User Guide
TN-10GSFP-xxx
SFP Transceiver Modules

- Hot-Pluggable SFP Optical Transceiver
- Digital Diagnostic Function
- Class 1 Laser International Safety Standard IEC-60825 Compliant
- Compatible with Small Form Factor Pluggable Multi-Sourcing Agreement (MSA)

Contents

Introduction

The Transition Networks TN-10GSFP-xxx-TMs series small form factor pluggable (SFP) transceiver modules are designed to install in any SFP slot, and connect multimodeor single mode fiber-optic cable to the network through the SFP connector. The TN-10GSFP-xxx-TMs are designed for bi-directional, serial-optical data communications up to 10.5 Gbps.

Description

All of Transition's SFPs and XFPs are compliant with the Multi-Sourcing Agreement (MSA) ensuring interoperability with all other MSA compliant networking devices.

MSA Compliant 10G SFP+

TN-10GSFP-SR: Compliant with IEEE 802.3ae 10GBASE-SR/SW. Link Length up to 300 m with OM3 multi-mode fiber; 82 m with OM2 multi-mode fiber; 33 m with OM1 multimode fiber.

TN-10GSFP-LRx: Compliant with IEEE 802.3ae 10GBASE-LR/LW. Maximum Link Length of 70 KM.

Specifications

The TN-10GSFP-xxx was designed to meet these standards and specifications:

| Standards	IEEE802.3ae
Compliance	IEC-60825; FAD 21; CFR 1040.10 and 1040.11
Data Rates	10.3 Gbps
Dimensions	0.52 x 2.18 x 0.33" (13.4 x 55.5 x 8.5 mm)
Power	3.3V
Power Consumption	Power Consumption: 0.66 watts
Environment	0°C – 70°C
Shipping Weight	1 lb. (454 g) approximately
Voltage	3.3 volts
Operating Temp	TN-10GSFP-xxx: 0°C to 70°C (32°F to 158° F) TN-10GSFP-xxT: -40°C to 85°C (-40°F to 185° F)
Storage Temp	-40°C to 85°C (-40° to 185°F)
Warranty	Lifetime

Transition Networks' SFP modules fully comply with Multi-Sourcing Agreement (MSA). This compliance allows our SFP modules to be used in other MSA compliant SFP platforms without any problems.

Optical Specifications

The Optical Spec for all Transition Networks' SFPs are listed and maintained in a separate document at www.transition.com/sfp.pdf.

Application: Fiber Connections with SFPs

SFPs are used with Gigabit Ethernet Switches and Routers, Fibre Channel Switch Infrastructure, xDSL applications, Metro Edge Switching, etc.
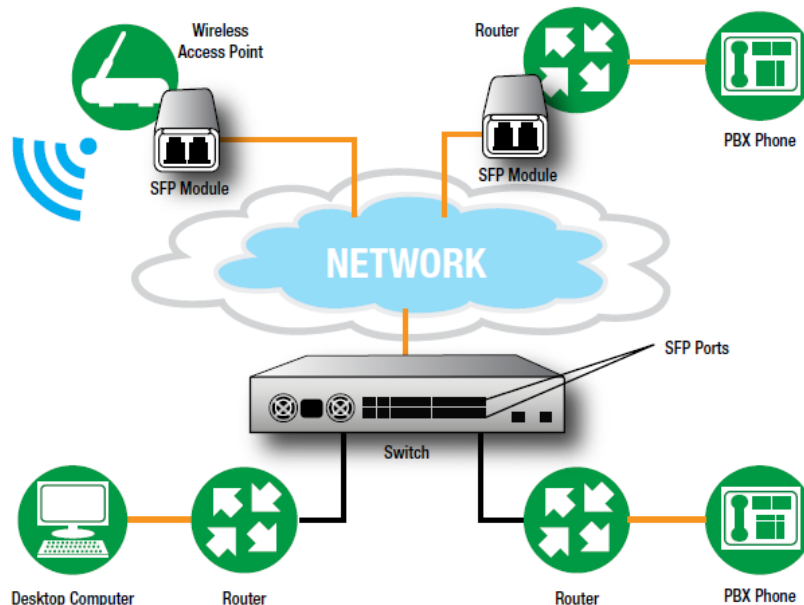
SFP Unpacking

Before you start installing the TN-10GSFP-xxx, verify that the package contains the following items:

- o One TN-10GSFP-xxx
- o Two protective foam pieces
- o One Documentation Postcard

Please notify your sales representative immediately if any of the above items are missing or damaged. Save the packaging for possible future use.

SFP Installation

Cautions

- The SFP tranceiver module is keyed to only be installed one way. However, if forced the wrong way, damage may occur.
- Avoid getting dust or other contaminants into the fiber bore of the SFP transceiver module, as this will cause the optics to not operate properly.
- Be sure to clean the optic surfacees of the optical fiber before you plug them back in to the optical bores of another SFP tranceiver module.

Installing an SFP Module

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. 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.

3. Check the slot orientation. Note that for some devices (e.g., S4224) some slots are "upside down" compared to other slots.

4. Position the SFP device at the desired installation slot, with the label facing correctly.

5. Carefully slide the SFP device into the slot, aligning it with the internal installation guides.
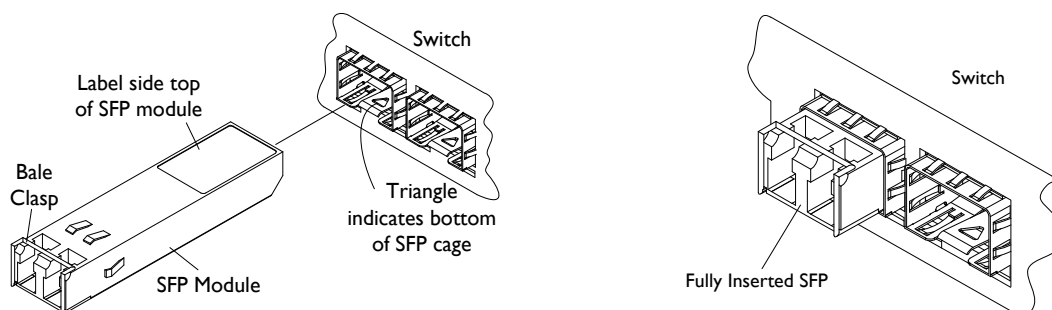
6. Ensure that the SFP device is firmly seated against the internal mating connector. To verify that the SFP is seated and latched properly:

   a. Grasp the SFP by the sides and try to remove it without releasing the latch.
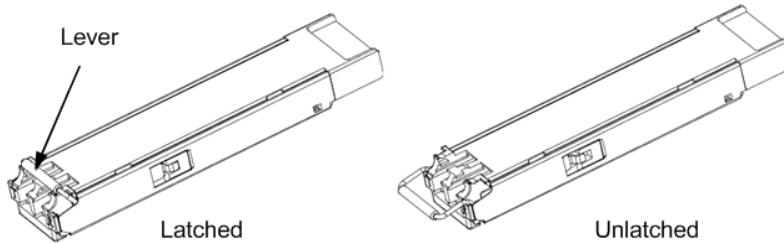
   b. If the SFP can <u>not</u> be removed, it is installed and seated properly. If the SFP <u>can</u> be removed, reinsert it and press harder with your thumb; repeat if necessary until it is latched securely into the socket.

7. 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.

8. Remove the dust plug from the connector. Save the dust plug for future use.

9. Attach an appropriate cable into the SFP module port.

10. Attach the other end of the cable into the other device.

11. Observe the status LED(s). See the related manual for details.

Fiber Cable Physical Characteristics

The fiber cable physical characteristics must meet or exceed IEEE 802.3ae specifications:

- Single mode fiber (recommended):   9 µm
- Multimode fiber (recommended):   62.5/125 µm
- Multimode fiber (optional):   100/140, 85/140, 50/125 µm

Warning: Visible and invisible laser radiation when open. DO NOT stare into laser beam or view directly with optical instruments. Failure to observe this warning could result in damage to your eyes or blindness.

Connecting Fiber Cables

To install the fiber cable, do the following:
1. Locate the appropriate fiber cable.
2. Install the cable as shown below.

Removing an SFP Module

Caution: Be careful when removing the SFP or 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. SFP with 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. SFP with 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/SFP+ transceiver module in an antistatic bag or other protective package.

Diagnostic Monitoring Interface (DMI)

The following DMI port screen and explanation table contains brief definitions of the DMI support offered on some (SFP Transceiver Modules. For further information, see the help option on the CPSMM-xxx, SNMP agent, or Transition Networks Focal Point or ION System GUI. **Note:** This feature is not available on all devices and may vary between products.

DMI Parameter	Description
DMI Rx Power	Measured receive optical power in microwatts and in decibels relative to 1mW.
DMI Rx Power Alarm	Alarm status of measured receive optical power.
DMI Temp	Internally measured temperature of transceiver in degrees Celsius and degrees Farenheit.
DMI Temp Alarm	Alarm status for internally measured temperature of the transceiver.
DMI Bias Current	Measured transmit bias current in microamperes.
DMI Bias Alarm	Alarm status for measured transmit bias current for the interface.
DMI Tx Power	Measured transmit power in microwatts and in decibels relative to 1mW.
DMI Tx Power Alarm	Alarm status of measured transmit power.
Rx Power Intrusion Threshold	Tells the converter to stop passing traffic when the receive power drops below the new threshold. This feature is sometimes referred to as 'Intrusion Detection,' since tapping into a fiber to intercept traffic leads to a reduction in receive power. This value can be entered in microwatts or in decibels relative to 1mW.

TN-SFP distances, TX power, RX power, and link budgets can be found on Transition Netwoks' website, document "SFP/XFP Fiber and Copper Connectors." See 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.

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.

DDMI (Digital Diagnostics Monitoring Interface)

DDMI (Digital Diagnostics Monitoring Interface) provides enhanced digital DMI for optical transceivers which allows real time access to device operating parameters.

The following DMI port screen and explanation table contains brief definitions of the DDMI support offered on some Small Form Factor Pluggable (SFP) Transceiver Modules. For further information, see the help option or User Guide for the S3290, S4140, S4212, and S4224. **Note:** This feature is not available on all devices and functionality may vary between products.

The Transceiver Information and DDMI Information sections are described below.

DDMI Parameter	Description
DMI	Rx Power (uW) Intrusion Threshold; a level for Rx Power on the Fiber port. If the DMI read value falls below the preset value, an intrusion is detected, and a trap is generated. The default is 0 uW. The range is 0 - 65,535 uW.
Port	The device's port number.
Vendor	The SFP vendor's name (e.g., *Transition*).
Part Number	The SFP vendor Part number provided by the SFP vendor (*TN-10GSFP-SR*).
Serial Number	The SFP Vendor Serial number provided by the SFP vendor (e.g., *8672105*).
Revision	The SFP vendor Revision level for part number provided by the SFP vendor.
Data Code	The vendor's manufacturing date code (e.g*., 2011-08-09*).
Transeiver	The Transceiver compatibility (e.g., *1000BASE_SX* or *10G*).
Current	The current value of temperature, voltage, TX bias, TX power, and RX power.
High Alarm Threshold	The high alarm threshold value of temperature, voltage, TX bias, TX power, and RX power.
High Warn Threshold	The high warn threshold value of temperature, voltage, TX bias, TX power, and RX power.
Low Warn Threshold	The low warn threshold value of temperature, voltage, TX bias, TX power, and RX power.
Low Alarm Threshold	The low alarm threshold value of temperature, voltage, TX bias, TX power, and RX power.

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

Transition now

Chat live via the Web with Transition Networks Technical Support.

Log onto www.transition.com and click the **Transition Now** link.

Web-based seminars

Transition Networks provides seminars via live web-based training.

Log onto www.transition.com and click the **Learning Center** link.

E-Mail

Ask a question anytime by sending an e-mail to our technical support staff.

techsupport@transition.com

Address

Transition Networks

10900 Red Circle Drive

Minnetonka, MN 55343, U.S.A.

Telephone: 952-941-7600

Toll free: 800-526-9267

Fax: 952-941-2322

For More Information

Technical information in this document is subject to change without notice. For more information see the TN SFP Line Card or the SFP/XFP Landing page.

Compliance Information

Class 1 Laser Compliance

This product has been tested and found to comply with the limits for Class 1 laser for IEC60825, EN60825, and 21CFR1040 specifications.

Translated Safety Warnings

Warning Class 1 laser product.   **Advarsel** Laserprodukt av klasse 1.

Waarschuwing Klasse-1 laser produkt.   **Aviso** Produto laser de classe 1.

Varoitus Luokan 1 lasertuote.   **¡Advertencia!** Producto láser Clase I.

Attention Produit laser de classe 1   **Varning!** Laserprodukt av klass 1.

Warnung Laserprodukt der Klasse 1.   **Aviso** Produto a laser de classe 1.

Avvertenza Prodotto laser di Classe 1.   **Advarsel** Klasse 1 laserprodukt.

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 Fäll is der Benutzer für Gegenmaßnahmen verantwortlich.

Attention !

Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures 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.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EGMitgliedstaaten verstösst gegen die jeweligen 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	9/30/13	Initial release.
B	7/24/15	Add TN-10GSFP-xxT and update contact information and format.

Trademarks
All trademarks and registered trademarks are the property of their respective owners.