LANTRONIX®

AP-GET-SFP-01

Gigabit Ethernet Embedded Media Converter
10/100/1000Base-T Port to 1000Base-X Port

Install Guide

Part Number 33881
Revision A May 2025

Intellectual Property

Patented: https://www.lantronix.com/legal/patents/; additional patents pending.

Warranty

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

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

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Revision History

Date	Rev	Notes
May 2025	A	Initial release

Contents

1. Product Introduction

This manual describes installation of the AP-GET-SFP-01 Gigabit Ethernet Embedded Media Converter.

Product Description

The AP-GET-SFP-01 provides cost effective, entry-level media conversion between 10/100/1000Base-T ports and 100/1000Base-X fiber ports. It is designed as an embedded solution that can be mounted internally in Tempest rated computer and networking equipment such as VoIP Phones, Workstations, Thin Clients, Printers, Monitors and similar devices. Government agencies like Intelligence, Defense, and Foreign Affairs generally require fiber connectivity to these devices to aid in data security as well as mitigating electro-magnetic emissions.

The converter should be positioned such that the copper connection is internal to the device it is mounted within, while the fiber is the only port accessible externally. With its fixed configuration, deployments are plug-and-play and the hot-swappable dual speed SFP slot supports autosensing 100Mbps or 1000Mbps SFP transceivers. Lantronix offers a wide variety of SFP optical transceivers to meet specific deployment environments supporting either multimode or single mode fiber.

The copper port and power input share a connection through a 10-Pin interface via a PH Connector. Pins 1 and 2 are used to provide the internal power connection, while pins 3 through 10 are used for the 10/100/1000 Ethernet connection.

This converter is an ideal solution for fiber integration in both Fast Ethernet and Gigabit Ethernet environments, along with its small size; it is perfect for locations where space is limited.

Ordering Information

SKU	Description
AP-GET-SFP-01	10/100/1000Base-T (10-pin) [100 m/328 ft.] to 100/1000Base-X Open SFP Slot Embedded Media Converter

Options (sold separately)

Option	Description
TN-GLC-FE-100FX	100Base-FX SFP Module
TN-GLC-SX-MM	1000Base-SX SFP Module

Features

- 10/100/1000Base-T on the copper port
- Fiber 100/1000Base-X open SFP slot
- Supports Power Level III (2W) SFP modules
- Auto-Negotiation enabled
- Auto-sensing 100/1000 SFP port speed
- Auto-MDI/MDIX enabled
- Active Link Pass Through (ALPT) enabled
- Automatic Link Restoration
- Support for Jumbo Frames up to 10,240 bytes
- Power input range from 3.3 to 5 VDC

- PCB board assembly only, metal enclosure not provided
- 10-pin connector B10B-PH-K-S on-board header for UTP and power connections (customer supplies a mating connector solution)
- One internal copper port status LED
- One external fiber port status LED
- Two PCB mounting holes

Operational Features

Auto-Negotiation

The AP-GET-SFP-01 Auto-Negotiation feature is permanently enabled. Auto-Negotiation allows the media converter to configure itself automatically to achieve the best possible mode of operation over a link.

It broadcasts speed (1000 Mb/s) and duplex capabilities (full) to the other device and negotiates the best mode of operation. Auto-Negotiation allows quick and easy installation because the optimal link is established automatically.

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 requires the links to become Active before LPT becomes Active. With Active LPT there are two states: **Diagnostic** and **Active**.

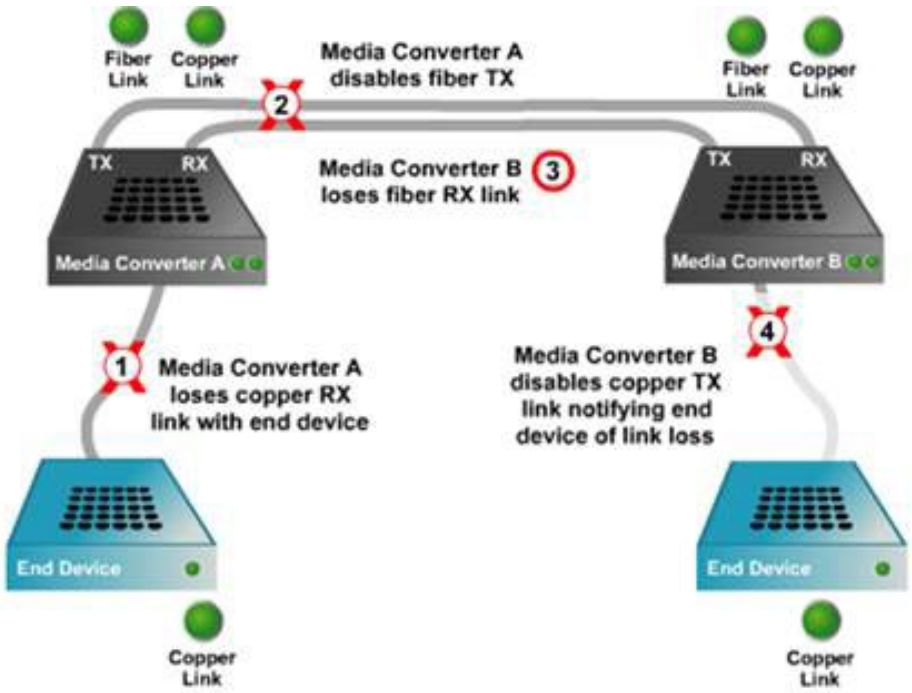
The media converter enters the **Diagnostic** state when either of the following conditions is met:

- Upon power-up of the converter.
- Upon removing the converter's SFP module (if equipped).

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 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.

Note*: The media converter remains in the Diagnostic state until the link status for both media converter's ports are 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 its SFP module is removed**. In the Active state, Active LPT works as shown below.


Fiber Link
Copper Link
Media Converter A disables fiber TX
2
Fiber Link
Copper Link
TX
RX
Media Converter B loses fiber RX link
3
TX
RX
Media Converter A
Media Converter B
4
1
Media Converter A loses copper RX link with end device
Media Converter B disables copper TX link notifying end device of link loss
End Device
End Device
Copper Link
Copper Link

Technical Specifications

Standards	IEEE 802.3-2012, IEEE 802.3z, IEEE 802.3ab
Connectors	Fiber Ports: empty SFP slot TP and Power: B10B-PH-K-S to PH Connector by JST
Data Speeds	SFP Ports at 1000Base-FX and 1000Base-X
Status LEDs	SFP Link/Activity: Green, On for Link, Blink for Activity TP Link/Activity: Yellow, On for Link, Blink for Activity
Dimensions	Width: 2.65 in. [67.3 mm] Depth: 1.5 in. [38.1 mm] Height: 0.62 in. [15.75 mm]
Power Consumption	.75 Watts without the SFP
Power Source	3.3 - 5VDC
Operating Temperature	0 to +50°C
Storage Temperature	-40 to +85°C
Altitude	0 to 10,000 feet
Operating Humidity	5% to 95% (non-condensing)
Shipping Weight	0.05 lbs. [0.02 kg]
Warranty	Lifetime

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.

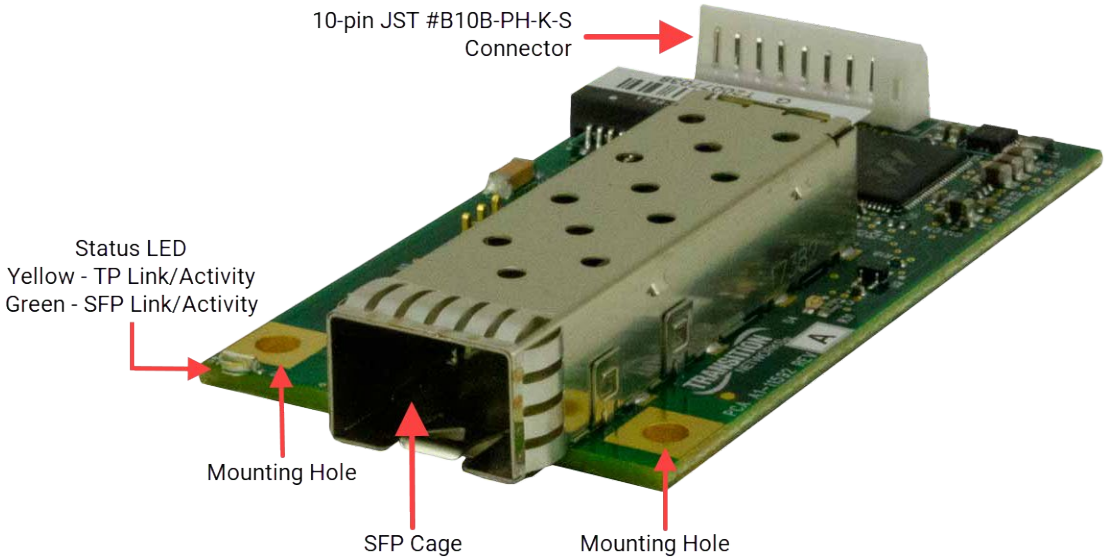
WARNING: Visible and invisible laser radiation when open. Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

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

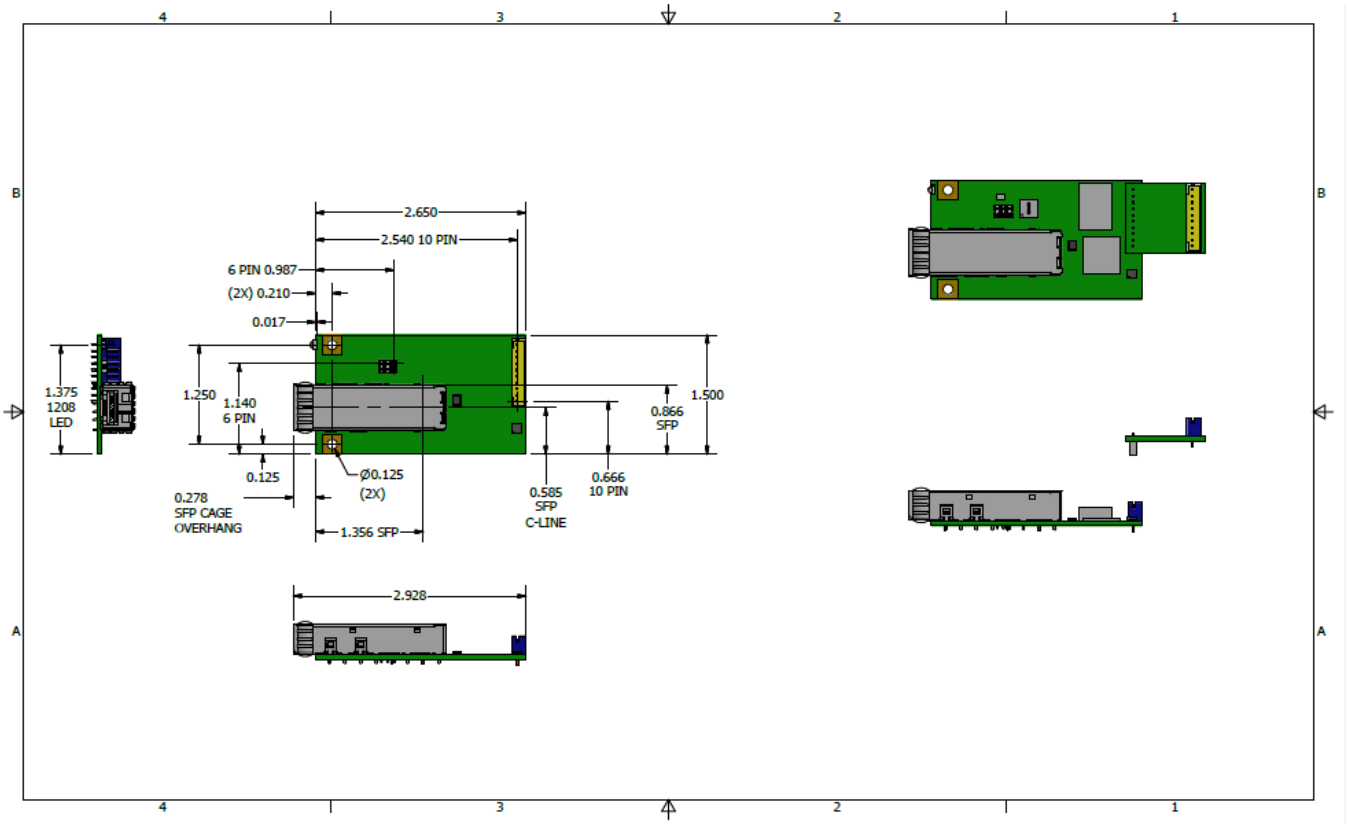
IMPORTANT: Copper based media ports such as Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building (inside plant) link segments that are not subject to lightening transients or power faults. Copper-based media ports such as Twisted 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 lightening transients or power faults.

2. Hardware Description

Product View



PCB Board Dimensions



Pin Assignments

The copper port and power input share a connection through a 10-Pin interface via a B10B-PH-K-S to PH connector by JST. Pins 1 and 2 are used to provide the internal power connection, while pins 3 through 10 are used for the 10/100/1000 Ethernet connection.

The following table describes the 10-pin connector pin assignments.

10-Pin Connector Pinout	
Pin	**Signal Name**
1	+5V
2	GND
3	RX+
4	RX-
5	TX+
6	TX-
7	BI_DC+
8	BI_DC-
9	BI_DD+
10	BI_DD-

Status LED Indicators

LED	Color	Description
SFP Link/Activity	Green	On – Link Blink – Activity
TP Link/Activity	Yellow	On – Link Blink – Activity

3. Installation

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when handling the AP-GET-SFP-01. Failure to observe this could result in damage to or failure of the module.

Package Contents

Make sure you have received the following items. Contact your sales representative if any item is missing or damaged. Please save the packaging for possible future use.

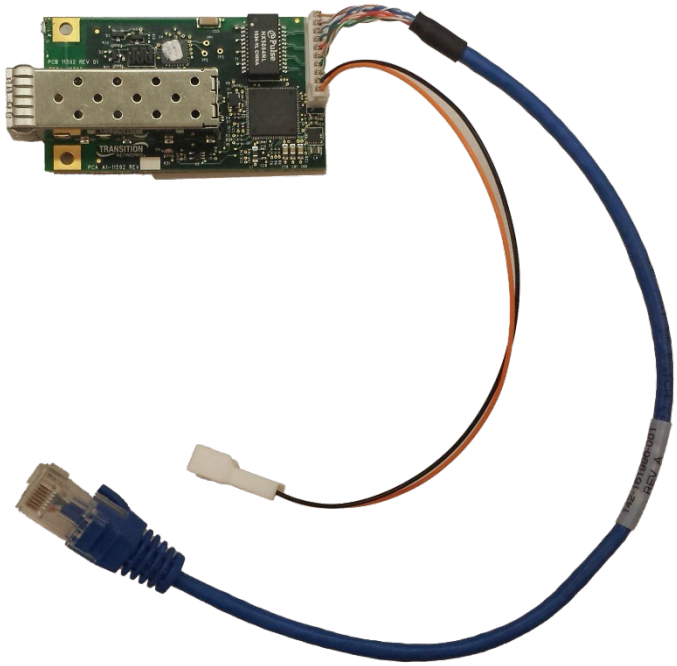
- One AP-GET-SFP-01 Media Converter
- One documentation postcard

Installing the Board

The converter should be positioned such that the copper connection is internal to the device it is mounted within, while the fiber is the only port accessible externally.

The copper port and power input share a connection through a 10-Pin interface via a PH Connector. Pins 1 and 2 are used to provide the internal power connection, while pins 3 through 10 are used for the 10/100/1000 Ethernet connection. Mating connector/cable is not provided. The board should be installed or removed only when host system is powered down.

The following image shows power and Ethernet connection to the 10-pin connector.



Insert and Connect the SFP

Perform the steps below to install an SFP in the AP-GET-SFP-01. Refer to the documentation that came with your SFP for specific requirements. See the Lantronix website for full details on SFP products.

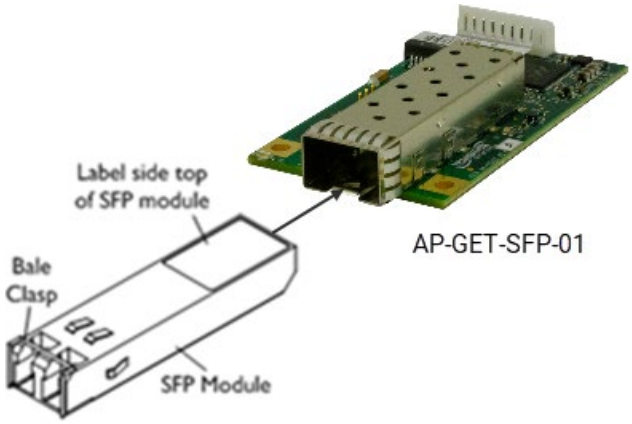
Note: *AP-GET-SFP-01 supports fiber SFPs only. Copper SFPs are not supported.*

We recommend powering off the AP-GET-SFP-01 prior to installing the SFP module.

Remove the SFP transceiver module from its protective packaging.

Note*: Do not remove the optical bore dust plugs until directed to do so in a later procedure.*

1. Check the slot orientation. Position the SFP module at the desired installation slot, with the label facing correctly.
2. Carefully slide the SFP module into the slot, aligning it with the internal installation guides.
3. Ensure that the SFP module is firmly seated against the internal mating connector.
4. Remove the dust plug from the connector. Save the dust plug for future use.
5. Connect the fiber cable to the fiber port connector of the SFP module. Make sure the SFP bale clasp (release latch) is in the up (closed) position when you insert the cable connector into the SFP.
6. Attach the other end of the cable into the other device.



Removing an SFP Module

CAUTION: Be careful when removing the SFP from a device. Some SFP transceiver module temperatures may exceed 160°F (70°C) and be too hot to touch with bare hands.

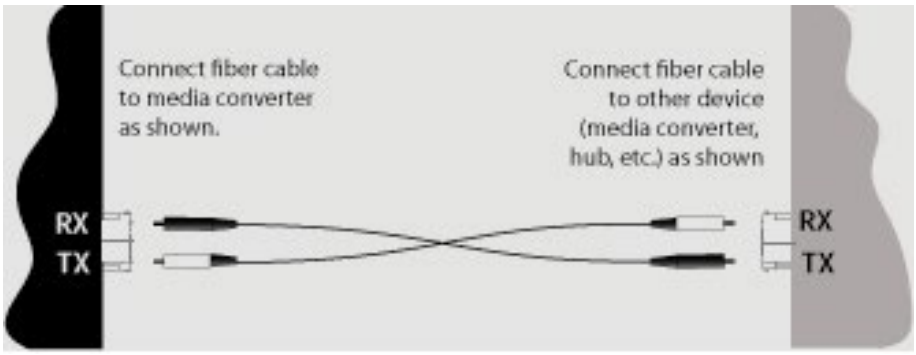
Note: *Do not remove and replace the SFP modules more often than necessary; excessive SFP removing and replacing can shorten the SFP's useful life.*

1. Attach an ESD-preventive wrist strap to your wrist and to the ESD ground connector or a bare metal surface on your chassis.
2. For future reattachment of fiber-optic cables, note which connector plug is send (TX) and which is receive (RX).
3. Remove the SFP transceiver module:
   a. If the SFP transceiver module has an actuator button latch, gently press the actuator button on the front of the SFP transceiver module until it clicks and the latch mechanism releases the SFP transceiver module from the socket connector. Grasp the actuator button between your thumb and index finger, and carefully pull the SFP transceiver module straight out of the module slot.
   b. If the SFP transceiver module has a bail clasp latch, pull the latch out and down to eject the SFP transceiver module from the socket connector. If the bail clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bail clasp latch. Grasp the SFP transceiver module between your thumb and index finger, and carefully remove it from the socket.
4. Replace the Dust Plug.
5. Place the removed SFP transceiver module in an antistatic bag or other protective package.

Connecting Two-Strand Fiber Cable

Full duplex (always ON) is on the fiber side only; therefore, the 512-Bit Rule does not apply. The cable lengths are constrained by the cable requirement.

1. Locate or build IEEE 803.2™ compliant 1000Base-X fiber cable with male, two-stranded TX to RX LC connectors installed at both ends.
2. Connect the fiber cable to the AP-GET-SFP-01 media converters as follows:
   - 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 cable to the other device (another media converter, hub, etc.) as follows:
   - Connect the male TX cable connector to the female RX port.
   - Connect the male RX cable connector to the female TX port.



Two-strand Fiber Cable

Connecting Single-Strand Fiber Cable

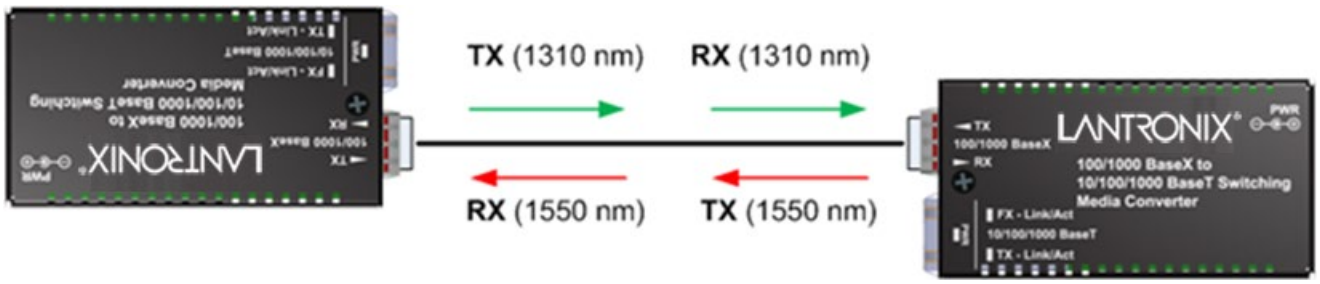
Full duplex (always ON) is on the fiber side only; therefore, the 512-bit rule does not apply. The cable lengths are constrained by the cable requirement. Single fiber technology helps maximize the usage of a limited number of fiber runs. In a traditional optical link, a fiber pair consists of two uni-directional strands. The single fiber technology multiplexes two optical wavelengths of 1310nm and 1550nm into a single strand fiber. In a single fiber media converter, each wavelength is responsible for either the transmit or receive function. Consequently, the bi-directional transmission is achieved by using a single strand.

The converters in a single fiber scenario "match" each other's wavelengths. For example, Converter A transmits at the wavelength of 1310nm and receives at 1550nm while the other converter transmits at 1550nm and receives at 1310nm. Therefore, converters are usually used in pairs. Single fiber technology on Lantronix Media Converters has a maximum distance of 20 to 80km.

1. Locate or build IEEE 803.2™ compliant 1000Base-X fiber cable with a male, single-strand LC connector installed at each end.

2. Connect the fiber cable to the AP-GET-SFP-01 media converters as follows:

3. Connect the fiber cable to the other device (another media converter, hub, etc.) as follows:



Single-strand Fiber Cable

4. Cable Specifications

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

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

AP-GET-SFP-01

Fiber Optic Transmitter Power:	depends on the SFP module used.
Fiber Optic Receiver Sensitivity:	depends on the SFP module used.
Link Budget:	depends on the SFP module used.

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.

Copper Cable

Categories 5 and 5e: minimum requirement

Gauge	24 to 22 AWG
Attenuation	22.0 dB /100m @ 100 MHz
Maximum Cable Distance	100 meters

- Straight-through or crossover twisted-pair cable may be used.
- Shielded (STP) or unshielded (UTP) twisted-pair cable may be used.
- Pins 1&2 and 3&6 are the two active pairs in an Ethernet network.
- All four pairs are used in a gigabit Ethernet network.
- 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.