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Santa Clara, CA 95054

Installing CWDM Gigabit Interface Converters

NORTTEL
NETWORKS™



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EMI Compliance

Meets requirements of:

FCC Part 15, Subparts A and B, Class A
EN55022: 1998/CISPR22:1997), Class A
General License VDE 0871, Class B
(AmtsblVfg No. 243/1991, Vfg 46/1992) VCCI Class A ITE
EN55024:1998/CISPR24:1997



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



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 handling a printed circuit board.

Product Safety

Meets requirements of:

CSA 22.2 No. 950-M95/UL1950, 3rd ed.
EN60950: 1992 /A1:1993 /A2:1993 /A3:1995 /A4:
199721CFR, Chapter I
EN60825-1:1994 /A11:1996



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.



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



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.



Advertencia: Los equipos de fibra óptica pueden emitir radiaciones de láser o infrarrojos 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.



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。

Introduction

This section describes how the Nortel Networks* coarse wavelength division multiplexed Gigabit Interface Converter (CWDM GBIC) works within the optical routing system. It also provides a list of CWDM GBICs by wavelength and shows how they are labeled and color-coded.

CWDM GBIC description

CWDM GBICs are transceivers that link Gigabit Ethernet ports with fiber optic networks. WDM technology consolidates multiple optical channels, using specific wavelengths to expand available bandwidth, on a common optical fiber.

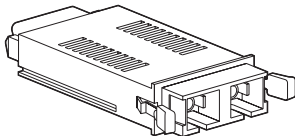
About the optical routing system

CWDM GBICs ([Figure 1](#)) are a component in the optical routing system designed to support high speed data communication 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 ([Table 1 on page 7](#)). The optical routing system also includes the following:

- Optical multiplexer-demultiplexer (CWDM OMUX)
- Optical add/drop multiplexer (CWDM OADM)

For more information about the optical routing system, and connecting CWDM GBICs to CWDM OMUXs and CWDM OADMs, see *Installation and Networking Guidelines for Optical Routing*, part number 212257-A.

Figure 1 CWDM GBIC

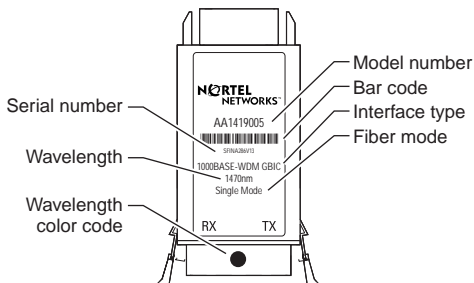


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CWDM GBIC labeling

Figure 2 shows how Nortel Networks CWDM GBICs are labeled, including color-coding by wavelength.

Figure 2 Nortel Networks CWDM GBIC label



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Note: When you contact Nortel Networks about this product, have the following information available:

- Nortel Networks serial number
- Wavelength
- Interface type
- CWDM GBIC part number

CWDM GBIC model numbers

Table 1 lists the CWDM GBIC model numbers by wavelength and matching multiplexers in the CWDM optical routing system. The system uses color matching for simplifying connections between the CWDM GBIC and the multiplexer.

Table 1 CWDM GBIC model numbers

Wave-length (nm)/ color code	Model number			
	CWDM GBIC	CWDM OADM	CWDM OMUX-4	CWDM OMUX-8
1470 /Gray	AA1419005	AA1402002		AA1402010 ↓
1490 /Violet	AA1419006	AA1402003	AA1402009	
1510 /Blue	AA1419007	AA1402004		
1530 /Green	AA1419008	AA1402005	AA1402009	
1550 /Yellow	AA1419009	AA1402006		
1570 /Orange	AA14190010	AA1402007	AA1402009	
1590 /Red	AA14190011	AA1402008		
1610 /Brown	AA14190012	AA14020011	AA1402009	

Handling, safety, and environmental guidelines

Before installing a CWDM GBIC, read the following handling, safety, and environmental guidelines:

- CWDM GBICs are static sensitive. To prevent damage from electrostatic discharge (ESD), follow your normal board and component handling procedures.
- CWDM GBICs are dust sensitive. When you store a CWDM GBIC, or when you disconnect it from a fiber optic cable, always keep the dust cover over the CWDM GBIC's optical bores.
- To clean contaminants from the optical bores of a CWDM GBIC, use an alcohol swab or equivalent to clean the ferrules of the optical connector. This also helps to prevent damage to the ferrules during handling.
- Dispose of this product according to all national laws and regulations.



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.

Installing a CWDM GBIC

Use the following procedure to install a CWDM GBIC in a switching module. This procedure requires an alcohol swab for cleaning the ferrules of the optical connector to prevent damage during handling and installation.

To install a CWDM GBIC in the switching module:

- 1 Remove the CWDM GBIC from its protective packaging.
- 2 Verify that the CWDM GBIC is the correct wavelength for your network configuration ([Table 1 on page 7](#)).
- 3 Remove the dust cover from the CWDM GBIC's optical bores.
- 4 To prevent damage during handling, clean the ferrules of the optical connector with an alcohol swab.
- 5 Grasp the CWDM GBIC between your thumb and forefinger.
- 6 Insert the CWDM GBIC into the slot on the front panel of the Gigabit Ethernet switching module ([Figure 3](#)). A clicking sound indicates it is properly seated.



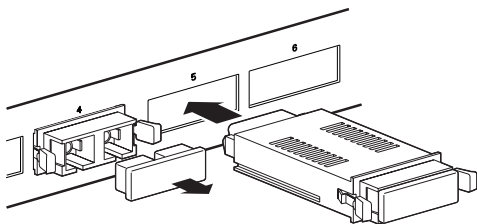
Note: CWDM GBICs are keyed to prevent improper insertion. If the CWDM GBIC resists pressure, do not force it. Remove it, turn it over, and reinsert it.

The CWDM GBIC is installed.

For instructions about connecting the CWDM GBIC to a multiplexer, see *Installation and Networking Guidelines for Optical Routing*, part number 212257-A.

For instructions about monitoring communication between the CWDM GBIC and the switch, see the user's guide for the switch.

Figure 3 Inserting a CWDM GBIC into the switching module



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Removing a CWDM GBIC

Use the following procedure to remove a CWDM GBIC. When storing a CWDM GBIC, place a dust cover over the fiber optic bores.



Note: When disposing of a CWDM GBIC, comply with all national laws and regulations.

To remove a CWDM GBIC from the switching module:

- 1 Disconnect the fiber cable from the CWDM GBIC connector.
- 2 Grasp the extraction tabs (Figure 1) located on either side of the CWDM GBIC between your thumb and forefinger.
- 3 Slide the CWDM GBIC out of the Gigabit Ethernet module slot.
- 4 If the CWDM GBIC does not slide easily from the module slot, use a gentle side-to-side rocking motion while firmly pulling the CWDM GBIC from the slot.

CWDM GBIC specifications

Table 2 CWDM GBIC specifications

Item	Specification	
Physical dimensions	0.39 X 1.18 X 2.56 inches (1 X 3 X 6.5 cm)	
Connectors	single mode fiber optic SC	
Cabling	SMF, 9 μ m	
Data rate	Nominal range	1.0625 to 1250 Mbaud
Average launch power	minimum maximum	0 dBm +4 dBm
Transmitter extinction ratio	minimum	7 dB
Data format	8 B/10 B	
Average receive power	minimum maximum	-24 dBm -1 dBm
Power supply	maximum	3.15 to 5.5 V, 40 mA
Operating temperature range	0°C to 60°C	
Regulatory	Class 1 devices per FDA/CDRH and 1EC8251 Laser Safety Regulations	



Note: A minimum attenuation of 5 dB must be present between the transmitter and receiver. To avoid receiver saturation, you must insert a minimum attenuation of 5 dB when:

- testing the GBIC in loopback mode
- using short runs of fiber with no intermediate CWDM OADM or CWDM OMUX

To determine the expected signal loss for a CWDM OADM, CWDM OMUX, or fiber length, see *Installation and Networking Guidelines for Optical Routing*, part number 212257-A.

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.

Connecting to Nortel Networks online

This section describes products, services, and support systems that can be accessed online.

Hard-copy technical manuals

You can print selected technical manuals and release notes free, directly from the Internet. Go to the www.nortelnetworks.com/documentation URL. Find the product for which you need documentation. Then locate the specific category and model or version for your hardware or software product. Use Adobe*

Acrobat Reader* to open the manuals and release notes, search for the sections you need, and print them on most standard printers. Go to Adobe Systems at the www.adobe.com URL to download a free copy of the Adobe Acrobat Reader.

You can purchase selected documentation sets, CDs, and technical publications through the Internet at the www1.fatbrain.com/documentation/nortel/ URL.

How to get help

If you purchased a service contract for your Nortel Networks product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller for assistance.

If you purchased a Nortel Networks service program, contact one of the following Nortel Networks Technical Solutions Centers:

Technical Solutions Center	Telephone
Europe, Middle East, and Africa	(33) (4) 92-966-968
North America	(800) 4NORTEL or (800) 466-7835
Asia Pacific	(61) (2) 9927-8800
China	(800) 810-5000

An Express Routing Code (ERC) is available for many Nortel Networks products and services. When you use an ERC, your call is routed to a technical support person who specializes in supporting that product or service. To locate an ERC for your product or service, go to the www12.nortelnetworks.com/ URL and click ERC at the bottom of the page.

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