



Nortel Ethernet Routing Switch 5500 Series

Installation — SFPs

Document status: Standard
Document version: 03.01
Document date: 19 July 2007

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New in this release

The following sections detail what's new in *Nortel Ethernet Routing Switch 5500 Series Installation — SFPs* for release 5.1.

Features

See the following sections for information about feature changes.

1000BASE-BX support

The Ethernet Routing Switch 5500 Series supports the 1000BASE-BX SFP. See "[1000BASE-BX SFP specifications](#)" (page 28).

Other changes

This document is a new document based upon *Nortel Ethernet Routing Switch 8600 Installation — SFP and XFP Tranceivers and GBICs* (NN46205-305).

Introduction

This document provides installation instructions and technical specifications for Small Form Factor Pluggable (SFP) transceivers.

For a list of supported SFPs, see your latest product-specific release notes. Information contained in the Release Notes takes precedence over any information contained in this document.

Navigation

- ["Safety and regulatory information" \(page 9\)](#)
- ["Small form factor pluggable transceivers" \(page 17\)](#)
- ["SFP specifications" \(page 23\)](#)

Safety and regulatory information

This section contains important safety and regulatory information. Read this section before you install Small Form Factor Pluggable (SFP) transceivers.

Navigation

- ["Handling, safety, and environmental guidelines" \(page 9\)](#)
- ["Care of fiber optic equipment" \(page 10\)](#)
- ["Product safety warnings and information" \(page 13\)](#)

Handling, safety, and environmental guidelines

Before you install an SFP, read the following handling, safety, and environmental guidelines:

- SFPs are static sensitive. To prevent damage from electrostatic discharge (ESD), see ["Electrostatic discharge prevention" \(page 9\)](#).
- SFPs are dust sensitive. When you store an SFP, or when you disconnect it from a fiber optic cable, always keep a dust cover over the optical bore.
- To clean contaminants from the optical bores of an SFP, use an alcohol swab or equivalent to clean the ferrules of the optical connector.
- Dispose of this product according to all national laws and regulations.

Electrostatic discharge prevention

To prevent equipment damage, observe the following electrostatic discharge (ESD) precautions when handling or installing the components.

- Ground yourself and the equipment to an earth or building ground. Use a grounded workbench mat (or foam that dissipates static charge) and a grounding wrist strap. The wrist strap should touch the skin and be grounded through a one megaohm resistor.
- Do not touch anyone who is not grounded.
- Leave all components in their ESD-safe packaging until installation, and use only a static-shielding bag for all storage, transport, and handling.

- Clear the area of synthetic materials such as polyester, plastic, vinyl, or styrofoam because these materials carry static electricity that damages the equipment.

Care of fiber optic equipment

Fiber optic equipment must be kept clean and damage-free. Use the information in this section to properly maintain and care for fiber optic equipment.

Care of fiber optic equipment navigation

- ["Fiber optic cable care" \(page 10\)](#)
- ["Fiber optic connector care" \(page 11\)](#)
- ["Job aid: connector cleaning tools and materials" \(page 11\)](#)
- ["Cleaning single SC and FC connectors" \(page 12\)](#)
- ["Cleaning duplex SC connectors" \(page 12\)](#)
- ["Cleaning receptacles" \(page 13\)](#)

Fiber optic cable care

Although the glass fiber of fiber optic cable is protected with reinforcing material and plastic insulation, it is subject to damage. Use the following precautions to avoid damaging the glass fiber.

- Do not kink, knot, or vigorously flex the cable.
- Do not bend the cable to less than a 40 mm radius.
- Do not stand on fiber optic cable; keep the cable off the floor.
- Do not pull fiber optic cable any harder than you would a cable containing copper wire of comparable size.
- Do not allow a static load of more than a few pounds on any section of the cable.
- Place protective caps on fiber optic connectors that are not in use.
- Store unused fiber optic patch cables in a cabinet, on a cable rack, or flat on a shelf.

Frequent overstressing of fiber optic cable causes progressive degeneration that leads to failure.

If you suspect damage to a fiber optic cable, either due to mishandling or an abnormally high error rate observed in one direction, reverse the cable pairs. If the high error rate appears in the other direction, replace the cable.

**CAUTION**

Do not crush fiber optic cable. If fiber optic cable is in the same tray or duct with large, heavy electrical cables, it can be damaged by the weight of the electrical cable.

Fiber optic connector care

Before connecting them to transmission equipment, test equipment, patch panels, or other connectors, clean all fiber optic connectors. The performance of an optical fiber connector depends on how clean the connector and coupling are at the time of connection. Use the following cleaning procedures when analyzing fiber connector integrity.

If a connector performs poorly after cleaning, visually inspect the connector to determine the possible cause of the problem and to determine if it needs replacing.

**WARNING**

Do not look into the end of fiber optic cable. The light source used in fiber optic cables can damage your eyes.

To avoid getting debris in your eyes, wear safety glasses when working with the canned air duster.

To avoid eye irritation on contact, wear safety glasses when working with isopropyl alcohol.

Perform the following maintenance procedures to ensure that optical fiber assemblies function properly. To prevent them from collecting dust, make sure connectors are covered when not in use.

**CAUTION**

To prevent further contamination, clean fiber optic equipment only when there is evidence of contamination.

To prevent contamination, make sure the optical ports of all active devices are covered with a dust cap or optical connector.

To avoid the transfer of oil or other contaminants from your fingers to the end face of the ferrule, handle connectors with care.

Job aid: connector cleaning tools and materials

You need the following tools and materials to clean fiber optic connectors.

- Lint-free, nonabrasive wiping cloths
- Cotton swabs, with a tightly wrapped and talcum-free tip
- Optical-grade isopropyl alcohol (IPA)

- Canned compressed air with extension tube



CAUTION

To avoid contamination, optical ports should only be cleaned when there is evidence of contamination or reduced performance, or during their initial installation.

To prevent oil contamination of connectors, do not use commercial compressed air or house compressed air in place of canned compressed air.

Do not allow the air extension tube to touch the bottom of the optical port.

Cleaning single SC and FC connectors

Clean connectors so that the optical signal is minimally attenuated by the connector.

Procedure steps

Step Action

- 1 Remove dust or debris by applying canned air to the cylindrical and end-face surfaces of the connector.
- 2 Gently wipe the cylindrical and end-face surfaces with a pad or a wipe dampened with optical-grade isopropyl alcohol.
- 3 Gently wipe the cylindrical and end-face surfaces with a dry, lint-free tissue.
- 4 Dry the connector surfaces by applying canned air or letting them air dry.

To prevent contamination, do not touch the connector surfaces after cleaning; and cover them with dust caps if you are not going to use them right away.

—End—

Cleaning duplex SC connectors

Clean connectors so that the optical signal is minimally attenuated by the connector.

Procedure steps

Step Action

- 1 To remove or retract the shroud, do one of the following.

- On removable shroud connectors, hold the shroud on the top and bottom at the letter designation, apply medium pressure, and pull it free from the connector body. Do not discard the shroud.
 - On retractable shroud connectors, hold the shroud in its retracted position.
- 2 Remove dust or debris from the ferrules and connector face with the canned air duster.
 - 3 Gently wipe the cylindrical and end-face surfaces of both ferrules using a wipe saturated with optical-grade isopropyl alcohol.
 - 4 Gently wipe the cylindrical and end-face surfaces of the connector with Texwipe cloth (or dry lint-free tissue).
 - 5 Blow dry the connector surfaces with canned air.
 - 6 Using care to not touch the clean ferrules, gently push the shroud back onto the connector until it seats and locks in place.

—End—

Cleaning receptacles

Clean connector receptacles or ports so that the optical signal is minimally attenuated by the connection.

Procedure steps

Step	Action
1	Remove dust or debris by blowing canned air into the optical port of the device using the canned air extension tube.
2	Clean the optical port by inserting a small dry swab into the receptacle and rotating it. Each cleaning wand should only be used to clean one optical port.
3	Reconnect the optical connector and check for proper function. If problems persist, ensure that the connector and receptacle are not damaged.

—End—

Product safety warnings and information

The products described in this guide meet requirements of:

Nortel Ethernet Routing Switch 5500 Series
Installation — SFPs
NN47200-302 03.01 Standard
5.1 27 August 2007

IEC 60950 3rd edition
CSA 22.2 No. 60950 3rd edition
UL 60950 3rd edition
EN60950 3rd edition
EN60825-1, +A11, +A2



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WARNING

Fiber optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a light source.

ATTENTION

Vorsicht:

Glasfaserkomponenten können Laserlicht bzw. Infrarotlicht abstrahlen, wodurch Ihre Augen geschädigt werden können. Schauen Sie niemals in einen Glasfaser-LWL oder ein Anschlußteil. Gehen Sie stets davon aus, daß das Glasfaserkabel an eine Lichtquelle angeschlossen ist.

ATTENTION

Avertissement:

L'équipement à fibre optique peut émettre des rayons laser ou infrarouges qui risquent d'entraîner des lésions oculaires. Ne jamais regarder dans le port d'un connecteur ou d'un câble à fibre optique. Toujours supposer que les câbles à fibre optique sont raccordés à une source lumineuse.

ATTENTION

Advertencia:

Los equipos de fibra óptica pueden emitir radiaciones de láser o infrarrojas que pueden dañar los ojos. No mire nunca en el interior de una fibra óptica ni de un puerto de conexión. Suponga siempre que los cables de fibra óptica están conectados a una fuente luminosa.

ATTENTION**Avvertenza:**

Le apparecchiature a fibre ottiche emettono raggi laser o infrarossi che possono risultare dannosi per gli occhi. Non guardare mai direttamente le fibre ottiche o le porte di collegamento. Tenere in considerazione il fatto che i cavi a fibre ottiche sono collegati a una sorgente luminosa.



警告：光ファイバ装置は目に有害なレーザー光や赤外線を放射することがあります。光ファイバやコネクタ・ポートを覗き込まないでください。光ファイバ・ケーブルは光源に接続されているものと思ってください。

**CAUTION**

Only qualified technicians should install this equipment.

Place all printed circuit boards on an antistatic mat until you are ready to install them. If you do not have an antistatic mat, wear a discharge leash to free yourself of static before touching any of the printed circuit boards, or free yourself of static by touching a grounded metal object before you handle a printed circuit board.

Small form factor pluggable transceivers

This section describes how to select and install small form factor pluggable (SFP) transceivers.

Use an SFP to interface a device motherboard to a fiber optic or unshielded twisted pair network cable. The SFPs described in this section provide Ethernet at 1 gigabit per second (Gbit/s).

Navigation

- ["Selecting an SFP" \(page 17\)](#)
- ["Installing an SFP" \(page 20\)](#)
- ["Removing an SFP" \(page 22\)](#)
- ["SFP specifications" \(page 23\)](#)

Selecting an SFP

Use an SFP transceiver to interface a device motherboard to a fiber optic or unshielded twisted pair network cable. Select the appropriate transceiver to provide the required reach.

Procedure steps

Step	Action
1	Determine the required reach. Depending on the product, SFPs are available for cable distances of up to 100 meters (m), 550 m, 10 kilometers (km), 40 km, 70 km, and 120 km.
2	Determine the required media and connector type. Fiber optic cable is required for any reach over 100 m. Possible media include CAT5, single mode fiber, and multimode fiber. Possible connectors include LC, MT-RJ, and RJ-45.

- 3 If the media is optical fiber, determine any wavelength restrictions or requirements.
To expand available bandwidth on a common optical fiber, use CWDM SFPs.
- 4 Determine if digital diagnostic monitoring (DDM) is required.
Not all SFPs or products support DDM.
- 5 Use the following job aids to determine the appropriate SFP for your application.

—End—

Procedure job aid: SFPs and common applications

The following table describes the reach provided by various SFPs. This table is informational only—not all Nortel Ethernet switching and routing products support all the SFPs listed here.

SFPs and common applications

SFP model	Common application
1000BASE-T	Lowest-cost Gigabit Ethernet solution. Up to 100 m reach over Category 5 (CAT5) unshielded twisted pair (UTP).
1000BASE-SX	Well-suited for campus local area networks (LAN) and intrabuilding links. Up to 275 or 550 m reach (fiber-dependent) over a fiber pair.
1000BASE-LX	Up to 10 km reach over a single mode fiber (SMF) pair. Up to 550 m reach over a multimode fiber (MMF) pair.
1000BASE-XD	Up to 40 km reach over a single mode fiber pair.
1000BASE-ZX	Up to 70 km reach over a single mode fiber pair.
1000BASE-BX	Up to 10 km reach. Bidirectional over one single mode fiber.
1000BASE-EX	Up to 120 km reach over a single mode fiber pair.
1000BASE-LRM	Up to 300 m reach over FDDI-grade 62.5 μ m multimode fiber. Suited for campus LANs.

Procedure job aid: SFP models without DDI support

SFPs are hot-swappable input/output enhancement components designed for use with Nortel products to allow Gigabit Ethernet ports to link with other Gigabit Ethernet ports over various media types.

The SFPs described in this section do not have Digital Diagnostic Interface capability, and are RoHS -E5 compliant.

CWDM SFPS are also supported. CWDM technology consolidates multiple optical channels on a common optical fiber. CWDM uses multiple wavelengths to expand available bandwidth.

CWDM SFPs are designed to support high speed data communications for Metropolitan Area Networks (MANs). The system uses a grid of eight CWDM optical wavelengths in both ring and point-to-point configurations. All components are color-coded by wavelength.

ATTENTION

The attainable cable length can vary depending on the quality of the fiber optic cable used.

SFP models without DDI support

Model and connector	Product number	Description
1000BASE-SX (LC)	AA1419013-E5	850 nanometers (nm), up to 275 or 550 m
1000BASE-SX (MT-RJ)	AA1419014-E5	850 nm, up to 275 or 550 m
1000BASE-LX (LC)	AA1419015-E5	1310 nm, up to 10 km
1000BASE-XD CWDM (LC)	AA1419025-E5 to AA1419032-E5	1470 nm to 1610 nm, up to 40 km
1000BASE-ZX CWDM (LC)	AA1419033-E5 to AA1419040-E5	1470 nm to 1610 nm, up to 70 km

For specifications for these SFPs, see "[SFP specifications](#)" (page 23).

Procedure job aid: SFP models with DDI

Any Digital Diagnostic Indicating (DDI) SFP can be used in any Ethernet Routing Switch module that supports SFPs. The optical functions of the SFP are supported. Access to the DDI information will be provided in a future release.

The SFPs described in this section are all RoHS -E6 compliant.

The following table lists and describes the Nortel SFP models with DDI capability. All these SFPs use LC connectors.

SFP models with DDI capability

Model	Product number	Description
1000BASE-T (RJ-45)	AA1419043-E6	CAT5 UTP, up to 100 m. Note that because the 1000BASE-T device is all electrical, there is no need for DDI support.
1000BASE-BX (LC type)	AA1419069-E6, AA1419070-E6	Bidirectional 1310 nm and 1490 nm, up to 10 km

For specifications for these SFPs, see "[SFP specifications](#)" (page 23).

Installing an SFP

Install an SFP to provide an interface between the switch and the network cable.

Installing an SFP takes about 3 minutes.

Prerequisites

- Verify that the SFP is the correct model for your network configuration.

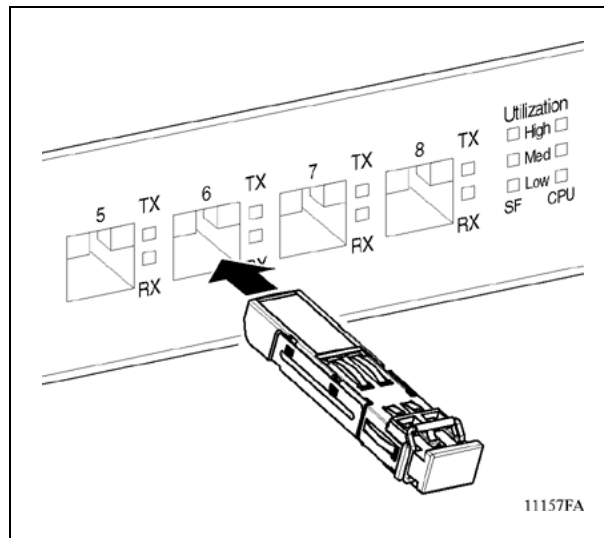
Procedure steps



CAUTION

SFPs are keyed to prevent incorrect insertion. If the SFP resists pressure, do not force it; turn it over, and reinsert it.

Step	Action
1	Remove the SFP from its protective packaging.
2	Grasp the SFP between your thumb and forefinger.
3	As shown in the following figure, insert the SFP into the SFP slot on the module. Apply a light pressure to the SFP until the device clicks and locks into position.



- 4 Remove the dust cover from the optical bore and insert the fiber optic connector.

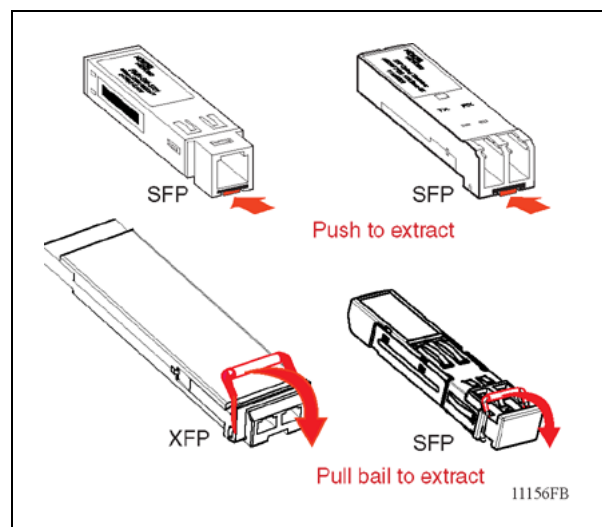
—End—

Procedure job aid: locking and extractor mechanisms

Depending on the transceiver manufacturer, your SFP transceiver can have various types of locking/extractor mechanisms.

The following figure shows typical locking/extractor mechanisms used on SFP transceivers; other locking/extractor mechanisms exist, although they are not shown here.

SFP locking and extractor mechanisms: MT-RJ, dual LC



Removing an SFP

Remove an SFP to replace it or to commission it elsewhere.

Procedure steps

Step	Action
1	Disconnect the network fiber cable from the SFP connector.
2	Affix dust covers over the fiber optic bore and connector.
3	Depending on your SFP model, to release the SFP, press the locking/extractor mechanism. Your SFP locking/extractor mechanism can be different than the models shown.
4	Slide the SFP out of the module SFP slot. If the SFP does not slide easily from the module slot, use a gentle side-to-side rocking motion while firmly pulling the SFP from the slot.
5	Store the SFP in a safe place until needed.

ATTENTION

If you discard the SFP, be sure to dispose of it according to all national laws and regulations.

—End—

SFP specifications

This section provides technical specifications for the supported small form factor pluggable (SFP) models. Use this information to aid in proper network design.

The specifications given in this section meet or exceed the applicable IEEE standards, where they exist.

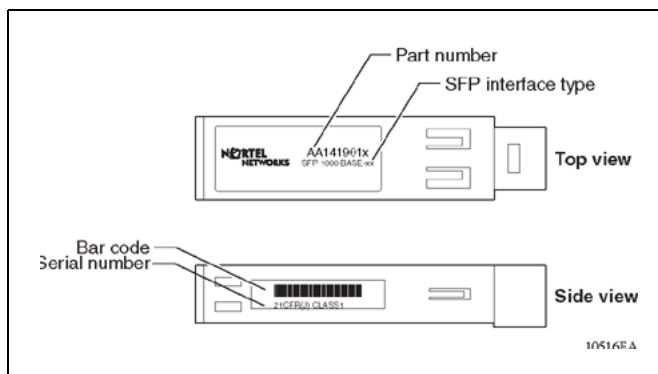
In these specifications, unless otherwise noted, *receiver sensitivity* is defined as the minimum average input optical power for which the receiver is guaranteed to meet the bit error rate (BER) of 10^{-12} .

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- ["SFP labels" \(page 23\)](#)
- ["General SFP specifications" \(page 24\)](#)
- ["1000BASE-T SFP specifications" \(page 24\)](#)
- ["1000BASE-SX \(LC\) SFP specifications" \(page 25\)](#)
- ["1000BASE-SX \(MT-RJ\) SFP specifications" \(page 26\)](#)
- ["1000BASE-LX SFP specifications" \(page 26\)](#)
- ["1000BASE-XD CWDM SFPs" \(page 27\)](#)
- ["1000BASE-ZX CWDM SFP specifications" \(page 28\)](#)
- ["1000BASE-BX DDI SFP specifications" \(page 28\)](#)

SFP labels

The Nortel label on a typical SFP contains a Nortel serial number, a bar code, a manufacturer's code, an interface type, and a part number.

SFP label**General SFP specifications**

The following table describes general SFP specifications.

General SFP specifications

Parameter	Description
Dimensions (H x W x D) for non-DDI SFPs	0.53 x 0.33 x 2.22 inches (in.) 13.4 x 8.50 x 56.4 millimeters (mm)
Dimensions (H x W x D) for DDI SFPs	0.457 x .604 x 2.18 in. 11.6 x 15.3 x 55.43 mm
Operating temperature	-5 to +85°C
Storage temperature	-40 to +85°C
Maximum supply current	300 mA unless otherwise stated
Maximum power consumption	1.0 W unless otherwise stated

1000BASE-T SFP specifications

The 1000BASE-T SFP provides Gigabit Ethernet connectivity using a single eight-pin RJ-45 connector. The 1000BASE-T SFP only operates at 1 gigabit per second (1 Gbit/s) and does not support 100BASE-T or 10BASE-T interfaces. The part number for this model is AA1419043-E6.

ATTENTION

You must disable autonegotiation before operating the 1000BASE-T SFP. By default, SFPs inserted into certain product-specific modules are set for Autonegotiation = True.

The maximum current requirement of the SFP is 375 milliamperes (mA) at 5 volts (V).

The following table describes the 1000BASE-T SFP specifications.

IEEE 802.3z 1000BASE-T SFP specifications

Parameter	Specifications
Standards	IEEE 802.3z, IEEE 802.3ab
Connectors	RJ-45
Cabling	CAT5E or better UTP
Distance	Up to 100 m

1000BASE-SX (LC) SFP specifications

The 1000BASE-SX SFP provides 1000BASE-SX Gigabit Ethernet connectivity at 850 nm using multimode optical fiber. This SFP supports full-duplex operation only. The part number for this model is AA1419013-E5.

The following table describes standards, connectors, cabling, and distance for the 1000BASE-SX SFP.

IEEE 802.3z 1000BASE-SX (LC) SFP specifications

Parameter	Specifications
Connectors	Duplex LC
Cabling	<ul style="list-style-type: none"> 62.5 μm MMF optic cable 50 μm MMF optic cable
Distance	<ul style="list-style-type: none"> up to 275 m using 62.5 μm MMF optic cable up to 550 m using 50 μm MMF optic cable
Wavelength	850 nm
Link optical power budget	7.0 dB
Laser characteristics	
Launch power	-10 to -4.0 dBm
Receiver characteristics	
Receiver sensitivity	-17 dBm
Maximum input power	0 dBm

1000BASE-SX (MT-RJ) SFP specifications

The 1000BASE-SX (MT-RJ type) SFP provides Gigabit Ethernet connectivity using MT-RJ multimode fiber connectors. The following table describes standards, connectors, cabling, and distance for the 1000BASE-SX (MT-RJ type) SFP. The part number for this model is AA1419014-E5.

IEEE 802.3z 1000BASE-SX (MT-RJ) SFP specifications

Parameter	Specifications
Connectors	Duplex MT-RJ
Cabling	<ul style="list-style-type: none"> 62.5 μm MMF optic cable 50 μm MMF optic cable
Distance	<ul style="list-style-type: none"> up to 275 m using 62.5 μm MMF optic cable up to 550 m using 50 μm MMF optic cable
Wavelength	850 nm
Link optical power budget	7.0 dB
Laser characteristics	
Launch power	-10 to -4.0 dBm
Receiver characteristics	
Receiver sensitivity	-17 dBm
Maximum input power	0 dBm

1000BASE-LX SFP specifications

The 1000BASE-LX SFP provides 1000BASE-LX Gigabit Ethernet connectivity at 1310 nanometers (nm) using single mode or multimode optical fiber. The 1000BASE-LX SFP supports full-duplex operation only. The part number for this model is AA1419015-E5.

The following table describes standards, connectors, cabling, and distance for the 1000BASE-LX SFP.

IEEE 802.3z 1000BASE-LX SFP specifications

Parameter	Specifications
Connectors	Duplex LC
Cabling	<ul style="list-style-type: none"> 50 micrometer (μm) multimode fiber (MMF) 62.5 μm multimode fiber 9 μm single mode fiber (SMF)
Distance	<ul style="list-style-type: none"> Up to 550 meters (m) using MMF Up to 10 kilometers (km) using SMF

Parameter	Specifications
Wavelength	1310 nm
Link optical power budget	10.5 deciBels (dB)
Laser characteristics	
Launch power	-3.5 to 3.0 deciBels referenced to 1 milliwatt (dBm)
Receiver characteristics	
Receiver sensitivity	-20 dBm
Maximum input power	-3.0 dBm

1000BASE-XD CWDM SFP specifications

The part numbers of the 40 km models range from AA1419025-E5 to AA1419032-E5.

1000BASE-XD CWDM (40 km) SFP specifications

Parameter	Specifications
Connectors	Duplex LC
Cabling	SMF, 9 μ m
Data rate	1.0 Gbit/s
Line rate (8B/10B code)	1.25 Gbit/s
Operating temperature range	0°C to 60°C
Link optical power budget	17 dB
Transmit characteristics	
Launch power	-4.0 to 1.0 dBm
Receive characteristics	
Receiver sensitivity	-21 dBm
Maximum input power	-3.0 dBm

ATTENTION

For the 40 km CWDM SFPs, a minimum attenuation of 4 dB must be present between the transmitter and receiver. To avoid receiver saturation, you must insert a minimum attenuation of 4 dB when you test the CWDM SFP in loopback mode, or use short runs of fiber with no intermediate CWDM OADM or CWDM OMUX.

To determine the expected signal loss for an optical add drop multiplexer (OADM), an optical multiplexer (OMUX), or fiber length, see *Nortel Ethernet Routing Switch 8600 Planning and Engineering—Network Design* (NN46205-200).

For example, given a loss budget of 24 dB and assuming fiber loss of .25 dB/km, up to 96 km reach is supported with no intermediate CWDM OADM or CWDM OMUX.

1000BASE-ZX CWDM SFP specifications

ATTENTION

For the 70 km CWDM SFPs, a minimum attenuation of 10 dB must be present between the transmitter and receiver.

The part numbers of the 70 km models range from AA1419033-E5 to AA1419040-E5.

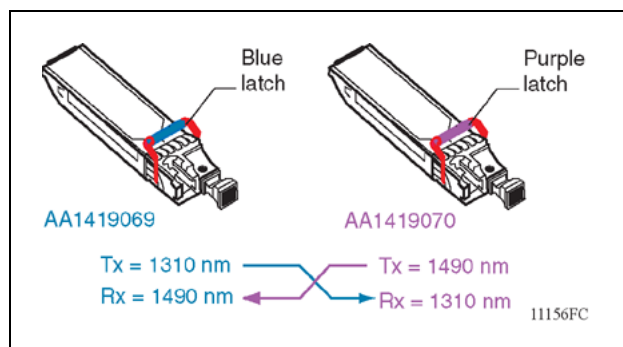
1000BASE-ZX CWDM (70 km) SFP specifications

Parameter	Specifications
Connectors	Duplex LC
Cabling	SMF, 9 μ m
Data rate	1.0 Gbit/s
Line rate (8B/10B code)	1.25 Gbit/s
Operating temperature range	0°C to 60°C
Link optical power budget	20 dB
Transmit characteristics	
Launch power	-3.0 to 2.0 dBm
Receive characteristics	
Receiver sensitivity	-23 dBm
Maximum input power	-3.0 dBm

1000BASE-BX DDI SFP specifications

The 1000BASE-BX bidirectional SFPs (part numbers AA1419069-E6 and AA1419070-E6) provide Gigabit Ethernet connectivity over a single fiber.

1000BASE-BX operation



As shown in the previous figure, the transmit (Tx) and receive (Rx) paths share the same fiber by using two different wavelengths. One model transmits at 1310 nm and receives at 1490 nm, while the mating model transmits at 1490 nm and receives at 1310 nm. You can only connect a mating pair.

You can use 1000BASE-BX SFPs to double the number of your fiber links. For example, if you have 20 installed fiber pairs with 20 conventional ports connected, you can use 1000BASE-BX SFPs to expand to 40 ports, using the same fiber.

The long wavelength optical transceivers used in these models provide variable distance ranges using single mode fiber optic cabling.

The following table describes standards, connectors, cabling, and distances for the 1000BASE-BX SFP.

IEEE 802.3ah 1000BASE-BX10 SFP specifications

Parameter	Specifications
Connectors	Single-fiber LC
Data rate	1.0 Gbit/s
Line rate (8B/10B code)	1.25 Gbit/s
Distance	Up to 10 km
Wavelength	1310 nm and 1490 nm
Link optical power budget	11.0 dB
Maximum transmitter and dispersion power penalty	3.3 dB
Laser characteristics	
Maximum launch power	-3.0 dBm
Minimum launch power	-9.0 dBm
Receiver characteristics	
Maximum receiver sensitivity	-19.5 dBm
Maximum input power (maximum average receive power)	-3.0 dBm

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Nortel Ethernet Routing Switch 5500 Series

Installation — SFPs

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Publication: NN47200-302
Document status: Standard
Document version 03.01
Document date: 27 August 2007

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