectors, multimode fiber
- LPS500A-SM-10K-SC: PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX, SC connectors, single-mode fiber, 10 km
- LPS500A-MM-LC: PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX, LC connectors, multimode
- LPS500A-SM-10K-LC: PoE PSE Media Converter, 10/100/1000BASE-T to 1000BASE-SX, LC connector, single-mode fiber, 10km

### 2.2 Features

- IEEE 802.3af PoE PSE compatible
- Internal AC power supply
- Overcurrent protection
- Undercurrent detection
- Minimum load sensing
- Fault protection Input
- PSE MDI power enable/disable
- LFP and FEF
- Supports one 10/100/1000BASE-T Gigabit Ethernet UTP port and one 1000BASE-SX/LX (SC/LC) Gigabit Ethernet fiber port
- Supports 802.3x flow control for full-duplex ports and backpressure for half-duplex ports
- Supports comprehensive types of fiber with different distances and connections, including SC and LC
- Supports auto mode on the twisted-pair port
- DIP switch to set configurations
- Supports jumbo frame (Normal Mode: 2 KB, Cut-Through Mode: 9 KB)

## 2.3 What's Included

Your package should include the following items. If anything is missing or damaged, please contact Black Box Technical Support at 724-746-5500.

- (1) 10/100/1000BASE-T To 1000BASE-X PoE Media Converter
- (1) AC power cord
- (1) user manual on CD-ROM

## 2.4 Front and Back Panels

The media converter has one Gigabit Ethernet twisted-pair port and one fiber port on its front panel. It also has a Power LED on the front panel. The AC power input connector is on the back panel.

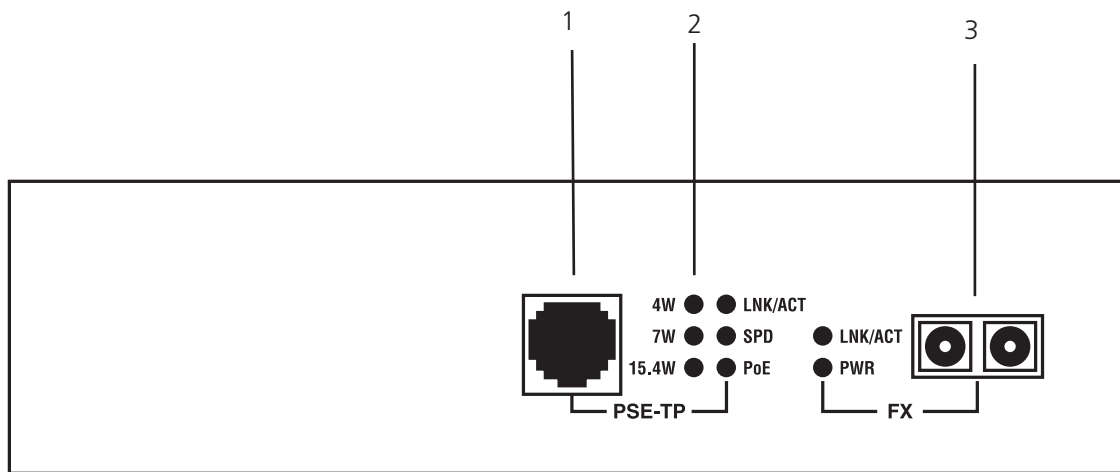


Figure 2-1. Front panel.

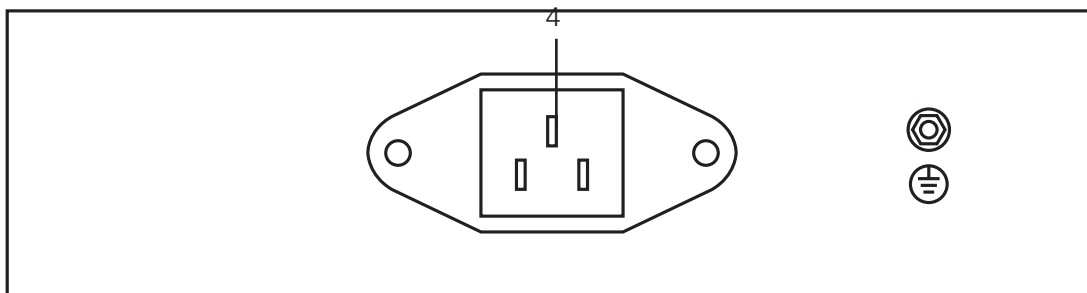


Figure 2-2. Back panel.



Table 2-1. Front- and back-panel components.

Number	Component	Description
1	RJ-45 port	Links to twisted-pair Gigabit Ethernet
2	LED indicators	Described in Table 2-2.
3	(2) SC or LC connectors	Links to fiber.
4	3-prong power outlet	Links to power cord.

## 2.5 LED Indicators

Table 2-2. Indicators and their functions.

LED	Color	Function
FX LNK/ACT	Green	Lit when fiber connection is good. Blinks when fiber data is present.
TP LNK/ACT	Green	Lit when TP connection is good. Blinks when TP data is present.
TP SPD	Green	Lit when TP speed is 1000 Mbps.
		Off when TP speed is 100 or 10 Mbps.
		Amber
	Amber	Lit when TP speed is 100 Mbps. Off when TP speed is 1000 or 10 Mbps.
PWR	Green	Lit when 5-V power is coming up.
PoE PSE-TP	Green	Lit when PoE input power is active.
	Red	Lit when PoE input power is disrupted (caused by overtemperature/overcurrent).
4W	Green	Lit when PD Class Type is Class 1.
7W	Green	Lit when PD Class Type is Class 2.
15.4W	Green	Lit when PD Class Type is Class 0 or 3.

## 2.6 Side Panel DIP Switches and Reset Button

DIP switches and a reset button are on the side panel of the converter. See Figure 2-3.

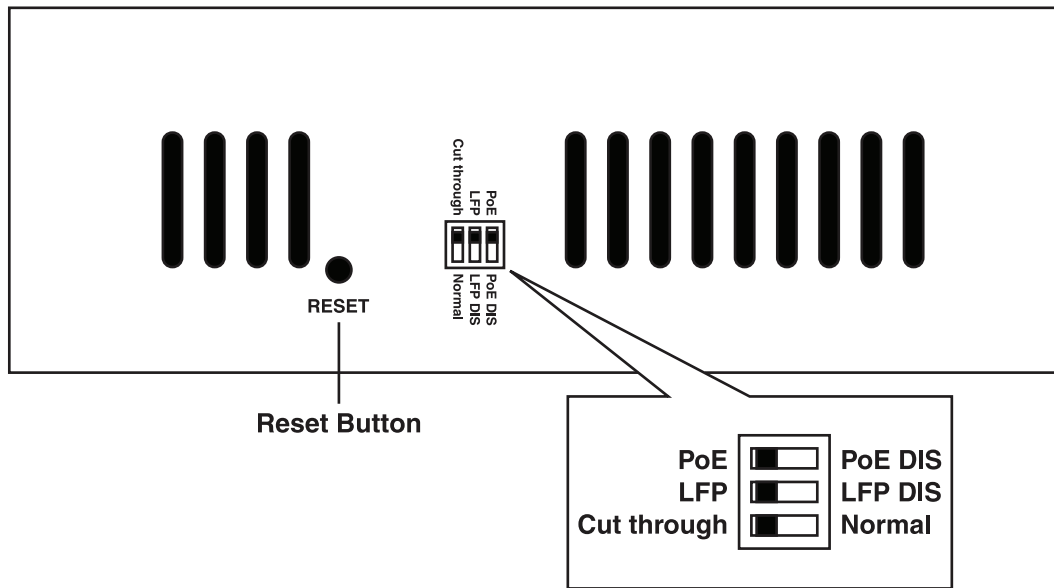


Figure 2-3. DIP switches and Reset button on the converter's side panel.

Table 2-3. Side panel components and their functions.

Component	Setting	Function
Reset button	Press once	After you change the DIP switch settings, you must press the Reset button for changes to take effect.
DIP Switch S1-1 Bridge mode	Up	Cut-through (default) mode supports jumbo frames size up to 9216 Bytes.
	Down	Normal mode supports frame size up to 2048 Bytes.
DIP Switch S1-2 LFP	Up	LFP enabled (default)
	Down	LFP disabled
DIP Switch S1-3 PoE ON/OFF	PoE ON	Powering PD devices (enabled [default])
	PoE OFF	Not powering PD devices (disabled)

## 3. Installation

### 3.1 Connecting Hardware

The 10/100/1000BASE-T PoE PSE to 1000BASE-X Media Converter requires no software configuration. To install the media converter, follow the steps below:

1. Connect the PSE media converter to an AC power source.
2. Connect a PoE/PD device to the PSE/TP port on the media converter using the appropriate twisted-pair cable. The media converter can also work as a standard media converter when PoE is disabled.
3. Connect the FX port to a fiber network using the appropriate fiber cable.

**WARNING:** Verify that the AC input conforms to your country's AC power requirement before inserting the power plug.

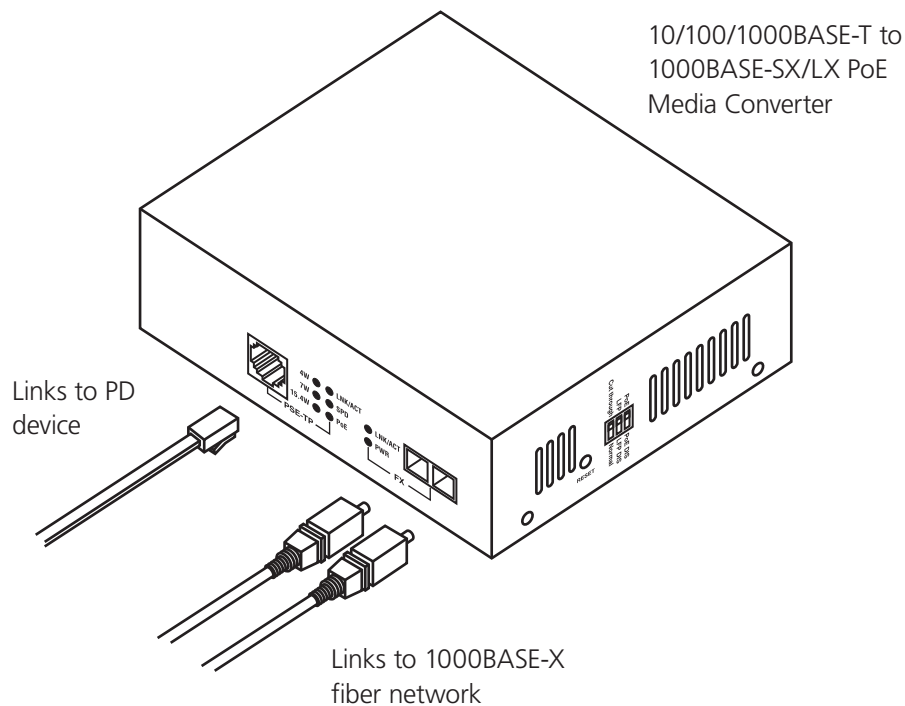


Figure 3-1. Connecting PSE PoE converter and cables.

## 3.2 PoE Endpoint RJ-45 Pin Assignment

IEEE 802.3af assigns pairs on the RJ-45 connector of the CAT5 cable as shown in Figure 3-2.

Endpoint: -48V via twisted-pair Pins 1, 2, 3, 6.

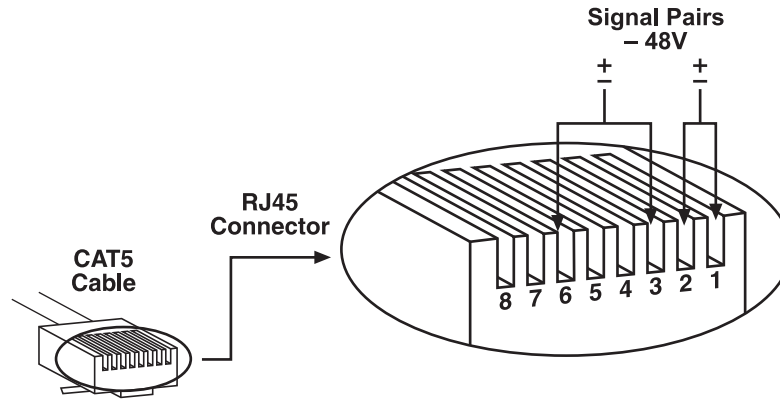


Figure 3-2. Endpoint PSE RJ-45 male connector.

### 4. Link Fault Passthrough

This converter supports link fault passthrough (LFP). Link status on one port is sent to the other port to identify the remote nodes.

If the twisted-pair port is unplugged, the converter stops transmission on the fiber port. This causes the remote fiber node link to fail. LEDs indicate the link failure on both twisted-pair and fiber ports.

If the fiber link fails, the converter restarts autonegotiation on the twisted-pair port but stays in the link failure state. This causes the remote twisted-pair node link to fail. LED also indicates the link failure on both twisted-pair and fiber ports.

Refer to Figure 4-1 for the normal status when the link succeeds. Refer to Figure 4-2 and Figure 4-3 for the error status when TP Cable A, Fiber Cable B, or Fiber Cable C fails to connect.

NOTE: LFP function only takes effect when S1-2 (see Figure 2-3) is enabled. Disabling S1-2 will turn LFP off.

- indicates LNK/ACT LED Lit
- ° indicates LNK/ACT LED Off

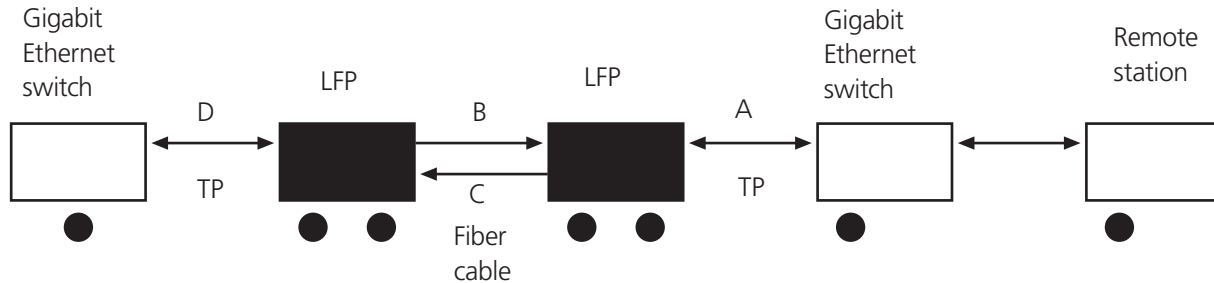


Figure 4-1. Normal status via a pair of LFPs.

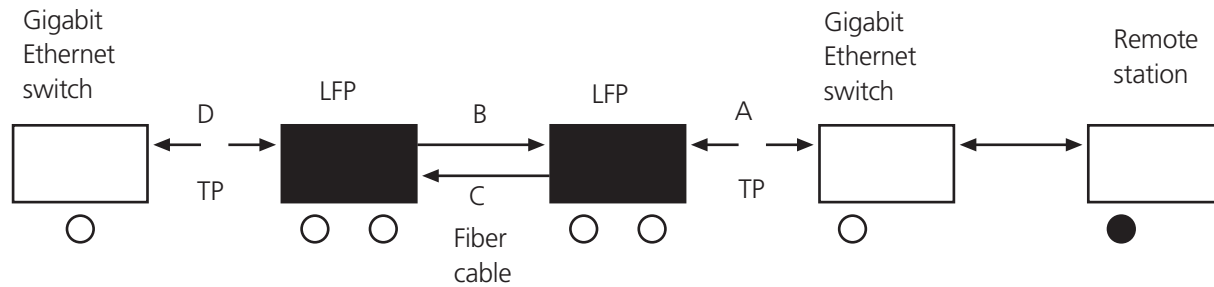


Figure 4-2. The status when TP Cable A or D is broken.

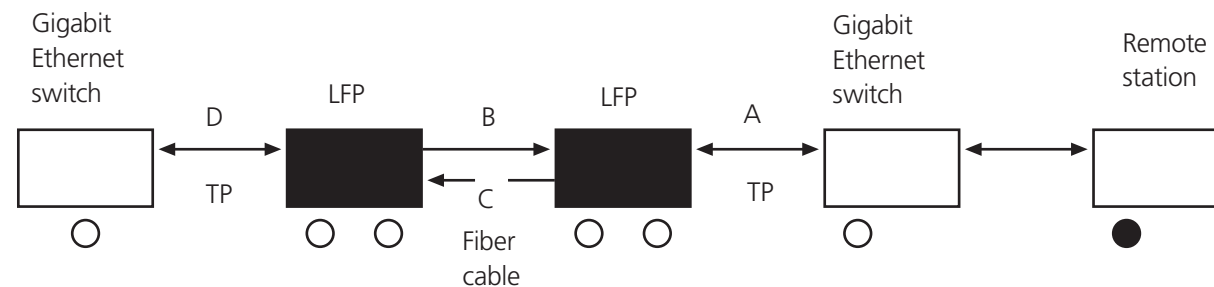


Figure 4-3. The status when Fiber Cable B or C is broken.

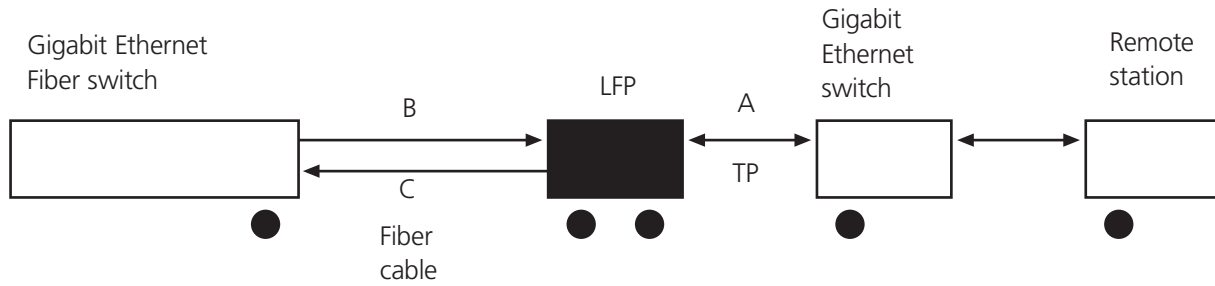


Figure 4-4. Normal status via one LFP.

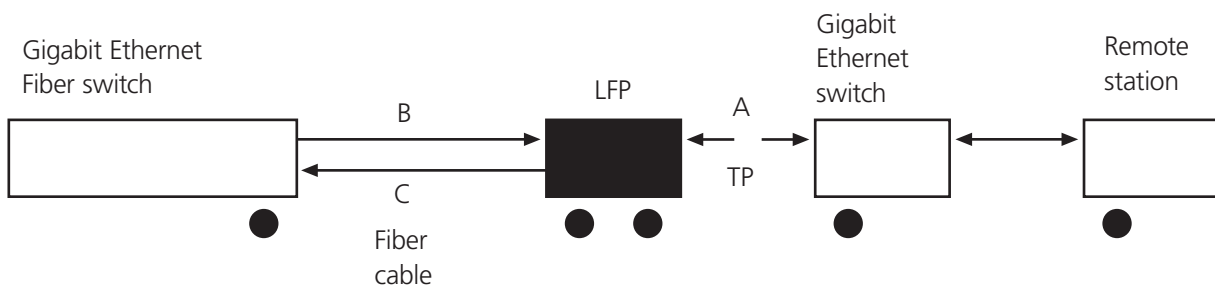


Figure 4-5. The status when twisted-pair Cable A is broken.

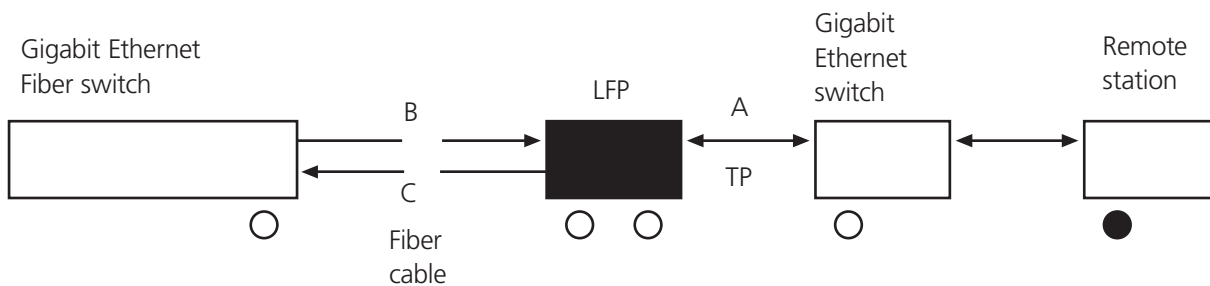


Figure 4-6. The status when fiber Cable B or C is broken.

NOTE: The LFP function can work with different link partners (for example, a fiber port on a switch). You do not have to use these units in pairs for this function to work.

### 5. Cable Connection Parameters

1000BASE-SX/LX networks only support full-duplex mode. The switch-based media converter breaks the twisted-pair and fiber segments' collision domain to extend the cabling distance.

TP cable limitations: CAT5 and up to 328 feet (100 m)

Table 5-1. Multimode fiber cable limitations.

Mode	Multimode Fiber 62.5/125 $\mu\text{m}$		Multimode Fiber 50/125 $\mu\text{m}$	
	Bandwidth (MHz-km)	Distance	Bandwidth (MHz-km)	Distance
1000SX (SC/LC) 850nm	160 m	220 m	400	500 m
1000LX (SC/LC) 1310 nm	Single-mode fiber 9/125 $\mu\text{m}$ Single-mode transceiver 1310 nm: 10 km			

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