

User Guide

M/GE-PSW-SFP-01

Mini Media Converter

- One 10/100/1000BASE-T RJ-45 port
- One 100/1000BASE-X dual-speed SFP slot
- AutoCross support
- Auto-Negotiation support
- Fixed Full-Duplex on Fiber
- Active Link Pass Through (ALPT)
- Automatic Link Restoration
- Unit and Port LEDs allow for quick status information
- Enterprise commercial grade



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Introduction

Transition Networks' M/GE-PSW-SFP-01 is used to convert 100/1000BASE-X fiber port to 10/100/1000BASE-T copper port, or vice versa. The M/GE-PSW-SFP-01 is a mini form factor media converter with a fixed configuration (no DIP switches or jumpers) that is powered by a 12VDC external power supply or a 5V DC via USB to Barrel cable.

The M/GE-PSW-SFP-01 provides a cost-effective method for integrating fiber optic cabling into a 10/100/1000 UTP environment. With its miniature size, the Mini offers a space-saving alternative while it converts copper to fiber with the smallest footprint available in the industry.

The M/GE-PSW-SFP-01 supports one dual-speed Small Form Factor (SFP) hot-pluggable slot, providing autosense with 100M or Gigabit SFP transceivers. A wide variety of SFP optical transceivers is available to offer a full range of deployment options over multimode or single mode fiber.

Model Numbers

The M/GE-PSW-SFP-01 is a 10/100/1000Base-T (RJ-45) (100 m/328 ft.) to 100/1000Base-X SFP Slot (empty) converter.

Model	Copper connector	Fiber connector
M/GE-PSW-SFP-01	RJ-45 10/100/1000BASE-T	SFP 100/1000BASE-X dual speed SFP slot

Options

Option	Description	Notes
USBC-AM-DC	USB 2.0 Cable male to Barrel Connector male	USB Power Option; requires the standard USB to DC barrel connector cable
WMBM	Wall Mount Bracket	Wall Mount Bracket: 3.3" [84 mm]
RMBM	Rack Mount Bracket	For RMS19-SA4-01 and/or E-MCR-05

Package Contents

- One M/GE-PSW-SFP-01 Media Converter
- One documentation postcard
- One Wall Mount AC Adapter (12 VDC 400 mA)

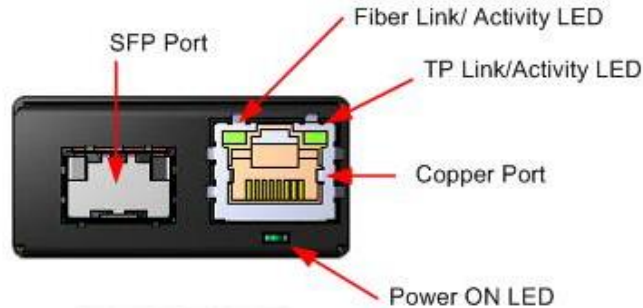


M/GE-PSW-SFP-01

Installation

Copper and fiber ports

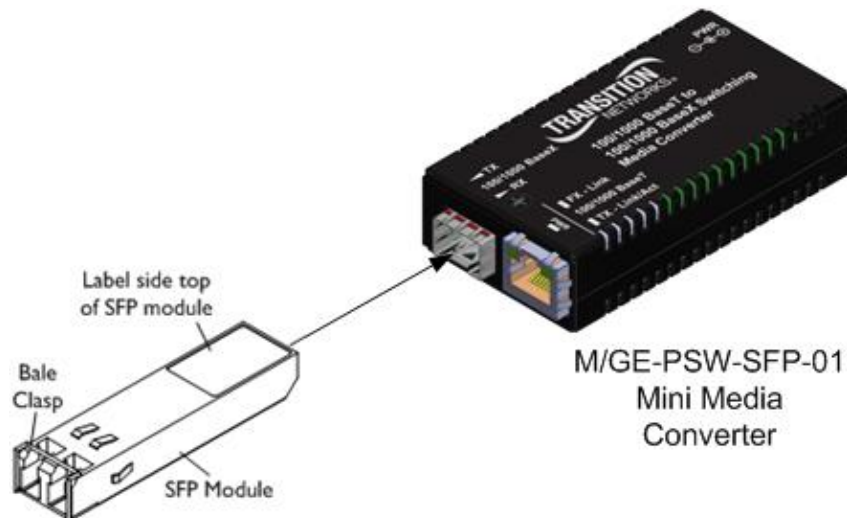
The figure below shows the front panel of the M/GE-PSW-SFP-01 media converter.



Insert and Connect the SFP

Perform the steps below to install an SFP in the M/GE-PSW-SFP-01. Refer to the documentation that came with your SFP for specific requirements. See our [website](#) for full details on our SFP products.

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



Removing an SFP Module

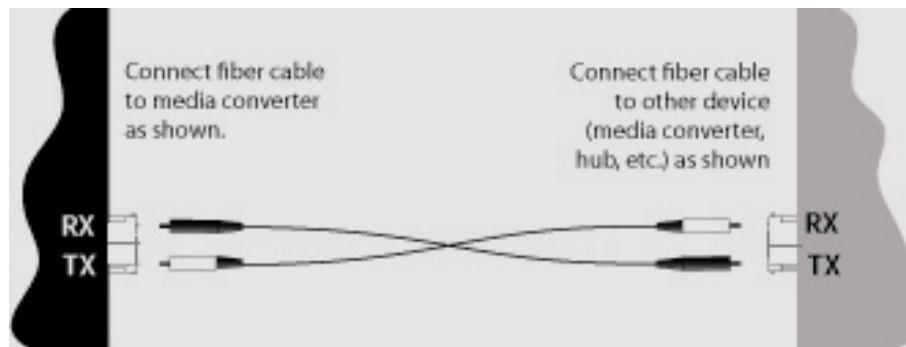
Caution: Be careful when removing the SFP from a device. Some SFP transceiver module temperatures may exceed 160°F (70°C) and be too hot to touch with bare hands. Note: Do not remove and replace the SFP modules more often than necessary; excessive SFP removing and replacing can shorten the SFPs useful 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 M/GE-PSW-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.

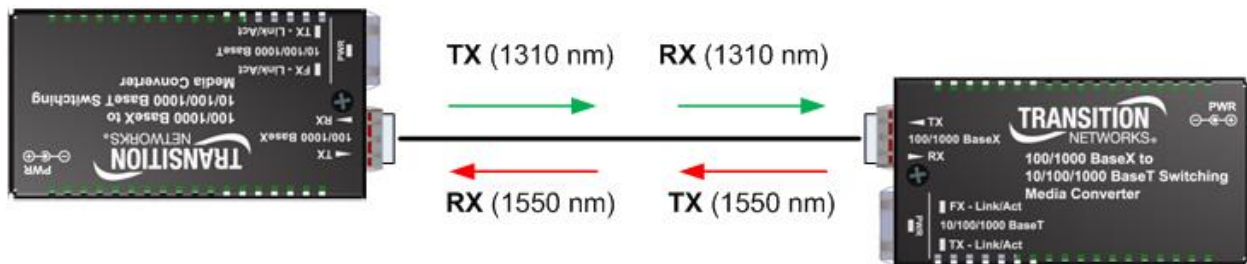


Two-strand Fiber Cable

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 Transition Networks 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 M/GE-PSW-SFP-01 media converters as follows:
3. Connect the fiber cable to the other device (another media converter, hub, etc.) as follows:

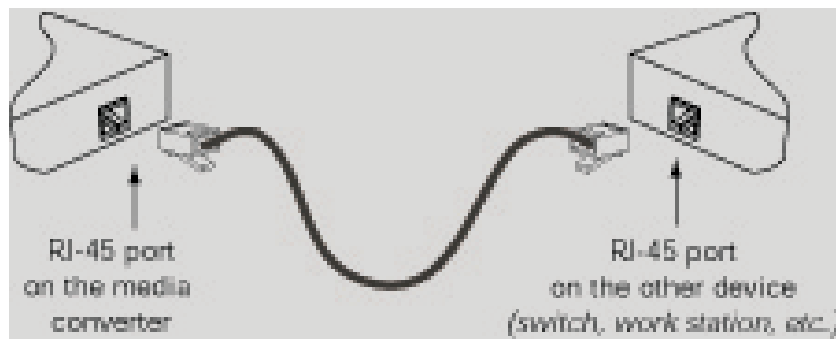


Single-strand Fiber Cable

Connect the twisted-pair copper cable

The AutoCross feature allows either MDI (straight-through) or MDI-X (crossover) cable connections to be configured automatically, according to network conditions.

1. Locate or build IEEE 803.2™ compliant 10/100/1000Base-T cables with 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 M/GE-PSW-SFP-01.
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.).



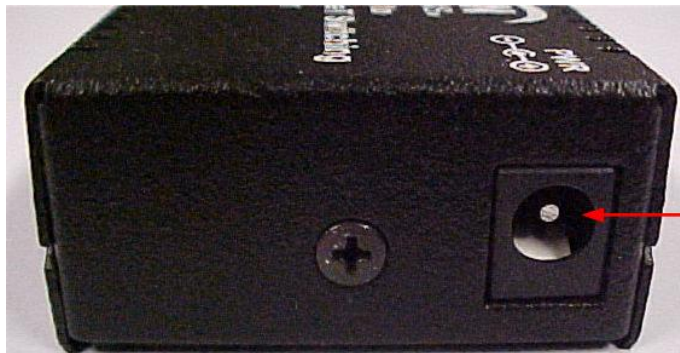
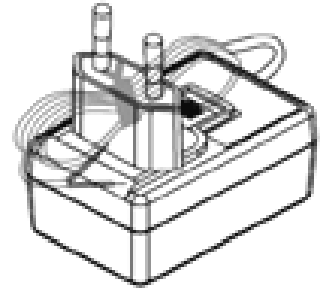
Twisted-pair Copper Cable

Power up the media converter

Transition Networks offers a variety of power supplies, depending on the country code bundle, that can be used to adapt 100 - 240VAC to the 12VDC input to the media converter. The Power Supply is Included.

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

The M/GE-PSW-SFP-01 media converter is powered by using a DC power adapter through the barrel connector on its back panel, as shown below.



Barrel Connector
(12 VDC)

M/GE-PSW-SFP-01 Back Panel Power

Power adapter

AC power

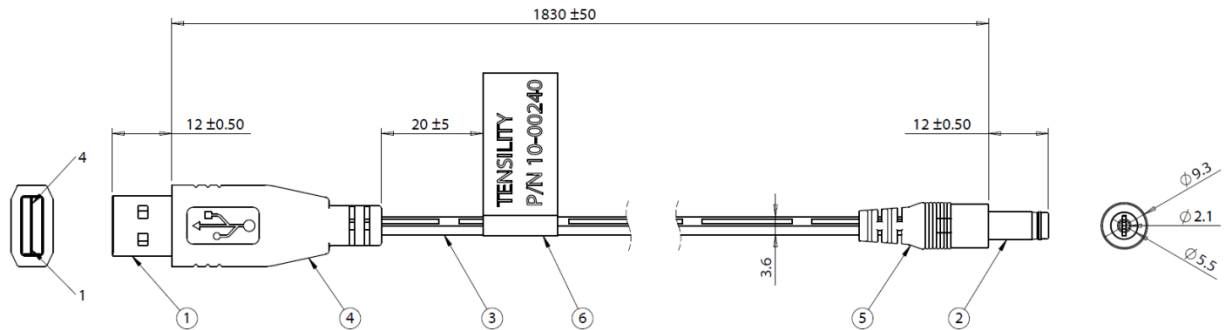
1. Connect the barrel connector of the power adapter to the media converter's power port (located on the back panel of the media converter).
2. Connect the power adapter plug to AC power.
3. Verify that the media converter is powered up by observing that the front panel LED power (PWR) indicator is lit.

DC power (USBC-AM-DC)

See the Transition Networks SPS-2460-SA DC external power supply User's Guide for information on powering the media converter. An optional USB-AM-DC cable can also be used, with power derived from an active USB port of a laptop or workstation (USB 2.0 Cable A male to B male).

The USBC-AM-DC is a USB 2.0 Cable male to Barrel Connector male. The USB Power Option requires the standard USB to DC barrel connector cable. **Description:** Cable, 1830 mm, USB A plug to 5.5x2.1x12 mm 50-00024 plug, center pos, 22 AWG, UL2468, 30-00008 wire.



USBC-AM-DC Dimensions:**DC power:**

1. Insert the power adapter barrel into the barrel connector located on the back of the media converter.
2. Connect the power adapter to DC power source.
3. Observe that the power ON LED is lit.

USB port power:

Use a USB 2.0 Type A to barrel connector cable to enable powering the media converter via an active USB port.

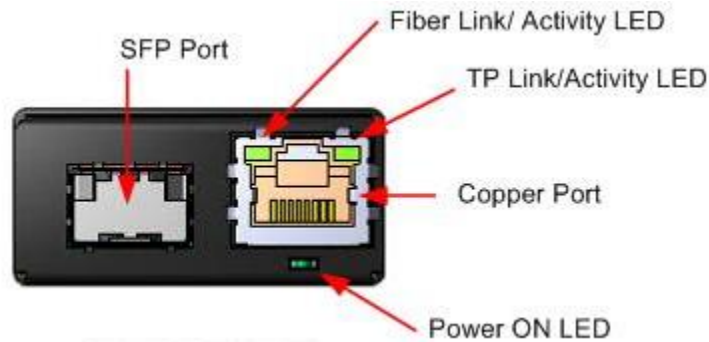
Note: When using the USB port to power the media converter, make sure that the output USB port is turned ON (some laptops and PCs can turn OFF the USB port).

Note: The USB port provides power to the device only; it is not used to transfer data.

Operation

Status LEDs

Use the status LEDs to monitor the M/GE-PSW-SFP-01 media converter operation in the network.



Power Indicator LED

Pwr LED: Green – On for power applied to board; otherwise Off.

Ethernet RJ-45 LEDs

Upper left LED of RJ45 is for Fiber: Green for 1000 and yellow for 100.

(Left) Fiber Port LED On – On for Link (*fiber*)
 Blinking – Activity

Upper right LED of RJ45 is for TP: Green for 1000 and yellow for 10/100.

(Right) TP Port LED On – On for Link (*copper*)
 Blinking – Activity

Features

Auto-Negotiation

The M/GE-PSW-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.

AutoCross™

The AutoCross feature allows using either straight-through (MDI) or crossover (MDI-X) copper cables. AutoCross determines the characteristics of the connection and automatically configures the device to link up, regardless of the copper cable configuration, MDI or MDI-X.

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:

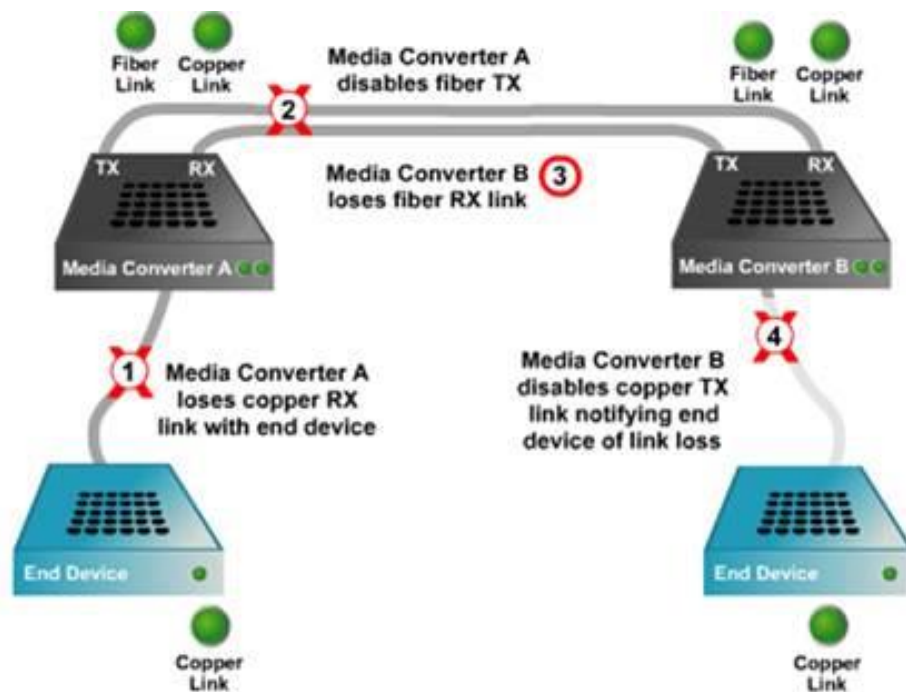
- Upon power-up of the converter.
- **Upon removing the converter’s SFP module (if equipped).**

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 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 of the 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 its SFP module is removed**. In the Active state, Active LPT works as shown below.



Note: Active Link Pass-Through (ALPT) is a new feature available at firmware Rev. C or higher.

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

M/GE-PSW-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.

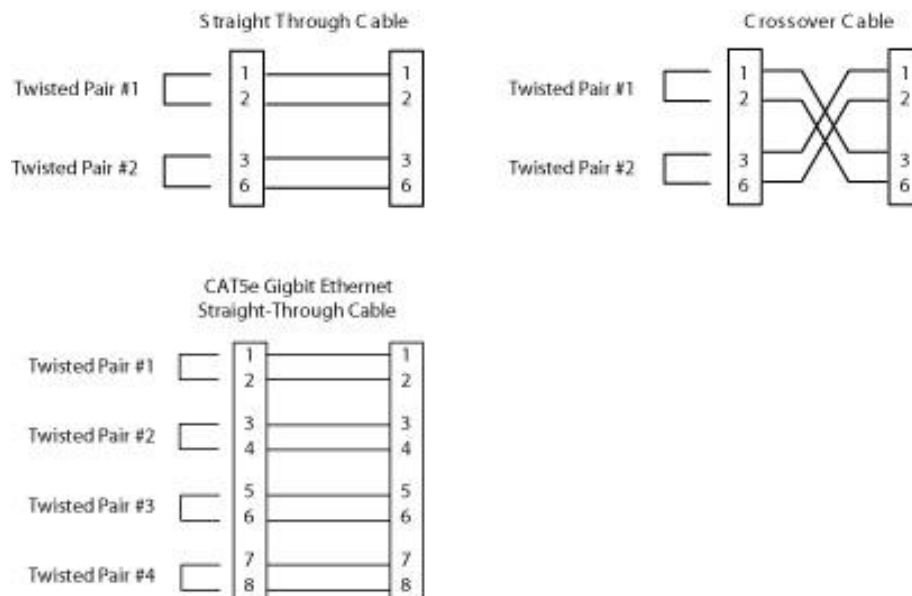
The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Copper cable

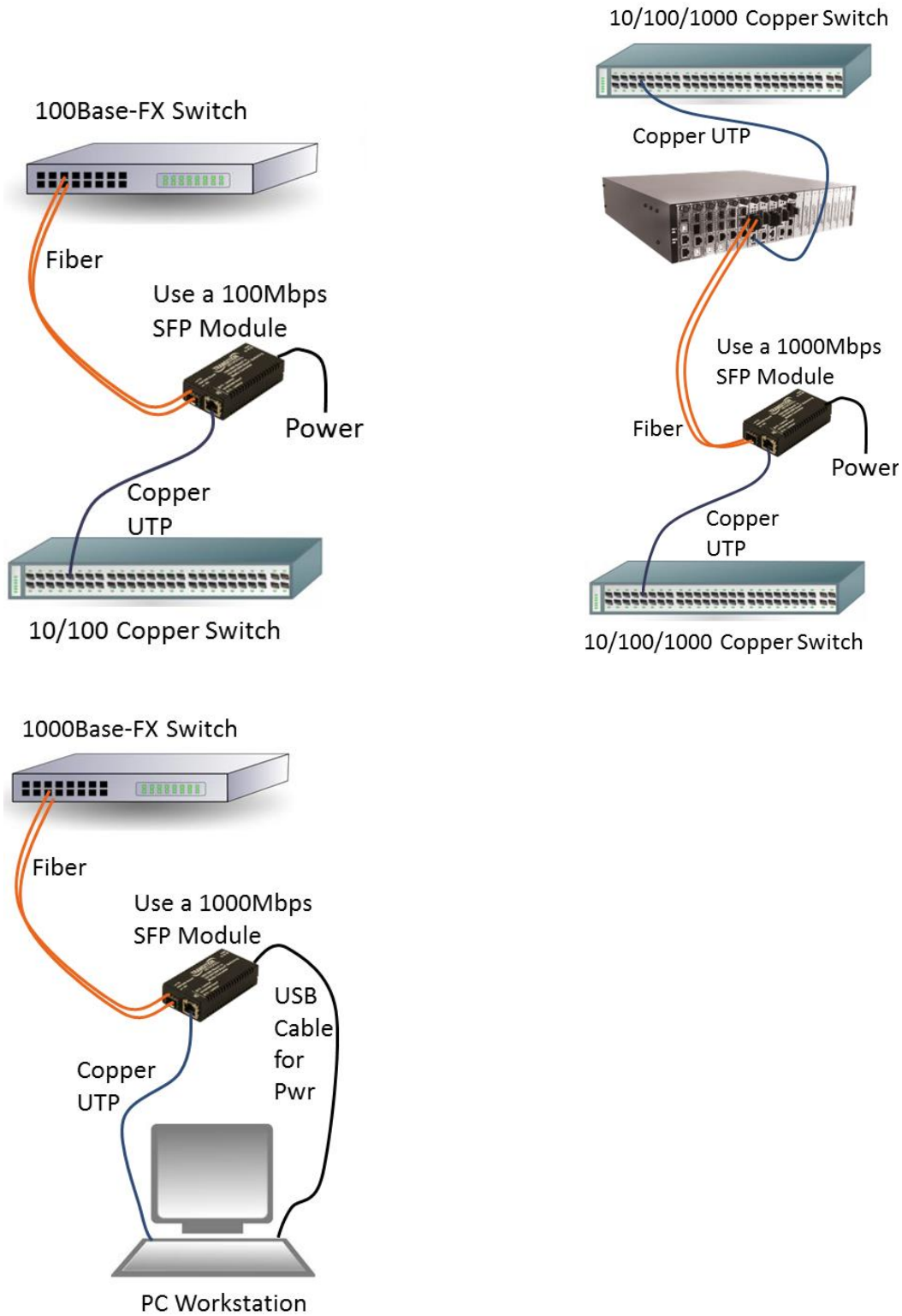
Categories 5 and 5e: minimum requirement

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.



Application Examples



Technical Specifications

For Transition Networks' M/GE-PSW-SFP-01 or equivalent:

Standards	IEEE 802.3™, IEEE 802.3u, IEEE 802.3z, IEEE 802.3x
RAM	1Mb
MAC Table size	8K
Max Frame Size	10240 bytes (untagged)
Regulatory Compliance for Emission	FCC Class A; CE
Safety Compliance	UL Listed, C-UL Listed (Canada). External Power Supply is UL Listed.
Data Rate	1000Mbps
Power Consumption	Approx. 1.2 Watts without SFP 3.1 W with typical SFP (actual Power Consumption will vary based on the SFP used)
Power Sources	Unit accepts 4.5 VDC to 14 VDC Wall Mount AC adapter : 12 VDC 400mA USB 2.0: +5 VDC, 0.5A
Dimensions	Width: 1.8" (46 mm); Depth: 3.3" (85 mm); Height: 0.85" (22 mm)
Operating Temperature	0 to +50°C
Storage Temperature	-15 to 65 °C
Altitude	0-10,000 feet
Operating Humidity	5% to 95% (non-condensing)
Shipping Weight	2 lbs. (0.90 kg)

For current information on the M/GE-PSW-SFP-01, view the online user guide at www.transition.com.

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 lightning 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 lightning transients or power faults.

Troubleshooting

If the media converter fails, isolate and correct the failure by determining the answers to the following questions and then taking the indicated action:

1. Is the **PWR** (power) LED lit and did the **TX** and **FX** LEDs turn ON then turn OFF?

NO

- Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
- Is the power adapter properly installed in the media converter and in the outlet?
- Contact TN Tech Support. See [Contact Us](#) on page 14 below.

YES

- Proceed to step 2.

Note: As a link pass-through device, both the copper and the fiber cables must be installed before the LEDs will light.

2. Are the “**FX – Link**” and “**TX-Link/Act**” LEDs lit on the RJ-45 port?

NO

- Check the copper cables for proper connection. See “[Copper and fiber ports](#)” on page 3.
- Check the fiber cables for proper connection. See “[Copper and fiber ports](#)” on page 3.
- Contact TN Tech Support. See [Contact Us](#) on page 14 below.

YES

Note: The fiber port mode is set by the type of SFP module in the SFP slot at power up. The fiber port mode will not change when a new (different model) SFP is plugged in until a reboot is performed.

- Contact TN Tech Support. See [Contact Us](#) on page 14 below.

Contact Us

Technical Support: Technical support is available 24-hours a day

US and Canada: 1-800-260-1312

International: 00-1-952-941-7600

Main Office

tel: +1.952.941.7600 | toll free: 1.800.526.9267 | fax: 952.941.2322

sales@transition.com | techsupport@transition.com | customerservice@transition.com


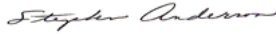
Address

Transition Networks
10900 Red Circle Drive
Minnetonka, MN 55343, U.S.A.

Web: <https://www.transition.com>

Compliance Information

Declaration of Conformity

<i>EU Declaration of Conformity</i>		
M/GE-PSW-SFP-01		
<small>Model/Part Number</small>		
<i>Transition Networks, Inc.</i>		
<i>10900 Red Circle Drive, Minnetonka, Minnesota 55343 U.S.A.</i>		
<small>Manufacturer's Name and Address</small>		
This declaration of conformity is issued under the sole responsibility of the manufacturer.		
		
M/GE-PSW-SFP-01 is in conformity with the relevant Union harmonisation legislation:		
<i>Electromagnetic Compatibility (EMC) Directive 2014/30/EU: EN 55022:2010, EN 55024:2010</i>		
<i>Low-Voltage Directive (LVD) 2014/35/EU: EN 60950-1:2006</i>		
And hereby is declared compliant and carries the CE marking		
I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standards(s).		
<u>Minnetonka, Minnesota</u>	<u>[May 20, 2016]</u>	
<small>Place</small>	<small>Date</small>	<small>Signature</small>
<u>Stephen Anderson</u>		<u>Vice President of Engineering</u>
<small>Full Name</small>		<small>Position</small>

CE Mark

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, Transition Networks 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.

Record of Revisions

Rev	Date	Notes
A	04/29/14	Initial release.
B	5/24/16	Correct description on page 1, add DoC, and update fiber art and text.
C	6/2/16	Add cable and power supply information and add application examples.
D	3/14/17	Add ALPT for FW Rev. C and update contact information.

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