NT0H65AM **323-1701-201**

Nortel

Optical Metro 5100/5200

Installing Optical Metro 5200 Shelves and Components, Part 1 of 2

Standard Release 8.0 Issue 1 April 2005

What's inside...

See Part 2 for the following:

NORTEL

Printed in Canada and the United Kingdom

Contents

About this document

This document provides the installation procedures for Nortel Optical Metro 5100/5200 Optical Metro 5200.

ATTENTION

This document is presented in two parts: Part 1 and Part 2. Each part has its own table of contents. The table of contents in Part 1 contains topics found in Part 1 only. The table of contents in Part 2 contains topics found in Part 2 only. Part 2 continues sequential chapter numbering from Part 1.

Installing Optical Metro 5200 Shelves and Components, Part 1, 323-1701-201, contains the following:

Chapter 1, "Observing safety guidelines"

Chapter 2, "Preparing for installation"

Chapter 3, "Installing a rack (19-inch or 23-inch)"

Chapter 4, "Installing Optical Metro 5200 shelves and equipment"

Installing Optical Metro 5200 Shelves and Components, Part 2, 323-1701-201, contains the following:

Chapter 5, "Connecting power"

Chapter 6, "Installing peripheral cables"

Chapter 7, "Installing circuit packs"

Chapter 8, "Fiber management"

Chapter 9, "Cleaning connectors"

This document provides procedures for installing shelves in a site, and installing components in an Optical Metro 5200.

This document contains the following information for the Optical Metro 5200:

- safety guidelines
- preparing for installation
- installing shelves and equipment

- connecting power
- installing peripheral cables
- installing circuit packs
- fiber management
- cleaning connectors

Audience for this document

This document is intended for the following audience:

- strategic and current planners
- provisioners
- installers
- transmission standards engineers
- field maintenance engineers
- system line-up and testing (SLAT) personnel
- maintenance technicians
- network administrators

Optical Metro 5100/5200 library

The Optical Metro 5100/5200 library consists of the *Nortel Optical Metro 5100/5200 Technical Publications*, NT0H65AM.

Technical Publications

The *Optical Metro 5100/5200 Nortel Technical Publications* (NTP) consist of descriptive information and procedures.

Descriptive information

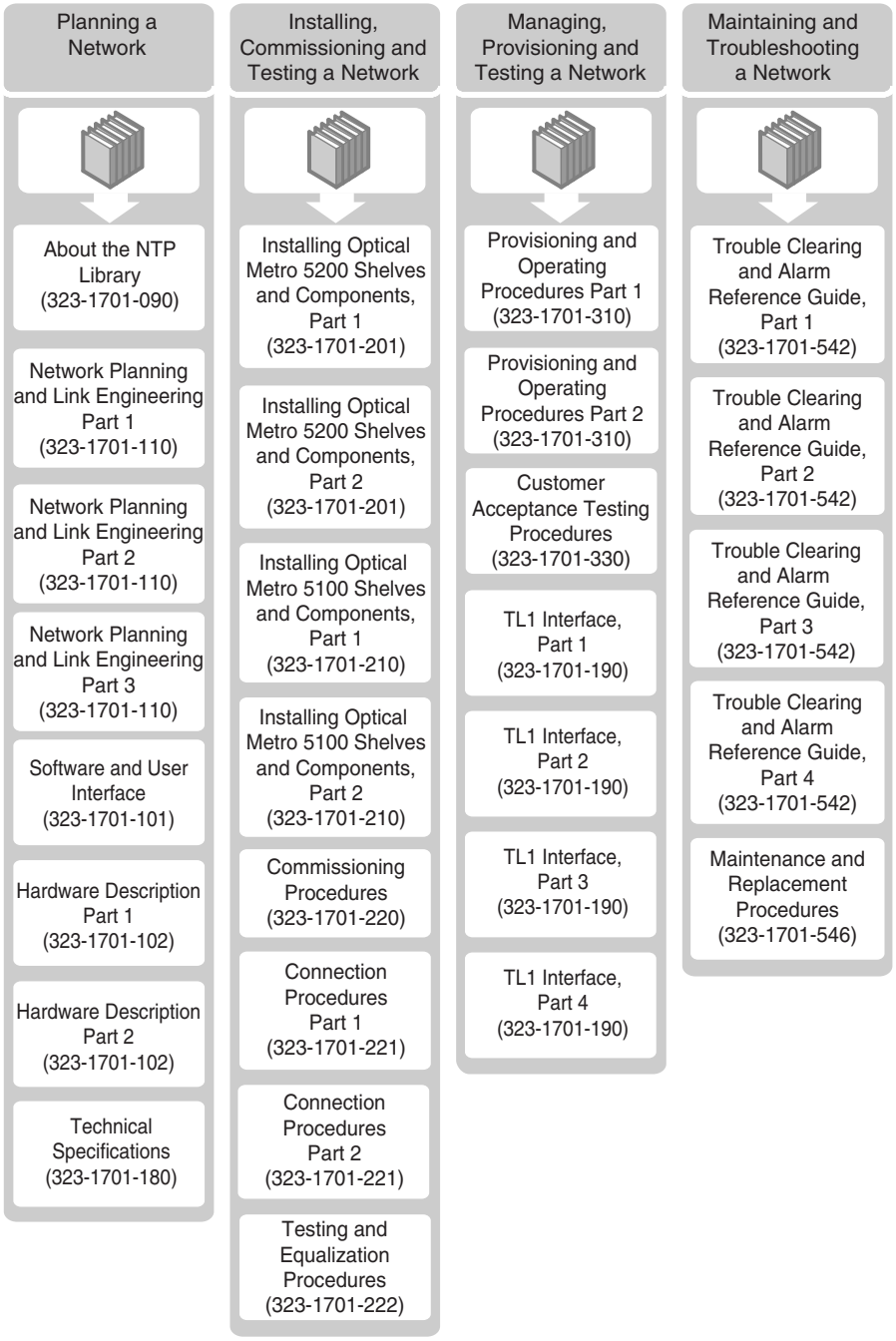
These NTPs provide detailed descriptive information about the Optical Metro 5100/5200 system, including system software and hardware descriptions, technical specifications, ordering information, and TL1 user information.

Procedures

These NTPs contain all procedures required to install, provision, and maintain the Optical Metro 5100/5200 system.

The following roadmap lists the documents in the Optical Metro 5100/5200 library.

OM2805p



Technical assistance service telephone numbers

For technical support and information from Nortel Networks, refer to the following table.

Technical Assistance Service	
For service-affecting problems: For 24-hour emergency recovery or software upgrade support, that is, for: • restoration of service for equipment that has been carrying traffic and is out of service • issues that prevent traffic protection switching • issues that prevent completion of software upgrades	**North America:** 1-800-4NORTEL (1-800-466-7835) **International:** 001-919-992-8300
For non-service-affecting problems: For 24-hour support on issues requiring immediate support or for 14-hour support (8 a.m. to 10 p.m. EST) on upgrade notification and non-urgent issues.	**North America:** 1-800-4NORTEL (1-800-466-7835) ***Note:*** You require an express routing code (ERC). To determine the ERC, see our corporate Web site at www.nortel.com. Click on the Express Routing Codes link. **International:** Varies according to country. For a list of telephone numbers, see our corporate Web site at www.nortel.com. Click on the Contact Us link.
Global software upgrade support:	**North America:** 1-800-4NORTEL (1-800-466-7835) **International:** Varies according to country. For a list of telephone numbers, see our corporate Web site at www.nortel.com. Click on the Contact Us link.

Observing safety guidelines

This chapter contains safety guidelines for personal safety and for the correct handling and operation of equipment.

Nortel Networks documentation contains precautionary messages and safety procedures that refer to specific tasks or conditions. Read and follow all precautionary messages before you start to work on the equipment.

This chapter contains the following sections:

Audience

Personnel working directly on equipment must be

- trained and qualified to carry out the tasks required
- authorized to carry out the tasks required

- conversant with and follow the specific safety guidelines referring to the product and the general safety procedures of their company

Precautionary messages

To prevent personal injury, equipment damage, or service interruptions follow all precautionary messages found in the documentation and the safety procedures established by your company.

The following precautionary messages appear in the documentation.

DANGER
Risk of personal injury
A precautionary message with this symbol indicates a risk of personal injury.

DANGER
Risk of electrical shock
A precautionary message with this symbol indicates a risk of personal injury caused by an electrical hazard.

DANGER
Risk of laser radiation exposure
A precautionary message with this symbol indicates a risk of personal injury caused by exposure to laser beam.

DANGER
Risk of burn
A precautionary message with this symbol indicates a risk of personal injury caused by a hot surface.

CAUTION
Risk of interruption to service
A precautionary message with this symbol can indicate a risk of service interruption or equipment damage.

CAUTION
Risk of damage to circuit packs
A precautionary message with this symbol indicates a risk of static damage to circuit packs and that the use of antistatic protection is required.

Note: The circuit packs use an attention label, see Preventing circuit pack damage.

Safety standards

The network elements of this product conform to all relevant safety standards. In particular, they meet:

- IEC 60950—Safety of Information Technology Equipment, Third Edition, Corrigendum: 1/2000, 1 April 1999, 540 pages
- IEC 60825-2:2004, IEC 60825-1:2001 and IEC 60825-2:2000—Safety of Laser Products
- FDA 21 CFR 1040—Performance Standards for Light-Emitting Products, 1997

The classification of Nortel products is based on the maximum accessible power. Under normal operating conditions, the power within the optical system can be high, but not accessible. Upon fault or fiber disconnect conditions, the internal safety systems reduce the power to the accessible power level, as stated on the labels.

Laser radiation—optical transmission systems

Nortel Networks optical products use laser or light-emitting diode (LED) sources that emit light energy into optical fibers. This energy is within the red (visible) and infrared (not visible) areas of the electromagnetic spectrum.

International standards

The IEC 60825 series of international standards covers the safety of laser and LED products. The following list provides examples from the International Electrotechnical Commission (IEC), Code of Federal Register (CFR), and European Norm (EN) series of standards:

- IEC 60825-1, Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide Edition 1.1; Edition 1: 1993, Consolidated with Amendment 1: 1997; Issue 1, 1998, 123 pgs. (Part 1 of a series of publications under the general title of: Safety of Laser Products). This standard provides information about equipment classification and on limit values for safety of laser products.

  Note: IEC 60825 Amendment 2 was published in January 2001 with revised laser classification levels (Class 1, 1M, 1R, 3B, and 4) governing open-source lasers within the wavelength ranges specified for Nortel Networks products.

- IEC 60825-2:2000-05, Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems, Second Edition, May 2000, 123 pgs. This standard provides information about the safety of optical fiber communication systems.
- IEC 60825-2:2004, Safety of laser products –Part 2: Safety of optical fibre communication systems (OFCS). Part 2 of IEC 60825 provides requirements and specific guidance for the safe operation and maintenance of optical fibre communication systems (OFCS).
- Regional standards such as the EN 60825 series: for example, British Standard BS EN 60825-1:2001, Safety of Laser Products, Equipment Classification, Requirements and User's Guide, 15 Dec. 2001, 123 pgs. These standards are based on the IEC 60825 series.

  Note: In Europe, the EN 60825 series of standards for CE marking purposes evaluate the safety of laser and LED products. The EN 60825 series is technically equivalent to IEC 60825.

- In the United States, the Food and Drug Administration (FDA) publishes regulations 21 CFR 1010, Performance Standards for Electronics Products: General, April 1996, and 21 CFR 1040 in the Code of Federal Register (CFR). Regulations 21 CFR 1010 and 21 CFR 1040 contain laser safety requirements equivalent to the European standards.

  Note: Laser Notice 50, issued by the US Dept. of Health and Human Services (FDA) on July 26, 2001, now states that there is no objection to the FDA conforming with IEC hazard warning labels as specified in IEC 60825-1. This is an effort on the part of the FDA to align its standards for laser products with IEC 60825-1.

Although the FDA classifications (I, IIIb, IV) are similar to IEC (1, 3A, 3B, 4), the classifications are not directly equivalent. Nortel Networks ensures that all its products are compliant to either or both the FDA and IEC requirements, as appropriate.

The optical systems meet either the Synchronous Digital Hierarchy (SDH) or Synchronous Optical Network (SONET) standards. SDH systems are normally for use outside North America. SONET systems are normally for use in North America. Normally the IEC 60825 series of standards are used to classify and certify SDH products and FDA CFR is used to classify and certify SONET products.

The maximum intrinsic output power of laser and LED sources used in optical fiber communication systems can vary from Class 1 (IEC) or Class I (FDA) for short-reach applications, to Class 3A (IEC 60825-1:2001) or Class 1M (IEC 60825-2:2004) or Class IIIb (FDA) or higher for long-reach applications. The IEC standards require that products are assessed on their maximum accessible optical power during both normal operation and under fault conditions.

Radiation hazards

Under normal operation, with all optical connectors in position and correctly terminated, the optical radiation is completely enclosed. The system is a Class 1 (IEC) or Class I (FDA) product, irrespective of the transmitted power within the optical fiber.

Where optical cables are unterminated (possibly caused by optical fiber breaks or removal of connectors), the accessible output from circuit packs containing optical transmitters can be greater than Class 1 (IEC) or Class I (FDA). Follow the requirements set out in standard IEC 60825-2:2000 or IEC 60825-2:2004 concerning optical fiber communication systems.

The maximum radiation hazard encountered when disconnecting an optical fiber or during a fiber break does not exceed the AEL for Class 1M (IEC) or Class I (FDA). The worst case hazard level, as defined by IEC 60825-2, is Hazard Level 3A (IEC 60825-2:2000) and defined by ANSI Z136.2 as Service Group 1. Because the system is intended to be installed in a restricted access location, no additional engineering design features are required to prevent exposure to the laser radiation.

- Hazard level 1 is equivalent to Class 1. You can install and use products with this classification in any location.
- Hazard level 3A (IEC 60825-2:2000) and Hazard level 1M (IEC 60825-2:2004) is equivalent to Class 3A. You can install and use products with this classification in restricted or controlled locations. While it is not advised to, a Class 3A optical source is considered to be safe for long-term direct viewing without optical aids. Optical products designed

by Nortel Networks for short-haul and medium-haul applications normally are within Hazard level 3A (IEC 60825-2:2000) or 1M (IEC 60825-2:2004) and are labeled accordingly.

Note 1: The FDA does not have a classification with limits equivalent to those of IEC Class 3A for the infrared wavelength range 1425–1625 nm. FDA classifications for this wavelength range go from Class I to Class IIIb directly. FDA Class IIIb is similar to IEC Class 3B. Labels for IEC Class 3A contain a reference to FDA Class IIIb.

Note 2: In this document, Class 3A always refers to the IEC classification.

- Hazard level *k* x 3A (IEC 60825-2:2000-05) or 1M (IEC 60825-2:2004) indicates that you can access optical powers higher than Class 3A (IEC). Standard IEC 60825 permits these higher levels in controlled locations. Nortel Networks optical products in this category have warning labels that clearly state the *k* x 3A (IEC 60825-2:2000-05) or 1M (IEC 60825-2:2004) hazard level.

The following conditions determine the precautions you must take:

- the maximum accessible power
- the location of the part of the system where the optical radiation is accessible

Controlling equipment access

Definitions of locations for laser safety are as follows:

- Unrestricted—a location where access to the protective housing (enclosure) is unrestricted. Examples include domestic premises and those open to the public
- Restricted—a location where access to the protective housing (enclosure) is restricted and not open to the public. Examples include industrial and commercial premises
- Controlled—a location where access to the protective housing (enclosure) is controlled and is accessible only to authorized persons who have received acceptable training in laser safety and servicing of the system. Examples include optical cable ducts and switching centers.

Safety standard IEC 60825-1 does not require the classification of passive optical subassemblies, such as optical multiplexers, patch panels, and couplers. The output power of passive optical subassemblies depends on the input power. If you calculate the losses between the input and output power you can evaluate the type of hazard in any part of the equipment using these subassemblies.

A passive optical subassembly supplied and installed as part of a complete Nortel optical communication system has the appropriate hazard level assigned to it and labels attached. If Nortel Networks does not supply and install the subassembly, you must determine the maximum accessible optical output level and assign the appropriate hazard level and labels.

Labeling

Labeling according to the IEC 60825 and FDA series of standards is attached to the optical circuit pack and the product. The following sections describe the symbols, legends, wording, meaning, and hazard precautions needed for optical communication systems.

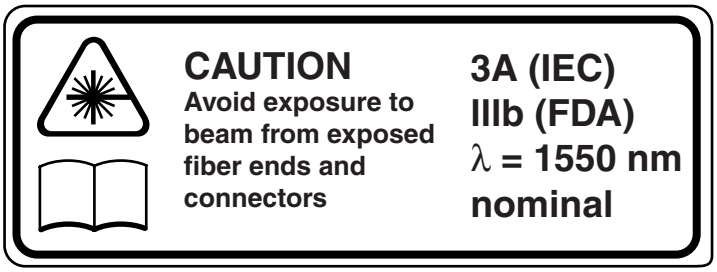
> ***Note:*** To fit the mechanical design of the circuit pack faceplate, the elements of the circuit pack explanatory label can be separated and the aspect ratio changed.

The elements of a typical label are

- laser warning symbol
- warning text explaining the risk associated with the hazard from exposed optical fiber ends and unterminated connectors; this text indicates that a hazard can exist on either the fixed or free end of a connector depending on direction of transmission
- class number, according to both IEC 60825-1 and FDA CFR standards
- wavelength, shown as a nominal or a DWDM range of values, for example:
  - 1550 nm nominal means a single wavelength within the range 1525 nm to 1625 nm
  - 1510 nm - 1625 nm means that multiple discrete DWDM wavelengths exist in the range
- book symbol, appears on products where space is limited and the full safety text cannot be included. Details of the full labeling text is contained within this documentation.

Circuit pack explanatory label - Class 3A (IEC)/Class IIIb (FDA)
A typical label is as follows.

DX1575



The full text indicated by the book symbol is as follows.

INVISIBLE LASER RADIATION
DO NOT LOOK DIRECTLY INTO OPTICAL FIBRE OR OPTICAL DATA INPUT/OUTPUT CONNECTORS. LASER RADIATION CAN COME FROM THE DATA INPUT/OUTPUT CONNECTORS OR UNTERMINATED OPTICAL FIBRE. LASER PRODUCT CLASS 3A FROM EN60825

Circuit pack power label - Class 3A (IEC)/Class IIIb (FDA)
Class 3A (IEC)/Class IIIb (FDA) circuit packs contain additional standards information. A typical label is as follows.

DX1577

Max Optical Output Power ≤ 21 mW (+13.3dBm)
Standards: IEC 60825-1:1993/A1:1997
FDA 21 CFR 1040.10:1997

This label may or may not be visible on the front panel. The label can be mounted elsewhere on the optical circuit pack. Information required is

- maximum accessible optical output power at the faceplate
- the name and publication date of the standards to which the product was assessed

Circuit pack explanatory label - Class 1 (IEC)/Class I (FDA)
Class 1 (IEC)/Class I (FDA) laser products are safe under all conditions and can be used in any location. A typical label is as follows.

DX1578

CLASS 1 LASER PRODUCT
to IEC 60825-1

The label can be fixed to the front panel or on any other surface. If the optical source is Class 1 (IEC)/Class I (FDA), no label is required.

The starburst laser warning symbol is optional for Class 1 (IEC)/Class I (FDA) products and is normally fitted in close proximity to the appropriate optical connectors.

Passive subassembly labels

A passive optical subassembly supplied and installed as part of a complete Nortel optical communication system has the appropriate hazard level assigned and labels attached. If Nortel Networks does not supply and install the subassembly, you must determine the maximum accessible optical output level and assign the appropriate hazard level and labels.

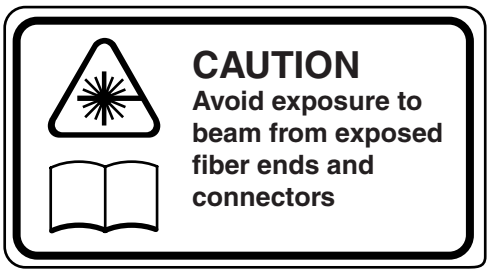
Passive subassemblies (for example, optical patch panels, couplers and splitters, optical switches) can carry optical signals of any power depending on the source optical fibers. These subassemblies require the appropriate laser warning and explanatory labels that are normally fitted in close proximity to the connectors or access panel. You are responsible for ensuring the following requirements are met:

- the optical powers at the inputs and outputs of the subassemblies are known
- appropriate labeling is fitted to subassemblies

personnel are fully trained in optical safety and understand the optical safety issue associated with the subassemblies

A typical label is as follows.

DX1581



Product level regulatory label

Each product containing optical circuit packs contains a product-level regulatory label. This label is fitted on the bay assembly or the front of the equipment. The label need not be visible when the equipment has been installed. This label includes information about the standards met by the equipment and necessary approval marks.

HIP OFA and VG OFA label kit

The high input power (HIP) or Variable Gain (VG) OFA label kit, which comes with these OFAs, contains

- a Readme page that describes where label information is located in the NTPs
- labels to be applied by the customer at various points in their HIP and VG OFA systems including:
  - Caution: Invisible Laser Radiation label

— Hazard Level Indicator label

— Standard OMX Caution

— Fiber tag labels for fiber connectors

Caution: Invisible Laser Radiation label

This label, shown in Figure 1-1 on page 1-10, includes the laser warning symbol (IEC starburst) and the cautionary text. You need to peel and stick the label on various passive products that appear downstream of the HIP and VG amplifiers. Twelve of these labels are included in the label kit.

Figure 1-1
Label—Caution: Invisible Laser Radiation

OM1773t

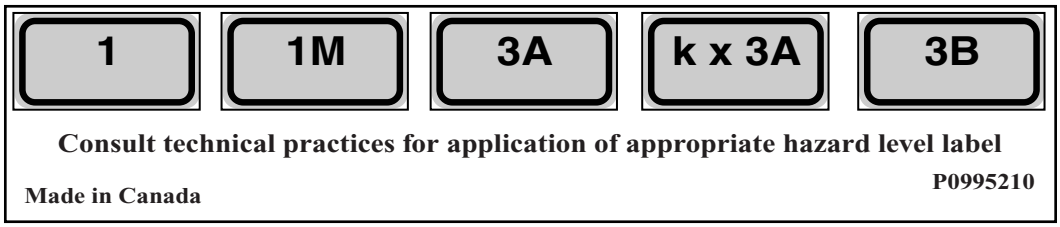
Hazard Level Indicator label

This label, shown in Figure 1-2 on page 1-11, includes a selection of alphanumeric labels, which describe various hazard levels present at different points in the system during operation of the HIP and VG amplifiers. You need to peel and stick the appropriate hazard level on to the label on all passive products that appear downstream of the HIP and VG amplifiers. Twelve of these labels are included in the label kit.

Note: The HIP OFA circuit packs will have a hazard level label indicating 3A, *k* x 3A, or 1M. The 3A and *k* x 3A labels are in accordance with the second edition of IEC 60825-2:2000. The 1M label is in accordance with IEC 60825-2:2004. Circuit packs that are labeled Hazard level 3A or *k* x 3A are considered equivalent to Hazard level 1M under the new requirements of IEC 60825-2:2004.

Figure 1-2
Label—Hazard Level Indicator

OM1774t

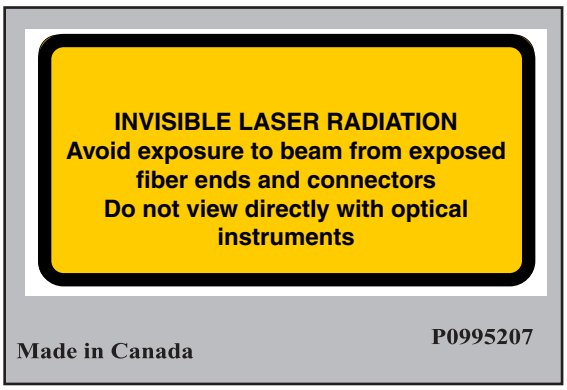


Standard OMX Caution

This label, shown in Figure 1-3 on page 1-11, includes the laser cautionary text as shown. It is smaller in size, compared to existing labels, in order for it to fit overtop of the existing standard OMX and ECT caution text. You need to peel and stick this label on these classic products that appear downstream of the HIP and VG amplifiers. Nine of these labels are included in the label kit.

Figure 1-3
Label—Standard OMX Caution

OM1775t

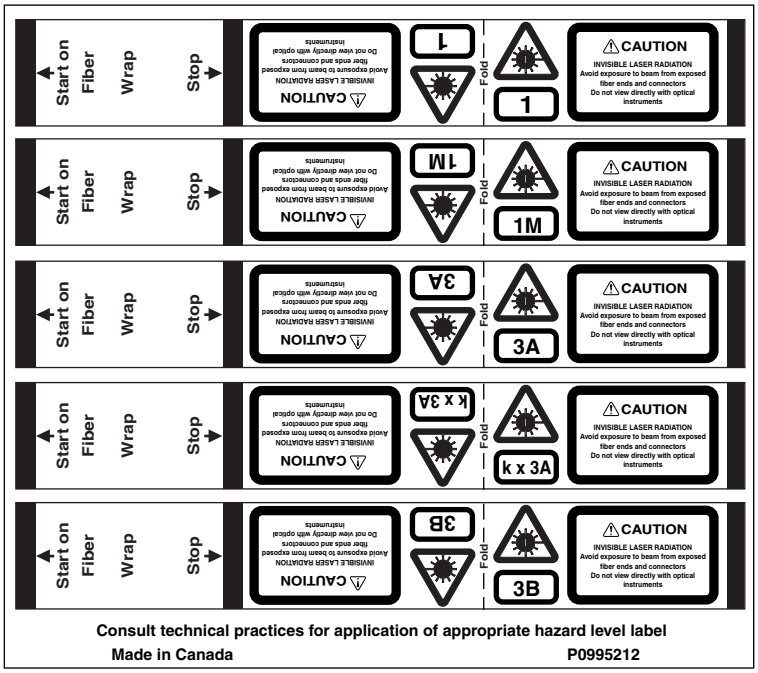


Fiber tag labels for fiber connectors

This label, shown in Figure 1-4 on page 1-12, includes a selection of tags, which describe various hazard levels present at different connectors in the system during operation of the HIP and VG amplifiers. You need to peel, roll and stick the appropriate hazard level on to the fiber plugging in to the passive products. Twenty-one of these labels are included in the label kit.

Figure 1-4
Label—Fiber tags for connectors

OM1776t



HIP OFA and VG OFA system safety labeling

HIP OFA and VG OFA system safety labeling applies to

- ECT drawers
- standard OMXs
- OMX 16CH DWDM
- the following additional products which are packaged in drawers including:
  - — C&L splitter/couplers
  - — OSC filters
  - — OMXs (OMX 4CH + Fiber Manager, OMX 4CH Enhanced, OMX 1CH CWDM, OMX 1CH CWDM, OMX 1CH ITU CWDM, OMX 4CH ITU CWDM, OMX 4CH ITU CWDM)
  - — PBEs, APBEs and VOAs
  - — DSCMs

ECT drawers

The ECTs require customer placement of the following labels from the OFA Label Kit as appropriate:

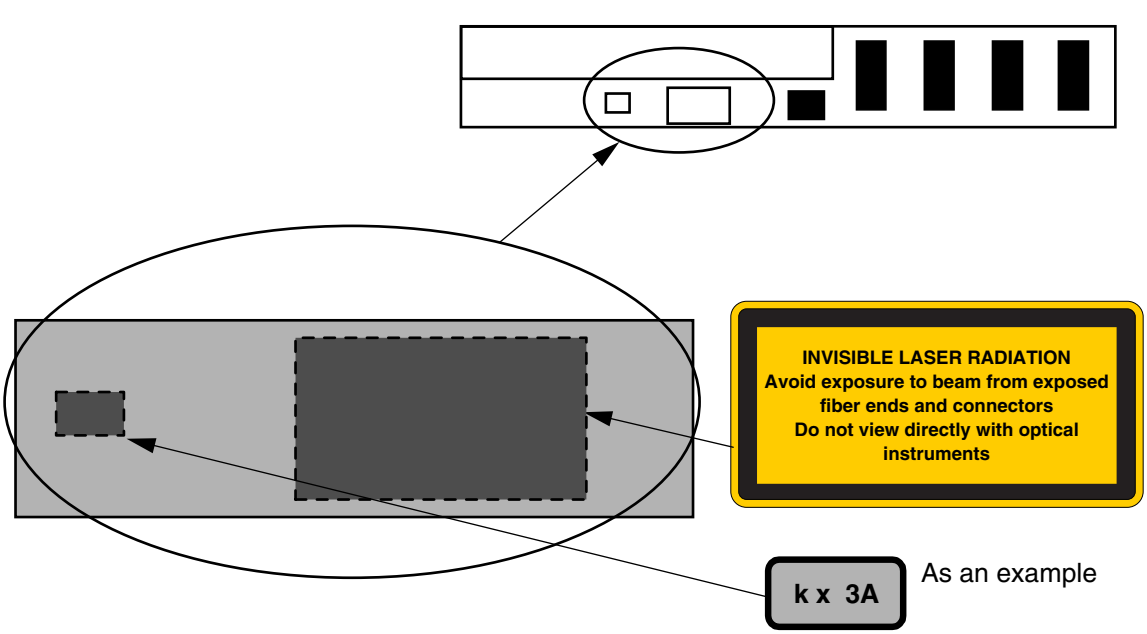
- the smaller OMX Caution (see Figure 1-3 on page 1-11)

- Hazard Level Indicator label (see Figure 1-2 on page 1-11)

The OMX Caution label is placed over the existing Caution text. The Hazard Level Indicator label is placed to the left of the starburst symbol on the drawer (see Figure 1-5 on page 1-13).

To select the appropriate Hazard Level indicator label required for these products in HIP and VG amplified systems, see the section "Selection of the Hazard Level Indicator label and fiber tags for systems with HIP OFAs and VG OFAs".

Figure 1-5
Customer placement of the Hazard Level Indicator label on ECT drawers



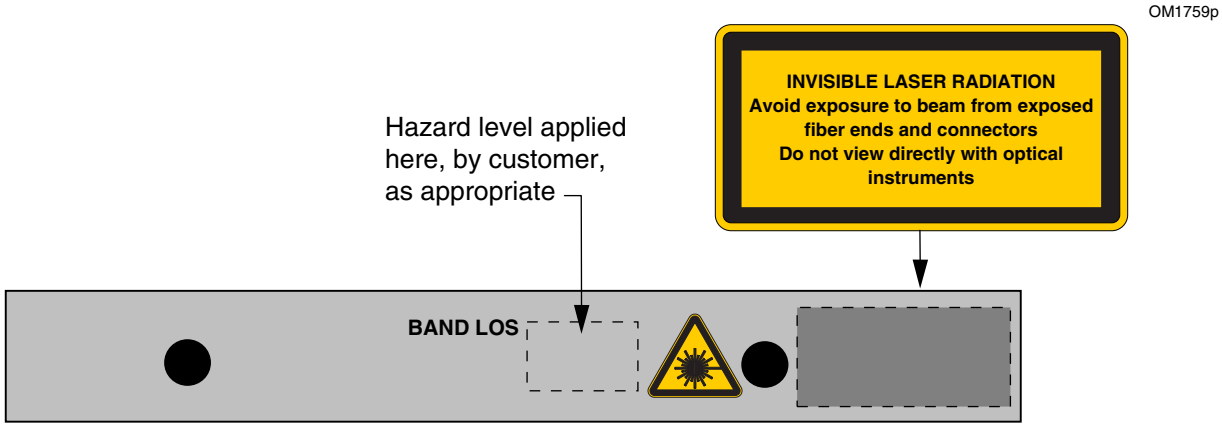
Standard OMXs
The standard OMXs requires customer placement of the following labels from the OFA Label Kit as appropriate:

- the smaller OMX Caution (see Figure 1-3 on page 1-11)
- Hazard Level Indicator label (see Figure 1-2 on page 1-11)

The OMX Caution label is placed over the existing Caution text. The Hazard Level Indicator label is be placed to the left of the starburst symbol on the face of the OMX (see Figure 1-6 on page 1-14).

To select the appropriate Hazard Level indicator label required for these products in HIP and VG amplified systems, see the section "Selection of the Hazard Level Indicator label and fiber tags for systems with HIP OFAs and VG OFAs".

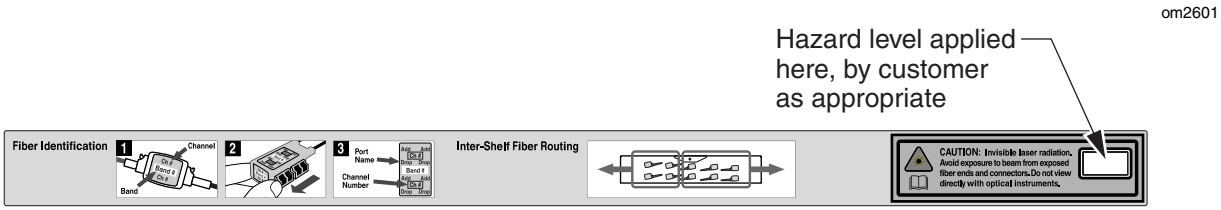
Figure 1-6
Customer placement of the Hazard Level Indicator label on standard OMXs



OMX 16CH DWDM
The OMXs 16CH DWDM requires customer placement of the Hazard Level Indicator label (see Figure 1-2 on page 1-11 and Figure 1-7 on page 1-14).

To select the appropriate Hazard Level indicator label required for OMX 16CH DWDM in HIP and VG amplified systems, see the section "Selection of the Hazard Level Indicator label and fiber tags for systems with HIP OFAs and VG OFAs".

Figure 1-7
Customer placement of the Hazard Level Indicator label on OMX 16CH DWDM



Customer placement of labels for other products excluding standard OMX, OMX 16CH DWDM, ECT and DSCM

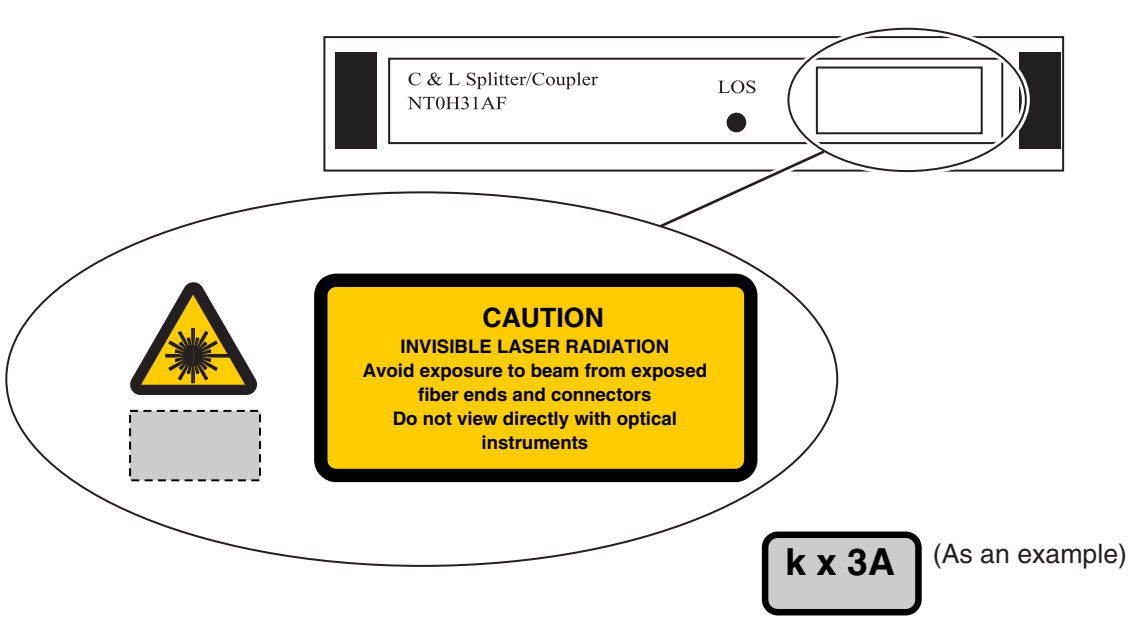
These products need to have both of the following labels over top of the face overlay:

- Caution: Invisible Laser Radiation label, (see Figure 1-1 on page 1-10)
- Hazard Level Indicator label, (see Figure 1-2 on page 1-11)

Apply the two labels as shown in Figure 1-8, with the Caution Label placed directly over the existing Caution text and Symbol grouping.

To select the appropriate Hazard Level indicator label required for these products in HIP and VG amplified systems, see the section "Selection of the Hazard Level Indicator label and fiber tags for systems with HIP OFAs and VG OFAs".

Figure 1-8
Customer placement of labels on drawers other than the standard OMXs, and ECTs



Selection of the Hazard Level Indicator label and fiber tags for systems with HIP OFAs and VG OFAs

This section describes the various amplifier topologies and the hazard levels associated with the products after amplification.

> ***Note:*** In Figure 1-9 to Figure 1-16 hazard level labels indicating 3A, *k* x 3A, and 1M are shown. The 3A and *k* x 3A labels are in accordance with the second edition of IEC 60825-2:2000. The 1M label is in accordance with IEC 60825-2:2004. Circuit packs that are labeled Hazard level 3A or *k* x 3A are considered equivalent to Hazard level 1M under the new requirements of IEC 60825-2:2004.

Post amplification only: C&L components, OSC components, and OMX components

HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration

Any product that supports C&L bands splitting/coupling, OSC splitting/coupling or OMX may require the Hazard Level Indicator label when deployed in a HIP/VG-HIP/VG coupled or single HIP or VG post amp OFA system.

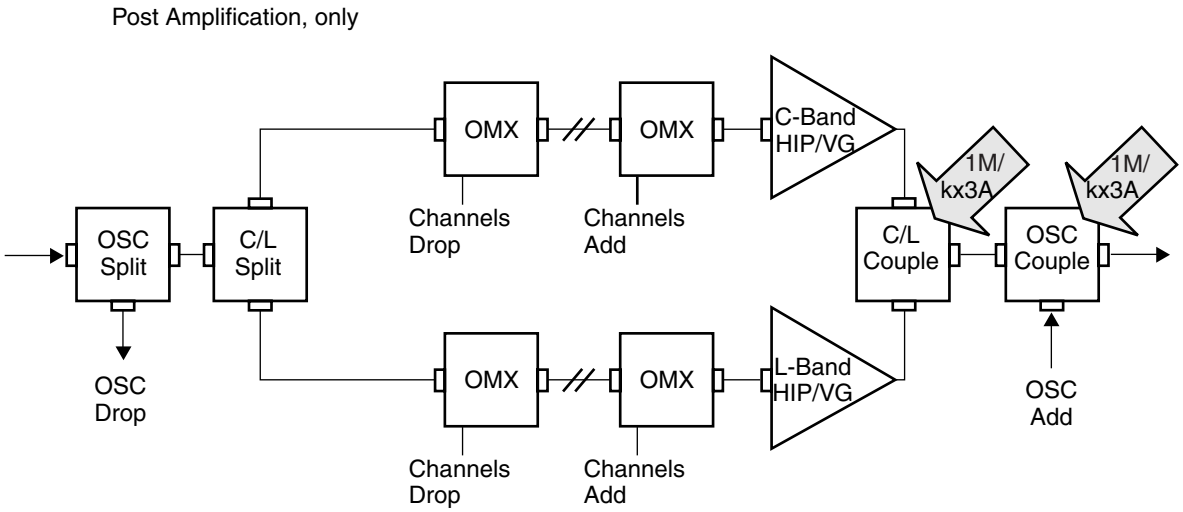
The following are some examples of the products that support C&L band power splitting/coupling, OSC splitting/coupling or OMX:

- the dual tray C&L splitter/couplers
- the ECTs
- the PBEs in 1U
- the dual tray OSC filters
- the standard OMXs
- the OMX 4CH + Fiber Manager

Figure 1-9 shows a post amplification topology with C-Band HIP/VG and L-Band HIP/VG OFAs coupled.

Figure 1-9
Post amplification topology example with HIP/VG OFAs coupled C and L-Band

OM1760p



In this configuration, or in a single HIP or VG post amp configuration:

- the “Hazard Level 1M Indicator” label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions
- the “Hazard Level 1M” fiber tags must be placed on all input and output fiber cables (going into and coming out of the products present) that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions after the HIP or VG Amp

C&L products require fiber tags on fibers plugging into:

- C BAND IN, L BAND IN and OTS OUT

OSC products require fiber tags on fibers plugging into:

- THRU IN and OTS OUT

See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the C&L, OSC, and OMX products.

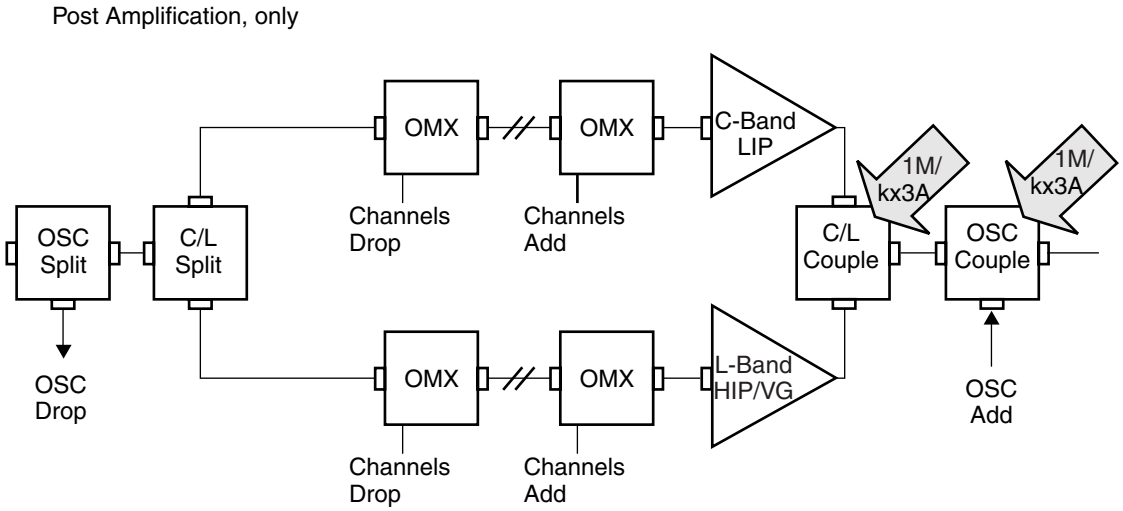
HIP/VG-LIP post amplifier coupled configuration

The same products as in the previous section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the correct Hazard Level Indicator labeling in this configuration.

Figure 1-10 shows a post amplification topology using a C-band LIP, and a L-band HIP OFA or VG OFA coupled.

Figure 1-10
Post amplification topology example with coupled C-band LIP OFA and L-band HIP or VG OFA

OM1761p



In this configuration, the Hazard Level Indicator labels and the fiber tags are the same as in the previous section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration".

See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC and OMX products.

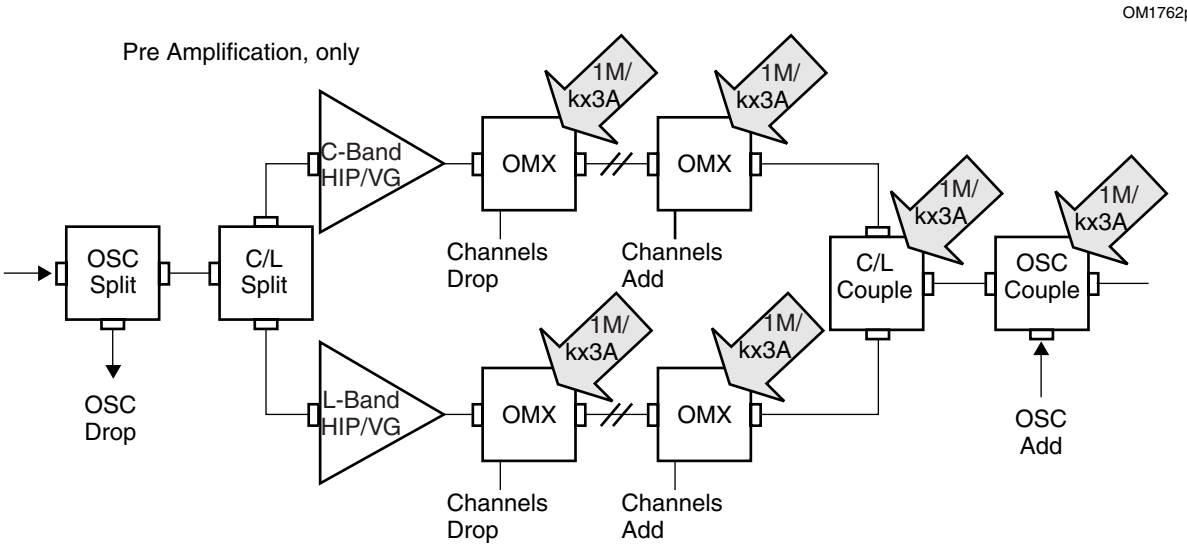
Pre amplification only: C&L components, OSC components, and OMX components

HIP/VG-HIP/VG pre amplifier coupled configuration or single HIP or VG pre amplifier configuration

The same products as in the section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the proper Hazard Level Indicator labeling when deployed in a HIP/VG-HIP/VG coupled or HIP/VG pre amplification OFA system.

Figure 1-11 on page 1-18 shows a pre-amplification topology with C-Band HIP or VG and L-Band HIP or VG OFAs coupled.

Figure 1-11
Pre-amplification topology example with coupled C-band and L-band HIP or VG OFAs



In this configuration, or in a single HIP or VG pre-amplification configuration:

- the "Hazard Level 1M Indicator" label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions
- the "Hazard Level 1M" fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions

OMX products require fiber tags on:

- fiber end plugging in to OTS IN
- fiber end plugging in to THRU IN
- fiber end coming out of OTS OUT
- fiber end coming out of THRU OUT

C&L products require fiber tags on fibers plugging into:

- C BAND IN, L BAND IN and OTS OUT

OSC products require fiber tags on fibers plugging into:

- THRU IN and OTS OUT

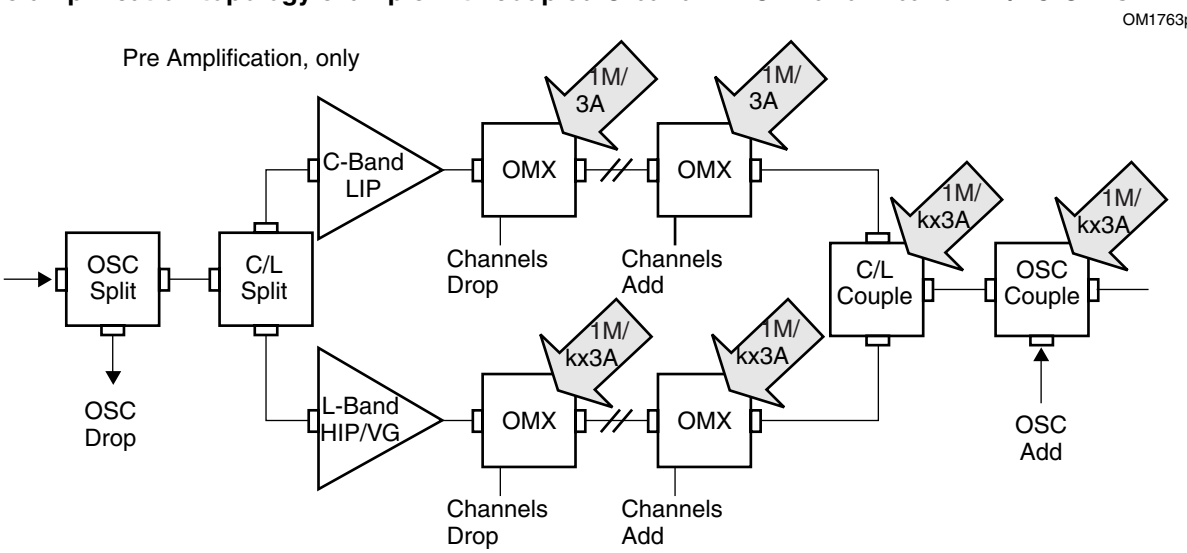
See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC, and OMX products.

HIP/VG-LIP pre amplifier coupled configuration

The same products as in the section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the proper Hazard Level Indicator labeling in this configuration.

Figure 1-12 on page 1-19 shows a pre-amplification topology using a C-band LIP, and an L-band HIP or VG coupled.

Figure 1-12
Pre-amplification topology example with coupled C-band LIP OFA and L-band HIP/VG OFAs



In this configuration:

- the "Hazard Level 1M Indicator" label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions after the HIP OFA or VG OFA
- the "Hazard Level 1M" fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions after the HIP OFA or VG OFA

- the “Hazard Level 3A Indicator” label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX function after the LIP OFA
- the “Hazard Level 1M” fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX function after the LIP OFA

OMX products require fiber tags on:

- fiber end plugging in to OTS IN
- fiber end plugging in to THRU IN
- fiber end coming out of OTS OUT
- fiber end coming out of THRU OUT

C&L products require fiber tags on fibers plugging into:

- C BAND IN, L BAND IN and OTS OUT

OSC products require fiber tags on fibers plugging into:

- THRU IN and OTS OUT

See the section “HIP OFA and VG OFA system safety labeling” on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC and OMX products.

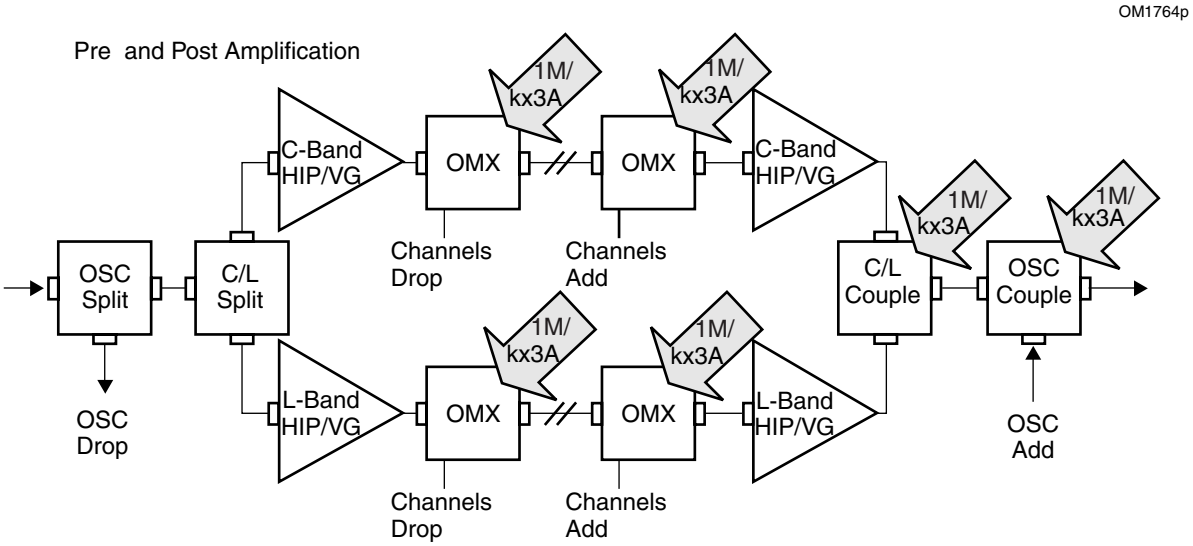
Pre and post amplification: C&L components, OSC components, and OMX components

HIP/VG-HIP/VG pre and post amplifier coupled configuration or single HIP/VG pre and post amplifier configuration

The same products as in the section “HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration” require the proper Hazard Level Indicator labeling when deployed in a HIP/VG-HIP/VG coupled or single HIP/VG pre and post amplification OFA system.

Figure 1-13 shows a pre and post amplification topology with C-Band HIP/VG and L-Band HIP/VG OFAs coupled.

Figure 1-13
Pre and post amplification topology example with coupled C-band HIP/VG OFA and L-band HIP/VG OFA



In this configuration, or in a single HIP/VG pre and post amplification configuration:

- the “Hazard Level 1M Indicator” must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions
- the “Hazard Level 1M” fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions

OMX products require fiber tags on:

- fiber end plugging in to OTS IN
- fiber end plugging in to THRU IN
- fiber end coming out of OTS OUT
- fiber end coming out of THRU OUT

C&L products require fiber tags on fibers plugging into:

- C BAND IN, L BAND IN and OTS OUT

OSC products require fiber tags on fibers plugging into:

- THRU IN and OTS OUT

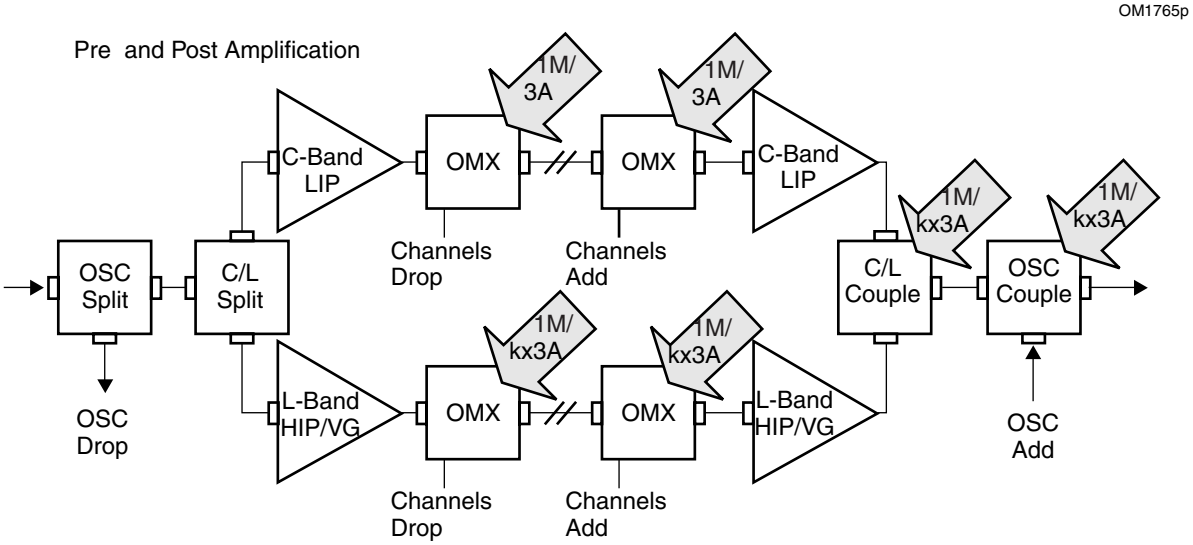
See the section “HIP OFA and VG OFA system safety labeling” on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC, and OMX products.

HIP/VG-LIP pre and post amplifier coupled configuration

The same products as in the section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the proper Hazard Level Indicator labeling in this configuration.

Figure 1-14 on page 1-22 shows a pre and post amplification topology with a C-band LIP and an L-band HIP/VG OFA coupled for both pre and post amplification.

Figure 1-14
Pre and post amplification example with coupled C-band LIP OFA and L-band LIP OFA



In this configuration

- the "Hazard Level 1M Indicator" label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions after the HIP OFA or VG OFA
- the "Hazard Level 1M" fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX, C&L coupling and OSC coupling functions after the HIP OFA or VG OFA
- the "Hazard Level 1M Indicator" label must be applied to the faceplate of the products present that are downstream of the amplifier providing the OMX function after the LIP OFA
- the "Hazard Level 1M" fiber tags must be placed on all input and output fiber patch cords going into and coming out of the products present that are downstream of the amplifier providing the OMX function after the LIP OFA

OMX products require fiber tags on

- fiber end plugging in to OTS IN
- fiber end plugging in to THRU IN
- fiber end coming out of OTS OUT
- fiber end coming out of THRU OUT

C&L products require fiber tags on fibers plugging into:

- C BAND IN, L BAND IN and OTS OUT

OSC products require fiber tags on fibers plugging into: THRU IN and OTS OUT.

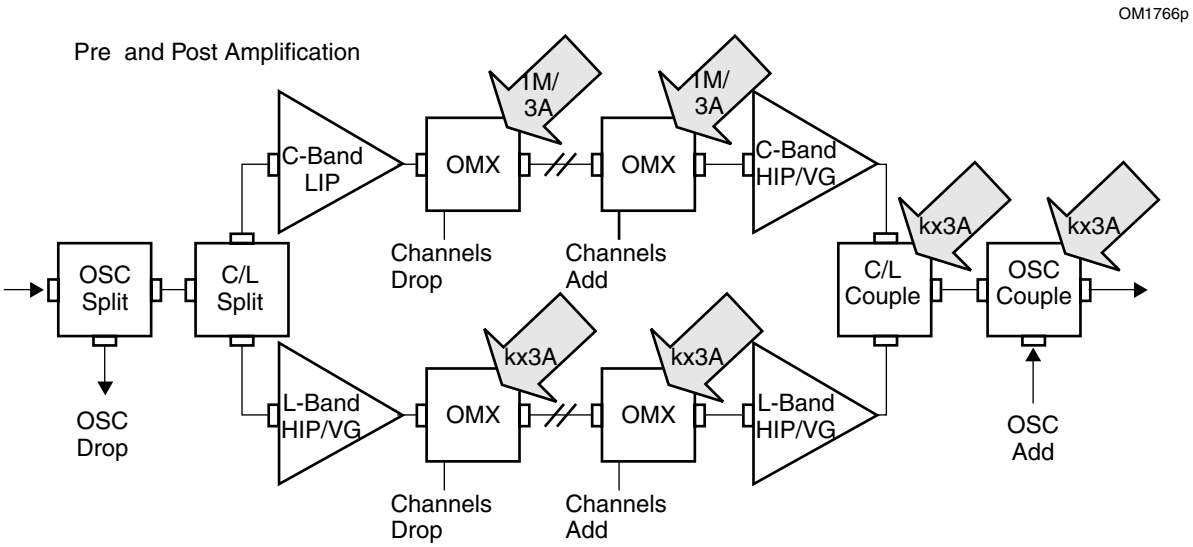
See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC and OMX products.

HIP/VG-LIP pre and HIP/VG-HIP/VG post amplifier coupled configuration

The same products as in the section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the proper Hazard Level Indicator labeling in this configuration.

Figure 1-15 shows a pre and post amplification topology where the pre amplification is done using a C-band LIP OFA and an L-band HIP/VG.

Figure 1-15
Pre and post amplification example with C-band LIP OFA and L-band HIP/VG OFA pre-amplification



In this configuration, the Hazard Level Indicator labels and fiber tags are the same as in the previous topology "HIP/VG-LIP pre and post amplifier coupled configuration".

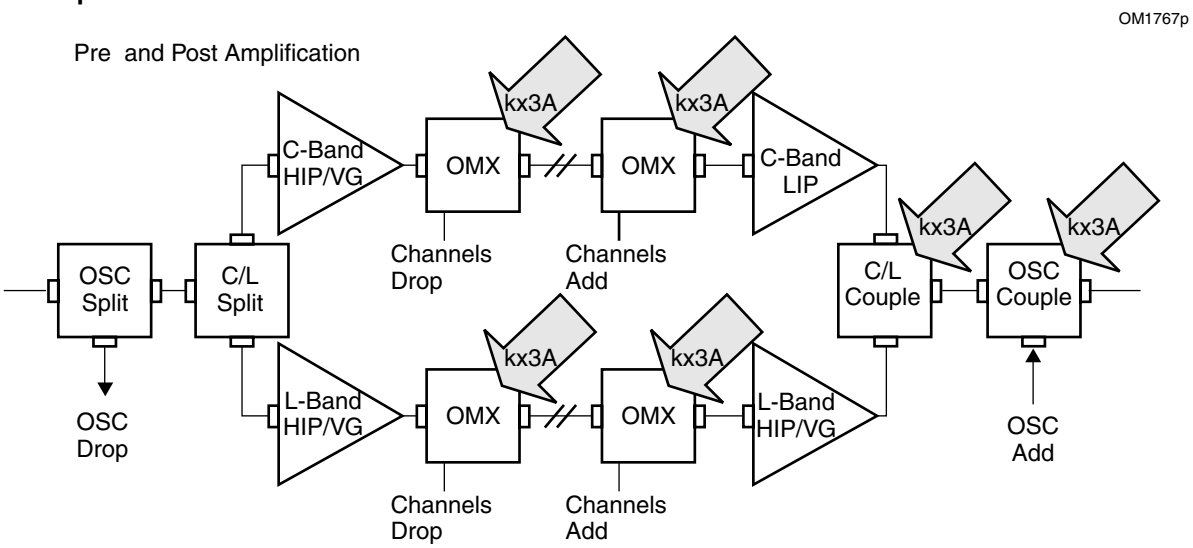
See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the various C&L, OSC, and OMX products.

HIP/VG-HIP/VG pre and HIP/VG-LIP post amplifier coupled configuration

The same products as in the section "HIP/VG-HIP/VG, post amplifier coupled configuration or single HIP or VG post amp configuration" require the proper Hazard Level Indicator labeling in this configuration.

Figure 1-16 on page 1-24 shows a pre and post amplification topology where the post amplification is done using a C-band LIP OFA and an L-band HIP or VG OFA.

Figure 1-16
Pre and post amplification example with C-band LIP OFA and L-band HIP/VG OFA post-amplification



In this configuration, the Hazard Level Indicator labels and fiber tags are the same as in the previous topology "HIP/VG-LIP pre and post amplifier coupled configuration".

See the section "HIP OFA and VG OFA system safety labeling" on page 1-12 to define which labels are required from the OFA Label Kit and where they are to be placed on the C&L, OSC, and OMX products.

Summary of customer Hazard Level Indicator labels and fiber tags

Table 1-1 lists the situations where the Hazard Level Indicator labels and fiber tags are used.

Table 1-1
Summary of customer Hazard Level Indicator labels and fiber tags

Topology	C&L coupler, Hazard Level and fiber tag OSC coupler, Hazard Level fiber tag	OMX Hazard Level OMX fiber tag
HIP/VG (+HIP/VG coupled) post amp(s) only	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	—
HIP/VG+LIP coupled post amps only	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	—
HIP/VG (+HIP/VG coupled) pre amp(s) only	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	kx3A (IEC 60825-2:2000) or 1M (IEC 60825-2:2004)
HIP/VG+LIP coupled pre amps only	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	LIP • 3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004) HIP/VG • kx3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004
HIP/VG (+HIP/VG) pre & HIP/VG (+HIP/VG) post amps	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	kx3A (IEC 60825-2:2000) or 1M (IEC 60825-2:2004)
HIP/VG+LIP pre & HIP/VG+LIP post amps	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	LIP • 3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004) HIP/VG • kx3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004)

Table 1-1 (continued)
Summary of customer Hazard Level Indicator labels and fiber tags

Topology	C&L coupler, Hazard Level and fiber tag OSC coupler, Hazard Level fiber tag	OMX Hazard Level OMX fiber tag
HIP/VG+LIP pre & HIP/VG+HIP/VG post amps	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	LIP • 3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004) HIP/VG • kx3A (IEC 60825-2:2000) or • 1M (IEC 60825-2:2004)
HIP/VG+HIP/VG pre & HIP/VG+LIP post amps	kx3A (in accordance IEC 60825-2:2000) or 1M (in accordance IEC 60825-2:2004)	kx3A (IEC 60825-2:2000) or 1M (IEC 60825-2:2004)
Note: All Hazard Level labels and fiber tags are required downstream of the noted amplifier. Therefore, all OMX labels and fiber tags are required in pre amplification configurations only.		

HIP OFA and VG OFA labels for Optical Metro 5200 OFA and Mixed shelves and ECT installation kit

When even one HIP OFA or VG OFA is put in an OFA shelf or Mixed shelf, the Caution: Invisible Laser Radiation label (see Figure 1-1 on page 1-10), if it is not already present, in the bottom right hand side recess of the shelf cover on the Optical Metro 5200 standard (12 U) shelf or the Mechanical Shelf Assembly for OMX Variants (11U). Once this label is in place, place the 1M Hazard Level Indicator label (see Figure 1-2 on page 1-11) in the area below the starburst.

Similarly, the OFA fan cover assembly requires the same two labels to be placed over top of the existing cautionary text. Remove the "Class 3A Laser Product" label if it appears. If an ECT installation kit has been ordered, then the 1M Hazard Level Indicator" label, shipped with the kit, must be peeled and put in place in the area below the starburst already present.

Using optical fibers

Optical fibers are either single or multiple core. The following information and precautionary messages apply to all optical fibers.

Handling optical fibers

When you work with optical fibers, you must take the following precautions.

- Wear safety glasses when you install optical fibers.

  Note: See "Typical laser safety eye wear" on page 1-28 for recommended typical laser safety eye wear information.

DANGER

Risk of laser radiation exposure

Do not look directly into the optical beam. Invisible light can severely damage your eyes. Keep all optical connectors capped.

- Do not look into the opening of an optical fiber, or the opening of an optical fiber connector, if the optical fiber is active or the unit has the power turned on.

CAUTION

Risk of damage to circuit packs

Never connect or disconnect an optical fiber on an active or powered up optical amplifier. To connect or disconnect an optical fiber, place the optical amplifier out of service (OOS), unseat the optical amplifier, then connect or disconnect the optical fiber. High optical power levels can damage circuit packs if improper connections are made.

- Avoid direct exposure to optical fiber ends or optical connector ends where you can access the laser signal directly.
- If you are handling bare optical fiber without a sheath, never look into an active optical fiber or the optical fiber connector opening of an active or powered-up unit if you are handling a bare optical fiber without a sheath.
- If you are handling bare optical fiber without a sheath, avoid direct exposure to optical fiber ends or optical connector ends where you can directly access the laser signal if you are handling a bare optical fiber without a sheath.
- Clean your hands after you handle optical fibers. Small pieces of glass are not always visible and can damage your eyes.

DANGER

Risk of eye injury

If you have a piece of glass in your eye, get medical assistance immediately.

- Do not handle pieces of optical fiber with your fingers. Use tweezers or adhesive tape to lift and discard any loose optical fiber ends.
- Wear rubber gloves when you clean optical connectors. The gloves prevent direct contact with the isopropyl alcohol and prevent contamination of the ferrules with skin oils.
- Place all optical fiber clippings in a plastic container provided for that purpose.

- Handle optical fibers with caution. Place the optical fibers in a safe location during installation.
- Protect all optical fiber connectors with clean dust caps at all times.
- Follow the manufacturer instructions when you use an optical test set. Incorrect calibration or control settings can create hazardous levels of radiation.

Splicing optical fibers

When you splice optical fiber or when you must look at a spliced optical fiber with a small magnifier, take the following precautions:

- Power off all laser sources to the optical fiber or disconnect the remote optical fiber end from the laser sources before you start splicing. Make sure that all laser sources remain disconnected or powered off. The sources can be in a central office, on a subscriber premises, or in a remote location.
- Disconnect all optical test sets from the optical fiber before you start splicing. The connections can be local or remote.
- Use only the optical instruments approved by your company.

Repairing optical fibers

When an accidental break occurs in the optical fiber, do the following:

- Report the location of the damaged optical fiber to both the central-office and field-repair personnel.
- Power off all laser sources to the optical fiber or disconnect the remote optical fiber end from the laser sources (see "Handling optical fibers" on page 1-26 before you disconnect any optical fiber from a laser source). The sources can be in a central office, subscriber premises, or a remote location.

Typical laser safety eye wear

Protective eye wear is recommended when working with optical fiber and lasers. Laminated glass technology (LGT) eye wear that provides protection against exposure to lasers in the 1064 nm to 1600 nm range is suitable.

Working with power

DANGER

Risk of electrical shock

Read and understand the power procedures you are performing. Take necessary precautions and use the appropriate insulated tools when working with power.

When installing power feeds, or performing routine power maintenance, ensure that you:

- Read and understand the power procedures you are performing.
- Take the necessary precautions and use the correct insulated tools for the intended function.

A tripped circuit breaker indicates that an over-current event has probably occurred. Before resetting the circuit breaker, service personnel must:

- Determine the parts of product fed by the circuit breaker.
- Determine if there are any obvious causes for the trip occurring in the affected parts and associated wiring. For example, signs or odours associated with an overheated component.
- Verify that the configuration of the power distribution elements is per the installation instructions.

After resetting any previously tripped circuit breaker, wait near the product for at least one minute to ensure that the fault has cleared and the product has returned to normal operation.

When working with batteries ensure that you do not wear an electrostatic wrist earth strap when working with standby battery supplies. Batteries are heavy. Observe correct lifting precautions during installation.

Dissipating static electricity

The level of static electricity increases on your body when you move a short distance. The increased level of static electricity can damage equipment. You must wear both a heel grounder (that attaches to your leg and foot) and an antistatic wrist-strap, or another personal grounding device when you work on any of the following:

- network element shelves (including the metal frame and cover)
- cables connected to circuit packs
- circuit packs

Note: Heel grounders or similar worn footwear attachments work when the floor is designed to dissipate static electricity. If the properties of the floor are unknown or in doubt, use a wrist-strap and make sure it is connected to a piece of electrostatic discharge (ESD) grounding equipment before proceeding with any maintenance or installation activity.

Any one of the previously mentioned grounding devices dissipate electrostatic charges to the ground quickly. Use grounding devices correctly to eliminate the electrostatic discharge (ESD) threat you pose to the equipment.

When you wear an antistatic wrist-strap and a heel grounder you must make sure the grounding straps are in contact with a moist part of your skin.Connect the grounding cord to the ESD (electrostatic discharge) grounding jack on the maintenance panel.

The following list provides guidelines on how your company can ensure the best ESD protection:

- Install bays on conductive floor coverings.
- Provide conductive shoes, antistatic wrist-straps, and heel grounders to all personnel working on the equipment.

Preventing circuit pack damage

CAUTION
Risk of equipment damage
Make sure you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

CAUTION
Risk of shelf malfunction
Nortel Networks recommends that you do not use cellular phones at any Optical Metro 5200 site. The use of cellular phones in proximity to Optical Metro equipment can cause shelf malfunction.

Handling circuit packs

All circuit packs are subject to damage by rough handling or from electrostatic discharge. When you handle or replace circuit packs, take the following precautions:

- Wear an antistatic wrist-strap and a heel grounder, or another personal grounding device before you remove a circuit pack from its package or from the shelf.

- Protect each circuit pack that is not in active use on the shelf by storing each one separately in a shielded box/antistatic bag.
- Handle each circuit pack by the faceplate or stiffener.
- Do not touch the solder side of the circuit pack, the pin connector, or the components.
- Do not stack circuit packs on or against each other.
- Inspect all pin connectors on each circuit pack for damage before use.
- Inspect all circuit packs for damage before inserting into the shelf.
- Do not force circuit packs into their packaging material.
- Protect all optical connectors of the transmit and receive optical circuit packs with clean dust caps at all times.
- Allow each circuit pack to come to room temperature before you insert the component into the shelf.

Storing and transporting circuit packs

Circuit packs shipped separately from the network element shelf come in shielded containers marked with the following symbol.

ATTENTION

OBSERVER DES PRÉCAUTIONS POUR LA MANIPULATION. DISPOSITIF SENSIBLE AUX CHARGES STATIQUES

ATTENTION

FOLLOW PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

Leave spare circuit packs in the original shielded containers until you need the circuit packs. To prevent damage to circuit packs while in storage, follow the procedures that prevent:

- accumulation of dirt or dust on the pin connectors
- damage to the printed-circuit board or its components
- warpage (to printed-circuit boards stored in areas where the humidity can exceed 95% and the temperature can exceed 70°C)

Transporting circuit packs

When you transport circuit packs, pack each circuit pack in its original shielded container and padding, or in a shielded bag. If you lose the original material, use another shielded container.

Maintenance

For maintenance and equipment replacement of the Optical Metro 5100/5200 components, refer to Optical Metro 5000-series NTP library, *Maintenance and Replacement Procedures*, 323-1701-546.

CAUTION
Potential fire hazard
After you finish performing maintenance on the cabinet, remove any paper or other combustible materials from the cabinet before you close the doors. Failure to follow this warning can result in a fire.

Regulating radio-frequency emissions

The following regulatory notices apply to all Nortel transmission products.

This equipment meets the limits for a Class A digital device according to Part 15 of the FCC Rules or CISPR22/EN55022. These limits provide acceptable protection against harmful interference when you operate equipment in a commercial environment.

This equipment can generate, use, and emit radio-frequency energy. If you do not install and use this equipment according to the instruction manual, this equipment can cause harmful interference to radio communications. Operation of this equipment in a residential area can cause harmful interference. In this event, you must correct the interference at the cost to your company.

This Class A digital instrument meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Controlling equipment access

For safety and security purposes, the internal space of the Optical Metro 5100/5200 is a restricted access location. In North America, the location restriction must be in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Outside North America, the location restriction must be in accordance with international safety standard IEC 60950. In the context of these requirements, a restricted access location is further defined as a location

- where access is restricted to only trained personnel
- to which unsupervised members of the general public are not admitted

The ambient temperature of the equipment location must not exceed 50°C.

Preparing for installation

Use the procedures and information in this chapter to prepare for the installation of an Optical Metro 5200 shelf.

List of required materials and tools

All tools and materials tables include a check box for you to ensure that you have all the required materials for an installation.

Table 2-1 lists the tools and materials that you need to complete the procedures in this NTP.

Table 2-1
Tools and materials required to install the Optical Metro 5200 shelf

Item	Quantity	Supplied	√
Equipment rack - standard 7-ft (2.1 m)	1	no	
Wrench	1	no	
Bolts for securing the base of the rack	4	no	
#2 Phillips screwdriver	1	no	
Phillips screws, flat head 6-32 x 1/4 in.	as required	yes	
Vertical fiber brackets	as required	yes	
Phillips screws PH 8-32 X 3/16 in.	as required	yes	
Phillips PH 10-32 X 3/4 in. mounting screws with clips	as required	yes	
Phillips PH 12-24 X 3/4 in. mounting screws with washers	as required	yes	
Phillips CH M5 X 20 mm mounting screws with washers	as required	yes	
Phillips CH M6 X 20 mm mounting screws with washers and clips	as required	yes	
Mounting brackets • 1 set of 19/23 mounting brackets • 1 set of ETSI mounting brackets	1 set of each	yes	

Table 2-1 (continued)
Tools and materials required to install the Optical Metro 5200 shelf

Item	Quantity	Supplied	√
ETSI mounting brackets	2	yes	
9ft, 10 AWG direct current power cable, with 1-hole lugs at both ends (See Note 1 for ETSI equivalent)	2 pairs	no	
14 AWG ground wire, with lugs at both ends	1	no	
8 mm (5/16 in) slot screwdriver	1	no	
12.5 mm (1/2 in) slot screwdriver	1	no	
#1 Phillips screwdriver	1	no	
Mounting screws (for rectifier)	4	no	
6 through 10 AWG stranded copper wire	as required	no	
Wire strippers	1	no	
Wire crimping tool	1	no	
–48 V 10 AWG insulated stranded copper wire (See Note 2 for ETSI equivalent)	as required	no	
0 V 10 AWG insulated stranded copper wire (See Note 3 for ETSI equivalent)	as required	no	
Insulated barrel-type circular lugs	2	no	
Phillips #8 pan head screws 8-32 x 1/4-in.	4	yes	
Ring lug for 10 AWG	4	no	
Note 1: 2.74 m, 2.5 mm^2 cable ***Note 2:*** 6mm^2 –48 V double insulated ***Note 3:*** 6mm^2 0 V double insulated			

Precautions

CAUTION
Risk of equipment damage
Make sure you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

CAUTION
Risk of shelf malfunction
Nortel Networks recommends that you do not use cellular phones at any Optical Metro 5200 site. The use of cellular phones in proximity to Optical Metro 5200 equipment can cause shelf malfunction.

Procedure list

All procedure lists include a check box for you to keep track of where you are in an installation. Place a check mark in this column when you are performing the procedure.

Table 2-2 lists the procedures in this chapter.

Table 2-2
Installation preparation procedures

Procedure	Page	√
2-1 Checking the condition and contents of the shipment	2-4	

Procedure 2-1
Checking the condition and contents of the shipment

Follow this procedure to check the condition of the Optical Metro 5200 equipment, as well as the content of the shipment. When you complete this procedure, report any missing equipment or equipment damage to Nortel Networks Technical assistance service telephone numbers immediately.

Precautions

CAUTION
Risk of equipment damage
Do not expose the shelf or equipment to direct sunlight. Direct sunlight can cause temperatures to exceed the defined limits, and result in incorrect operation or damage to the unit.

CAUTION
Risk of equipment damage
Optical Metro 5200 equipment is designed to operate inside buildings only. Install shelves and equipment in a dry area with enough air circulation to maintain the surrounding environment within the defined limits. Failure to meet the environmental requirements of the equipment can result in incorrect operation or damage to the unit.

Action

Step	Action
1	Locate and remove the packing slip from the shipping container and keep it to use to verify the contents of the shipment.
2	Inspect the container to make sure it has not been damaged.
3	If the container was damaged in shipping, record the type of damage and the extent of the damage.

—continued—

Procedure 2-1 (continued)
Checking the condition and contents of the shipment

Step	Action
4	Check the container to make sure that the contents did not come loose during shipping.

DANGER
Risk of personal injury
Nortel Networks recommends that two persons lift each Optical Metro 5200 shelf. If you try to lift the shelf alone you can cause personal injury, damage to the shelf, or both.

5	Carefully remove the contents of the shipping containers one item at a time.
6	If you discover damaged equipment, record the type of damage and the extent of the damage. Contact your Nortel Networks Order Manager to begin the Return Materials Authorization (RMA) process. ***Note:*** If you need to return equipment, use the original container.
7	Locate the packing slip and invoice to use for reference. Inspect the contents of the shipping containers one item at a time. Check the product identification codes and serial numbers of the items in the box against the information listed on the packing slip and the invoice.
8	Check each item off the packing slip and the invoice.
9	If any equipment is missing or incorrect, contact your Nortel Networks Order Manager to begin the Return Materials Authorization (RMA) process.

—end—

Installing a rack (19-inch or 23-inch)

Use the procedures in this chapter to install a standard Nortel Networks rack. All other racks must be installed using the manufacturer's documentation. Table 3-1 lists the product engineering codes (PEC) for the Nortel Networks standard frames and frame filler panels.

Table 3-1
Product engineering codes for frames and frame accessories

PEC	Description
NT7E6020	Frame insulation kit
NT7E6040	Frame leveling kit
NT7E70AA	Front access 23-in. frame (2.13 m or 7 ft high)
NT7E70BA	Front access 23-in. frame (2.29 m or 7 ft 6 in. high)
NT7E70CA	Front access 23-in. frame (2.44 m or 8 ft high)
NT7E70DA	Front access 23 in. frame (2.74 m or 9 ft high)
NT7E70EA	Front access 23 in. frame (3.51 m or 11 ft 6 in. high)
NT7E70FA	Front access 23. in frame (2.64 m or 8 ft 8 in. high)

Before you begin

Before you begin the procedures in this chapter, make sure that you

- review the"Observing safety guidelines" chapter in this book
- complete the procedures in "Preparing for installation"

Precautions

CAUTION
Risk of equipment damage
Make sure you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

CAUTION
Risk of shelf malfunction
Nortel Networks recommends that you do not use cellular phones at any Optical Metro 5200 site. The use of cellular phones in proximity to Optical Metro 5200 equipment can cause shelf malfunction.

Procedure list

All procedure lists include a check box for you to keep track of where you are in an installation. Place a check mark in this column when you are performing the procedure.

Table 3-2 lists the procedures in this chapter.

Table 3-2
Rack procedures

Procedure	Page	Comments	√
3-1 Preparing the floor area for installing the rack	3-3	Required.	
3-2 Securing the rack framework	3-6	Required.	
3-3 Connecting the rack ground to the office ground	3-14	Required.	

Procedure 3-1
Preparing the floor area for installing the rack

Use this procedure to prepare the floor area to install a standard Nortel Networks rack. This procedure details all the steps required to prepare the floor layout for installing the rack. All other racks must be installed using the manufacturer's documentation.

There are two types of rack anchors:

- standard anchor
- M12 earthquake (zone 4) anchor

Requirements

Table 3-3 lists the tools and materials required to prepare the floor for installing the rack.

Table 3-3
Tools and materials for preparing the floor to install a rack

Item	Quantity	Supplied	√
Electric drill (hammer drill kit), 5/8 in. size	1	no	
Masonry drill bit (size depends on selected floor anchors)	1	no	
Chalk line	1	no	
Vacuum cleaner	1	no	
Setting tool	1	no	
Safety goggles	1	no	
Socket wrench set, 1/2 in. drive	1	no	
Roll of acetate fiber tape (1 inch, 2.5 cm, or wider)	1	no	
Felt pen	1	no	

Action

Step	Action
1	Make sure that the installation site has sufficient clearance for the rack.
2	Mark the reference and layout lines on the floor, as shown in Figure 3-1.

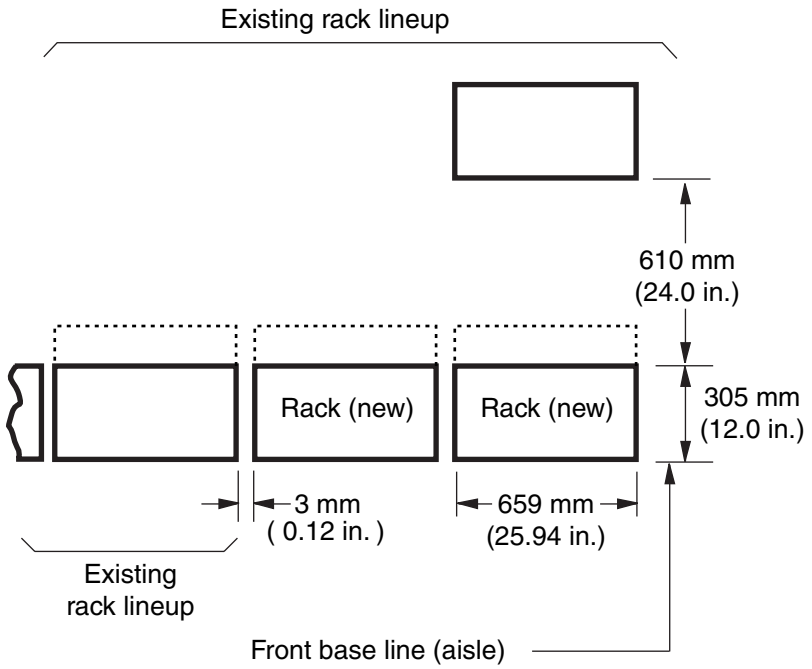
—continued—

Procedure 3-1 (continued)
Preparing the floor area for installing the rack

Step	Action

Figure 3-1
Floor plan for rack installation

OM1213t



3 Mark the four anchor bolt holes. See Figure 3-2.

4

DANGER
Risk of personal injury
Be sure to wear safety goggles before you drill holes for the anchor bolts.

Be sure to wear safety goggles. Then drill the four anchor bolt holes (see Figure 3-2).

Concrete floors: Drill the holes deep enough to meet local earthquake requirements and other criteria. Vacuum all dirt out of the holes.

Wood or steel floors: Make the appropriate pilot holes for lag bolts in wood or clearance holes for machine bolts in steel.

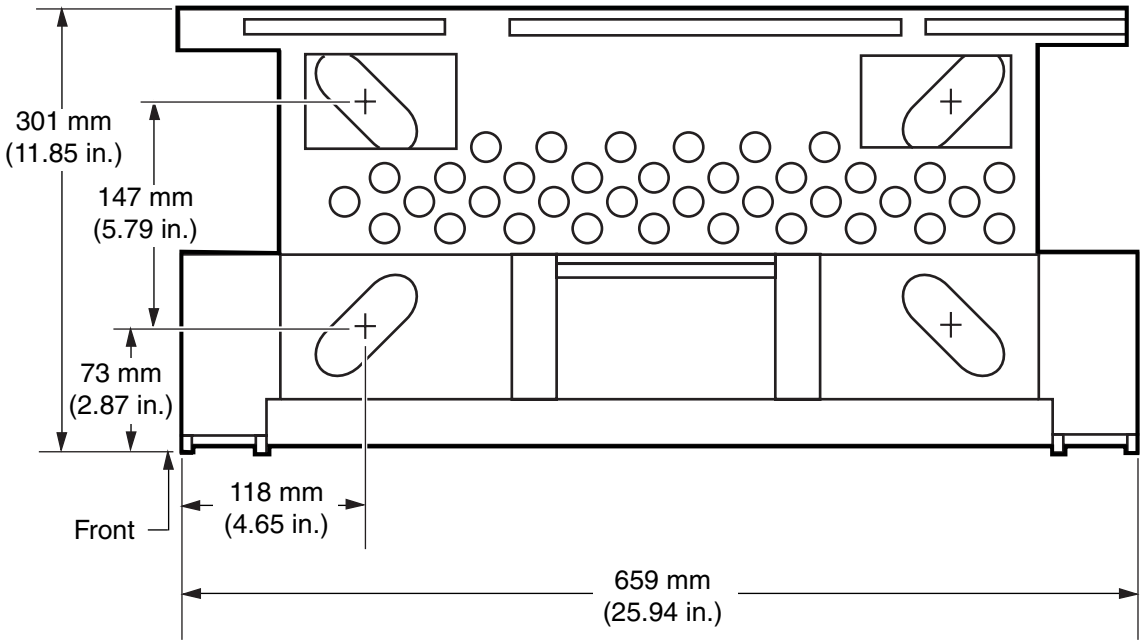
—continued—

Procedure 3-1 (continued)
Preparing the floor area for installing the rack

Step	Action
5	If you do not install the rack immediately, cover the holes with acetate fiber tape.

Figure 3-2
Anchor bolt locations

OM1214p



Rack top view
(Footprint without front guard rail)

Note 1: For standard (zone 2) anchor bolts, use a 16 mm (5/8 in.) masonry bit, and drill a hole 60 mm (2-3/8 in.) deep.

Note 2: For zone 4 anchor bolts, use a 18 mm masonry bit and drill a hole 100 mm (4.0 in.) deep.

—end—

Procedure 3-2
Securing the rack framework

Use this procedure to secure the rack framework for a standard Nortel Networks rack. All other racks must be installed using the manufacturer's documentation.

Requirements

Table 3-4 lists the tools and materials required to secure the rack framework. Table 3-5 list additional tool and materials required to secure the rack framework to a raised floor.

Table 3-4
Tools and materials for securing the rack framework

Item	Quantity	Supplied	√
frame mover kit, NT7E6116	1	no	
spirit level, 24 in. (61 cm)	1	no	
socket wrench set, 1/2 in. drive	1	no	
socket, 3/8 in. hexagonal 3 in. deep—for standard anchoring	1	no	
socket, 5/8 in. hexagonal 3 in. deep—for M12 earthquake anchoring	1	no	
torque wrench (100 ft·lb), 1/2 in. drive	1	no	
flathead screwdriver	1	no	
canvas belt	1	no	
metal shims	as required	no	
frame insulating kit (NT7E6020) (if installing IBN grounding)	1	no	

—continued—

Procedure 3-2 (continued)
Securing the rack framework

Table 3-5
Additional tools and materials for securing the rack framework to a raised floor

Item	Quantity	Supplied	√
H555-120 anchor bolts (includes 3/8 in. nut)	4	no	
P098C764 3/8 x 16 in. threaded rod, cut to suit	4	no	
P0401452 3/8 in. nuts	8	no	
P0284166 washers	8	no	
P0284166 washers, P0284175 washers	8	no	
P0374775 clamp	4	no	

Precautions

DANGER
Risk of personal injury
Make sure that you fasten the equipment rack to the floor or equipment platform according to the rack manufacturer's specifications. Failure to fasten the rack correctly can cause personal injury or damage to equipment or both.

DANGER
Risk of personal injury
Make sure the floor or equipment platform is level before installing an equipment rack. Failure to install an equipment rack on a level surface can result in personal injury or damage to equipment or both.

CAUTION
Risk of equipment damage
Do not operate an Optical Metro 5200 shelf if it is not correctly mounted in an equipment rack.

—continued—

Procedure 3-2 (continued)
Securing the rack framework

Action

Step	Action	
1	**If**	**Then**
	installing the rack in an IBN grounding network	Place the base insulating pad (part of the frame insulating kit NT7E6020) in the correct position over the anchor holes in the floor (required for IBN grounding). See Procedure 3-3 for more information on IBN grounding, then proceed to step 2.
	installing the rack in a CBN grounding network	Use the frame mover kit to carefully slide the rack assembly into its exact position in the rack lineup. Check that the anchor slots in the rack base and the insulating pad line up with the anchor holes. See Procedure 3-3 for more information on CBN grounding, then proceed to step 4.
2	Plumb the lineup to determine the highest floor spot, as the reference for leveling all racks in that lineup.	
3	Use the frame mover kit to carefully slide the rack assembly over the insulating pad into its exact position in the rack lineup. ***Note:*** Check that the anchor slots in the rack base and the insulating pad line up with the anchor holes.	
4	Verify that the rack is plumb. Insert shims, if necessary, to correct the alignment and leveling. ***Note:*** For an IBN grounding network, place the shims between the rack and the insulating pad so that they are within the outline of the pad.	
5	Assemble and insert the required number of anchors. For concrete floors, see Figure 3-3 on page 3-10. For raised floors over concrete, see Figure 3-4 on page 3-11. Make sure that you properly insert the insulated bushings on the anchors into the base anchoring slots.	
6	Tighten the anchor bolts while verifying the level of the rack. Change the shims if necessary.	

—continued—

Procedure 3-2 (continued)
Securing the rack framework

Step	Action
7	Tighten all anchor bolts with a torque wrench to the following specifications: • Standard anchor: to a final torque of 36 ft·lb (48.8 N·m). • M12 anchor for earthquake (zone 4): to a final torque of 57 ft·lb (77.2 N·m). **CAUTION** **Risk of damaging equipment** Avoid causing any strain on the racks when connecting racks together.
8	Secure the rack to any adjacent insulated rack and to the top supports according to Figure 3-5 and Figure 3-6. **—end—**

Figure 3-3
Securing the rack framework to the floor

F0172

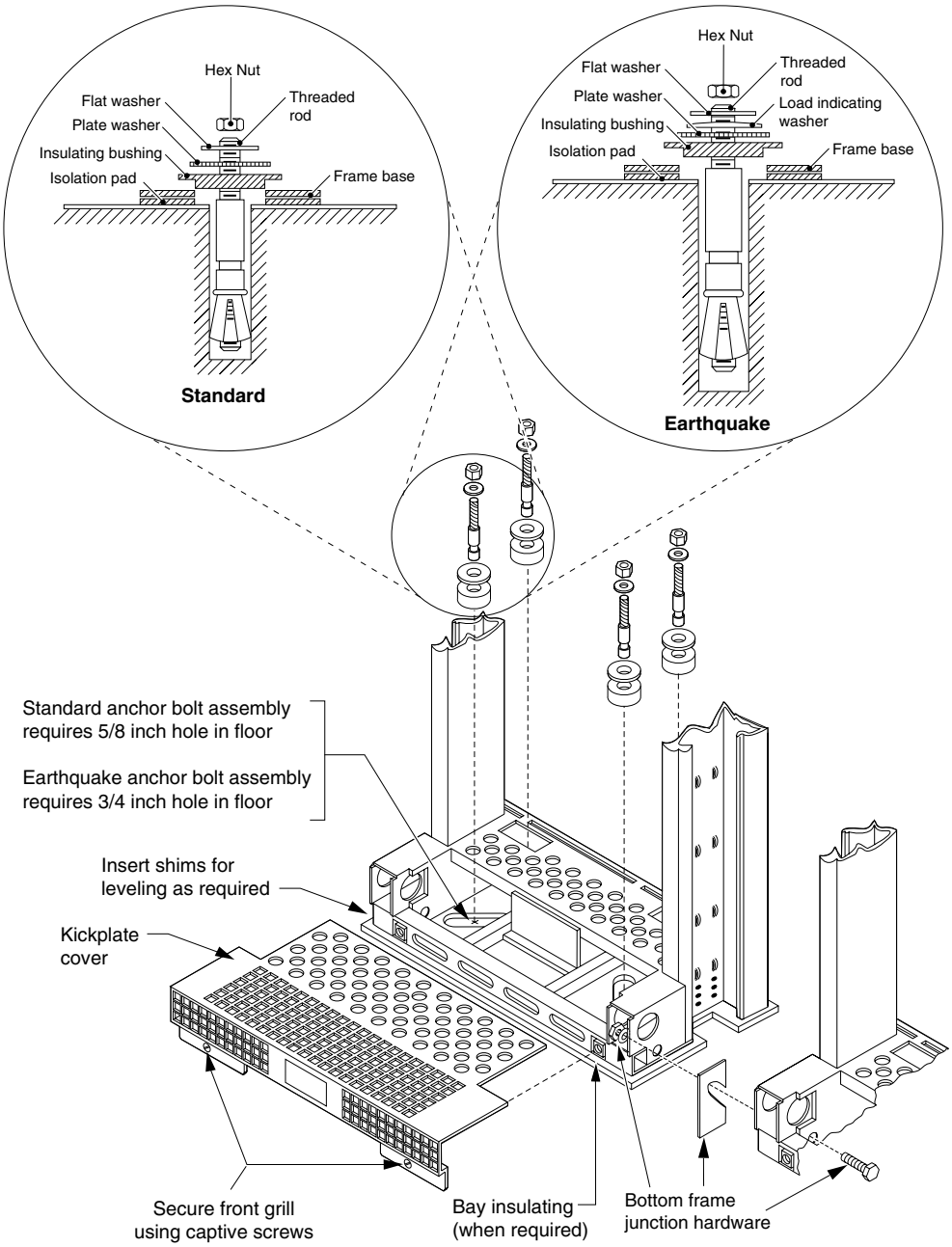


Figure 3-4
Securing the rack framework to a raised floor

F3068

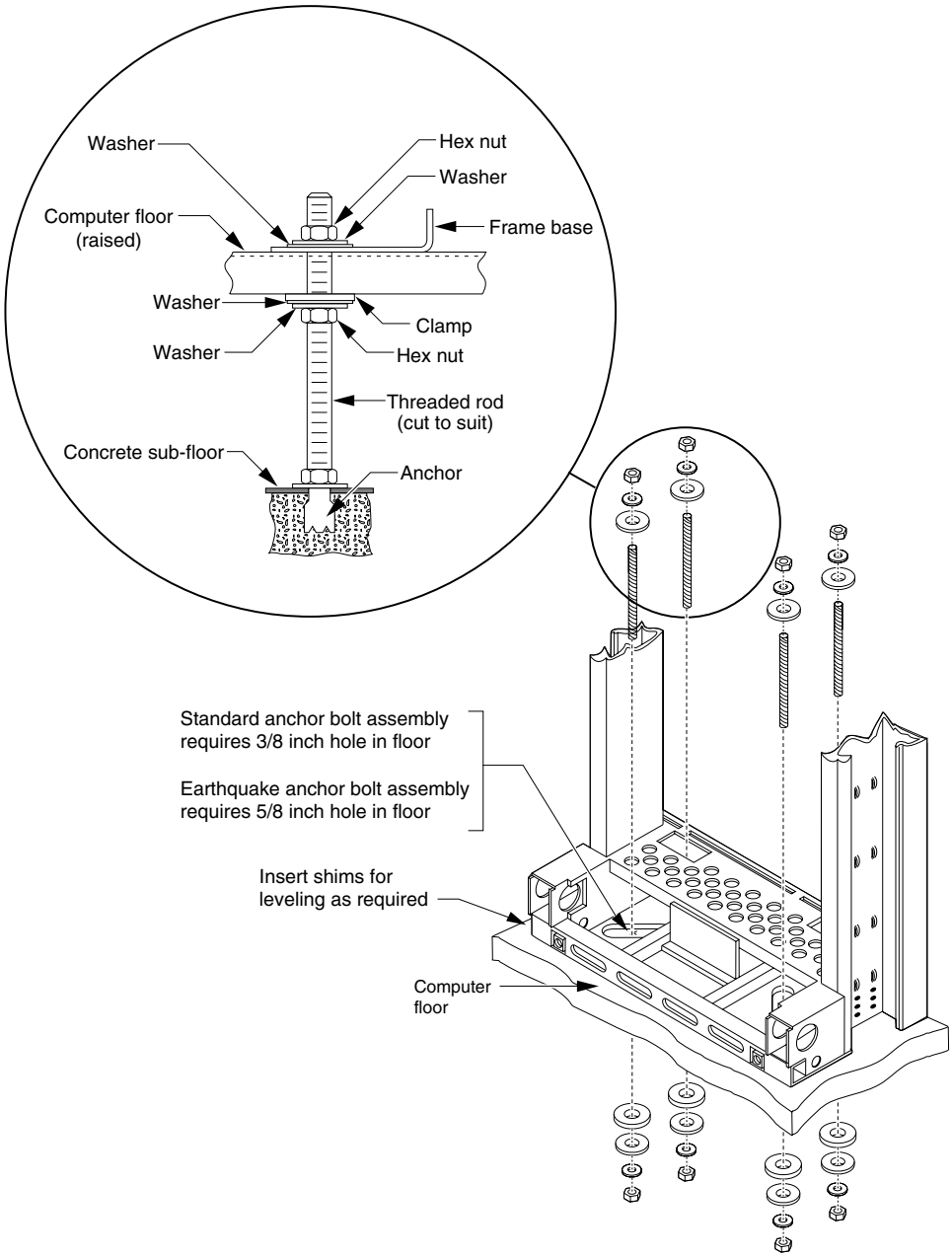
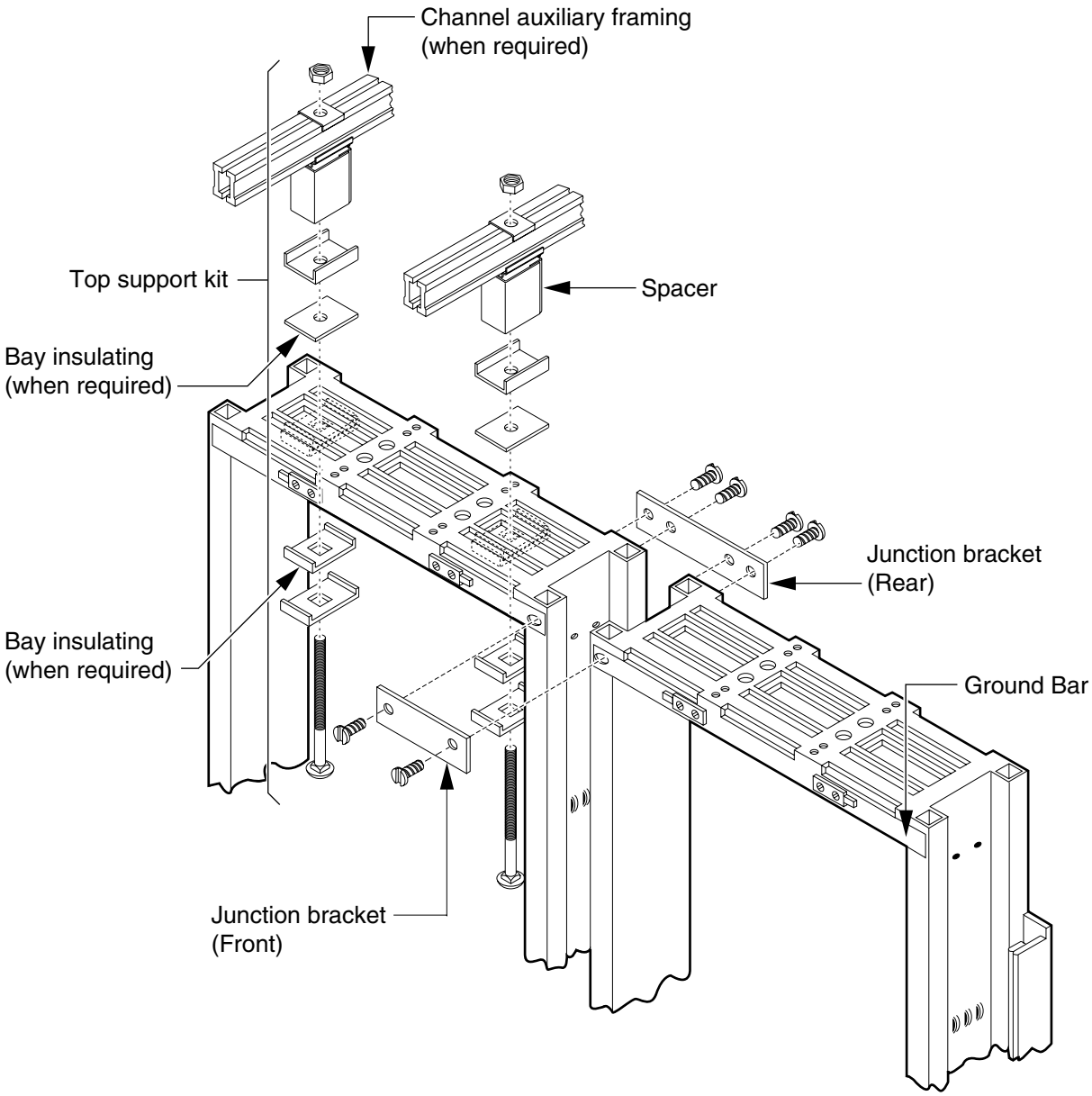


Figure 3-5
Securing the rack framework to an adjacent rack

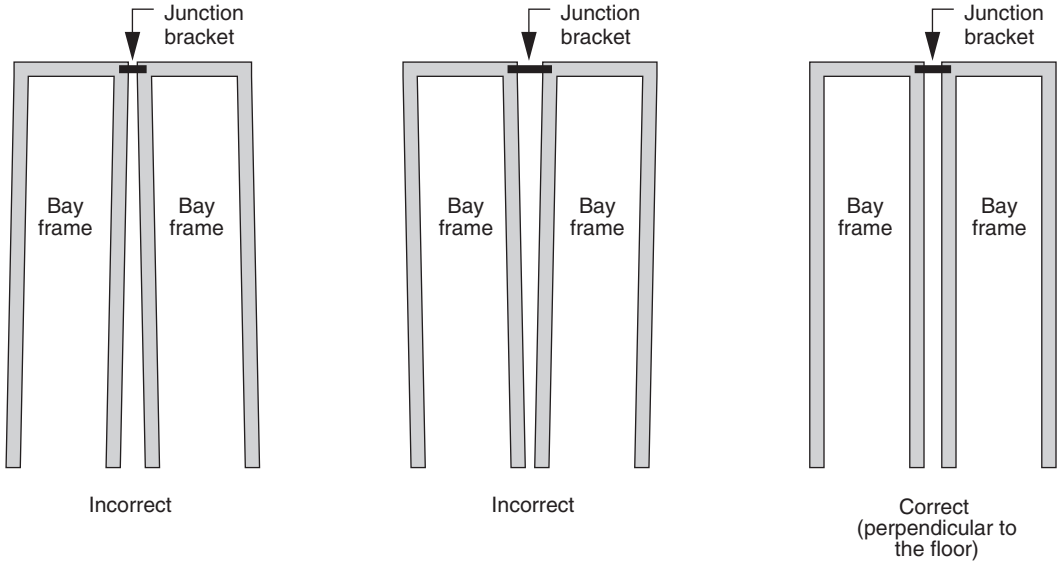
F0173(R8)



Partial Front View

Figure 3-6
Correct and incorrect way to secure adjacent rack frames

OTP1231.eps



Procedure 3-3
Connecting the rack ground to the office ground

Use this procedure to connect the rack ground to the office ground for a standard Nortel Networks rack. All other racks must be installed using the manufacturer's documentation. This procedure integrates new racks with the grounding method of existing racks.

Equipment-grounding practices

There are two possible grounding methods that you can use when you install telecommunication equipment: the common bonding network or the isolated bonding network.

Common bonding network

In a common bonding network (CBN), the equipment has the rack ground, the equipment logic ground, the battery return, the ac ground, and the building ground all connected together to form a common ground.

Isolated bonding network

The isolated bonding network (IBN) requires isolating the logic ground, the rack ground, and the battery return from a CBN, except for a single connection to ground. A copper ground bar forms the connection for the single point ground (SPG). A special example of an IBN is when there is a connection from the logic ground to the rack ground.

An IBN is less susceptible to noise and transient voltages than a common bonding network because it eliminates ground loops through the use of the single point ground references.

—continued—

Procedure 3-3 (continued)
Connecting the rack ground to the office ground

Requirements

Table 3-6 lists the tools and materials required to connect the rack to the office ground.

Table 3-6
Tools and materials for connecting the rack to the office ground

Item	Quantity	Supplied	√
wirecutters	1	no	
pliers	1	no	
crimping tool	1	no	
nut driver, 5/16 in.	1	no	
flathead screwdriver	1	no	
#6 AWG, 7-strand copper insulated conductor ground wire	as required	no	
grounding lug (part of rack equipment)	1	yes	

Action

Step	Action
1	Check that the rack ground bar is in place and is securely fastened to the rack with the self-tapping screws provided. See the location of the ground bar in Figure 3-8 on page 3-17.
2	Attach and route the grounding conductor cable from the office ground point to the ground bar at the top of the rack.
3	Strip 13 mm (0.5 in.) of insulation from the conductor and crimp the grounding lug to the conductor. See Figure 3-7.
4	Attach the ground wire crimped connector to terminal 2 (green screw) on the ground bar according to Figure 3-8 on page 3-17.

—end—

Figure 3-7
Crimp-type ground lug

OTP1192

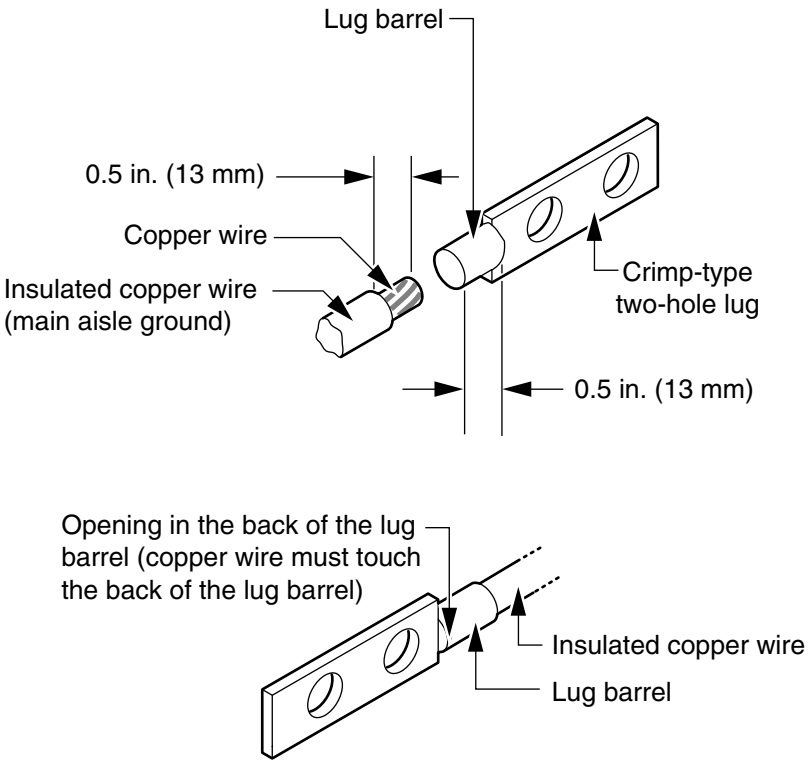
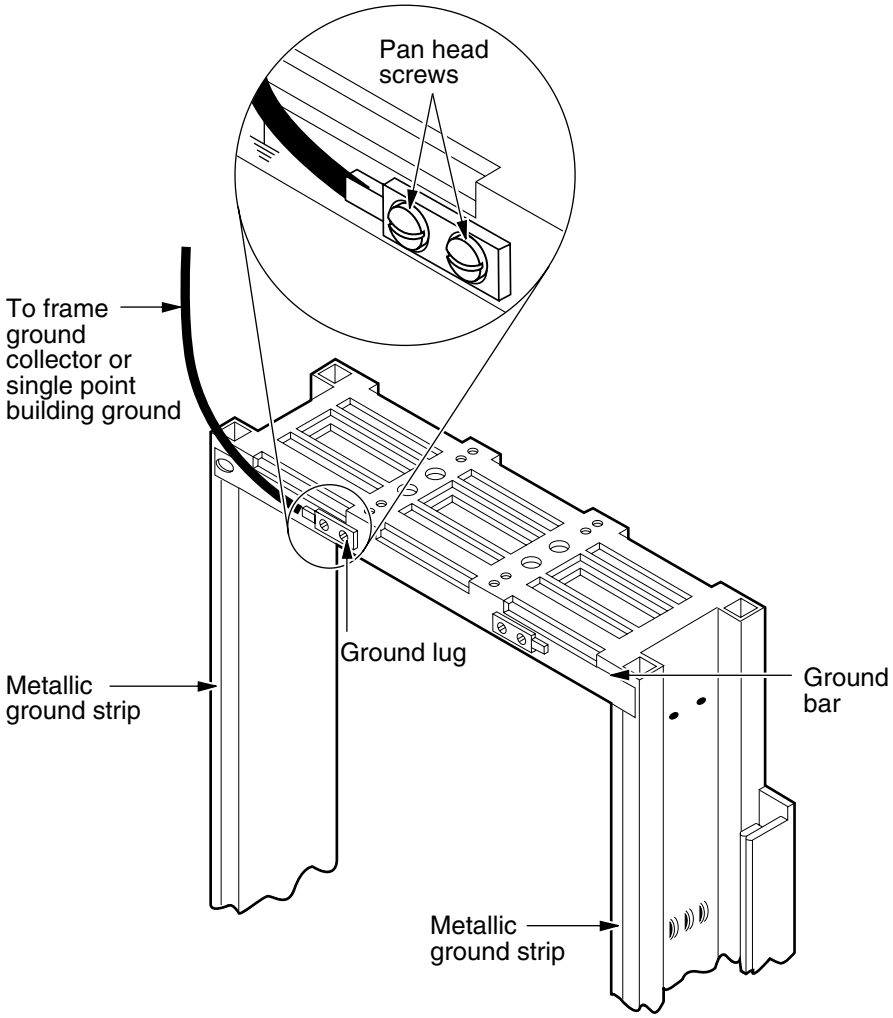


Figure 3-8
Connecting the ground wire to the rack system ground

F0174_R16-1



Installing Optical Metro 5200 shelves and equipment

Use the procedures in this chapter to install external components in an equipment rack, and Optical Metro 5200 shelves, with or without vertical fiber brackets, in

- 19-inch equipment racks with EIA wide, universal, or 25-mm hole spacing
- 23-inch equipment racks with EIA wide, universal, or 25-mm hole spacing
- 535-mm equipment racks or cabinets with ETSI 25-mm hole spacing

The procedures in this chapter assume that you are using a standard 7-ft equipment rack or cabinet.

Requirements

All tools and materials tables include a check box for you to ensure that you have all the required materials for an installation. Table 4-1 lists the tools and materials that you need to complete the procedures in this chapter.

Table 4-1
Tools and materials required to perform the procedures in this chapter

Item	Quantity	Supplied	√
Wrench	1	no	
Bolts for securing the base of the rack	4	no	
#2 Phillips screwdriver	1	no	
Phillips screws, flat head 6-32 x 1/4 in.	as required	yes	
Vertical fiber brackets	as required	yes	
Phillips screws PH 8-32 X 3/16 in.	as required	yes	
Phillips PH 10-32 X 3/4 in. mounting screws with clips	as required	yes	
Phillips PH 12-24 X 3/4 in. mounting screws with washers	as required	yes	
Phillips CH M5 X 20 mm mounting screws with washers	as required	yes	

Table 4-1 (continued)
Tools and materials required to perform the procedures in this chapter

Item	Quantity	Supplied	√
Phillips CH M6 X 20 mm mounting screws with washers and clips	as required	yes	
Mounting brackets • 1 set of 19/23 EIA mounting brackets • 1 set of ETSI mounting brackets	1 set of each	yes	
ETSI mounting brackets	2	yes	
9 ft, 14 AWG direct current power cable, with lugs at both ends (See Note 1 for ETSI equivalent)	2 pairs	no	
14 AWG ground wire, with lugs at both ends	1	no	
8 mm (5/16 in) slot screwdriver	1	no	
12.5 mm (1/2 in) slot screwdriver	1	no	
#1 Phillips screwdriver	1	no	
Mounting screws (for rectifier)	4	no	
10 AWG stranded copper wire	as required	no	
Wire strippers	1	no	
Wire crimping tool	1	no	
–48 V 10 AWG insulated stranded copper wire (See Note 2 for ETSI equivalent)	as required	no	
0 V 10 AWG insulated stranded copper wire (See Note 3 for ETSI equivalent)	as required	no	
Insulated barrel-type circular lugs	2	no	
Phillips #8 pan head screws 8-32 x 1/4-in.	4	yes	
Ring lug for 10 AWG	4	no	
Note 1: 2.74 m, 2.5 mm^2 cable ***Note 2:*** 6mm^2 –48 V double insulated ***Note 3:*** 6mm^2 0 V double insulated			

Precautions

CAUTION
Risk of equipment damage
Make sure you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

CAUTION
Risk of shelf malfunction
Nortel Networks recommends that you do not use cellular phones at any Optical Metro 5200 site. The use of cellular phones in proximity to Optical Metro 5200 equipment can cause shelf malfunction.

Before you begin

Before you begin the procedures in this chapter, make sure that you have

- determined your site requirements
- determined your equipment requirements

Procedure list

All procedure lists include a check box for you to keep track of where you are in an installation. Place a check mark in this column when you are performing the procedure. Table 4-2 lists the procedures in this chapter.

Table 4-2
Shelf installation procedures

Procedure	Page	Comments	√
4-1 Determining the shelf position in a rack or cabinet	4-7	Recommended. If you decide not to follow this procedure, you can determine shelf and equipment positions by measuring the correct spaces on the rack or cabinet. If you decide to measure the spaces, make sure that you measure from the bottom of the equipment rack or cabinet.	
4-2 Installing rack mounting brackets on a shelf	4-10	Required if you are installing a shelf in a 19-inch or 23-inch equipment rack.	
4-3 Installing vertical fiber brackets	4-19	Recommended for with any installation of Optical Metro 5200 shelves.	
4-4 Installing the NEBS shelf extension	4-23	Required only if your site must be NEBS compliant.	

Table 4-2 (continued)
Shelf installation procedures

Procedure	Page	Comments	√
4-5 Front-mounting or mid-mounting an Optical Metro 5200 shelf in a 19-inch, 23-inch, or 535-mm rack	4-26	If you are front-mounting a shelf in a 23-inch rack with vertical fiber brackets, you must complete Procedure 4-3 before completing Procedure 4-5. If you are mid-mounting a shelf with vertical fiber brackets in a 19-inch rack, see Procedure 4-3 first. If you are front-mounting a shelf in a 23-inch rack, perform Procedure 4-3 before completing Procedure 4-5. Do not perform this procedure if you are front-mounting a shelf with vertical fiber brackets in a 19-inch rack. Perform Procedure 4-6.	
4-6 Front-mounting an Optical Metro 5200 shelf in a 19-inch rack with vertical fiber brackets	4-30	Required for this installation in this rack size.	
4-7 Installing the optional air baffle on a shelf	4-33	Required only if you need to control the direction of the air exhaust.	
4-8 Connecting the ground wire to a shelf	4-36	Required.	
4-9 Installing a Breaker Interface Panel (BIP) - NTN458RA	4-40	Required.	
4-10 Installing a 3U APRS rectifier	4-45	Required for sites without a source of direct current power.	
4-11 Installing an Ethernet hub	4-50	Required for all sites with more than two shelves.	
4-12 Installing an Optical Trunk Switch	4-54	Optional. Provides protection for unamplified point-to-point networks.	
4-13 Installing an Enhanced Trunk Switch shelf	4-58	Required when using an Enhanced Trunk Switch.	
4-14 Installing an OMX (Standard) tray	4-68	Optional.	

Table 4-2 (continued)
Shelf installation procedures

Procedure	Page	Comments	√
4-15 Installing and grounding equipment drawers	4-77	Required to mount the following equipment in a rack: • patch panel 16 port (NT0H43CA) • patch panel 20 port (NT0H43CB) • OMX 4CH + Fiber Manager (NT0H32xE) • OMX 4CH Enhanced (NT0H32xF) • OMX 16CH DWDM (NT0H32JA/KA) • OMX 1CH CWDM (NT0H33xB) • OMX 4CH CWDM (NT0H77xA) • OMX 4CH CWDM with dual taps (NT0H33JB/KB) • OMX 4CH ITU CWDM (NTPM33AA) • OMX 8CH ITU CWDM (NTPM33BA) • OMX 1CH OADM ITU CWDM (NTPM34xB) • OMX 4CH OADM ITU CWDM (NTPM34JA/KA) • OSC splitter/coupler tray (NT0H57DA/FA) • OSC splitter/coupler tray assembly with dual taps (NT0H57GB/GC) • C&L splitter/coupler drawer (NT0H31AF) • 1310 nm splitter/coupler drawer (NT0H57JB) • Per Band Equalizer (NT0H31Bx) • Transponder Protection Tray single- mode (NT0H59Ax) • Transponder Protection Tray multimode (NT0H59Bx) • Fiber Manager (NT0H57BB) • VOA drawer with one tray (two VOAs) (NT0H31AH) • VOA drawer with two trays (four VOAs) (NT0H31AJ) • DSCM drawer (NT0H57LA) • Dual filter drawer (NT0H57BA)	
4-16 Installing and grounding Equipment Inventory Unit (NT0H43HA)	4-96	Required to mount the Equipment Inventory Unit in an equipment rack or cabinet.	
4-17 Installing and grounding a second ECT drawer in an OFA shelf	4-104	Optional.	
4-18 Installing and grounding a second OMX drawer in an OADM shelf	4-109	Optional (but highly recommended if you already installed one OMX [Standard] drawer).	
4-19 Installing an ECT tray in a drawer	4-114	Optional.	

Table 4-2 (continued)
Shelf installation procedures

Procedure	Page	Comments	√
4-20 Installing a DSCM tray in a DSCM drawer	4-120	Required to install a DSCM tray in a DSCM drawer	
4-21 Installing optical trays in a drawer	4-123	Required to install: • OMX 1CH CWDM (NT0H33AA-HA) • OMX 1CH OADM ITU CWDM (NTPM34AA-HA) • OSC splitter/coupler tray (NT0H57CA/EA) • OSC splitter/coupler tray with dual taps (NT0H57GA) • C&L Dual Splitter/Coupler (NT0H31AE) • 1310 nm Splitter/Coupler (NT0H57JA) • VOA tray (two VOAs) (NT0H31AG)	
4-22 Installing or removing the shelf cover	4-126	Optional.	

Procedure 4-1
Determining the shelf position in a rack or cabinet

Follow this procedure to determine shelf and equipment positions in an equipment rack or cabinet. When you complete this procedure, the mounting screws are partially (half-way) inserted in the correct holes of the rack or cabinet rails. This allows you to hang the shelves in the correct position during shelf installation.

For additional information on acceptable shelf and equipment position, refer to "Site requirements and equipping rules" in *Network Planning and Link Engineering*, 323-1701-110. For more information on installation equipment, see "Optical Metro 5100/5200 shelf installation kit" in *Hardware Description*, 323-1701-102.

Requirements

Before you begin, make sure that the equipment rack has been installed (see the chapter "Installing a rack (19-inch or 23-inch)").

Table 4-3 lists the tools and materials required for determining shelf positions.

Table 4-3
Tools and materials for determining shelf positions

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
Vertical fiber brackets	2	yes	
Phillips screws PH 8-32 X 3/16 in.	10	yes	
Measuring tape	1	no	

—continued—

Procedure 4-1 (continued)
Determining the shelf position in a rack or cabinet

Action

Step	Action
1	Start at the bottom of the empty equipment rack and measure the desired shelf locations using a tape measure.
2	Use the vertical fiber brackets (supplied in the Optical Metro 5200 installation kit) as a template to find the correct mounting holes on the rack or cabinet rail. See Figure 4-1 on page 4-9.
3	Line up the keyhole slots of the vertical fiber brackets with the holes in the rack or cabinet rail. ***Note 1:*** The top and bottom pair of keyholes line up with holes in a 19-inch or 23-inch rack with EIA wide or universal hole spacing. The inside pair of keyholes line up with holes in a 19-inch, 23-inch, or 535-mm (ETSI) rack or cabinet with 25-mm hole spacing. The holes on the vertical fiber bracket are the same as the holes on the 19/23 mounting bracket. See Figure 4-1 on page 4-9. ***Note 2:*** The 535-mm (ETSI) bracket (not shown) only has holes for 25-mm hole spacing.
4	Insert one mounting screw through the keyhole into the rack or cabinet using the vertical fiber bracket as a guide. Turn the screw half way into the rack or cabinet rail. Make sure there is a gap between the screw head and the bracket. See Figure 4-2 on page 4-9. ***Note:*** If the mounting screw does not have an attached washer, take a lock washer from the installation kit, and position it between the rack rail and the head of the screw.
5	Let the bracket rest on the screw you inserted. Verify that the correct hole of the top pair of holes on the bracket line up with a hole in the rail.
6	Line up a second bracket on the opposite rail. Repeat step 3 through step 5 to align the brackets on both rails. If necessary, remove the screws of one bracket and adjust the position of the bracket.
7	If you have no more shelves to measure positions for, lift the brackets over the screws and remove the brackets. Leave the screws in position on the rails.
8	If you are installing another shelf in the rack or cabinet, repeat step 2 to step 6. ***Note:*** If you are installing a second shelf that is not a NEBS extension shelf on top of a NT0H50BA shelf, Nortel Networks recommends that you leave 1U of space above the NT0H50BA shelf.

—end—

Figure 4-1
Hole spacing on vertical fiber brackets and 19/23 mounting brackets

OM0275t0

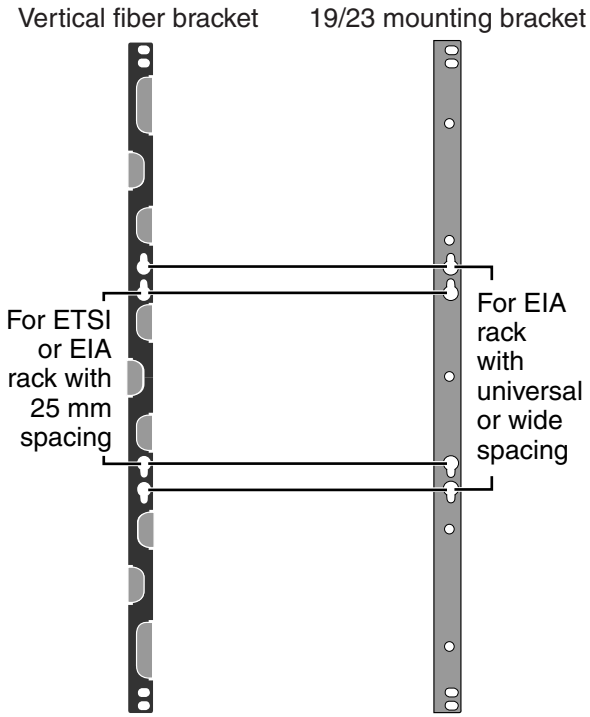
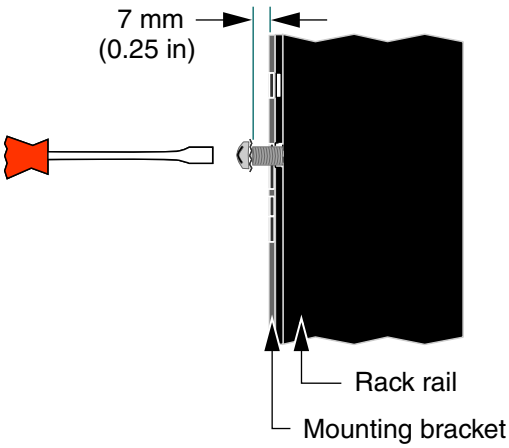


Figure 4-2
Installing screws in the keyholes of the mounting brackets

OM0112t



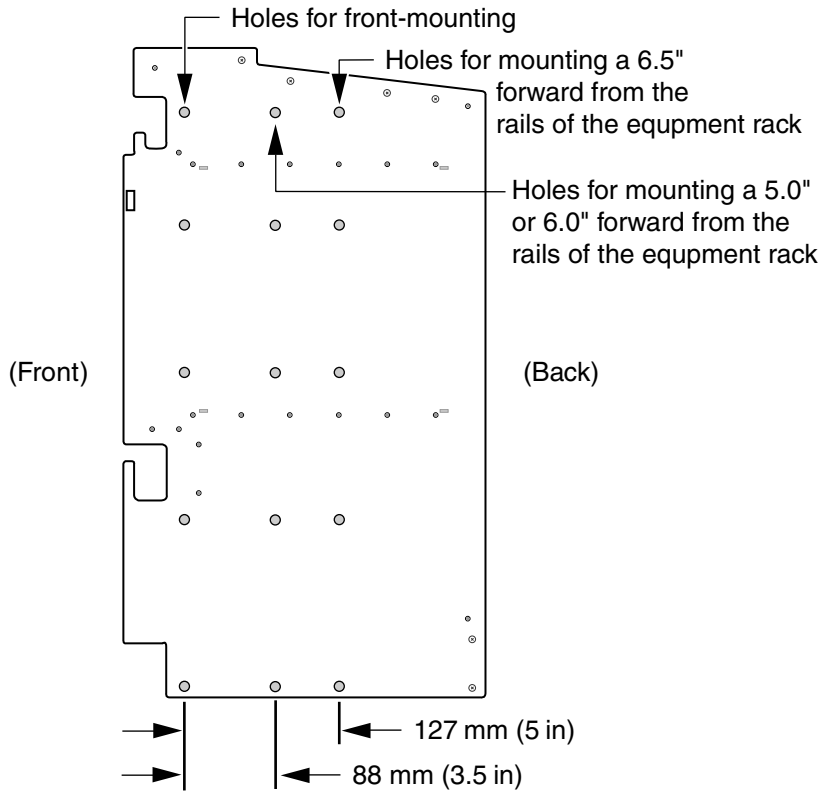
Procedure 4-2
Installing rack mounting brackets on a shelf

Follow this procedure to install mounting brackets on a shelf. You must attach the mounting brackets to the shelf before you can front-mount or mid-mount the shelf in a 19-inch, 23-inch, or ETSI equipment rack. The Optical Metro 5200 shelf has three sets of holes on both sides to attach the mounting brackets for front-mounting and mid-mounting configurations. See Figure 4-3 for mounting positions. For more information on installation equipment, see "Optical Metro 5100/5200 shelf installation kit" in *Hardware Description*, 323-1701-102.

When you complete this procedure, the correct mounting brackets for your equipment rack are installed on the shelf for front-mounting or mid-mounting. Follow Procedure 4-3 if you want to front-mount a shelf in a 23-inch rack, with vertical fiber brackets. Follow Procedure 4-5 if you want to mid-mount a shelf in a 19-inch or 23-inch rack, with or without vertical fiber brackets, or if you want to front-mount a shelf in a 23-inch rack, without vertical fibers.

Figure 4-3
Front-mounting and mid-mounting holes on the side of a shelf

OM0159t



—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

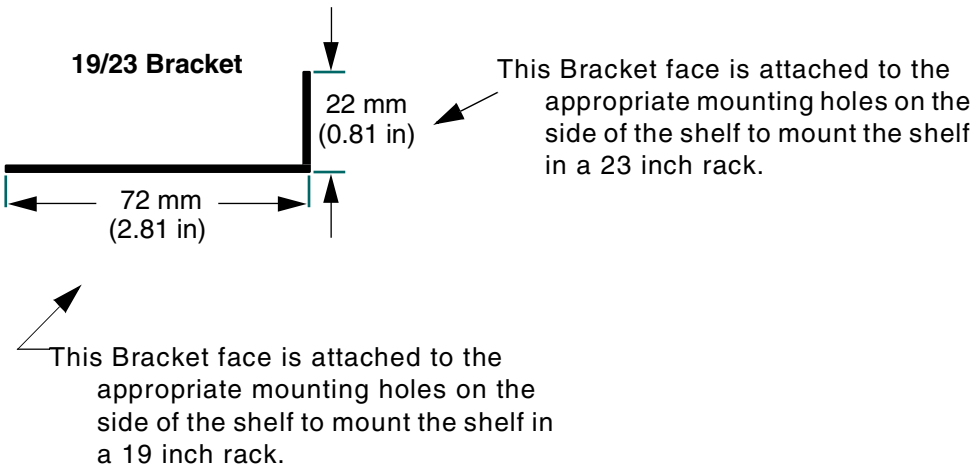
The Optical Metro 5200 shelf is shipped with one set of 19/23 rack mounting brackets. Figure 4-4 shows a cross section of a 19/23 mounting bracket. The 19/23 mounting brackets can be used to install Optical Metro 5200 shelves in racks with EIA wide, universal, or 25-mm hole spacings on the rack rails.

The mounting brackets must be attached for the proper configuration (see Figure 4-5):

- The shelf is shipped with the 19/23 mounting brackets installed in position for front-mounting the shelf in a 19-inch rack.
- To front-mount or mid-mount a shelf in a 23-inch rack, remove the installed 19/23 brackets and attach them with the narrower face aligned with the appropriate holes of the shelf.
- To front-mount or mid-mount a shelf in a ETSI rack, remove the installed 19/23 brackets and attach the ETSI mounting brackets.
- To mid-mount a shelf in a 19-inch rack, remove the installed brackets and install them in the mid-mounting holes on the shelf.

Figure 4-4
Cross section of a 19/23 mounting bracket

OM0137t

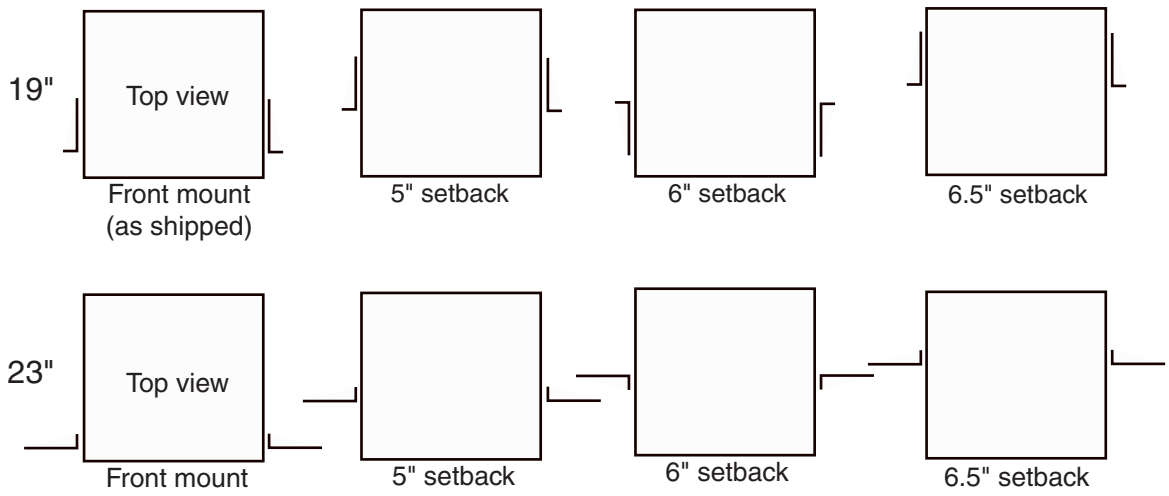


—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

Figure 4-5
Mounting bracket orientation (19” and 23” rack - top view)

OM2130p



Requirements

Table 4-4 lists the tools and materials required to install mounting brackets on an Optical Metro 5200 shelf for installation in a standard 19-inch or 23-inch equipment rack.

Table 4-4
Tools and materials for installing mounting brackets

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
19/23 mounting bracket (for a 23-inch rack)	2	yes	
ESTI mounting brackets	2	yes	
Phillips screws PH 8-32 X 3/16 in.	10	yes	
Torque wrench	1	no	

—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

Precaution

CAUTION
Risk of equipment damage
Use only the screws that were supplied with the shelf to attach the mounting brackets to the chassis of the shelf. Longer screws can cause damage to the circuit packs in the shelf.

ATTENTION
The shelf is shipped with the 19/23 mounting brackets installed in position for front-mounting the shelf in a 19-inch rack.

ATTENTION
You can front-mount or mid-mount a shelf in a 535-mm rack, but you must front-mount a shelf in a 535-mm cabinet.

ATTENTION
You must attach the vertical fiber brackets to the ETSI mounting brackets before you attach the ETSI mounting brackets to the shelf.

—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

Action

Step	Action
1	Make sure the Optical Metro 5200 shelf is on a flat, stable surface.

If you are	**Then**
front-mounting in a 19-inch rack	you have completed this procedure because the mounting brackets are already attached. ***Note:*** If you want to front-mount in a 19 in. rack with vertical fiber brackets, follow Procedure 4-6.
mid-mounting in a 19-inch rack	remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf and go to step 2.
mid-mounting in a 23-inch rack	remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf and go to step 3.
front-mounting in a 23-inch rack	remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf and go to step 4.
mid-mounting in a 535-mm rack	remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf and go to step 5.
front-mounting in a 535-mm rack	remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf and go to step 6.

2 For mid-mounting on a 19-inch rack,

a. line up the 2.81 in. (72 mm) face of the 19/23 bracket in the appropriate mid-mounting holes (see Figure 4-5) on one side of the shelf. See Figure 4-6 on page 4-16.

b. hold the bracket in position against the side of the shelf. Insert the screws (PH 8-32 X 3/16 in.) in the top and bottom holes and tighten the screws to a torque value of 18 in-lb. See Figure 4-3 on page 4-10.

c. Insert and tighten the three remaining screws (PH 8-32 X 3/16 in.) into the bracket to a torque value of 18 in-lb.

d. Repeat substeps a. through c. for the opposite side.

You have completed this procedure.

—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

Step	Action
3	For mid-mounting on a 23-inch rack, **a.** Line up the 0.81 in. (22 mm) face of a 19/23 mounting bracket in the appropriate mid-mounting holes (see Figure 4-5) on one side of the shelf. **b.** Hold the bracket in position against the side of the shelf. Insert the screws (PH 8-32 X 3/16 in.) in the top and bottom holes and tighten the screws to a torque value of 18 in-lb. See Figure 4-3 on page 4-10. **c.** Insert and tighten the three remaining screws (PH 8-32 X 3/16 in.) into the bracket to a torque value of 18 in-lb. **d.** Repeat substeps a. through c. for the opposite side. *You have completed this procedure.*
4	For front-mounting on a 23-inch rack, **a.** Line up the 0.81 in. (22 mm) face of the 19/23 bracket in the front-mounting holes (see Figure 4-5) on one side of the shelf. See Figure 4-7 on page 4-17. **b.** Hold the bracket in position against the side of the shelf. Insert the screws (PH 8-32 X 3/16 in.) in the top and bottom holes and tighten the screws to a torque value of 18 in-lb. See Figure 4-3 on page 4-10. **c.** Insert and tighten the three remaining screws (PH 8-32 X 3/16 in.) into the bracket to a torque value of 18 in-lb. **d.** Repeat substeps a. through c. for the opposite side. *You have completed this procedure.*
5	For mid-mounting in a 535-mm rack, ***Note:*** You must attach the vertical fiber brackets to the ETSI mounting brackets before you attach the ETSI mounting brackets to the shelf. See Procedure 4-3 “Installing vertical fiber brackets” on page 4-19. **a.** Line up the face of the ETSI bracket in the mid-mounting holes on one side of the shelf so that the vertical fiber bracket faces you. **b.** Hold the bracket in position against the side of the shelf. Insert the screws (PH 8-32 X 3/16 in.) in the top and bottom holes and tighten the screws to a torque value of 18 in-lb. See Figure 4-3 on page 4-10. **c.** Insert and tighten the three remaining screws (PH 8-32 X 3/16 in.) into the bracket to a torque value of 18 in-lb. **d.** Repeat substeps a. through c. for the opposite side. *You have completed this procedure.*

—continued—

Procedure 4-2 (continued)
Installing rack mounting brackets on a shelf

Step	Action
6	For front-mounting in a 535-mm rack, ***Note:*** You must attach the vertical fiber brackets to the ETSI mounting brackets before you attach the ETSI mounting brackets to the shelf. See Procedure 4-3 “Installing vertical fiber brackets” on page 4-19. **a.** Line up the face of the ETSI bracket in the front-mounting holes on one side of the shelf so that the vertical fiber bracket faces you. See Figure 4-8 on page 4-18. **b.** Hold the bracket in position against the side of the shelf. Insert the screws (PH 8-32 X 3/16 in.) in the top and bottom holes and tighten the screws to a torque value of 18 in-lb. See Figure 4-3 on page 4-10. **c.** Insert and tighten the three remaining screws (PH 8-32 X 3/16 in.) into the bracket to a torque value of 18 in-lb. **d.** Repeat substeps a. through c. for the opposite side. *You have completed this procedure.* **—end—**

Figure 4-6
Installing the mounting brackets on a shelf for mid-mounting (19-inch rack example)

OM0133t

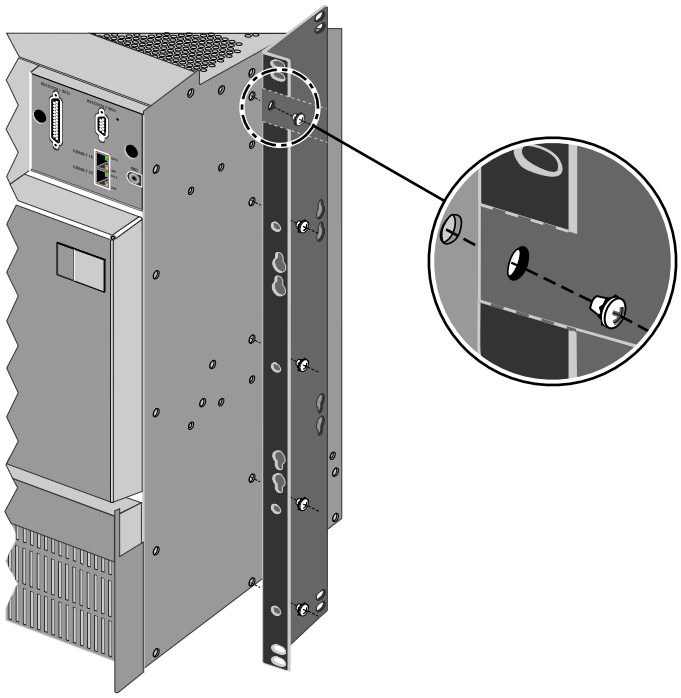


Figure 4-7
Installing the mounting brackets on the shelf (23-inch rack example)

OM0135t

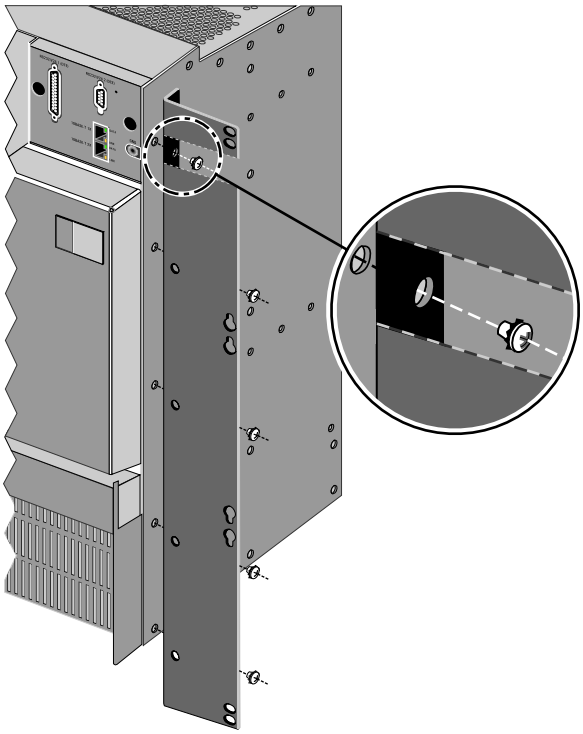
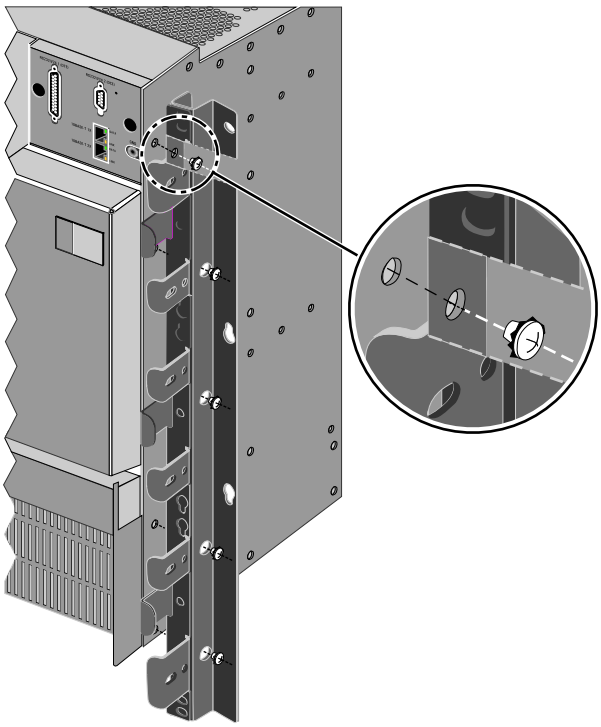


Figure 4-8
Installing the ETSI mounting brackets on a shelf (vertical fiber bracket example)

OM0254t



Procedure 4-3
Installing vertical fiber brackets

Follow this procedure to attach vertical fiber brackets to the mounting brackets that you attached to the shelf in Procedure 4-2.

Follow Procedure 4-5 to mount the shelf in the rack. Follow Procedure 4-6 to front-mount a shelf with vertical fiber brackets in a 19 in. rack.

For more information on installation equipment, see "Optical Metro 5100/5200 shelf installation kit" in *Hardware Description*, 323-1701-102.

Requirements

Before you begin, the equipment rack should be installed (see the chapter "Installing a rack (19-inch or 23-inch)").

Table 4-5 lists the tools and materials required to install the vertical fiber brackets.

Table 4-5
Tools and materials for installing vertical fiber brackets

Item	Quantity	Supplied	√
Vertical fiber brackets	2	yes	
ETSI mounting brackets	2	yes	
#2 Phillips screwdriver	1	no	
Phillips screws 8-32 X 3/16 in.	6	yes	

Precautions

ATTENTION
You must attach the vertical fiber brackets to the ETSI mounting brackets before you attach the ETSI mounting brackets to the shelf.

—continued—

Procedure 4-3 (continued)
Installing vertical fiber brackets

Action

Step	Action	
1	**If** you are installing vertical fiber brackets for a	**Then**
	23 in. front and mid mount	follow step 2 through step 7
	19 in. front and mid mount	follow Procedure 4-6 “Front-mounting an Optical Metro 5200 shelf in a 19-inch rack with vertical fiber brackets”
	ETSI	follow step 2 through step 7
2	Line up a vertical fiber bracket with the holes in mounting bracket that are closest to the shelf on one side of the shelf. ***Note:*** If you are mounting the shelf in an ETSI rack, you must attach the vertical fiber brackets to the ETSI mounting brackets before you attach the ETSI mounting brackets to the shelf. See Figure 4-10 on page 4-21 for ETSI mounting brackets.	
3	Attach the vertical fiber brackets to the mounting brackets through the screw holes nearest to the sides of the shelf. See Figure 4-9 on page 4-21. The vertical fiber bracket must be installed with the bottom guide on the outside of the shelf to allow for proper fibering of the shelf. See Figure 4-11 on page 4-22.	
4	Insert the top screw through the back of the mounting bracket through the vertical fiber bracket and tighten to a torque value of 18 in-lb.	
5	Insert the bottom screw through the back of the mounting bracket through the vertical fiber bracket and tighten to a torque value of 18 in-lb.	
6	Insert the remaining screws through the back of the mounting bracket through the vertical fiber bracket and tighten to a torque value of 18 in-lb.	
7	Repeat step 2 through step 6 to attach the second vertical fiber bracket to the other side of the shelf.	

—end—

Figure 4-9
Installing vertical fiber brackets on a front-mounted shelf (23-inch rack)

OM0136t

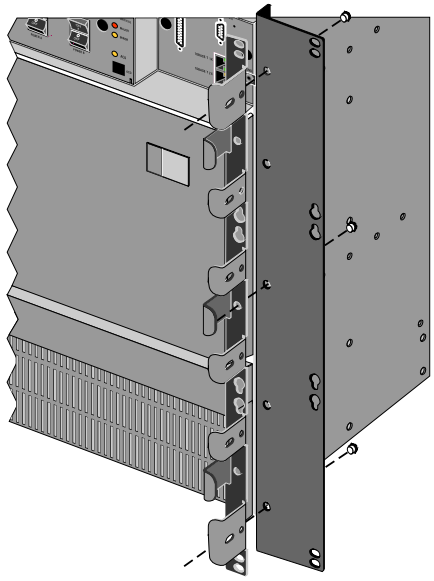


Figure 4-10
Attaching vertical fiber brackets to ETSI mounting brackets

OM253t

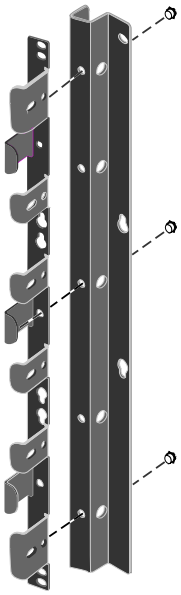
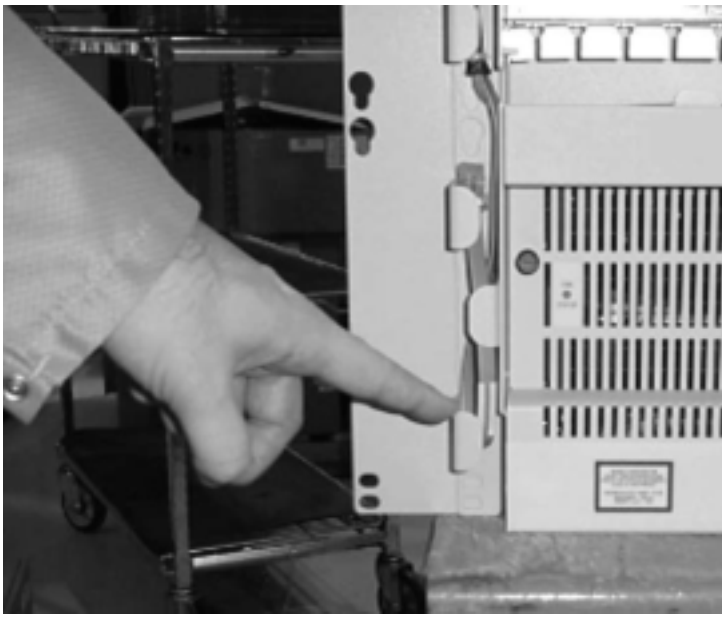


Figure 4-11
Installed vertical fiber brackets

OM2131t.jpg



Procedure 4-4
Installing the NEBS shelf extension

Use this procedure to install the NEBS shelf extension (NT0H44AF).

For more information see "Optical Metro 5200 shelves" in *Hardware Description*, 323-1701-102.

Requirements

Complete this procedure before you install Optical Metro 5200 shelves in an equipment rack. Table 4-6 lists the tools and materials required to install the NEBS shelf extension (NT0H44AF).

Table 4-6
Tools and materials for installing the NEBS shelf extension

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
Phillips screws, flat head 6-32 x 1/4 in.	2	yes	

Action

Step	Action
1	Place the shelf extension on top of the shelf with the shelf extension grill facing towards the front of the shelf. Insert the shelf extension tabs into the shelf slots, labeled 1 in Figure 4-13 on page 4-24. ***Note:*** The top of the shelf has slots on both sides. The bottom of the shelf extension has tabs on both sides, as shown in Figure 4-12 on page 4-24.
2	Push the shelf extension towards the front of the shelf until the back of the shelf extension lines up with the back of the shelf, labeled 2 in Figure 4-13 on page 4-24.
3	Insert and tighten one screw (flat head 6-32 x 1/4 in.), as shown in Figure 4-14 on page 4-25, to a torque value of 10 in-lb. Insert and tighten the second screw in the same hole on the other side of the shelf.

CAUTION
Risk of equipment damage
Do not exceed 10 inch-pounds of torque when tightening the screws.

—end—

Figure 4-12
NEBS shelf extension tab

OM0265p

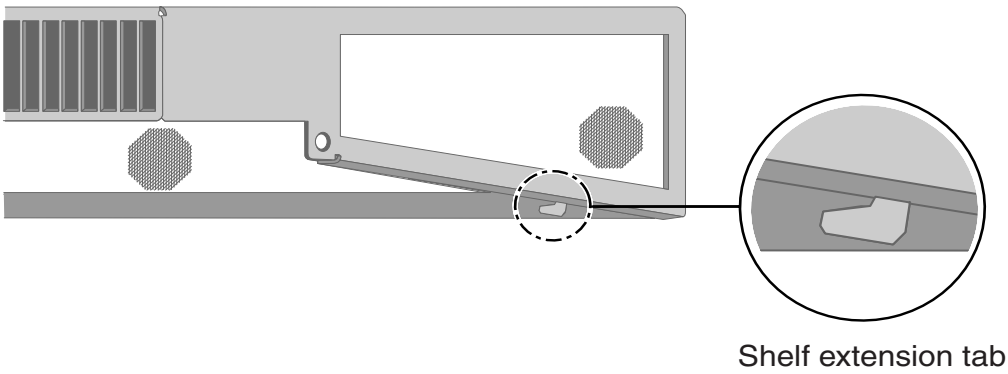


Figure 4-13
Positioning the shelf extension

OM0266

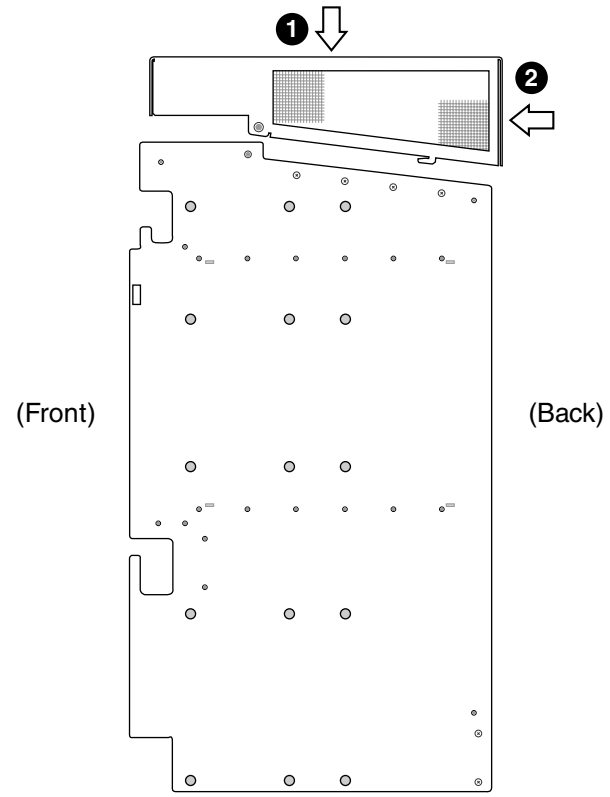
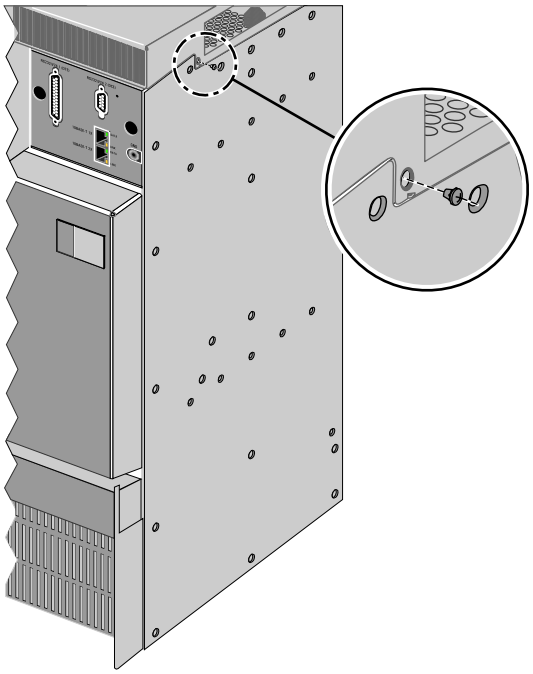


Figure 4-14
Securing the shelf extension

OM0267t



Procedure 4-5
Front-mounting or mid-mounting an Optical Metro 5200 shelf in a 19-inch, 23-inch, or 535-mm rack

Follow this procedure to install an Optical Metro 5200 in one of the following configurations:

- front-mount a shelf in a 19-inch rack without vertical fiber brackets
- mid-mount a shelf in a 19-inch rack
- front-mount or mid-mount a shelf in a 23-inch rack
- front-mount a shelf in a 535-mm rack or cabinet

  Note: If you want to front-mount the shelf with vertical fiber brackets in a 19-inch rack, follow Procedure 4-6.

When you complete this procedure

- front-mounted shelves are offset 38 mm (1.5 in.) forward from the rails of the equipment rack
- mid-mounted shelves are offset either 5.0 inches, 6.0 inches, or 6.5 inches, forward from the rails of the equipment rack

For more information on installation equipment, see "Optical Metro 5100/5200 shelf installation kit" in *Hardware Description*, 323-1701-102.

—continued—

Procedure 4-5 (continued)
Front-mounting or mid-mounting an Optical Metro 5200 shelf in a 19-inch, 23-inch, or 535-mm rack

Requirements

Table 4-7 lists the tools and materials required to mount a shelf in one of the installations listed above. Select the mounting screws that are compatible with the rack that you are using. Clips are included for racks that have mounting holes that are not threaded. See Figure 4-3 on page 4-10.

Table 4-7
Tools and materials for mounting a shelf with or without vertical fiber brackets

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
Phillips PH 10-32 X 3/4 in. mounting screws with clips	8	yes	
Phillips PH 12-24 X 3/4 in. mounting screws with washers	8	yes	
Phillips CH M5 X 20 mm mounting screws with washers	8	yes	
Phillips CH M6 X 20 mm mounting screws with washers and clips	8	yes	

The torque required for attaching the screws from Table 4-7 are listed in Table 4-8.

Table 4-8
Torque values

Item	Torque
#10-32 x 3/4-inch Phillips Head machine screws	24 in-lb.
#12-24 x 1/2-inch Hex Head thread forming screws	32 in-lb.
M5 x 20mm machine screws	30 in-lb.
M6 x 20mm machine screws	45 in-lb.

—continued—

Procedure 4-5 (continued)
Front-mounting or mid-mounting an Optical Metro 5200 shelf in a 19-inch, 23-inch, or 535-mm rack

Precautions

DANGER
Risk of personal injury
Nortel Networks recommends that two people lift each Optical Metro 5200 shelf. If you try to lift the shelf alone you can cause personal injury, damage to the shelf, or both.

ATTENTION
If you are installing more than one shelf in an equipment rack, mount the lower shelf first. When you start at the bottom, you ensure that there is enough room to lift the keyholes on the shelf over the mounting screws.

ATTENTION
If you are installing a second shelf on top of a NT0H50BA shelf, Nortel Networks recommends that you leave 1U of space above the NT0H50BA shelf.

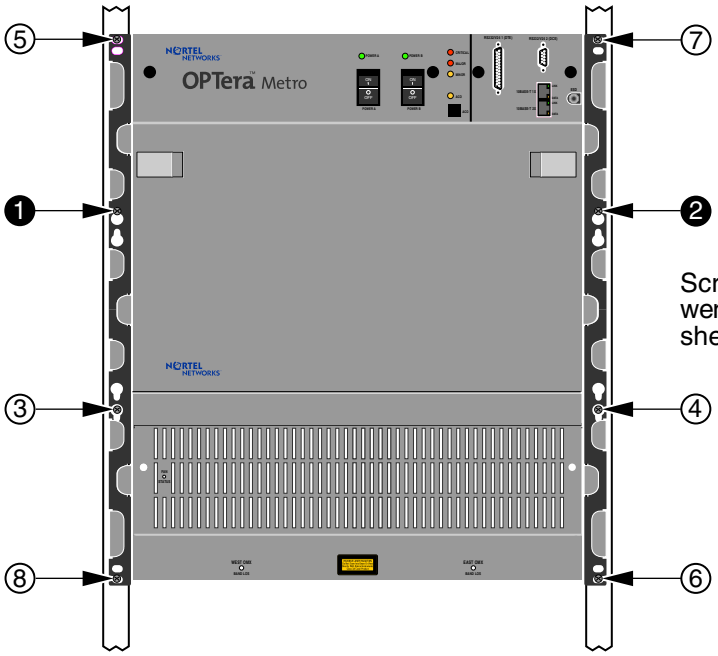
Action

Step	Action
1	To position the shelf, locate the two screws you attached to the rails of the rack or cabinet in Procedure 4-1.
2	Lift the shelf into position so that the keyholes of the mounting brackets line up with the screws.
3	Lower the shelf into position over the screw heads and hold it against the rack rails at the bottom of the shelf.
4	Insert the remaining screws (3 to 8) in order. Insert the screws through the holes in the mounting brackets that line up with holes in the rack rails. See Figure 4-15 on page 4-29. ***Note:*** If the mounting screw does not have an attached washer, take a lock washer from the installation kit, and position it between the rack rail and the head of the screw.
5	Tighten all the screws. For torque values, see Table 4-8 on page 4-27.

—end—

Figure 4-15
Order of installing the mounting screws

OM0244p



Procedure 4-6
Front-mounting an Optical Metro 5200 shelf in a 19-inch rack with vertical fiber brackets

Follow this procedure to front-mount an Optical Metro 5200 shelf with vertical fiber brackets in a 19-inch equipment rack.

> ***Note:*** If you want to mid-mount the shelf in a 19-inch rack with vertical fiber brackets, follow Procedure 4-5.

For more information on installation equipment, see "Optical Metro 5100/5200 shelf installation kit" in *Hardware Description*, 323-1701-102.

Requirements

Table 4-9 lists the tools and materials required for front-mounting a shelf with vertical fiber brackets in a 19-inch equipment rack.

Table 4-9
Tools and materials for front-mounting a 19-in. shelf with vertical fiber brackets

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
Vertical fiber brackets	2	yes	
Phillips PH 10-32 X 3/4 in. mounting screws with clips	8	yes	
Phillips PH 12-24 X 3/4 in. mounting screws with washers	8	yes	
Phillips CH M5 X 20 mm mounting screws with washers	8	yes	
Phillips CH M6 X 20 mm mounting screws with washers and clips	8	yes	

The torque required for attaching the screws from Table 4-9 are listed in Table 4-10.

Table 4-10
Torque values

Item	Torque
#10-32 x 3/4-inch Phillips Head machine screws	24 in-lb.
#12-24 x 1/2-inch Hex Head thread forming screws	32 in-lb.
M5 x 20mm machine screws	30 in-lb.
M6 x 20mm machine screws	45 in-lb.

—continued—

Procedure 4-6 (continued)
Front-mounting an Optical Metro 5200 shelf in a 19-inch rack with vertical fiber brackets

Precautions

DANGER
Risk of personal injury
Nortel Networks recommends that two people lift each Optical Metro 5200 shelf. If you try to lift the shelf alone you can cause personal injury, damage to the shelf, or both.

ATTENTION
If you are installing more than one shelf in an equipment rack, mount the lower shelf first. By starting at the bottom, you ensure that there is enough room to lift the keyholes on the shelf over the mounting screws.

ATTENTION
If you are installing a second shelf on top of a NT0H50BA or a NT0H50BB shelf, Nortel Networks recommends that you leave 1U of space above the NT0H50BA or NT0H50BB shelf.

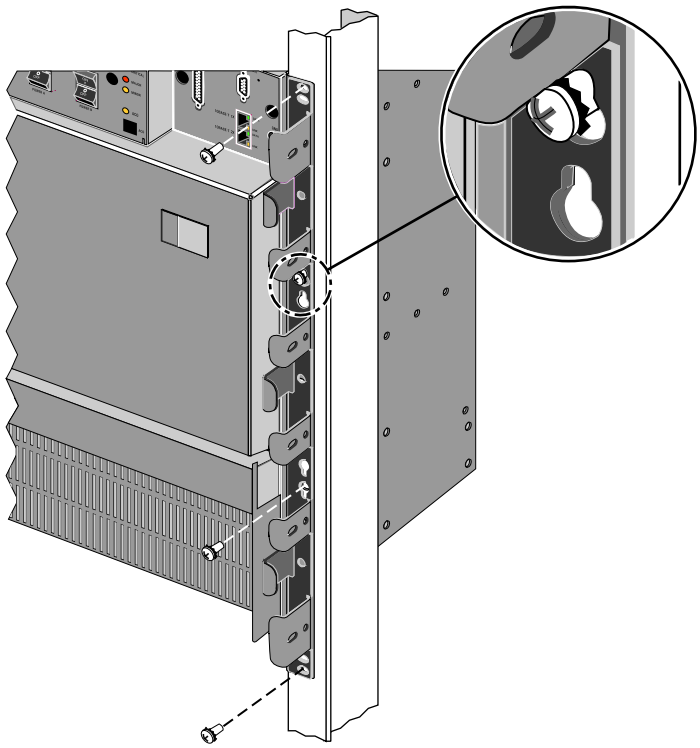
Action

Step	Action
1	To position the shelf, locate the two screws you attached to the rails of the rack or cabinet in Procedure 4-1.
2	Lift the shelf into position so that the keyholes of the mounting brackets line up with the screws.
3	Lower the shelf into position over the screw heads and hold it against the rack rails at the bottom of the shelf.
4	While holding the shelf in position, lower the vertical fiber brackets into position over the screw heads on each side of the rack. Make sure the vertical fiber brackets line up with the mounting brackets. The vertical fiber bracket must be installed with the bottom guide on the outside of the shelf to allow for proper fibering of the shelf. See Figure 4-16 on page 4-32.
5	Insert the remaining screws (3 through 8) in order, through the holes in the vertical fiber brackets that line up with holes in the rack rails. See Figure 4-15 on page 4-29. ***Note:*** If the mounting screw does not have an attached washer, take a lock washer from the installation kit, and position it between the rack rail and the head of the screw.
6	Tighten all the screws. For torque values, see Table 4-10 on page 4-30.

—end—

Figure 4-16
Vertical fiber bracket position in a 19-inch installation

OM0102t



Procedure 4-7
Installing the optional air baffle on a shelf

Use this procedure to install air baffle (NT0H51CA) on a shelf.

The air baffle consists of a blocking plate and an air exhaust deflector. The positioning of the blocking plate on either the front or the back of the deflector determines the exhausted airflow direction. (See Figure 4-17 for an example of rear air flow.) Without the air baffle, the air exhausts to the rear and sides of the Optical Metro 5200 shelf at the top.

The use of the air baffle is always optional on the NT0H50BB shelf. Use the air baffle only when the direction of the air exhaust is a concern. If the exhaust direction (rear and sides) of the shelf is acceptable, the air baffle is not required.

> ***Note:*** On the NT0H50BB shelf, the NEBS extension is never required, because the NT0H50BB shelf contains its own flame spread control method.

The air baffle is also optional on the NT0H50BA shelf. Use the air baffle when NEBS flame compliance is not required, but when there is a need to control the air exhaust direction. When there is a need to have NEBS flame spread compliance, the NEBS extension shelf required. However, it is not possible to install both the NEBS extension shelf and the air baffle on the same shelf.

Requirements

Determine whether the air is to be exhausted through the front or the back of the baffle.

You need a No. 2 Phillips screwdriver to perform this procedure.

Action

Step	Action
1	Based on your air exhaust requirement, select an option:

If air needs to be exhausted through the	**Then** position the blocking plate on the
front of the air exhaust deflector	rear side of the air exhaust deflector
rear of the air exhaust deflector	front side of the air exhaust deflector

Figure 4-17 shows how to position the blocking plate for rear air exhaust.

—continued—

Procedure 4-7 (continued)
Installing the optional air baffle on a shelf

Step	Action
2	Use four of the six screws provided to attach the blocking plate to the air exhaust deflector.
3	Hook the air baffle on top of the shelf (see Figure 4-18 for the location of the hooks).
4	Use the remaining two screws to secure the air baffle to the shelf (see Figure 4-18 for the location of the screws).

—end—

Figure 4-17
Air exhaust deflector and blocking plate (rear exhaust)

OM2570p

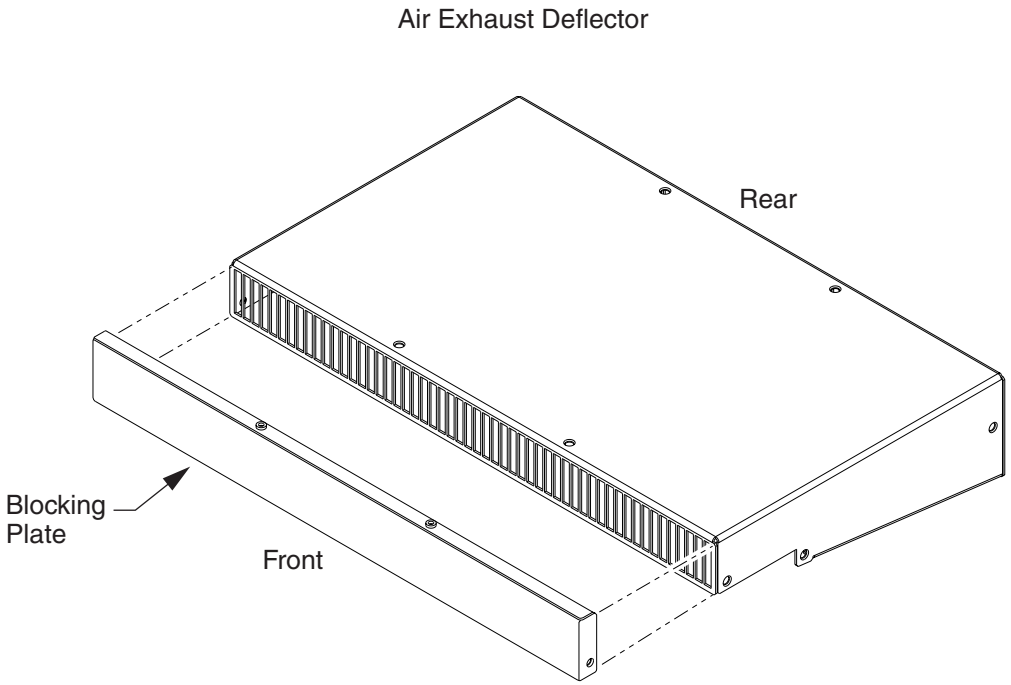
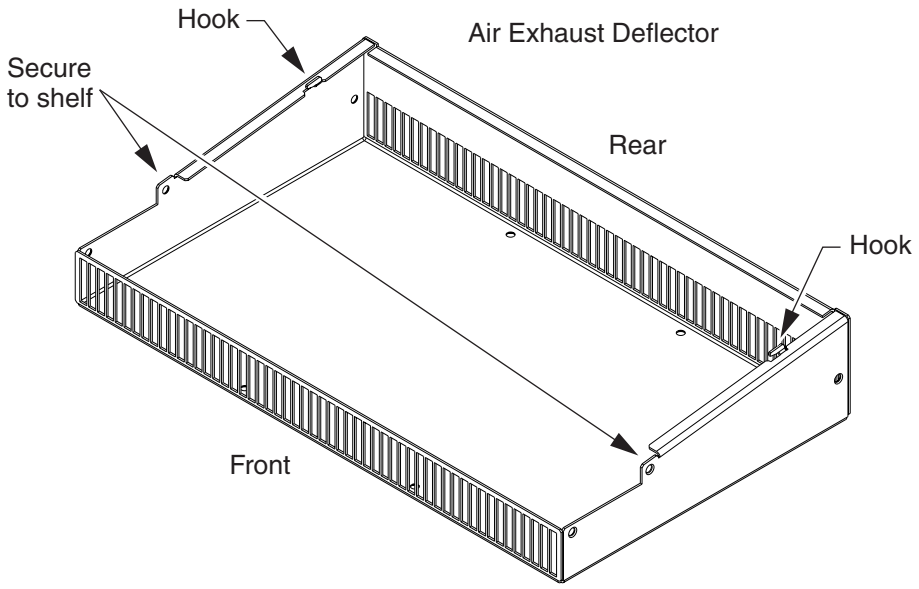


Figure 4-18
Location of hooks and screws

OM2571p



Procedure 4-8
Connecting the ground wire to a shelf

Follow this procedure to connect a ground wire from the Optical Metro 5200 chassis to a ground point. You must connect a ground wire to ensure correct electrical ground and electrostatic discharge (ESD) protection.

For more information on the Optical Metro 5200 shelf, see *Hardware Description*, 323-1701-102.

Requirements

There is a choice of 6 AWG or 10 AWG grounding wire. Determine what type of grounding wire you require before beginning this procedure

Requirements

Table 4-11 lists the tools and materials you need to connect a ground wire to a shelf.

Table 4-11
Tools and materials for connecting a ground wire to a shelf

Item	Quantity	Supplied	√
#2 slot screwdriver	1	no	
#2 Phillips screwdriver	1	no	
Torque screwdriver			
Wire strippers	1	no	
6AWG stranded copper wire	24 inches (61 cm)	yes	
10 AWG stranded copper wire	24 inches (61 cm)	yes	
#6 AWG two hole compression lug	2	yes	
#10 AWG two hole compression lug	2	yes	
#10-32 SEMS style screws	2	yes	

—continued—

Procedure 4-8 (continued)
Connecting the ground wire to a shelf

Action

Step	Action
1	Strip approximately 12 mm (0.5 in.) of insulation from the end of the ground wire (see Figure 4-21). Insert the wire into the double hole compression lug and crimp the wire to the lug.
2	Using two of the appropriately sized screws provided, attach one end of the ground wire to the left side of the rack where the metallic grounding strip that connects to the system grounding point is located. See Figure 4-20 on page 4-38.
3	Remove the cover on the left side of the maintenance panel by loosening the two thumbscrews and lifting it off. See Figure 4-19 on page 4-37
4	Strip approximately 12 mm (0.5 in.) of insulation from the other end of the ground wire (see Figure 4-21). Insert the wire into the double hole compression lug and crimp the wire to the lug.
5	Attach the shelf ground lug to the grounding bracket using the two #10-32 screws provided. See Figure 4-22 (routing from above) or Figure 4-23 (routing from below).
6	Tighten the screws to a torque value of 24 in-lb.
7	Replace the cover on the maintenance panel (removed in step 3)

—end—

Figure 4-19
Removing maintenance panel cover

OM0146p

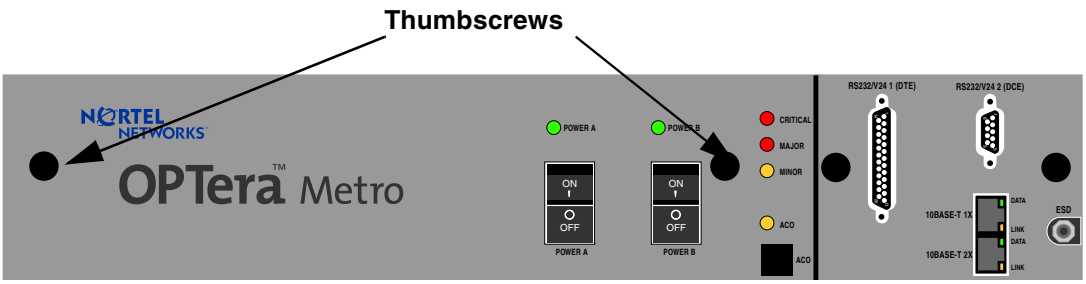


Figure 4-20
Connecting the shelf ground to the rack frame ground

OM1291p

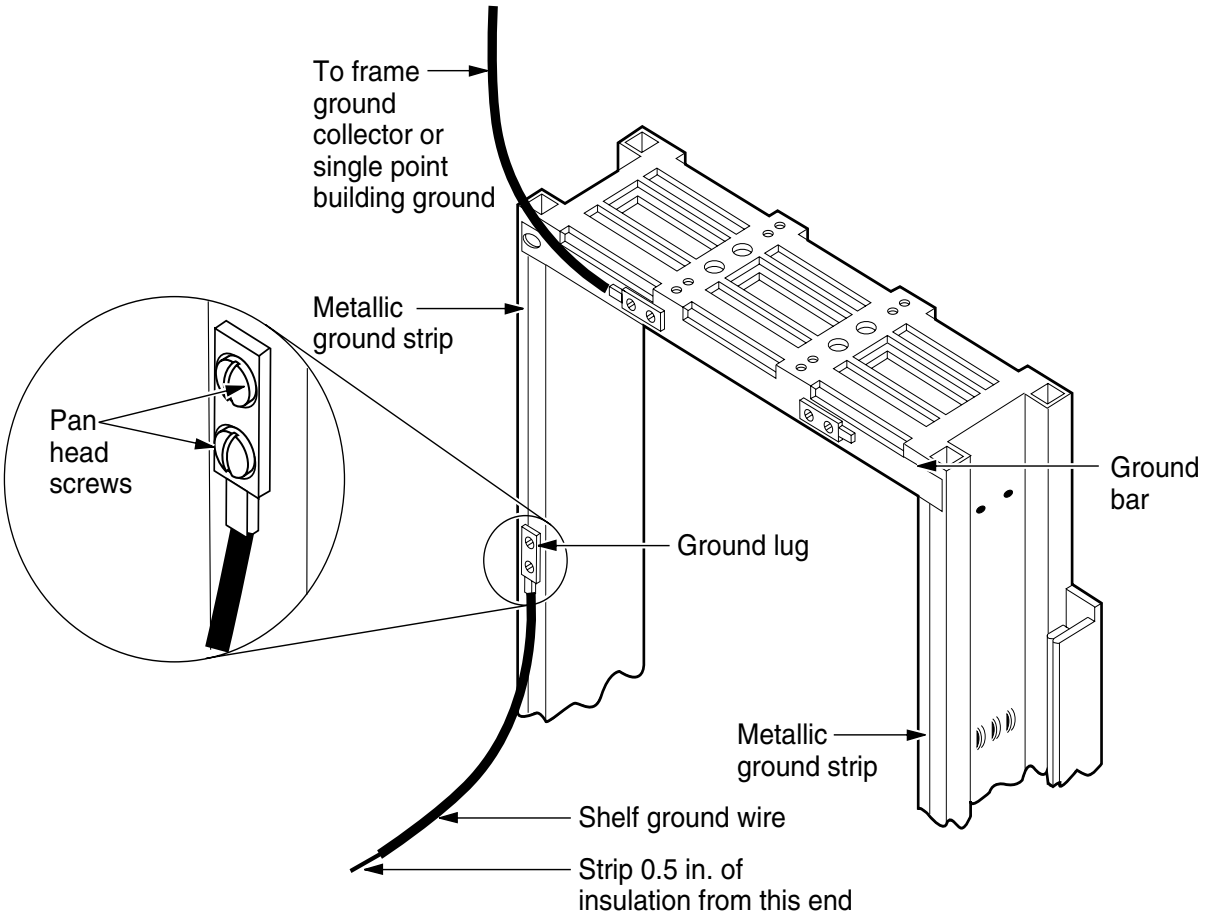


Figure 4-21
Attaching the shelf ground lug

DX0390

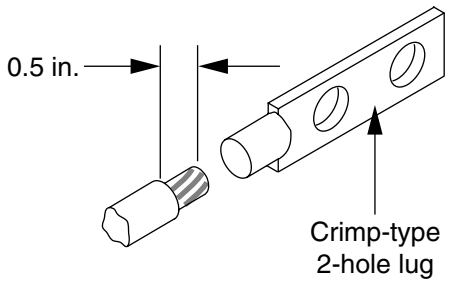


Figure 4-22
Connecting the ground wire (double hole compression lug - routed from above) to the Optical Metro 5200 shelf

OM2132t.jpg

Figure 4-23
Connecting the ground wire (double hole compression lug - routed from below) to the Optical Metro 5200 shelf

OM2133t.jpg

Procedure 4-9
Installing a Breaker Interface Panel (BIP) - NTN458RA

Use this procedure to install and ground the Breaker Interface Panel (BIP) - NTN458RA. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information on Optical Metro 5200 hardware, see *Hardware Description*, 323-1701-102.

Requirements

Table 4-12 lists the tools and materials you need to connect a ground wire to a shelf.

Table 4-12
Tools and materials for installing a BIP

Item	Quantity	Supplied	√
Mounting screws	as required	no	
Torque screwdriver or wrench	1	no	

The BIP is not supplied with power cables. You must purchase or assemble the power cables according to the specifications.

Before you install the BIP, you must

- ensure that the equipment frame is installed, secured, and grounded according to the manufacturer's instructions
- ensure that all required interface, power, and communications cables are available

DANGER
Risk of electrical shock
The -48 Vdc office battery supply can deliver severe electrical shock that can cause personal injury. Follow all of your company's safety precautions and those found in this document.

CAUTION
Risk of equipment damage
Before connecting input cables, make sure input power to panel is turned off.

—continued—

Procedure 4-9 (continued)
Installing a Breaker Interface Panel (BIP) - NTN458RA

Step	Action

Mounting the BIP in the equipment frame

1 Identify the equipment frame.

If you are mounting the BIP in a	**Then** go to
19-in. equipment frame	step 2
23-in. open equipment frame	step 3

2 Attach the 19-in mounting bracket to the side of the BIP, at five inches from the front. See Figure 4-24 on page 4-43.

Note: Use a torque wrench to verify that torque has been applied correctly: 27 in-lbs (or 311 g-m) for installation and 20 in-lbs (or 230 g-m) for inspection.

Go to step 4.

3 Attach the 23-in mounting bracket to the side of the BIP, at five inches from the front. See Figure 4-24 on page 4-43.

Note: Use a torque wrench to verify that torque has been applied correctly: 27 in-lbs (or 311 g-m) for installation and 20 in-lbs (or 230 g-m) for inspection.

4 Mount the BIP on the equipment frame using four mounting screws. See Figure 4-24 on page 4-43.

Note: The minimum clearance required above BIP 1 is 0.5 in.

- With one hand, hold and position the BIP to the frame.
- With the other hand, insert the screws that attach the right side of the BIP to the frame.
- Continue to hold the BIP in position with one hand.
- With the other hand, insert the screws that attach the left side of the BIP to the frame.
- Use a screw driver to tighten the four screws.

  Note: Use a torque wrench to verify that torque has been applied correctly: 35 in-lbs (4.29 N-m).

Connecting the ground cable

DANGER
Improper grounding and risk of electrocution
Failure to turn circuit breakers to the OFF position can cause personal injury.

5 Attach a 2-hole compression lug onto the ground wire.

—continued—

Procedure 4-9 (continued)
Installing a Breaker Interface Panel (BIP) - NTN458RA

Step	Action
6	If required, lightly coat anti-oxidant on lug, grounding terminal and surrounding contacting surface. Connect the lug to the terminal using KEPS nut as shown in Figure 4-25 on page 4-44 at the rear of the BIP. ***Note:*** Use a torque wrench to verify that torque has been applied correctly: 20 in-lbs (2.27 N-m).
7	Use the thread forming screws that comes with the shelf to attach the other end of the ground cable to the frame.
Connecting office (bay) alarms to the BIP	
8	At the rear of the panel, slide out the alarm wiring pinout insert. The alarm wiring pinout information for this BIP is shown in Figure 4-24 on page 4-43.
9	Wire wrap the office alarm cable to the appropriate pins. The minimum number of wire-wrap connections for each pin is five.
Routing the power cables	
10	Route the power cables from the BIP to the shelf.

—end—

Figure 4-24
Breaker inter panel (BIP) - NTN458RA

EX1052p

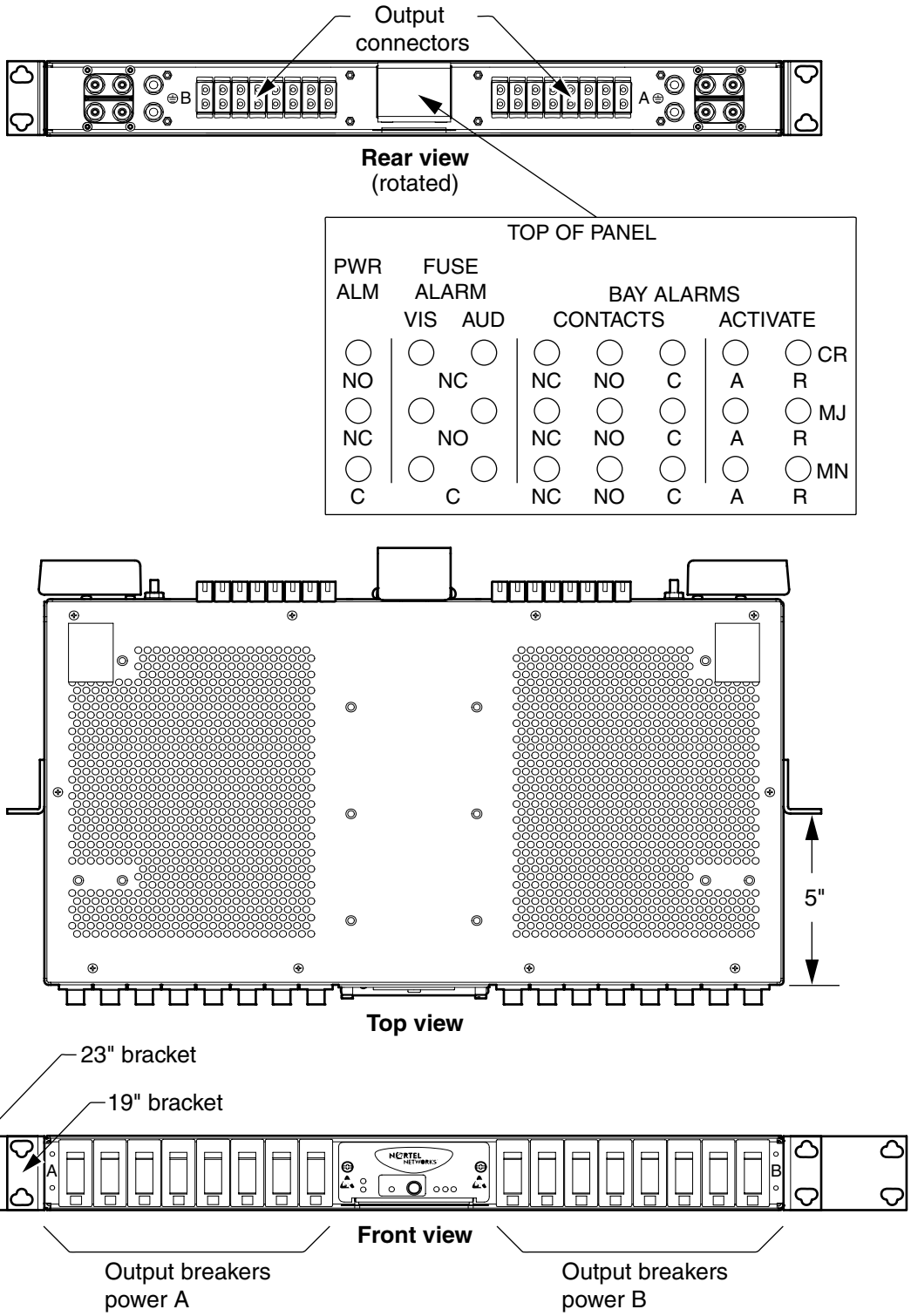
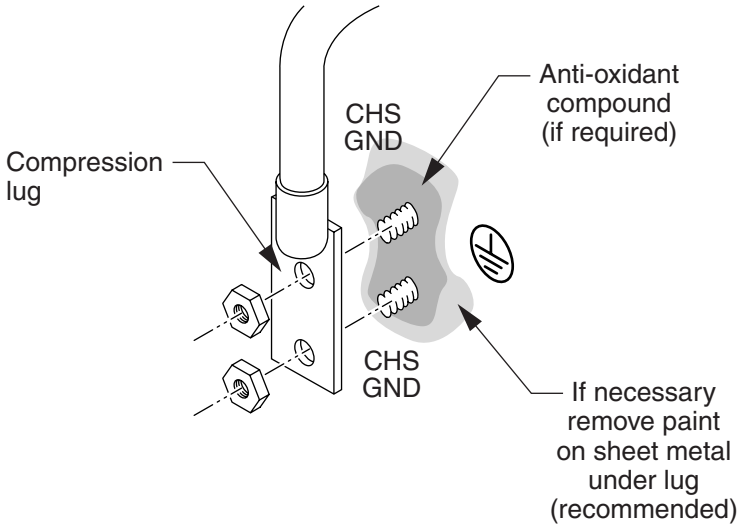


Figure 4-25
Attaching the ground lug

OM2594t



Procedure 4-10
Installing a 3U APRS rectifier

Follow this procedure to install a 3U AC Power Rectifier Shelf (3U APRS - NT0H4311) chassis in a 19-inch equipment rack and to install up to two 3U AC Power Rectifiers (3U APRS) units in the chassis. For all other rectifier types, please refer to the manufacturers' instructions.

> ***Note:*** The 3U APRS rectifier is built for installation in a 19-inch rack. If you want to mount the 3U APRS rectifier in a 23-inch rack, you must order and install the "19 to 23-inch extender brackets" (A0704348).

For more information about rectifiers, refer to the "Rectifiers" chapter in *Hardware Description,* 323-1701-102. For information on equipment locations, see "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information, refer to the rectifier installation manual shipped in the box with the chassis, modules and cables. For more information on the content of the power kit, see"Optical Metro 5100/5200 ordering information" in *Network Planning and Link Engineering,* 323-1701-110.

Requirements

Table 4-13 lists the tools and materials required for installing a 3U APRS rectifier.

Table 4-13
Tools and materials for installing a 3U APRS rectifier

Item	Quantity	Supplied	√
8 mm (5/16 in) slot screwdriver	1	no	
12.5 mm (1/2 in) slot screwdriver	1	no	
Phillips #1 screwdriver	1	no	
Phillips #2 screwdriver	1	no	
Phillips screws with lock washers (for mounting in rack)	4	no	
10 AWG stranded copper wire (for grounding) (ETSI equivalent: 6 mm^2 Earth cable)	as required	no	
Wire strippers	1	no	

—continued—

Procedure 4-10 (continued)
Installing a 3U APRS rectifier

Precautions

CAUTION
Risk of equipment damage
The rectifier is designed to operate inside buildings only. Install the unit in a dry area with enough air circulation to maintain the surrounding environment within the defined limits. Failure to maintain the surrounding environment as required can result in damage to the equipment.

CAUTION
Risk of equipment damage
Do not limit air flow by covering the air inlets on the front or back of the enclosure. If the air inlets are blocked, shelf temperatures can exceed the defined limits, which can result in incorrect shelf operation or damage to the unit. Make sure there is at least 125 mm (5 in.) of space behind the chassis for cooling air exhaust.

Action

Step	Action
1	Ensure that the PS1 and PS2 switches on the front of the rectifier chassis are in the OFF position. See Figure 4-26 on page 4-47.
2	Position the rectifier chassis at the bottom of the rack.
3	Fasten the chassis to the rack rails from the front, using mounting screws and lock washers in the mounting holes at the four corners of the chassis. ***Note:*** The 3U APRS rectifier is built for installation in a 19-inch rack. If you want to mount the 3U APRS rectifier in a 23-inch rack, you must order and install the “19 to 23-inch extender brackets” (A0704348).
4	Measure and cut a piece of grounding wire to the length required to reach from the grounding lug, on the right-hand side at the back of the chassis, to the right-side rack rail. See Figure 4-27 on page 4-48.
5	Strip 7 mm (0.25 in.) of insulation from one end of the ground wire. See Figure 4-28 on page 4-48.
6	Insert and tighten the wire in the grounding lug on the rectifier chassis. See Figure 4-27 on page 4-48.

—continued—

Procedure 4-10 (continued)
Installing a 3U APRS rectifier

Step	Action
7	Route and secure the wire to the side of the rack and connect it to the system ground point.
8	If necessary, unscrew the retaining screws and remove the blanking plate from the rectifier bay.
9	Use the handle at the top of the unit on the rectifier to slide the rectifier into the chassis.
10	Push the rectifier firmly to align it against the chassis, as shown in Figure 4-29.
11	Rotate the locking knob clockwise to lock the rectifier in the chassis. ***Note:*** For power connection information, refer to the "Connecting power" chapter of this book.
12	Repeat step 8 to step 11 for the second rectifier unit (if required).

—end—

Figure 4-26
3U APRS chassis—front view (with rectifier units)

OM1301p

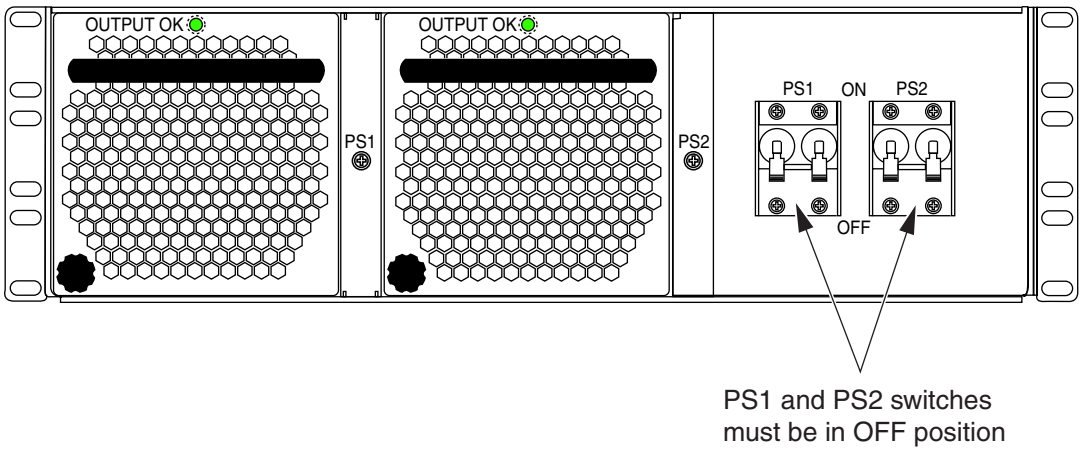


Figure 4-27
3U APRS chassis—back view (with rectifier units installed)

OM1302p

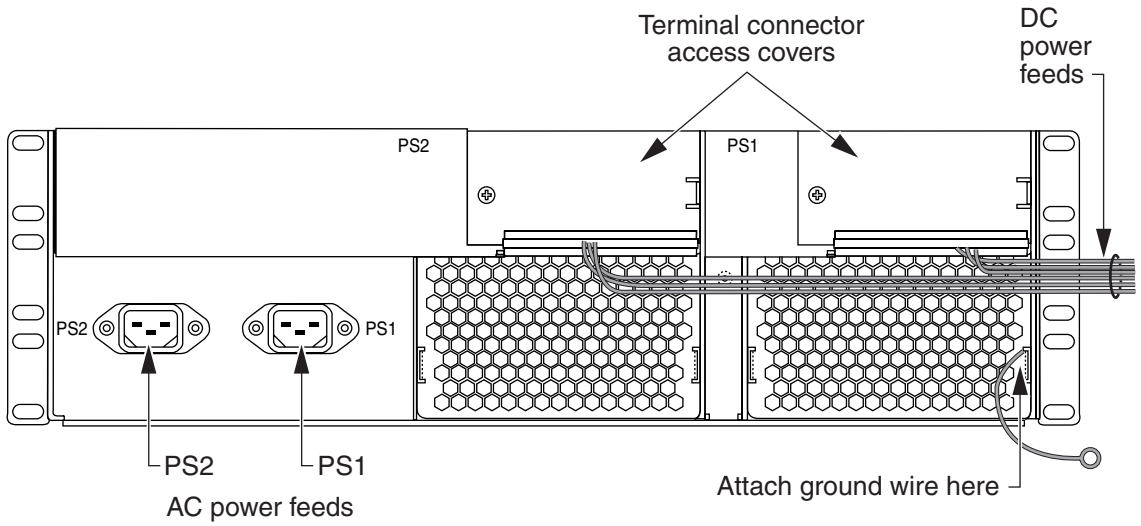


Figure 4-28
Attaching ring lugs to the ground wire

OM1324p

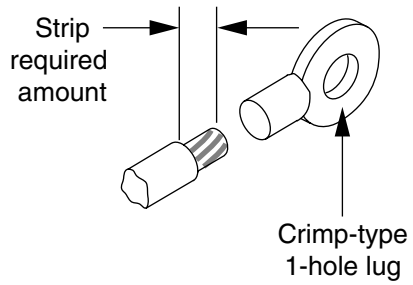
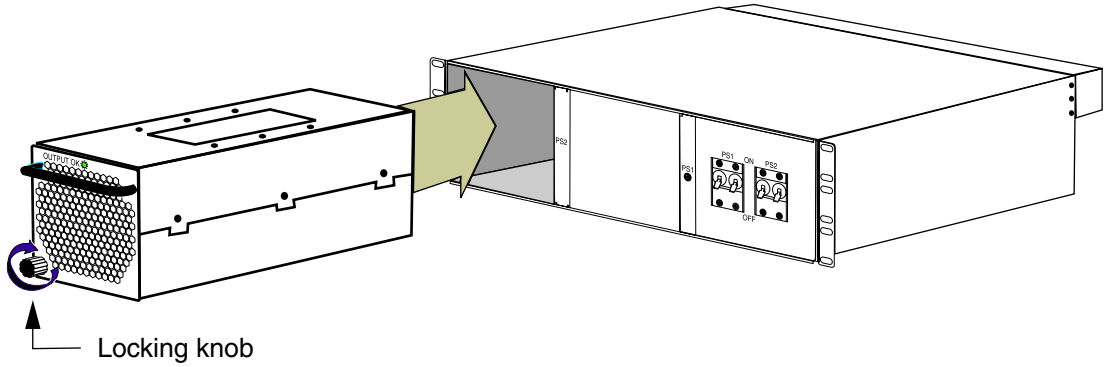


Figure 4-29
Installing a rectifier unit

OM0243p

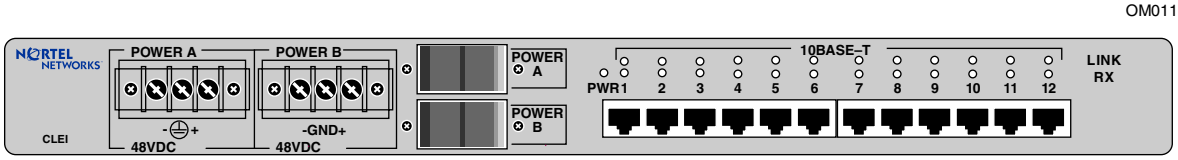


Procedure 4-11
Installing an Ethernet hub

Follow this procedure to front-mount or mid-mount an Ethernet hub (NT0H43AB) in an equipment rack. For all other Ethernet hub types, please refer to the manufacturers' instructions. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

Figure 4-30 shows the Ethernet hub.

Figure 4-30
Ethernet hub



For more information on Ethernet hubs, see "Ethernet hub" in *Hardware Description*, 323-1701-102.

Requirements

Every site that has more than two shelves belonging to the same network requires an Ethernet hub for intershelf messaging. In a ring network, you must install an Ethernet hub at the terminal site. In a point-to-point network, install an Ethernet hub in both terminal sites if there are more than two shelves per site. The recommended location for the Ethernet hub is at the top of the first equipment rack in a site.

—continued—

Procedure 4-11 (continued)
Installing an Ethernet hub

Table 4-14 lists the tools and materials required to install an Ethernet hub.

Table 4-14
Tools and materials for installing an Ethernet hub (NT0H43AB)

Item	Quantity	Supplied	√
14 AWG direct current power cable, with lugs at both ends	2 pairs	no	
14 AWG ground wire, with grounding lugs at both ends (ETSI equivalent: 2.5 mm^2 Earth cable)	1	no	
Ethernet hub mounting brackets	1 set	yes	
Phillips screwdriver	1	no	
Phillips screws 10-32 X 3/8-in. with external lock washers (for attaching mounting brackets to Ethernet hub)	8	yes	
Phillips #10 screws (for mounting Ethernet hub in rack)	4	yes	
Phillips #10 external lock washers (use with Phillips #10 screws)	4	yes	
Torque wrench	1	no	

Precautions

DANGER
Risk of personal injury
There is a risk of electrical shock when routing and making the power connections.

If you do not get the expected results

- make sure that the direct current power supply has been properly turned on
- check the power cables and connectors for correct installation
- make sure that there are no crimps, breaks, or short-circuits in the cable

—continued—

Procedure 4-11 (continued)
Installing an Ethernet hub

Action

Step	Action
1	Place the Ethernet hub on a hard, level surface with the front toward you.
2	Position a mounting bracket over the front-mounting or mid-mounting holes on the side of the Ethernet hub. Figure 4-31 and Figure 4-32 show the mounting brackets used to install an Ethernet hub in a 19-inch rack with wide or universal hole spacing.
3	Insert and tighten the four screws to attach the mounting bracket to the Ethernet hub.
4	Repeat step 2 and step 3 for the other side of the Ethernet hub.
5	**CAUTION** **Risk of equipment damage** You must support the Ethernet hub until you secure the brackets to the equipment rack or cabinet. Insert the Ethernet hub into the equipment rack or cabinet.
6	Measure and cut a piece of grounding wire to the length required to reach from the grounding lug, on the right-hand side at the back of the chassis, to the right-side rack rail.
7	Strip 7 mm (0.25 in.) of insulation from one end of the ground wire.
8	On the left side of the rack, insert one screw through the grounding lug, into the mounting bracket and rack rail holes, and tighten. Insert and tighten the rest of the screws.

—end—

Figure 4-31
Ethernet hub mounting bracket — for 19-inch rack with wide or universal hole spacing

OM0285t

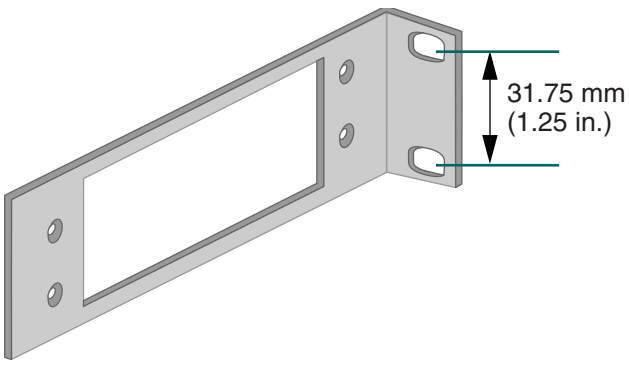
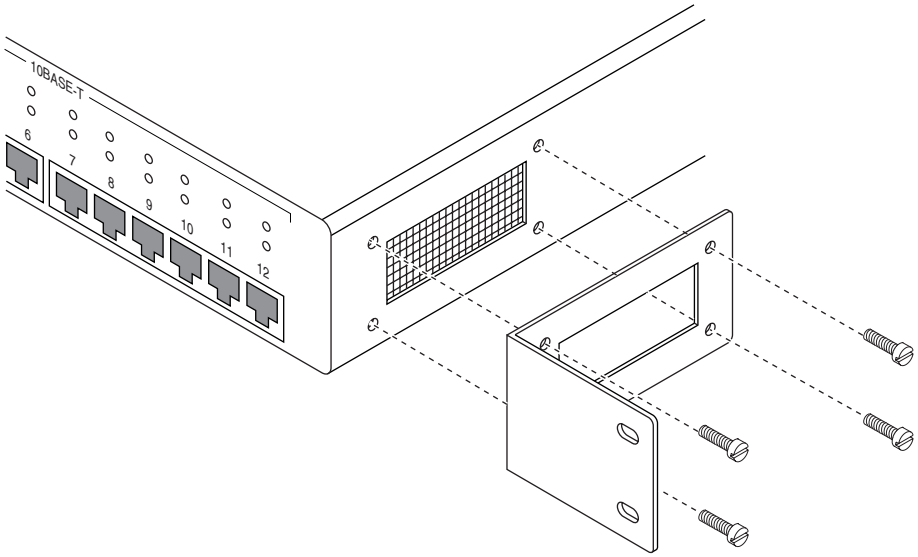


Figure 4-32
Attaching the Ethernet hub mounting bracket — for 19-inch rack with wide or universal hole spacing

OM1304t



Procedure 4-12
Installing an Optical Trunk Switch

You can front-mount an Optical Trunk Switch in a 19-inch or 23-inch equipment rack. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information on the Optical Trunk Switch, see "Optical Trunk Switch" in *Hardware Description*, 323-1701-102.

Requirements

Table 4-15 lists the tools and materials you need to install an Optical Trunk Switch.

Table 4-15
Tools and materials for installing an Optical Trunk Switch

Item	Quantity	Supplied	√
Optical Trunk Switch mounting brackets (see Note:)	1 set of each	Installed	
Phillips screwdriver	1	No	
Phillips pan head screws 6-32 x 3/8 inch with external lock washers (for attaching mounting brackets to the Optical Trunk Switch)	8	Installed	
Phillips screws with external lock washers (for mounting the Optical Trunk Switch in the rack)	4	Yes	
Grounding lug	2	No	
10 AWG wire (for grounding)	1	No	
Note: The Optical Trunk Switch is shipped with the 19-inch front-mount brackets installed (see Figure 4-33).			

—continued—

Procedure 4-12 (continued)
Installing an Optical Trunk Switch

Figure 4-33
Optical Trunk Switch brackets - 19-inch front rack mounting

OM2118t.jpg

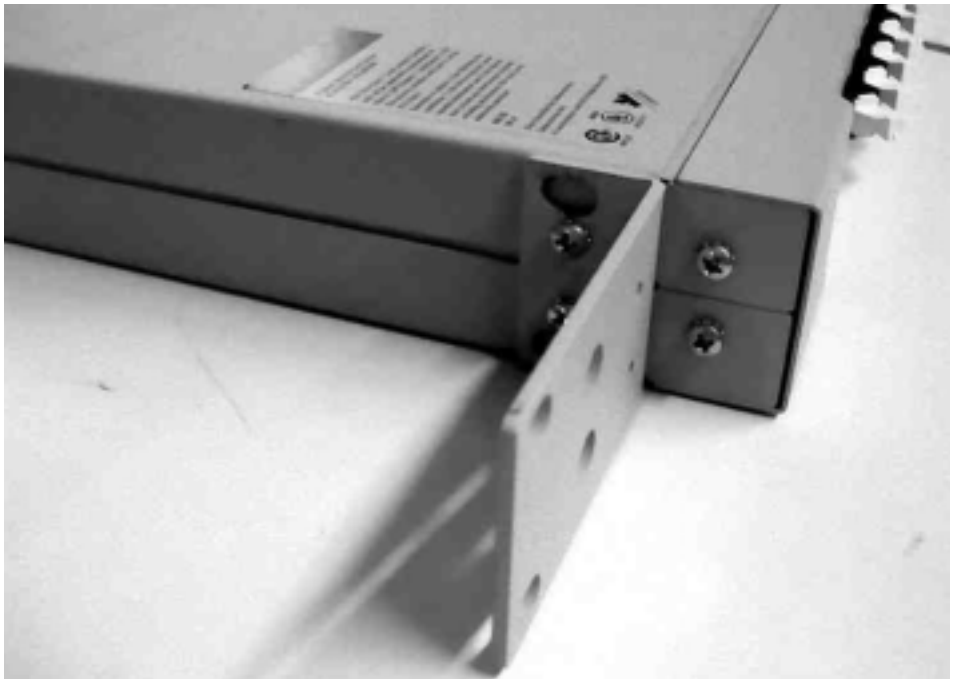


Figure 4-34
Optical Trunk Switch brackets - 23-inch front rack mounting

OM2119t.jpg

—continued—

Procedure 4-12 (continued)
Installing an Optical Trunk Switch

Action

Step	Action
1	Place the Optical Trunk Switch on a hard, level surface with the front facing toward you.
2	**If** you are installing the Optical Trunk Switch with — **Then** go to 19-inch rack mounting — step 4 23-inch rack mounting — step 3
3	Remove the mounting brackets that are installed on the Optical Trunk Switch, and re-attach them for use in a 23-inch rack (see Figure 4-34). Tighten the screws to a torque value of 10 in-lb.
4	Support the Optical Trunk Switch in position on the equipment rack. On one side of the rack, insert and tighten one screw into the mounting bracket and rack rail holes. Insert and tighten the rest of the screws.
5	Strip 7 mm (0.25 in.) of insulation from both ends of the 10 AWG wire. See Figure 4-28 on page 4-48.
6	Route and secure the cables along the side of the rack.
7	Attach a single hole ring lug to both ends of the 10 AWG wire. Connect one lug to the system grounding point. See Figure 4-35 for grounding locations.
8	Connect the other end of the 10 AWG ground wire to the primary ground at the back on the left side of the Optical Trunk Switch.
9	Secure the grounding cable to the equipment rack using lacing cord (wax string) or tie wraps. ***Note:*** For power connection information, refer to the "Connecting power" chapter of this book.

—end—

Figure 4-35
Rear view of an Optical Trunk Switch

OM1299p.jpg

Procedure 4-13
Installing an Enhanced Trunk Switch shelf

Use this procedure to front-mount an Enhanced Trunk Switch (ETS) shelf in a 19-inch, 23-inch or ETSI equipment rack. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

Each ETS shelf is 1U high. Nortel Networks recommends that you install the ETS shelves directly beneath the Optical Metro 5100/5200 terminal shelf.

> ***Note:*** The ETS shelf is 300 mm (11.8 in.) in depth, excluding connectors. Rear-access to the ETS shelf is required. You must plan for this access when you design your captive office floor plan.

The ETS consists of three components: the shelf, the Comms module, and the Switch module. Each item is shipped in individual boxes. Install the ETS shelf first by using this procedure (Procedure 4-13). Then install the ETS Comms module (Procedure 7-2). Finally install the ETS Switch module (Procedure 7-3).

> ***Note:*** For instructions on grounding the ETS shelf, see Procedure 5-5, "Connecting power leads and grounding the ETS shelf".

For more information on the Enhanced Trunk Switch, see "Enhanced Trunk Switch" in *Hardware Description*, 323-1701-102.

The ETS shelf must be installed in the equipment rack or cabinet. The ETS installation kit includes three types of mounting brackets:

- 19 inch
- 23 inch
- ETSI

Requirements

Before you start this procedure, you must bear the following in mind.

—continued—

Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

ATTENTION

You must have already determined the correct position in the rack for the ETS shelf. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

You must have already determined the required setback (1.5-inch, 5-inch, 6-inch, or 6.5-inch) and the corresponding rack mounting brackets (ETSI, 19-inch or 23-inch).

Table 4-16 lists the tools and materials you need to install an ETS shelf.

Table 4-16
Tools and materials for installing an ETS shelf

Item	Quantity	Supplied	√
Enhanced Trunk Switch shelf mounting brackets (see Note)	1 set of each: 19-inch, 23-inch, ETSI	Yes (part of the ETS installation kit)	
Phillips screwdriver	1	No	
Phillips pan head screws 6-32 x 3/8 inch with external lock washers (for attaching rack mounting brackets to the Enhanced Trunk Switch shelf)	8	Installed	
Phillips screws with external lock washers (for mounting the Enhanced Trunk Switch shelf in the rack)	4	Yes (part of the ETS installation kit)	
Note: The ETS shelf is shipped with 19-in. rack mounting brackets installed for 1.5 inch setback (see figure 3-9).			

—continued—

Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

Precautions

CAUTION
Risk of overheating
Keep the air inlets and outlets clean and unobstructed to allow the fan module to cool the unit as required.

ATTENTION
If you are installing more than one shelf in an equipment rack, mount the lower shelf first. When you start at the bottom, you ensure that there is enough room to lift the keyholes on the shelf over the mounting screws.

ATTENTION
The ETS shelf is shipped with 19-inch rack mounting brackets installed for the 1.5-inch setback position. If this position meets your requirements, then start with step 6.

—continued—

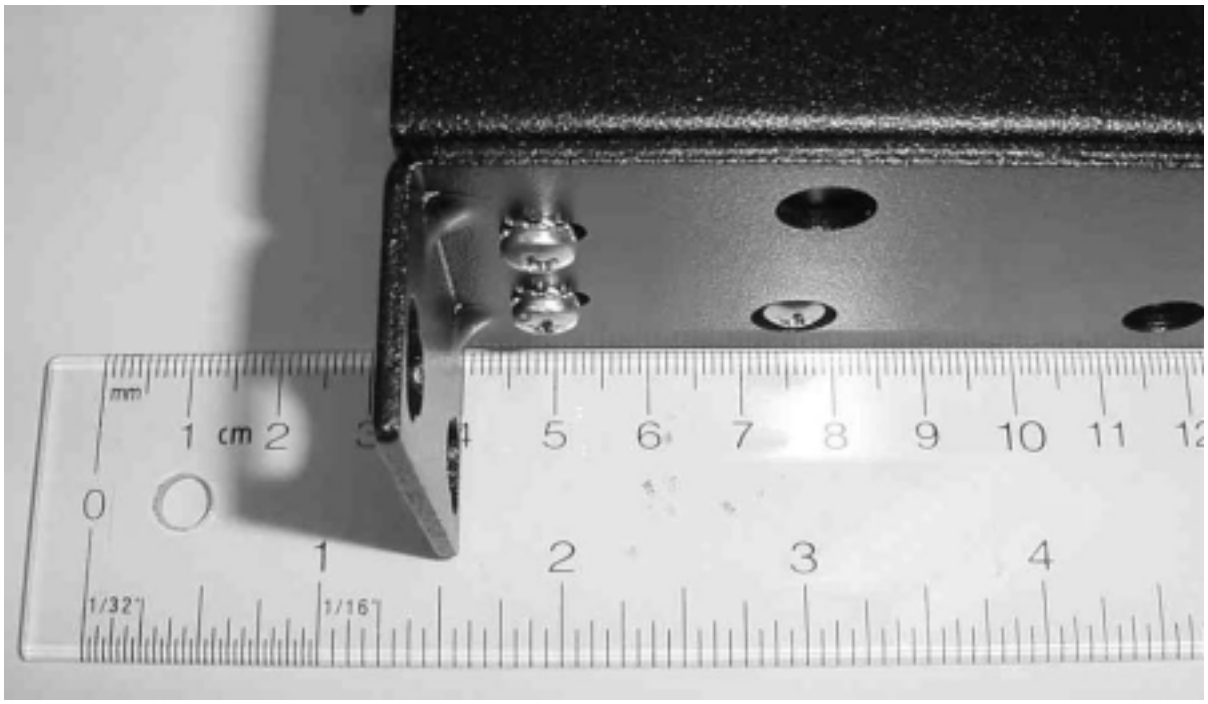
Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

To front mount an ETS shelf in the 1.5-inch setback position, attach the mounting brackets as shown in Figure 4-36.

Note: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Figure 4-36
ETS shelf front mount (1.5 inch setback for the 19-inch rack mounting bracket)

OM2607p.jpg



—continued—

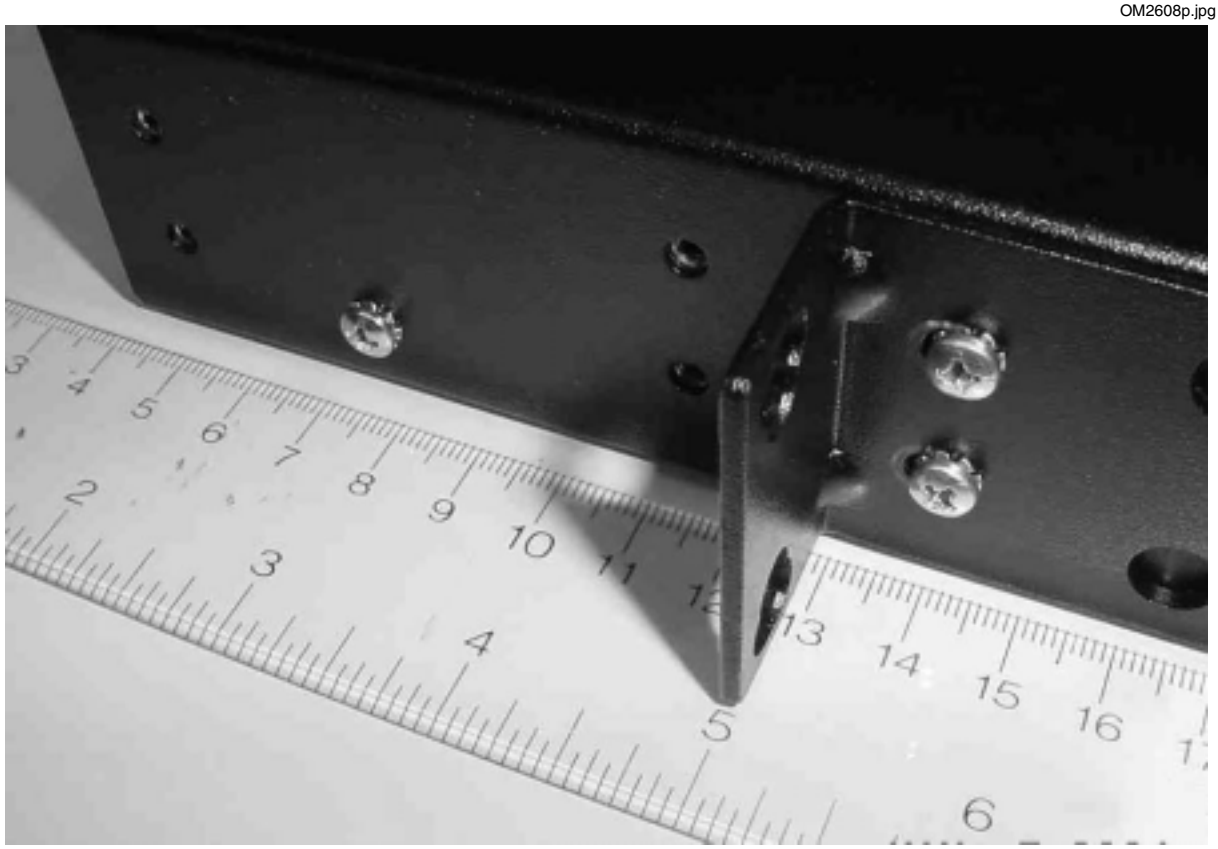
Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

To front mount an ETS shelf in the 5-inch setback position, attach the mounting brackets as shown in Figure 4-37.

Note: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Figure 4-37
ETS shelf front mount (5-inch setback for the 19-inch rack mounting bracket)

OM2608p.jpg



—continued—

Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

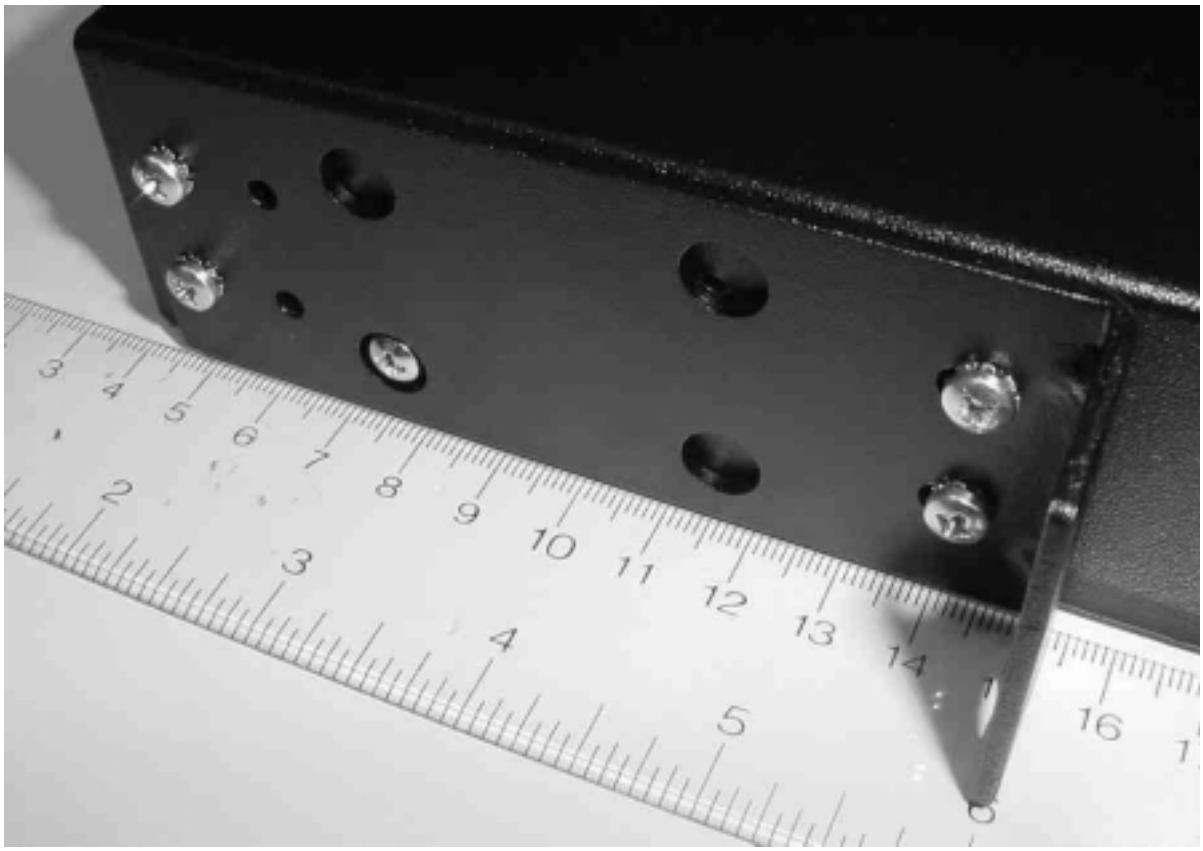
To front mount an ETS shelf in the 6-inch setback position, attach the mounting brackets as shown in Figure 4-38.

Note 1: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Note 2: For the 6-inch setback position, the mounting brackets are mounted in a reverse position (compared to the other setback positions).

Figure 4-38
ETS shelf front mount (6-inch setback for the 19-inch rack mounting bracket)

OM2609p.jpg



—continued—

Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

To front mount an ETS shelf in the 6.5-inch setback position, attach the mounting brackets as shown in Figure 4-39.

Note: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Figure 4-39
ETS shelf front mount (6.5-inch setback for the 19-inch rack mounting bracket)

OM2549p.jpg

—continued—

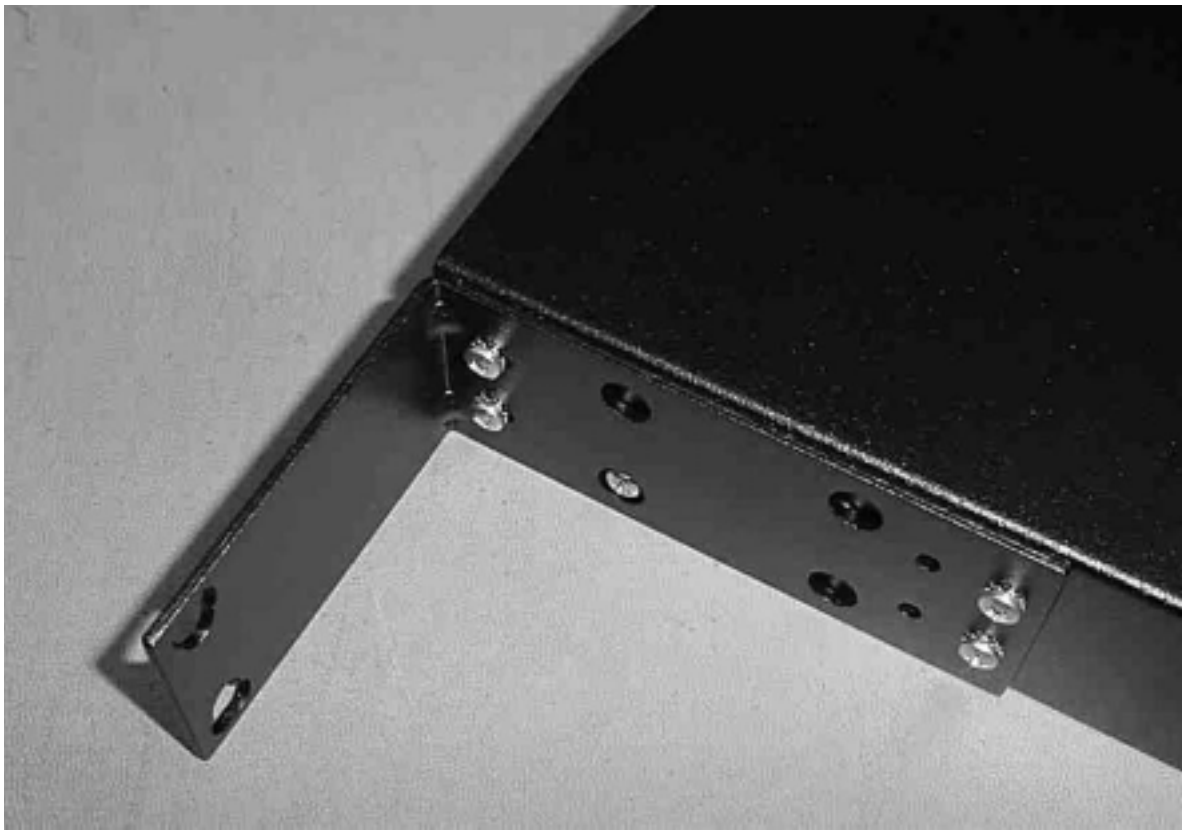
Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

To front mount an ETS shelf in the 23-inch front rack mounting with a 1.5-inch setback position, attach the mounting brackets as shown in Figure 4-40.

Note: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Figure 4-40
Enhanced Trunk Switch shelf brackets - 23-inch front rack mounting (1.5-inch setback)

OM2550p.jpg



—continued—

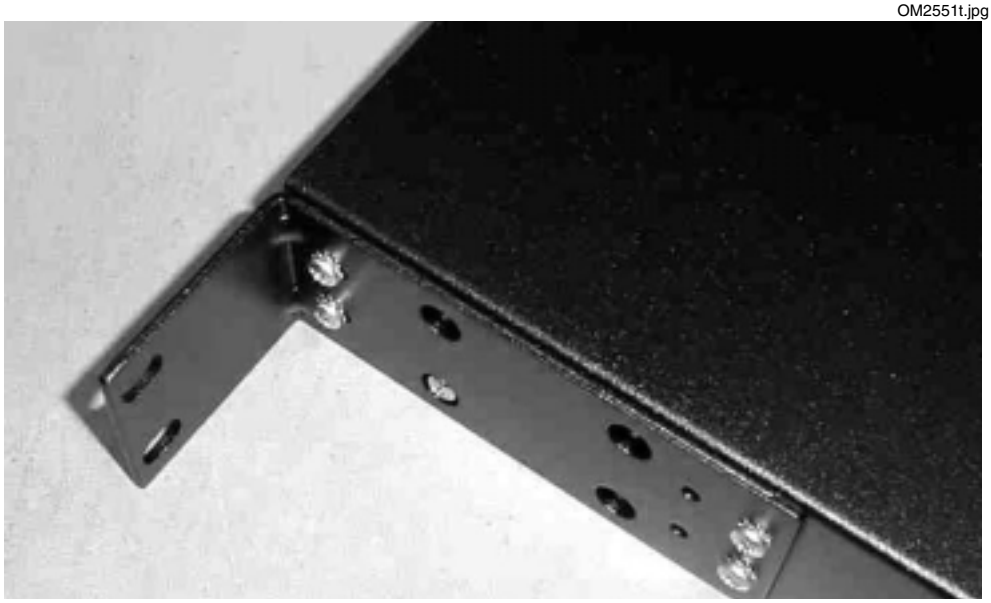
Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

To front mount an ETS shelf in the ETSI front rack mounting with a 1.5-inch setback position, attach the mounting brackets as shown in Figure 4-41.

Note: Approximately 1.5 inches are required in front of the ETS shelf to connect fibers to the ETS Switch module.

Figure 4-41
Enhanced Trunk Switch shelf brackets - ETSI front rack mounting (1.5-inch setback)

OM2551t.jpg



—continued—

Procedure 4-13 (continued)
Installing an Enhanced Trunk Switch shelf

Action

Step	Action
	Note: Each of the three mounting brackets (19-inch, 23-inch, ETSI) have four setback positions (1.5-, 5-, 6-, and 6.5-inch).
1	Place the Enhanced Trunk Switch shelf on a hard, level surface with the front facing toward you.
2	**If** you are installing the Enhanced Trunk Switch shelf with — **Then** go to 23-inch rack mounting — step 3 ETSI rack mounting — step 3 19-inch rack mounting — step 5 ***Note:*** The ETS shelf is shipped with the 19-inch rack mounting brackets installed for the 1.5-inch setback position.
3	Remove the 19-inch rack mounting brackets that are installed on the Enhanced Trunk Switch shelf.
4	Select the appropriate rack mounting brackets (for 23-inch rack mounting or ETSI rack mounting) in the ETS installation kit. To distinguish between the types of rack mounting brackets, refer to Figure 4-36, Figure 4-40, and Figure 4-41.
5	Install the rack mounting brackets on the ETS shelf based on the required setback position (1.5-, 5-, 6- or 6.5-inch). To distinguish between the four setback positions, refer to Figure 4-36, Figure 4-37, Figure 4-38, and Figure 4-39. Tighten the screws to a torque value of 10 in·lbf.
6	Support the Enhanced Trunk Switch shelf in position on the equipment rack. On one side of the rack, insert and tighten one screw into the mounting bracket and rack rail holes. Insert and tighten the rest of the screws (total of 4). ***Note:*** For instructions on grounding the ETS shelf, see Procedure 5-5, "Connecting power leads and grounding the ETS shelf". **—end—**

Procedure 4-14
Installing an OMX (Standard) tray

Follow this procedure to install an OMX (Standard) tray in an OMX (Standard) drawer. For OMX fiber labelling requirements in High Input Power (HIP) amplified systems, see the chapter "Observing safety guidelines" and Procedure 8-1 "Labeling cables and optical fibers" of the chapter "Fiber management" in this book.

ATTENTION

The OMX (Standard) tray is assigned the PEC NT0H5730, and is installed within an OMX standard drawer . The OMX standard drawer is a fixed part of the 12U high NT0H50AA Optical Metro 5200 shelf assembly (1U = 44.45 mm). The OMX (Standard) tray will house (2) OMX modules with matched wavelength bands. Each OMX module is ordered using PEC NT0H30xA (where x = A,B,C,D,J,K,L,M).

Standard NT0H30xA OMX modules can be used in conjunction with the 11U high NT0H50BA or NT0H50BB Optical Metro 5200 shelf assembly variant.

In order to setup the OMX (Standard) tray and OMX modules below an 11U or 12U shelf, the NT0H44AJ OMX mounting kit must be ordered.

For further information, refer to *Hardware Description*, 323-1701-102.

When you complete this procedure

- OMX (Standard) trays are installed in the OMX drawer
- the laser radiation tag is attached to some fiber-optic pigtails, to comply with safety requirements

Requirements

Before you begin this procedure, the Optical Metro 5200 shelf (12 U high) must be mounted in a rack or cabinet.

—continued—

Procedure 4-14 (continued)
Installing an OMX (Standard) tray

Table 4-17 lists the tools and materials required for installing an OMX (Standard) tray.

Table 4-17
Tools and materials for installing OMX (Standard) trays

Item	Quantity	Supplied	√
#2 Phillips screwdriver	1	no	
Laser radiation tag	1	yes	

Precautions

DANGER
Invisible laser radiation
The Optical Metro 5100/5200 operates up to a Hazard Level of k x 3A (IEC 60825-2:2000) or 1M (IEC 60825-2:2004). Use only viewing instruments with proper optical attenuation.

CAUTION
Risk of equipment damage
Do not connect the pigtails from an OMX (Standard) tray to circuit packs before the OMX is installed in the drawer. If you move an OMX after it is connected to the circuit packs you can damage the optical fibers.

Action

Step	Action
1	If the cover of the cooling unit is not open, remove the cover by loosening the thumbscrews on each side of the cover.
2	Press and hold the front locking tabs on each side of the drawer with your index fingers. Pull out the drawer until it is fully extended, as shown in Figure 4-42 on page 4-72.

—continued—

Procedure 4-14 (continued)
Installing an OMX (Standard) tray

Step	Action
3	Attach the center OMX retaining brackets to the drawer, if they are not already attached, using the screws provided. See Figure 4-42 on page 4-72 for the location of these brackets. ***Note:*** Each drawer has two flanges, fabricated as part of the drawer, and two retaining brackets, that you must attach. These flanges and brackets are on the front of the drawer and are used to guide the OMXs into place and secure each planes' OMX module to the drawer. The flange on the left side of the drawer is for the west OMX. The flange located on the right side of the drawer is for the east OMX. The retaining brackets which must be attached to the drawer prior to installing the OMX modules are screwed into place from the bottom of the drawer.
4	Remove the retaining screws from the front of the OMX module. See Figure 4-43 on page 4-73 for the locations of the screws.
5	Attach the laser radiation tags to the ends of the fiber patch cords locating them outside of the module close to the connector that plugs into the circuit pack. The laser radiation tags are part of the Optical Metro 5200 installation kit. **CAUTION** **Risk of equipment damage** Support the pigtails of the OMX when you handle the trays. Incorrect handling can damage the optical fibers.
6	Place the OMX pigtails on top of the module.
7	Line up the hole in the back of a module with the west pin in the back of the drawer. See Figure 4-44 on page 4-73.
8	Carefully lower the front of the OMX over the flange and bracket into the drawer. See Figure 4-44 on page 4-73.
9	Fasten the OMX to the drawer with two of the retaining screws that you removed in step 4. See Figure 4-43 on page 4-73.
10	Repeat step 5 through step 9 to install the other OMX in the right (east) side of the drawer.
11	Remove the four screws on the top of the West OMX tray and lift the module access cover to access the fiber optic connections. See Figure 4-45 on page 4-74.
12	Locate the screw on the top of the OMX that are used to secure the flexible fiber guides. See Figure 4-45 on page 4-74. ***Note:*** Screws are shipped in the left (west) position of the OMX.

—continued—

Procedure 4-14 (continued)
Installing an OMX (Standard) tray

Step	Action
13	Remove the caps from the top of the flexible cable guide that is to be attached to the west OMX module and move the tabs out of the way. Extend the cable guide.
14	Remove the fiber guide screw from the left side of the west OMX tray.
15	Insert the screw through the hole in the flexible fiber guide into the hole on the left side of the west OMX and tighten, as shown in Figure 4-46 on page 4-74. ***Note:*** Leave the other end of the flexible fiber guides unconnected.
16	Route the OMX pigtails from the west OMX through the opening on the left side of the module and through the flexible cable guide on the left side of the tray.
17	Replace the caps that you removed in step 13.
18	Connect the flexible fiber guide to the left side of the shelf and route the OMX fiber optical pigtails up through the vertical fiber guides and into the horizontal fiber trough at the bottom of the card cage.
19	Remove the four screws on the top of the East OMX tray and lift the module access cover to access the fiber optic connections.
20	Replace the west OMX module cover, making sure that the pigtails come out of the opening in the cover that is closest to the rack rail. (The cover only fits one way. If necessary, turn the cover 180°.) Make sure that the back edge of the cover fits into the slot at the back of the module.
21	Remove the fiber guide screw from the left side of the east OMX.
22	Remove the caps from the top of the flexible cable guide that is to be attached to the east OMX module and move the tabs out of the way. Extend the cable guide.
23	Insert the screw through the hole in the flexible fiber guide into the hole on the right side of the east OMX and tighten. See Figure 4-47 on page 4-75. ***Note:*** Leave the other end of the flexible fiber guides unconnected.
24	Route the OMX pigtails from the east OMX through the opening on the right side of the module and through the flexible cable guide on the right side of the tray.

CAUTION
Risk of equipment damage
To avoid damaging the optical fibers, make sure that the optical fibers inside the OMX (Standard) module are clear of the cover when you replace the cover.

—continued—

Procedure 4-14 (continued)
Installing an OMX (Standard) tray

Step	Action
25	Replace the caps that you removed in step 21.
26	Connect the flexible fiber guide to the right side of the shelf and route the OMX fiber optic pigtails up through the vertical fiber guides and into the horizontal fiber trough at the bottom of the card cage.
27	Replace the east OMX module cover, making sure that the pigtails come out of the opening in the cover that is closest to the rack rail. (The cover only fits one way. If necessary, turn the cover 180°.) Make sure that the back edge of the cover fits into the slot at the back of the module. See Figure 4-48 on page 4-75.
28	Re-attach the cover of the cooling unit (if removed in step 1).
29	Slide the OMX tray into the shelf while pressing the locking tabs in the middle of the sides of the OMX tray. See Figure 4-49 on page 4-76. *The front locking tabs click when the tray is in the correct position.*

—end—

Figure 4-42
Releasing the front locking tabs on the OMX (Standard) drawer

OM0130p

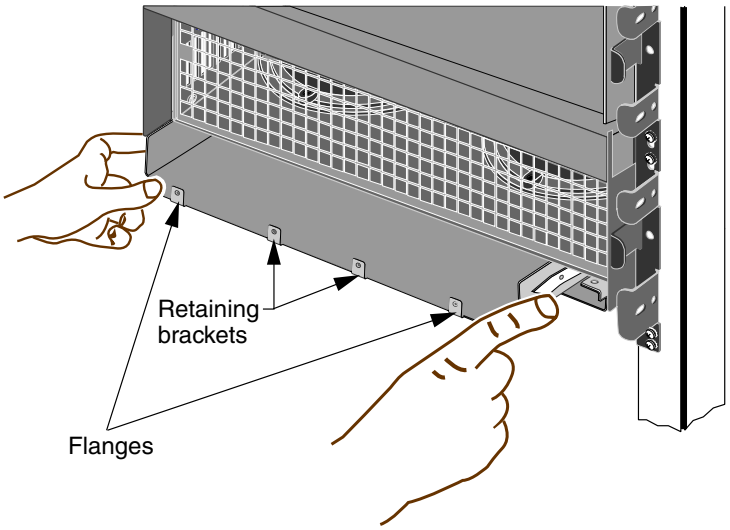


Figure 4-43
Retaining screws in the OMX (Standard) tray

OM1315p

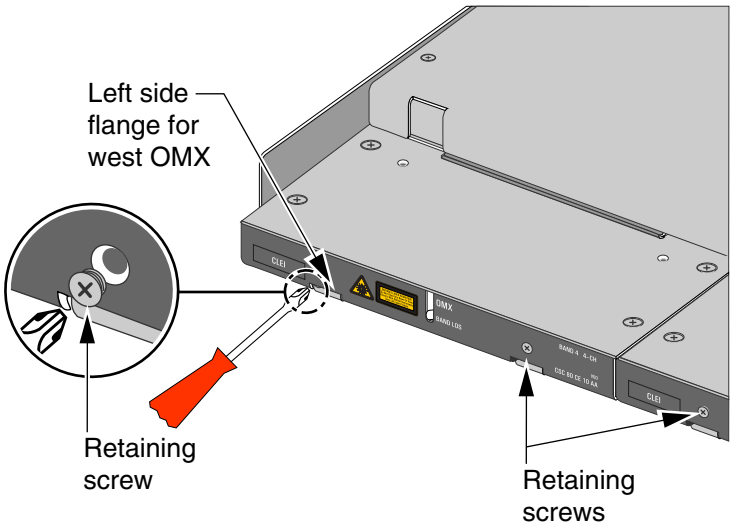


Figure 4-44
Installing the OMX (Standard) tray (optical fibers are not shown)

OM1314p

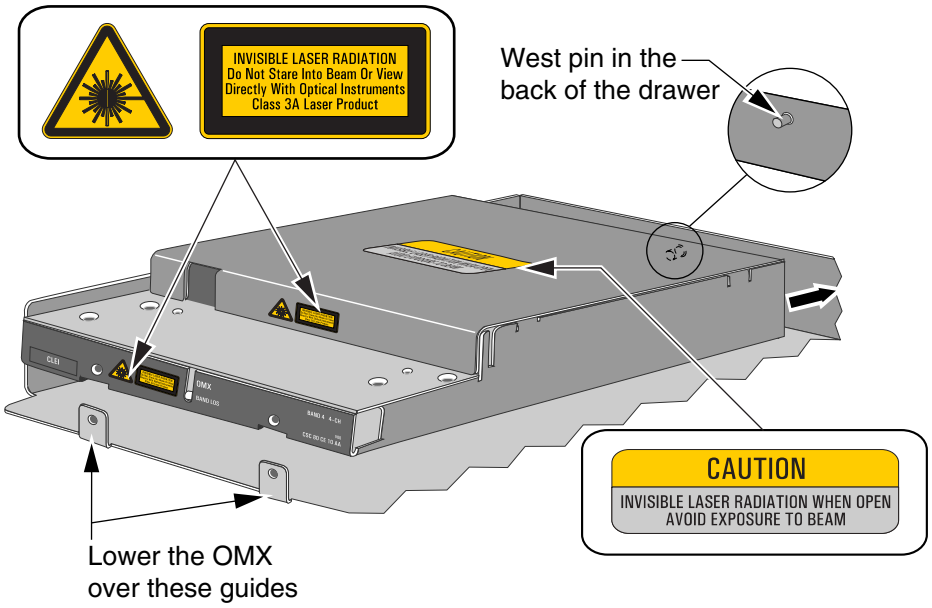


Figure 4-45
Removing the cover of an OMX (Standard) module on the west plane

OM1316p

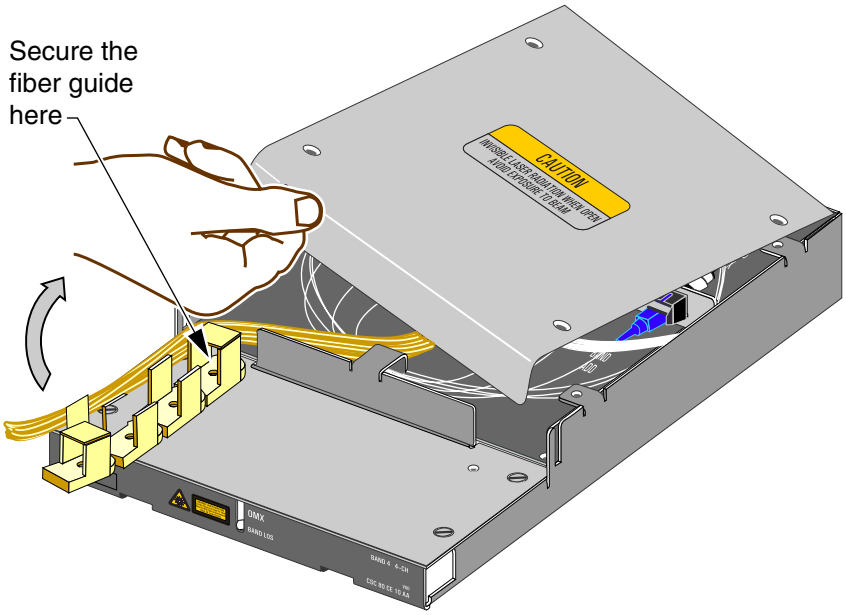


Figure 4-46
Securing the flexible fiber guide on the OMX (Standard) tray

OM1317p

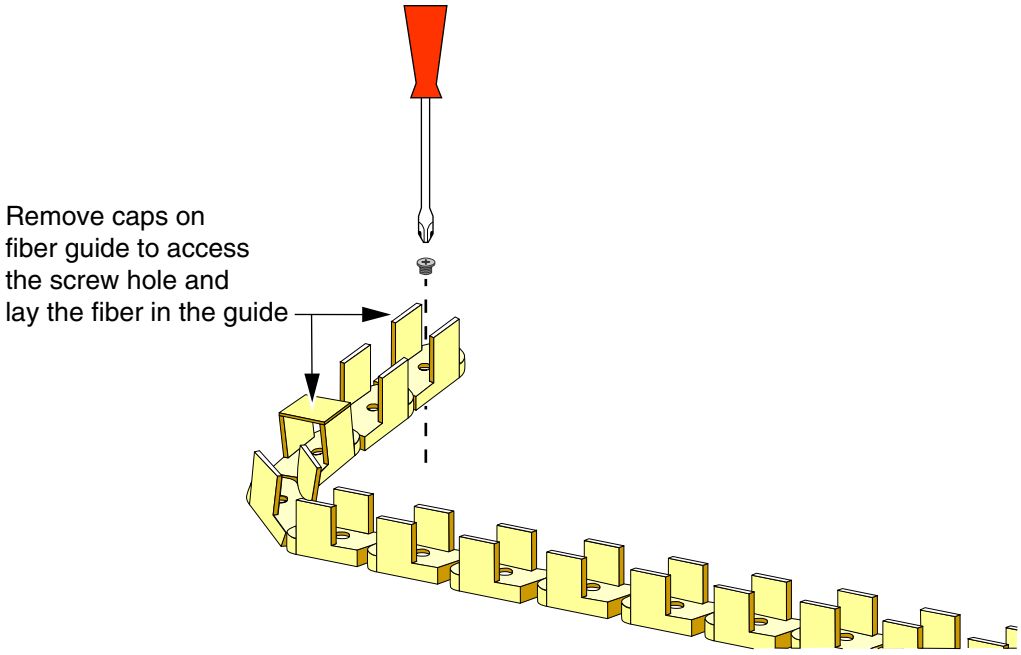


Figure 4-47
Flexible fiber guide position for east plane

OM0128p

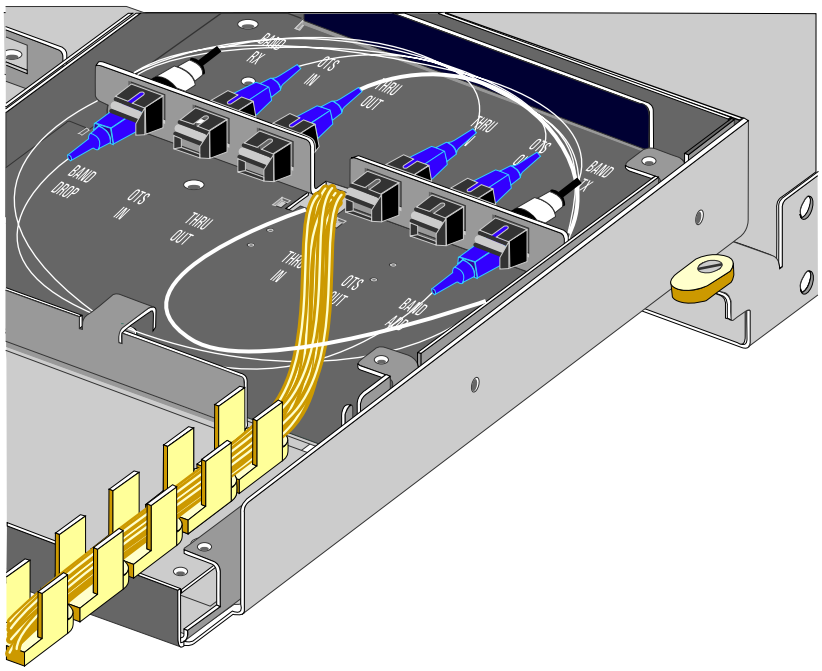


Figure 4-48
Routing the OMX (Standard) cables on the east plane

OM0123p

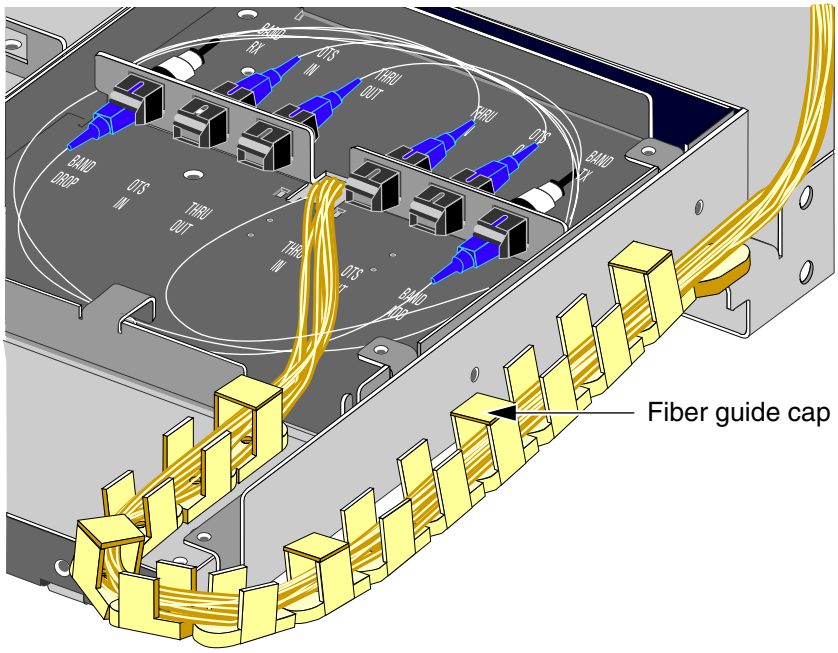
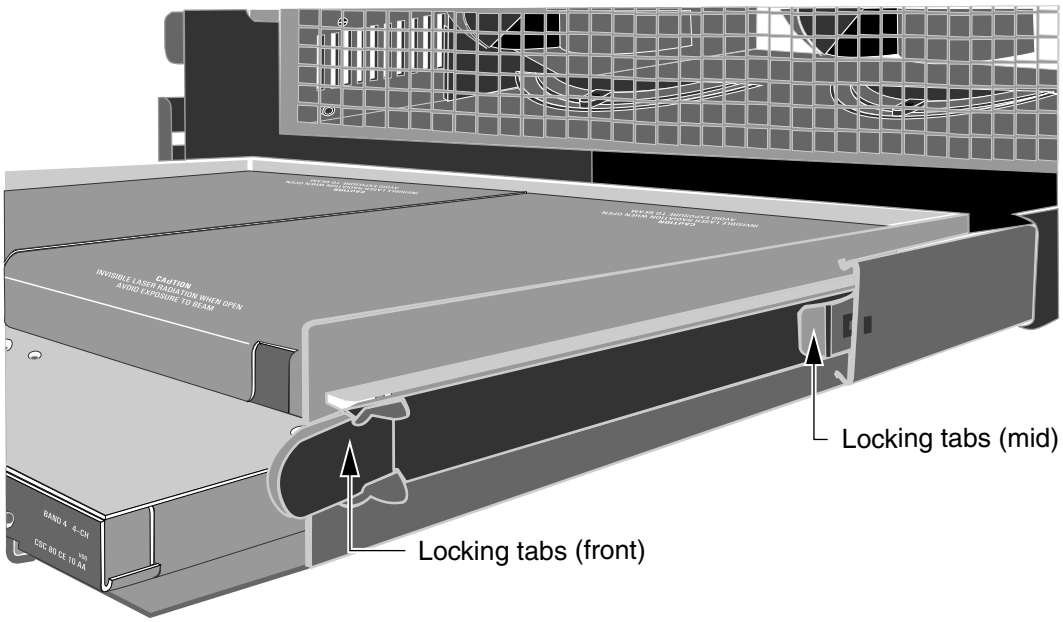


Figure 4-49
Locking tabs on the OMX (Standard) tray

OM0129p



Procedure 4-15
Installing and grounding equipment drawers

Follow this procedure to mount the following equipment in an equipment rack or cabinet.

- Patch panel 16 port (NT0H43CA)
- Patch panel 20 port (NT0H43CB)
- OMX 4CH + Fiber Manager (NT0H32xE)
- OMX 4CH Enhanced (NT0H32xF)
- OMX 16CH DWDM (NT0H32JA/KA)
- OMX 1CH CWDM (NT0H33xB)
- OMX 4CH CWDM (NT0H77xA)
- OMX 4CH CWDM with dual taps (NT0H33JB/KB)
- OMX 4CH ITU CWDM (NTPM33AA)
- OMX 8CH ITU CWDM (NTPM33BA)
- OMX 1CH OADM ITU CWDM (NTPM34xB)
- OMX 4CH OADM ITU CWDM (NTPM34JA/KA)
- OSC splitter/coupler tray (NT0H57DA/FA)
- OSC splitter/coupler tray assembly with dual taps (NT0H57GB/GC)
- C&L Dual Splitter/Coupler (NT0H31AF)
- 1310 nm Splitter/Coupler (NT0H57JB)
- PBE (NT0H31Bx)
- Transponder Protection Tray single-mode (NT0H59Ax)
- Transponder Protection Tray multimode (NT0H59Bx)
- Fiber Manager (NT0H57BB)
- VOA drawer with one tray (two VOAs) (NT0H31AH)
- VOA drawer with two trays (four VOAs) (NT0H31AJ)
- DSCM drawer (NT0H57LA)
- Dual filter drawer (NT0H57BA)

ATTENTION
If you plan to interconnect the drawers installed on an Optical Metro 5200 shelf, leave 1 U of space between the drawers to allow for fiber bend.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information on Optical Metro 5200 hardware, see *Hardware Description*, 323-1701-102.

Each drawer must be installed in an equipment rack or cabinet, and is shipped with three styles of mounting brackets:

- ETSI
- 19 inch
- 23 inch

Note: In some cases, the same mounting bracket fits both the 19-inch and 23-inch mouting positions, depending on the way the rack mouting bracket is attached to the drawer. For this specific type of rack mounting bracket, you can attach the bracket to the drawer in two ways: use five screws for the 19-inch setting or reverse the bracket position and use two screws for the 23-inch setting.

Holes in the left and right sides of the drawer are used to secure the mounting brackets to a drawer. Each drawer is shipped with one set of mounting brackets already installed. The installed brackets are for front-mounting the drawer in a 19-inch equipment rack or cabinet.

ATTENTION
The following illustrations (for regular 1U drawers: Figure 4-50, Figure 4-52, Figure 4-54, and Figure 4-56; for OMX 16CH DWDM: Figure 4-53, Figure 4-55, and Figure 4-57) show a 23-inch rack mounting bracket. Only Figure 4-51 shows a 19-inch rack mounting bracket for the OMX 16CH DWDM. ON the regular 1U drawer and on the OMX 16CH DWDM, all three brackets use a common pattern for attaching screws to the side of the drawer for any given mounting position.

To front mount a drawer (with a 40 mm setback), attach the mounting brackets as shown in Figure 4-50 for a regular 1U drawer and as shown in Figure 4-51 for an OMX 16CH DWDM.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Figure 4-50
Front mount (40 mm)

OM2114.jpg

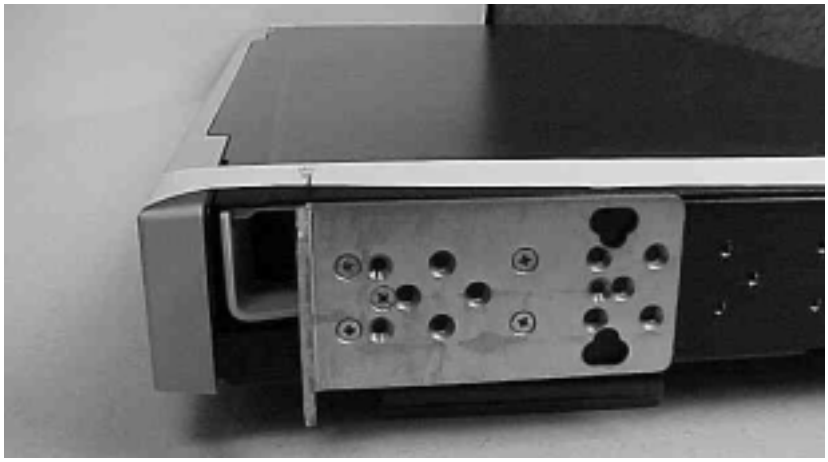
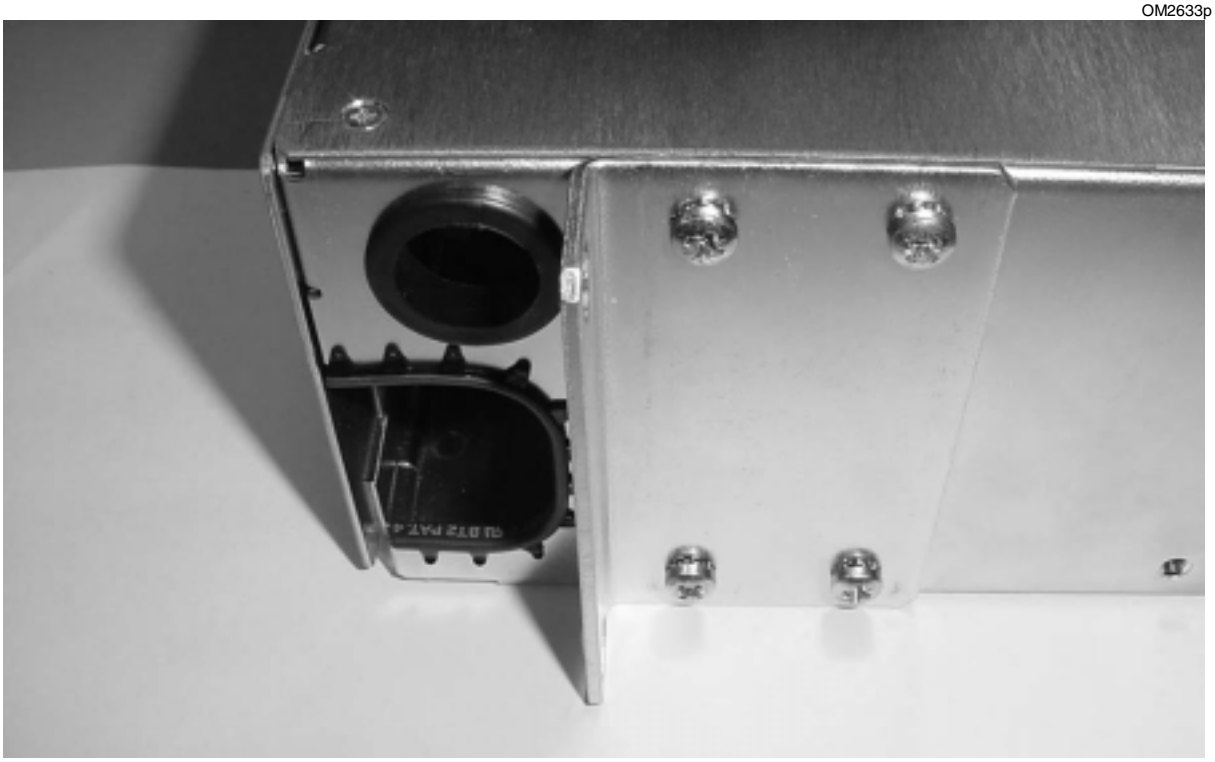


Figure 4-51
OMX 16CH DWDM front mount (40 mm)

OM2633p



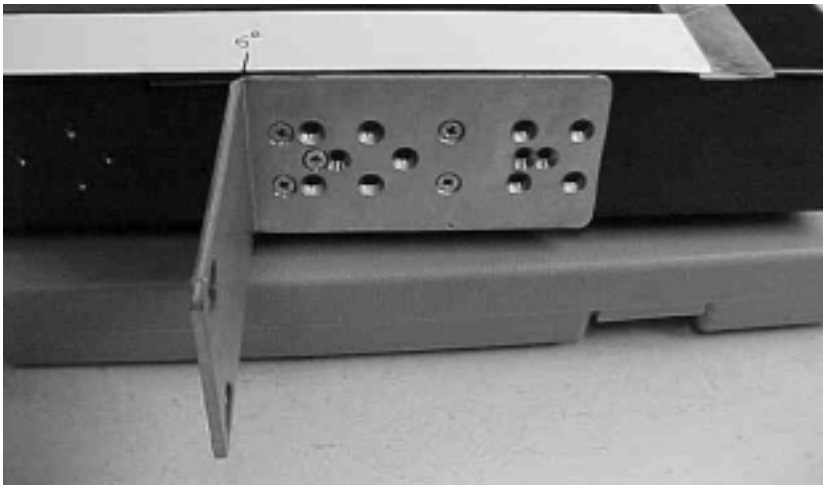
—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

To front mount a drawer in the 5-inch setback position, attach the mounting brackets as shown in Figure 4-52 for a regular drawer and as shown in Figure 4-53 for an OMX 16CH DWDM.

Figure 4-52
Front mount (5-inch setback)

OM2115.jpg

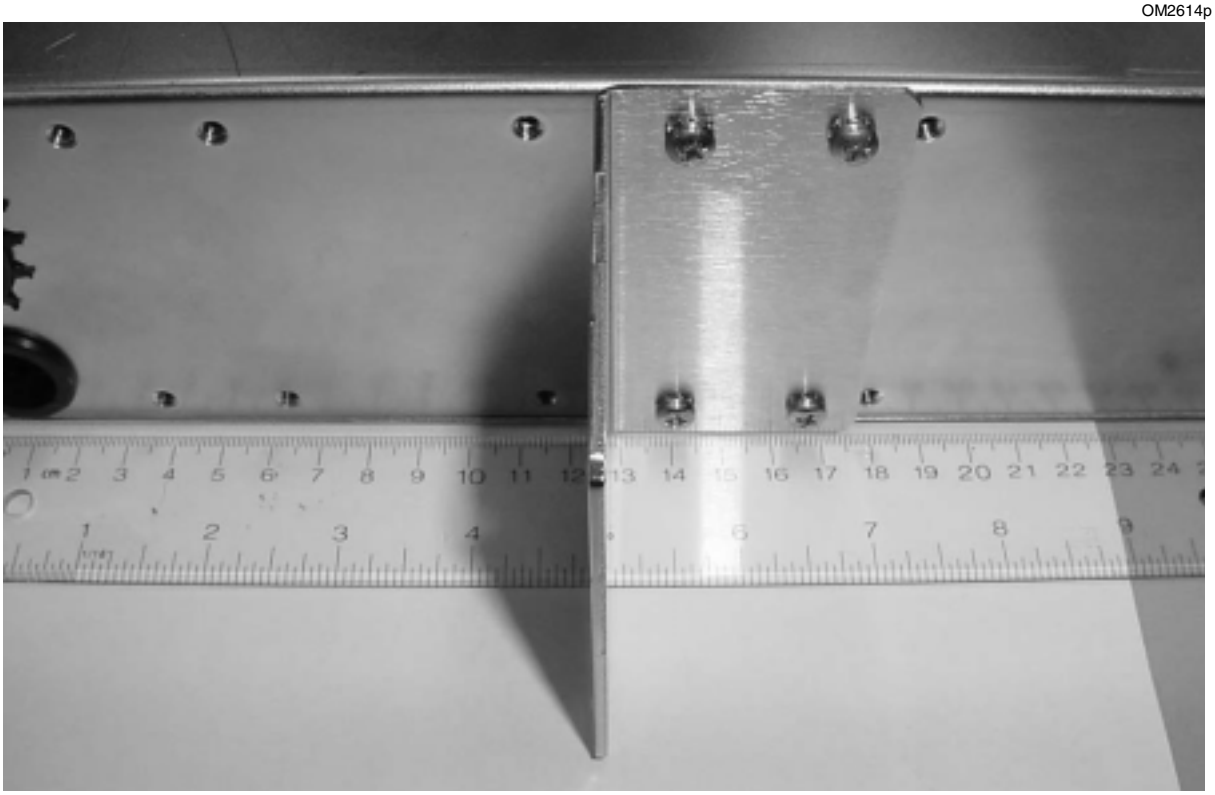


—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Figure 4-53
OMX 16CH DWDM front mount (5-inch setback)

OM2614p



—continued—

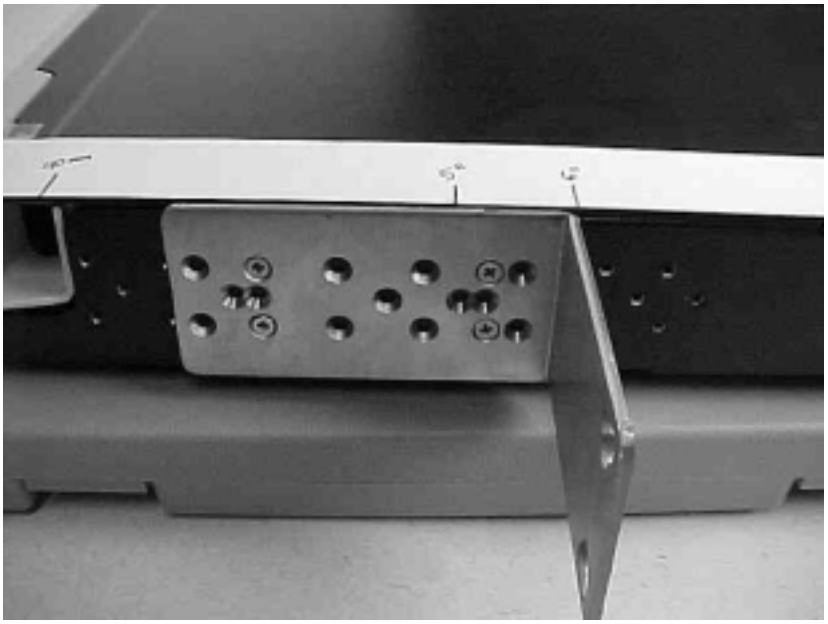
Procedure 4-15 (continued)
Installing and grounding equipment drawers

To front mount a drawer in the 6-inch setback position, attach the mounting brackets as shown in Figure 4-54 for a regular 1U drawer and as shown in Figure 4-55 for an OMX 16CH DWDM.

> ***Note:*** For the regular 1U drawer, the mounting brackets are mounted in a reverse position (from the 40 mm and 5-inch setback positions).

Figure 4-54
Front mount (6-inch setback)

OM2116.jpg

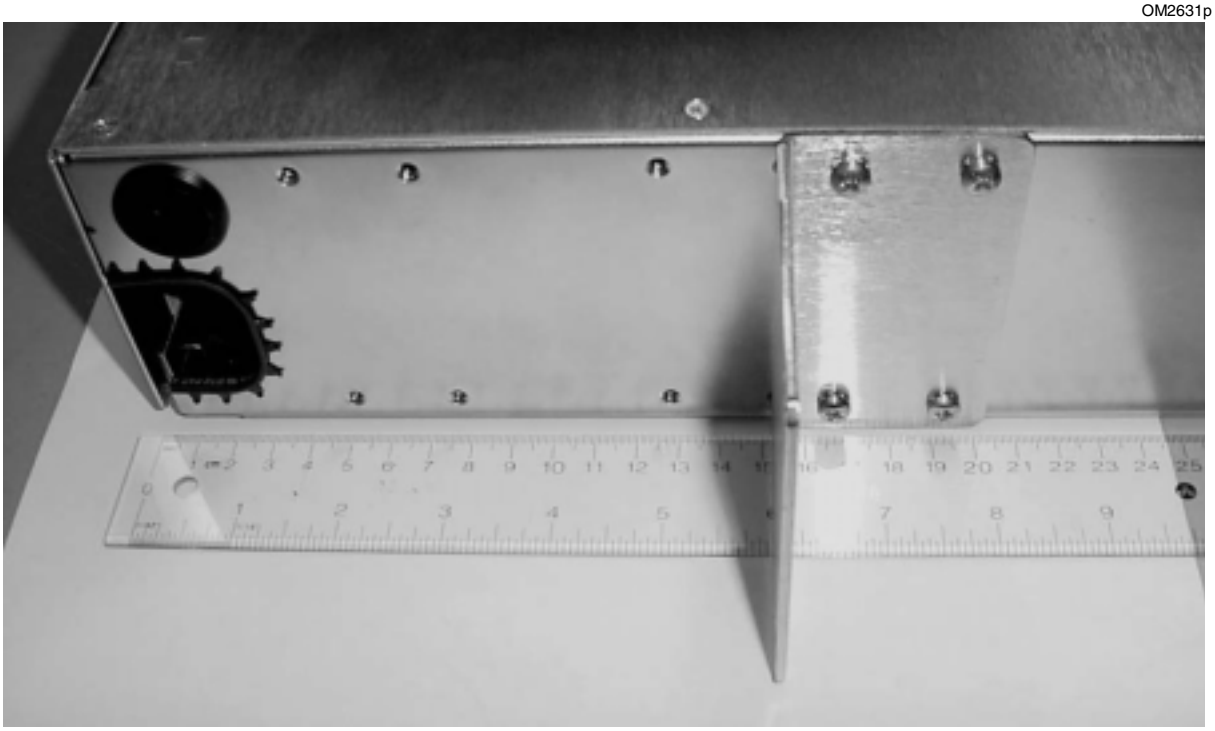


—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Figure 4-55
OMX 16CH DWDM front mount (6-inch setback)

OM2631p



—continued—

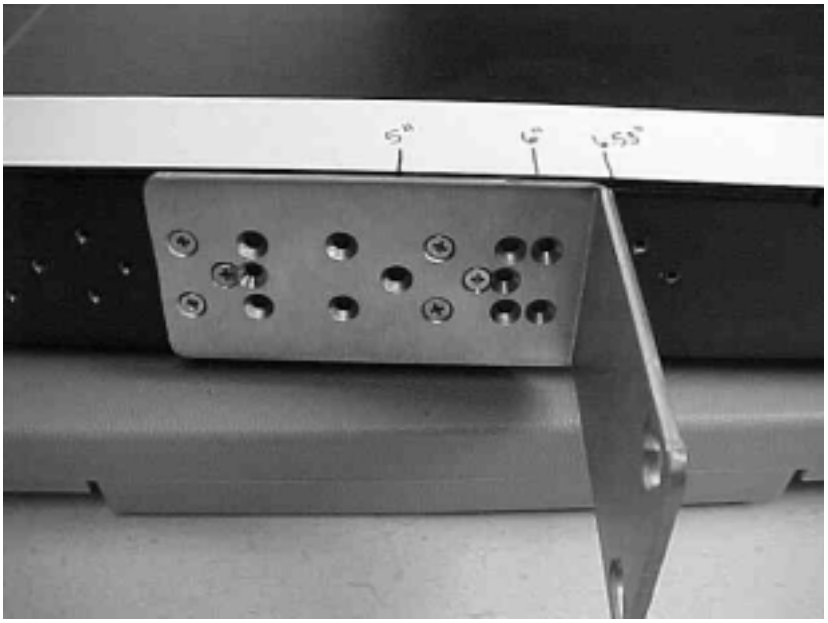
Procedure 4-15 (continued)
Installing and grounding equipment drawers

To front mount a drawer in the 6.5-inch setback position, attach the mounting brackets as shown in Figure 4-56 for a regular 1U drawer and as shown in Figure 4-57 for an OMX 16CH DWDM.

> ***Note:*** For both the regular 1U drawer and the OMX 16CH DWDM, the mounting brackets are mounted in a reverse position (from the 40-mm and 5-inch setback positions). However, an exception applies to the OMX 1CH and 4CH OADM ITU CWDM. On these 1U drawers, you do not reverse the rack mounting bracket for the 6.5-inch setback position (not shown in the following figures).

Figure 4-56
Front mount (6.5-inch setback)

OM2117t.jpg

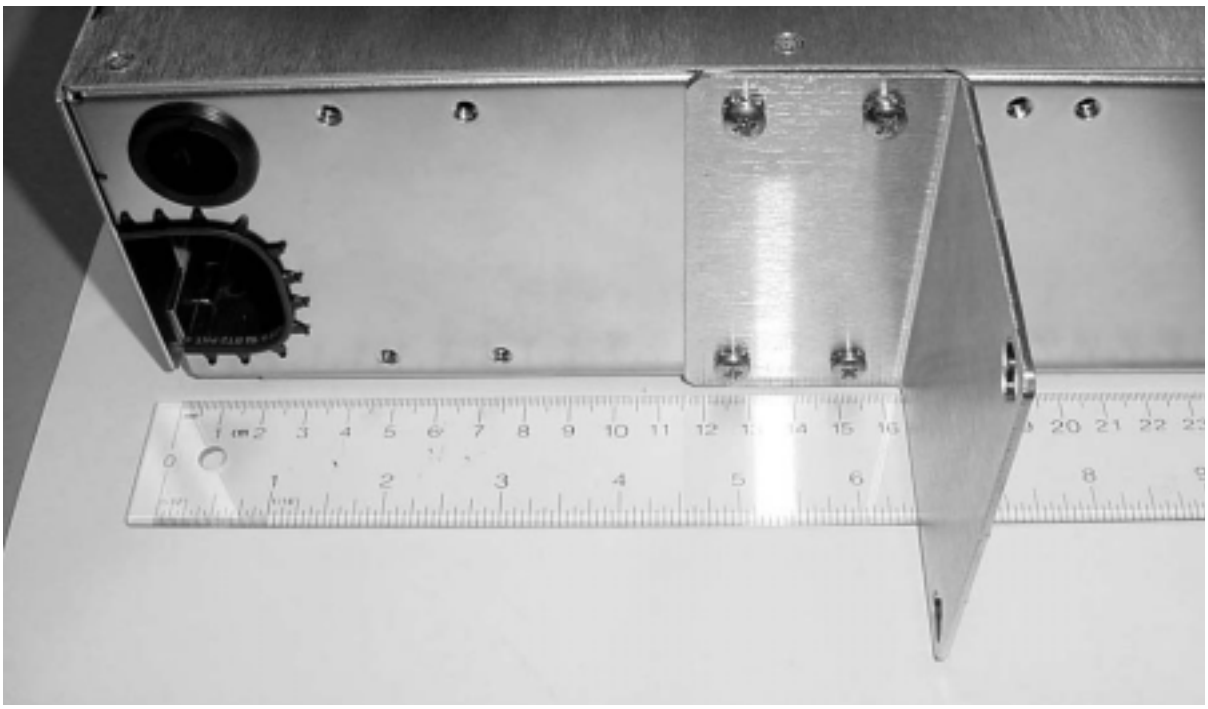


—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Figure 4-57
OMX 16CH DWDM front mount (6.5-inch setback)

OM2632p



Requirements

ATTENTION
You must have already determined the correct position in the rack for the particular type of component you are installing. See the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

Table 4-18 lists the tools and materials required to install and ground a drawer.

—continued—

Table 4-18
Tools and materials for installing and grounding a drawer

Item	Quantity	Supplied	√
Mounting brackets	2 sets (2 brackets per set)	yes	
Phillips flat countersunk screws 4-40 X 3/16-in. (for attaching mounting brackets to the drawer)	12	yes	
Regular 1U drawers: single-hole grounding lug OMX 16CH DWDM: two-hole grounding lug	2 2	no yes	
Regular 1U drawers: 2-holed lug for 10 AWG wire or 6 AWG (for system grounding point) ***Note:*** This 2-holed lug (which is not supplied) is a choice in addition to the single-hole lug (which is supplied).	2	not supplied with the 1U drawer	
10 AWG wire or 6 AWG wire (for grounding), as desired, for 1U equipment drawer ***Note:*** See details regarding the related 2-holed lug.	1	no (for regular 1U drawers) yes (OMX 16CH DWDM)	
2-holed lug (#10 bolt, 5/8" spacing) for 6 AWG wire for grounding 1U drawer	2	supplied with 1U drawer	
2-holed lug (#10 bolt, 5/8" spacing) for 10 AWG wire (for grounding 1U drawer)	2	not supplied with the 1U drawer	
#12-24 x 1/2-inch hex head thread forming screws	4	yes	
#12 external-tooth lock washers	4	yes	
#10-32 x 3/4-inch Phillips head machine screws	4	yes	
#10-32 flange-mount nuts	4	yes	
#10 external-tooth lock washers	4	yes	
# 8-32 x 5/16 in. Philips head machine screws (for attaching mounting brackets to the OMX 16CH DWDM)	8	yes (with the OMX 16CH DWDM)	
M5 x 20 mm machine screws	4	yes	
M5 external-tooth lock washers	4	yes	
M6 x 20 mm machine screws	4	yes	
M6 flange-mount nuts	4	yes	

Table 4-18 (continued)
Tools and materials for installing and grounding a drawer

Item	Quantity	Supplied	√
M6 external-tooth lock washers	4	yes	
#1 Phillips screwdriver	1	no	
#2 Phillips screwdriver	1	no	
#3 Phillips screwdriver	1	no	
5/16-inch socket (for hex-head screws)	1	no	
Torque wrench	1	no	

The torque required for attaching the screws from Table 4-18 are listed in Table 4-19.

Table 4-19
Torque values

Item	Torque
Phillips flat countersunk screws 4-40 X 3/16-in. (for attaching mounting brackets to the drawer)	9 in.-lb.
#12-24 x 1/2-inch Hex head thread forming screws	32 in.-lb.
#10-32 x 3/4-inch Phillips head machine screws	24 in.-lb.
# 8-32 x 5/16 in. Philips head machine screws (for attaching mounting brackets to the OMX 16CH)	18 in-lb.
M5 x 20mm machine screws	30 in.-lb.
M6 x 20mm machine screws	45 in.-lb.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Precautions

CAUTION
Risk of equipment damage
Make sure that you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

ATTENTION
Drawers are shipped with mounting brackets installed for front-mounting into a 19-inch equipment rack. If you are front-mounting the drawer with the brackets already installed into a 19-inch rack, begin with step 7.

Action

Step	Action
1	Place the drawer on a hard, level surface with the front facing toward you.
2	**If** you are — **Then** go to mid-mounting or front-mounting in a 19-inch or 23-inch or 535-mm ETSI rack — step 3 front-mounting drawers with 19-inch front mounting brackets already installed — step 7
3	Remove the 19-inch mounting brackets installed in the front-mounting holes of the shelf.
4	Select the appropriate mounting brackets according to your equipment rack (see the introduction to this procedure). Select the appropriate mounting holes to use according to Figure 4-50 through Figure 4-56.
5	Hold the bracket in position against the side of the drawer. Insert the required screws, 3 to 5, (#4-40 X 3/16 in.) and tighten to a torque value of 9 in-lb.
6	Attach the second mounting bracket on the other side of the drawer (repeat step 4 and step 5).

ATTENTION
Make sure that the drawer is adequately supported during the rack-mounting procedure.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Step	Action
7	Lift and position the drawer in the rack or cabinet.
8	On one side of the drawer, insert a screw with lock washer through the top hole in the mounting bracket and into the rack rail and secure the screw. For torque values, see Table 4-19 on page 4-87.
9	On the other side of the drawer, insert one screw with lock washer through the top hole in the mounting bracket and into the rack rail and secure the screw. For torque values, see Table 4-19 on page 4-87.
10	Insert one screw with lock washer into each of the remaining holes on both sides of the drawer.
11	Tighten all the screws to secure the drawer to the rack rails. For torque values, see Table 4-19 on page 4-87.
12	Measure and cut a length of insulated ground wire to reach from the ground point on the drawer to the system ground point (see Figure 4-28 on page 4-48). ***Note:*** For the regular 1U drawer, the mounting bracket on the left side of the drawer is the ground point for the drawer. A second ground point for the drawer is located on the left side of the drawer (see Figure 4-59 on page 4-92). For the OMX 16CH DWDM, the ground point is located inside the module on the top left of the Channel 1 add/drop connectors as shown in Figure 4-61 on page 4-94. For the regular 1U drawer and the OMX 16CH DWDM, the metallic grounding strip on the rack rail is the connection point for the system ground. If the mounting brackets rest on the metallic tape, you do not require the ground cable.
13	Prepare the ground cable as follows.

If you are using	**Then**
single-holed lugs	strip 7 mm (0.25 in.) of insulation from both ends of the 10 AWG ground cable (see Figure 4-28 on page 4-48)
the 6 AWG ground cable and the 2-holed lug (which is supplied with the 1U drawer)	strip 14 mm (0.5 in) of insulation from both ends of the 6 AWG ground cable

Note: Strip the ground cable based on the manufacturer's recommendations or standard practice.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Step	Action
14	Select the appropriate ground lug to insert and crimp at each end of the stripped wire.

If you are	**Then** select
grounding a regular 1U drawer (using the ground on the mounting bracket)	a single hole ground lug and continue with step 15
grounding a regular 1U drawer (using the ground on the left side of the drawer)	a 2-holed ground lug and continue with step 20
grounding an OMX 16CH DWDM	a 2-holed ground lug and continue with step 27

15	Remove the top screw on the mounting bracket on the left side of the drawer, where the bracket is attached to the rack.
16	Position the lug over the hole and insert the screw (with the lockwasher attached) through the lug, the mounting bracket, and into the rail.
17	Tighten the screw. For torque values, see Table 4-19 on page 4-87.
18	Use a screw to secure the ring lug on the other end of the ground wire to the system ground point (see Figure 4-58). For torque values, see Table 4-19 on page 4-87.
19	If required, put the appropriate East and/or West label sticker(s) on the faceplate of the drawer. You have completed this procedure.
20	Route the ground cable behind the back rack upright to the ground point on the left side of the drawer.
21	Position the lug over the hole and insert the screws (with the lockwasher attached) through the lug. ***Note:*** The screws are provided with the drawer.
22	Use a screw to secure the ring lug on the other end of the ground wire to the system ground point (see Figure 4-58). For torque values, see Table 4-19 on page 4-87.
23	Use two screws to secure the dual ring lug on the other end of the ground wire to the system ground point (see Figure 4-62). For torque values, see Table 4-19 on page 4-87.
24	If required, put the appropriate East and/or West label sticker(s) on the faceplate of the drawer.

—continued—

Procedure 4-15 (continued)
Installing and grounding equipment drawers

Step	Action
25	Tighten the screw. For torque values, see Table 4-19 on page 4-87
26	Use a screw to secure the ring lug on the other end of the ground wire to the system ground point (see Figure 4-58). For torque values, see Table 4-19 on page 4-87. You have completed this procedure.
27	Open the OMX 16CH DWDM drawer by unscrewing the two lock-screws on the top side (left and right) of the front panel. Then, pull down the OMX 16CH DWDM front panel. See Figure 4-60 for a view of the top right lock screw (front panel closed).
28	Locate the dual hole grounding point inside the OMX 16CH DWDM. The dual hole grounding point is located in the top left portion of the module, near the Band 1 fiber connectors (see to Figure 4-61).
29	Insert the ground wire in the OMX 16CH DWDM by routing the wire and the dual hole lug through the round aperture on the side of the OMX 16CH DWDM. The round aperture is where the ground wire must exit the OMX 16CHM DWDM when the front panel is closed (see Figure 4-61).
30	Select the two required screws in the OMX 16CH DWDM installation kit, and secure the ground wire to the dual hole ground point inside the OMX 16CH DWDM (see Figure 4-61).
31	Tighten the screw. For torque values, see Table 4-19 on page 4-87.
32	Use two screws to secure the dual ring lug on the other end of the ground wire to the system ground point (see Figure 4-62). For torque values, see Table 4-19 on page 4-87.
33	Close the OMX 16CH DWDM front panel by pulling up the panel and securing the two external lock-screws.
34	If required, put the appropriate East and/or West label sticker(s) on the faceplate of the OMX 16CH DWDM.

—end—

Figure 4-58
Grounding each drawer individually to the rack

OM1331t.jpg

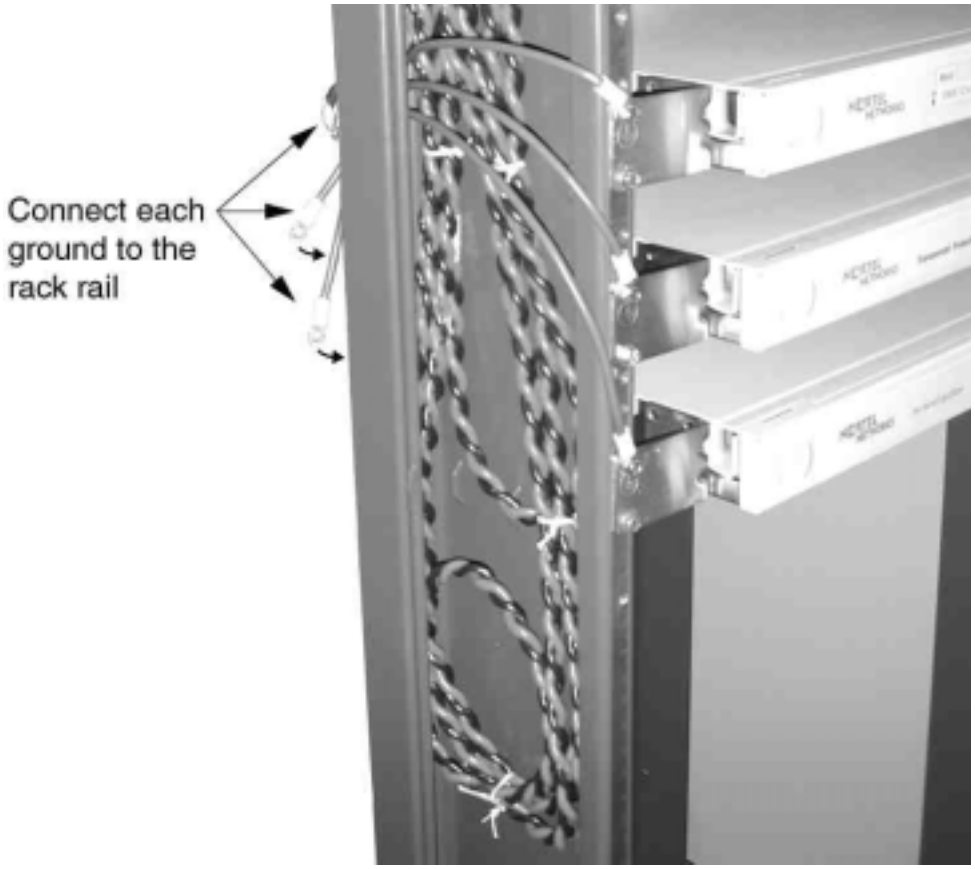


Figure 4-59
Second ground point on drawer (left side)

OM2828t.jpgt

Figure 4-60
Lock screw on the OMX 16CH DWDM front panel (front panel closed)

OM2613p

Figure 4-61
Dual hole ground point inside the OMX 16CH DWDM

OM2611p.jpg

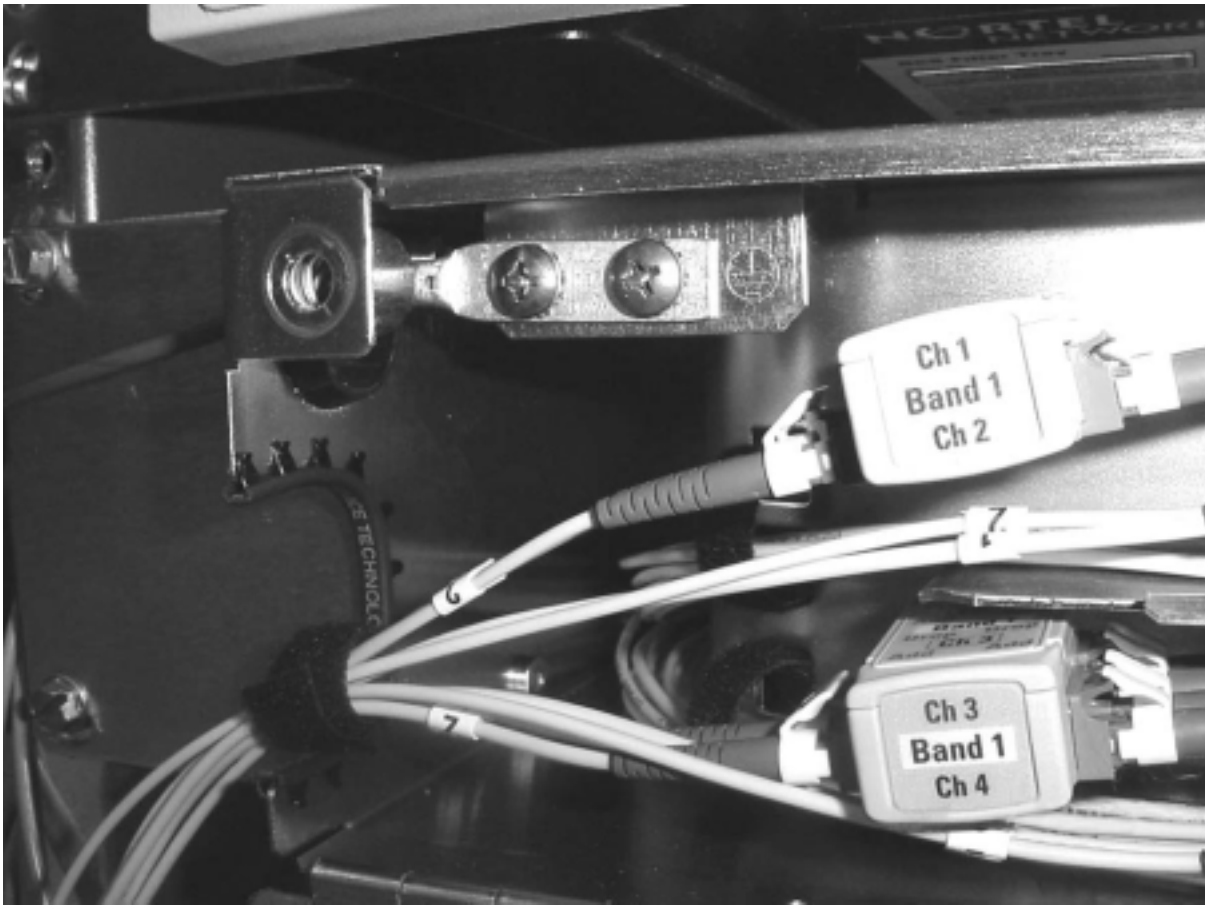


Figure 4-62
Dual hole ground point on the rack rail

OM2612p.jpg

Procedure 4-16
Installing and grounding Equipment Inventory Unit (NT0H43HA)

Follow this procedure to mount the Equipment Inventory Unit (EIU) (NT0H43HA) in an equipment rack or cabinet.

ATTENTION

If you plan to interconnect the drawers installed on an Optical Metro 5200 shelf, leave 1 U of space between the drawers to allow for fiber bend.

For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110. For more information on Optical Metro 5200 hardware, see *Hardware Description*, 323-1701-102.

Each drawer must be installed in an equipment rack or cabinet, and is shipped with three styles of mounting brackets:

- ETSI
- 19 inch
- 23 inch

Holes in the left and right sides of the drawer are used to secure the mounting brackets to a drawer.

ATTENTION

Figure 4-63, Figure 4-64, Figure 4-65, and Figure 4-66 show a 23-inch rack mounting bracket. All three brackets use a common pattern to attach screws to the side of the drawer for any given mounting position.

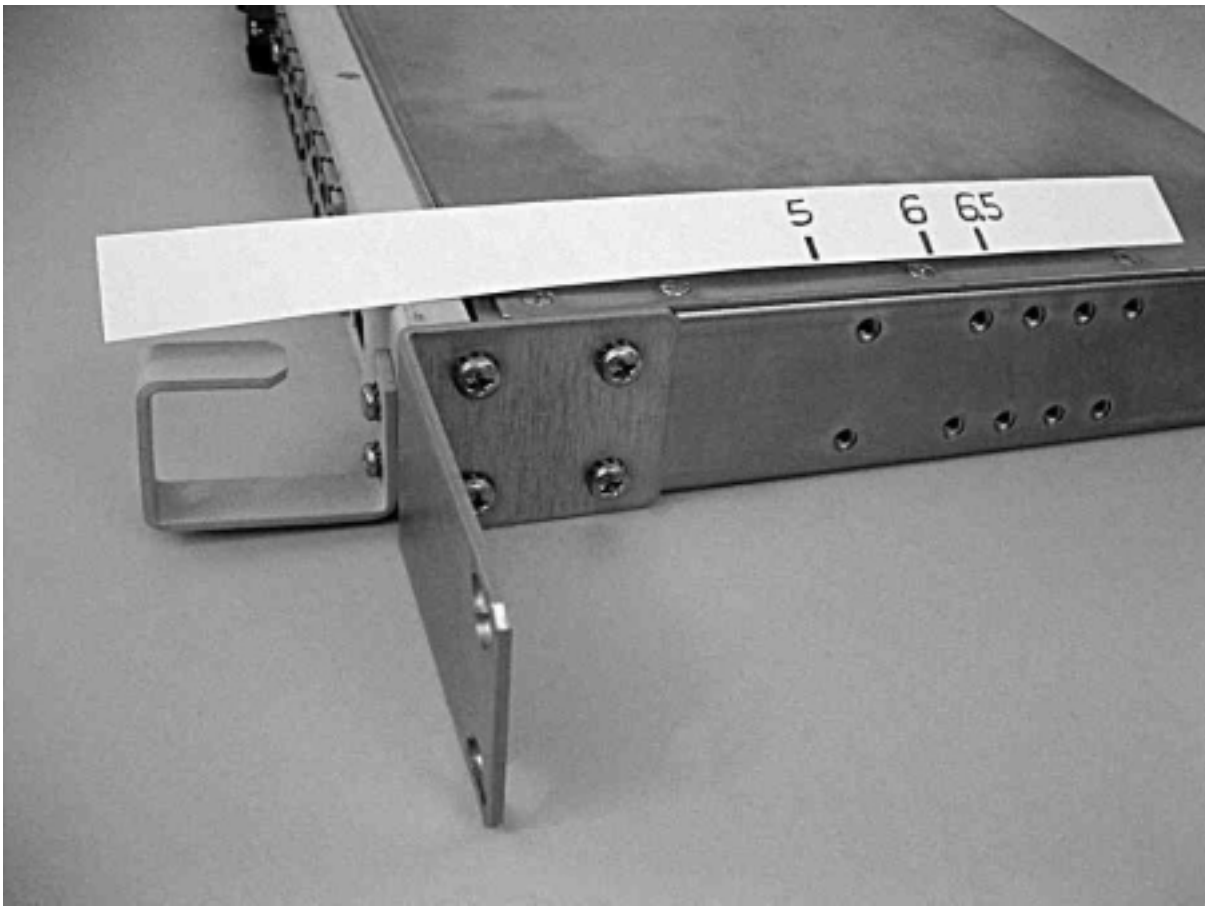
—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

To front mount a drawer with a 40-mm setback, attach the mounting brackets as shown in Figure 4-63.

Figure 4-63
Front mounting a drawer with a 40-mm setback

OM2344p.jpg



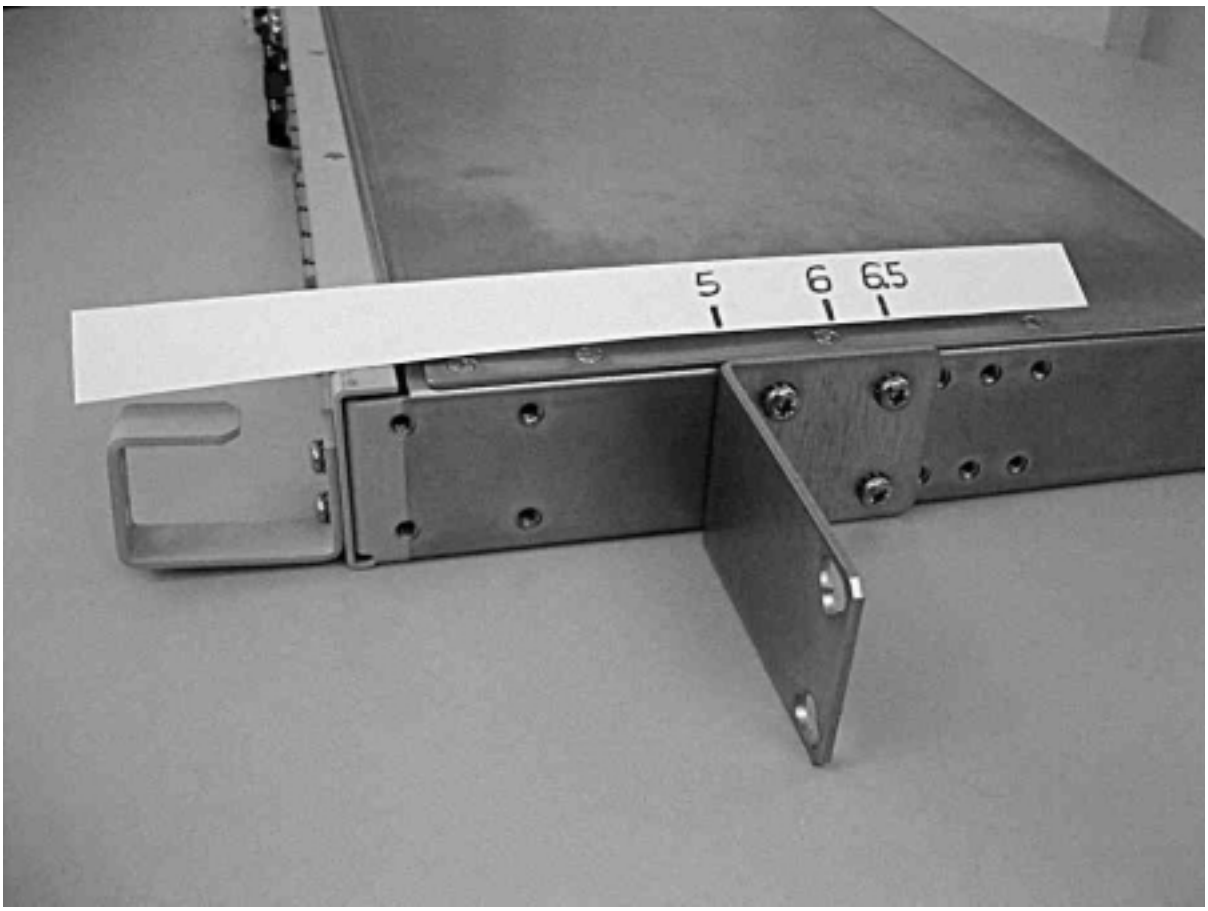
To front mount a drawer with a 5-inch setback, attach the mounting brackets as shown in Figure 4-64.

—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

Figure 4-64
Front mounting a drawer with a 5-inch setback

OM2343p.jpg



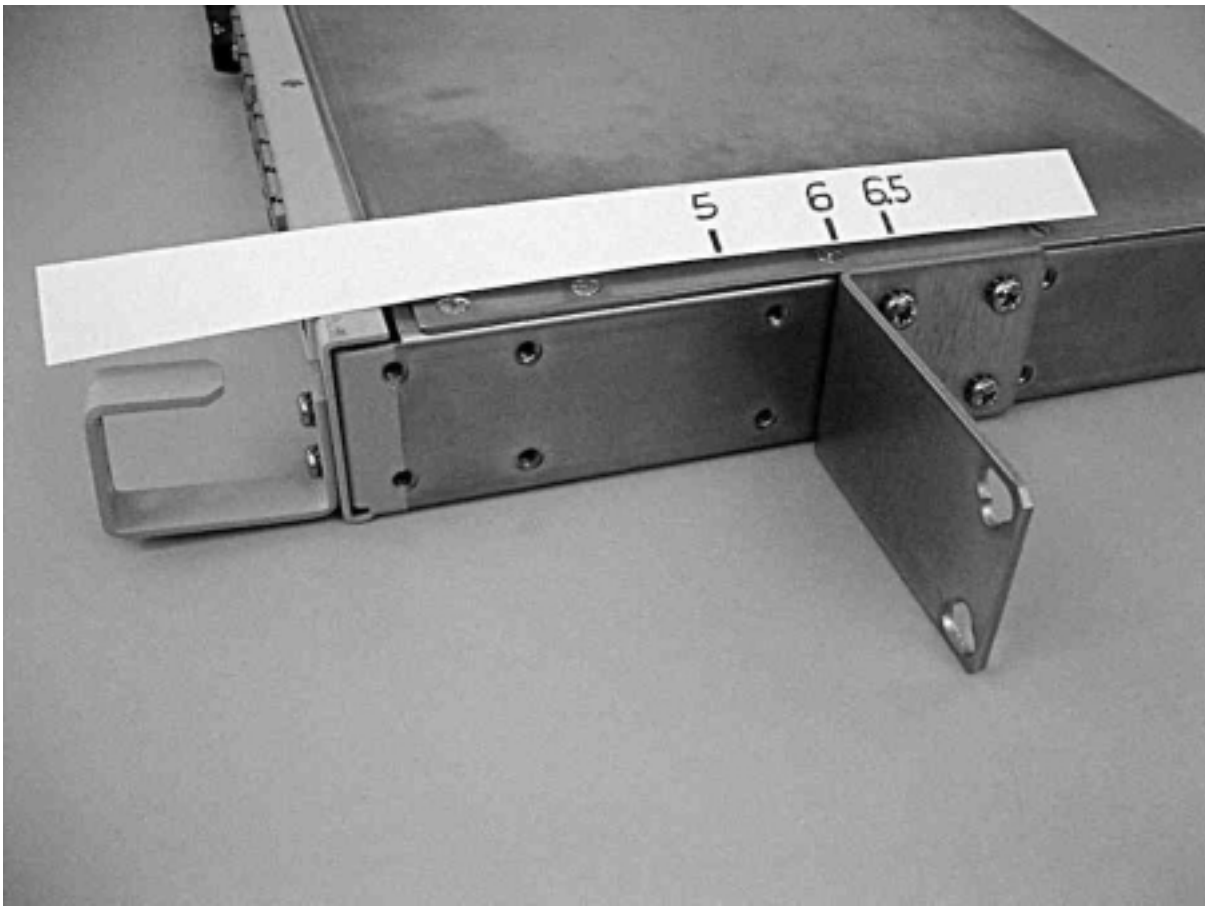
—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

To front mount a drawer in the 6-inch setback position, attach the mounting brackets as shown in Figure 4-65.

Figure 4-65
Front mount (6-inch setback)

OM2341p.jpg



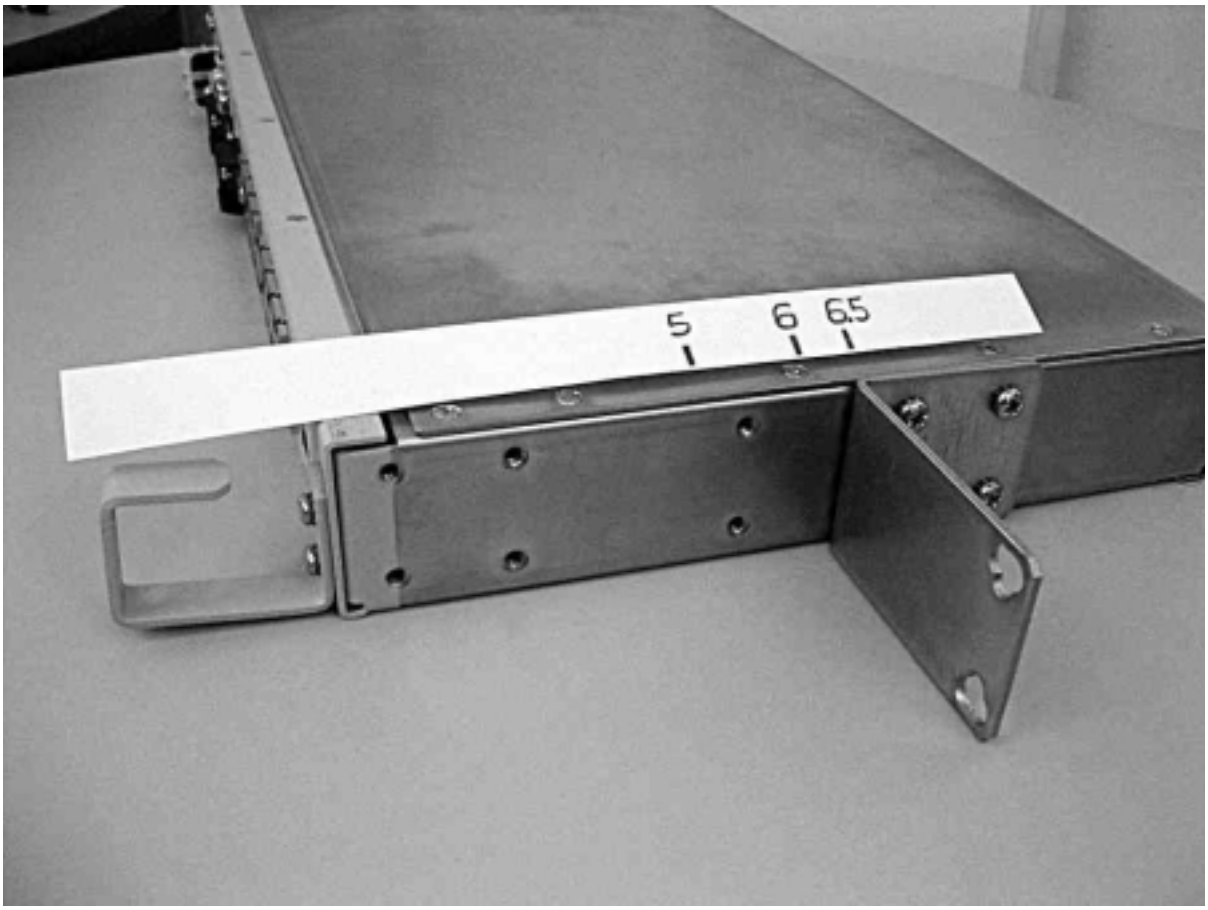
—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

To front mount a drawer in the 6.5-inch setback position, attach the mounting brackets as shown in Figure 4-66.

Figure 4-66
Front mount (6.5-inch setback)

OM2342p.jpg



Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

Requirements

ATTENTION
You must have already determined the correct position in the rack for the particular type of component you are installing. See the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

Table 4-20 lists the tools and materials required to install and ground an EIU.

Table 4-20
Tools and materials for installing and grounding an EIU

Item	Quantity	Supplied	√
Mounting brackets	3 sets (2 brackets for each set)	yes	
#8-32 Phillips head screws (for attaching the mounting brackets to the drawer)	8	yes	
10 AWG 2-hole crimp lug (for grounding)	2	yes	
#10-32 screw (for attaching the ground lug to the EIU)	2	yes	
10 AWG green wire (for grounding)	24-inch	yes	
#12-24 hexhead screws (for mounting the shelf to the frame and the ground lug to the system ground)	6	yes	
#2 Phillips screwdriver	1	no	
5/16-inch socket (for hexhead screws)	1	no	
Torque wrench (see Note)	1	no	
Note: The torque required to attach the screws listed in this table are listed in Table 4-21.			

—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

Table 4-21
Torque values

Item	Torque value
#12-24 x 1/2-inch hexhead thread-forming screws	32 in.-lb.
#10-32 x 3/4-inch Phillips head machine screws	24 in.-lb.
#8-32 Phillips head machine screws	18 in.-lb.

CAUTION
Risk of equipment damage
Make sure that you know how to handle electronic components correctly before you begin installation procedures. Incorrect handling can cause damage to static-sensitive components.

Action

Step	Action
1	Place the drawer on a hard level surface with the front facing toward you.
2	Select your next step.

If you are	**Then** go to
mid-mounting or front-mounting in a 19-inch or 23-inch or 535-mm ETSI rack	step 3
front-mounting drawers with 19-inch front-mounting brackets that are already installed	step 7

3	Remove the 19/23 mounting brackets installed in the front-mounting holes of the shelf.
4	Select the appropriate mounting brackets according to your equipment rack (see the introduction to this procedure). Select the appropriate mounting holes to use according to Figure 4-63, Figure 4-64, Figure 4-65, and Figure 4-66.
5	Hold the bracket in position against the side of the drawer. Insert the four screws (#8-32) and tighten to a torque value of 18 in-lb.

—continued—

Procedure 4-16 (continued)
Installing and grounding Equipment Inventory Unit (NT0H43HA)

Step	Action
6	Attach the second mounting bracket on the other side of the drawer. Then repeat step 4 and step 5.

ATTENTION
Make sure that the drawer is adequately supported during the rack-mounting procedure.

7	Lift and position the drawer in the rack or cabinet.
8	On one side of the drawer, insert a screw with lock washer through the top hole in the mounting bracket and into the rack rail and secure the screw. For torque values, see Table 4-21 on page 4-102.
9	On the other side of the drawer, insert one screw with lock washer through the top hole in the mounting bracket and into the rack rail and secure the screw. For torque values, see Table 4-21 on page 4-102.
10	Insert one screw with lock washer into each of the remaining holes on both sides of the drawer.
11	Tighten all the screws to secure the drawer to the rack rails. For torque values, see Table 4-21 on page 4-102.
12	Measure and cut a length of insulated ground wire to reach from the ground point on the drawer to the system ground point. See Figure 4-28 on page 4-48.
13	Strip 13 mm (0.50 in.) of insulation from both ends of the 10 AWG ground cable. See Figure 4-28 on page 4-48.
14	Insert both stripped ends into the two 2-hole lugs and crimp.
15	Use the two #10-32 screws to attach one 2-hole lug to the front panel of the EIU beside the ground symbol.
16	Tighten the screws. For torque values, see Table 4-21 on page 4-102.
17	Use the two remaining #12-24 hexhead screws to attach the other lug to the system ground point.
18	Tighten the screws. For torque values, see Table 4-21 on page 4-102.

—end—

Procedure 4-17
Installing and grounding a second ECT drawer in an OFA shelf

Use this procedure to install a second drawer in an Optical Metro 5200 shelf for an ECT. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information on ECT drawers, see "ECT" in *Hardware Description*, 323-1701-102.

Each optical fiber amplifier (OFA) shelf has a built-in drawer to hold one ECT tray. The ECT that installs in this tray is for either east or west traffic. You can install a second, removable drawer to hold an ECT tray for traffic of the opposite direction directly below the first tray.

An OFA shelf supports a maximum of two ECTs. Nortel Networks recommends that you install a second ECT drawer, even if you currently need only one ECT. By installing the second drawer, you can ensure that you have space in the rack to accommodate a second ECT in the future.

To install the second ECT drawer, you must use the OFA installation kit. This kit includes:

- An empty drawer
- Mounting hardware (nuts and bolts)
- Brackets
  - — 1 set of EIA (standard) 19 inch mounting brackets (installed) - Part # P0910852
  - — 1 set of EIA (standard) 23 inch mounting brackets - Part #P0910853
  - — 1 set of EIA (metric, 25-mm hole spacing) 19 inch mounting brackets - Part #P0989895
  - — 1 set of EIA (metric, 25-mm hole spacing) 23 inch mounting brackets - Part #P0989894
  - — 1 set of ETSI mounting brackets for 25-mm hole spacing - Part #P09898911

—continued—

- Cooling unit grill cover (to replace the existing grill cover)
- Fiber parking bracket
- ECT datacom cables (2)
- Fibers (ECT east to OFA circuit pack fibers - NT0H4402, and ECT west to OFA circuit pack fibers - NT0H4401)

Requirements

Table 4-22 lists the tools required to install a second ECT drawer.

Table 4-22
Tools for installing a second ECT drawer

Item	Quantity	Supplied	√
Phillips #2 screwdriver	1	no	
Miniature slot screwdriver	1	no	
Wire strippers	1	no	
10 AWG stranded copper wire	as required	no	
Crimp tool	1	no	
OFA installation kit	1	yes	
Single hole ring nuts	2	no	

—continued—

Procedure 4-17 (continued)
Installing and grounding a second ECT drawer in an OFA shelf

Action

Step	Action	
1	**If** you are installing the drawer	**Then**
	in a 19-inch frame	screw in the drawer in the frame right below the existing ECT drawer
	in a 19-inch frame using 25mm hole spacing	replace the already-installed mounting brackets with the set of EIA (metric, 25-mm hole spacing) 19-inch mounting brackets (Part #P0989895) and screw in the drawer in the frame right below the existing ECT drawer.
	in a 23-inch frame	replace the already-installed mounting brackets with the set of EIQ (standard) 23-inch mounting brackets (Part #P0910852) and screw in the drawer in the frame right below the existing ECT drawer
	in a 23-inch frame using 25-mm hole spacing	replace the already-installed mounting brackets with the set of EIA (metric, 25-mm hole spacing) 23-inch mounting brackets (Part #P0989894) and screw in the drawer in the frame right below the existing ECT drawer.
	in an ETSI 535-mm frame	replace the already-installed mounting brackets with the set of ETSI mounting brackets for 25-mm hole spacing (Part #P09898911) and screw in the drawer in the frame right below the existing ECT drawer.
2	Measure and cut a length of insulated 10 AWG ground wire to reach from the ground point on the drawer to the system ground point. See Figure 4-58, Grounding each drawer individually to the rack on page 4-92. ***Note:*** The mounting bracket on the left side of the drawer is the ground point for the drawer. The metallic grounding strip on the rack rail is the connection point for the system ground.	
3	Strip 7 mm (0.25 in.) of insulation from both ends of the 10 AWG ground cable. See Figure 4-28 on page 4-48.	
4	Attach and crimp single hole ring lugs to each stripped end of the 10 AWG ground cable.	
5	Remove the top screw on the mounting bracket on the left side of the drawer, where the bracket is attached to the rack.	

—continued—

Procedure 4-17 (continued)
Installing and grounding a second ECT drawer in an OFA shelf

Step	Action
6	Position the lug over the hole and insert the screw through the lug, the mounting bracket and into the rail.
7	Tighten the screw.
8	Use a screw to secure the lug on the other end of the ground wire to the system ground point.
9	**If** you are / **Then** currently installing an ECT tray in the drawer — you have completed this procedure. Go to Procedure 4-19, "Installing an ECT tray in a drawer". not installing an ECT tray in the drawer (or are not planning to install it in the near future) — you must install a fiber parking bracket in the drawer. Go to step 10.
10	Open the drawer by pressing and holding the front locking tabs on each side of the drawer and pull the drawer out until it is fully extended.
11	Remove the two front left screws from the retaining flanges at the front of the drawer.
12	Place the fiber parking bracket at the front left corner of the drawer and screw the fiber parking bracket to the retaining flanges. See Figure 4-67 on page 4-108.
13	Connect the flexible fiber guides to the shelf. Connect the left side flexible fiber guide to the fiber parking bracket. See Figure 4-68 on page 4-108.
14	Close the drawer by pressing and holding the front locking tabs.
15	Take the longer grill cover from the OFA installation kit and install it on the shelf (replacing the regular grill cover). ***Note:*** The longer cover protects both ECT drawers and ensures that there is enough space reserved in the rack for a second ECT drawer.

—end—

Figure 4-67
Parking bracket

OM2134t.jpg

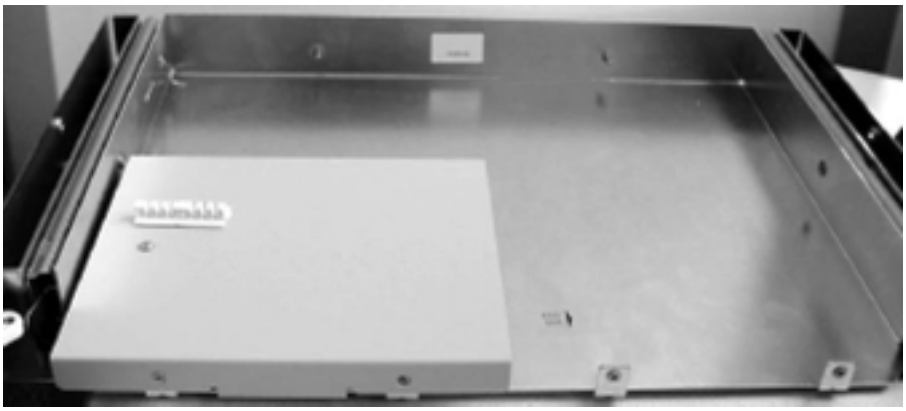


Figure 4-68
Parking bracket with fiber guide

OM2135t.jpg

Procedure 4-18
Installing and grounding a second OMX drawer in an OADM shelf

Use this procedure to install a second drawer in an Optical Metro 5200 shelf for an OMX (standard). For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

ATTENTION

The OMX (Standard) tray is assigned the PEC NT0H5730, and is installed within an OMX standard drawer . The OMX standard drawer is a fixed part of the 12U high NT0H50AA Optical Metro 5200 shelf assembly (1U = 44.45 mm). The OMX (Standard) tray will house (2) OMX modules with matched wavelength bands. Each OMX module is ordered using PEC NT0H30xA (where x = A,B,C,D,J,K,L,M).

Standard NT0H30xA OMX modules can be used in conjunction with the 11U high NT0H50BA or NT0H50BB Optical Metro 5200 shelf assembly variant.

In order to setup the OMX (Standard) tray and OMX modules below an 11U or 12U shelf, the NT0H44AJ OMX mounting kit must be ordered.

For further information, refer to *Hardware Description*, 323-1701-102.

For more information on OMX (Standard) drawers, see "OMX modules" in *Hardware Description*, 323-1701-102.

Each Optical Metro 5200 12U shelf has a built-in drawer to hold one OMX tray. The OMX that installs in this tray is for both east or west traffic. You can install a second, removable drawer to hold an OMX tray for traffic of an additional band directly below the first tray (see "Optical layer functional blocks" in *Network Planning and Link Engineering*, Part 1, 323-1701-110).

An Optical Metro 5200 12U shelf supports a maximum of two Standard OMXs. Nortel Networks recommends that you install a second OMX (Standard) drawer, even if you currently need only one OMX (Standard). By installing the second drawer, you can ensure that you have space in the rack to accommodate a second OMX (Standard) in the future.

—continued—

Procedure 4-18 (continued)
Installing and grounding a second OMX drawer in an OADM shelf

To install the second OMX (Standard) drawer, you must use the OMX Mounting Kit (Legacy OMX, Short Shelf). This kit includes:

- an empty drawer
- mounting hardware (nuts and bolts)
- brackets
  - — 1 set of EIA (standard) 19 inch mounting brackets (installed) - Part # P0910852
  - — 1 set of EIA (standard) 23-inch mounting brackets - Part #P0910853
  - — 1 set of EIA (metric, 25-mm hole spacing) 19-inch mounting brackets - Part #P0989895
  - — 1 set of EIA (metric, 25-mm hole spacing) 23-inch mounting brackets - Part #P0989894
  - — 1 set of ETSI mounting brackets for 25-mm hole spacing - Part #P09898911
- cooling unit grill cover (to replace the existing grill cover)
- fiber parking bracket
- OMX datacom cables (2)

Requirements

Table 4-23 lists the tools required to install a second OMX drawer.

Table 4-23
Tools for installing a second OMX drawer

Item	Quantity	Supplied	√
Phillips #2 screwdriver	1	no	
Miniature slot screwdriver	1	no	
Wire strippers	1	no	
10 AWG stranded copper wire	as required	no	
Crimp tool	1	no	
OMX mounting kit	1	yes	
Single hole ring nuts	2	no	

—continued—

Procedure 4-18 (continued)
Installing and grounding a second OMX drawer in an OADM shelf

Action

Step	Action
1	Select your first step.

If you are installing the drawer	**Then**
in a 19-inch frame	screw in the drawer in the frame right below the existing OMX (Standard) drawer
in a 19-inch frame using 25mm hole spacing	replace the already-installed mounting brackets with the set of EIA (metric, 25-mm hole spacing) 19-inch mounting brackets (Part #P0989895) and screw in the drawer in the frame right below the existing OMX (Standard) drawer
in a 23-inch frame	replace the already-installed mounting brackets with the set of EIQ (standard) 23-inch mounting brackets (Part #P0910852) and screw in the drawer in the frame right below the existing OMX (Standard) drawer
in a 23-inch frame using 25-mm hole spacing	replace the already-installed mounting brackets with the set of EIA (metric, 25-mm hole spacing) 23-inch mounting brackets (Part #P0989894) and screw in the drawer in the frame right below the existing OMX (Standard) drawer
in an ETSI 535-mm frame	replace the already-installed mounting brackets with the set of ETSI mounting brackets for 25-mm hole spacing (Part #P09898911) and screw in the drawer in the frame right below the existing OMX (Standard) drawer

2	Measure and cut a length of insulated 10 AWG ground wire to reach from the ground point on the drawer to the system ground point. See Figure 4-58, Grounding each drawer individually to the rack on page 4-92. ***Note:*** The mounting bracket on the left side of the drawer is the ground point for the drawer. The metallic grounding strip on the rack rail is the connection point for the system ground.
3	Strip 7 mm (0.25 in.) of insulation from both ends of the 10 AWG ground cable. See Figure 4-28 on page 4-48.
4	Attach and crimp single hole ring lugs to each stripped end of the 10 AWG ground cable.

—continued—

Procedure 4-18 (continued)
Installing and grounding a second OMX drawer in an OADM shelf

Step	Action
5	Remove the top screw on the mounting bracket on the left side of the drawer, where the bracket is attached to the rack.
6	Position the lug over the hole and insert the screw through the lug, the mounting bracket and into the rail.
7	Tighten the screw.
8	Use a screw to secure the lug on the other end of the ground wire to the system ground point.
9	Select your next step.

If you are	**Then**
currently installing an OMX tray in the drawer	you have completed this procedure. Go to Procedure 4-19, “Installing an ECT tray in a drawer”.
not installing an OMX tray in the drawer or are not planning to install an OMX tray in the near future	you must install a fiber parking bracket in the drawer. Go to step 10.

10	Open the drawer by pressing and holding the front locking tabs on each side of the drawer and pull the drawer out until it is fully extended.
11	Remove the two front left screws from the retaining flanges at the front of the drawer.
12	Place the fiber parking bracket at the front left corner of the drawer and screw the fiber parking bracket to the retaining flanges. See Figure 4-69 on page 4-113.
13	Connect the flexible fiber guides to the shelf. Connect the left side flexible fiber guide to the fiber parking bracket. See Figure 4-70 on page 4-113.
14	Close the drawer by pressing and holding the front locking tabs.

—continued—

Procedure 4-18 (continued)
Installing and grounding a second OMX drawer in an OADM shelf

Step	Action
15	Take the longer grill cover from the OMX mounting kit and install the grill cover on the shelf (replacing the regular grill cover). ***Note:*** The longer cover protects both OMX drawers and ensures that there is enough space reserved in the rack for a second OMX drawer.

—end—

Figure 4-69
Parking bracket

OM2134t.jpg

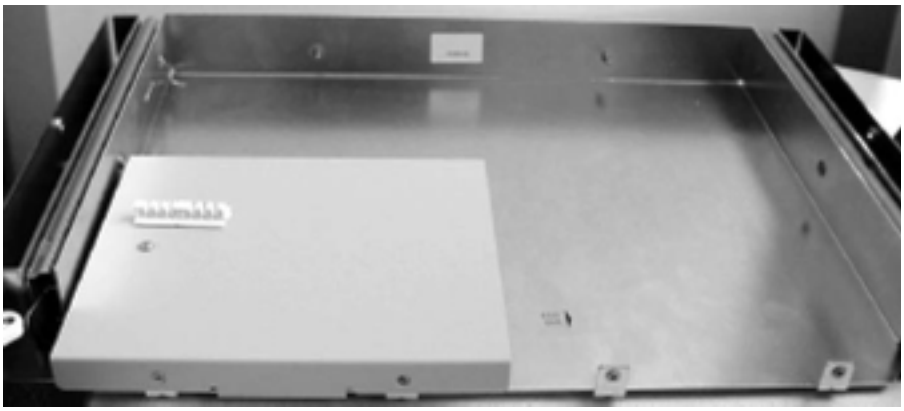


Figure 4-70
Parking bracket with fiber guide

OM2135t.jpg

Procedure 4-19
Installing an ECT tray in a drawer

Follow this procedure to install an ECT tray in a drawer. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering,* 323-1701-110.

For more information on ECT drawers, see "ECT" in *Hardware Description*, 323-1701-102.

Each optical fiber amplifier (OFA) shelf has a built-in drawer to hold one ECT tray. The ECT that installs in this tray is for either east or west traffic. You can install a second, removable drawer to hold an ECT tray for traffic of the opposite direction directly below the first tray.

> ***Note:*** Included in the OFA installation kit are labels identifying East or West traffic. You should place these labels on the ECT trays after installation, and traffic direction is identified.

An OFA shelf supports a maximum of two ECTs. Nortel Networks recommends that you install a second ECT drawer, even if you currently need only one ECT. By installing the second drawer you can ensure that you have space in the rack to accommodate a second ECT in the future.

Each ECT tray contains a splitter/coupler, miniature variable optical attenuators (VOA), and an equalizer for C-band or L-band traffic, depending on the model.

The interconnections for the ECT are the same for each model. Inside the ECT, there are two inputs and two outputs for connections to the OFA C-band and OFA L-band circuit packs. There are also optical transmission signal (OTS) input and output adapters. You access these inputs and outputs by lifting a door located on the top left side of the ECT tray. Figure 4-71 shows the location of the connectors in the ECT. For more information, see the chapter "ECT" in *Hardware Description*, 323-1701-102.

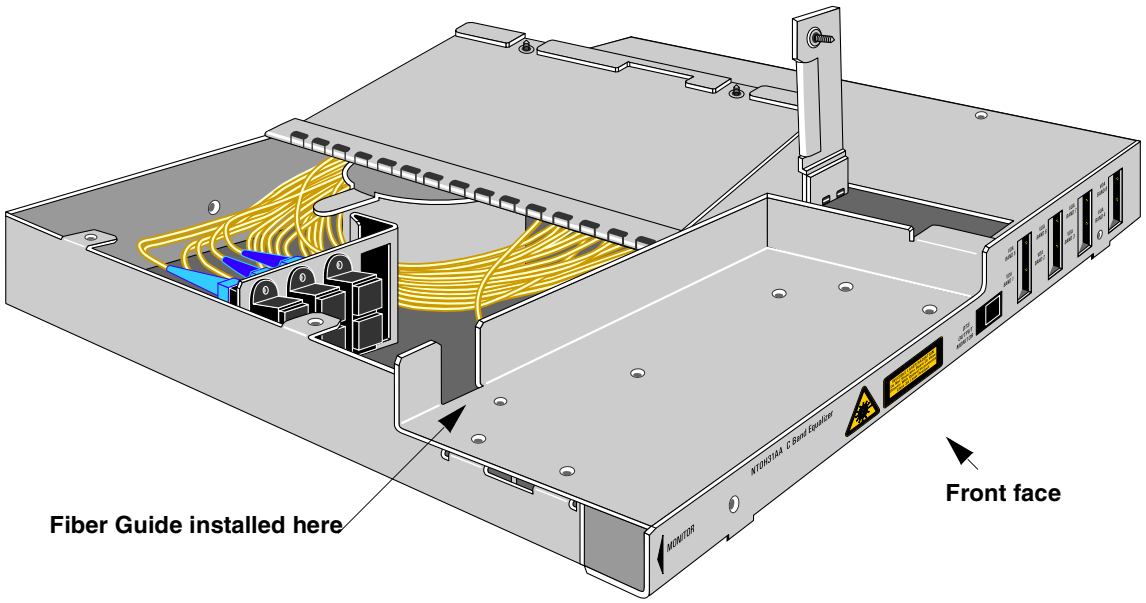
After you install the ECT tray, route the patch cords from the ECT through the flexible fiber guide to the fiber management trough in the OFA shelf. You connect the ECT patch cords to the OFA circuit packs after you seat the circuit packs in the shelf. Refer to Procedure 8-10, "Routing fibers for the ECT tray". For ECT fiber labelling requirements in High Input Power (HIP) amplified systems, see the chapter "Observing safety guidelines" and Procedure 8-1 "Labeling cables and optical fibers" of the chapter "Fiber management" in this book.

—continued—

Procedure 4-19 (continued)
Installing an ECT tray in a drawer

Figure 4-71
Interior view of the ECT tray

OM0131p



Requirements

Table 4-24 lists the tools required to install an ECT tray in the drawer.

Table 4-24
Tools for installing an ECT drawer

Item	Quantity	Supplied	√
Phillips #2 screwdriver	1	no	
Miniature slot screwdriver	1	no	

—continued—

Procedure 4-19 (continued)
Installing an ECT tray in a drawer

Precautions

CAUTION
Risk of equipment damage
Do not make fiber connections to the ECT tray before you install it in the drawer. If you move an ECT tray after you make the fiber connections you can damage the optical fibers.

Action

Step	Action
1	If it is not already open, remove the grill from the cooling unit by loosening the screws. Set the grill aside. ***Note 1:*** When you have completed the installation and are ready to replace the grill, use the redesigned cover that is included in the installation kit. The new cover will protect both ECTs.

—continued—

Procedure 4-19 (continued)
Installing an ECT tray in a drawer

Step	Action	
2	**If**	**Then**
	you only require one EAST ECT tray in the shelf	you will install the EAST ECT tray in the top drawer. The second WEST ECT tray will be placed in the bottom drawer. To install the second ECT drawer in the shelf, refer to Procedure 4-17.
	you only require one WEST ECT tray in the shelf	you will install the WEST ECT tray in the top drawer. Place the right labels included in the OFA installation kit over the current labels on the shelf grill. The second EAST ECT tray will be placed in the bottom drawer. To install the second ECT drawer in the shelf, refer to Procedure 4-17.
	you require two ECT trays in the shelf and you are installing the top ECT tray int he shelf as the EAST ECT and the bottom tray in the shelf as the WEST ECT tray	go to step 3.
	you require two ECT trays in the shelf and you are installing the top ECT tray int he shelf as the WEST ECT and the bottom tray in the shelf as the EAST ECT tray	place the right labels included in the OFA installation kit over the current labels on the shelf grill. Go to step 3.
3	Open the top drawer by pressing and holding the front locking tabs on each side of the drawer and pull the drawer out until it is fully extended. See Figure 4-72 on page 4-119. ***Note:*** Each drawer has two flanges, fabricated as part of the drawer, and two retaining brackets that are attached to the drawer. These flanges and brackets are on the front of the drawer and are used to guide the ECTs into place and secure the module to the drawer. See Figure 4-72.	

—continued—

Procedure 4-19 (continued)
Installing and grounding a second ECT drawer in an OFA shelf

Step	Action	
4	**If**	**Then**
	a fiber bracket has been installed in the drawer	remove the flexible fiber guide by removing the screw on the top of the bracket. Unscrew the two front retaining screws and remove the fiber parking bracket from the tray. Remove the two center retaining brackets from the drawer and secure them to the nuts provided under the access door.
	there is no fiber parking bracket in the empty tray	remove the two center retaining brackets from the drawer and secure them to the nuts provided under the access door.
5	Remove the retaining screws from the front of the ECT tray.	
6	Lift the ECT module over the two flanges on the front of the drawer.	
7	Secure the ECT to the drawer with the two retaining screws that you removed in step 5.	
8	Replace the flexible fiber guide with the screws you removed in step 4. Tighten the screws.	
9	Take the fibers from the OFA installation kit and attach laser radiation tags to the ends of the fiber patch cords, locating them outside the ECT module, close to the connector that plugs into the circuit pack. ***Note:*** The laser radiation tags are part of the Optical Metro 5200 installation kit.	

CAUTION
Risk of equipment damage
Support the fibers of the ECT when you handle the trays. Incorrect handling can damage the optical fibers.

Step	**If** you are installing	**Then**
10	the EAST ECT tray	place the EAST ECT fibers in the drawer, being careful not to pinch any fibers.
	the WEST ECT tray	place the WEST ECT fibers in the drawer, being careful not to pinch any fibers.

11	Close the drawer by pressing and holding the front locking tabs.
12	If you are installing a second tray in the shelf, perform Procedure 4-17, "Installing and grounding a second ECT drawer in an OFA shelf". Otherwise, go to the next step.
13	To install the ECT datacom cables, refer to Procedure 6-9, "Connecting passive devices to the maintenance panel".

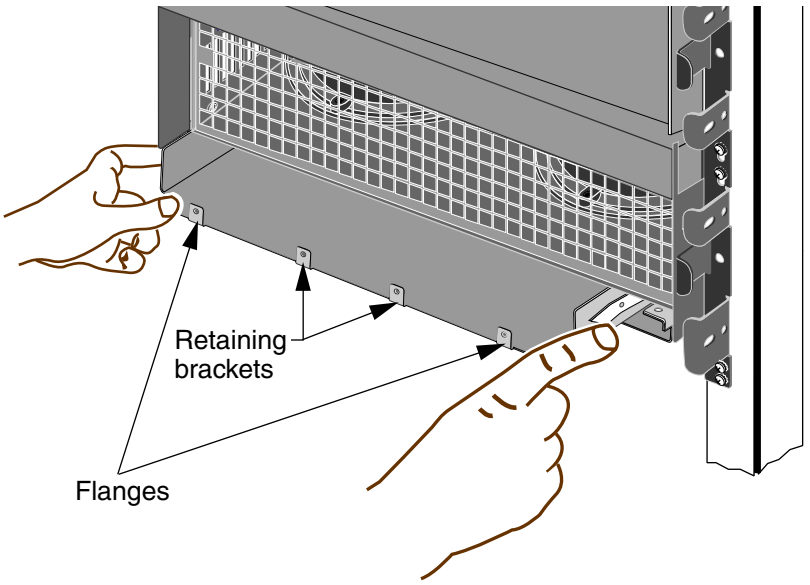
—continued—

Procedure 4-19 (continued)
Installing and grounding a second ECT drawer in an OFA shelf

Step	Action
14	To install the DSCM datacom cables, refer to the appropriate procedure: • Procedure 6-9, "Connecting passive devices to the maintenance panel" • Procedure 6-10, "Connecting passive devices to the Equipment Inventory Unit in new installations" • Procedure 6-11, "Connecting passive devices to the Equipment Inventory Unit in existing installations"
15	Install the new grill cover on the shelf.

Figure 4-72
Releasing the front locking tabs on the tray

OM0130p



—end—

Procedure 4-20
Installing a DSCM tray in a DSCM drawer

Follow this procedure to install a DSCM tray in a DSCM drawer (NT0H57LA).

For information on equipment locations, see "Site requirements and equipping rules" section in *Network Planning and Link Enginnering*, 323-1701-110. For more information on DSCM tray and DSCM tray drawers, refer to *Hardware Description*, 323-1701-102.

Normally, the DSCM trays are not shipped installed in the DSCM drawer. You must perform this procedure to install every DSCM tray received.

Requirements

Before you begin this procedure, you must have completed Procedure 4-15, "Installing and grounding equipment drawers". Table 4-18 on page 4-86 lists the required tools and materials. Table 4-25 lists additional the material required to perform this procedure.

Table 4-25
Material required to install a DSCM tray in a DSCM drawer

Item	Quantity	Supplied
Hex cap nut	4	yes with the DSCM drawer (NT0H57LA)

When you complete this procedure, the DSCM tray is installed in the DSCM drawer.

Action

Step	Action
1	Open the DSCM tray drawer by pressing and holding the two locking latches located on the sides of the drawer, and pulling it toward you until the drawer is fully extended.
2	Locate the locking clip at the back left corner of the drawer. Lock the drawer open by rotating the locking clip counter-clockwise until it rests on the edge of the drawer.
3	Insert the DSCM tray (Figure 4-73) into the DSCM tray drawer as follows: **a.** Place the DSCM tray at an angle so that the slots at the rear of the tray align with the rear studs on the drawer. **b.** Align the front slots on the tray with the front studs on the drawer and lower the front of the tray to the base of the drawer

—continued—

Procedure 4-20 (continued)
Installing a DSCM tray in a DSCM drawer

Step	Action
4	Fasten the DSCM tray to the drawer using the four nuts as follows: **a.** Insert a nut to each of the screws at the front of the tray and tighten. **b.** Insert a nut to each of the screws at the back of the tray and tighten. See Figure 4-74.
5	Locate the locking clip at the back left corner of the drawer. Unlock the drawer by rotating the locking clip clockwise.
6	Close the drawer by pressing and holding the locking tabs on the sides of the tray while you slide the tray into the rack.

—end—

Figure 4-73
DSCM tray

OM2581p

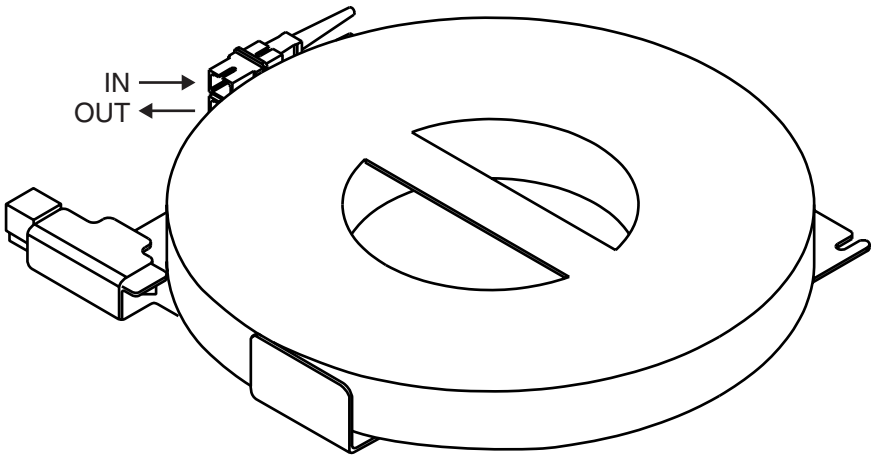
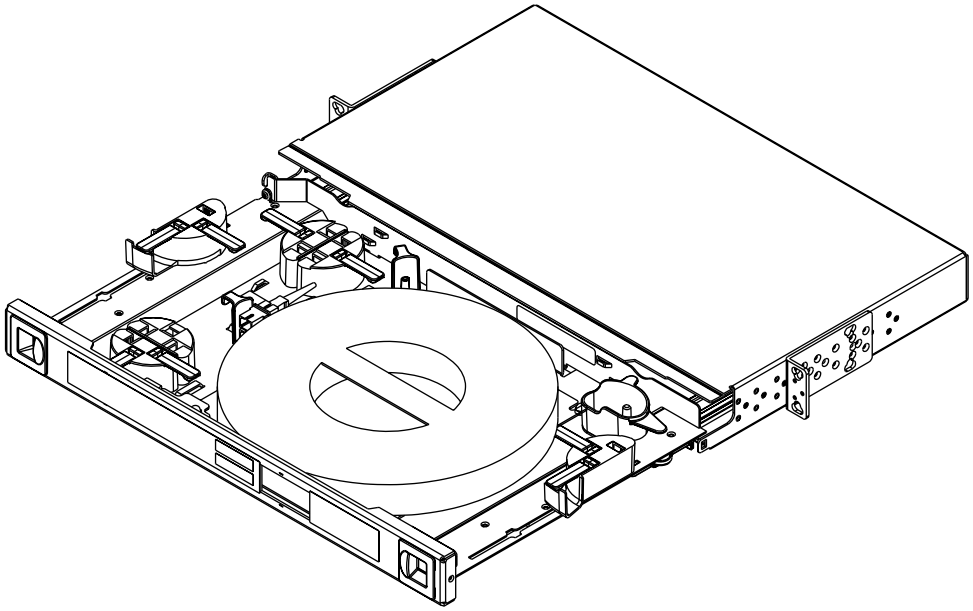


Figure 4-74
DSCM tray in a DSCM drawer

OM



Procedure 4-21
Installing optical trays in a drawer

Follow this procedure to install the following trays in a drawer:

- OMX 1CH CWDM (NT0H33AA-HA)
- OMX 1CH OADM ITU CWDM (NTPM34AA-HA)
- OSC splitter/coupler tray (NT0H57CA/EA)
- OSC splitter/coupler tray with dual taps (NT0H57GA)
- C&L Dual splitter/coupler (NT0H31AE)
- 1310 nm splitter/coupler (NT0H57JA)
- VOA tray (two VOAs) (NT0H31AG)

Follow this procedure to install west and east optical trays in a drawer. For information on equipment locations, see the chapter "Site requirements and equipping rules" in *Network Planning and Link Engineering*, 323-1701-110. For more information on optical trays and drawers, see "OSC trays", "C&L splitter/coupler", "1310 nm splitter/coupler" and the "OMX modules" in *Hardware Description*, 323-1701-102.

Depending on the span losses associated with the link, attenuation may be required in support of these trays. For more information about attenuators, refer to *Network Planning and Link Engineering,* 323-1701-110.

Normally, these trays are shipped installed in a drawer. Use this procedure when you have an empty drawer and you need to install a tray in that drawer.

Requirements

Before you begin this procedure, you must have completed Procedure 4-15 "Installing and grounding equipment drawers". Table 4-22 on page 4-105 lists the tools and materials that you must use.

When you complete this procedure, the west and east optical trays are installed in the drawer.

—continued—

Procedure 4-21 (continued)
Installing optical trays in a drawer

Action

Step	Action
	Note: During the installation, you can use the west and east labels shipped with the drawer to identify your west and east trays. For the OSC splitter/coupler tray with dual taps, Nortel Networks recommends that you place the east and west labels on the left sider of the LED windows on the faceplate of the drawer.
1	Press and hold the front locking tabs on each side of the drawer with your index fingers. Pull out the drawer until it is fully open.
2	Take note of the vintage of the drawer: • yellow chromate finish drawer • black painted finish drawer
3	Take note of the vintage of the optical tray: • yellow chromate finish tray • black painted finish tray
4	**CAUTION** **Risk of equipment incapability** If you want to install a tray that has a black painted finish into a NT0H57BA drawer that has a yellow chromate finish, then you must use an NT0H57BF tray conversion kit. Select your next step.

If you have the following combination	**Then**
a yellow chromate finish drawer and a black painted finish tray	go to step 5
a yellow chromate finish drawer and a yellow chromate finish tray	go to step 6
a black painted finish drawer and a black painted finish tray	go to step 7
a black painted finish drawer and a yellow chromate finish tray	contact your next level of support

—continued—

Procedure 4-21 (continued)
Installing optical trays in a drawer

Step	Action
5	Attach conversion plate to the underside of module with four 4-40 flat head screws provided.
6	Put the tray to either the left or right side of the drawer and fasten the tray to the drawer using the two screws for the front and back of the drawer as follows: • Insert a screw through the hole at the front of the tray into the hole at the front of the drawer and tighten. • Insert a screw through the hole at the rear of the tray into the hole in the backof the drawer and tighten. Go to step 8.
7	Put the tray to either the left or right side of the drawer, insert the tab at the front of the tray into the slot on the drawer, and fasten the tray to the drawer using the screw for the back of the drawer as follows: • Insert a screw through the hole at the rear of the tray into the hole in the back of the drawer and tighten. ***Note:*** If applicable, you must remove dust caps from the front of the monitoring ports of the OSC splitter/coupler tray with dual taps (NT0H57GA), to be able to insert the tray into the drawer.
8	Repeat step 1 through step 4 to install the other tray in the other side of the drawer. ***Note:*** If you removed the dust caps from the front of the monitoring ports of the OSC splitter/coupler tray with dual taps (NT0H57GA), you can now place them on the monitoring ports. **—end—**

Procedure 4-22
Installing or removing the shelf cover

The shelf cover covers the card cage, the fiber-optic management comb, and provides electromagnetic interference (EMI) shielding.

The shelf cover has two latches at the top and mounts on two pivot pins located at the sides of the shelf above the horizontal fiber management tray.

Precautions

DANGER
Risk of personal injury or equipment damage
Do not let go of the shelf cover when you open it. The shelf cover is not permanently attached to the shelf and you must remove the door completely. If you let go of the door when you open it, you can cause personal injury, damage to the equipment, or both.

CAUTION
Risk of equipment damage
Make sure that all fiber-optic cables are installed correctly in the fiber guides before you replace the shelf cover. Failure to do so can cause damage to the cables or result in a service outage.

Action

Step	Action
1	Line up the shelf cover with the two pivots at the sides of the shelf. See Figure 4-75 on page 4-127.
2	**CAUTION** **Risk of fiber damage** Ensure that all fibers feeding into the circuit packs are completely in the fiber guide holes at the bottom of the shelf before closing the shelf cover. Failure to do so will cause the fiber to be pinched. See Figure 4-76. Without letting go of the door, rest the door on the pivots and hold the latches on each side of the shelf cover open.

—continued—

Procedure 4-22 (continued)
Installing or removing the shelf cover

Step	Action
3	**CAUTION** **Risk of equipment damage** The door is not secured to the shelf until you latch it in the closed position. Do not let go of the door before it is latched. Close the door. When the door is in firmly place, release the lock latches to secure the door to the shelf. **—end—**

Figure 4-75
Replacing the shelf cover

OM0138t

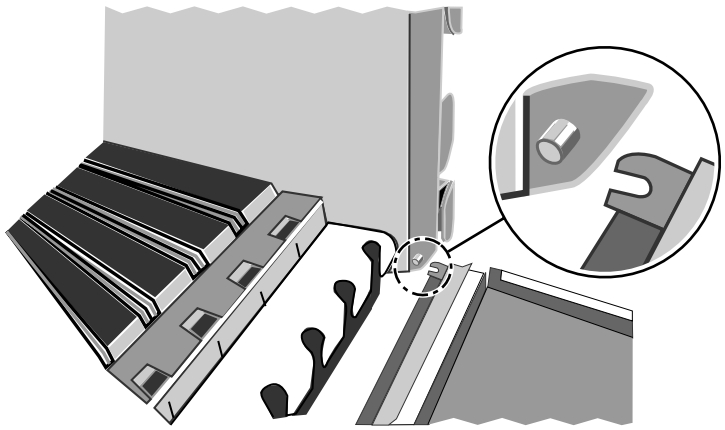


Figure 4-76
Fibers in the fiber guides at the bottom of the shelf

OM1307p.jpg

Figure 4-77
New spring-loaded lock on drawers

OM2825t.jpg

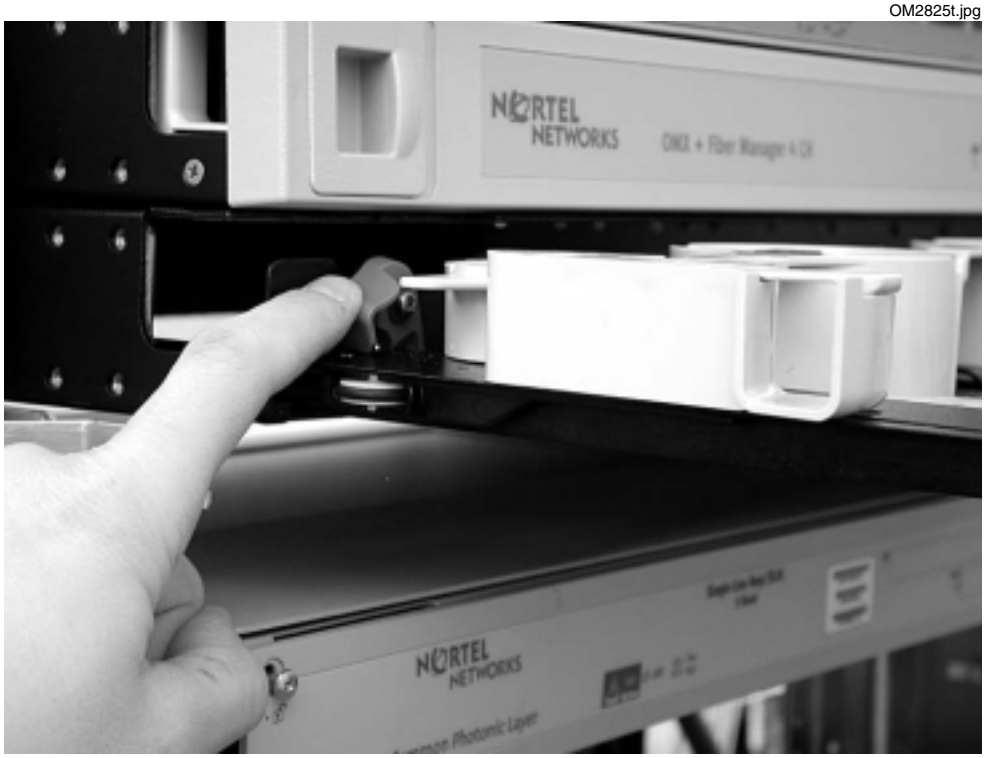
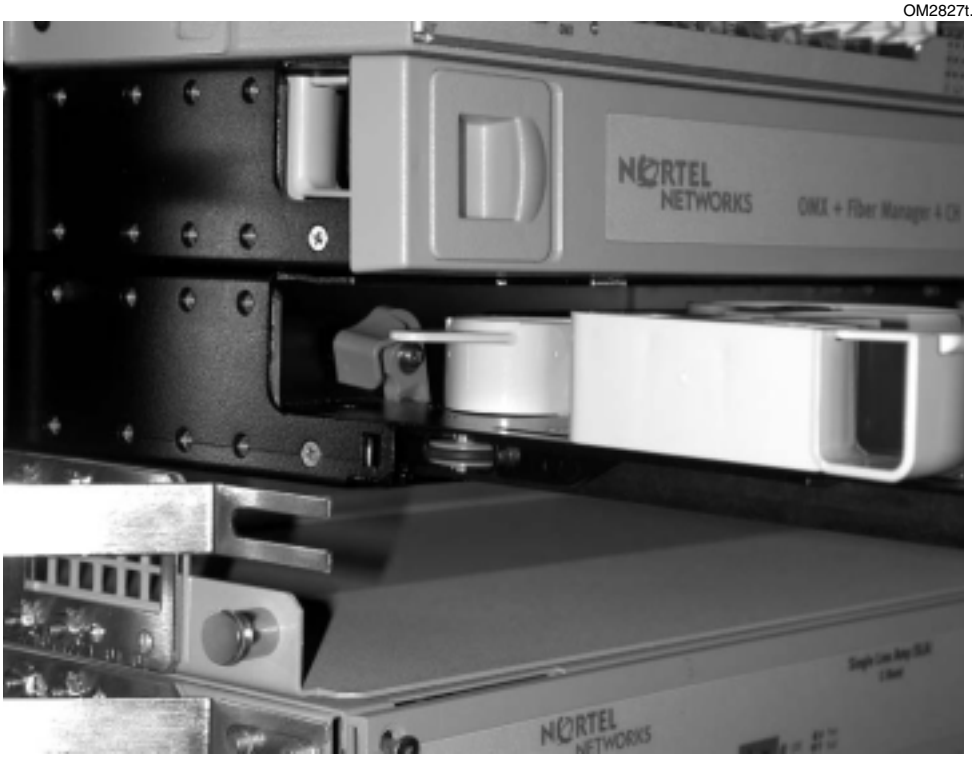


Figure 4-78
New spring-loaded lock on drawers

OM2827t.jpg



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