User Guide

TN-QSFP-40G-xx
Cisco Compatible 40G QSFP+

Optical Transceivers

- High capacity: up to 44.4 Gbps per module
- Compliant with SFF 8436 QSFP+ MSA
- Single +3.3 V Power Supply
- RoHS Compliant (all models)
- Low Power Dissipation : SR4< 1.5 Watts, LR4 < 3.5w
- Digital Diagnostic Monitoring (DMI and DDMI)
- Class 1 Laser International Safety Standard IEC 60825 Compliant
- 40GBase-SR4: 4 lanes, up to 11.1Gbps per lane, Standard MPO connector
- 40GBase-LR4: 4 wavelength CWDM Mux/Demux design, up to 11.1Gbps per wavelength, Duplex LC connector

Contents

Introduction

The Transition Networks TN-QSFP-40G-xx series 40G QSFP+ optical transceivers are designed to install in any QSFP+ port allowing for 40GBase-X interfaces to the network through the QSFP+ connector.
The TN-QSFP-40G-xx transceivers are Cisco compatible and are designed for bi-directional serial-optical data communication such as 40G Ethernet.

Description

Transition Networks' QSFP+ modules fully comply with the Multi-Sourcing Agreement (MSA). This compliance allows our QSFP+ modules to be used in all other MSA compliant QSFP+ platforms. TN QSFP+ modules are also compatible with all Cisco QSFP+ based routers and switches, as well as Cisco's IOS software. TN QSFP+ modules are not Cisco OEM brand modules.

Ordering Information

Product Number	Description
TN-QSFP-40G-LR4	QSFP+ 40GBase-LR4, 1271nm, 1291nm, 1311nm, 1331nm, single mode (LC) [10km/6.2mi.] Link Budget: 7.0 dB
TN-QSFP-40G-SR4	QSFP+ 40GBase-SR4, 850nm multimode MPO (Multi-fiber Push On) [400m/1313ft. on OM4, 300m/985ft. on OM3]. Link Budget: 2.3 dB
TN-QSFP-40G-LR4-3	QSFP+ 40GBase-LR4, 1271nm, 1291nm, 1311nm, 1331nm single mode (LC) [30km/18.7mi.] Link Budget: 9.0 dB
TN-QSFP-40G-SR-BD	QSFP+ 40GBase-SR-BD, 850/900nm multimode [150m/492ft. on OM4, 100m/328ft. on OM3]
TN-QSFP-40G-IR4	QSFP+ 40GBase-IR4, 1271nm, 1291nm, 1311nm, 1331nm, single mode (LC) [2km/1.24 mi.] DMI

Specifications and Standards

The TN-QSFP-40G-xx was designed to meet these standards and specifications:

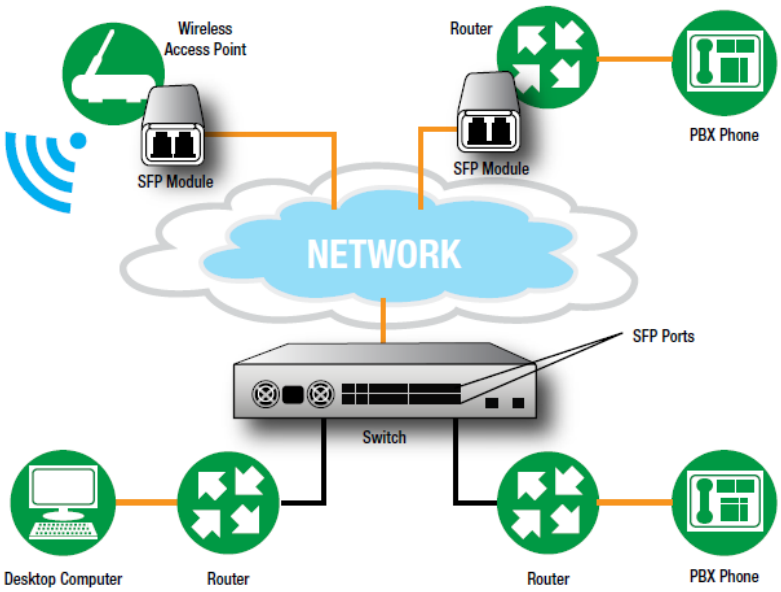
Standards	IEEE 802.3ba
Compliance	SFF 8436, IEC 60825-1, FDA CDRH 21-CFR 1040.10 Class 1
Dimensions	Width: 0.71" [18 mm] x Depth: 2.83" [72 mm] x Height: 0.33" [8.5 mm]
Power Input	3.3V
Power Consumption	TN-QSFP-40G-SR4: <1.5W TN-QSFP-40G-LR4: <3.5W TN-QSFP-40G-LR4-3: <3.5W TN-QSFP-40G-IR4: max. 2.5W TN-QSFP-40G-SR-BD: 2.5 W (typ.); 3.5 W (max.)
Shipping Weight	0.03 Kg. (1.05 Oz.)
Voltage	Single +3.3 V Power Supply
Operating Temp	0°C to +70°C
Storage Temp	-40°C to +85°C
Warranty	Lifetime

Optical Specifications

The Optical Specs for all Transition Networks' SFPs are available on our Optical Devices webpage.

Application: Fiber Connection with TN-QSFP-40G-xx

Applications include 40G Ethernet, 10G Ethernet, and Data Center Aggregation Connection. TN-QSFP-40G-SR-BD applications can include 40 Gigabit Ethernet interconnects, datacom/telecom switch & router connections, data aggregation and backplane applications, and proprietary protocol and density applications.



TN-QSFP-40G-xx Unpacking

Before you start installing the TN-QSFP-40G-xx, verify that the package contains the following items:

- One TN-QSFP-40G-xx SFP
- One Documentation Postcard

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

The optical ports of the QSFP+ transceiver must be terminated with an optical connector or with a dust plug. The QSFP+ transceiver must be operated within the specified temperature and voltage limits.

The Fiber Optic Association, Inc. provides a Technical Bulletin on "*Guidelines For Testing And Troubleshooting Fiber Optic Installations*" at http://www.thefoa.org/tech/guides/TT3.pdf.
There are other FOA Technical Bulletins that should be used as references for the design and planning of the network. These documents can be downloaded from the FOA Tech Topics website.

TN-QSFP-40G-xx Installation

The TN-QSFP-40G-xx is used primarily in short reach applications in switches, routers, and data center equipment where it provides higher density than SFP+ modules.

Note: The multiple-fiber push-on (MPO) connectors and the duplex LC connectors on the TN-QSFP-40G-xx support network interface cables with either Physical contact (PC) or Ultra-Physical Contact (UPC) flat-polished face types. The MPO connectors and the duplex LC connectors on the TN-QSFP-40G-xx do not support network interface cables with an angle-polished contact (APC) face type.
Warning: Invisible laser radiation may be emitted from the aperture of the port when no cable is connected; avoid exposure to laser radiation and do not stare into open apertures.
Warning: Ultimate disposal of this product should be handled according to all national laws /regulations.
Warning: Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.

Tools Needed

These tools are needed to install the TN-QSFP-40G-xx: 1) Wrist strap or other personal grounding device to prevent ESD occurrences; 2) Antistatic mat or antistatic foam to set the TN-QSFP-40G-xx on; 3) Fiber-optic end-face cleaning tools and inspection equipment.

Cautions

- The QSFP+ 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 QSFP+ transceiver module.
- Clean the optic surfacees of the optical fiber before you plug them back in to the optical bores of another QSFP+ tranceiver module.
- Each port must match the wavelength specifications on the other end of the cable, and the cable must not exceed the specified cable length for reliable communications.

Installing the TN-QSFP-40G-xx

Caution: The TN-QSFP-40G-xx is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling or coming into contact with a TN-QSFP-40G-xx.

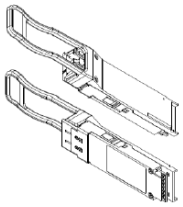
The TN-QSFP-40G-xx has a pull-tab latch. To install a TN-QSFP-40G-xx, follow these steps:

1. Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.
2. Remove the TN-QSFP-40G-xx from its protective packaging.
3. Check the label on the TN-QSFP-40G-xx to verify that you have the correct model for your network.
4. Remove the optical bore dust plug and set it aside.
5. Hold the transceiver so that the identifier label is on the top.
6. Align the TN-QSFP-40G-xx in front of the module's transceiver socket opening and carefully slide it into the socket until it makes contact with the socket electrical connector.
7. Press firmly on the front of the TN-QSFP-40G-xx with your thumb to fully seat the TN-QSFP-40G-xx in the TN-QSFP-40G-xx socket. **Caution**: If the latch is not fully engaged, you could accidently disconnect the TN-QSFP-40G-xx.
8. Reinstall the dust plug into the TN-QSFP-40G-xx optical bore until you are ready to attach the network interface cable. Do not remove the dust plug until you are ready to attach the network interface cable.

Fiber Cable Physical Characteristics

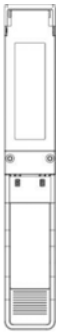
The fiber cable physical characteristics must meet or exceed IEEE 802.3ae or IEEE 802.3ba standard.

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.



TN-QSFP-40G-SR-BD applications can include 40 Gigabit Ethernet interconnects, Datacom/Telecom switch & router connections, Data aggregation and backplane applications, Proprietary protocol and density applications. The **TN-QSFP-40G-SR-BD** provides an aggregate bandwidth of 40Gbps into a duplex LC cable. This allows reuse of the installed LC duplex cabling infrastructure for 40GbE application. Link distances up to 100 m using OM3 and 150m using OM4 optical fiber are supported. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm on one end and 900nm on the other end. The electrical interface uses a 38 contact QSFP+ type edge connector. The optical interface uses a conventional LC duplex connector. The **TN-QSFP-40G-SR-BD** is capable of over 100m transmission on OM3 Multimode Fiber (MMF) and 150m on OM4 MMF.

- Without digital diagnostic functions
- Temperature range 0°C to 70°C
- Power Consumption :2.5 W (typ.); 3.5 W (max.)



Check with your cable supplier for MPO connection rules and procedures.

The **TN-QSFP-40G-IR4** is a QSFP+ LR4 10km optical transceiver with DDM and SMF. It is compliant with 40G Ethernet IEEE802.3ba and 40GBASE-LR4 Standard, and is QSFP+ MSA compliant. It supports up to 11.2Gb/s data rate per wavelength and up to 10km transmission on single mode fiber (SMF). Its operating case temperature is 0 to 70℃. The TN-QSFP-40G-IR4 has maximum power consumption of 2.5W using the LC duplex connector. The TN-QSFP-40G-IR4 is compliant to 40GBASE-LR4 of the IEEE P802.3ba standard.

ISO/IEC 11801 (Structured Cabling): International standard ISO/IEC 11801 Information technology — Generic cabling for customer premises specifies general-purpose telecommunication cabling systems (structured cabling) that are suitable for a wide range of applications (analog and ISDN telephony, various data communication standards, building control systems, factory automation). It covers both balanced copper cabling and optical fibre cabling. The standard was designed for use within commercial premises that may consist of either a single building or of multiple buildings on a campus. It was optimized for premises that span up to 3 km, up to 1 km2 office space, with between 50 and 50,000 persons, but can also be applied for installations outside this range. A major revision, Edition 3, has been released in November 2017, unifying requirements for commercial, home and industrial networks.

The standard defines several classes of optical fiber interconnect:

OM1: Multimode fiber type 62.5 µm core; minimum modal bandwidth of 200 MHz·km at 850 nm
OM2: Multimode fiber type 50 µm core; minimum modal bandwidth of 500 MHz·km at 850 nm
OM3: Multimode fiber type 50 µm core; minimum modal bandwidth of 2000 MHz·km at 850 nm
OM4: Multimode fiber type 50 µm core; minimum modal bandwidth of 4700 MHz·km at 850 nm

Attaching the Optical Network Cable

Before removing the dust plugs and making any optical connections, follow these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the MPO connector or the duplex LC connector end faces just before you make any connections.
- Grasp the MPO or the duplex LC connector only by the connector housing to plug or unplug a fiber-optic cable.

Note: The MPO connectors on the TN-QSFP-40G-SR4 are keyed to prevent incorrect insertion.

Note: The multiple-fiber push-on (MPO) connectors and the duplex LC connectors on the TN-QSFP-40G-xx support network interface cables with either Physical contact (PC) or Ultra-Physical Contact (UPC) flat-polished face types. The MPO connectors and the duplex LC connectors on the TN-QSFP-40G-xx do not support network interface cables with an angle-polished contact (APC) face type.

1. Remove the dust plugs from the optical network interface cable MPO connectors. Save the dust plugs for future use.
2. Inspect and clean the MPO or duplex LC connector's fiber-optic end faces.
3. Remove the dust plugs from the TN-QSFP-40G-xx optical bores.
4. Immediately attach the network interface cable MPO connector or duplex LC connector to the TN-QSFP-40G-xx.
5. Verify that the optical network cable is fully seated by pulling gently on the cable's MPO or duplex LC connector boot. If the network cable disconnects, reinstall it and make sure that the cable connector is fully seated and that the connector latch engages.

Removing the TN-QSFP-40G-xx

Caution: Be careful when removing the QSFP+ from a device. Some QSFP+ 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 QSFP+ modules more often than necessary; excessive QSFP+ removing and replacing can shorten the useful life of the QSFP+.

Caution: The TN-QSFP-40G-xx is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling or coming into contact with a TN-QSFP-40G-xx.

To remove a QSFP+ transceiver, follow these steps:

1. Disconnect the network interface cable from the TN-QSFP-40G-xx.
2. Immediately install the dust plug into the TN-QSFP-40G-xx optical bore.
3. Grasp the tab and gently pull to release the TN-QSFP-40G-xx from the socket.
4. Slide the TN-QSFP-40G-xx out of the socket.
5 .Place the TN-QSFP-40G-xx into an antistatic bag.

CLI Command output: show interface transceiver capabilities and details

Cisco Nexus9000 93180YC-EX chassis with TN-QSFP-40G-IR4:

```
 [2018-07-17 13:44:34.731]     switch# show interface ethernet 1/49 capabilities
[2018-07-17 13:44:34.863] Ethernet1/49
[2018-07-17 13:44:34.890]   Model:                 N9K-C93180YC-EX
[2018-07-17 13:44:34.928]   Type (SFP capable):    WSP-Q40GLR4L
[2018-07-17 13:44:34.962]   Speed:                 1000,10000,25000,40000,50000,100000
[2018-07-17 13:44:35.027]   Duplex:                full
[2018-07-17 13:44:35.061]   Trunk encap. type:     802.1Q
[2018-07-17 13:44:35.096]   Channel:               yes
[2018-07-17 13:44:35.128]   Broadcast suppression: percentage(0-100)
[2018-07-17 13:44:35.178]   Flowcontrol:           rx-(off/on),tx-(off/on)
[2018-07-17 13:44:35.225]   Rate mode:            dedicated
[2018-07-17 13:44:35.260]   Port mode:            Routed,Switched
[2018-07-17 13:44:35.305]   QOS scheduling:        rx-(8q2t),tx-(7q)
[2018-07-17 13:44:35.351]   CoS rewrite:          yes
[2018-07-17 13:44:35.381]   ToS rewrite:          yes
[2018-07-17 13:44:35.414]   SPAN:                 yes
[2018-07-17 13:44:35.444]   UDLD:                 yes
[2018-07-17 13:44:35.479]   MDIX:                 no
[2018-07-17 13:44:35.511]   TDR capable:          no
[2018-07-17 13:44:35.535]   Link Debounce:        yes
[2018-07-17 13:44:35.568]   Link Debounce Time:   yes
[2018-07-17 13:44:35.598]   FEX Fabric:           yes
[2018-07-17 13:44:35.629]   dot1Q-tunnel mode:    yes
[2018-07-17 13:44:35.660]   Pvlan Trunk capable:  no
[2018-07-17 13:44:35.693]   Port Group Members:   193
[2018-07-17 13:44:35.727]   EEE (efficient-eth):  no
[2018-07-17 13:44:35.752]   PFC capable:          yes
[2018-07-17 13:44:35.784]   Buffer Boost capable: no
[2018-07-17 13:44:35.814]   Breakout capable:     yes
[2018-07-17 13:44:35.844]   MACSEC capable:       no
[2018-07-17 13:44:35.885]
[2018-07-17 13:44:35.902] switch# show interface ethernet 1/49 transceiver details
[2018-07-17 13:44:36.151] Ethernet1/49
[2018-07-17 13:44:36.162]     transceiver is present
[2018-07-17 13:44:36.194]     type is WSP-Q40GLR4L
[2018-07-17 13:44:36.224]     name is TRANSITION
[2018-07-17 13:44:36.243]     part number is TN-QSFP-40G-IR4
[2018-07-17 13:44:36.293]     revision is --
[2018-07-17 13:44:36.310]     serial number is TN02000254
[2018-07-17 13:44:36.339]     nominal bitrate is 10300 MBit/sec per channel
[2018-07-17 13:44:36.397]     Link length supported for 9/125um fiber is 2 km
[2018-07-17 13:44:36.445]     cisco id is 13
[2018-07-17 13:44:36.490]     cisco extended id number is 196
[2018-07-17 13:44:36.537]
[2018-07-17 13:44:36.537] Lane Number:1 Network Lane
[2018-07-17 13:44:36.551]            SFP Detail Diagnostics Information (internal calibration)
[2018-07-17 13:44:36.614]   ----------------------------------------------------------------------------
[2018-07-17 13:44:36.693]                 Current              Alarms                  Warnings
[2018-07-17 13:44:36.762]                 Measurement     High        Low         High          Low
[2018-07-17 13:44:36.841]   ----------------------------------------------------------------------------
[2018-07-17 13:44:36.923]   Temperature   32.16 C        80.00 C    -10.00 C     75.00 C       -5.00 C
[2018-07-17 13:44:37.009]   Voltage        3.32 V         3.70 V      2.90 V      3.59 V        3.00 V
[2018-07-17 13:44:37.086]   Current       36.67 mA       75.00 mA    10.00 mA    70.00 mA      15.00 mA
[2018-07-17 13:44:37.167]   Tx Power      -2.11 dBm       3.29 dBm   -8.21 dBm    2.29 dBm     -7.01 dBm
[2018-07-17 13:44:37.251]   Rx Power      -1.45 dBm       4.49 dBm  -16.57 dBm    2.49 dBm    -14.43 dBm
[2018-07-17 13:44:37.335]   Transmit Fault Count = 0
[2018-07-17 13:44:37.363]   ----------------------------------------------------------------------------
[2018-07-17 13:44:37.447]   Note: ++  high-alarm; +  high-warning; --  low-alarm; -  low-warning
[2018-07-17 13:44:37.529]
[2018-07-17 13:44:37.529] Lane Number:2 Network Lane
[2018-07-17 13:44:37.553]            SFP Detail Diagnostics Information (internal calibration)
[2018-07-17 13:44:37.625]   ----------------------------------------------------------------------------
[2018-07-17 13:44:37.709]                 Current              Alarms                  Warnings
[2018-07-17 13:44:37.782]                 Measurement     High        Low         High          Low
```

```
[2018-07-17 13:44:37.862]   ----------------------------------------------------------------------------
[2018-07-17 13:44:37.944]   Temperature   32.16 C        80.00 C    -10.00 C     75.00 C       -5.00 C
[2018-07-17 13:44:38.026]   Voltage        3.32 V         3.70 V      2.90 V      3.59 V        3.00 V
[2018-07-17 13:44:38.107]   Current       37.24 mA       75.00 mA    10.00 mA    70.00 mA      15.00 mA
[2018-07-17 13:44:38.189]   Tx Power      -1.88 dBm       3.29 dBm   -8.21 dBm    2.29 dBm     -7.01 dBm
[2018-07-17 13:44:38.275]   Rx Power      -1.51 dBm       4.49 dBm  -16.57 dBm    2.49 dBm    -14.43 dBm
[2018-07-17 13:44:38.361]   Transmit Fault Count = 0
[2018-07-17 13:44:38.383]   ----------------------------------------------------------------------------
[2018-07-17 13:44:38.470]   Note: ++  high-alarm; +  high-warning; --  low-alarm; -  low-warning
[2018-07-17 13:44:38.543]
[2018-07-17 13:44:38.554] Lane Number:3 Network Lane
[2018-07-17 13:44:38.573]           SFP Detail Diagnostics Information (internal calibration)
[2018-07-17 13:44:38.659]   ----------------------------------------------------------------------------
[2018-07-17 13:44:38.728]               Current             Alarms                 Warnings
[2018-07-17 13:44:38.809]               Measurement     High        Low         High          Low
[2018-07-17 13:44:38.881]   ----------------------------------------------------------------------------
[2018-07-17 13:44:38.965]   Temperature   32.16 C        80.00 C    -10.00 C     75.00 C       -5.00 C
[2018-07-17 13:44:39.047]   Voltage        3.32 V         3.70 V      2.90 V      3.59 V        3.00 V
[2018-07-17 13:44:39.127]   Current       37.18 mA       75.00 mA    10.00 mA    70.00 mA      15.00 mA
[2018-07-17 13:44:39.209]   Tx Power      -1.59 dBm       3.29 dBm   -8.21 dBm    2.29 dBm     -7.01 dBm
[2018-07-17 13:44:39.292]   Rx Power      -1.94 dBm       4.49 dBm  -16.57 dBm    2.49 dBm    -14.43 dBm
[2018-07-17 13:44:39.375]   Transmit Fault Count = 0
[2018-07-17 13:44:39.409]   ----------------------------------------------------------------------------
[2018-07-17 13:44:39.488]   Note: ++  high-alarm; +  high-warning; --  low-alarm; -  low-warning
[2018-07-17 13:44:39.565]
[2018-07-17 13:44:39.565] Lane Number:4 Network Lane
[2018-07-17 13:44:39.593]           SFP Detail Diagnostics Information (internal calibration)
[2018-07-17 13:44:39.666]   ----------------------------------------------------------------------------
[2018-07-17 13:44:39.749]               Current             Alarms                 Warnings
[2018-07-17 13:44:39.823]               Measurement     High        Low         High          Low
[2018-07-17 13:44:39.901]   ----------------------------------------------------------------------------
[2018-07-17 13:44:39.991]   Temperature   32.16 C        80.00 C    -10.00 C     75.00 C       -5.00 C
[2018-07-17 13:44:40.066]   Voltage        3.32 V         3.70 V      2.90 V      3.59 V        3.00 V
[2018-07-17 13:44:40.146]   Current       36.73 mA       75.00 mA    10.00 mA    70.00 mA      15.00 mA
[2018-07-17 13:44:40.228]   Tx Power      -1.22 dBm       3.29 dBm   -8.21 dBm    2.29 dBm     -7.01 dBm
[2018-07-17 13:44:40.314]   Rx Power      -1.05 dBm       4.49 dBm  -16.57 dBm    2.49 dBm    -14.43 dBm
[2018-07-17 13:44:40.395]   Transmit Fault Count = 0
[2018-07-17 13:44:40.425]   ----------------------------------------------------------------------------
[2018-07-17 13:44:40.507]   Note: ++  high-alarm; +  high-warning; --  low-alarm; -  low-warning
[2018-07-17 13:44:40.584]
[2018-07-17 13:44:40.596] switch# show interface ethernet 1/49 status
[2018-07-17 13:44:41.640]
[2018-07-17 13:44:41.640] --------------------------------------------------------------------------------
[2018-07-17 13:44:41.725] Port          Name               Status    Vlan      Duplex  Speed   Type
[2018-07-17 13:44:41.796] --------------------------------------------------------------------------------
[2018-07-17 13:44:41.879] Eth1/49       --                 connected routed    full    40G     WSP-
Q40GLR4L
[2018-07-17 13:44:41.975]
[2018-07-17 13:44:41.975]
[2018-07-17 13:44:41.978] switch#
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Cleaning

It is important that every fiber connector be inspected and cleaned prior to mating. Numerous tools and cleaning products are available for cleaning with a fiber cleaner for the fiber head as well as for cleaning with a ferrule cleaner. Cleaning products can include cartridge and pocket style cleaners, lint−free wipes, lint−free swabs, lint−free wet wipes, lint−free swabs, etc. from a wide array of vendors.

This section is provided as a general guideline and not as a complete process or procedure, as no known cleaning method is 100% effective. Dirt is the single biggest problem with fiber optics. Inspect and clean connectors. Inspect and clean again until they are perfect. Inspect and clean both ends in pairs. Clean the connectors, the mating adapters, and the transceiver ports.

Have a cleaning policy in place including a checklist of items tailored to your specific site requirements. Keep records for future troubleshooting (e.g., where cable is run, splice and termination locations, make and model of components, OTDR data, cleaning performed, etc.).

Follow industry safety precautions! Warning: Invisible laser radiation might be emitted from disconnected fibers or connectors. Do not stare into beams directly or view with optical instruments. Always turn off any laser sources before you inspect fiber connectors, optical components, or bulkheads. Always make sure that the cable is disconnected at both ends or that pluggable transceiver is removed from the device. Always wear the appropriate safety glasses when required for your area. Never look into a fiber with the device lasers on. Always follow proper grounding procedures. Never connect a fiber to a fiberscope with the device lasers on.

For More Information

Technical information in this document is subject to change without notice. TN-QSFP+ distances, TX power, RX power, and link budgets can be found on Transition Networks website, document “SFP/XFP Fiber and Copper Connectors.” See at https://www.transition.com/.

40 Gigabit Ethernet ("40GbE" or "40G") Port Types (40GBASE-CR4, 40GBASE-KR4, 40GBASE-SR4, 40GBASE-LR4, 40GBASE-ER4, 40GBASE-FR, 40GBASE-T) ITU standards descriptions include:

40GBASE-SR4 ("short range") is a port type for multi-mode fiber and uses 850 nm lasers. Its Physical Coding Sublayer 64b⁄66b PCS is defined in IEEE 802.3 Clause 82 and its Physical Medium Dependent PMD in Clause 86. It uses four lanes of multi-mode fiber delivering serialized data at a rate of 10.3125 Gbit/s per lane. 40GBASE-SR4 has a reach of 100 m on OM3 and 150m on OM4. There is a longer range variant 40GBASE-eSR4 with a reach of 300 m on OM3 and 400 m on OM4. This extended reach is equivalent to the reach of 10GBASE-SR.

40GBASE-LR4 ("long range") is a port type for single-mode fiber and uses 1300 nm lasers. Its Physical Coding Sublayer 64b⁄66b PCS is defined in IEEE 802.3 Clause 82 and its Physical Medium Dependent PMD in Clause 87. It uses four wavelengths delivering serialized data at a rate of 10.3125 Gbit/s per wavelength.

The amendment to IEEE Std 802.3-2008 includes changes to IEEE Std 802.3-2008 and adds Clause 80 through Clause 88, Annex 83A through Annex 83C, Annex 85A, and Annex 86A. This amendment includes IEEE 802.3 Media Access Control (MAC) parameters, Physical Layer specifications, and management parameters for the transfer of IEEE 802.3 format frames at 40 Gb/s and 100 Gb/s.

EIA SFF-8436 Rev 4.8 section 5.5 Color Coding and Labeling of QSFP+ Modules: An exposed feature of the QSFP+ Module (a feature or surface extending outside of the bezel) shall be color coded as follows: Beige for 850nm, Blue for 1310nm, and White for 1550nm. For more information see ftp://ftp.seagate.com/sff/SFF-8436.PDF.

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

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Address

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

Compliance Information

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.

Class I Laser Compliance

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

Translated Safety Warnings

Warning Class I laser product.

Waarschuwing Klasse-I laser produkt.

Varoitus Luokan I lasertuote.

Attention Produit laser de classe I

Warnung Laserprodukt der Klasse I.

Avvertenza Prodotto laser di Classe I.

Advarsel Laserprodukt av klasse I.

Aviso Produto laser de classe I.

¡Advertencia! Producto láser Clase I.

Varning! Laserprodukt av klass I.

Aviso Produto a laser de classe I.

Advarsel Klasse I 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.

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 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	8/29/16	Initial release.
B	9/6/16	Incorporate editorial changes.
C	8/30/18	Add TN-QSFP-40G-SR-BD and TN-QSFP-40G-IR4.