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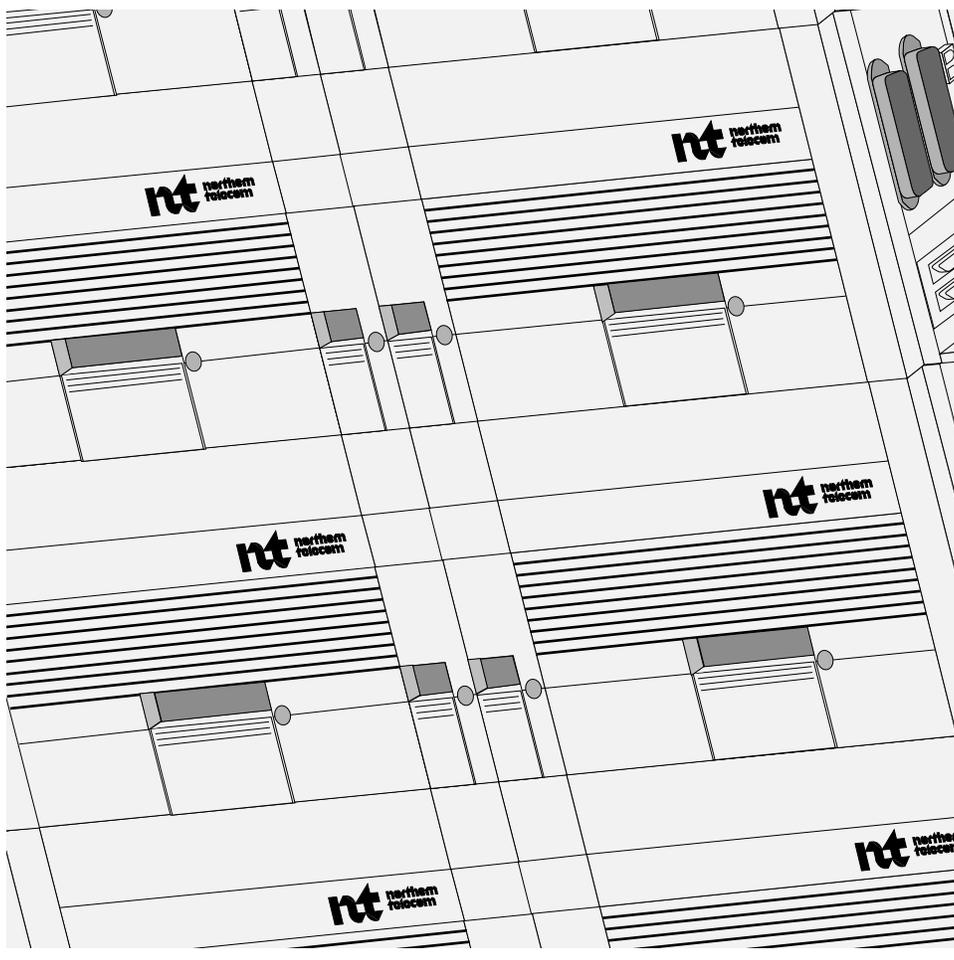
323-3001-201

SONET Products

AccessNode

Bay in Central Office Installation Manual for ABM

Issue 1.0 October 1999



NORTEL
NETWORKS™

SONET Products

AccessNode

Bay in Central Office Installation Manual for ABM

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- updated drawings to reflect 50-pair VF cables in Chapter 5

February 1999

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- updated cooling unit artwork in Chapters 2 and 4
- updated BIP information in Chapters 2 and 5
- updated bay end guard dimensions in Chapter 7
- removed all references to FST

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About this document

This document contains instructions for installing an access bandwidth manager (ABM) bay.

Audience

This document is intended for installers of an access bandwidth manager (ABM) bay. An ABM bay is an AccessNode equipment bay equipped with an ABM shelf. The ABM bay configurations covered by this manual are used in the following AccessNode applications:

- remote fiber terminal (RFT)
- fiber central office terminal (FCOT)
- DS1-fed access (DFA) terminal
- virtual tributary bandwidth manager (VTBM) ring node
- AccessNode Express (ANX) host digital terminal (HDT)

Users of this document should be familiar with telecommunications equipment, industry installation practices, and the tools required to complete the tasks.

Notice to installers

Please do not discard this document after you have completed the basic installation. Some of the procedures may need to be performed at a later time (such as connection to the Ethernet port from an Ethernet network or connection to the local craft interface port for maintenance). When the basic installation is complete, please turn this document over to the appropriate management personnel who may need this document for later reference.

Related documentation

For additional information related to ABM bay installation, see the following documents:

Engineering, Configuration, and Ordering Guide, Volume 1

- *Engineering and Ordering Information*, 323-3001-032
- *Mapper Layouts Planning Guide*, 323-3001-154
- *Site Installation Planning and Engineering*, 323-3001-200

Description, Volume 2A

- *Configuration and Equipment Description*, 323-3001-100

AccessNode Express documentation suite

- *AccessNode Express Customer Ordering Guide*, 323-3051-032
- *AccessNode Express Configuration and Equipment Description*, 323-3051-100
- *AccessNode Express Installation Guide*, 323-3051-210
- *AccessNode Express Maintenance Guide*, 323-3051-211
- *AccessNode Express TL1 User Guide*, 323-3051-312
- *AccessNode Express Alarm and Trouble Clearing Procedures*, 323-3051-543

Abbreviations for the color of conductor insulation in cables

In this document, a uniform system of abbreviations is used to represent the colors of the conductor insulation used in equipment cables. These abbreviations take the form:

<pair_color> <group_marker_type> <group_marker_color>

Item	Abbreviations
<pair_color>	<p>This is the background color of the conductor insulation which indicates the pair color.</p> <p>BL blue (pair 1 of the binder group)</p> <p>O orange (pair 2 of the binder group)</p> <p>G green (pair 3 of the binder group)</p> <p>BR brown (pair 4 of the binder group)</p> <p>S slate (pair 5 of the binder group)</p>
<group_marker_type>	<p>This is the type of group marker used on the conductor insulation.</p> <p>1 single dots spaced about 18 mm (3/4 in.) apart</p> <p>2 two dots spaced about 3 mm (1/8 in.) apart with about 18 mm (3/4 in.) between each pair of dots</p> <p>3 dashes about 3 mm (1/8 in.) long spaced about 18 mm (3/4 in.) apart</p> <p>none one colored stripe on conductor jacket</p>
<group_marker_color>	<p>This is the color of the dot, dots or the stripe used as the group marker on the conductor insulation.</p> <p>W white (binder group 1)</p> <p>R red (binder group 2)</p> <p>BK black (binder group 3)</p> <p>Y yellow (binder group 4)</p> <p>V violet (binder group 5)</p>

For example, the abbreviation BL 2W (representing Pair 1 of the second 25-pair binder) means that the conductor has a blue insulation background with two white dots spaced 18 mm (3/4 in.) apart. The abbreviation BL W (representing Pair 1 of the first 25-pair binder) means that the conductor has a blue insulation background with a single white stripe.

Safety guidelines and warnings

This chapter contains warnings and precautions for personal safety, and for the correct handling and operation of equipment while it is being installed.

Chapter contents

This chapter contains the following topics:

Topic	See
Notice to installers	page 1-1
Warnings and safety notices	page 1-2
FCC Part 15.21 radio interference notice to the user	page 1-3
Optical fiber cables	page 1-3
Nortel Networks optical interface products	page 1-5
International electrical symbols on equipment	page 1-5

Notice to installers

Please do not discard this document after you have completed the basic installation. Some of the procedures may need to be performed at a later time (such as connection to the Ethernet port from an Ethernet network or connection to the local craft interface port for maintenance). When the basic installation is complete, please turn this document over to the appropriate management personnel who may need this document for later reference.

Warnings and safety notices

This document contains Danger and Caution notices that are designed to alert you about the risk of personal injury, or of damage to equipment, as in the following:



DANGER

Risk of personal injury

A danger notice warns you about a risk of personal injury.



CAUTION

Risk to service or equipment

A caution notice warns you about a risk of service interruption or of equipment damage.

FCC Part 15.21 radio interference notice to the user

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.



CAUTION

Potential radio frequency interference

Nortel Networks equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it can cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Optical fiber cables

AccessNode equipment and associated optical test sets use laser sources that emit light energy into fiber cables. This energy lies within the infrared (invisible) regions of the electromagnetic spectrum.



DANGER

Risk of eye injury

At all times when handling optical fibers, follow the safety procedures recommended by your company.

Read and follow the precautions in the following paragraphs to reduce the risk of exposure to laser radiation.

Laser products are subject to federal and state or provincial regulations, and local practices. Regulation 21 CFR 1040 of the U.S. Bureau of Radiological Health requires manufacturers to certify each laser product as Class I, Class II, Class III, or Class IV, depending on the characteristics of the laser radiation that is emitted. In terms of health and safety, Class I products represent the least hazard (none at all), while Class IV products represent the greatest hazard.

Handling optical fibers

During the installation, service, repair, or removal of optical fiber cables or equipment, follow these rules:

- Avoid direct exposure to fiber ends or optical connections ends, where the laser signal is present.
- Wear safety glasses when handling optical fibers to avoid eye injury from flying glass fragments.
- Small bits of glass fiber are almost invisible on your fingers. Therefore, always wipe your hands on a tissue or on a clean absorbent cloth before making any contact with your eyes, or the area around your eyes.



DANGER

Risk of eye injury

If you suspect that you may have a glass chip in your eye, seek medical attention immediately.

- Handle optical fibers carefully, and always position them in a safe and secure location during the installation procedures.
- Do not handle broken or cut pieces of fiber with your bare fingers. Use tweezers or the sticky side of adhesive tape to pick up and discard loose fiber ends.
- Place all fiber cuttings or ends in a plastic bottle marked “Danger, Sharp Objects.”
- Protect optical fiber connectors with dust caps at all times.

Nortel Networks optical interface products

All Nortel Networks optical products have a Class I certification. However, hazardous exposure to laser radiation could occur when fibers that connect system components are disconnected, broken, or installed while equipment is powered on. Certain procedures carried out during installation or testing require the handling of optical fibers without dust caps, and therefore increase the risk of exposure. Exposure either to visible or invisible laser light could cause eye damage under certain conditions.

The caution label at the right appears on Nortel Networks optical interface cards near the optical connection, and must be complied with.

Caution

Avoid direct exposure to beam. Invisible light can blind. Keep all optical connectors capped.

International electrical symbols on equipment

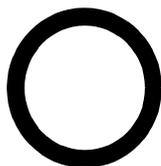
A number of International Electrotechnical Commission (IEC) symbols are used on AccessNode equipment. The labels and their meanings are as follows:

Power on



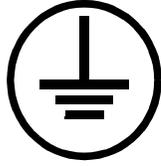
This symbol indicates that a main power on/off switch is in the on position.

Power off



This symbol indicates that a main power on/off switch is in the off position.

Protective grounding terminal



This symbol indicates the location of a terminal that must be connected to earth ground before you make any other connections to the equipment.

Alternating current



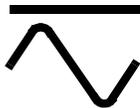
This symbol indicates the location of a terminal that supplies alternating current or to which a source of alternating current is applied.

Direct current



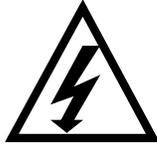
This symbol indicates the location of a terminal that supplies direct current or to which a source of direct current is applied.

Direct current and alternating current



This symbol indicates the location of a terminal that supplies direct current or alternating current, or to which a source of direct current or alternating current is applied.

Dangerous voltage



This symbol indicates the presence of a dangerous voltage inside an equipment enclosure. This voltage may be of sufficient magnitude to constitute a risk of electric shock to persons working on the equipment.

Electrostatic discharge



This symbol indicates a danger of damage to equipment because of the presence of static electricity. Static electricity may damage equipment. Always use an electrostatic discharge (ESD) grounding strap when working on or handling equipment circuit packs.

ABM bay equipment and cable configurations

This chapter describes the equipment, applications, and cabling configurations for the access bandwidth manager (ABM) bay in the AccessNode.

Chapter contents

This chapter includes the following information:

Topic	See
AccessNode ABM bay equipment configurations	page 2-2
ABM bay AccessNode applications	page 2-3
CDS prewired (672-line) ABM bay (NT4K01)	page 2-5
Add-drop ABM bay CDS start-up (NT4K02)	page 2-7
Add-drop ABM bay for HDT, mux, or OPC configurations (NT4K03)	page 2-9
AccessNode Express host digital terminal equipping rules	page 2-11
OC-3 tributaries equipping rules	page 2-12
ABM bay intershelf cabling connections	page 2-14
ABM bay external cabling connections	page 2-16
ABM bay installation tasklist	page 2-18

AccessNode ABM bay equipment configurations

Table 2-1 presents the configurations available for AccessNode ABM bays. Use the table to go directly to the description of your specific configuration.

Table 2-1
ABM bay configurations

ABM bay Configuration	Product engineering code (PEC)	Bay Height	See
Prewired 672 line (optical or DS1 fed)	NT4K01BB NT4K01FA NT4K01GA	2.15 m (7 ft) 2.75 m (9 ft) 3.5 m (11.5 ft)	page 2-5
Add-drop start-up	NT4K02BB NT4K02FA NT4K02GA	2.15 m (7 ft) 2.75 m (9 ft) 3.5 m (11.5 ft)	page 2-7
Add-drop with mux or OPC shelf	NT4K03BB NT4K03FA NT4K03GA	2.15 m (7 ft) 2.75 m (9 ft) 3.5 m (11.5 ft)	page 2-9

Two extender kits are available with the 2.15 m (7 ft) bay to increase its height to 2.75 m (9 ft), or to 3.5 m (11.5 ft):

- NT7E71DA 0.6 m (2 ft) frame extender
- NT7E71EA 1.5 m (4.5 ft) frame extender

ABM bay equipment options

Each ABM bay contains an access bandwidth manager (ABM) shelf and can support up to seven copper-distribution shelves (CDSs) or other equipment as described in the remainder of this chapter. ABM bays can be equipped to support OC-3, OC-12, DS1, and DS3 services.

ABM bay AccessNode applications

The ABM bay equipment configurations described in this chapter can be used in the following AccessNode applications:

- host digital terminal (HDT) supporting remote AccessNode Express (ANX) voice modules (VMs)
- virtual tributary bandwidth manager (VTBM) ring node
- point-to-point fiber central office terminal (FCOT)
- point-to-point remote fiber terminal (RFT)
- DS1-fed access (DFA) terminal
- single-ended AccessNode (SEAN) terminal

ABM bay AccessNode application links and connections

Table 2-2 lists the ABM bay AccessNode application link connection rates and connection descriptions.

Table 2-2
AccessNode application links and connections

AccessNode application	Application link connection rate	Application connection from/to
AccessNode Express (ANX) host digital terminal (HDT)	DS1	From a GR-303 host switch to ANX voice modules (VMs), or to another AccessNode application capable of receiving and transporting DS1 traffic to and from the ANX VMs Note: The ANX HDT cannot connect to a VTBM ring node.
Virtual tributary bandwidth manager (VTBM) ring node	OC-12	From one VTBM ring node to another VTBM ring node, and from VTBM ring hub to host switch or AccessNode OC-12 RFT
Point-to-point fiber central office terminal (FCOT)	OC-3 or OC-12	From host switch or other non-switched transport network to RFT
Point-to-point remote fiber terminal (RFT)	OC-3 or OC-12	From subscriber lines and other AccessNode applications to FCOT
DS1-fed access (DFA) terminal	DS1	From subscriber lines to any DS1 transport network
Single-ended AccessNode (SEAN)	OC-3	From subscriber lines to any OC-3 fiber transport network

Planning ABM bay configurations

For information on planning and engineering the ABM bay configurations described in this manual, see the following AccessNode documentation:

- *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration, and Ordering Guide*, Volume 1
- *Site Installation Planning and Engineering Guide*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1
- *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A

Ordering information

To order the equipment for the ABM bay configurations described in this manual, see *Engineering and Ordering Information*, 323-3001-032, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

CDS prewired (672-line) ABM bay (NT4K01)

The CDS prewired (672-line) access bandwidth manager (ABM) bay contains an ABM shelf and seven prewired copper-distribution shelves (CDSs). These bays can be used in optical and DS1-fed configurations. Figure 2-1 on page 2-6 illustrates the CDS prewired configuration.

Prewired 672-line optical configuration

The prewired 672-line ABM bay in the optical configuration features OC-3/OC-12 optical cards for connection to the AccessNode or TransportNode network elements. This configuration can be used in point-to-point or VTBM network topologies, or can serve as single-ended access to a TransportNode network.

Prewired 672-line DS1-fed AccessNode (DFA) configuration

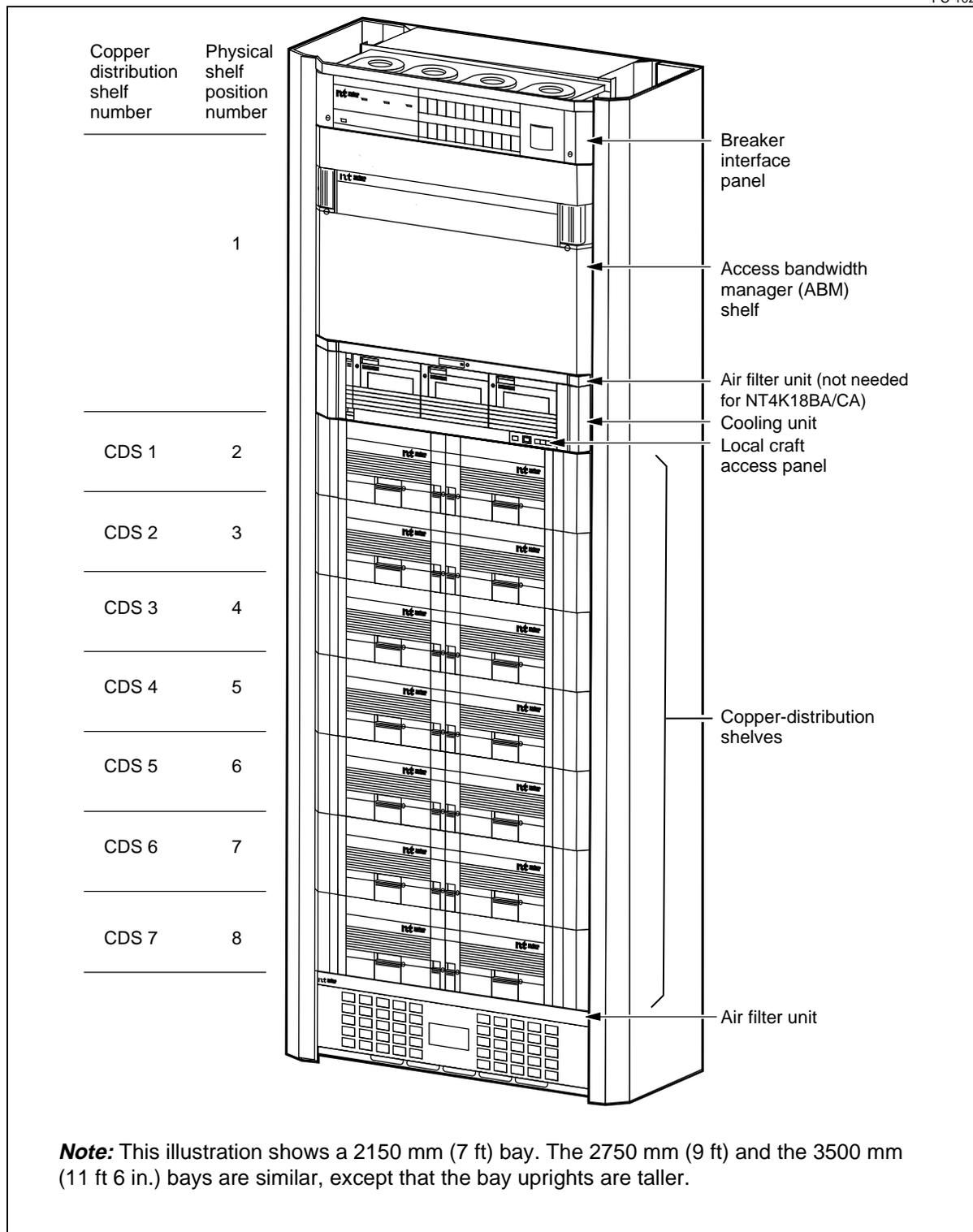
The DS1-fed AccessNode (DFA) ABM bay configuration features a TXC (Timing and Cross-connect) circuit pack in place of OC-3/OC-12 circuit packs. The TXC circuit pack (NT4K75AA) allows the DFA to use a DS1 link to the AccessNode or TransportNode network elements in the subnetwork.

DFA connection to an RFT

The DFA can be connected to an AccessNode RFT in both point-to-point and VTBM ring topologies. (However, the DFA cannot serve as a node in a VTBM ring). The DFA/RFT connection uses control-network and DS1 links to create a virtual 1344-line system. The DFA is independent of the fiber-fed RFT and does not share common equipment. It does, however, use the fiber-fed RFT's SONET digital communications channel (SDCC) to communicate with the central office Operations Controller (OPC).

Figure 2-1
CDS prewired 672-line optical or DS1 fed ABM bay (NT4K01)

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Add-drop ABM bay CDS start-up (NT4K02)

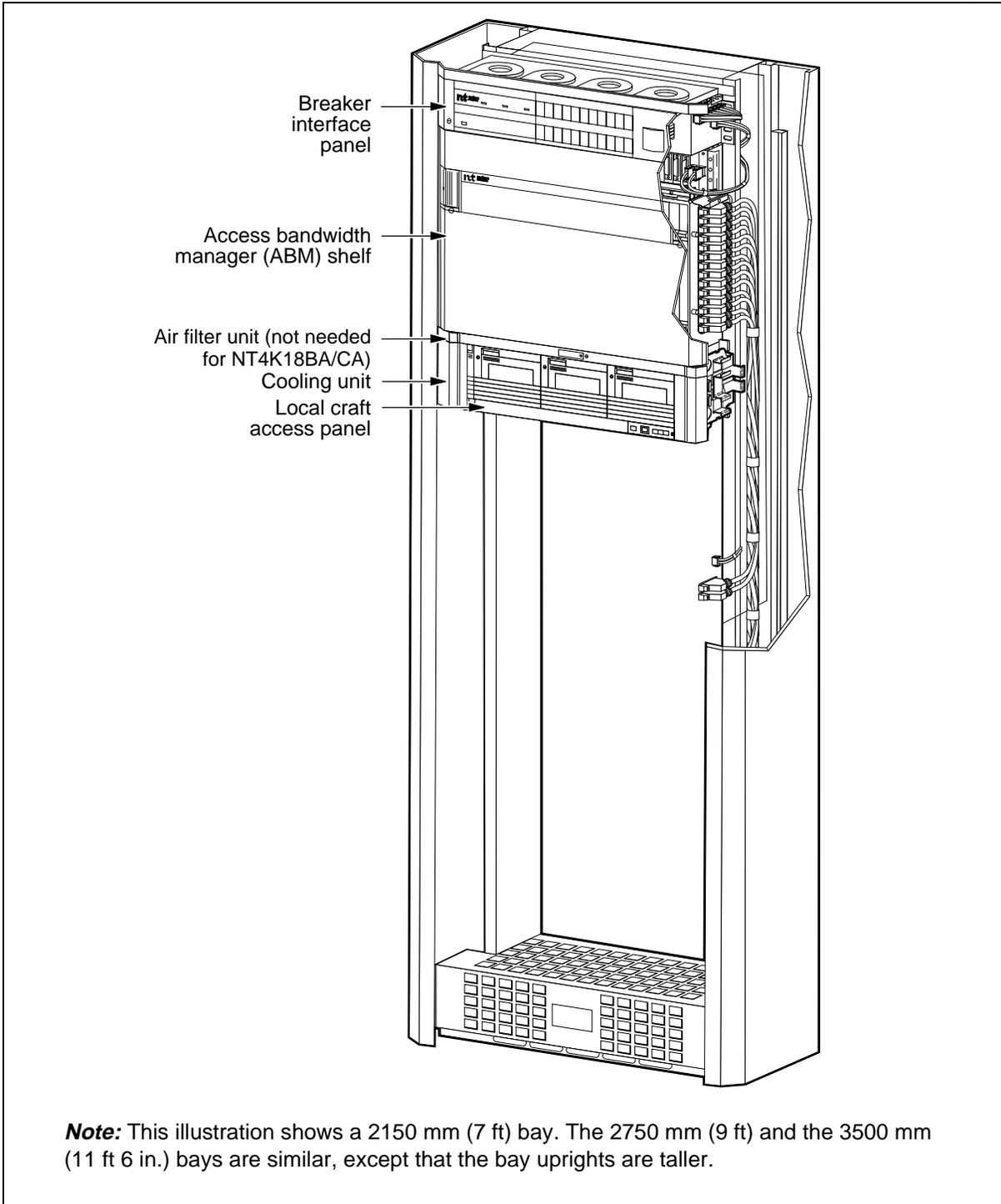
The add-drop ABM bay in the copper-distribution shelf (CDS) start-up configuration contains an ABM shelf, and is prewired for the addition of up to seven CDSs to support voice frequency (VF) copper lines. Figure 2-2 on page 2-8 illustrates this configuration.

Note: This bay assembly includes all the intershelf cabling required for copper-distribution shelves. The copper-distribution shelves are not included, but can be added as needed without additional wiring. Also not provided in the add-drop start-up bay assembly are the air filter required below the lowest CDS, and the bottom cover assembly that is required below the lowest CDS if there are fewer than 7 CDSs.

The add-drop start-up bay is factory-equipped to support DS1 and DS3 lines. This bay can support the equipment and network applications described in “ABM bay equipment options” and “ABM bay AccessNode applications” on page 2-3, as well as other configurations.

Figure 2-2
Add-drop ABM bay CDS start-up (NT4K02)

PC-10201



Add-drop ABM bay for HDT, mux, or OPC configurations (NT4K03)

The add-drop ABM bay used in AccessNode Express (ANX) host digital terminal (HDT), multiplexer (mux), and operations controller (OPC) shelf configurations contains an ABM shelf only. Figure 2-3 on page 2-10 illustrates this configuration.

ABM bay add-drop HDT configuration

The add-drop ABM bay used as an ANX HDT supports only DS1 lines. It does not include any copper-distribution shelves, nor does it include the intershelf cabling or additional equipment required for copper-distribution shelves. See “AccessNode Express host digital terminal equipping rules” on page 2-11 for further information on the equipment requirements of the HDT used in ANX.

ABM bay add-drop mux configuration

The add-drop mux ABM bay supports DS1 and DS3 lines. It does not include any copper-distribution shelves, nor does it include the intershelf cabling or additional equipment required for copper-distribution shelves.

You can modify the add-drop mux configuration to include copper-distribution shelves. This bay can also support the equipment and network topologies described in “ABM bay equipment options” on page 2-2 and “ABM bay AccessNode applications” on page 2-3, as well as other configurations.

ABM bay OPC shelf configuration

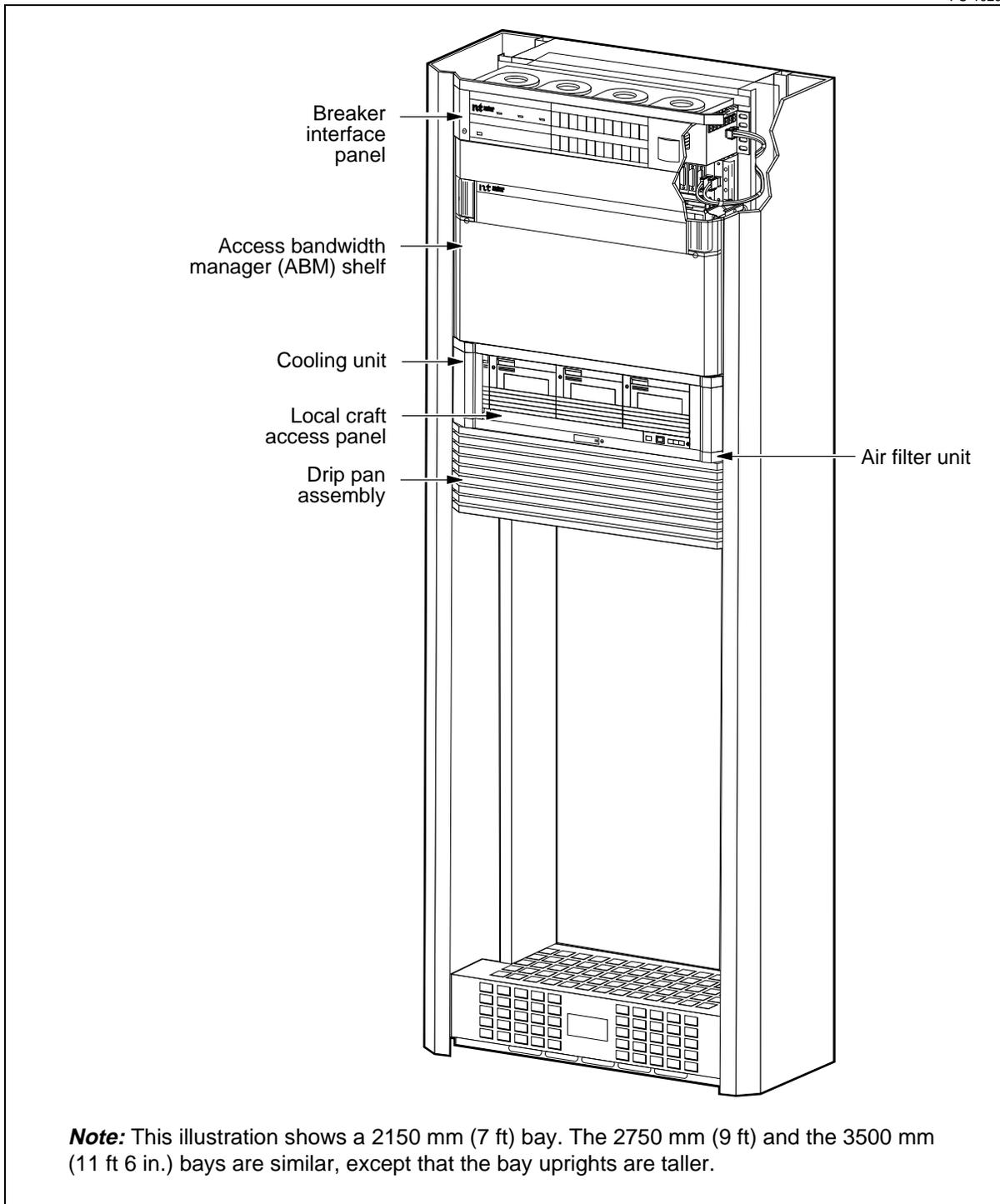
The OPC shelf configuration supports an operations controller (OPC) module and associated OPC support modules. The OPC shelf configuration of the ABM bay supports DS1 lines only. As with the add-drop mux bay, it does not include any copper-distribution shelves, nor does it include the intershelf cabling or additional equipment required for copper-distribution shelves.

You can modify the OPC shelf configuration to include copper-distribution shelves. This bay can also support the equipment and network topologies described in “ABM bay equipment options” and “ABM bay AccessNode applications” on page 2-3, as well as other configurations.

2-10 ABM bay equipment and cable configurations

Figure 2-3
Add-drop or OPC shelf mux ABM bay (NT4K03)

PC-10200



AccessNode Express host digital terminal equipping rules

Using an access bandwidth manager (ABM) bay as an AccessNode Express (ANX) host digital terminal (HDT) requires compliance to special equipping rules. Follow these equipping rules when installing an ABM bay for use as an ANX HDT:

- AN14 or newer AccessNode software is required.
- The ABM shelf in the ANX HDT must be equipped with a loop-back access interface card (LAIC) in slot 13 or slot 16. The ABM shelf cannot contain an access interface card (AIC).
- The ANX HDT network element (NE) must be a DS1-fed access (DFA) terminal. A timing and cross-connect (TXC) card must occupy a primary transport slot of the ABM shelf (slot 9 or 10). No support for DS3, STS-1, OC-3, or OC-12 services is provided.
- The ANX HDT can connect via DS1s to AccessNode NEs in point-to-point, single-ended, and DFA applications, which can be used as transport facilities to transport HDT traffic to and from the ANX voice modules (VMs).
- The ANX HDT cannot connect to a virtual tributary bandwidth manager (VTBM) ring node.
- The ANX HDT cannot support copper distribution shelves (CDSs) resident in the ABM bay.
- The ANX HDT cannot support orderwire service, external synchronization interface (ESI) cards, or an integrated remote test unit (IRTU).

Note: If the HDT is used with DMS-X protocol, you must use an IRTU, test access path (TAP) I/O, and TAP I/O cable to test non-switched special services (use the OPC Test Manager tool).

- Remote testing for the ANX VMs supported by an ANX HDT requires an integrated test bypass pair (ITBP) unit installed in a separate ANX auxiliary shelf. This auxiliary shelf connects to the HDT via DS1s.

Note: For information on the ITBP capability and the installation and use of the ANX auxiliary shelf, see *AccessNode Express Installation Guide*, 323-3051-210, or *AccessNode Express Maintenance Guide*, 323-3051-211.

- The ANX HDT supports the option of a resident operations controller (OPC) module in ABM shelf slots 5, 6, 7, and 8.
- DS1/VT working mappers can be used in ABM shelf slots 1-2 and slots 4-6, with ABM shelf slot 3 reserved for a DS1/VT protection mapper (n+1). Because of the TXC requirement, DS1/VT mappers cannot occupy ABM shelf slots 7 and 8.

Note: For complete information on planning mapper layouts for an ANX HDT, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration and Ordering Guide*, Volume 1.

OC-3 tributaries equipping rules

OC-3 tributary features include the following:

- the transport of 3 individual STS-1 signals or a single concatenated STS-3 signal (STS-3c) directly to customer premises from the RFT
- the support of extended narrowband, DS1, DS3 and OC-3 tributary mixes
- the support of optional 1+1 non-revertive protection
- software controlled STS-1 cross-connect capability

Installing the OC-3 tributaries into ABM bays requires compliance to special equipping rules and mounting location restrictions for the OC-3 tributaries. Follow these equipping rules when installing the OC-3 tributaries in the AccessNode ABM bays:

- In-service systems being re-configured to support OC-3 tributaries can remain in-service, except for the slots being re-configured.
- STS-1 cross-connections must be set up by the user.
- AccessNode software AN11 and newer is required to support OC-3 tributaries in single-ended and point-to-point applications.
- No asymmetrical or linear add/drop multiplexer (ADM) is provided.
- No orderwire is provided on OC-3 tributaries.
- The network element (NE) must be an OC-12 FCOT or RFT. No support for OC-3 tributaries on an OC-3 FCOT or RFT is provided. Also a DS1 fed or DFA AccessNode can not support OC-3 tributaries.
- Only non-diverse route SONET datacomm is provided.
- OC-3 tributaries can be configured in protected or unprotected mode.
- The OC-12 NE containing the OC-3 tributary may not take its timing from the tributary.
- For an ABM shelf, the OC-3 tributaries may be installed in slots 1, 3, 5, and 7 where slots 3 and 7 are the protection slots.
- If two Section Data Communications Channels (SDCCs) are to be enabled on two OC-3 tributaries in an RFT, then one host or one SDCC on the primary optics must be disabled.
- A single-ended AccessNode off an RFT must be in the same OPC span-of-control as the RFT.
- OC-3 to TIC STS-1 cross-connections are only supported in a single-ended AccessNode where the TIC 1 is default mapped to the OC-3 STS-1 #1.

Note: For information on planning mapper layouts for OC-3 tributaries, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration and Ordering Guide*, Volume 1.

ABM bay intershelf cabling connections

Figure 2-4 below and Figure 2-5 on page 2-15 show the intershelf cabling connections for the access bandwidth manager (ABM) shelf. These cables are factory-installed. Figure 2-4 shows the intershelf cabling connections for ABM bays without copper-distribution shelves (CDSs). Figure 2-5 on page 2-15 shows the intershelf cabling connections for ABM bays with CDSs.

Figure 2-4
Intershelf cable connections for ABM bays without copper-distribution shelves

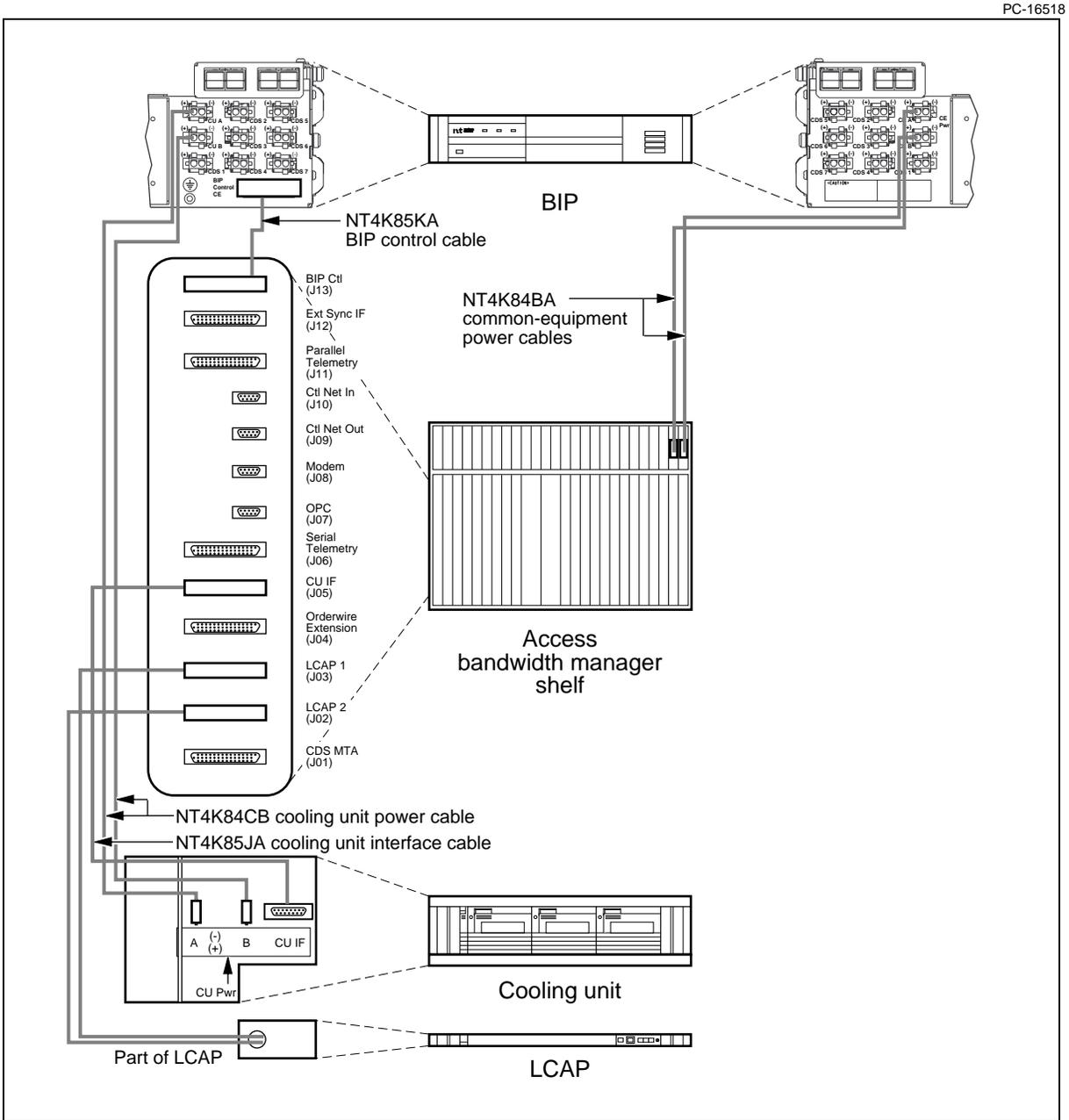
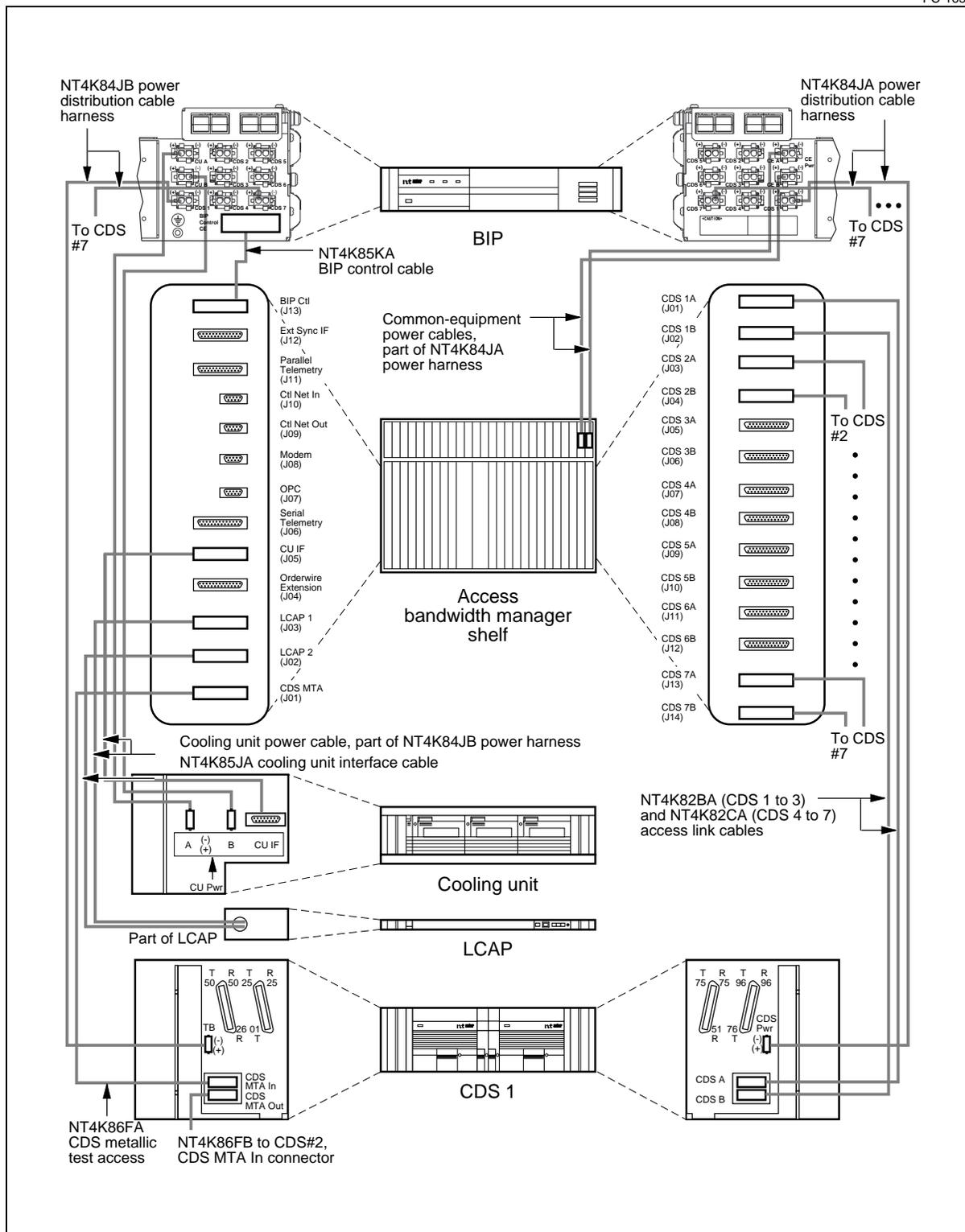


Figure 2-5
Intershelf cable connections for ABM bays equipped with copper-distribution shelves

PC-16517



ABM bay external cabling connections

Figure 2-6 on page 2-16 and Figure 2-7 on page 2-17 show the external cabling connections for the access bandwidth manager (ABM) shelf. These cables require field installation. Figure 2-6 shows the external cables for ABM bays without copper-distribution shelves (CDSs). Figure 2-7 on page 2-17 shows the external cables for ABM bays with CDSs.

Figure 2-6
External cables for ABM bays without copper-distribution shelves

PC-16515

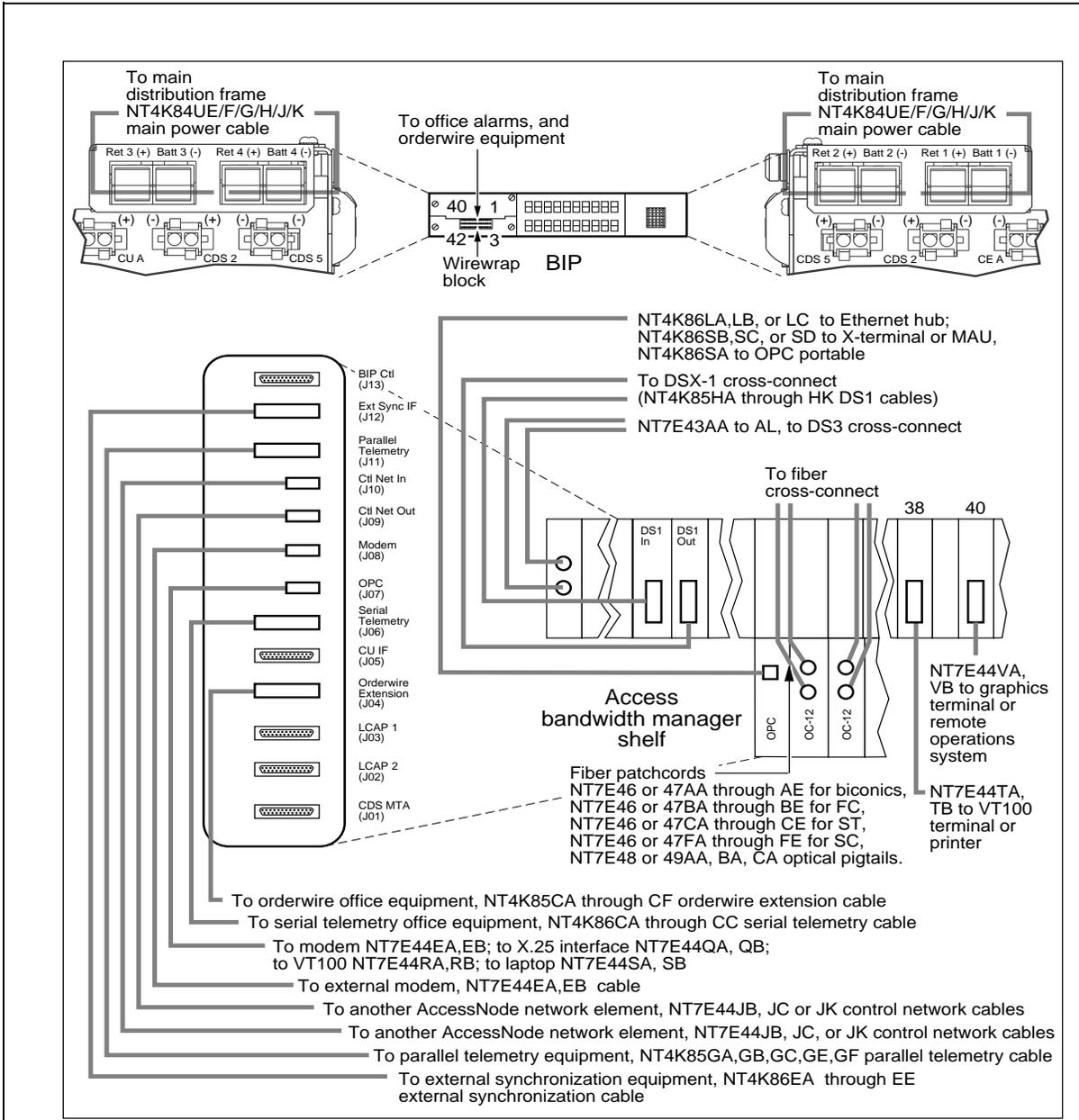
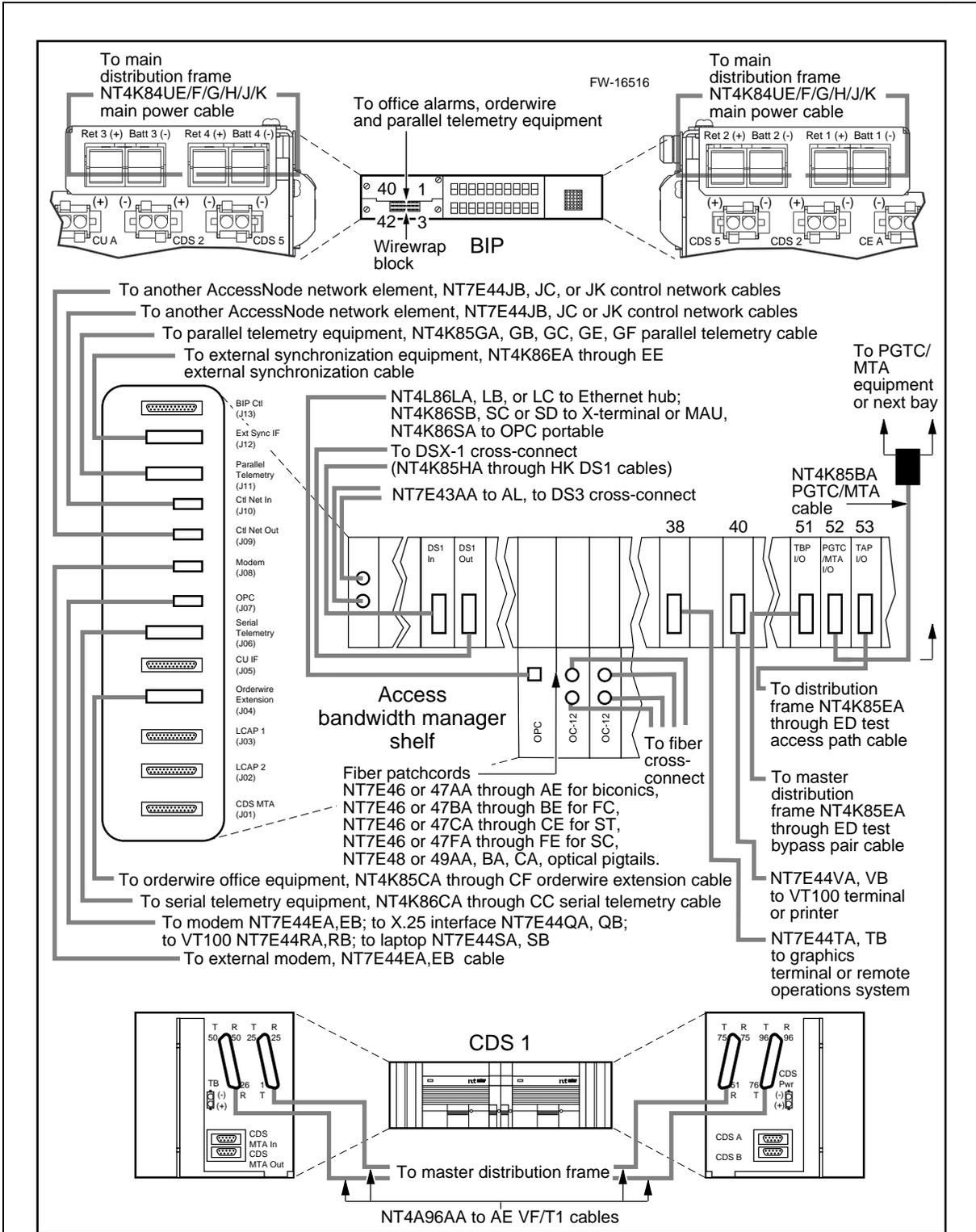


Figure 2-7
External cables for ABM bays equipped with copper-distribution shelves

PC-16516



ABM bay installation tasklist

The following table lists the tasks necessary to install the various configurations of the ABM bay.

Note: Installation procedures for the circuit packs are not included in this document. Circuit pack installation procedures are contained in *Commissioning and Testing*, Volume 3.

Task	See
Review the grounding requirements	“Power and ground distribution” in 323-3001-200.
Unpack and install the bay frame	page 3-1
Install the copper-distribution shelves, if applicable	page 4-1
Install the external bay cabling	page 5-1
Finish installing and securing the bay	page 6-1
Install the equipment covers, the bay end guards, and the bay end guard extenders	page 7-1

Unpacking and installing the bay frames

This chapter provides the procedures to install the bay frame equipment, in a standard central office bay lineup.

How to use this chapter

In the following table you will find a list of the procedures necessary to unpack and install the bay frame equipment. These procedures apply to all of the configurations of AccessNode equipment in bay. Perform the procedures in the order in which they are listed in the table. If you cannot successfully complete these procedures, contact your next level of support.

Chapter task list

Task	See
Marking and drilling the floor	Procedure 3-1 on page 3-2
Setting up the bay lifter	Procedure 3-2 on page 3-5
Unpacking and moving the bay	Procedure 3-3 on page 3-7
Securing the bay frame	Procedure 3-4 on page 3-12
Installing the bay frame extenders	Procedure 3-5 on page 3-20
Attaching the frame ground	Procedure 3-6 on page 3-21
Installing the ac cabling and the ac receptacle	Procedure 3-7 on page 3-24

Procedure 3-1 Marking and drilling the floor

Use this procedure to mark and drill the floor for the following bay anchors:

- standard anchor, NT7E7002
- M12 earthquake Zone 4 anchor, NT7E74AA

Requirements

You need the following tools and materials:

- measuring tape, 15 m (50 ft.)
- roto hammer drill (Hilti TE-52 or equivalent)
- masonry drill bit, size 18 mm (45/64 in.)—for M12 earthquake anchoring
- masonry drill bit, size 16 mm (5/8 in.)—for standard anchoring
- vacuum cleaner
- rubber bulb
- roll of acetate tape
- felt pen

Action

Step	Action
1	Reference the customer's floor plan for the intended location of the bay lineup.
2	Mark the base reference line for the front of the bay lineup, similar to Figure 3-1 on page 3-3.
3	Mark the four drill hole positions as shown in Figure 3-2 on page 3-4. If more than one bay is to be installed, allow a 3.0 mm (1/8 in.) space between bays. Note: The isolator pad can be used as a template for marking the floor.

—continued—

Procedure 3-1 (continued)
Marking and drilling the floor

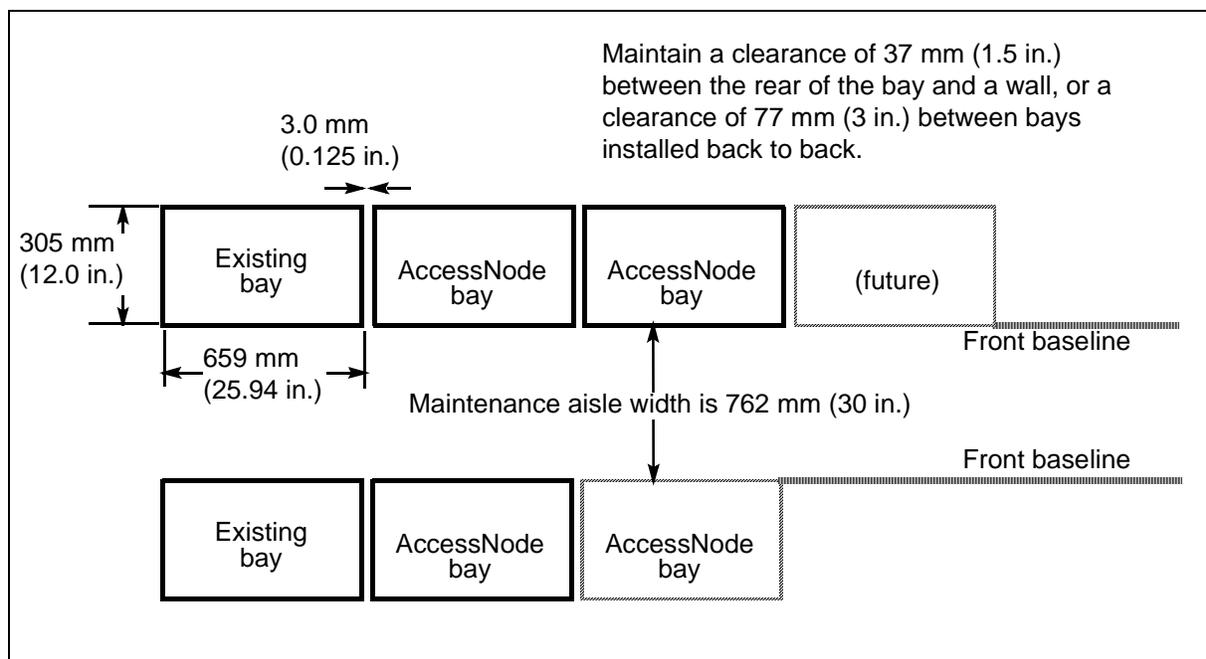
Step	Action
4	<p>Drill four holes according to the type of anchor being used, while at the same time cleaning out each hole thoroughly, using a vacuum cleaner, together with a rubber bulb for blowing out particles:</p> <ul style="list-style-type: none"> • <i>For standard anchor NT7E7002:</i> Using a 16 mm (5/8 in.) masonry bit, drill a hole 60 mm (2-3/8 in.) deep. • <i>For M12 earthquake (Zone 4 anchor NT7E74AA):</i> Using an 18 mm (45/64 in.) masonry bit, drill a hole 100 mm (4.0 in.) deep.



CAUTION
Risk of damage to smoke detectors or wiring under raised floors
 For installations on raised floors, check that there are no smoke detectors or wiring underneath the location in which you are going to drill the anchor holes.

5	If the bays are not to be secured immediately, cover the holes with tape to prevent them filling up with debris.
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Figure 3-1
Floor space requirements

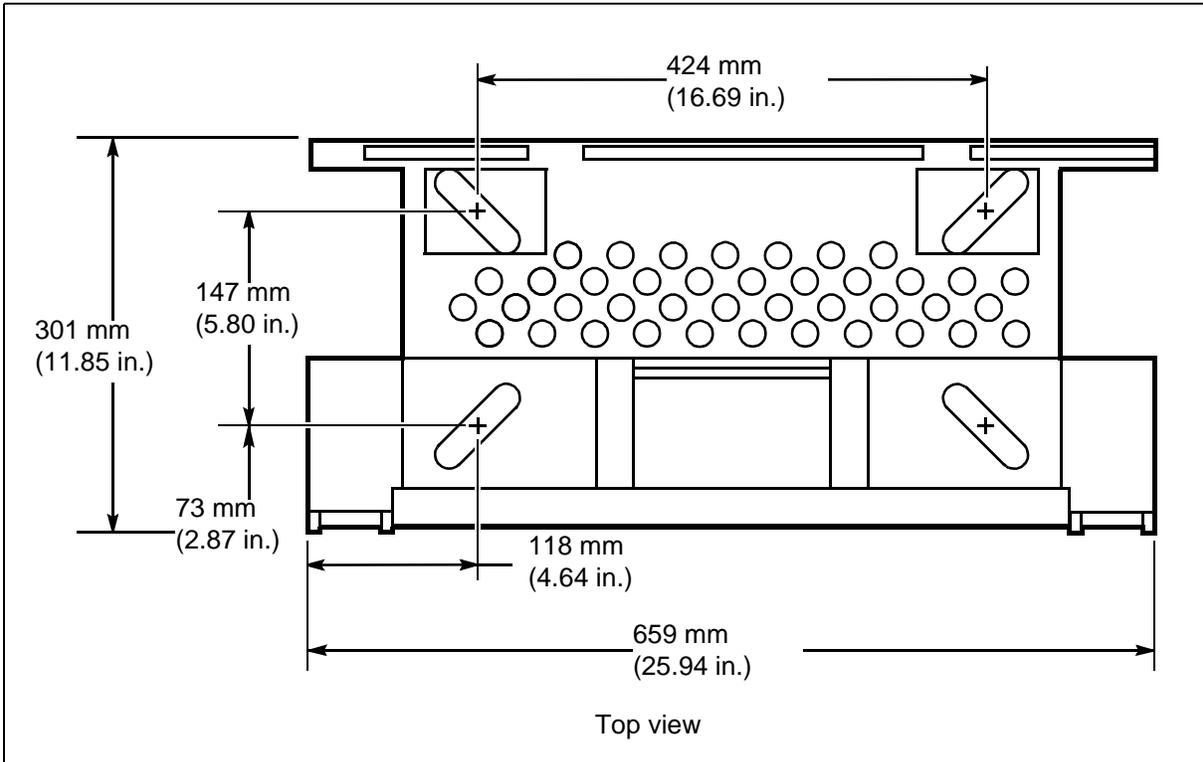


—continued—

3-4 Unpacking and installing the bay frames

Procedure 3-1 (continued)
Marking and drilling the floor

Figure 3-2
AccessNode universal bay footprint



—end—

Procedure 3-2

Setting up the bay lifter

Use this procedure to set up the bay lifter tool to prepare for moving the bay into place.

Requirements

You need the following tools and materials:

- bay lifter (available from Nortel Networks part room; part number T001054) or dolly to move a bay from the unpacking area to the installation area
- masonite sheet
- gloves
- safety goggles

The bay lifter is shipped in its own case. Unload and set up the bay lifter before unloading the equipment bay.

Action

Step	Action
1	Remove the bay lifter from its case.
2	Unfold the L-shaped bay lifter legs into a fully perpendicular position as shown in Figure 3-3 on page 3-6. Note: The drilled holes in the lower cross-bar must line up with the hole on the inner sleeve of each leg.
3	Insert the locking pins through the holes in the lower cross-bar and leg.
4	Slide the upper cross-bar support onto the top of the lifter rails.
5	Rotate the lifter rails until the drilled holes in the upper cross-bar line up with the holes on the lifter rail.
6	Insert the locking pins through the holes in the upper cross-bar and lifter rails.
7	Move the hydraulic jack into its upright position, and position the top cross-bar on the jack.
8	Attach the jack handle to the jack arm.

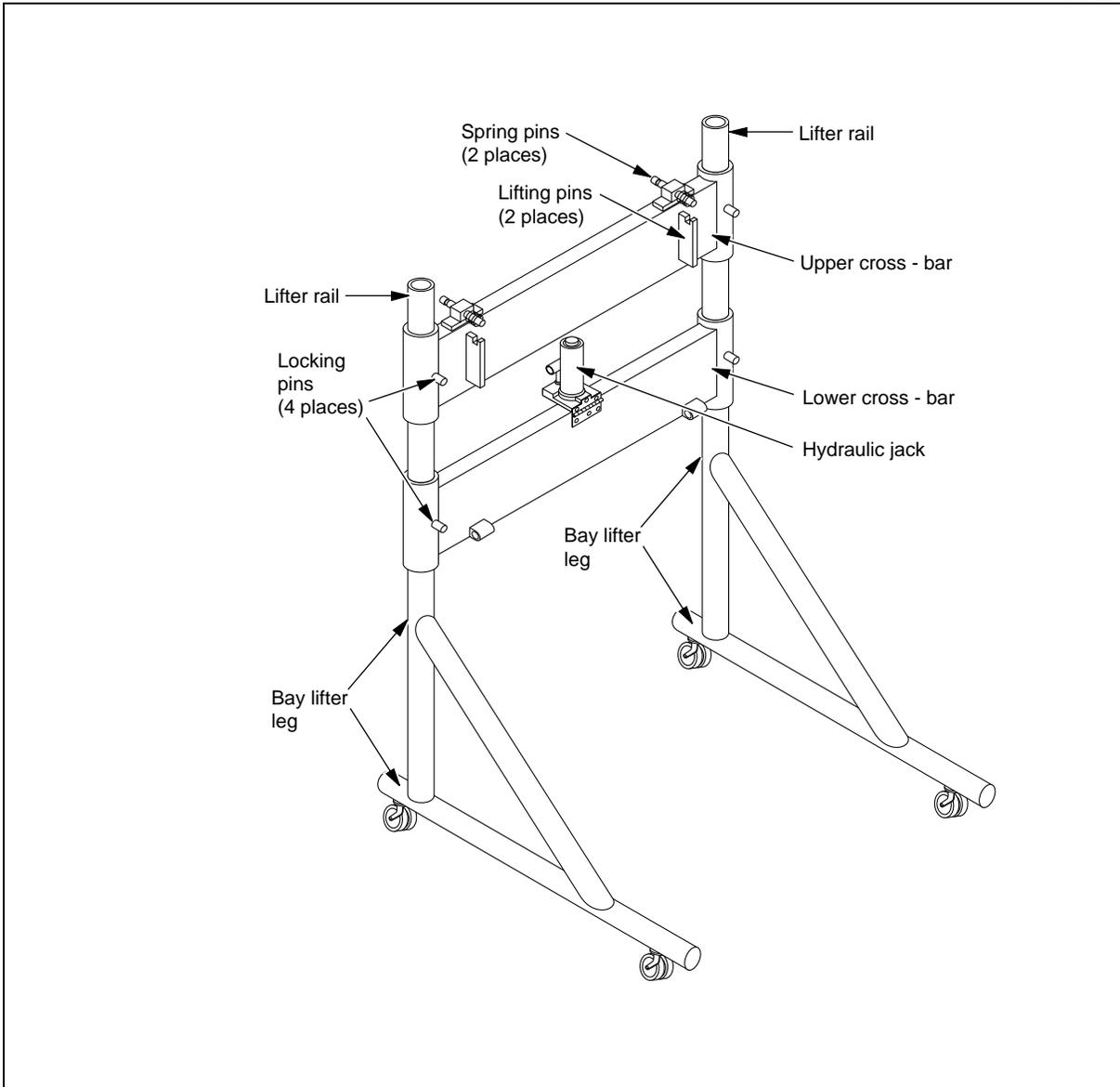
—continued—

3-6 Unpacking and installing the bay frames

Procedure 3-2 (continued) Setting up the bay lifter

Figure 3-3
Setting up the bay lifter

PC-15235



—end—

Procedure 3-3

Unpacking and moving the bay

Use this procedure to prepare the site and unpack the crated AccessNode equipment bay and move it to the installation location.

**DANGER****Risk of the bay toppling over**

With the shelves installed for shipping, the bay is heavier at the top than it is at the bottom and can topple over if mishandled. When using a fork lift to maneuver the bay on its pallet, use rope to tie the top of the bay to the mast of the fork lift. When maneuvering a bay by hand, keep the bay upright and use at least two people to maneuver it.

**CAUTION****Risk of structural stress when maneuvering uncrated bays**

When handling and moving uncrated bays, take care to avoid strain, excessive shock, or vibrations, which might damage the equipment or warp the frame.

Requirements

You need the following tools and materials:

- fork lift or lift truck to move the crated bay from the loading dock to the unpacking area
- claw hammer
- tin snips, 10 in.
- power knife (skinning knife)
- masonite sheet
- gloves
- safety goggles

To ensure smooth movement, prepare any uneven floors over which the crated or uncrated bays are transported.

When unloading and moving a crated bay, keep the bay vertical and move it by the bottom of the skid. If a bay must be moved horizontally, position the bay on one of its sides, and never on the front or back of the bay.

—continued—

3-8 Unpacking and installing the bay frames

Procedure 3-3 (continued)

Unpacking and moving the bay

All areas and passage ways must be accessible to allow the movement of crated bays from the receiving area to the equipment room. A clean, dry and dust-free area must be available to allow for the unpacking of crated bays, or shelf equipment. A sheet of masonite must be used for floor protection.

Action

Step Action

Unpacking the bay

- 1 Using the lift truck, move the crated bay equipment to the unpacking area and place it on a dry sheet of masonite (see Figure 3-4 on page 3-9).



DANGER

Risk of bay toppling over and causing injury

When using a lift truck to maneuver a bay, tie the top of the bay to the mast of the fork lift to prevent the bay toppling over during transport.

- 2 Using tin snips, cut the banding surrounding the bay crate.



DANGER

Risk of injury when cutting steel banding

Take care when cutting the steel banding to prevent recoiling. Wear safety glasses and gloves when cutting the steel banding. Fold and hammer the steel banding flat to prevent further recoil during disposal.

- 3 Carefully remove the top plate and all packing materials from the frame assembly and inspect for any damage to the equipment.

Note: Retain the containers for repacking in the event that the equipment has to be returned due to damage.

- 4 Remove and retain any assembly parts that are loosely attached to the framework.

- 5 Clear the unpacking area of all debris.



DANGER

Risk of bay toppling over and causing injury

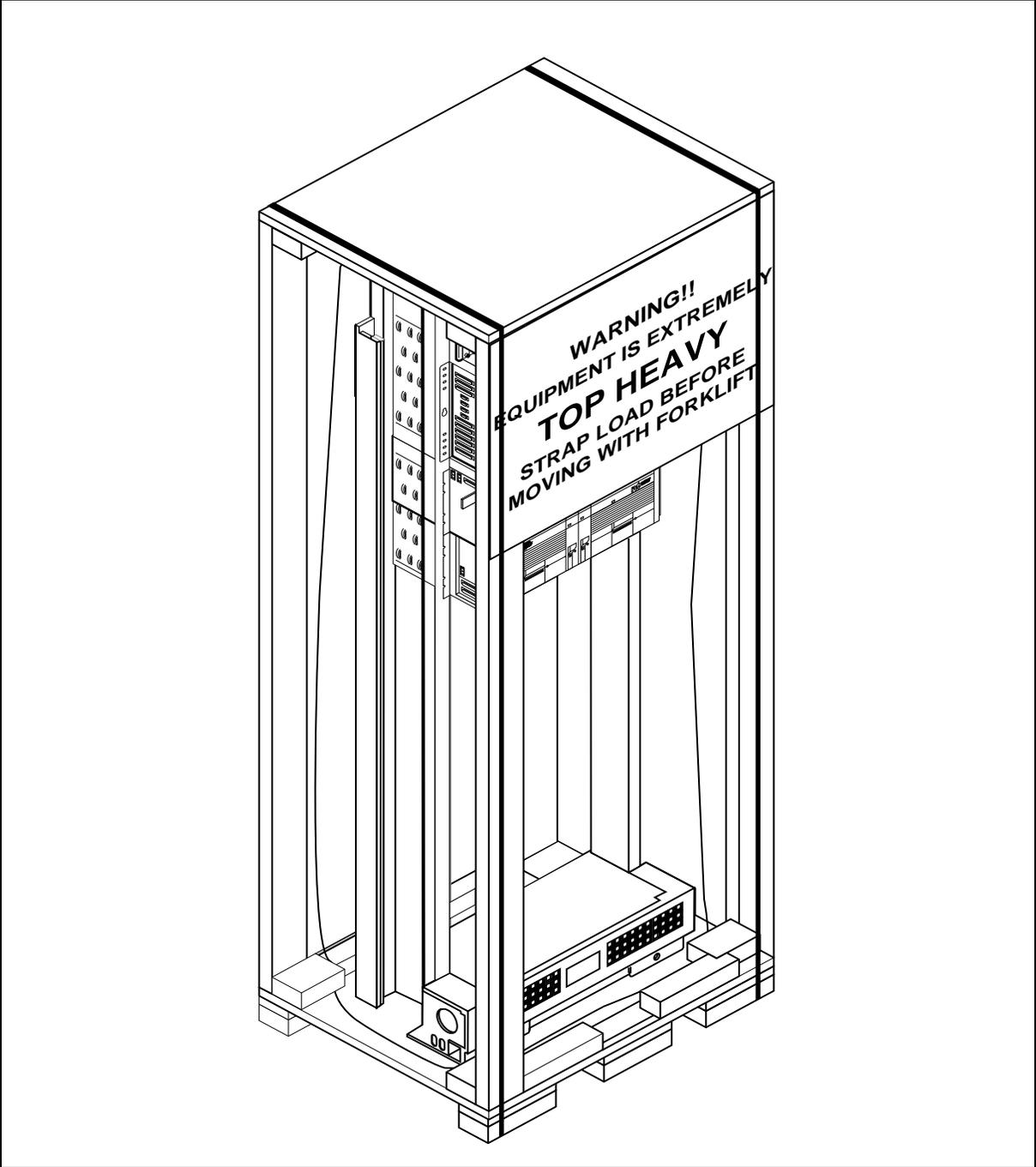
Use three people to remove the bay from the pallet: two to maneuver the base of the bay, and one to steady the top of the bay. With the shelves installed, the bay is heavier at the top, than at the bottom, and can topple over, if it is mishandled.

—continued—

Procedure 3-3 (continued)
Unpacking and moving the bay

Figure 3-4
Unpacking the crated bay

PC-15031



—continued—

3-10 Unpacking and installing the bay frames

Procedure 3-3 (continued)

Unpacking and moving the bay

Step Action

Attaching the bay lifter

- 6** Attach the bay to the bay lifter as follows (see Figure 3-5 on page 3-11):
- a.** Roll the bay lifter behind the bay until the bay lifter arm is almost touching the rear of the bay.
 - b.** Line up the attachments on the bay lifter arm with the cutouts near the top of the bay.
 - c.** Insert the attachments on the bay lifter arm into the cutouts. Use the jack handle to lift the bay lifter arm until the attachments are flush with the top of the bay cutouts.
 - d.** Insert the spring pins on each bay lifter arm into the cutouts above where the bay arm attachments are inserted. After inserting, turn the pins until they lock in the cutout.
 - e.** Use the jack handle to lift the bay high enough to clear the pallet.
 - f.** Remove the bottom pallet from the bay.
- 7** Move the bay to the installation area by slowly pushing the bay lifter to the appropriate space.



DANGER

Risk of bay toppling over and causing injury

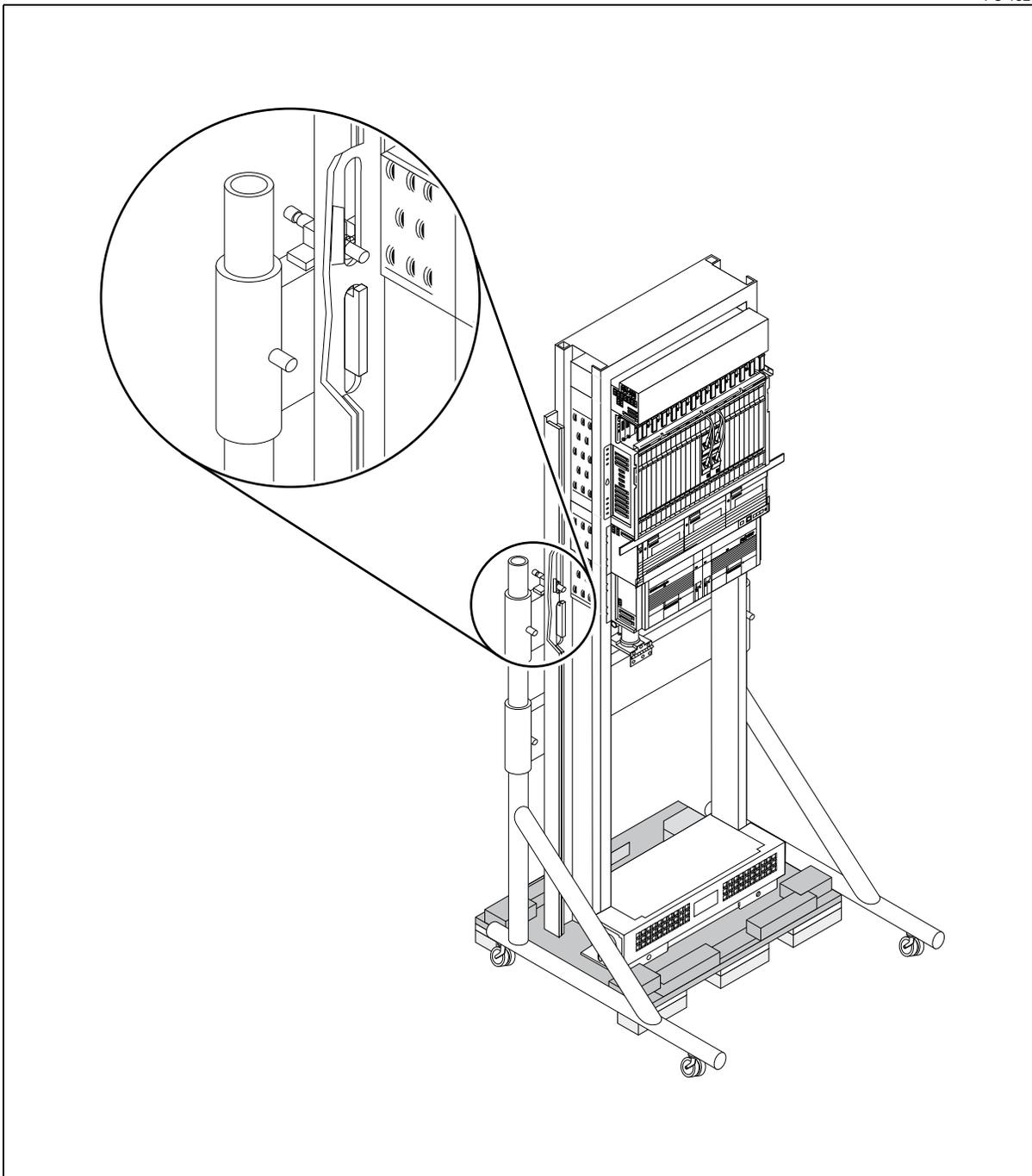
Use two people to maneuver the bay to the installation area using the bay lifter.

—continued—

Procedure 3-3 (continued)
Unpacking and moving the bay

Figure 3-5
Attaching the lifter to the bay

PC-15236



—end—

Procedure 3-4

Securing the bay frame

Use this procedure to secure the bay framework to the floor and, if applicable, to an adjacent bay framework.



DANGER

Risk of the bay toppling over

With the shelves installed for shipping, the bay is heavier at the top than it is at the bottom and can topple over if mishandled. Keep the bay upright except when installing the pad and shims, and use two people to maneuver or tilt the bay while a third person installs the shims.

Requirements

Remove any tape that was placed to protect anchor holes in the floor. This procedure assumes the bay is secured to the bay lifter as explained in Procedure 3-2 on page 3-5.

You need the following tools:

- frame movers
- socket wrench, 1/2 in. drive
- extra-deep socket, 16 mm (5/8 in.)—for standard anchoring
- extra-deep socket, 19 mm (3/4 in.)—for M12 earthquake anchoring
- torque wrench, 1/2 in. drive
- plumb line
- spirit level, 610 mm (24 in.), non-metallic
- double sided tape

—continued—

 Procedure 3-4 (continued)
Securing the bay frame

Action

Step Action

Removing the CDS in position 7

- 1** Go to one of the following steps according to the position of the bottom-most CDS shelf that has been shop-installed in the frame.

If the bottom-most CDS shelf is	Then
installed in CDS position 7 (the lower-most CDS position)	go to step 2
NOT installed in CDS position 7	go to step 10

- 2** Open and remove the side cable covers from the CDS installed in position 7.
- 3** Disconnect the power harnesses from the left and right sides of the CDS.
- 4** Disconnect the metallic test access cable from the MTA In connector on the left side of the CDS.
- 5** Disconnect the D/VT link access cables from the connectors on the right side of the CDS.
- 6** Tape the loose ends of the disconnected cables upward and out of the way.
- 7** Remove the two screws that secure the air filter unit (located below the CDS) to the bay upright, and slide the air filter unit out of the bay frame.
- 8** Remove the four screws that hold the CDS to the bay upright, and remove the CDS from the bay frame.
- 9** Tape the loose ends of the dc power harnesses upward and out of the way, in preparation for the next step.

Preparing the floor

- 10** Plumb the lineup to determine the highest spot on the floor. Mark this spot with chalk. You need to use it as a reference point when leveling all bays in the lineup.
- 11** Align the isolator pad over the holes drilled in the floor and secure the pad to the floor temporarily with 1 in. lengths of double sided tape so that it does not move while the bay is being maneuvered into place.

—continued—

3-14 Unpacking and installing the bay frames

Procedure 3-4 (continued)
Securing the bay frame

Step Action

- 12** Place the bay on the floor by reversing the jack arm switch and gently lowering the bay lifter arm until the bay is standing squarely on the floor.

	<p>DANGER Risk of the bay toppling over Use three people to remove the bay from the bay lifter: two to maneuver the base of the bay, and one to steady the top of the bay. With the shelves installed, the bay is heavier at the top than at the bottom and can topple over, if mishandled.</p>
---	---

- 13** To release the bay, unlatch the spring pins, remove the bay lifter arm from the bay, and roll the bay lifter away from the bay. Three people are required to perform this step.

Positioning the bay

- 14** Insert a frame mover at each side of the bay and engage the locking mechanism, as shown in Figure 3-6 on page 3-15.
- 15** With the frame movers installed, maneuver the bay so that it stands in front of the position in the lineup in which it is to be installed.
- 16** If you are installing a bay in an existing lineup of bays, cabling the bay will be easier if the bay is cabled first and then maneuvered into position in the lineup.

If the bay is to be installed	And local company policy	Then
in an existing lineup of bays	allows you to cable the bay while it is out of the line-up	go to step 17
in an existing lineup of bays	does NOT allow you to cable the bay while it is out of the line-up	go to step 19
in a new lineup		go to step 19

- 17** Secure the top of the bay to the overhead cable rack with straps or ropes so that it cannot tip over while it is being cabled.

Note: Ensure that the placement of the straps or ropes does not interfere with the bay extender installation as described in Procedure 3-5 on page 3-20, “Installing the bay frame extenders.”

- 18** Go to Procedure 3-5 on page 3-20, “Installing the bay frame extenders”.

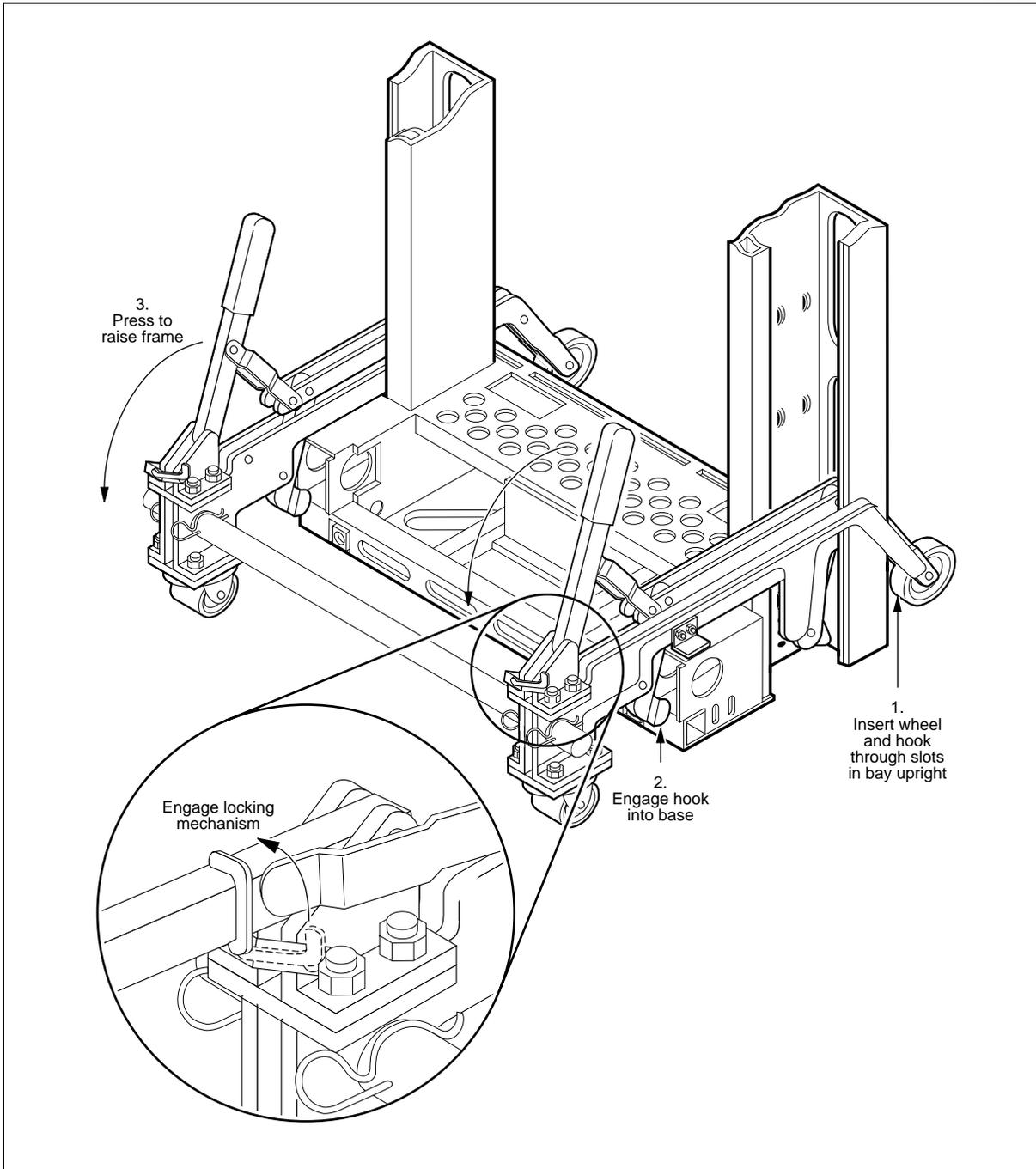
Note: You will secure the bay in place after it is cabled. Do not continue with step 19 of this procedure until you have completed the procedures in Chapter 5, “Installing the external ABM bay cabling.”

—continued—

Procedure 3-4 (continued)
Securing the bay frame

Figure 3-6
Installing frame movers into the bay uprights

PC-10955



—continued—

3-16 Unpacking and installing the bay frames

Procedure 3-4 (continued)

Securing the bay frame

Step	Action
19	With the frame movers installed, move the bay into position over the isolator pad.
20	Add shims as required beneath the base of the bay, ensuring that the anchor holes are not obstructed. If the bay is installed in an integrated bonding network (IBN) grounding environment, use plastic shims. If the bay is installed in a common bonding network, use metallic shims. Note: If metallic shims are used, they must be installed underneath the isolation pad.
21	Remove the frame movers from the bay frame.
22	Using the frame movers, carefully slide each subsequent bay framework into its assigned position in the lineup, adding an isolator pad beneath each bay frame.
Leveling the bay	
23	Using the 610 mm non-metallic spirit level, or a plumb bob attached to the top of the frame, check that each bay is vertically aligned, side to side and front to rear within 4.7 mm (0.1875 in.) of the overall bay height.
24	Insert non-conductive shims (for an IBN) or conductive shims (for a CBN) beneath the appropriate corner of the bay frame, to ensure that each bay is vertically aligned.
25	Tie the end of a roll of twine to the outside top edge of the first bay in the lineup and stretch it along the front edge of the other bays to the last bay of the same lineup. <i>With the twine pulled tight to ensure a straight reference line, the top edges of all bays should touch the twine with no significant gap.</i>
26	Adjust any bay that does not meet this requirement by adding shims, and rechecking.
27	For each bay, assemble either four standard anchors or four earthquake anchors (M12), as shown in Figure 3-7 on page 3-18.
28	Into each hole, insert an assembled anchor as shown in Figure 3-7 on page 3-18, and tap the anchor with a hammer until the sleeve of the anchor is no more than 3mm (1/8 in.) above the floor.

—continued—

Procedure 3-4 (continued)

Securing the bay frame

Step	Action
29	Loosely connect the junction hardware at the base of the bays, as shown in Figure 3-7 on page 3-18.
30	Tighten all of the anchors with a torque wrench, as follows: <ul style="list-style-type: none"> • <i>Standard anchor:</i> Use a 16 mm (5/8 in.) socket, and a torque setting of 36 ft-lbs (48.8 Nm). • <i>M12 anchor for earthquake (Zone 4):</i> Use a 19 mm (3/4 in.) socket, and a torque setting of 57 ft-lbs (77.2 Nm).
31	Tighten the junction hardware at the base of the bay.

Installing frame extenders

32	If frame extenders (NT7E71DA or NT7E71EA) are to be installed at the top of the frame, go to step 33. Otherwise, skip to step 37.
33	Unpack the frame extenders and their associated components.
34	Use the assembly drawing checklist to ensure that all of the required components have been provided with the frame extenders.
35	Mount and secure the frame extenders to the existing bay frame according to the installation drawing package.
36	Ground the frame extenders according to the installation drawing package.
37	If required, attach the auxiliary bay supports, as shown in Figure 3-8 on page 3-19. If the bay is being installed in an isolated bonding network (IBN) grounding environment, install isolation hardware between the top of the bay and the auxiliary bay supports.
38	Secure each bay to its adjacent bay at the top rear, as shown in Figure 3-8 on page 3-19.
39	Remove any tape that was holding the dc distribution harnesses up and out of the way.
40	If a CDS was removed to install the frame movers, continue at step 41. Otherwise skip to step 45.

Reinstall the CDS

41	Reinstall the CDS using the four screws removed previously.
42	Reinstall the filter unit below the CDS, and secure it to the bay uprights with the two screws removed previously.
43	Re-connect the dc distribution harnesses, the MTA cable, and the two D/VT link access cables to the CDS.
44	Reinstall the side cable covers on the CDS.
45	Go to Procedure 3-5 on page 3-20, "Installing the bay frame extenders".

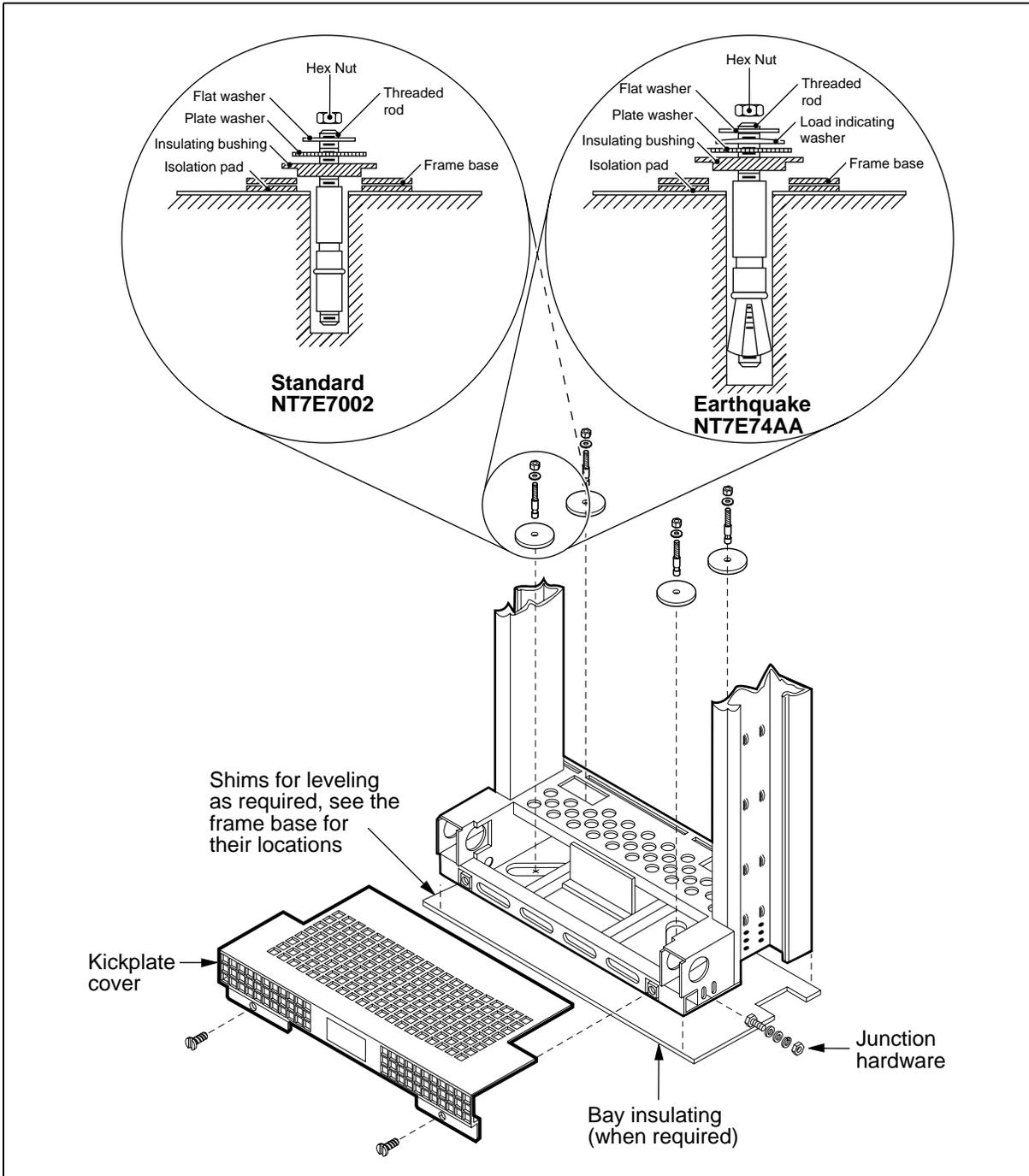
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3-18 Unpacking and installing the bay frames

Procedure 3-4 (continued) Securing the bay frame

Figure 3-7
Bay framework anchoring

PC-10034

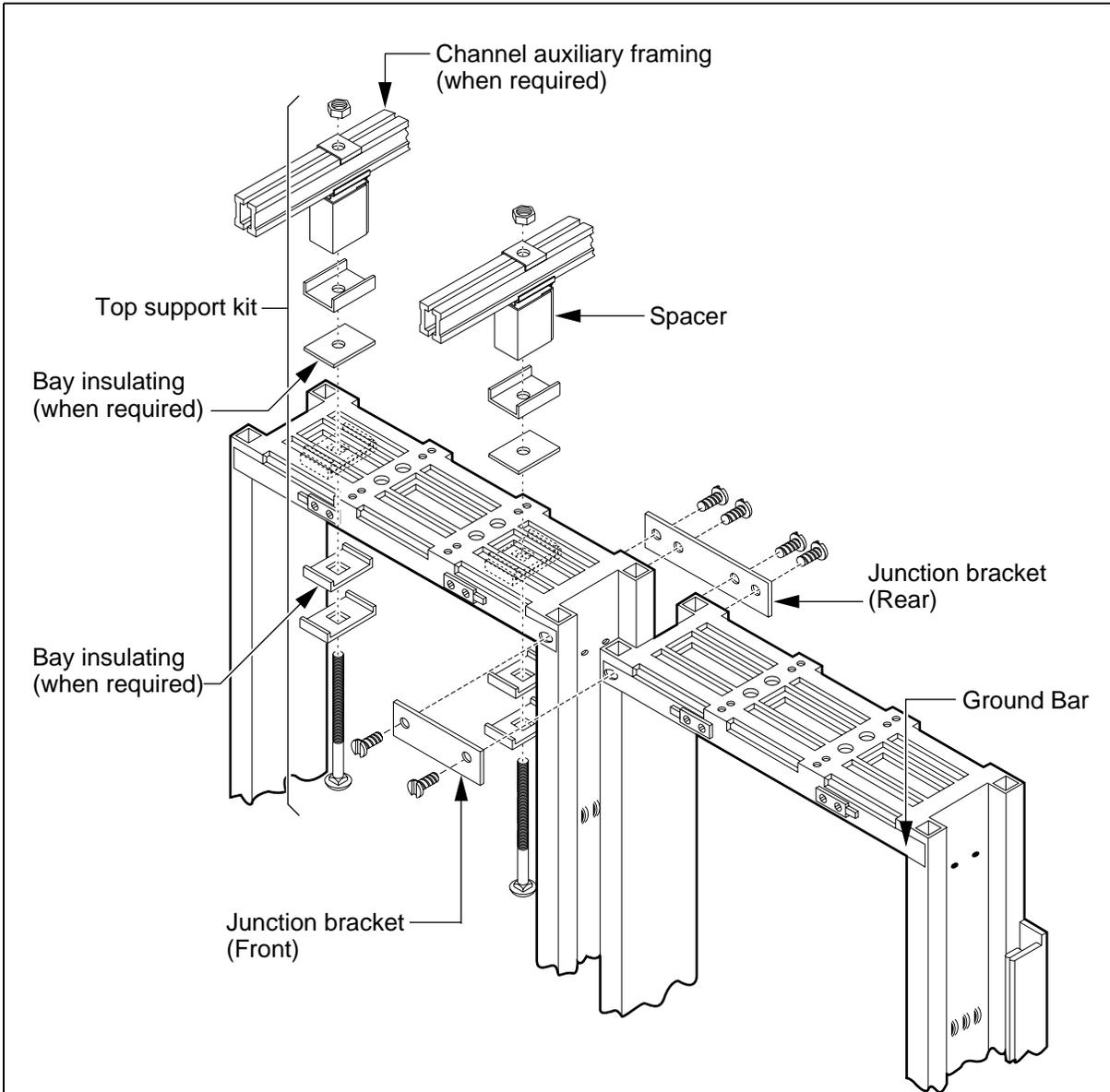


—continued—

Procedure 3-4 (continued)
Securing the bay frame

Figure 3-8
Securing a bay framework to an adjacent bay and the overhead bay auxiliary supports

PC-10035



—end—

Procedure 3-5 Installing the bay frame extenders

Use this procedure to install the frame extenders at the top of each bay. Two bay frame extenders are available to extend the height of a bay. These are the NT7E71DA bay frame extender, 0.61 m (2 ft) height, and the NT7E71EA bay frame extender, 1.37 m (4.5 ft) height.

Requirement

You need the following tools and materials:

- socket wrench, 1/ 2 in. drive
- installation drawing AD7E6910 (part of NT7E69BA)

Action

Step	Action
1	Unpack the frame extenders and their associated components.
2	Use the assembly drawing checklist to ensure that all of the required components have been provided with the frame extenders.
3	Mount and secure the frame extenders to the existing bay frame according to the installation drawing package.
4	Ground the frame extenders according to the installation drawing package.
5	Continue the installation process using Procedure 3-6 on page 3-21, "Attaching the frame ground."

—end—

Procedure 3-6

Attaching the frame ground

Use this procedure to attach the frame ground. The frame ground installation is considered part of the bay installation and is performed to ensure that:

- the new bays are integrated with the grounding scheme of the existing communication bays
- the integrity of the grounding network is maintained. See “Power and ground distribution” in *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Requirements

You need the following tools and materials:

- 6 AWG conductor (with green colored insulation)
- cable cutter and power knife
- insulation tester (Megger, KYORITSU model 3001B, KYORITSU model 3111V, or equivalent)
- hex nut driver set
- slotted screwdriver
- crimping tool, TBM2
- cable ties
- sandpaper or wire brush

Action

Step	Action
1	<p>Route a 6 AWG conductor from each bay frame directly to the office floor ground bar (or single point building ground in an isolated bonding network [IBN]), ensuring that there are no sharp bends in the conductors. Do not connect the cables to the floor ground bar (or single point building ground in an IBN) at this time.</p> <p>Note: An alternate arrangement must be used for lineups of more than six bays. In this alternative arrangement, the 6 AWG conductors connect in the overhead rack to a common 2 AWG frame ground collector that connects in turn to the floor ground bar (or single point building ground in an IBN).</p>

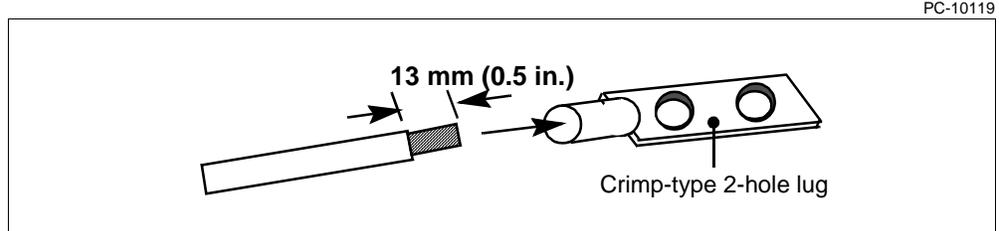
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3-22 Unpacking and installing the bay frames

Procedure 3-6 (continued)
Attaching the frame ground

Step	Action
2	Route the conductor from the overhead rack to reach the ground bar at the top of the bay.
3	Strip the 6 AWG conductor 13 mm (0.5 in.) and crimp a ground lug to the end of the conductor as shown in Figure 3-9.

Figure 3-9
Frame ground lug connection



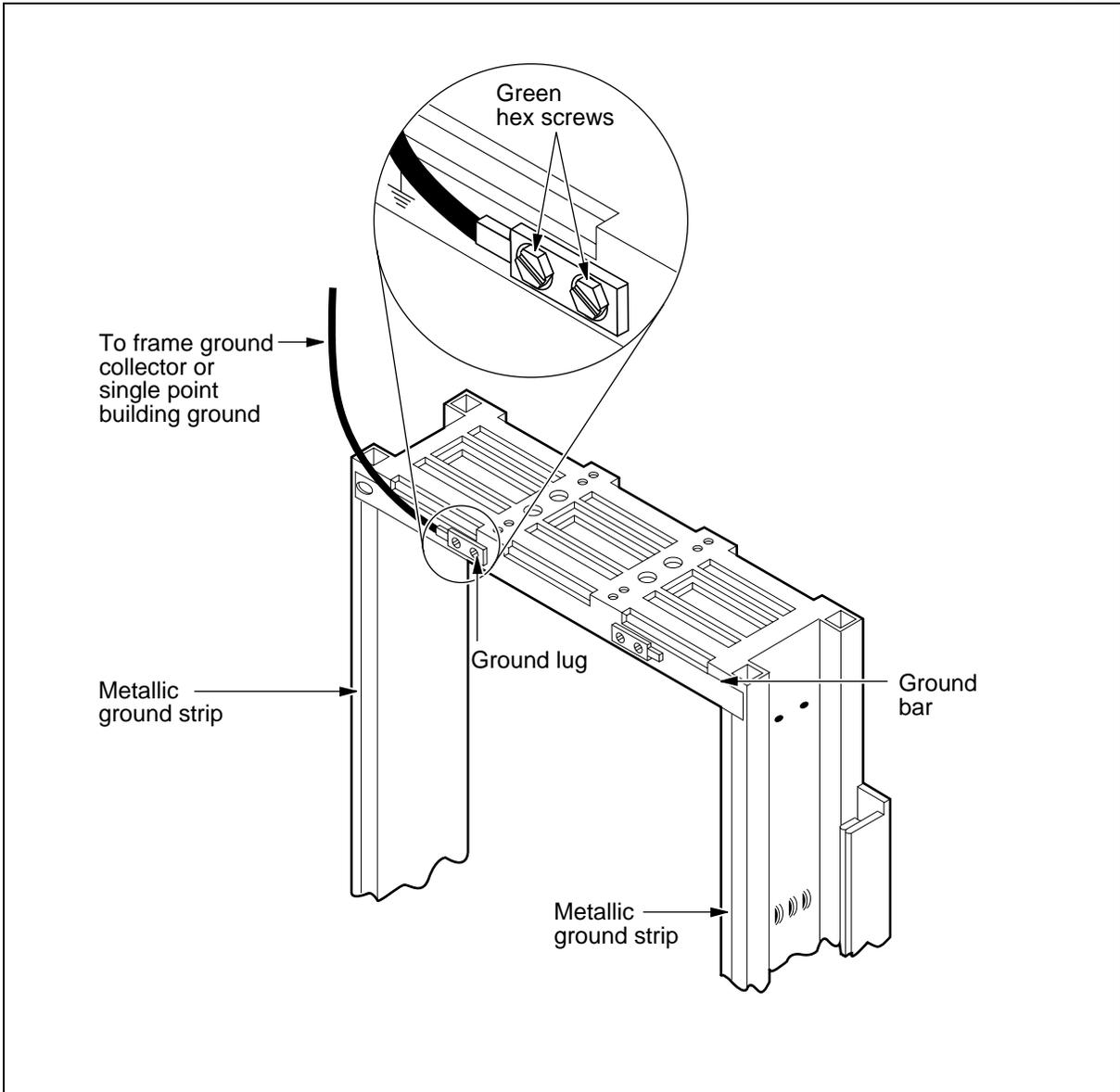
- 4 Attach the ground lug with two hex bolts to the ground bar at the top of the bay framework, as shown in Figure 3-10 on page 3-23.
Note 1: Clearance behind the breaker interface panel allows the lugs and bolts to be loosely attached.
Note 2: Each frame in an equipment lineup can be directly connected to the office or frame aisle ground by using either of the two ground lugs.
- 5 Using a nut driver or a slotted screwdriver, tighten the bolts.
- 6 If the office in which you are installing the frame is equipped with a mesh ground bonding network imbedded in the concrete floor, go to step 7. If not, continue at step 8.
- 7 Use local procedures to test current leakage to connect the frame ground cable(s) to the mesh ground bonding network. End this procedure here.
- 8 Connect one lead of the insulation tester to a known good ground point and the other lead to a grounding cable that is attached to the frames you have just installed. The polarity of the leads is not important for this test.
- 9 Set the test voltage to 500 V dc and measure the leakage current between the frame ground cable and the known good ground. The leakage current should be less than 1.5 mA (better than 2 megohms if you are using an instrument that provides an output reading in ohms).
- 10 If the leakage current is greater than 1.5 mA (or the resistance is less than 2 megohms) the isolation shims, or the overhead auxiliary bay support isolation hardware, are probably installed incorrectly. Check the installation of the isolation shims and repair as necessary.
- 11 Repeat the test on the grounding cable from each frame until you have tested all frame grounding cables.
- 12 Connect the ground cable(s) routed in step 1 and tighten the bolts.

—continued—

Procedure 3-6 (continued)
Attaching the frame ground

Figure 3-10
Connecting the frame ground

PC-10036



—end—

Procedure 3-7

Installing the ac cabling and the ac receptacle

Use this procedure to install the optional ac receptacle in the base of the bay.

The recommended ac cable is insulated metal clad cable, 12 AWG, with three conductors for standard receptacle wiring. A receptacle with an isolated ground (orange) can be used if local codes require its use.

Note 1: The ac cabling installation must comply with the office distribution and grounding scheme. See “Power and ground distribution” in *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Note 2: The ac outlet installation must be completed before other external bay cabling, to avoid congestion with other bay cabling.

Requirements

You need the following tools and materials:

- cable cutters
- hack saw
- power knife
- flat-bladed screwdriver
- socket wrench set, 1/2 in. drive
- pliers
- cable ties
- drawing package (NT7E69BA)

Action

Step	Action
1	Remove the knock-outs from the narrow sides of an electrical box.
2	Attach the electrical box to the front base of the bay in the location shown in Figure 3-11 on page 3-25. Note: Unless otherwise required by the customer, the ac receptacle box is bolted directly to the frame without the use of an insulator.
3	Route the ac cable from the office distribution panel to the bay frame.

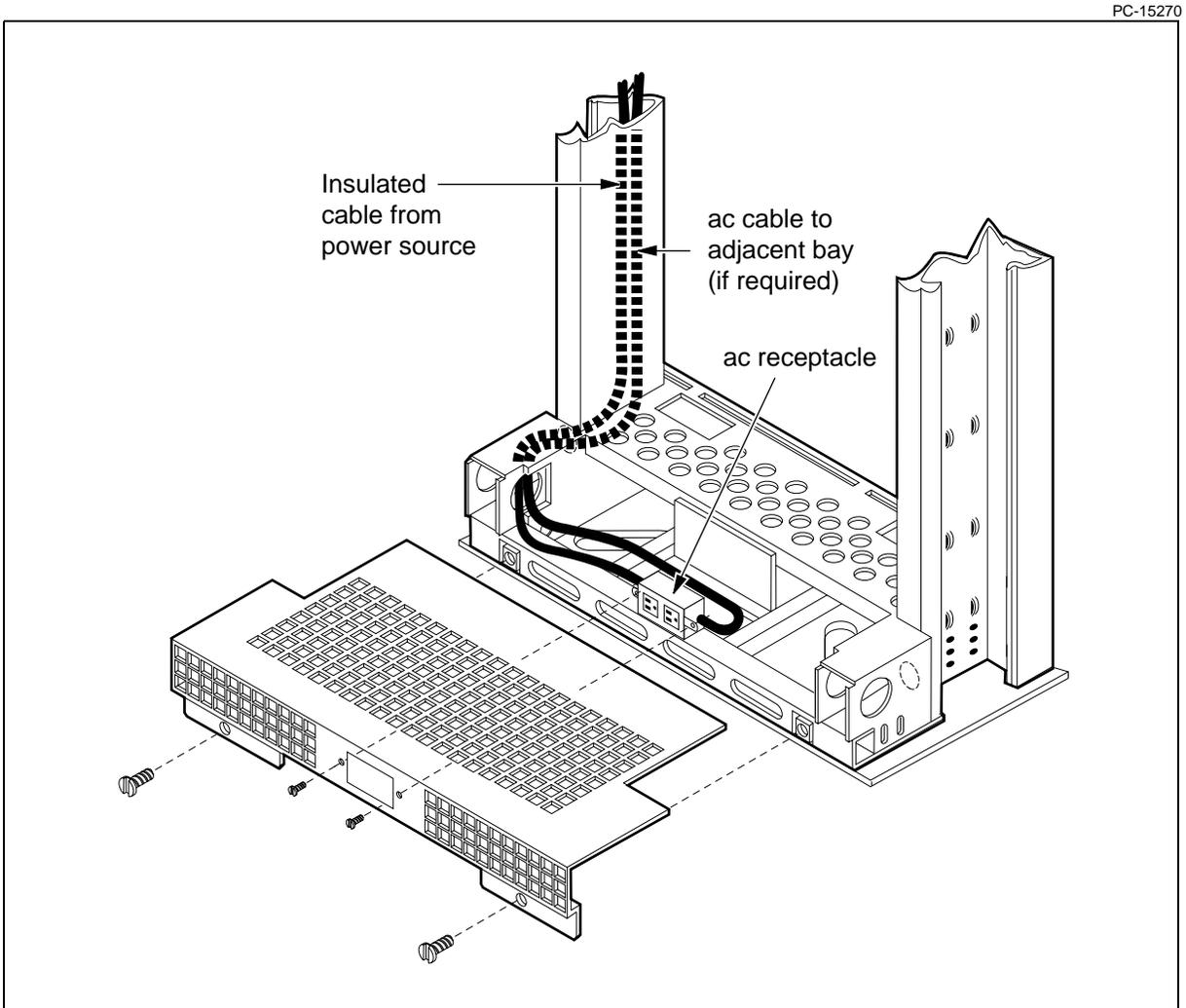
—continued—

Procedure 3-7 (continued)

Installing the ac cabling and the ac receptacle

Step	Action
4	Route the ac cable down the left side of the bay, as shown in Figure 3-11 on page 3-25.
5	If a single ac feed is used to feed more than one bay in a lineup, the ac cable is routed from the first electrical box, up the left side of the bay and down the left side of the adjacent bay, for termination in its receptacle box. Note: If local codes allow, the ac cable may be extended from the right side of the first electrical box, through the base of the bay horizontally, and terminated in the receptacle box of the adjacent bay.

Figure 3-11
Routing the ac cable



—continued—

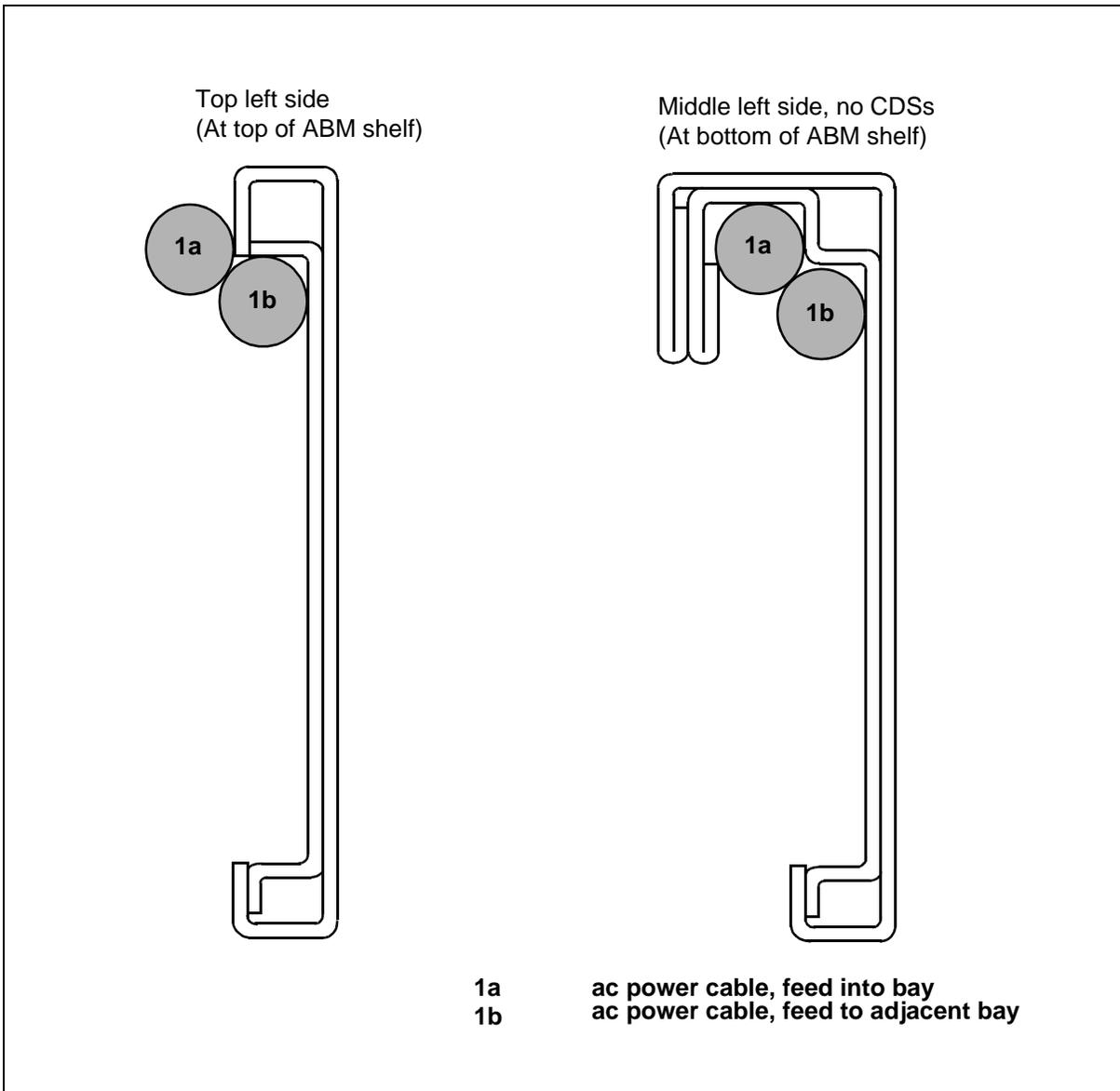
3-26 Unpacking and installing the bay frames

Procedure 3-7 (continued)

Installing the ac cabling and the ac receptacle

Step	Action
6	Place the ac cable(s) in the left bay upright to occupy the position shown in Figure 3-12 and secure the cable(s) with cable ties.

Figure 3-12
Placement of ac cable in the left upright



—continued—

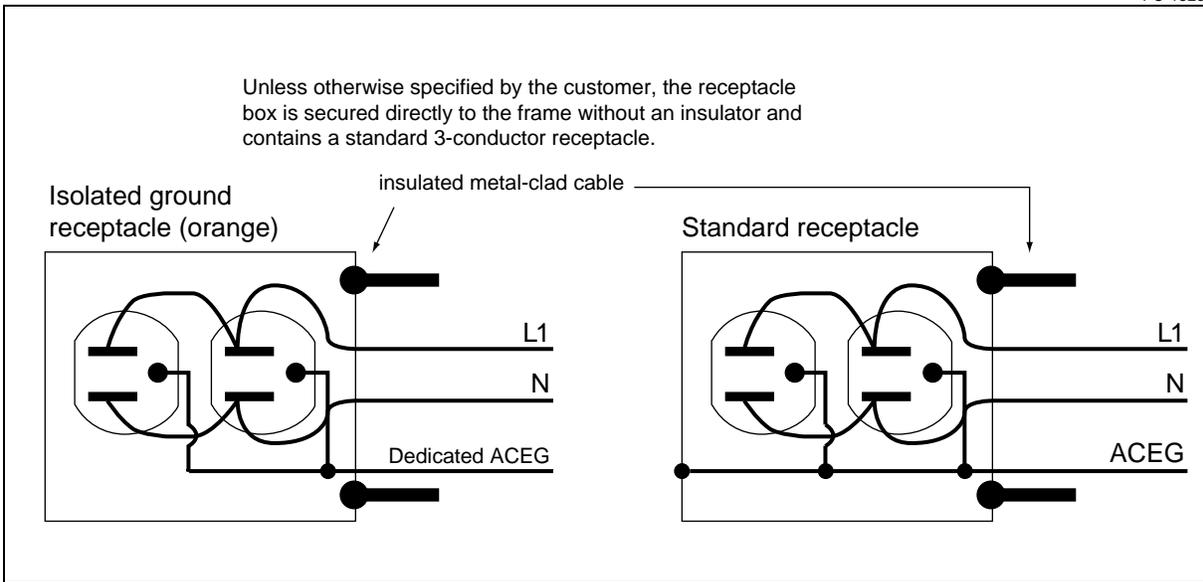
Procedure 3-7 (continued)

Installing the ac cabling and the ac receptacle

Step	Action
7	Terminate the ac cable in the electrical box for either a standard receptacle (brown or white) or an isolated ground receptacle (orange) to comply with the connections, as shown in Figure 3-13.

Figure 3-13
AC receptacle wiring

PC-15269



—end—

Mounting copper-distribution shelves

This chapter provides the procedures required to add copper-distribution shelves to an AccessNode bay frame.

How to use this chapter

The following table contains a list of the procedures necessary to add the copper-distribution shelves. Perform the procedures in the order in which they are listed in the table. If you cannot successfully complete these procedures, contact your next level of support.

Chapter task list

This chapter includes the following tasks:

Task	See
Installing copper-distribution shelves	Procedure 4-1 on page 4-2
Installing the dc distribution harnesses	Procedure 4-2 on page 4-8
Installing the D/VT link access cables	Procedure 4-3 on page 4-20
Installing the metallic test access cables	Procedure 4-4 on page 4-25
Installing the external bay cabling	Chapter 5

For information on deprovisioning a copper-distribution shelf in the AccessNode, see *Provisioning and Operations Procedures*, 323-3001-310, in *Operations, Administration, and Provisioning*, Volume 4B.

Procedure 4-1 Installing copper-distribution shelves

Use this procedure to mount copper-distribution shelves in an AccessNode bay and to secure the shelves in place.

Requirement

	DANGER Ensure that there are no power converters or line interface cards in the copper-distribution shelf while the shelf is being installed.
---	---

You need the following tools:

- hex nut driver set
- socket wrench set, 1/2 in. drive

Action

Step	Action						
1	Start this procedure as follows: <table border="1" data-bbox="521 1085 1421 1213"><thead><tr><th data-bbox="527 1094 548 1121">If</th><th data-bbox="1187 1094 1252 1121">Then</th></tr></thead><tbody><tr><td data-bbox="527 1131 1130 1159">there is already a copper-distribution shelf installed</td><td data-bbox="1187 1131 1328 1159">go to step 2</td></tr><tr><td data-bbox="527 1169 1089 1197">this is the first copper-distribution shelf installed</td><td data-bbox="1187 1169 1328 1197">go to step 7</td></tr></tbody></table>	If	Then	there is already a copper-distribution shelf installed	go to step 2	this is the first copper-distribution shelf installed	go to step 7
If	Then						
there is already a copper-distribution shelf installed	go to step 2						
this is the first copper-distribution shelf installed	go to step 7						
2	Starting with the first existing copper-distribution shelf below the access bandwidth manager (ABM) shelf, remove the left and right side cable covers from the copper-distribution shelf, as shown in Figure 4-1 on page 4-3.						
3	Grasp the cover at the top and pull outward while rotating the cover 90 degrees to disengage the cover from the latched position.						
4	Pull the cover straight out from the shelf to disengage the cover from the hinge pins on the copper-distribution shelf.						

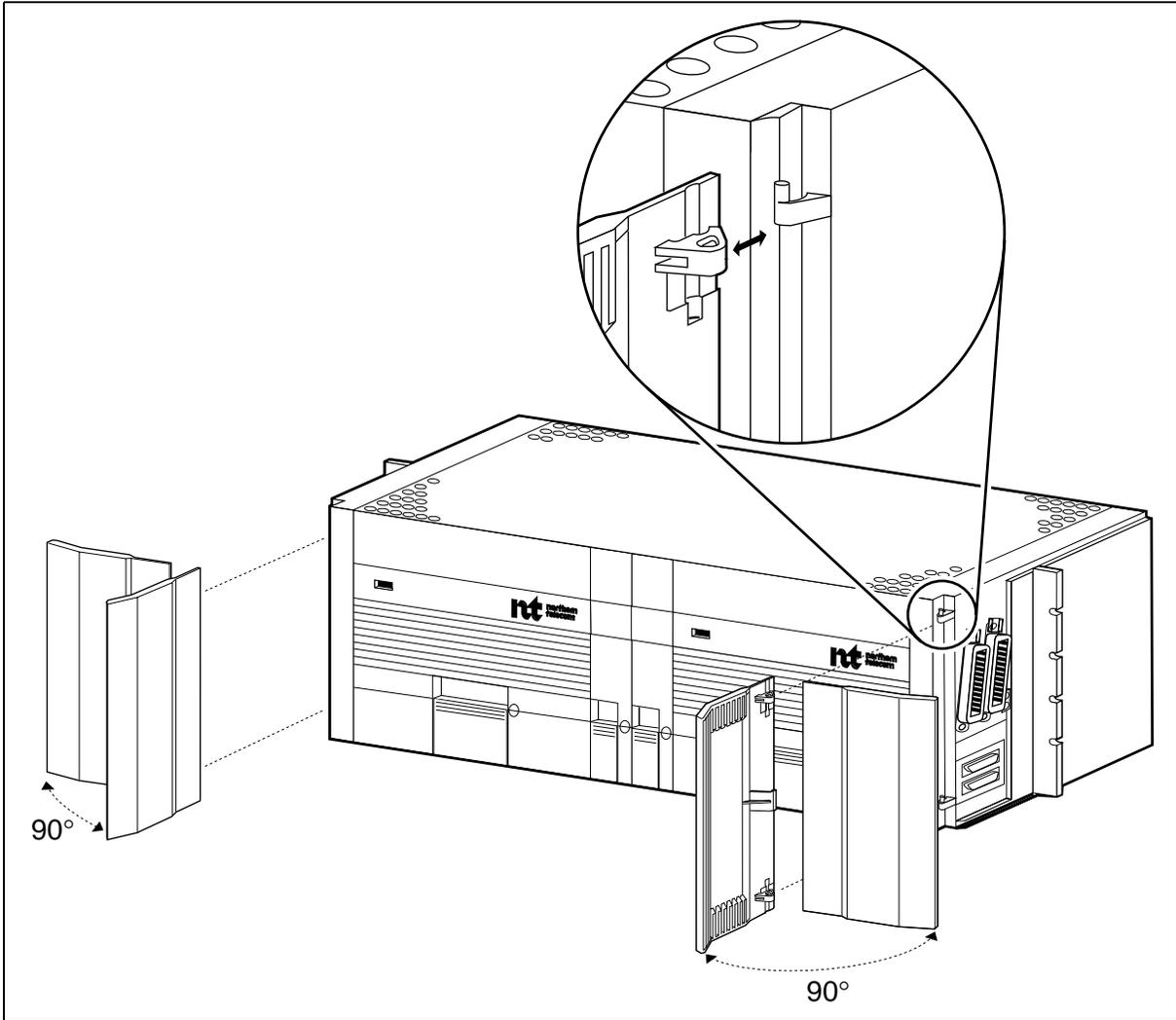
—continued—

Procedure 4-1 (continued)
Installing copper-distribution shelves

Step Action

Figure 4-1
Removing cable covers from existing copper-distribution shelf

PC-10042



—continued—

4-4 Mounting copper-distribution shelves

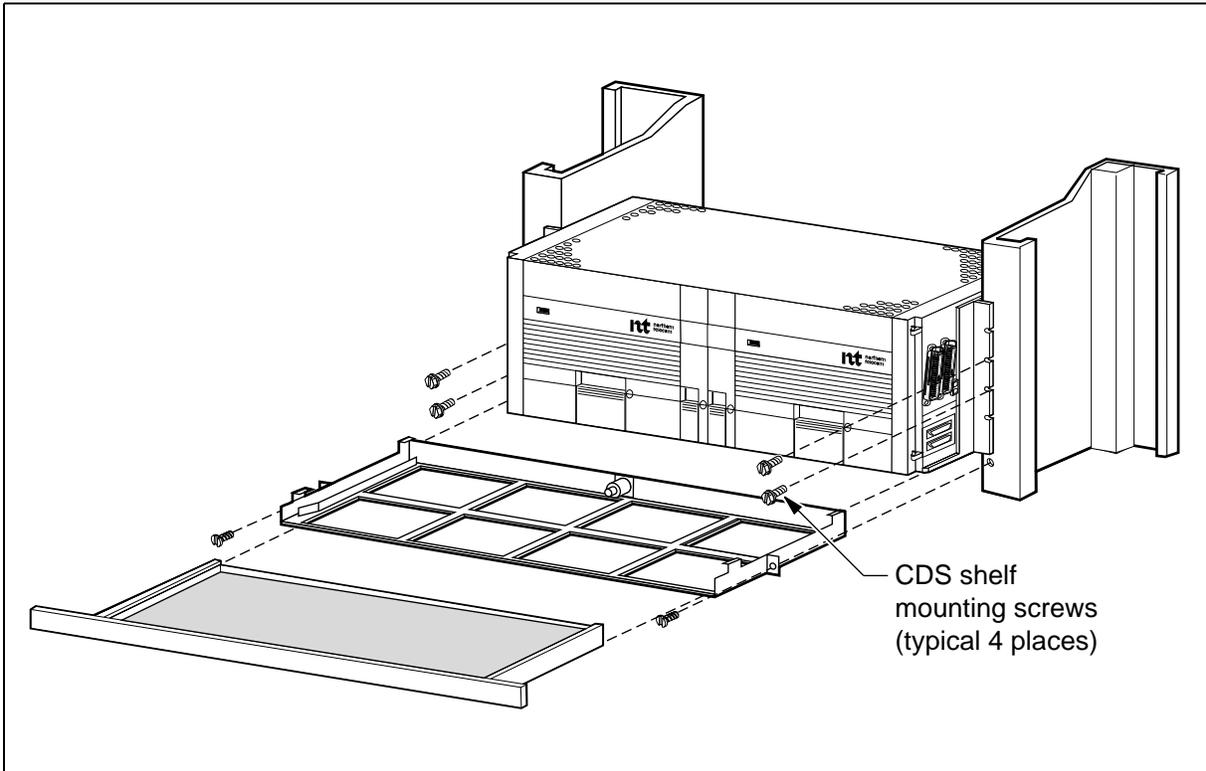
Procedure 4-1 (continued)

Installing copper-distribution shelves

Step	Action
5	Unscrew the two retaining screws holding the air filter unit in position, and slide the unit out from the grooves of the copper-distribution shelf, as shown in Figure 4-2.
6	Set the equipment covers and the air filter unit aside until the new add-on shelves have been installed.
7	If the protective covering is still on the metallic ground strip on each frame upright, peel off the covering to expose the metallic ground strip. Make sure that you peel off only the protective covering and not the actual metallic ground strip.

Figure 4-2
Removing the air filter unit from a copper-distribution shelf

PC-10031

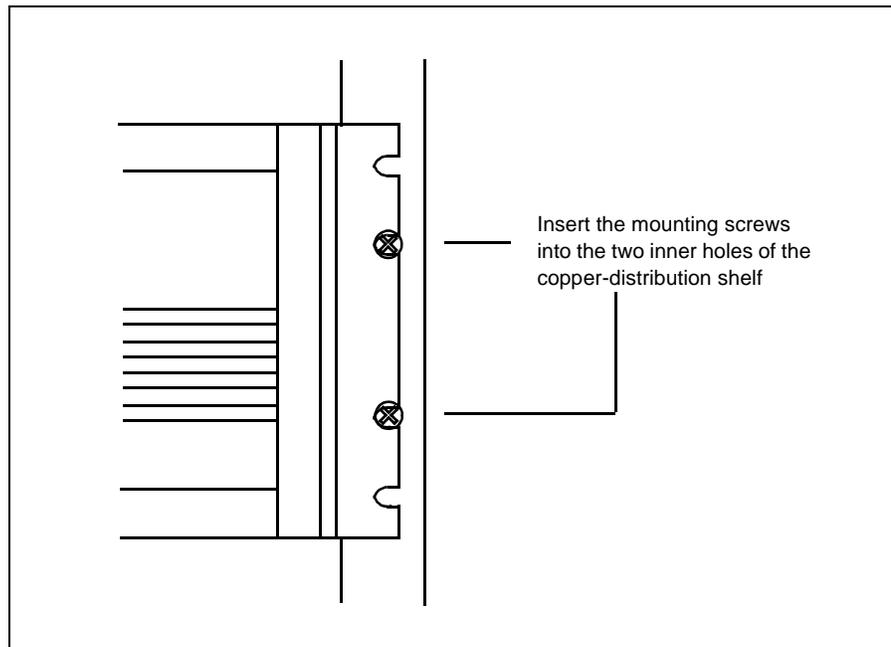


—continued—

Procedure 4-1 (continued)

Installing copper-distribution shelves

- | Step | Action |
|------|---|
| 8 | To install the copper-distribution shelf, two persons are required. Position the copper-distribution shelf below the bottom shelf in the frame. Ensure the copper-distribution shelf is positioned tight up against the bottom shelf. Figure 4-3 on page 4-6 shows the placement of the equipment in the frame. |
| 9 | Secure the copper-distribution shelf to the bay framework with 4 screws. Insert the left two screws first, then the right two screws. |



- | | |
|----|--|
| 10 | Repeat step 8 for the other copper-distribution shelves in succession, from the top of the frame, down. |
| 11 | Slide the air filter (NT4K15BA) unit beneath the lowermost copper-distribution shelf in the frame, engaging the grooves of the copper-distribution shelf, and secure the unit to the rack with two screws, as shown in Figure 4-4 on page 4-7. |
| 12 | Slide the air filter into the unit, and press the center of the faceplate to engage the rear latching mechanism. |

—continued—

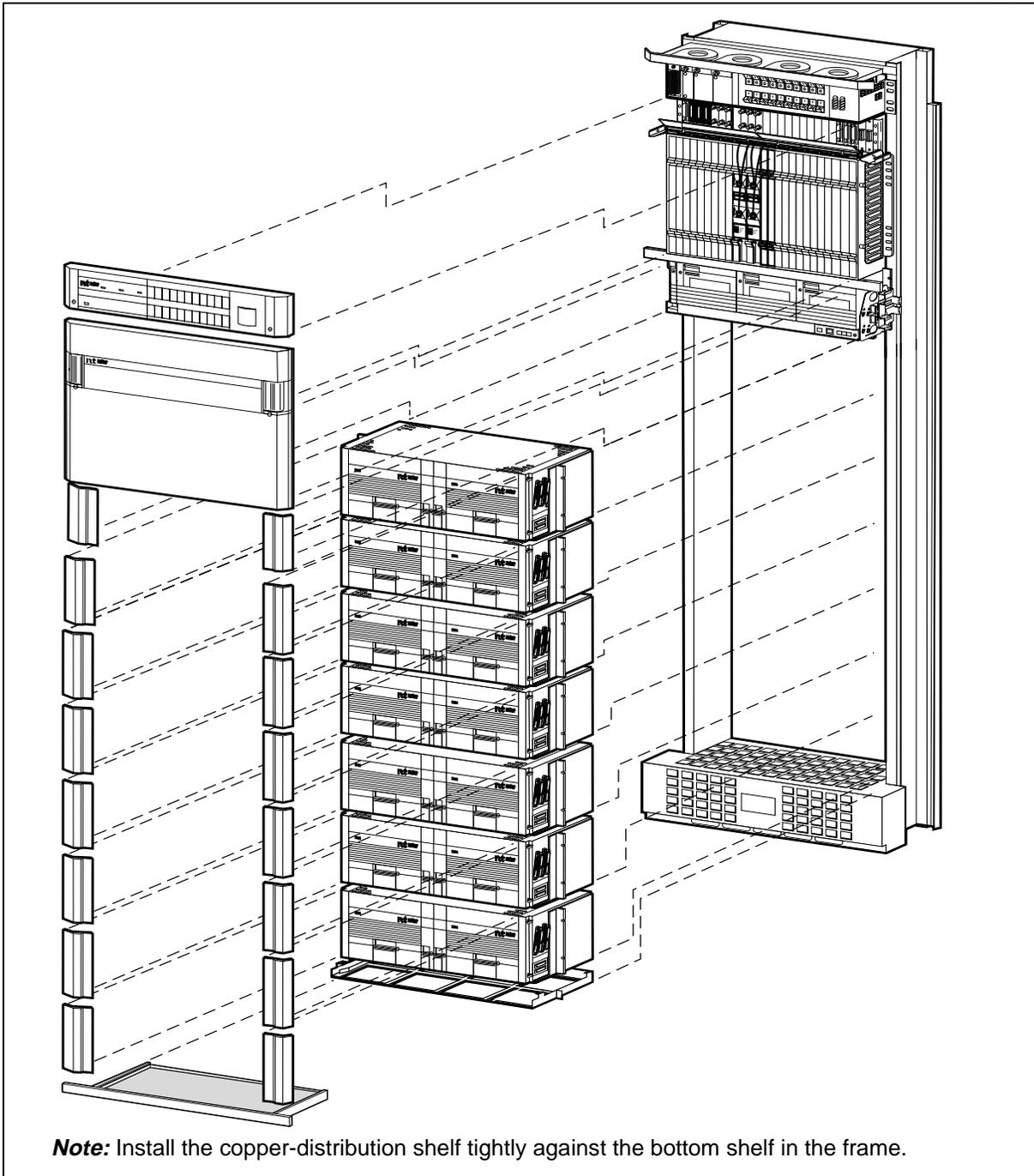
4-6 Mounting copper-distribution shelves

Procedure 4-1 (continued)

Installing copper-distribution shelves

Figure 4-3
Copper-distribution shelves and air filter unit placement

PC-10030

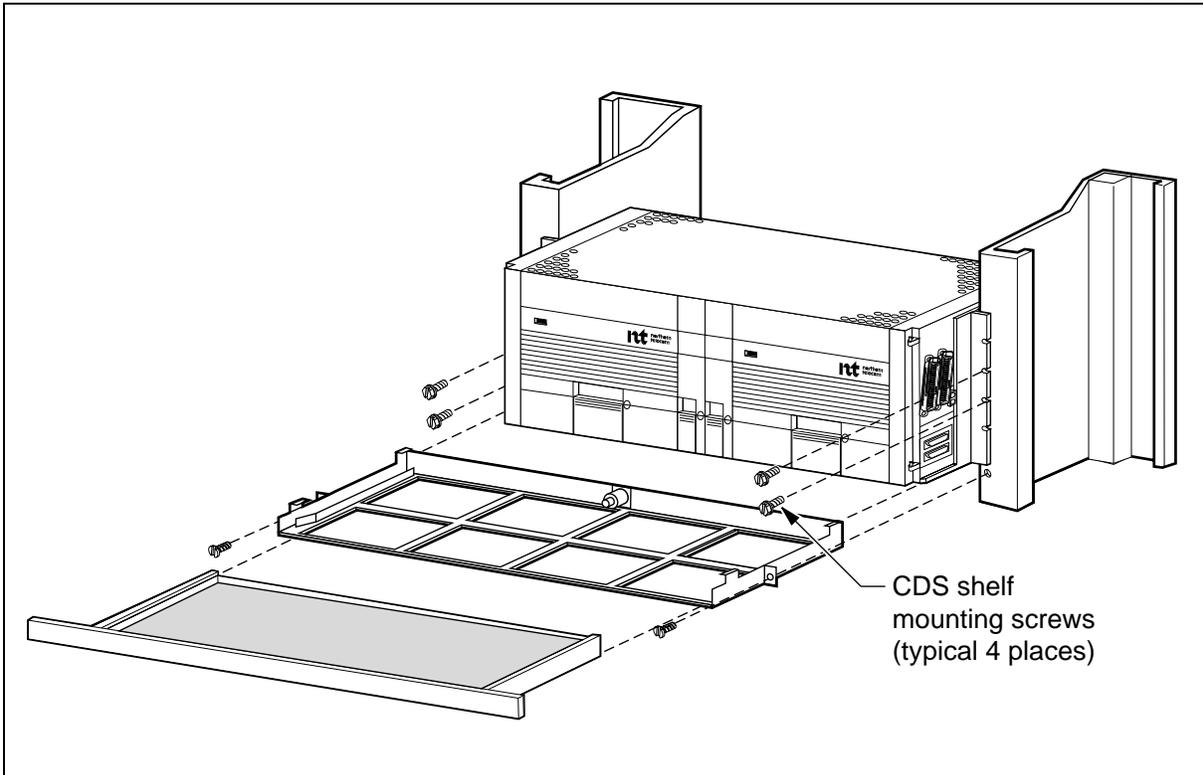


—continued—

Procedure 4-1 (continued)
Installing copper-distribution shelves

Figure 4-4
Installing air filter unit to the last copper-distribution shelf

PC-10031



—end—

Procedure 4-2 Installing the dc distribution harnesses

Use this procedure to do either of the following:

- Add dc distribution harnesses to a bay that is being upgraded from a multiplexer (NT4K03) configuration to an NT4K02 add-drop configuration with copper-distribution shelves, and to connect the harnesses to the copper-distribution shelves installed in the bay.
- Connect the existing dc distribution harnesses to the copper-distribution shelves in a bay to which copper-distribution shelves are being added (NT4K01, NT4K02 configurations).



CAUTION

Service affecting

This procedure is service affecting.

Requirement



CAUTION

Possible damage to equipment

Ensure that there are no power converters or line interface cards in the copper-distribution shelf while the harnesses are being installed.

You need the following tools and materials:

- cable cutters
- cable ties
- dc distribution harnesses NT4K84JA and JB, if harnesses are not already added to the bay

This procedure must be performed with the bay pulled out of the lineup to gain access to cable area.

—continued—

 Procedure 4-2 (continued)
Installing the dc distribution harnesses

Action

Step	Action						
1	Go to one of the following steps: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">If the dc distribution harnesses</th> <th style="text-align: left;">Then</th> </tr> </thead> <tbody> <tr> <td>need to be added to the bay</td> <td>go to step 2</td> </tr> <tr> <td>have been added to the bay</td> <td>go to step 22</td> </tr> </tbody> </table>	If the dc distribution harnesses	Then	need to be added to the bay	go to step 2	have been added to the bay	go to step 22
If the dc distribution harnesses	Then						
need to be added to the bay	go to step 2						
have been added to the bay	go to step 22						
2	At the left side of the bay, disconnect the existing NT4K84CB cooling unit cable from the CU Pwr A and CU Pwr B connectors on the BIP. The location of these connectors is shown in Figure 4-5 on page 4-11. Note: The NT3K84CB cooling unit cable and the NT4K84BA common-equipment power cable must be removed. Their functions have now been incorporated into the NT4K84JA and JB dc distribution harnesses that you are about to install.						
3	Disconnect the NT4K84CB cooling unit cable from the CU Pwr A and CU Pwr B connectors on the left side of the cooling unit. The location of these connectors is shown in Figure 4-6 on page 4-12.						
4	Clip the cable ties that secure the NT4K84CB cooling unit cable in place, and remove the cable.						
5	Route an NT4K84JB harness down the left side of the bay as shown in Figure 4-7 on page 4-13.						
6	Attach the connectors of the NT4K84JB harness to the CDS TB connectors on the BIP, as shown in Figure 4-7 on page 4-13. Connector 1 on the harness attaches to CDS TB 1 on the BIP, Connector 2 on the harness attaches to CDS TB 2, and so on.						
7	Attach the connectors labelled CU A and CU B to the CU Pwr A and CU Pwr B connectors on the left side of the BIP.						

—continued—

4-10 Mounting copper-distribution shelves

Procedure 4-2 (continued)

Installing the dc distribution harnesses

Step	Action
8	Attach the connectors labelled CU A and CU B to the CU Pwr A and CU Pwr B connectors on the left side of the cooling unit.
9	Dress the dc harness so that it does not extend beyond the edge of the bay upright and into the cabling area of the adjacent bay frame.
10	Tie-wrap the harness to the frame bar as shown in Figure 4-7 on page 4-13.
11	Secure the harness to the bay upright in the position shown in Figure 4-8 on page 4-14, using one cable tie at each lance plate.
12	At the right side of the bay, disconnect the existing NT4K84BA common-equipment power cable from the CE Pwr A and CE Pwr B connectors on the right side of the BIP. The location of these connectors is shown in Figure 4-5 on page 4-11.
13	Disconnect the NT4K84BA cable from the power connectors in the I/O area of the ABM shelf. See Figure 4-9 on page 4-15 for the location of these connectors.
14	Clip the cable ties that secure the NT4K84BA common-equipment power cable in place, and remove the cable.

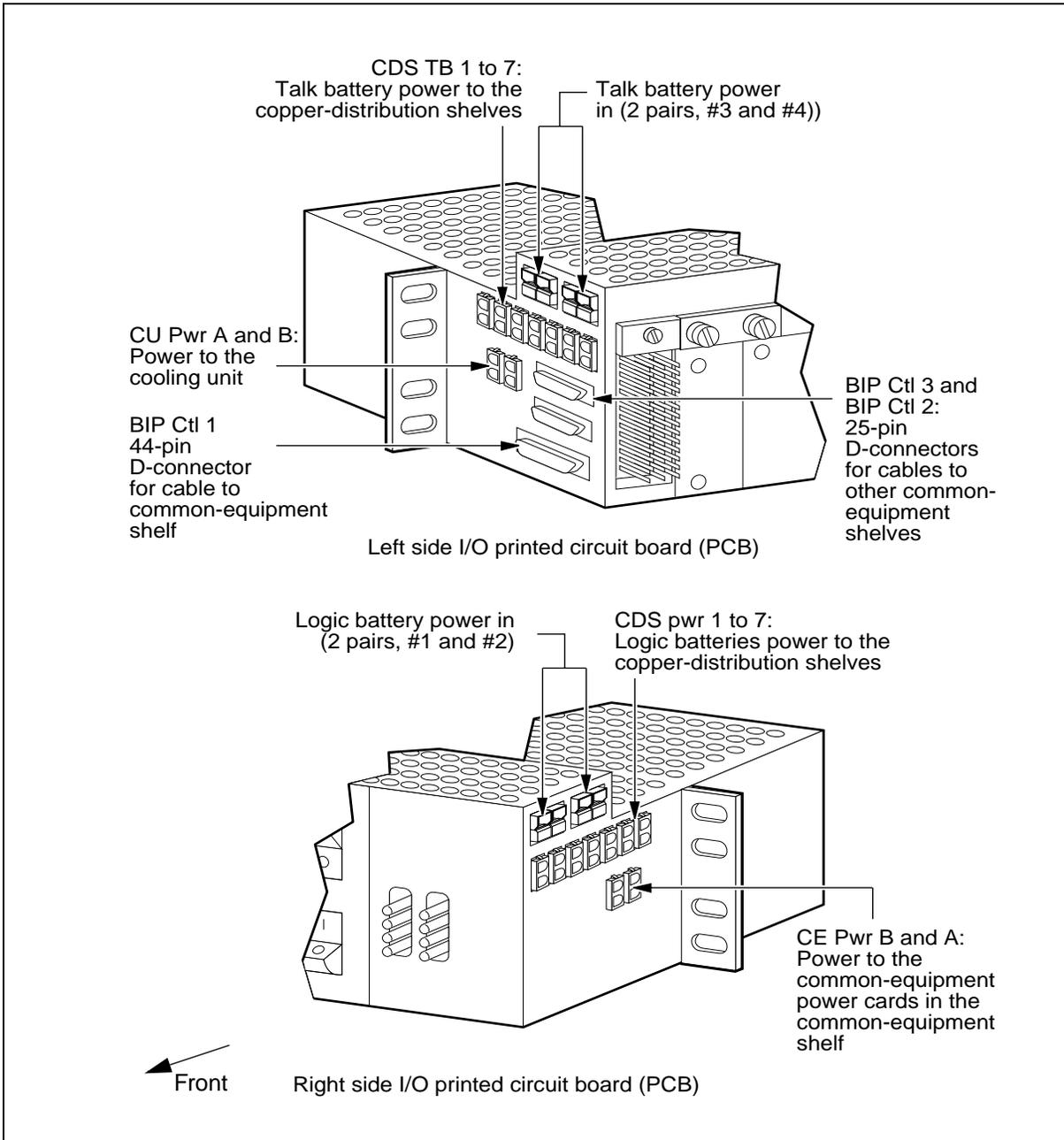
—continued—

Procedure 4-2 (continued)
Installing the dc distribution harnesses

Step Action

Figure 4-5
Location of the cooling unit and common-equipment power connectors on the BIP

PC-10063



—continued—

4-12 Mounting copper-distribution shelves

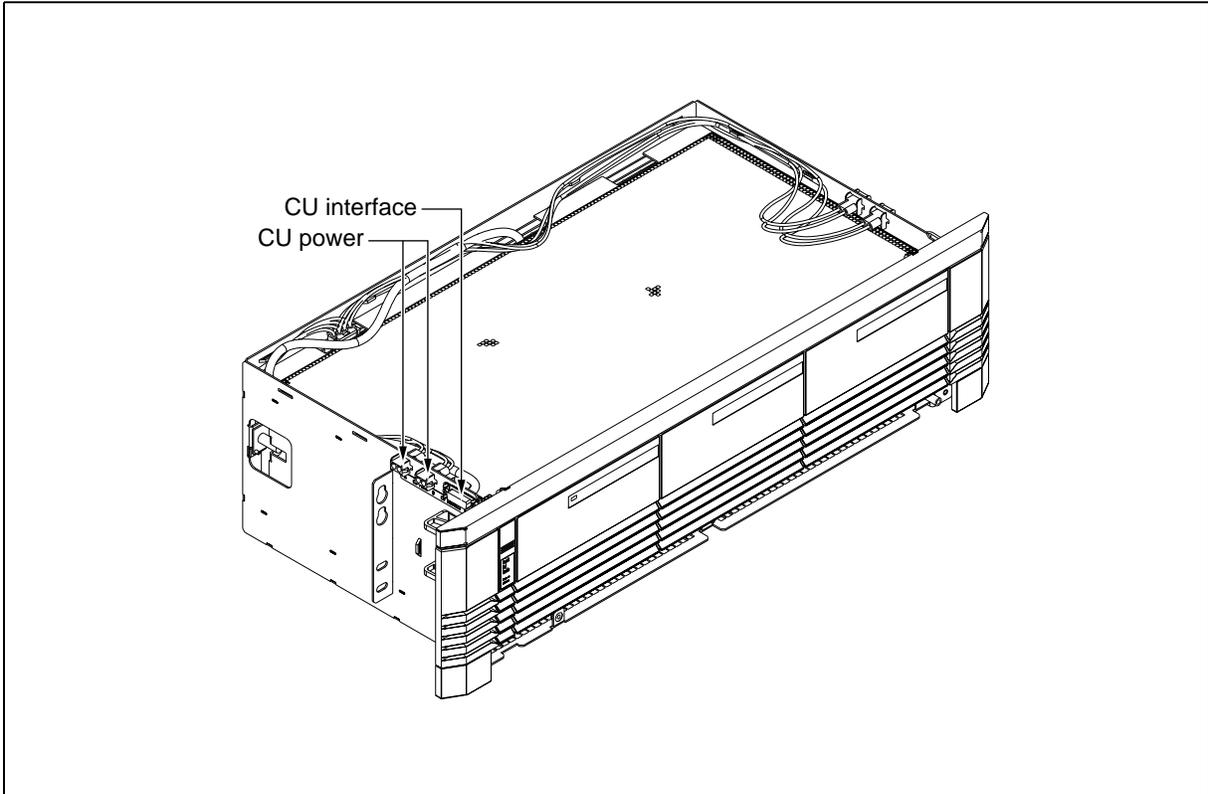
Procedure 4-2 (continued)

Installing the dc distribution harnesses

Step	Action
------	--------

Figure 4-6
Location of cooling unit power connectors on the cooling unit

PC-16449

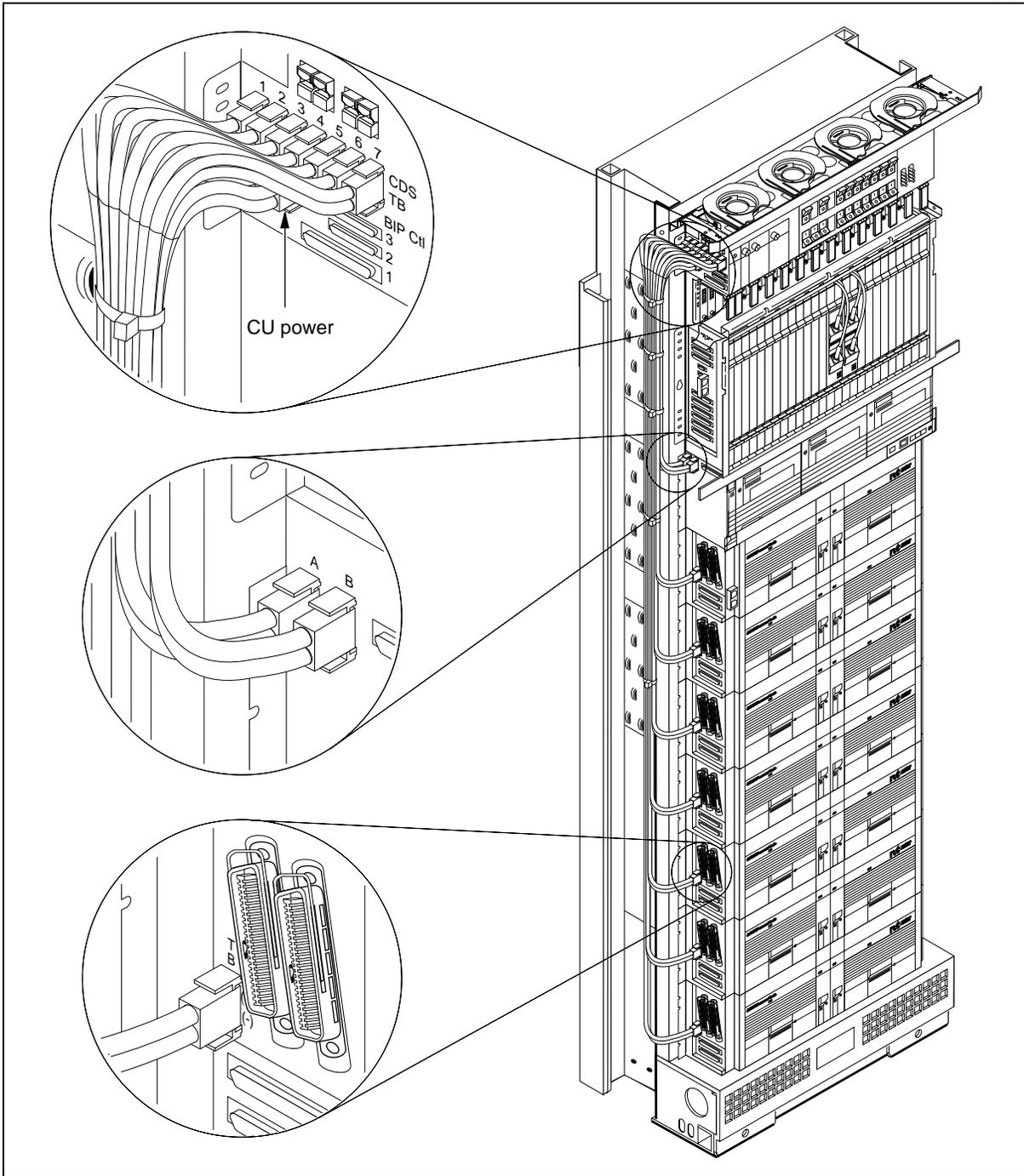


—continued—

Procedure 4-2 (continued)
Installing the dc distribution harnesses

Figure 4-7
Routing the dc distribution harness in the left bay upright

PC-10957



—continued—

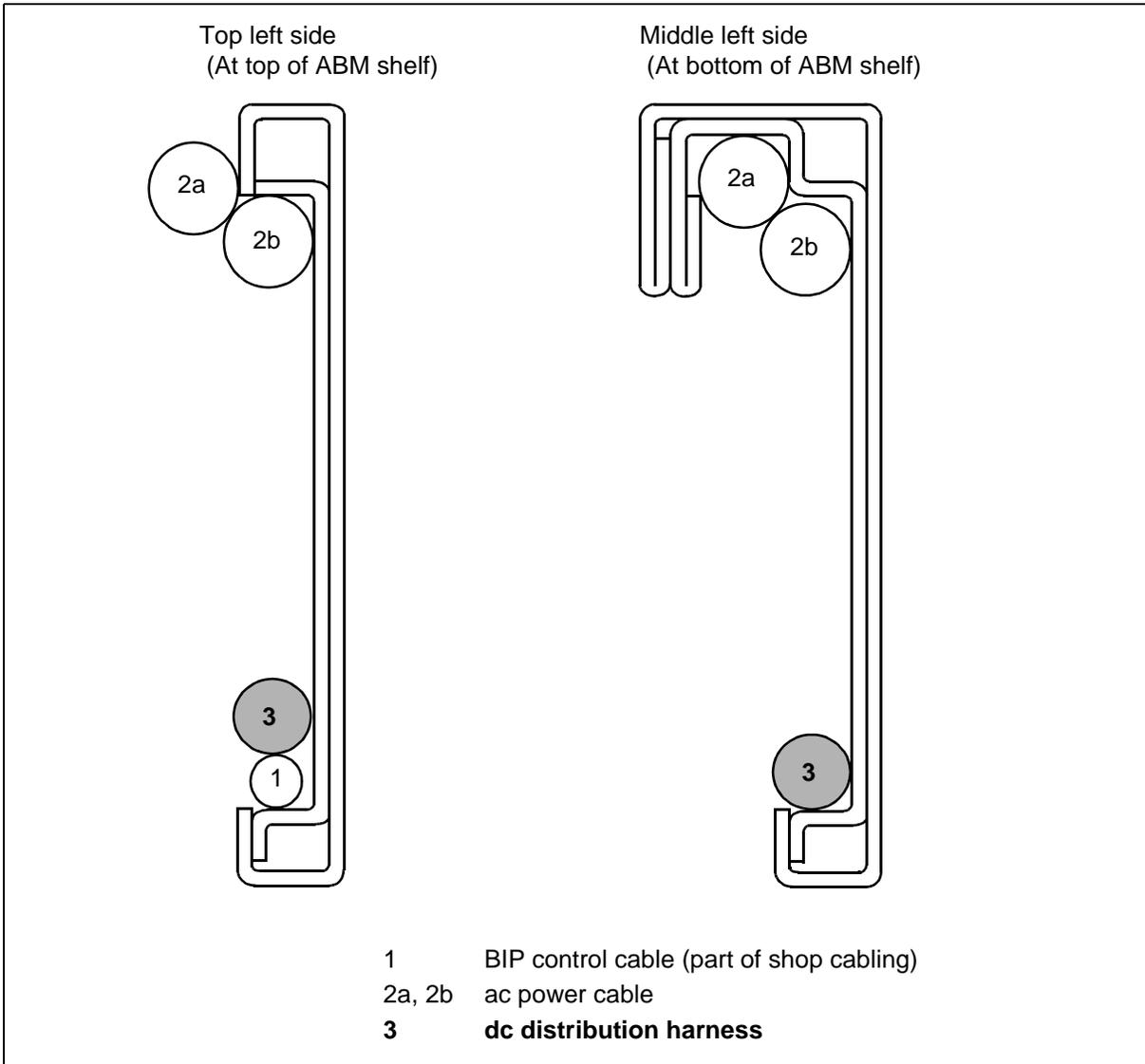
4-14 Mounting copper-distribution shelves

Procedure 4-2 (continued)

Installing the dc distribution harnesses

Step	Action
------	--------

Figure 4-8
Position of dc distribution harness in the left bay upright



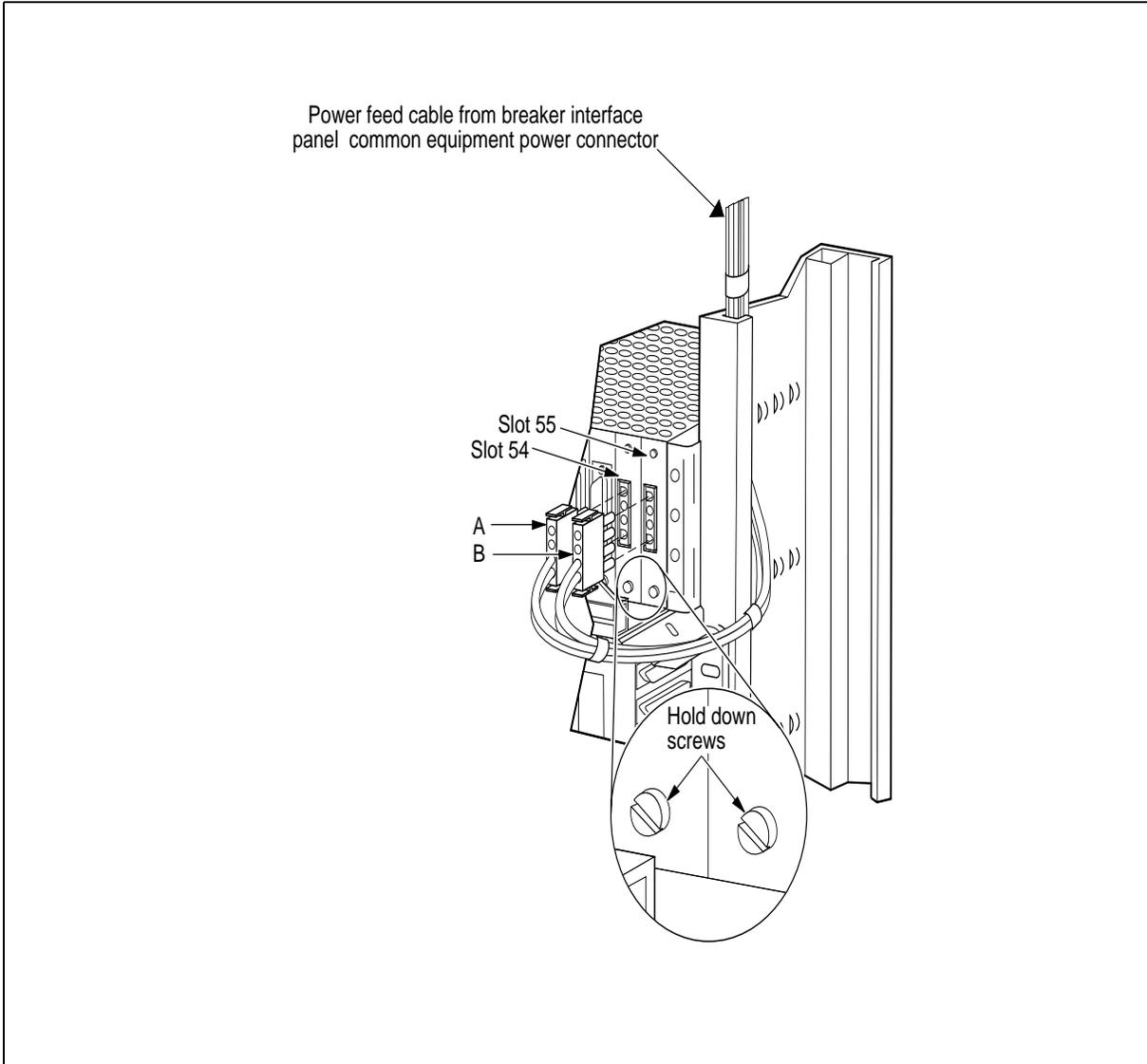
—continued—

Procedure 4-2 (continued)
Installing the dc distribution harnesses

Step	Action
------	--------

Figure 4-9
Location of common-equipment power connectors on the ABM shelf

PC-10078



—continued—

4-16 Mounting copper-distribution shelves

Procedure 4-2 (continued)

Installing the dc distribution harnesses

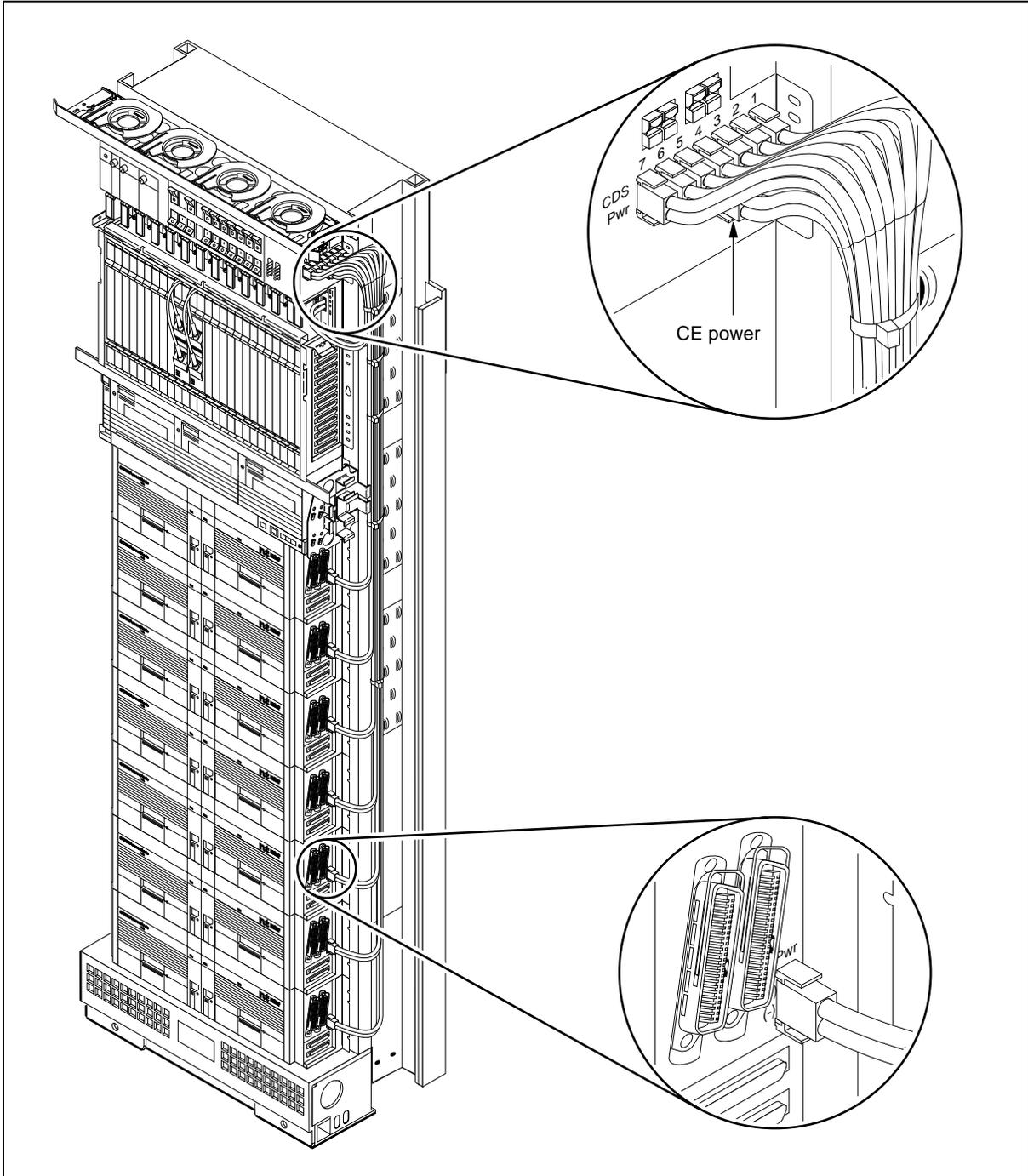
Step	Action
15	Route an NT4K84JA harness down the right side of the bay, as shown in Figure 4-10 on page 4-17.
16	At the right side of the bay, attach the connectors of the NT4K84JA harness to the CDS Pwr connectors on the BIP, as shown in Figure 4-10 on page 4-17. Connector 1 on the harness attaches to CDS Pwr 1 on the BIP, Connector 2 on the harness attaches to CDS Pwr 2, and so on.
17	Attach the connectors labeled CE A and CE B to the CE Pwr A and CE Pwr B connectors on the right side of the BIP.
18	Attach the connectors labeled CE A and CE B to the connectors on the cards in the I/O area of the ABM shelf, as shown in Figure 4-9 on page 4-15.
19	Dress the dc harness so that it does not extend beyond the edge of the bay upright and into the cabling area of the adjacent bay frame.
20	Lace the harness to the frame bar, as shown in Figure 4-10 on page 4-17.
21	Secure the harness to the bay upright in the position shown in Figure 4-11 on page 4-18, using one cable tie at each lance plate.

—continued—

Procedure 4-2 (continued)
Installing the dc distribution harnesses

Figure 4-10
Routing the dc distribution harness in the right bay upright

PC-10968



—continued—

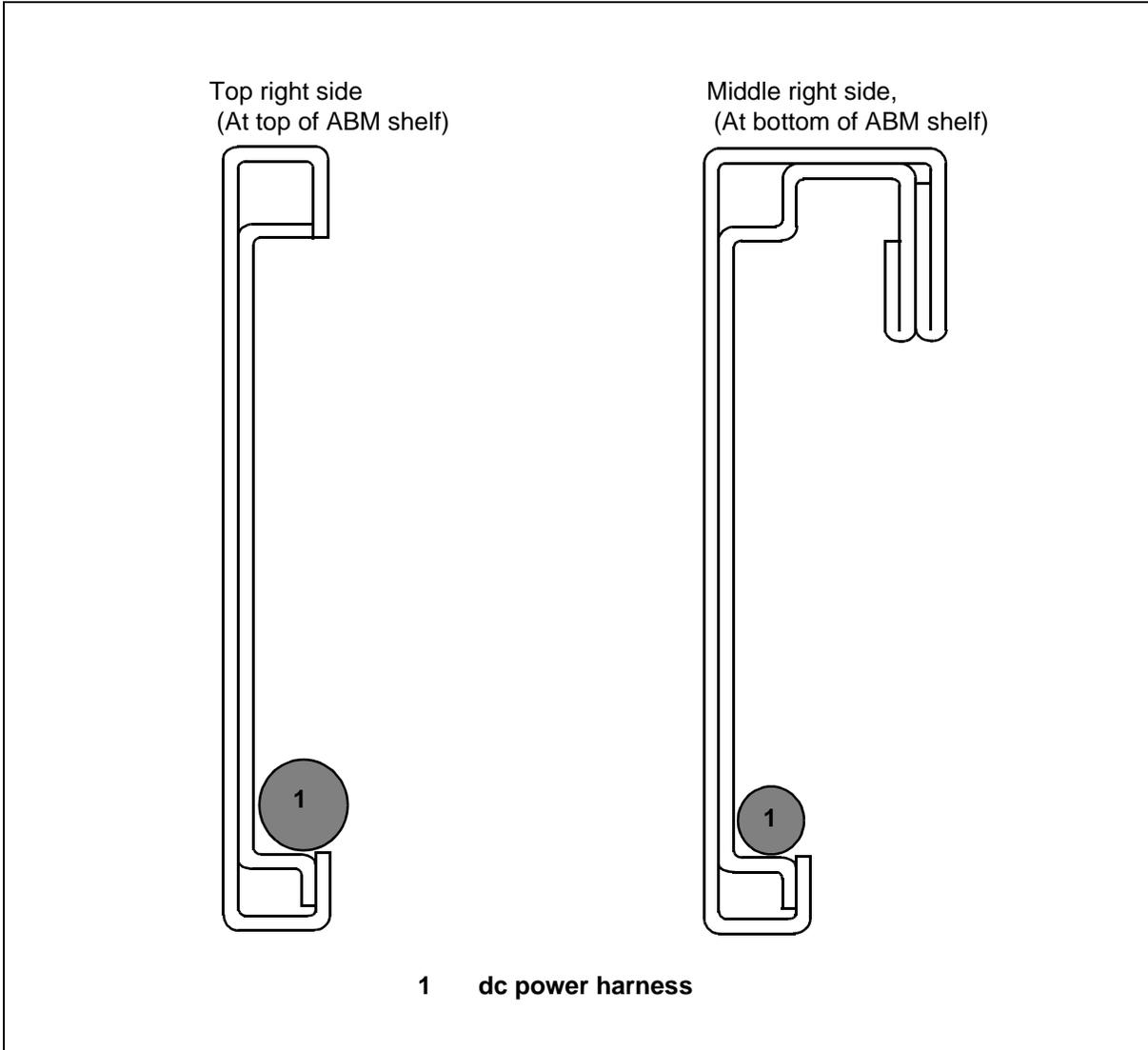
4-18 Mounting copper-distribution shelves

Procedure 4-2 (continued)

Installing the dc distribution harnesses

Step Action

Figure 4-11
Position of dc distribution harness in the right bay upright



—continued—

Procedure 4-2 (continued)

Installing the dc distribution harnesses

Step	Action
22	At the left side of the bay, attach the dc distribution harness connectors to the CDS TB connectors on the copper-distribution shelves, as shown in Figure 4-7 on page 4-13. Connector 1 attaches to CDS 1, connector 2 attaches to CDS 2, and so on.
23	At the right side of the bay, attach the dc distribution harness connectors to the CDS Pwr connectors on the copper-distribution shelves, as shown in Figure 4-10 on page 4-17. Connector 1 attaches to CDS 1, connector 2 attaches to CDS 2, and so on.

—end—

Procedure 4-3 Installing the D/VT link access cables

Use this procedure to do either of the following:

- Add the D/VT link (D-link) access cables to a bay that is being upgraded from a multiplexer (NT4K03) configuration to an add-drop configuration (NT4K02), and to connect the D/VT link access cables to the copper-distribution shelves installed in the bay.
- Connect the existing D/VT link access cables to the copper-distribution shelves in a bay to which copper-distribution shelves are being added (NT4K01, NT4K02 configuration).

Requirement



CAUTION

Ensure that there are no power converters or line interface cards in the copper-distribution shelf while the shelf is being installed.

You need the following tools and materials:

- cable cutters
- cable ties

This procedure must be performed with the bay pulled out of the lineup to gain access to cable area.

Action

Step	Action
------	--------

1 Go to one of the following steps:

If the D/VT link access cables	Then
need to be added to the bay	go to step 2
have been added to the bay	go to step 6

—continued—

Procedure 4-3 (continued)

Installing the D/VT link access cables

Step	Action
2	At the right side of the ABM shelf, connect NT4K82BA D/VT link access cables to connectors CDS1A, CDS 1B, CDS 2A, CDS 2B, CDS 3A, and CDS 3 B, as shown in Figure 4-12 on page 4-22.
3	Connect NT4K82CA D/VT link access cables to connectors CDS 4A, CDS 4B, CDS 5A, CDS 5B, CDS 6A, CDS 6B, CDS 7A, and CDS 7B.
4	Dress the cables down the right bay upright, as shown in Figure 4-12 on page 4-22.
5	Secure the cables to the lance plates with cable ties, as shown in Figure 4-12 on page 4-22. The cables should be secured in the right bay upright so that they occupy the position shown in Figure 4-13 on page 4-23.

—continued—

4-22 Mounting copper-distribution shelves

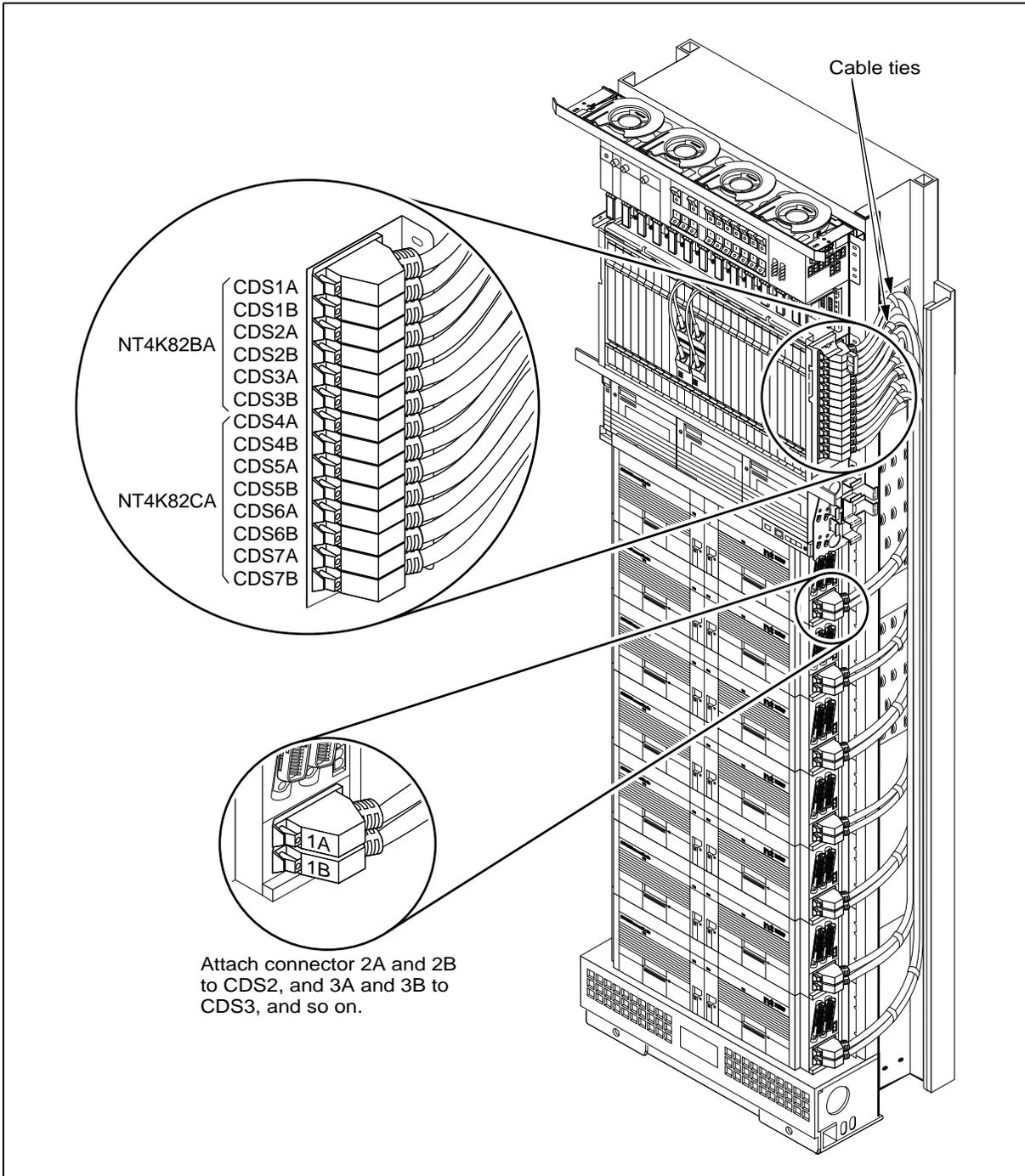
Procedure 4-3 (continued)

Installing the D/VT link access cables

Figure 4-12

Routing the D/VT link access cables into the right bay upright

PC-10958

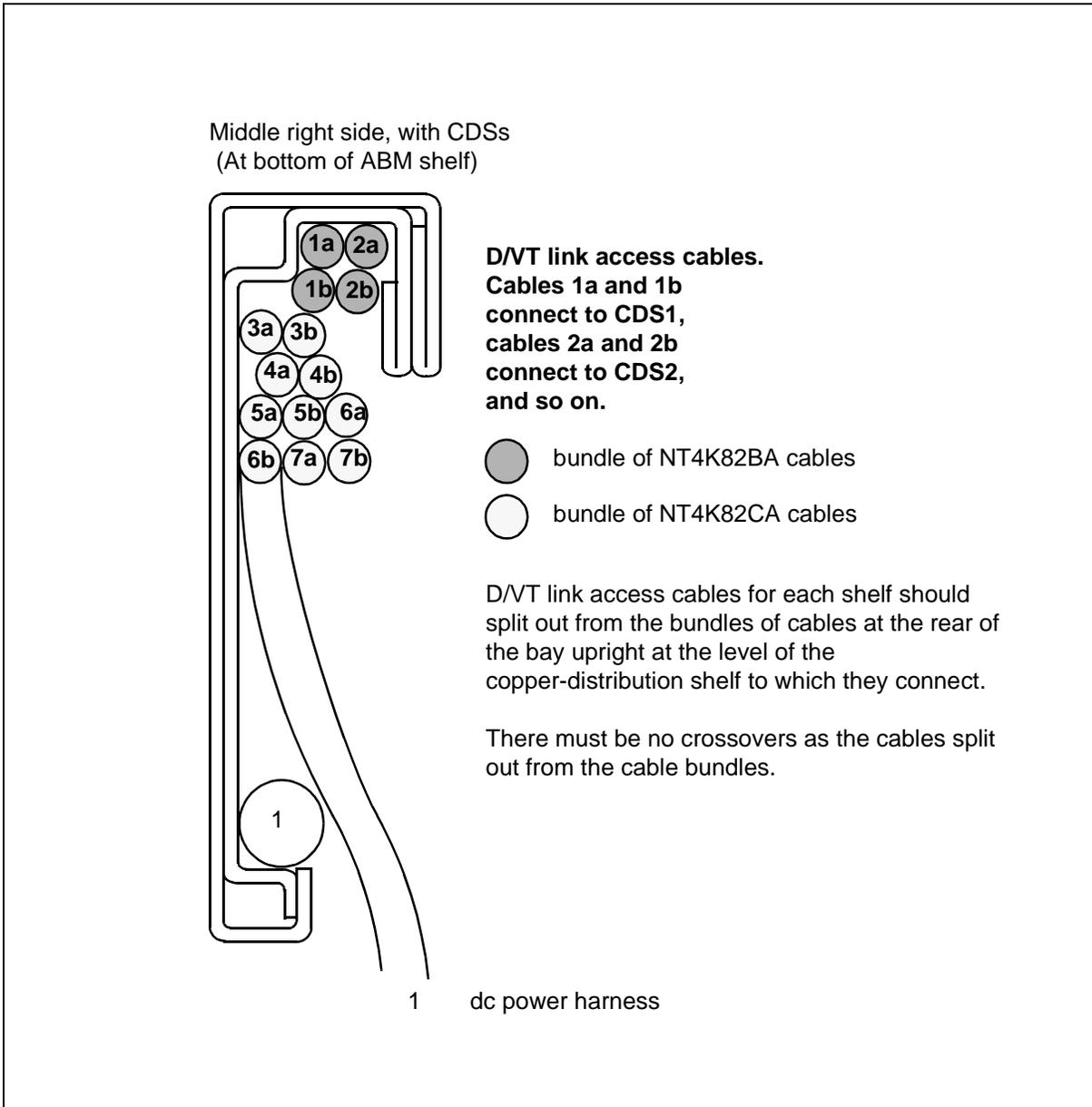


—continued—

Procedure 4-3 (continued)
Installing the D/VT link access cables

Step	Action
------	--------

Figure 4-13
Position of D/VT link access cables in the right bay upright



—continued—

4-24 Mounting copper-distribution shelves

Procedure 4-3 (continued)

Installing the D/VT link access cables

Step	Action
6	Attach the D/VT link access cables to CDS A and CDS B connectors on the copper-distribution shelves, as shown in Figure 4-12 on page 4-22. (Cables 1A and 1B are for copper-distribution shelf 1, and cables 2A and 2B for copper-distribution shelf 2, and so on.) Repeat for each copper-distribution shelf.
7	Dress the cables down the right bay upright (see Figure 4-12 on page 4-22).
8	Secure the cables to the lance plates with cable ties, as shown in Figure 4-12 on page 4-22. The cables should be secured in the right bay upright so that they occupy the position shown in Figure 4-13 on page 4-23.

—end—

Procedure 4-4

Installing the metallic test access cables

Use this procedure to install metallic test access (MTA) cables on an AccessNode bay. The MTA cables form a daisy chain that runs from the ABM shelf, through copper-distribution shelves 1 through 7.

Requirement



DANGER

Ensure that there are no power converters or line interface cards in the copper-distribution shelf while the shelf is being installed.

You need the following tools and materials:

- cable cutters
- cable ties
- MTA cables, NT4K86FA to connect from the ABM shelf to CDS 1, and NT4K86FB to connect between copper-distribution shelves 2 to 7

Action

Step	Action
1	If a copper-distribution shelf was already installed in the bay before you began the installation, skip to step 6. Otherwise, continue at step 2.
2	Connect an NT4K86FA metallic test access cable to the CDS MTA (J01) connector on the left side of the ABM shelf, as shown in Figure 4-14 on page 4-26.
3	Route the cable down to left bay upright, as shown in Figure 4-14 on page 4-26.

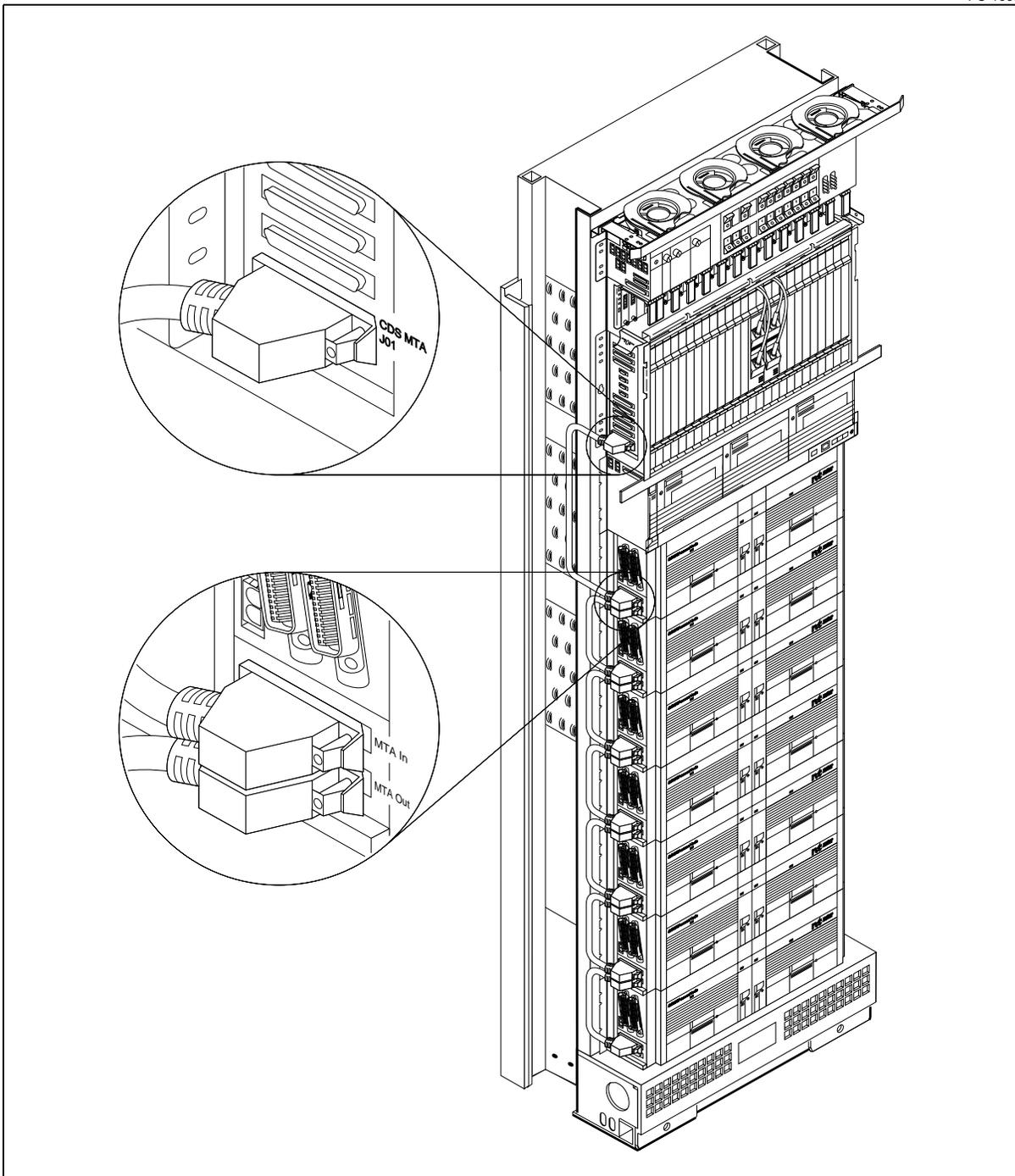
—continued—

4-26 Mounting copper-distribution shelves

Procedure 4-4 (continued)
Installing the metallic test access cables

Figure 4-14
Routing the MTA cables in the left bay upright

PC-10959



—continued—

Procedure 4-4 (continued)

Installing the metallic test access cables

Step	Action
4	Connect the free end of the cable to the MTA In connector on CDS 1, as shown in Figure 4-14 on page 4-26.
5	Secure the cable to the lance plates with cable ties, as shown in Figure 4-14 on page 4-26. The cable should be secured in the left bay upright so that it occupies the position shown in Figure 4-15 on page 4-28.
6	Connect an NT4K86FB metallic test access cable to the MTA Out connector on the left side of the uppermost CDS in the bay, as shown in Figure 4-14 on page 4-26.
7	Route the cable down the left bay upright, as shown in Figure 4-14 on page 4-26.
8	Connect the free end of the cable to the MTA In connector on the copper-distribution shelf below, as shown in Figure 4-14 on page 4-26.
9	Secure the cable to the lance plates with cable ties, as shown in Figure 4-14 on page 4-26. The cable should be secured in the left bay upright so that it occupies the position shown in Figure 4-15 on page 4-28.
10	Repeat steps 6 to 9 to install NT4K86FB MTA cables between all of the other CDSs in the bay.

—continued—

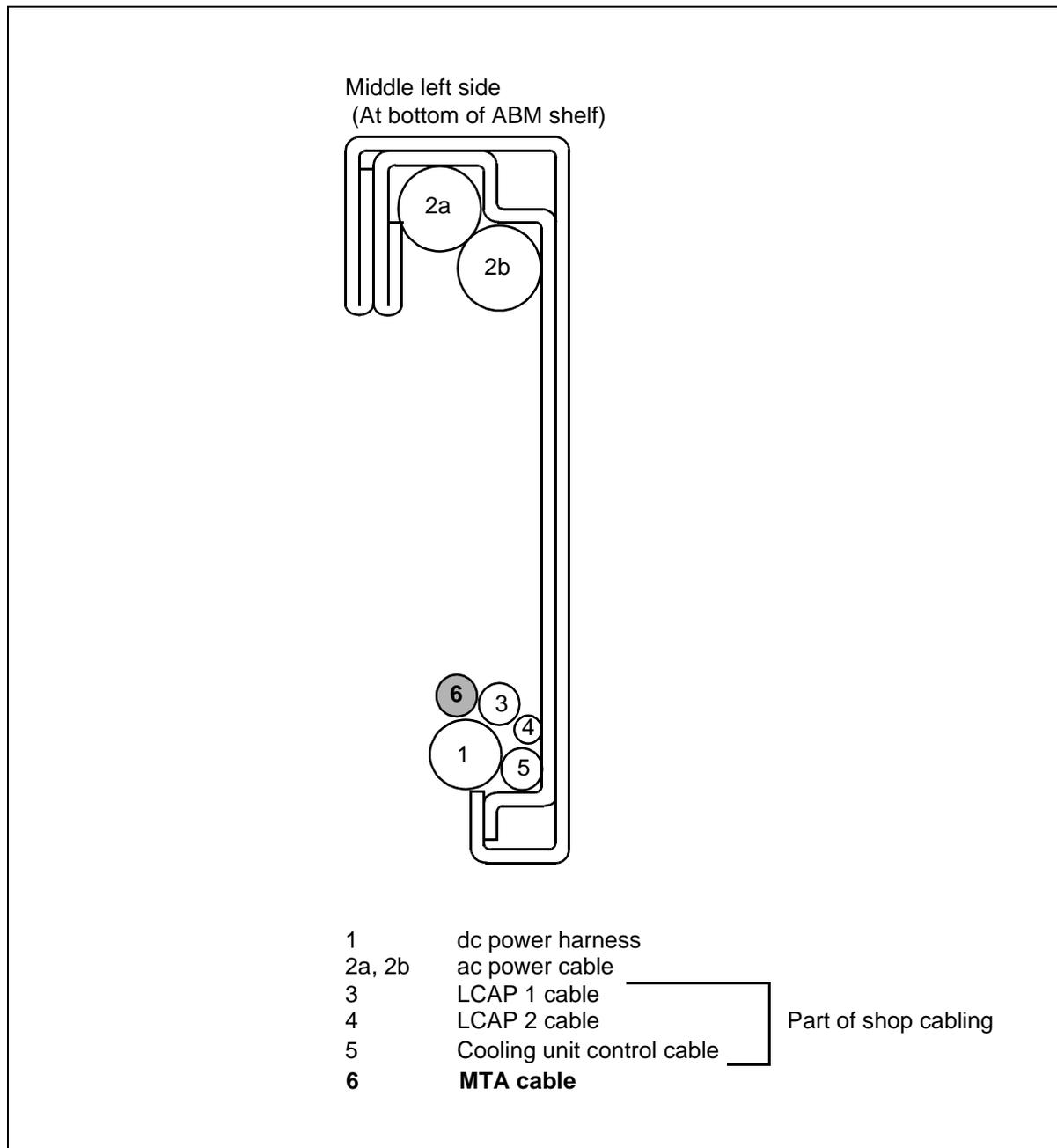
4-28 Mounting copper-distribution shelves

Procedure 4-4 (continued)

Installing the metallic test access cables

Figure 4-15

Position of the MTA cable in the left bay upright



—end—

Installing the external ABM bay cabling

This chapter describes how to install external cabling to an access bandwidth manager (ABM) bay from the interfacing office equipment. Pair and pin assignment tables are provided for each office termination cable. For descriptions of the ABM bay configurations, see Chapter 2, “ABM bay equipment and cable configurations.”

Note: If the bay was not secured in the bay lineup as described in Procedure 3-4 on page 3-12, you should secure the bay after completing the procedures in this chapter.

Cabling tasklists

Cabling installation requirements for ABM bays vary by bay configuration. The following table lists the cabling tasklists for each configuration. These tasklists contain the installation procedures for all possible external cabling in each ABM bay configuration. The cabling procedures you perform depend on the job specifications for your individual bay.

5-2 Installing the external ABM bay cabling

Tasklist	See
CDS prewired 672-line or single-ended AccessNode (SEAN) (NT4K01)	Table 5-1 on page 5-3
DS1-fed access (DFA) terminal (NT4K01)	Table 5-2 on page 5-4
Add-drop CDS start-up (NT4K02)	Table 5-3 on page 5-5
Add-drop CDS start-up with one or more CDS shelves (NT4K02)	Table 5-4 on page 5-6
Add-drop AccessNode Express (ANX) host digital terminal (HDT) (NT4K03)	Table 5-5 on page 5-7
Add-drop multiplexer (mux) configuration (NT4K03)	Table 5-6 on page 5-8
Add-drop OPC shelf configuration (NT4K03)	Table 5-7 on page 5-9
Upgrade an add-drop configuration (NT4K03) to an add-drop CDS start-up configuration (NT4K02)	Table 5-8 on page 5-10

Table 5-1
Install CDS prewired (672-line) or single-ended AccessNode (NT4K01)

Task	See
Install the voice frequency (VF) cables	Procedure 5-1 on page 5-11
Install an orderwire extension cable (672-line configurations only)	Procedure 5-2 on page 5-18
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an external synchronization cable	Procedure 5-8 on page 5-52
Install the fiber patch cords	Procedure 5-9 on page 5-57
Installing the fiber management storage tray and routing the fiber cables to the ABM	Procedure 5-10 on page 5-80
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 and/or DS3 cables:	
• Install DS1 cables only	Procedure 5-13 on page 5-100
• Install DS3 cables only	Procedure 5-14 on page 5-123
• Install a mix of DS1 and DS3 cables	Procedure 5-15 on page 5-129
• If the DS3 cables connect to a DS-3 cross-connect panel outside an integrated bonding network (IBN), install a TGR reference panel	Procedure 5-16 on page 5-151
Install a pair gain test controller/metallic test access (PGTC/MTA) cable	Procedure 5-17 on page 5-154
Install a test access pair cable (TBP function)	Procedure 5-18 on page 5-160
Install a test access path cable (TAP function)	Procedure 5-19 on page 5-165
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

5-4 Installing the external ABM bay cabling

Table 5-2
Install DS1-fed access (DFA) terminal (NT4K01)

Task	See
Install the voice frequency cables	Procedure 5-1 on page 5-11
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 cables	Procedure 5-13 on page 5-100
Install a pair gain test controller/metallic test access (PGTC/MTA) cable	Procedure 5-17 on page 5-154
Install a test access pair cable (TBP function)	Procedure 5-18 on page 5-160
Install a test access path cable (TAP function)	Procedure 5-19 on page 5-165
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

Table 5-3
Install add-drop start-up without copper-distribution shelves (NT4K02)

Task	See
Install an orderwire extension cable	on page 5-16
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an external synchronization cable	Procedure 5-8 on page 5-52
Install the fiber patch cords	Procedure 5-9 on page 5-57
Installing the fiber management storage tray and routing the fiber cables to the ABM	Procedure 5-10 on page 5-80
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 or DS3 cables:	
• Install DS1 cables only	Procedure 5-13 on page 5-100
• Install DS3 cables only	Procedure 5-14 on page 5-123
• Install a mix of DS1 and DS3 cables	Procedure 5-15 on page 5-129
• If the DS3 cables connect to a DS-3 cross-connect panel outside an integrated bonding network (IBN), install a TGR reference panel	Procedure 5-16 on page 5-151
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

Table 5-4
Install add-drop start-up with one or more copper-distribution shelves (NT4K02)

Task	See
Install the voice frequency (VF) cables	Procedure 5-1 on page 5-11
Install an orderwire extension cable	Procedure 5-2 on page 5-18
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an external synchronization cable	Procedure 5-8 on page 5-52
Install the fiber patch cords	Procedure 5-9 on page 5-57
Installing the fiber management storage tray and routing the fiber cables to the ABM	Procedure 5-10 on page 5-80
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 or DS3 cables:	
• Install DS1 cables only	Procedure 5-13 on page 5-100
• Install DS3 cables only	Procedure 5-14 on page 5-123
• If the DS3 cables connect to a DS-3 cross-connect panel outside an integrated bonding network (IBN), install a TGR reference panel	Procedure 5-16 on page 5-151
• Install a mix of DS1 and DS3 cables	Procedure 5-15 on page 5-129
Install a pair gain test controller/metallic test access (PGTC/MTA) cable. Note: For VTBM rings, PGTC/MTA is not supported.	Procedure 5-17 on page 5-154
Install a test access path cable (TBP function)	Procedure 5-18 on page 5-160
Install a test access path cable (TAP function)	Procedure 5-19 on page 5-165
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

Table 5-5
Install add-drop AccessNode Express host digital terminal (NT4K03)

Task	See
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an operations controller (OPC) cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install a control network cable and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 I/O cards and cables	Procedure 5-13 on page 5-100
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

5-8 Installing the external ABM bay cabling

Table 5-6
Install add-drop mux configuration (NT4K03)

Task	See
Install an orderwire extension cable	Procedure 5-2 on page 5-18
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an external synchronization cable	Procedure 5-8 on page 5-52
Install the fiber patch cords	Procedure 5-9 on page 5-57
Installing the fiber management storage tray and routing the fiber cables to the ABM	Procedure 5-10 on page 5-80
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 or DS3 cables:	
• Install DS1 cables only	Procedure 5-13 on page 5-100
• Install DS3 cables only	Procedure 5-14 on page 5-123
• Install a mix of DS1 and DS3 cables	Procedure 5-15 on page 5-129
• If the DS3 cables connect to a DS-3 cross-connect panel outside an integrated bonding network (IBN), install a TGR reference panel	Procedure 5-16 on page 5-151
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

Table 5-7
Install add-drop OPC shelf ABM bay configuration (NT4K03)

Task	See
Install a serial telemetry cable	Procedure 5-3 on page 5-22
Install an OPC cable to the SIL	Procedure 5-4 on page 5-26
Install a modem cable	Procedure 5-5 on page 5-35
Install the control network cables and termination plug	Procedure 5-6 on page 5-40
Install a parallel telemetry cable	Procedure 5-7 on page 5-47
Install an OPC Ethernet cable kit	Procedure 5-11 on page 5-88
Install an OPC cable to the I/O area of the ABM shelf	Procedure 5-12 on page 5-92
Install the DS1 cables	Procedure 5-13 on page 5-100
Install the wire-wrap connections to the BIP	Procedure 5-20 on page 5-170
Install the -48V cabling	Procedure 5-21 on page 5-174
Install a user interface cable to the LCAP	Procedure 5-22 on page 5-180
Finish installing the bay	Chapter 6

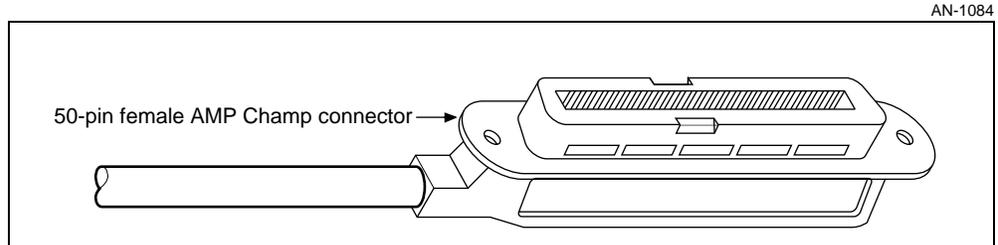
5-10 Installing the external ABM bay cabling

Table 5-8
Upgrade an add-drop mux configuration (NT4K03) to an add-drop CDS start-up configuration (NT4K02)

Task	See
Add the copper-distribution shelves	Chapter 4
Install the voice frequency (VF) cables	Procedure 5-1 on page 5-11
Install the equipment covers, the bay end guards, and the bay frame extenders	Chapter 6

Procedure 5-1 Installing the VF cables

Use this procedure to install VF cables from one or more copper-distribution shelves (CDSs) to the main distribution frame (MDF). The 50-pair VF cables have a “Y” end with two 25-pair connectors (50-pin AMP Champ) attached (see illustration, below). If the bay is not equipped with CDSs, skip this procedure and go to 129page 5-18.



Cable lengths

The 50-pair VF cables come in the following lengths:

Length	Part
15 m (50 ft)	NT4K85PA
30 m (100 ft)	NT4K85PB
46 m (150 ft)	NT4K85PC
61 m (200 ft)	NT4K85PD
76 m (250 ft)	NT4K85PE
91 m (300 ft)	NT4K85PF

Requirements

You need the following tools:

- cable cutters and needle nose pliers
- wire-wrap tool and quick connect tool (for connecting cables to the MDF)



CAUTION

Risk of damage to equipment

During initial setup of AccessNode, Nortel Networks recommends that the equipment side remains disconnected from the outside plant subscriber loops (at the protection modules) until the line cards are installed and powered up. For example, when using five-pin protector modules, pull the modules out slightly to the first detent position.

—continued—

5-12 Installing the external ABM bay cabling

Procedure 5-1 (continued)
Installing the VF cables

Action

Step	Action
1	For each CDS shelf installed in the bay, route one VF cables to the left side of the bay, and one to the right side of the bay.
2	Using local procedures, label both ends of the VF cables with the CDS number, and the pair assignment: <ul style="list-style-type: none">• cable that connects to the left side of the shelf (pairs 1 to 25 and 26 to 50)• cable that connect to the right side of the shelf (pairs 51 to 75, 76 to 96, plus four spares)
3	Route the 50-pair connectorized VF cable to each CDS for pairs 1-50 down the left side of the bay. Secure the cable to the CDS, as shown in Figure 5-1 on page 5-13.
4	On the left side of each CDS, connect the two 25-pair connectors on the 50-pair VF cable (for pairs 1 to 50), as shown in Figure 5-1 on page 5-13.
5	To secure each cable connector to the CDS, plug the cable connector into the shelf connector.

The spring clip clicks when it locks the cable in place.

	<p>CAUTION To avoid damaging the spring clip, do not use a tool of any kind (such as a screwdriver) either to squeeze the spring clip or to pry it open.</p>
---	---

6	Pull gently on the connector to make sure it is properly seated and locked in place. Note: Any time you unplug the connector, squeeze the base of the spring clip first to release the connector.
7	Route the cable to each CDS for pairs 51 to 96 down the right side of the bay. Secure the cable to the CDS, as shown in Figure 5-2 on page 5-14.
8	On the right side of each CDS, connect the two 25-pair connectors on the 50-pair VF cable (for pairs 51 to 96), as shown in Figure 5-2 on page 5-14 and secure them in place as explained in step 5.
9	Make sure all VF cables are connected to the proper CDS's.
10	Position the left side VF cables in the bay upright, locating the cables as shown in Figure 5-3 on page 5-15. Group the cables together. Secure them to the lance plates in the bay uprights with cable ties (see Figure 5-1 on page 5-13) and to the top bay bracket with lace twine. Place the tie wraps approximately one foot above the cable connector.

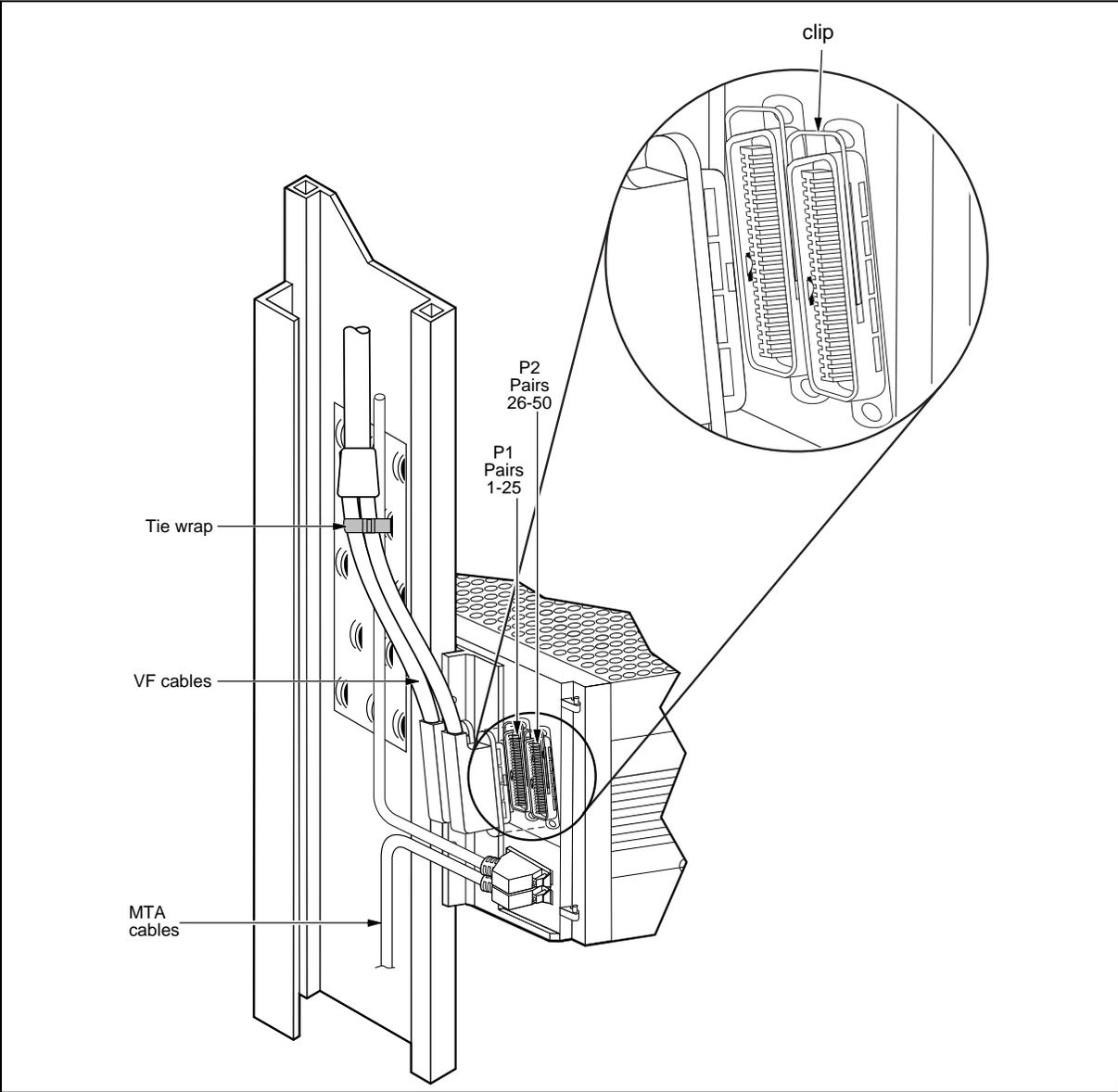
—continued—

Procedure 5-1 (continued)
Installing the VF cables

Step	Action
11	Position the right side VF cables in the bay upright, locating the cables as shown in Figure 5-4 on page 5-16. Group the cables together. Secure them to the lance plates in the bay uprights with cable ties (see Figure 5-2 on page 5-14) and to the top bay bracket with lace twine. Place the tie wraps approximately one foot above the cable connector.

Figure 5-1
Connecting VF pairs 1 to 50 to a copper-distribution shelf

AN-1086



—continued—

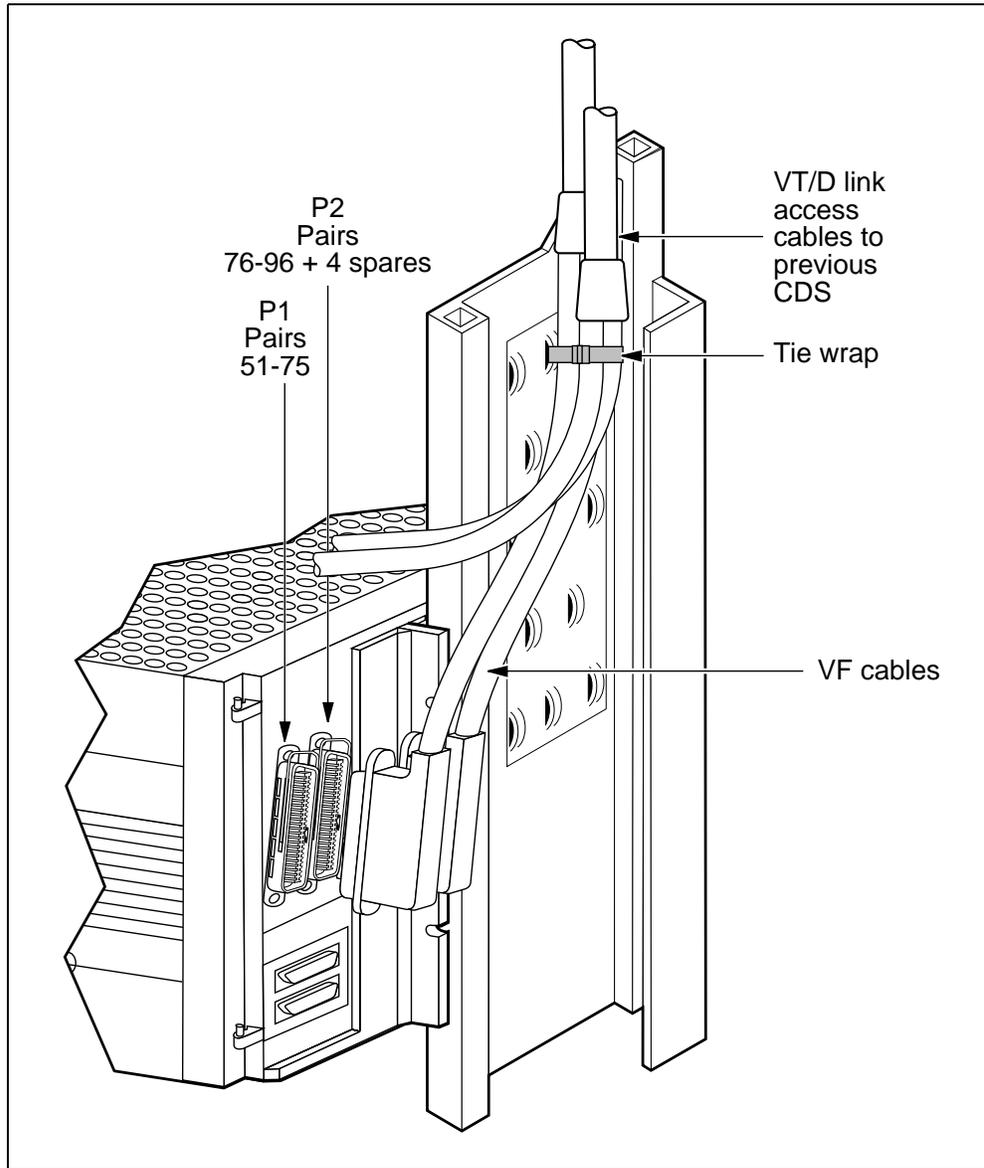
5-14 Installing the external ABM bay cabling

Procedure 5-1 (continued)
Installing the VF cables

Step Action

Figure 5-2
Connecting VF pairs 51 to 96 plus 4 spares to a copper-distribution shelf

AN-1087

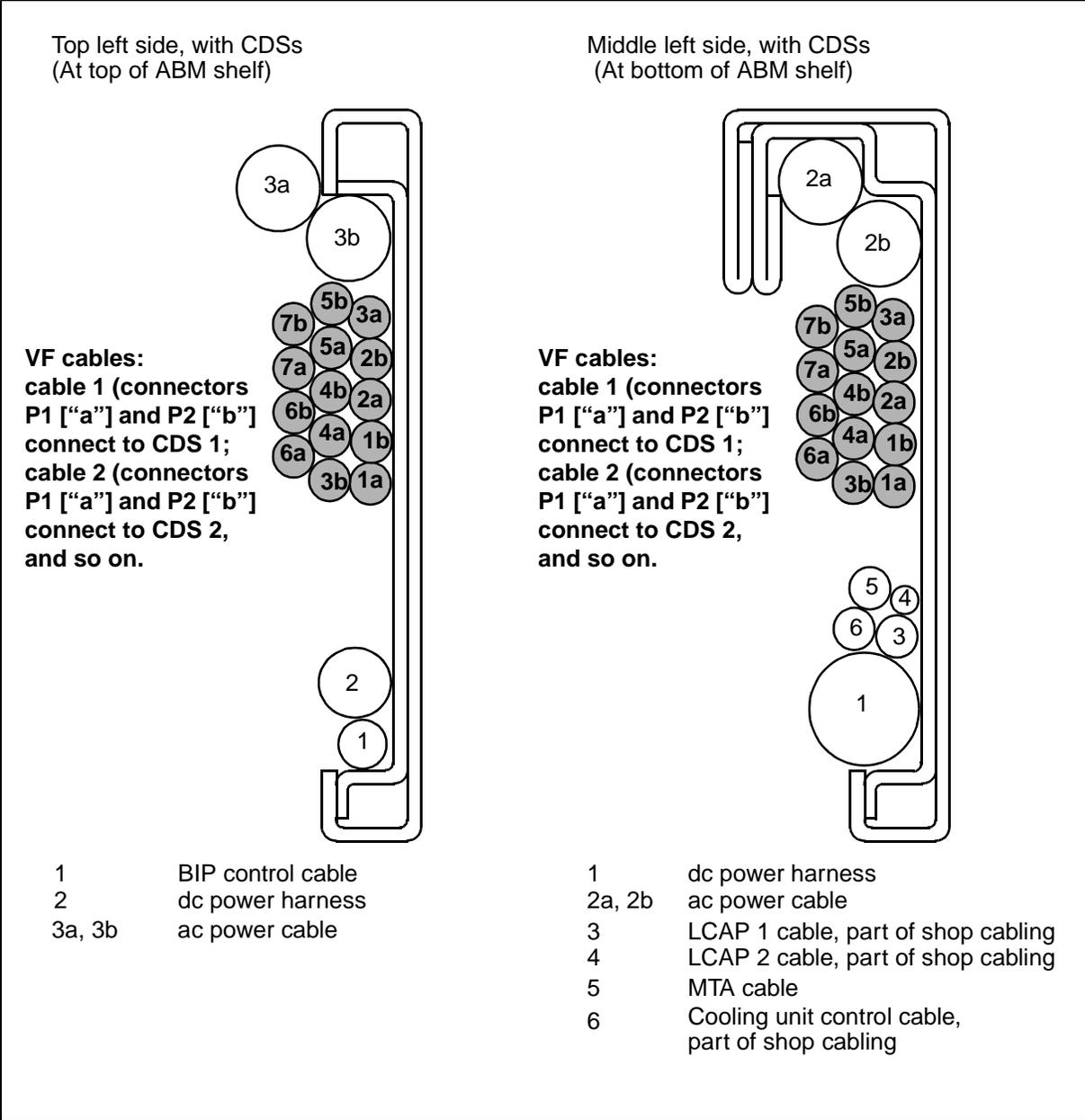


—continued—

Procedure 5-1 (continued)
Installing the VF cables

Step Action

Figure 5-3
Placement of VF cables in the left bay upright



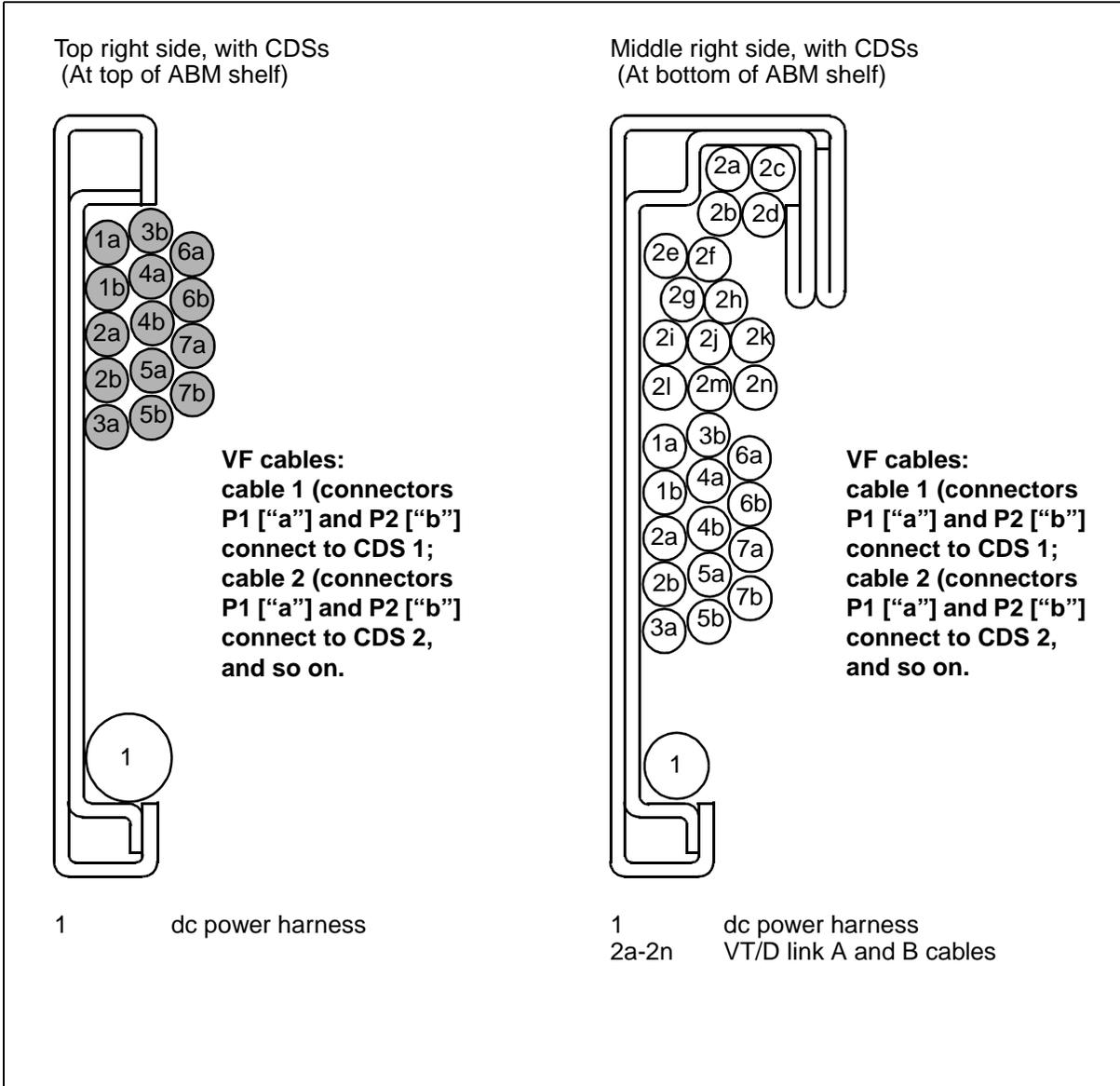
—continued—

5-16 Installing the external ABM bay cabling

Procedure 5-1 (continued)
Installing the VF cables

Step Action

Figure 5-4
Placement of VF cable in the right bay upright



- 12** Route the cables to the main distribution frame and terminate each VF cable to the MDF cross-connect. Refer to Table 5-9 on page 5-17 for the pair and color code assignment of a 50-pair connectorized cable.

—end—

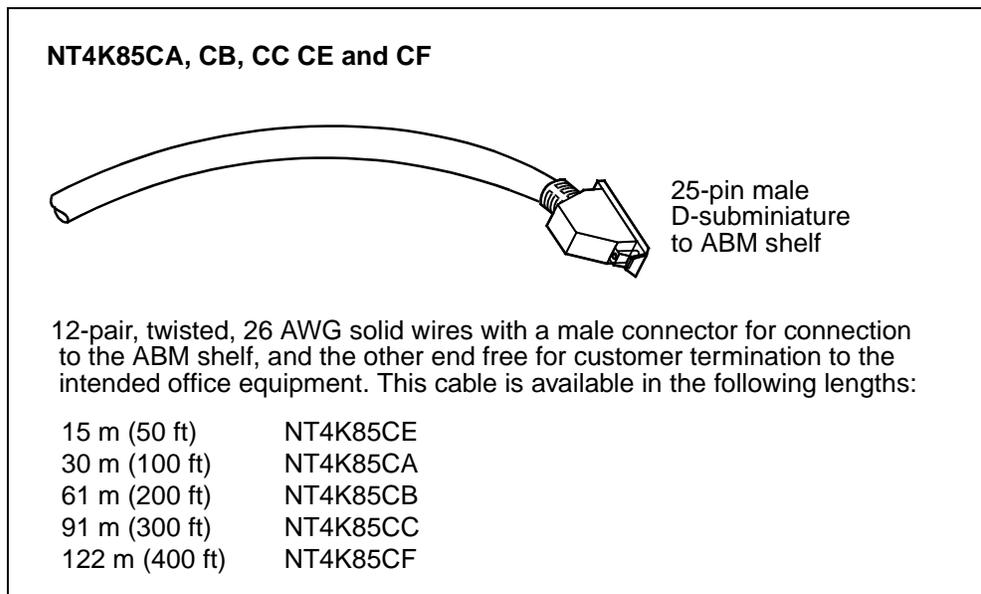
Table 5-9
Pin-outs for 25-pair connectors (P1 and P2) on 50-pair VF cables

Cable pair on		RING		TIP	
Connector P1	Connector P2	Connector Pin #	Wire Color	Connector Pin #	Wire Color
1	26	1	BL/WHT	26	WHT/BL
2	27	2	OR/WHT	27	WHT/OR
3	28	3	GN/WHT	28	WHT/GN
4	29	4	BN/WHT	29	WHT/BN
5	30	5	SL/WHT	30	WHT/SL
6	31	6	BL/RD	31	RD/SL
7	32	7	OR/RD	32	RD/OR
8	33	8	GN/RD	33	RD/GN
9	34	9	BN/RD	34	RD/BN
10	35	10	SL/RD	35	RD/SL
11	36	11	BL/BK	36	BK/BL
12	37	12	OR/BK	37	BK/OR
13	38	13	GN/BK	38	BK/GN
14	39	14	BN/BK	39	BK/BN
15	40	15	SL/BK	40	BK/SL
16	41	16	BL/YE	41	YE/BL
17	42	17	OR/YE	42	YE/OR
18	43	18	GN/YE	43	YE/GN
19	44	19	BN/YE	44	YE/BN
20	45	20	SL/YE	45	YE/SL
21	46	21	BL/VT	46	VT/BL
22	47	22	OR/VT	47	VT/OR
23	48	23	GN/VT	48	VT/GN
24	49	24	BN/VT	49	VT/BN
25	50	25	SL/VT	50	VT/SL

Procedure 5-2 Installing an orderwire extension cable

Use this procedure to install the external orderwire extension cable (NT4K85CA, CB, CC, CE, or CF) between the access bandwidth manager (ABM) shelf and the office cross-connect for the extension of orderwire circuitry.

This procedure does not apply to ABM shelves configured to be DS1-fed RFTs or single-ended RFTs attached to a TransportNode network element.



Requirement

You need the following tools and materials:

- cable cutters
- cable ties

Action

Step	Action
1	Route the end of the cable that has the 25-pin connector into the left side of the bay.
2	Connect the 25-pin D-subminiature connector on the cable to the Orderwire Extension (J04) connector, as shown in Figure 5-5 on page 5-19.

—continued—

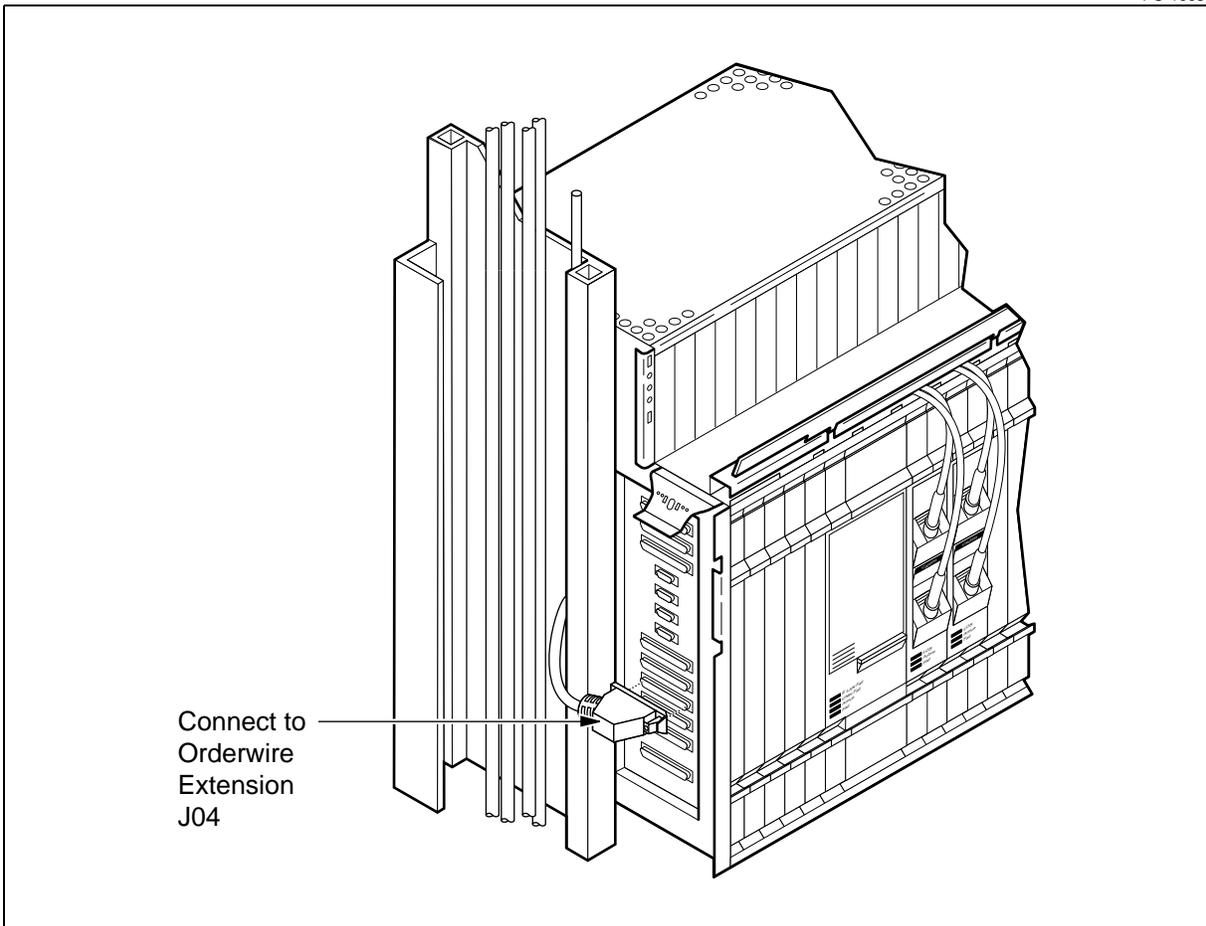
Procedure 5-2 (continued)

Installing an orderwire extension cable

Step	Action
3	Place the orderwire extension cable in the bay upright to occupy the position shown in Figure 5-6 on page 5-21, and use cable ties to secure the cable to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the bay upright.
4	Route the orderwire extension cable out of the bay to the office cross-connect.
5	Refer to the following wiring table and complete the office connections.

Figure 5-5
Connecting an orderwire extension cable

PC-10054



—continued—

5-20 Installing the external ABM bay cabling

Procedure 5-2 (continued)

Installing an orderwire extension cable

Table 5-10
Orderwire extension cable pair color coding and pin-out detail

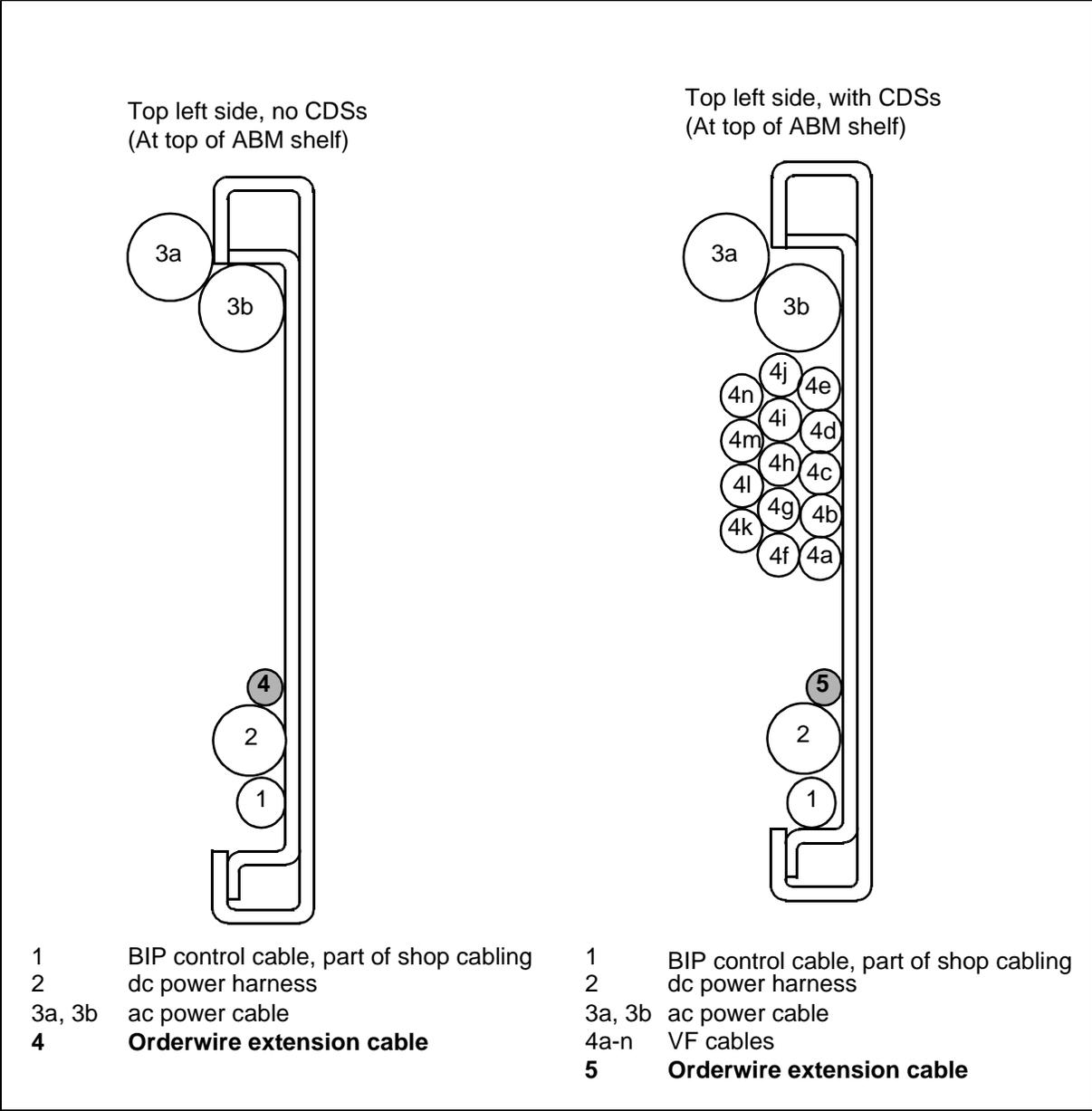
Signal	Pin	Pair	Color
2W OW jack Tip	1	1	W
2W OW jack Ring	2	1	BL
4W OW handset T	3	2	W
4W OW handset T1	4	2	O
4W OW handset R	5	3	W
4W OW handset R1	6	3	G
4W OW handset S	7	4	W
4W OW handset S1	8	4	BR
Brdcst Call	9	5	W
Bell Ext OW	10	5	S
Bell (return)	11	6	R
LED Loc OW	12	6	BL
LED Exp OW	13	7	R
Select Loc OW	14	7	O
Select Exp OW	15	8	R
Common Return	16	8	G
Common Return	17	jumpered to 16	
4W Loc OW T input	18	9	R
4W Loc OW R input	19	9	BR
4W Loc OW T1 output	20	10	R
4W Loc OW R1 output	21	10	S
4W Exp OW T input	22	11	BK
4W Exp OW R input	23	11	BL
4W Exp OW T1 output	24	12	BK
4W Exp OW R1 output	25	12	O

—continued—

Procedure 5-2 (continued)
Installing an orderwire extension cable

Step Action

Figure 5-6
Placement of orderwire extension cable in left bay upright

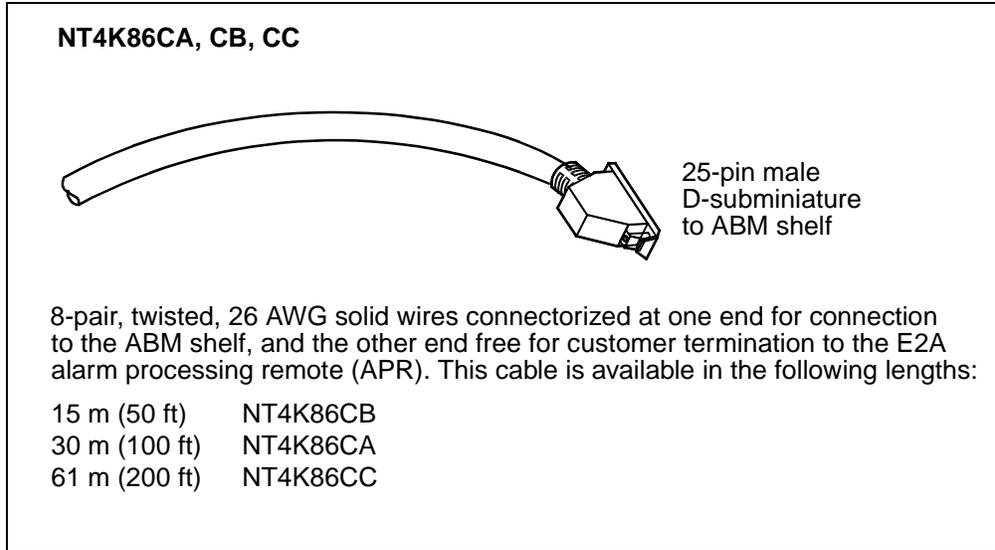


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Procedure 5-3

Installing a serial telemetry cable

Use this procedure to install the serial telemetry cable (NT4K86CA, CB, or CC) between the access bandwidth manager (ABM) shelf and office equipment intended for processing telemetry information.



Requirement

You need the following tools and materials:

- cable cutters
- cable ties
- serial telemetry cable

Action

Step	Action
1	Route the end of the cable that has the 25-pin connector into the left side of the bay.
2	Connect the 25-pin D-subminiature connector on the cable to the Serial Telemetry connector (J06), as shown in Figure 5-7 on page 5-23.

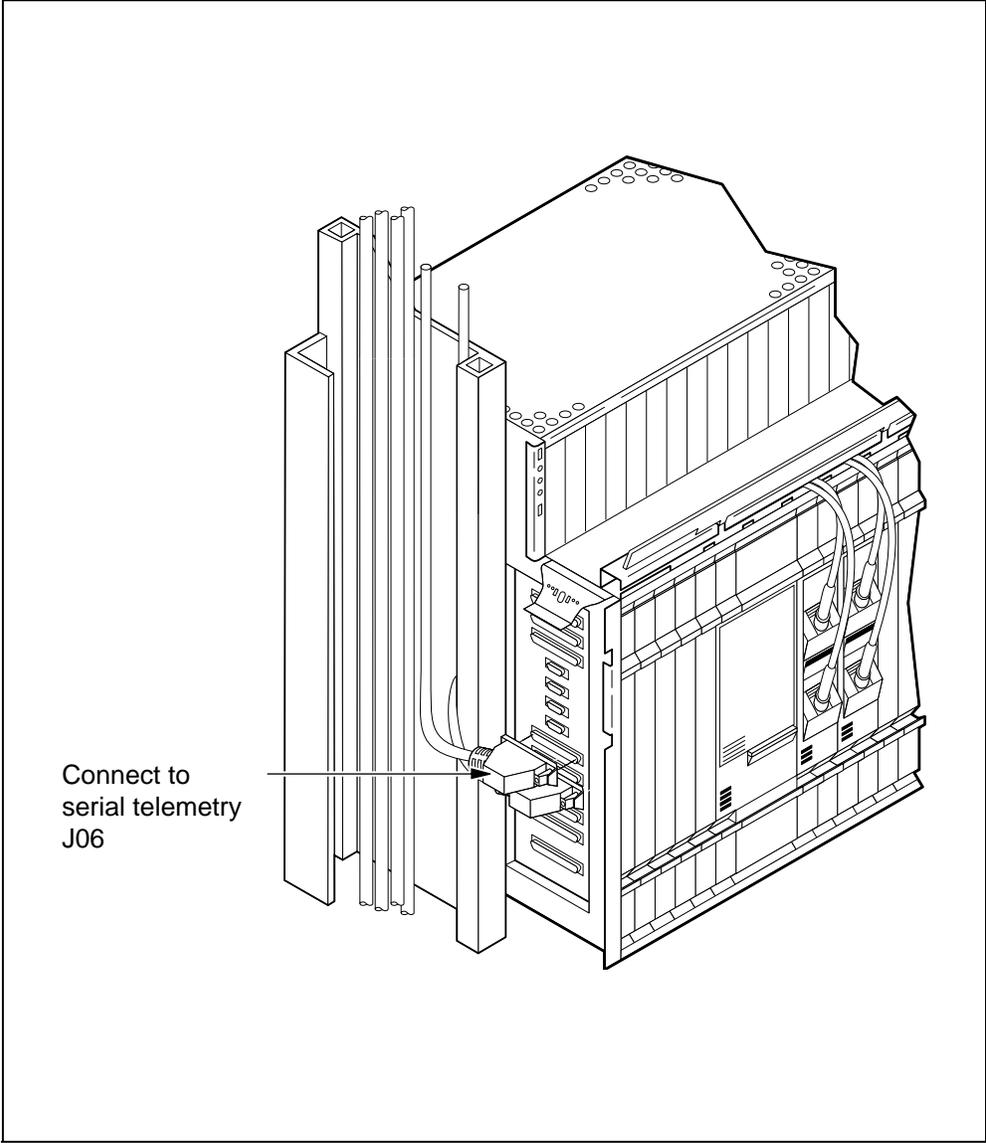
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Procedure 5-3 (continued)
Installing a serial telemetry cable

Step Action

Figure 5-7
Connecting a serial telemetry cable

PC-10697



—continued—

5-24 Installing the external ABM bay cabling

Procedure 5-3 (continued)

Installing a serial telemetry cable

- | Step | Action |
|------|---|
| 3 | Place the serial telemetry cable in the bay upright to occupy the position shown in Figure 5-8 on page 5-25, and use cable ties to secure the cable to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the bay upright. |
| 4 | Route the serial telemetry cable out of the bay to the office cross-connect. |
| 5 | Refer to the following wiring table and complete the office connections. |

Table 5-11
Serial telemetry cable pair color coding and pin-out detail

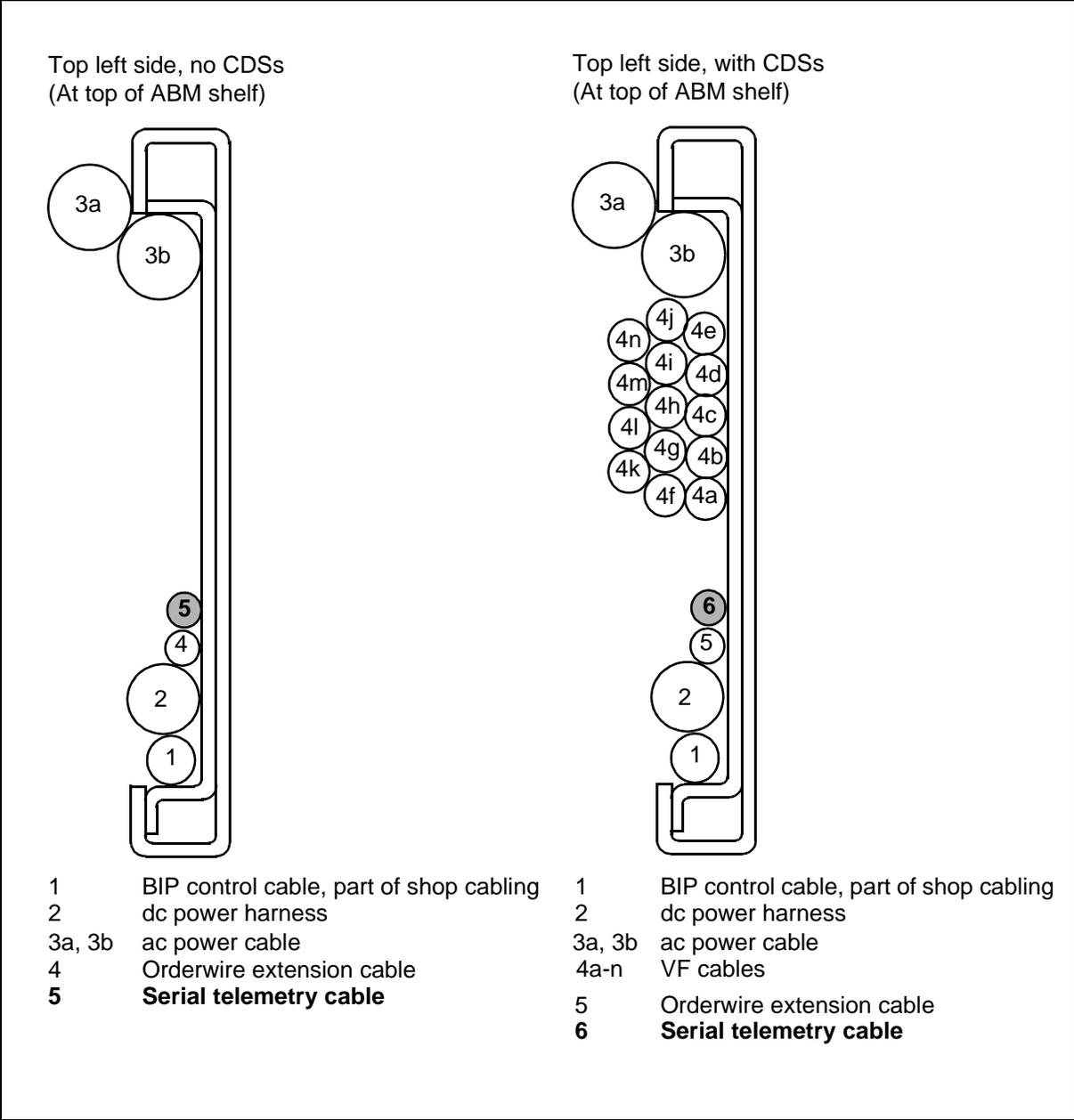
Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
	1		NC	Port 2 Tx-	14	7	O 1R
	2		NC	Port 2 Tx+	15	7	O 2R
	3		NC	Port 2 Rx+	16	1	BL 2W
Port 2 Rx-	4	1	BL 1W	Port 1 Rx+	17	2	O 2W
Port 1Rx-	5	2	O 1W	Port 1 Tx+	18	3	G 2W
Port 1 Tx-	6	3	G 1W		19		NC
	7		NC		20		NC
	8		NC	future	21	8	
	9		NC	future	22	8	
	10		NC	future	23	4	
future	11			future	24	5	
future	12			future	25	6	
future	13						
NC = no connection							

—continued—

Procedure 5-3 (continued)
Installing a serial telemetry cable

Step Action

Figure 5-8
Placement of serial telemetry cable in bay upright



—end—

Procedure 5-4 Installing an OPC cable to the SIL

Use this procedure to install input-output cables to the OPC connector (J07) on the side interconnect left (SIL) panel of the ABM shelf. These cables are only installed if the ABM shelf contains an operations controller (OPC) module.

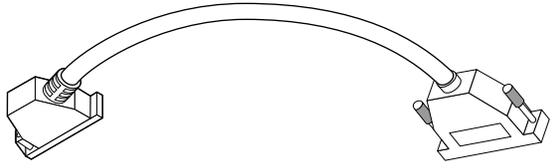
Note: To meet noise and ground current requirements, only connect an OPC cable between equipment that is bonded to the same ground point.

Table 5-12
OPC cables that connect to the left side of the ABM shelf, and their uses

PEC	Use
NT7E44EA, EB	Asynchronous RS232 interface for a modem to OPC, 9600 baud
NT7E44RA, RB	Asynchronous RS232 interface for VT-100 terminal or a printer
NT7E44QA, QB	X25 synchronous interface for a graphics terminal or a remote operations system
NT7E44SA, SB	Asynchronous RS232 interface for a laptop computer

PC-15273

NT7E44EA, EB



9-pin male
D-subminiature
to ABM shelf
25-pin male
D-subminiature
to modem or adapter

4-pair, twisted, 26 AWG solid wires with shielding, connectorized at both ends. The 9-pin male end connects to the 9-pin female connector on the ABM shelf. The 25-pin male end connects to a 25-pin female connector of a remote modem or null modem adapter. This cable is available in the following lengths:

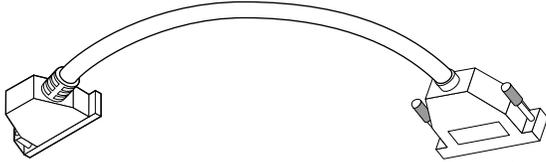
5 m (16 ft)	NT7E44EA
20 m (66 ft)	NT7E44EB

—continued—

Procedure 5-4 (continued)
Installing an OPC cable to the SIL

PC-15273

NT7E44RA, RB



9-pin male
D-subminiature
to ABM shelf

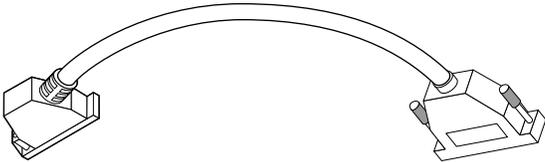
25-pin female
D-subminiature
to VT100 or printer

4-pair, twisted, 26 AWG solid wires with shielding, connectorized at both ends. The 9-pin male end connects to the 9-pin female connector on the ABM shelf. The 25-pin female end connects to a 25-pin male connector on a VT-100 terminal or on a printer. This cable is available in the following lengths:

- 5 m (16 ft) NT7E44RA
- 20 m (66 ft) NT7E44RB

PC-15273

NT7E44QA, QB



9-pin male
D-subminiature
to ABM shelf

25-pin male
D-subminiature
to EIA-530 interface

4-pair, twisted, 26 AWG solid wires with shielding, connectorized at both ends. The 9-pin male end connects to the 9-pin female connector on the ABM shelf. The 25-pin male end connects to a 25-pin female connector of an EIA-530 interface on a graphics terminal or on a remote operations system. This cable is available in the following lengths:

- 5 m (16 ft) NT7E44QA
- 20 m (66 ft) NT7E44QB

—continued—

5-28 Installing the external ABM bay cabling

Procedure 5-4 (continued)

Installing an OPC cable to the SIL

NT7E44SA or SB



9-pin female D-subminiature to RS232 on laptop

9-pin male D-subminiature to ABM

4-pair, twisted, 26 AWG solid wires with shielding, connectorized at both ends. The 9-pin male end connects to the 9-pin connector on the ABM shelf. The 9-pin female end connects to a 9-pin male connector of an RS232 interface on a Toshiba laptop computer. This cable is available in the following lengths:

5 m (16 ft)	NT7E44SA
20 m (66 ft)	NT7E44SB

Requirement

You need the following tools and materials:

- cable cutters
- cable ties

Action

Step	Action
1	Route the end of the cable with the 9-pin connector down the left side of the bay.
2	Connect the 9-pin male connector of the cable to the OPC (J07) connector, as shown in Figure 5-9 on page 5-29.
3	Place the cable into the left bay upright as shown in Figure 5-10 on page 5-30 and use cable ties to fasten the cable to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the bay upright.
4	Route the OPC cable out of the bay to the external equipment.
5	Connect the free end of the cable to the external equipment. For pin-outs of the equipment-end of these cables, see Table 5-13 on page 5-31 to Table 5-15 on page 5-33.

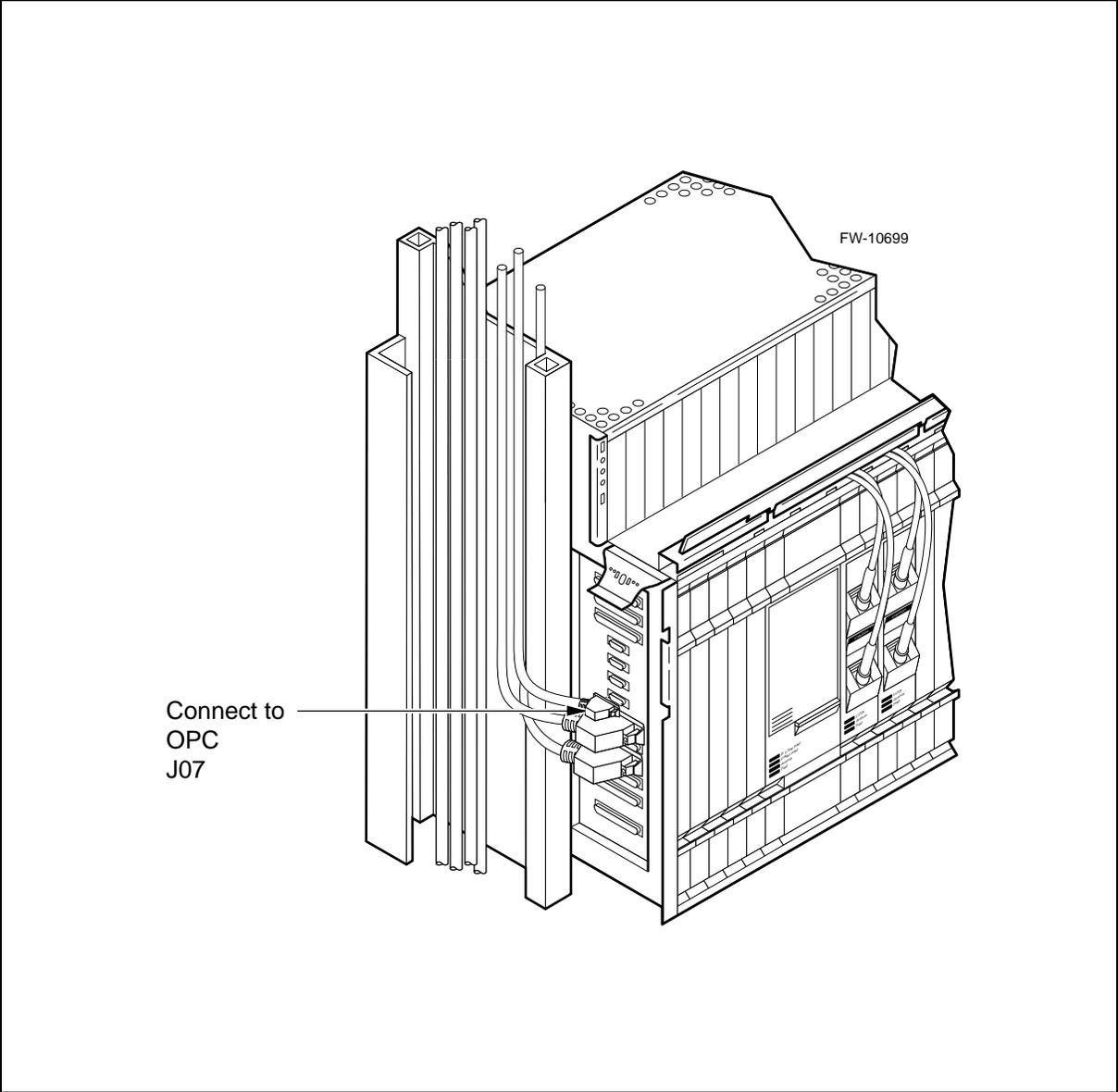
—continued—

Procedure 5-4 (continued)
Installing an OPC cable to the SIL

Step Action

Figure 5-9
Routing an OPC cable to the OPC connector on left side of the shelf

PC-10699



—continued—

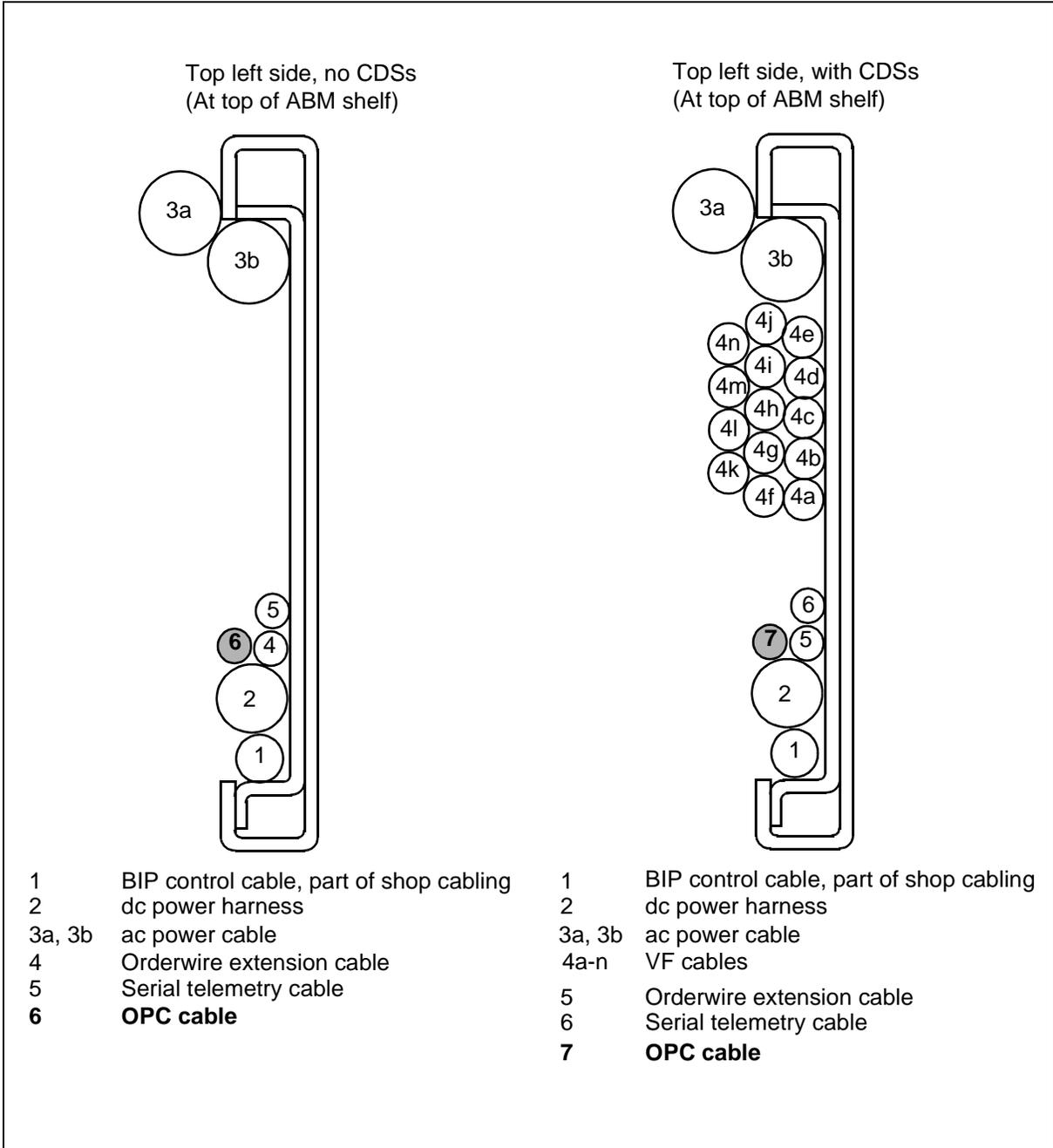
5-30 Installing the external ABM bay cabling

Procedure 5-4 (continued)

Installing an OPC cable to the SIL

Step Action

Figure 5-10
Dressing OPC cables into the left bay upright



—continued—

 Procedure 5-4 (continued)
 Installing an OPC cable to the SIL

Step Action

Table 5-13
Pin-outs for the NT7E44EA, EB cable

25-pin connector		9-pin connector
Pin	Signal	Pin (see Note)
1	not used	
2	Tx	3
3	Rx	2
4	RTS	7
5	CTS	8
6	DSR	6
7	signal ground	5
8	DCD	1
9 to 19	not used	
20	DTR	4
21 to 25	not used	4
Note: Pin 9 is not used on the 9-pin connector.		

—continued—

5-32 Installing the external ABM bay cabling

Procedure 5-4 (continued)
Installing an OPC cable to the SIL

Step Action

Table 5-14
Pin-outs for the NT7E44RA, RB cable

25-pin connector		9-pin connector
Pin	Signal	Pin (see Note 1)
1	not used	
2	Tx	2
3	Rx	3
4	RTS	1 (Note 3)
5	CTS	4 (Note 3 and Note 4)
6	DSR	4 (Note 4)
7	signal ground	5
8	DCD	7
9 to 19	not used	
20	DTR (Note 2)	6
20	DTR (Note 2)	8
21 to 25	not used	

Note 1: Pin 9 on the 9-pin connector is not used.

Note 2: Pin 20 on the 25-pin connector is connected to pins 6 and 8 on the 9-pin connector.

Note 3: If you are connecting a North American version of a DEC VT320 or a DEC VT420 terminal, you must short pin 1 (DCD) to pin 4 (DTR) on the 9-pin connector of this cable. If you are connecting an international version of these terminals, the cable can be used without any modification.

Note 4: Pin 4 on the 9-pin connector is connected to pins 5 and 6 on the 25-pin connector.

—continued—

 Procedure 5-4 (continued)
Installing an OPC cable to the SIL

Step Action
Table 5-15
Pin-outs for the NT7E44QA, QB cable

25-pin connector		9-pin connector
Pin	Signal	Pin (see Note)
1	not used	
2	Tx	3
3	Rx	2
4	RTS	7
5	CTS	8
6	DSR	not connected to this end of the cable
7	signal ground	5
8	DCD	not connected to this end of the cable
9 to 14	not used	
15	TxCLK	6
16	not used	
17	RxCLK	1
18 and 19	not used	
20	DTR	4
21 to 25	not used	

Note: Pin 9 is not used on the 9-pin connector.

—continued—

5-34 Installing the external ABM bay cabling

Procedure 5-4 (continued)

Installing an OPC cable to the SIL

Step Action

Table 5-16
Pin-outs for cables NT7E44SA, SB

9-pin connector at laptop		9-pin connector at ABM shelf
Pin	Signal	Pin (see Note 1)
1	DCD	4 (Note 3)
2	Rx	3
3	Tx	2
4	DTR (Note 2)	6
4	DTR (Note 2)	1
5	signal ground	5
6	DSR	4 (Note 3)
7	RTS	8
8	CTS	7
9	not used	

Note 1: Pin 9 at the ABM shelf end of the cable is not used.

Note 2: Pin 4 at the laptop end of the cable connects to pins 1 and 6 at the ABM shelf end of the cable.

Note 3: Pin 4 at the ABM shelf end of the cable connects to pins 1 and 6 at the laptop end of the cable.

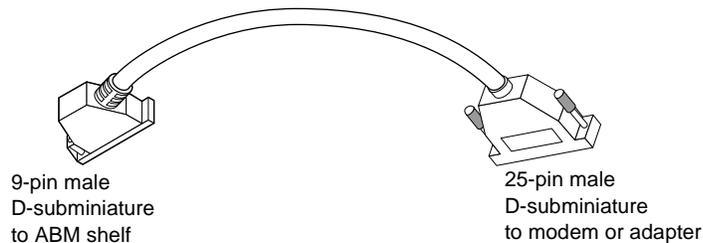
—end—

Procedure 5-5 Installing a modem cable

Use this procedure to install the optional modem cable (NT7E44EA, EB) between the modem port (J08) on the SIL of an ABM shelf and an office modem unit. You can also connect this cable to data terminal equipment such as a printer or a VT-100 terminal by using an NT7E44MA null modem adaptor cable between the NT7E44EA, EB cable and the printer or terminal.

Note: To meet noise and ground current requirements when connecting the cable directly to a printer (no modem is used), you must only connect the cable between equipment that is bonded to the same ground point.

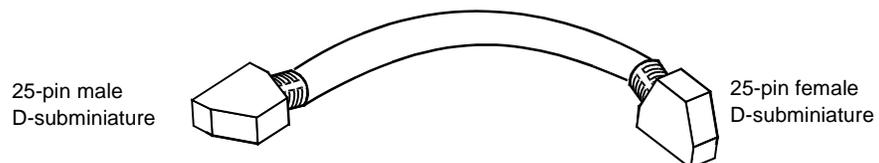
NT7E44EA, EB



4-pair, twisted, 26 AWG solid wires with shielding, connectorized at both ends. The 9-pin male end connects to the 9-pin female connector on the ABM shelf. The 25-pin male end connects to a 25-pin female connector of a remote modem or null modem adapter. This cable is available in the following lengths:

5 m (16 ft)	NT7E44EA
20 m (66 ft)	NT7E44EB

NT7E44MA null modem adaptor for direct connection to a printer, or a VT-100-type terminal



4-pair, 26 AWG solid wire connectorized at both ends. The 25-pin female end connects to the 25-pin male connector on the NT7E44EA/EB cable. The 25-pin male end then connects directly to the VT-100 terminal or printer.

—continued—

Procedure 5-5 (continued)
Installing a modem cable

Requirement

You need the following tools and material:

- cable cutters
- cable ties

Action

Step	Action						
1	Route the end of the cable that has the 9-pin connector into the bay.						
2	Connect the 9-pin connector on the cable to the Modem (J08) connector, as shown in Figure 5-11 on page 5-38.						
3	Place the modem cable in the bay upright to occupy the position shown in Figure 5-12 on page 5-39, and use cable ties to secure the cable to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the bay upright.						
4	Route the cable out of the bay.						
5	Do one of the following: <table border="1"><thead><tr><th>If</th><th>Then</th></tr></thead><tbody><tr><td>you are installing a modem</td><td>connect the free end of the cable to the modem</td></tr><tr><td>you are installing a printer or a terminal</td><td>connect an NT7E44MA null modem adaptor between the NT7E44EA, EB cable and the printer or terminal</td></tr></tbody></table>	If	Then	you are installing a modem	connect the free end of the cable to the modem	you are installing a printer or a terminal	connect an NT7E44MA null modem adaptor between the NT7E44EA, EB cable and the printer or terminal
If	Then						
you are installing a modem	connect the free end of the cable to the modem						
you are installing a printer or a terminal	connect an NT7E44MA null modem adaptor between the NT7E44EA, EB cable and the printer or terminal						
6	Reference Tables 5-17 and 5-18 on page 5-37 for the pin-outs of the modem and null modem adapter cables.						

—continued—

Procedure 5-5 (continued)
Installing a modem cable

Table 5-17
Pin-outs for the 25-pin connector on the NT7E44EA, EB cables

25-pin connectors		9-pin connectors
Pin	Signal	Pin (see Note)
1	not used	
2	Tx	3
3	Rx	2
4	RTS	7
5	CTS	8
6	DSR	6
7	signal ground	5
8	DCD	1
9 to 19	not used	
20	DTR	4
21 to 25	not used	

Note: Pin 9 is not used on the 9-pin connector.

Table 5-18
Pin-outs for the NT7E44MA null modem adapter

25-pin connectors	25-pin connectors
Pin	Pin (see Note)
1	1
2	3
3	2
4	5
5	4
6	20
8	20
20	6
20	8

Note: Pins 9 to 19 and 21 to 25 are connected in a one-to-one pattern. That is, pin 9 connects to pin 9, pin 10 connects to pin 10, and so on.

—continued—

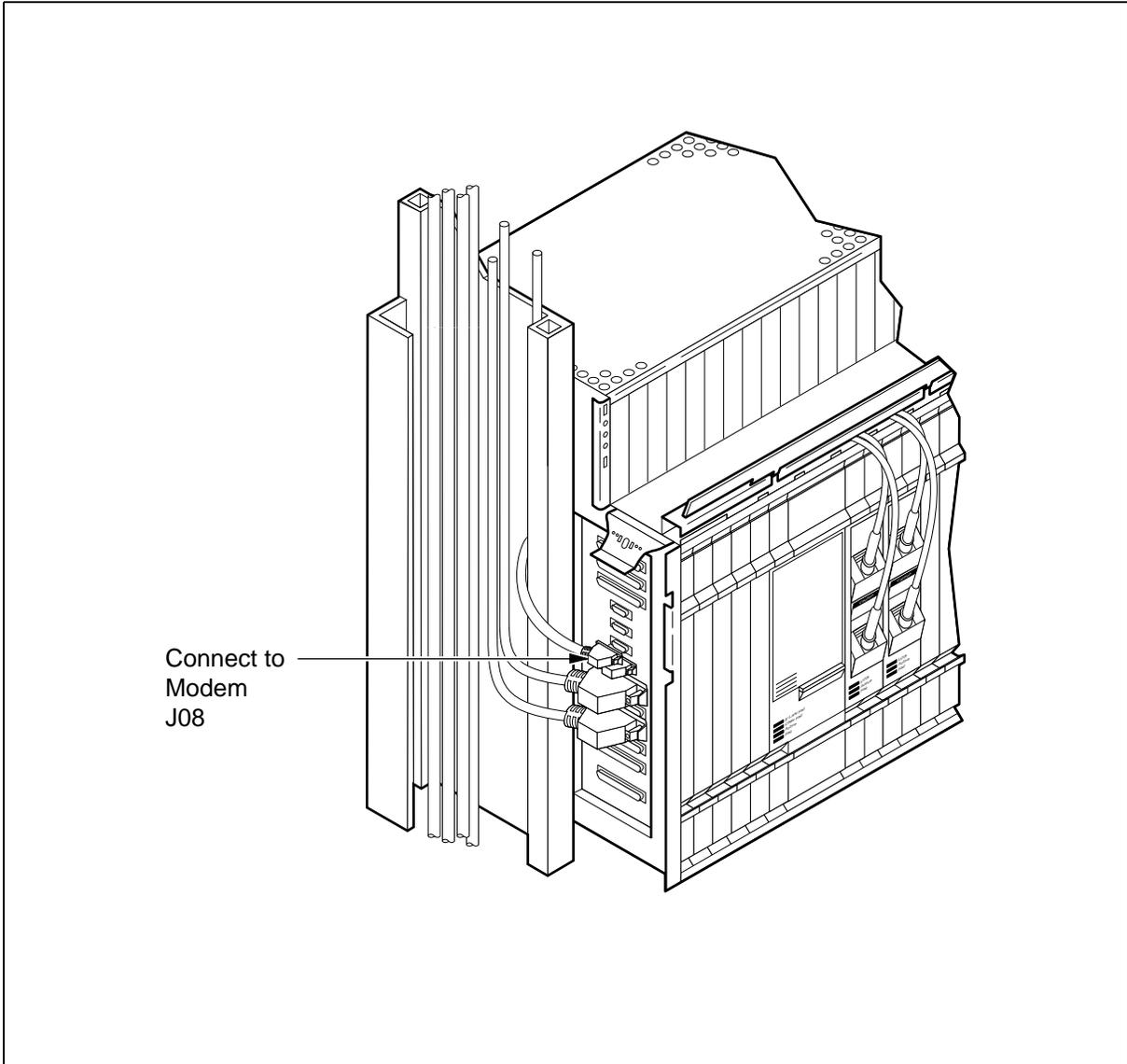
5-38 Installing the external ABM bay cabling

Procedure 5-5 (continued)
Installing a modem cable

Step **Action**

Figure 5-11
Installing a modem cable

PC-10041

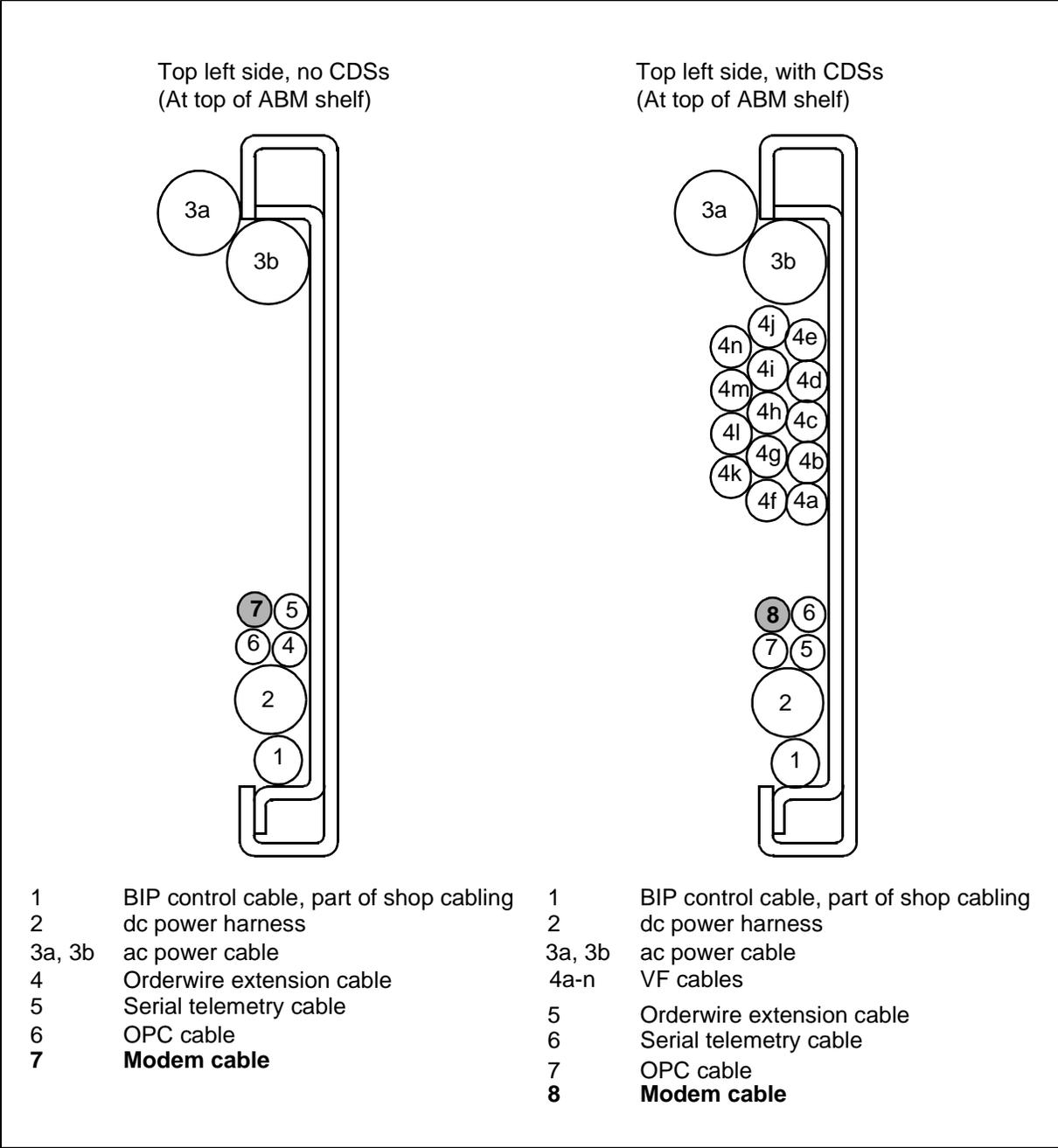


—continued—

Procedure 5-5 (continued)
Installing a modem cable

Step Action

Figure 5-12
Placement of the modem cable in bay upright



—end—

Procedure 5-6

Installing control network (CNET) cables and termination plugs

Use this procedure to install the control network (CNET) cables for an ABM bay or group of interconnected bays. The CNET cable is used to link together multiple ABM shelves/bays within the same office/facility.

Requirements

The following requirements apply to this procedure.

Tools and materials

You will need the following tools and materials to perform this procedure:

- cable cutters
- cable ties

Cabling rules

Observe the following cabling rules when performing this procedure:

- 1 One CNET cable (see Figure 5-13 on page 5-41) is required for each daisy-chain connection between multiple ABM shelves/bays, and a termination plug is required on the last CNET OUT connector in the chain.
- 2 A CNET termination plug (see Figure 5-14 on page 5-41) is required for each unused control network connector [CNET OUT (J02) and/or CNET IN (J11)] on each ABM shelf.
- 3 CNET cables must only be connected between equipment that is bonded to the same ground point.
- 4 CNET can support a maximum of 10 interconnected ABM bays (or network elements).

—continued—

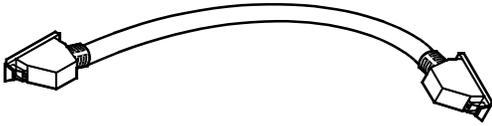
Procedure 5-6 (continued)

Installing control network (CNET) cables and termination plugs

Figure 5-13
CNET cabling

PC-10103

NT7E44JB/JC/JK/JX/JY/JW
CNET cabling



9-pin male D-subminiature

9-pin male D-subminiature

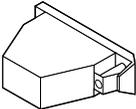
4-pair, twisted, 26 AWG stranded wires with shielding, connectorized with 9-pin male connectors at both ends in the following lengths:

1 m	(3.1 ft)	NT7E44JB
5 m	(16.4 ft)	NT7E44JC
10 m	(32 ft)	NT7E44JK
20 m	(64 ft)	NT7E44JX
30 m	(96 ft)	NT7E44JY
45 m	(144 ft)	NT7E44JW
100 m	(320 ft)	NT7E44JZ

Figure 5-14
CNET termination plug

PC-11009

NT7E5072
CNET termination plug



9-pin male D-subminiature termination plug

1	●	—	⚡	—	●	6	100 ohm	
2	●	—	⚡	—	●	7	100 ohm	
3	●	—	⚡	—	●	8	100 ohm	
4	●	—	⚡	—	●	9	100 ohm	
5	●							No connection

—continued—

5-42 Installing the external ABM bay cabling

Procedure 5-6 (continued)

Installing control network (CNET) cables and termination plugs

Action

If the installation only contains one ABM shelf, go to step 1. Otherwise, skip to step 2.

Step	Action
1	Terminate the CNET In connector (J10) and the CNET Out connector (J09) with termination plugs (NT7E7052), and end the procedure here.
2	At the left side of the ABM shelf in the left-most frame in the lineup, connect an NT7E7052 termination plug to the CNET In connector (J10).
3	At the ABM shelf of the left-most bay in the lineup, connect one end of a control network cable to connector CNET Out (J09) on the ABM shelf, as shown in Figure 5-15 on page 5-44.
4	Route the control network cable up the left side of the bay, place it in the bay upright at the position shown in Figure 5-17 on page 5-46.
5	Route the cable into the overhead cable rack and down into the left upright of the next bay in the lineup.
6	Connect the connector on the free end of the cable to the CNET In connector (J10) on the ABM shelf, as shown in Figure 5-16 on page 5-45.
7	Place the cable into the bay upright as shown in Figure 5-17 on page 5-46, and use cable ties secure it to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lances in the bay uprights.
8	Reference Table 5-19 on page 5-43 for the pin-outs of the control network cable.

—continued—

Procedure 5-6 (continued)

Installing control network (CNET) cables and termination plugs

Step	Action
9	Is this the last ABM shelf in the lineup to be connected?
If	Then
this is the last shelf	insert an NT7E7052 termination plug into the CNET Out connector (J09) on the access bandwidth manager shelf and end the procedure here
this is not the last shelf	connect one end of a control network cable to the CNET Out connector (J09) on the access bandwidth manager shelf, then go back to step 4

Table 5-19
Pin-outs for NT7E44JB, JC, and JK cables

Pins on CNET In connector	Signal	Pins on CNET Out connector	Signal
1	no connection	1	no connection
2	no connection	2	no connection
3	XCN2N	3	XCN2N
4	XCN1N	4	XCN1N
5	no connection	5	no connection
6	no connection	6	no connection
7	no connection	7	no connection
8	XCN2P	8	XCN2P
9	XCN1P	9	XCN1P

—continued—

5-44 Installing the external ABM bay cabling

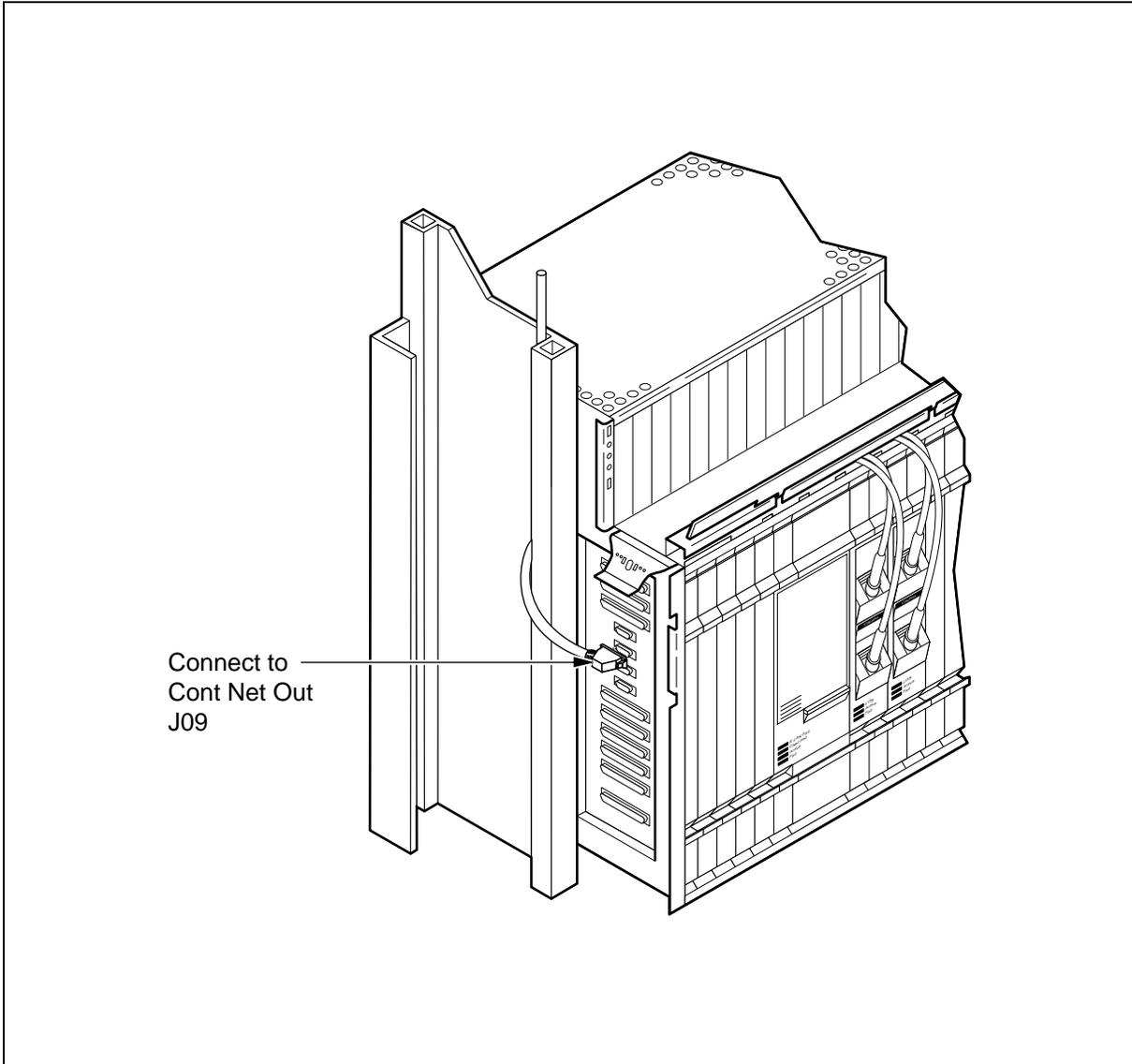
Procedure 5-6 (continued)

Installing control network (CNET) cables and termination plugs

Step Action

Figure 5-15
Connecting control network output cable

PC-10048



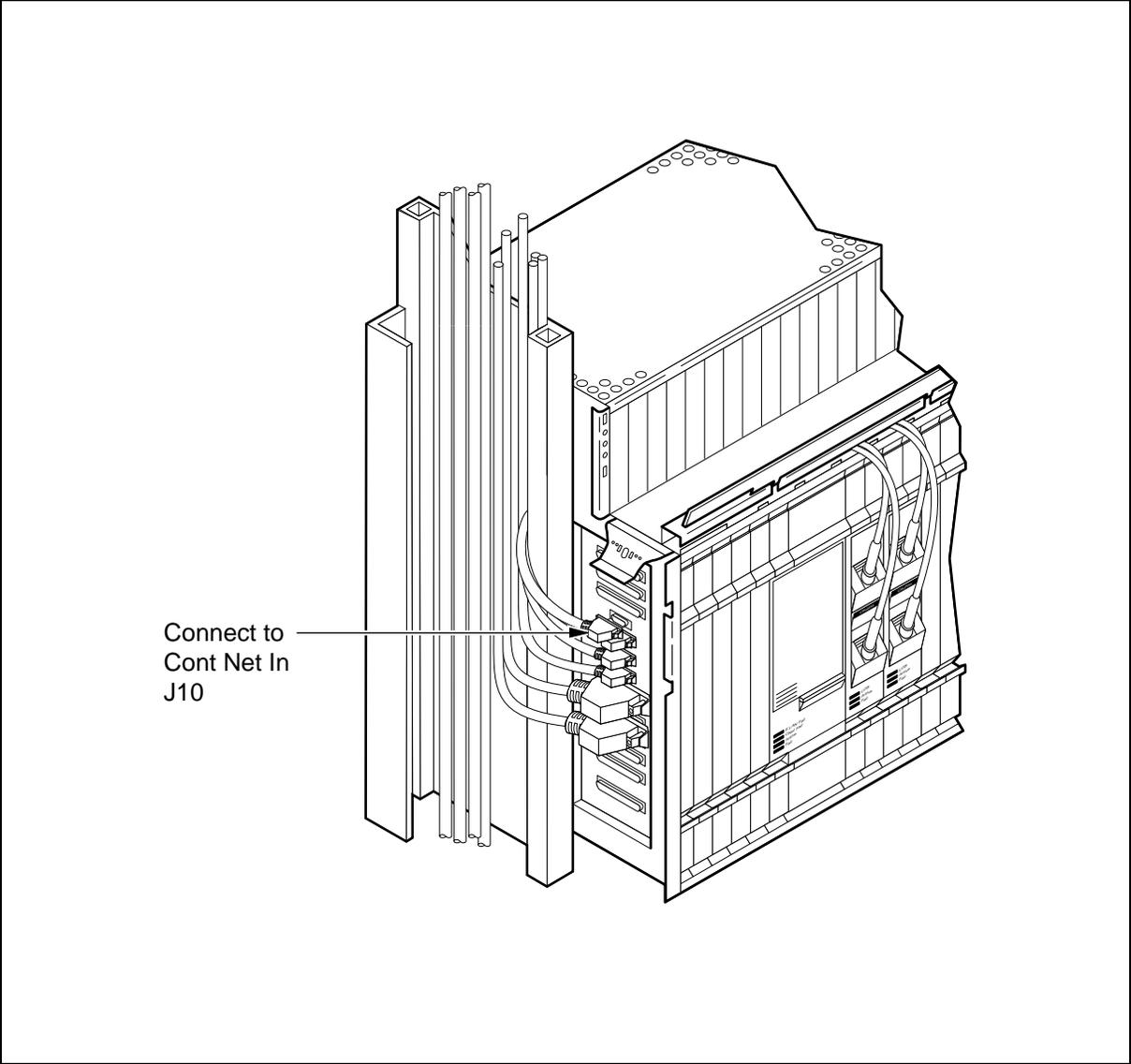
—continued—

Procedure 5-6 (continued)
Installing control network (CNET) cables and termination plugs

Step Action

Figure 5-16
Connecting the control network input cable

PC-10047



—continued—

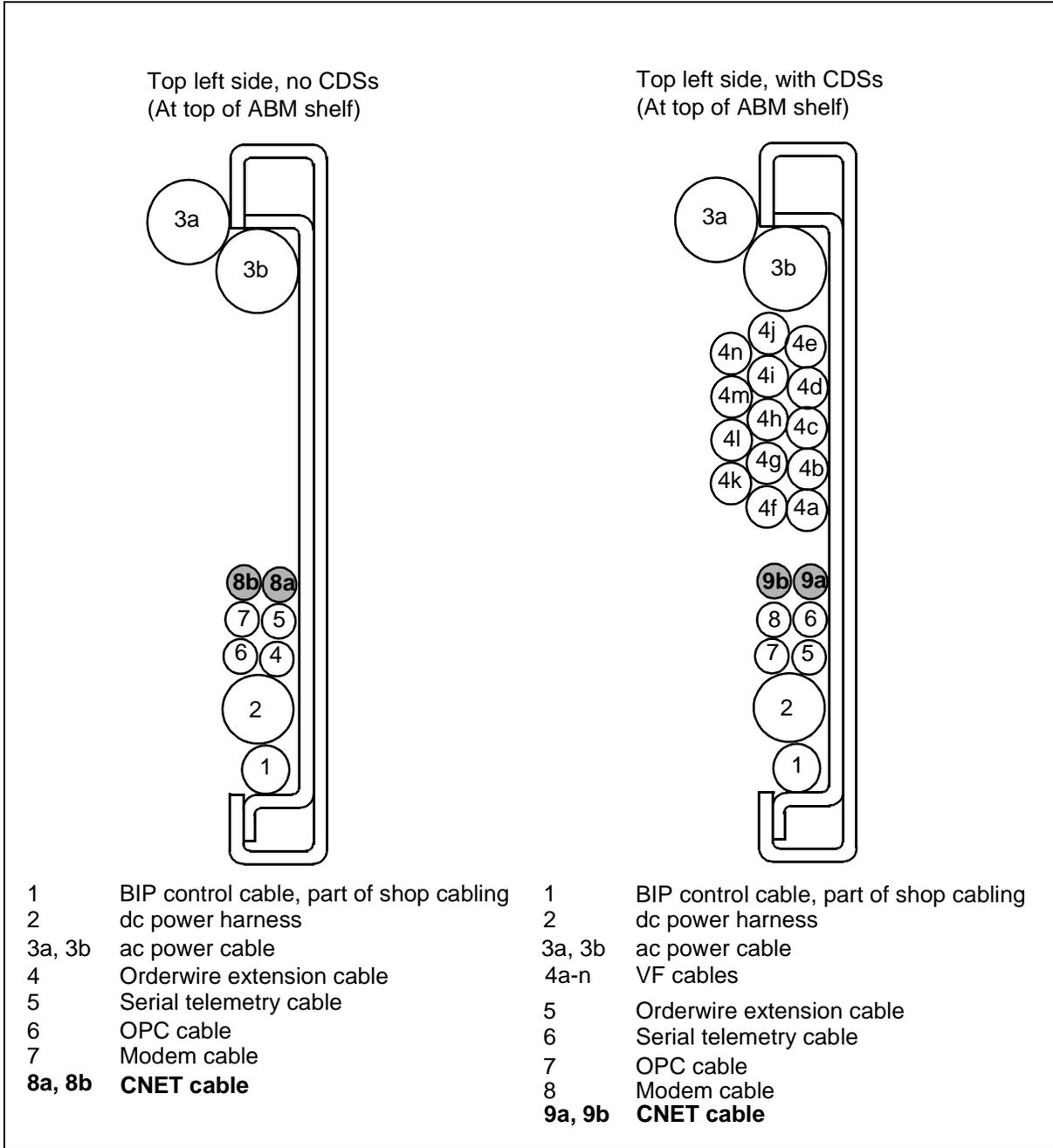
5-46 Installing the external ABM bay cabling

Procedure 5-6 (continued)

Installing control network (CNET) cables and termination plugs

Step Action

Figure 5-17
Placement of control network cables in bay upright

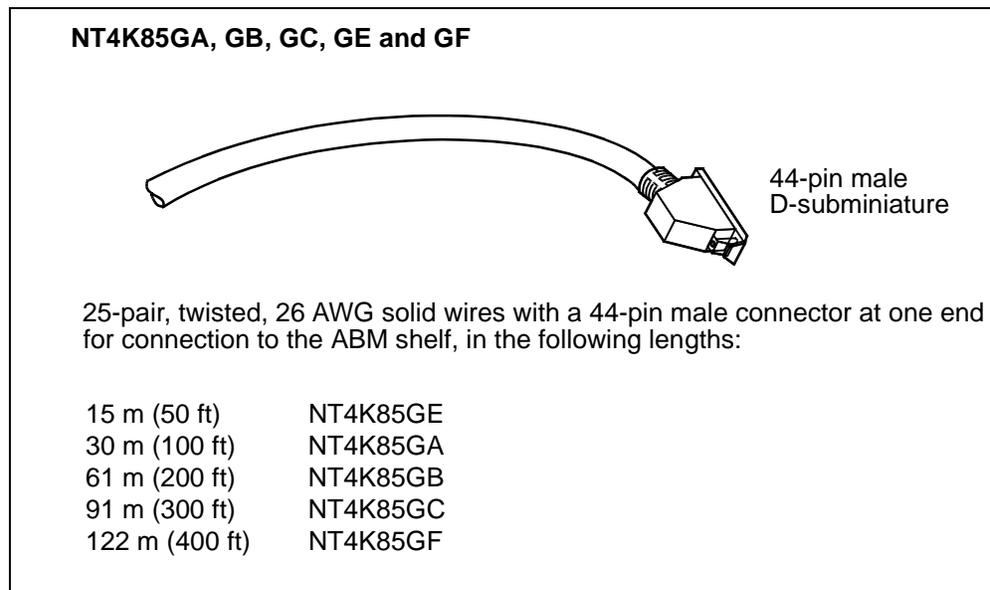


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Procedure 5-7

Installing a parallel telemetry cable

Use this procedure to install a parallel telemetry cable (NT4K85GA, GB, GC, GE or GF) to an ABM shelf.



Requirement

You need the following tools and material:

- cable cutters
- cable ties

Action

Step	Action
1	Route the end of the cable that has the 44 pin connector down the left side of the bay.
2	Connect the cable to the Parallel Telemetry (J11) connector, as shown in Figure 5-18 on page 5-48.

—continued—

5-48 Installing the external ABM bay cabling

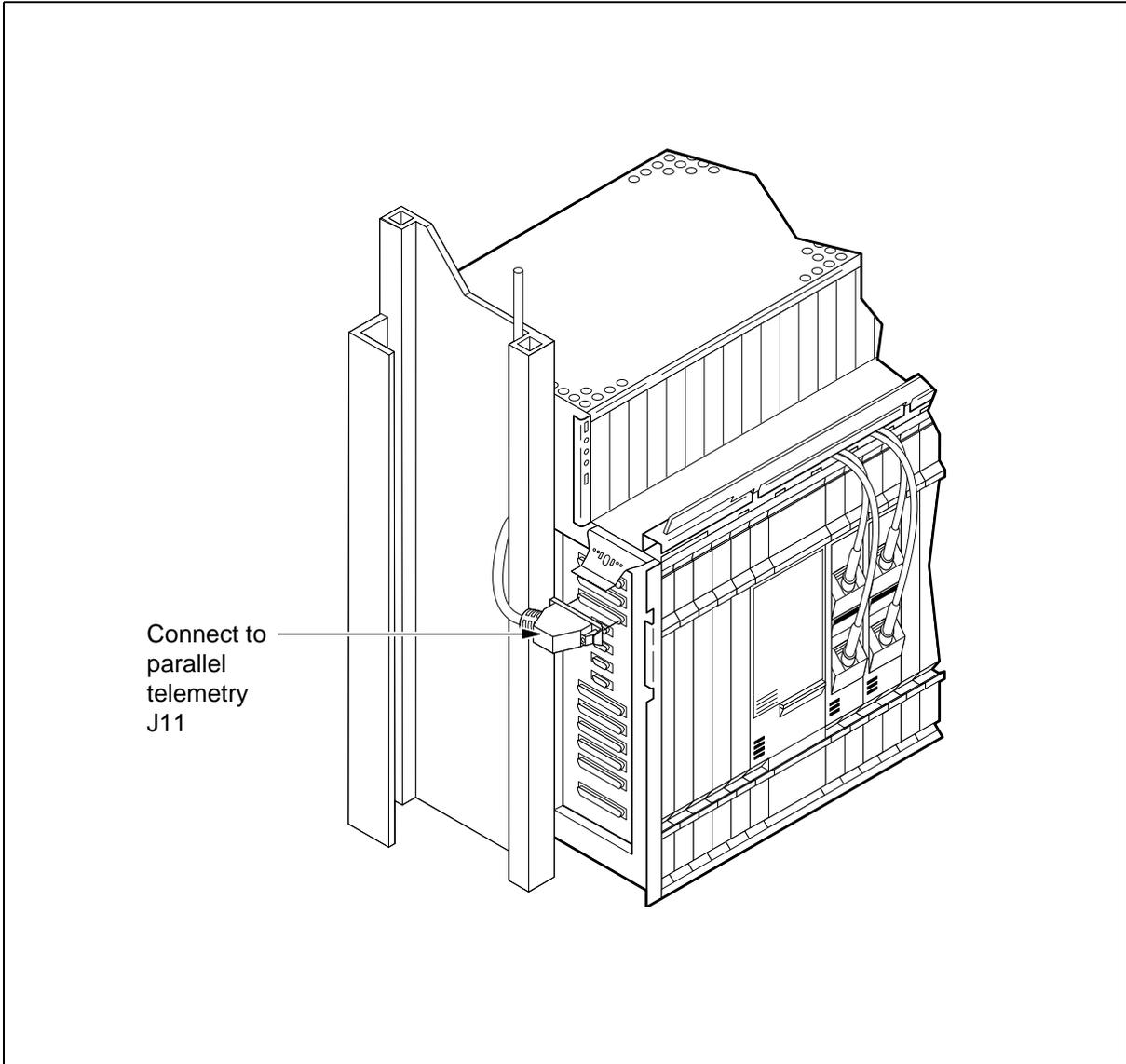
Procedure 5-7 (continued)

Installing a parallel telemetry cable

Step Action

Figure 5-18
Connecting a parallel telemetry cable

PC-10058



—continued—

Procedure 5-7 (continued)

Installing a parallel telemetry cable

Step	Action
3	Place the parallel telemetry cable in the bay upright to occupy the position shown in Figure 5-19 on page 5-50, and use cable ties to secure the cable to the bay upright. Whenever possible, bundle the cable with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the left bay upright.
4	Route the cable out of the bay to the external parallel telemetry equipment.

—continued—

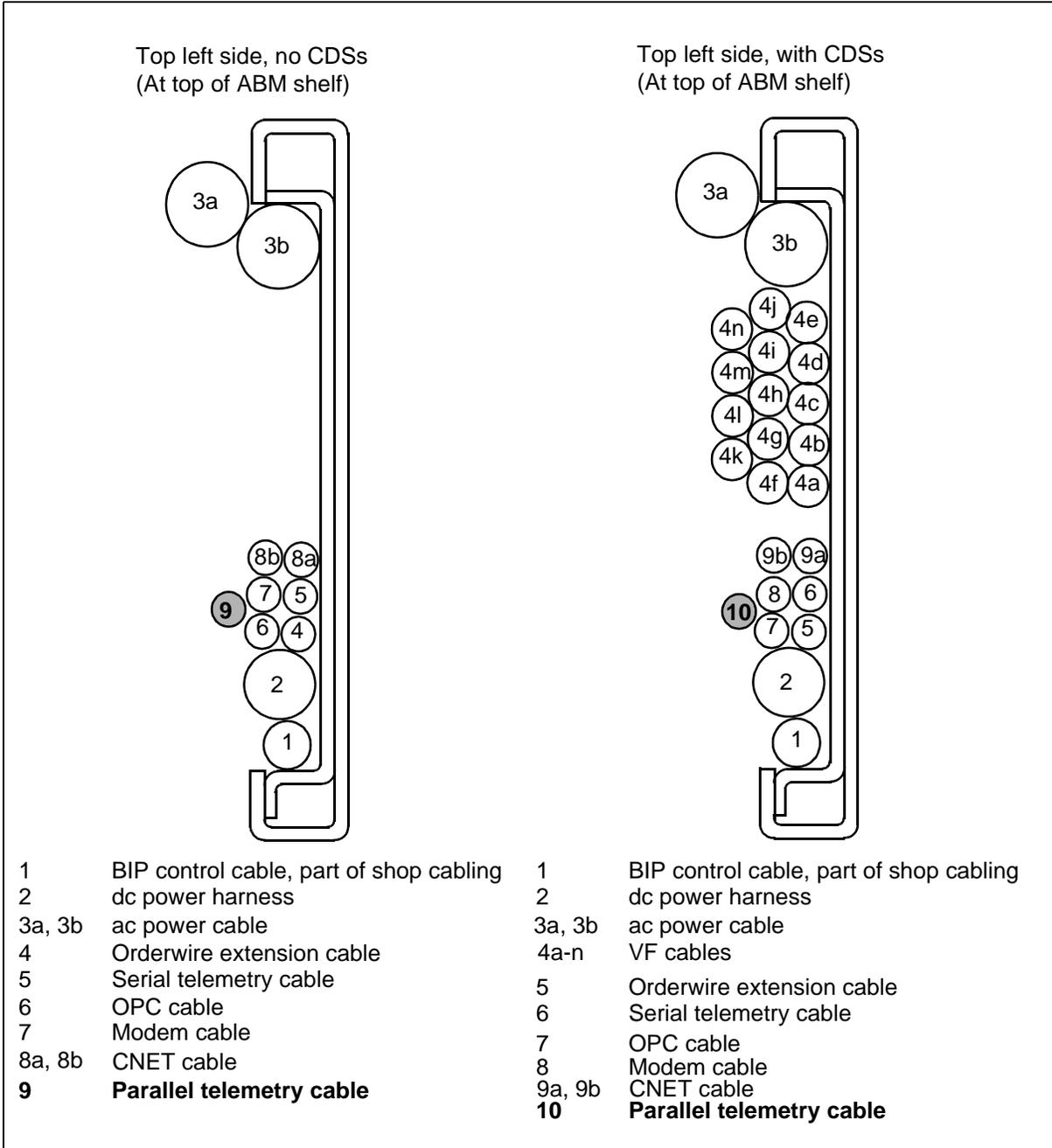
5-50 Installing the external ABM bay cabling

Procedure 5-7 (continued)

Installing a parallel telemetry cable

Step Action

Figure 5-19
Placement of the parallel telemetry cable in the bay upright



—continued—

Procedure 5-7 (continued)

Installing a parallel telemetry cable**Step Action**

5 Refer to the following wiring table and complete the office connections.

Table 5-20**Parallel telemetry cable pair color coding and pin-out detail**

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
OUT 01	1	1	BL 1W	IN 03	23	12	O 1BK
OUT 02	2	1	W 1BL	IN 04	24	12	BK 1O
OUT 03	3	2	O 1W	IN 05	25	13	G 1BK
OUT 04	4	2	W 1O	IN 06	26	13	BK 1G
OUT 05	5	3	G 1W	IN 07	27	14	BR 1BK
OUT 06	6	3	W 1G	IN 08	28	14	BK 1BR
OUT 07	7	4	BR 1W	IN 09	29	15	S 1BK
OUT 08	8	4	W 1BR	IN 10	30	15	BK 1S
OUT 09	9	5	S 1W	IN 11	31	16	BL 1Y
OUT 10	10	5	W 1S	IN 12	32	16	Y 1BL
OUT 11	11	6	BL 1R	IN 13	33	17	O 1Y
OUT 12	12	6	R 1BL	IN 14	34	17	Y 1O
OUT 13	13	7	O 1R	IN 15	35	18	G 1Y
OUT 14	14	7	R 1O	IN 16	36	18	Y 1G
OUT 15	15	8	G 1R	IN 17	37	19	BR 1Y
OUT 16	16	8	R 1G	IN 18	38	19	Y 1BR
OUT 17	17	9	BR 1R	IN 19	39	20	S 1Y
OUT 18	18	9	R 1BR	IN 20	40	20	Y 1S
OUT Return	19	10	S 1R	IN 21	41	21	BL 1V
OUT Return	20	10	R 1S	IN 22	42	21	V 1BL
IN 01	21	11	BL 1BK	IN Return	43	22	O 1V
IN 02	22	11	BK 1BL	IN Return	44	22	V 1O

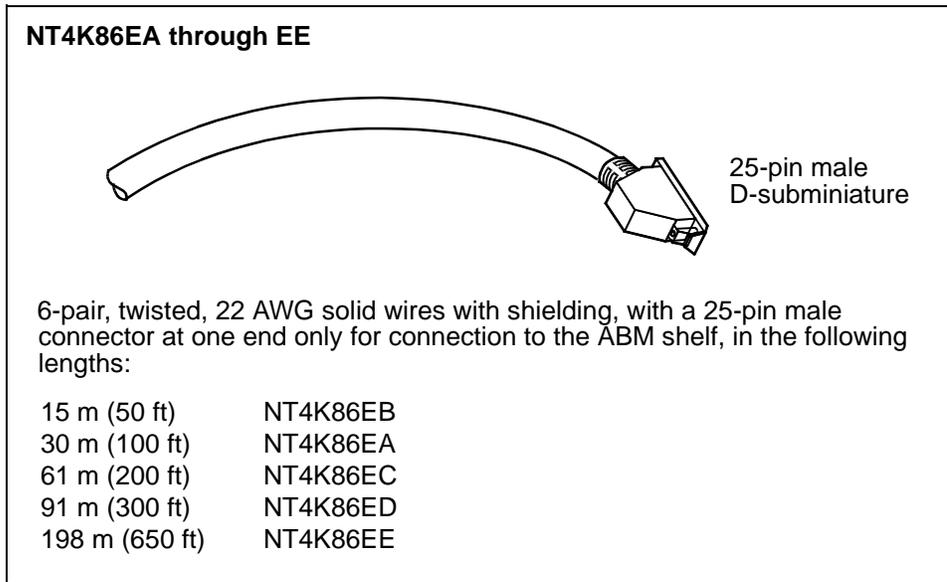
Note: Signals IN 12 to IN 22 are for future use.

—end—

Procedure 5-8 Installing an external synchronization cable

Use this procedure to install an external synchronization cable (NT4K86EA through EE) to an ABM shelf located at a central switching office. A remote ABM shelf is synchronized to the network and does not require installation of this cable.

Note: To meet noise and ground current requirements, only connect an ESI cable between equipment that is bonded to the same ground point.



Requirement

You need the following tools and materials:

- cable cutters
- cable ties

Action

Step	Action
1	Route the end of the cable that has the 25-pin connector into the left side of the bay.
2	Connect the cable to the Ext Sync (J12) connector, as shown in Figure 5-20 on page 5-53.

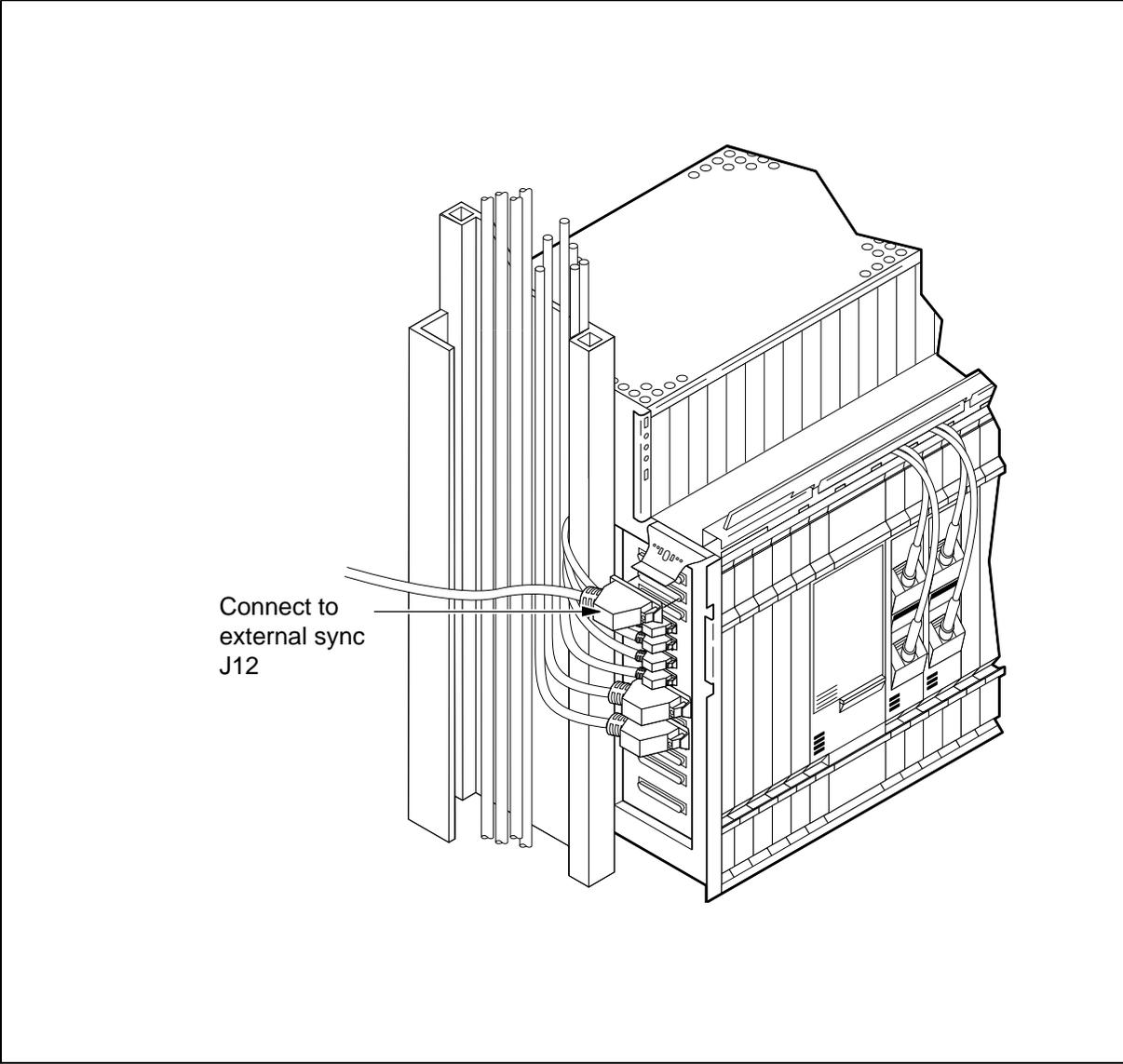
—continued—

Procedure 5-8 (continued)
Installing an external synchronization cable

Step Action

Figure 5-20
Connecting the external synchronization cable

PC-10056



—continued—

5-54 Installing the external ABM bay cabling

Procedure 5-8 (continued)

Installing an external synchronization cable

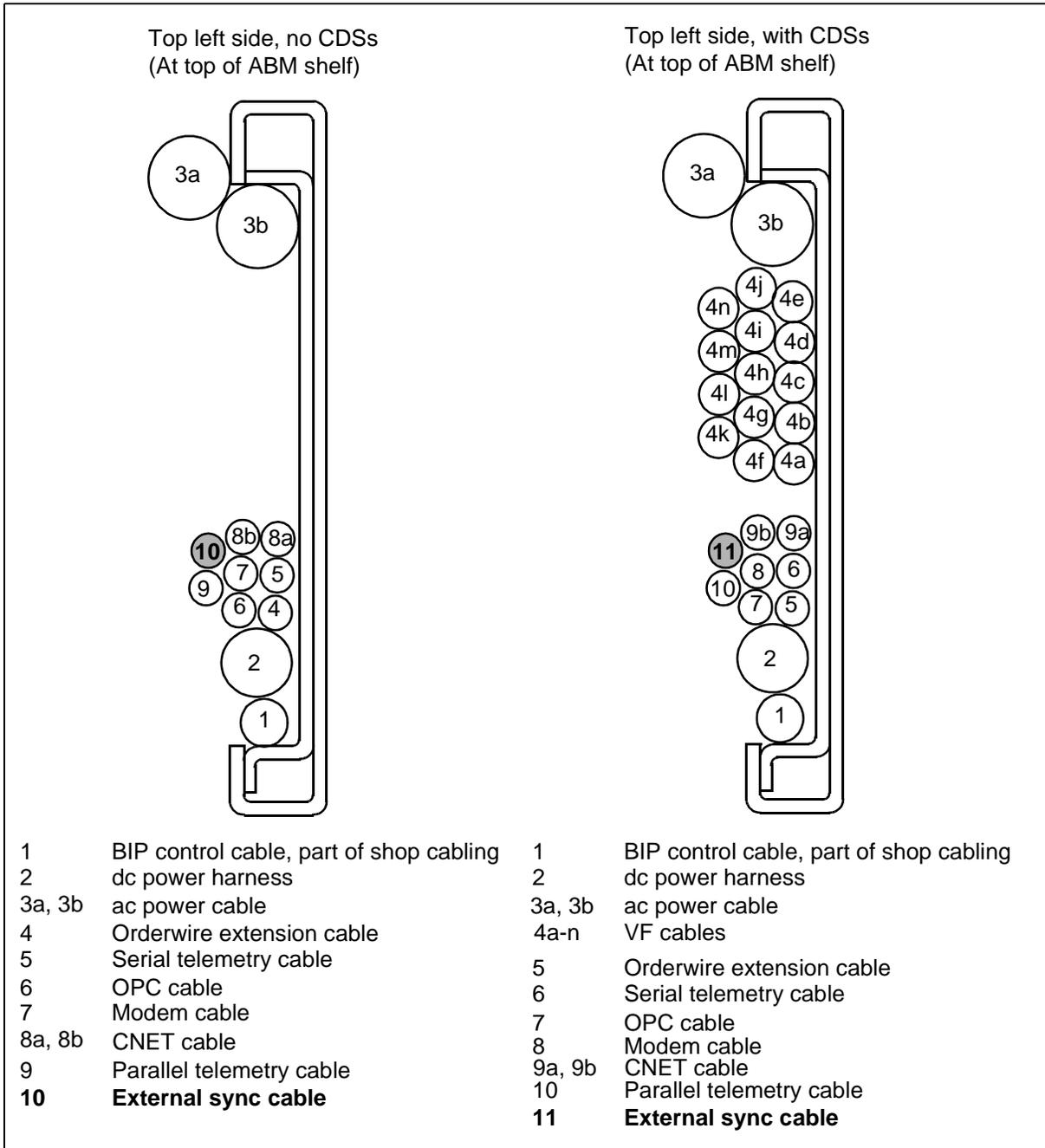
Step	Action
3	Place the external synchronization cable in the bay upright to occupy the position shown in Figure 5-21 on page 5-55, and secure the cable to the bay upright. Whenever possible, group this cable into a bundle with the other cables that connect to the left side of the ABM shelf, and use cable ties to secure the bundle to the lance plates in the bay upright.
4	Run the cable out of the bay to the external synchronization equipment.

—continued—

Procedure 5-8 (continued)
Installing an external synchronization cable

Step Action

Figure 5-21
Placement of the external synchronization cable in bay upright



—continued—

5-56 Installing the external ABM bay cabling

Procedure 5-8 (continued)

Installing an external synchronization cable

Step	Action
------	--------

- | | |
|---|--|
| 5 | See Table 5-21 for the cable pair color coding, and terminate the office end of the cable to the external synchronization equipment. |
|---|--|

Table 5-21

External synchronization cable pair color coding and pin-out details

Signal	Pin	Color
Primary reference input (Tip)	1	W 1BL
	2	not used
Secondary reference input (Tip)	3	W 1O
	4	not used
DS1 output (Tip), top ESI	5	W 1G
	6	not used
DS1 output (Tip), bottom ESI	7	W 1BR
	8	not used
	9	not used
	10	not used
	11	not used
	12	not used
	13	not used
	Primary reference input (Ring)	14
15		not used
Secondary reference input (Ring)	16	O 1W
	17	not used
DS1 output (Ring), top ESI	18	G 1W
	19	not used
DS1 output (Ring), bottom ESI	20	BR 1W
	21	not used
	22	not used
	23	not used
	24	not used
	25	not used

—end—

Procedure 5-9

Installing the fiber patch cords on bays with a low-fiber cable density

Use this procedure to install fiber patch cords from the faceplate of the OC-3 or the OC-12 tributary optical interface cards in the access bandwidth manager (ABM) shelf to the office fiber cross-connect. The OC-12 and the OC-3 optical interface cards do not have to be installed at this time. Circuit packs are installed later according to *Commissioning and Testing*, Volume 3.

For installations in which there are short distances between terminals, variable optical attenuators are required at the receive ends of the OC-3 or OC-12 optical interfaces. When variable optical attenuators are required, they are installed in a miniature variable optical attenuator (mVOA) storage assembly located at the right and/or left sides of the cooling unit. For instructions to determine when variable attenuators are required, refer to *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

The bay is equipped with a fiber storage tray assembly which can be used to store up to 5 m (15 ft) of excess fiber on up to eight fiber patch cords. If you are installing more than eight fiber patch cords to a fiber storage tray, go to Procedure 5-10, “Installing the fiber management storage tray and routing the fiber cables to the ABM” on page 5-80.

This procedure applies to the following optical patch cords and pigtails.

—continued—

5-58 Installing the external ABM bay cabling

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Table 5-22 lists the ABM shelf's optical patch cords.

Table 5-22
Optical patch cords

PEC	Length (in meters)	Connector type
NT7E46AA NT7E46AB NT7E46AC NT7E46AD NT7E46AE	5 10 15 20 30	Biconic-biconic
NT7E46BF NT7E46BA NT7E46BB NT7E46BC NT7E46BD NT7E46BE	3 5 10 15 20 30	FC-FC
NT7E46CF NT7E46CA NT7E46CB NT7E46CC NT7E46CD NT7E46CE	3 5 10 15 20 30	ST-ST
NT7E46FA NT7E46FB NT7E46FC NT7E46FD NT7E46FE	5 10 15 20 30	SC-SC

—continued—

 Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Table 5-23 lists the ABM shelf's optical patch cords with miniature variable optical attenuators (mVOAs).

Table 5-23
Optical patch cords with miniature variable optical attenuators

PEC	Length (in meters)	Connector type
NT7E47AA NT7E47AB NT7E47AC NT7E47AD NT7E47AE	5 10 15 20 30	Biconic-biconic
NT7E47BA NT7E47BB NT7E47BC NT7E47BD NT7E47BE	5 10 15 20 30	FC-FC
NT7E47CA NT7E47CB NT7E47CC NT7E47CD NT7E47CE	5 10 15 20 30	ST-ST
NT7E47FA NT7E47FB NT7E47FC NT7E47FD NT7E47FE	5 10 15 20 30	SC-SC

—continued—

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Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Table 5-24 lists the ABM shelf's optical pig tails with and without miniature variable optical attenuators (mVOAs).

Table 5-24
Optical pigtails

PEC	Length (in meters)	Connector type
NT7E48AA	20	Biconic
NT7E48BA	20	FC
NT7E48CA	20	ST
NT7E48FA	20	SC
NT7E49AA	20	Biconic (mVOA)
NT7E49BA	20	FC (mVOA)
NT7E49CA	20	ST (mVOA)
NT7E49FA	20	SC (mVOA)

—continued—

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Requirements

You need the following tools and materials:

- screwdriver, flat blade, 1/4 in. wide blade
- nut driver 5/16 in.
- wire cutters, flush cutting
- cable ties
- spiral wrap tubing, 9.3 mm (3/8 in.), R0116394, from installation kit NT4K0120
- tape measure



DANGER

Risk of eye injury

At all times when handling optical fibers, follow the safety procedures recommended by your company.

Read and follow the precautions in the following paragraphs to reduce the risk of exposure to laser radiation.



CAUTION

Risk of damage to fiber optical patch cords

Handle the fibers with extreme care. Never bend the cables into a curve that has a radius smaller than 77 mm (3 in.). Tighten connections to the optical units finger tight only.

Action

Step	Action
1	Using local procedures, label both ends of each patch cord with the following information: <ul style="list-style-type: none"> • the slot number in the ABM shelf for the OC-3 and OC-12 optical interface cards (slots 1 through 10) • the direction of the signal: Tx (transmit) or Rx (receive)

—continued—

5-62 Installing the external ABM bay cabling

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

- | Step | Action |
|------|--|
| 2 | Remove the BIP cover by turning the left and right locking screws on the BIP cover until the dots on the cover and on the locking screws are aligned, then pulling on the latches at each end of the cover, as shown in Figure 5-22. |



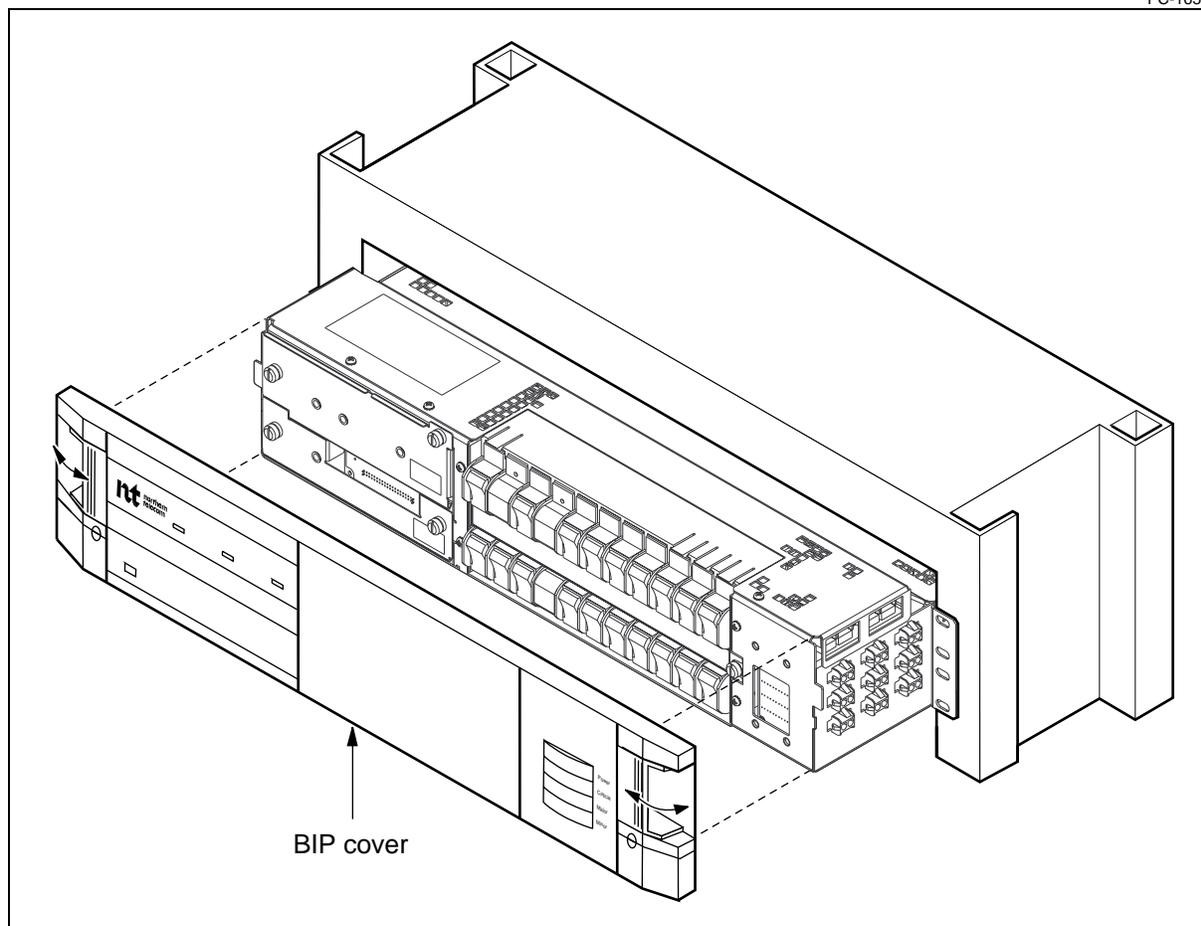
CAUTION

Risk of damage to the locking screws and to the finish of the BIP cover

Only use a flat-bladed screwdriver with a 1/4 in. wide blade to turn the locking screws on the BIP cover. Using a coin or any other tool will damage the slots in the locking screws or may slip and damage the finish of the BIP cover.

Figure 5-22
Removing the BIP cover

PC-16504



—continued—

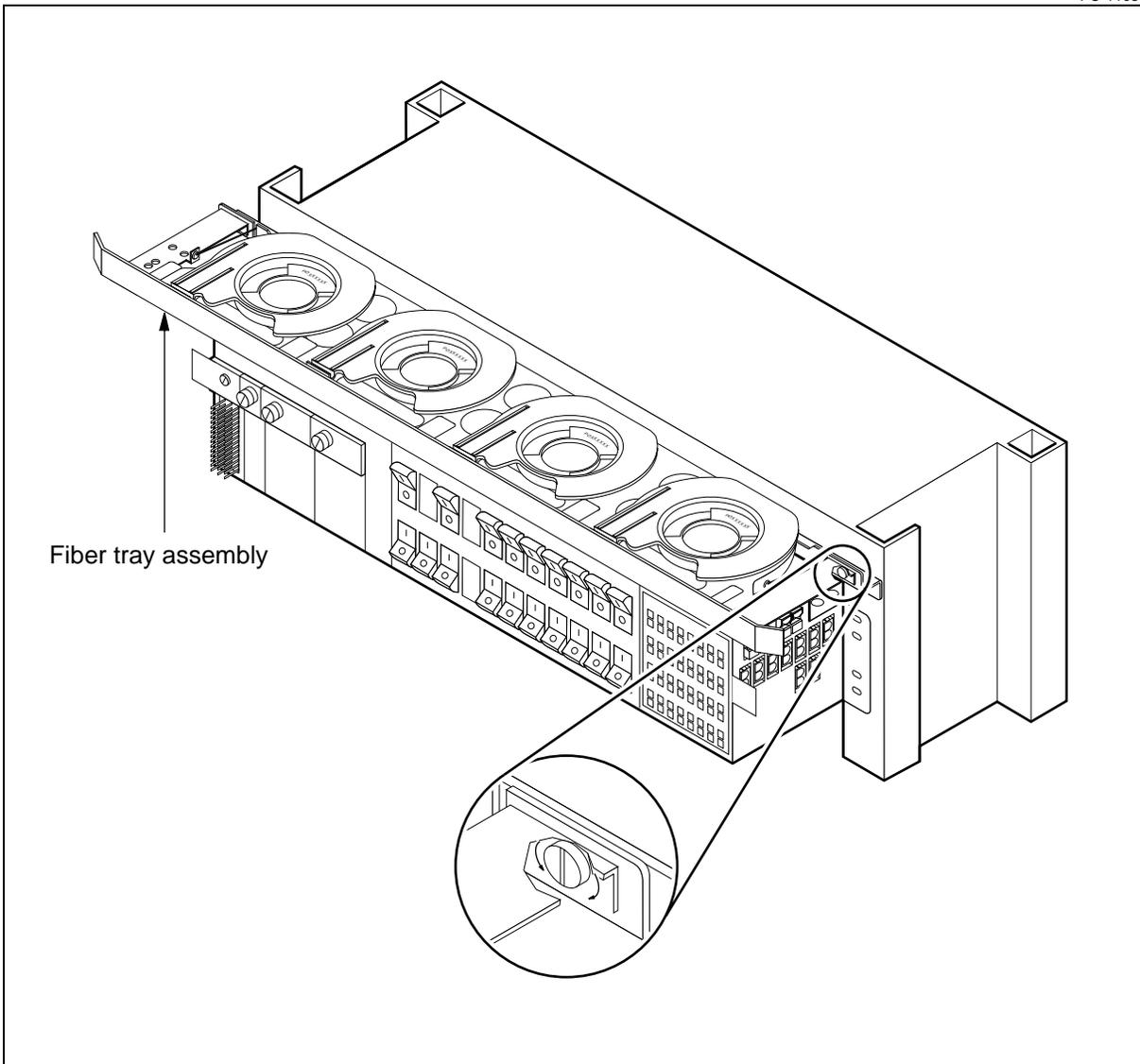
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
3	Release the two fasteners that secure the fiber storage tray assembly to the bay by rotating them 1/4 turn counterclockwise. The locations of these fasteners are shown in Figure 5-23.

Figure 5-23
Locations of the captive fasteners

PC-11034



—continued—

5-64 Installing the external ABM bay cabling

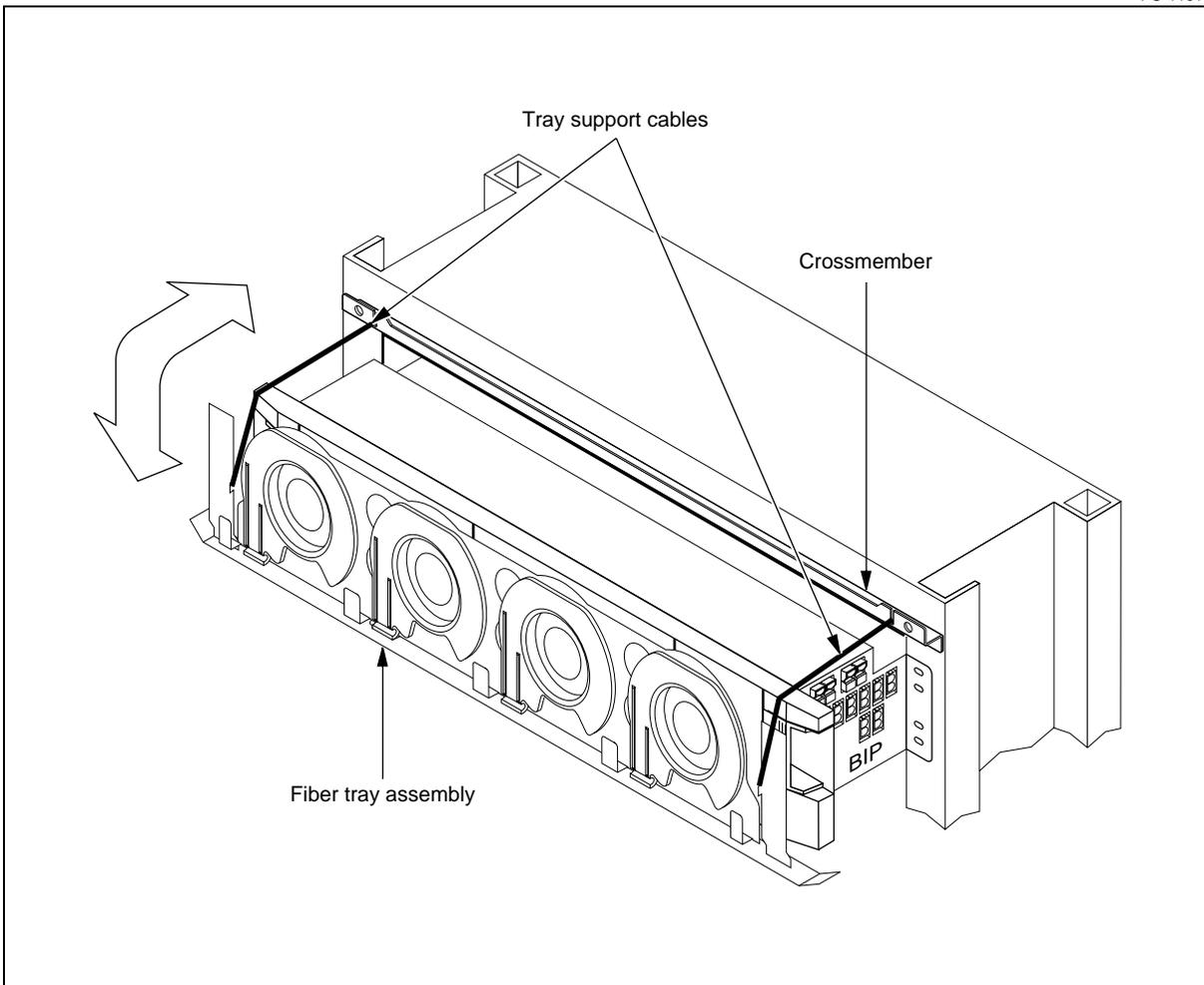
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
4	Reinstall the BIP cover by grasping the latches at each end of the cover, positioning the cover on the BIP, then releasing the latches.
5	Pull the fiber storage tray assembly outward away from the bay, and tilt it downward so that it hangs by its cables, as shown in Figure 5-24.

Figure 5-24
Hanging the fiber storage tray by its cables

PC-11013



—continued—

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density**Step Action**

- 6 Do one of the following:

If you are installing	Then
receive fibers with mVOAs	go to step 7
transmit fibers or receive fibers without mVOAs	go to step 20

- 7 Thread the receive fibers with mVOAs into the left side of the fiber storage tray assembly, through the tray, and out through the right side of the tray, as shown in Figure 5-25 on page 5-66.

**CAUTION****Risk of damage to the fiber patch cords**

Do not over-tighten the fiber cords when threading them in the fiber storage tray assembly and the mVOA storage assembly. They can be damaged if their surface is squeezed, indented, or broken.

- 8 Route the receive fibers with the mVOAs down the right side of the bay to the mVOA storage assembly at the right side of the cooling unit. The location of the mVOA storage assembly is shown in Figure 5-26 on page 5-67.

—continued—

5-66 Installing the external ABM bay cabling

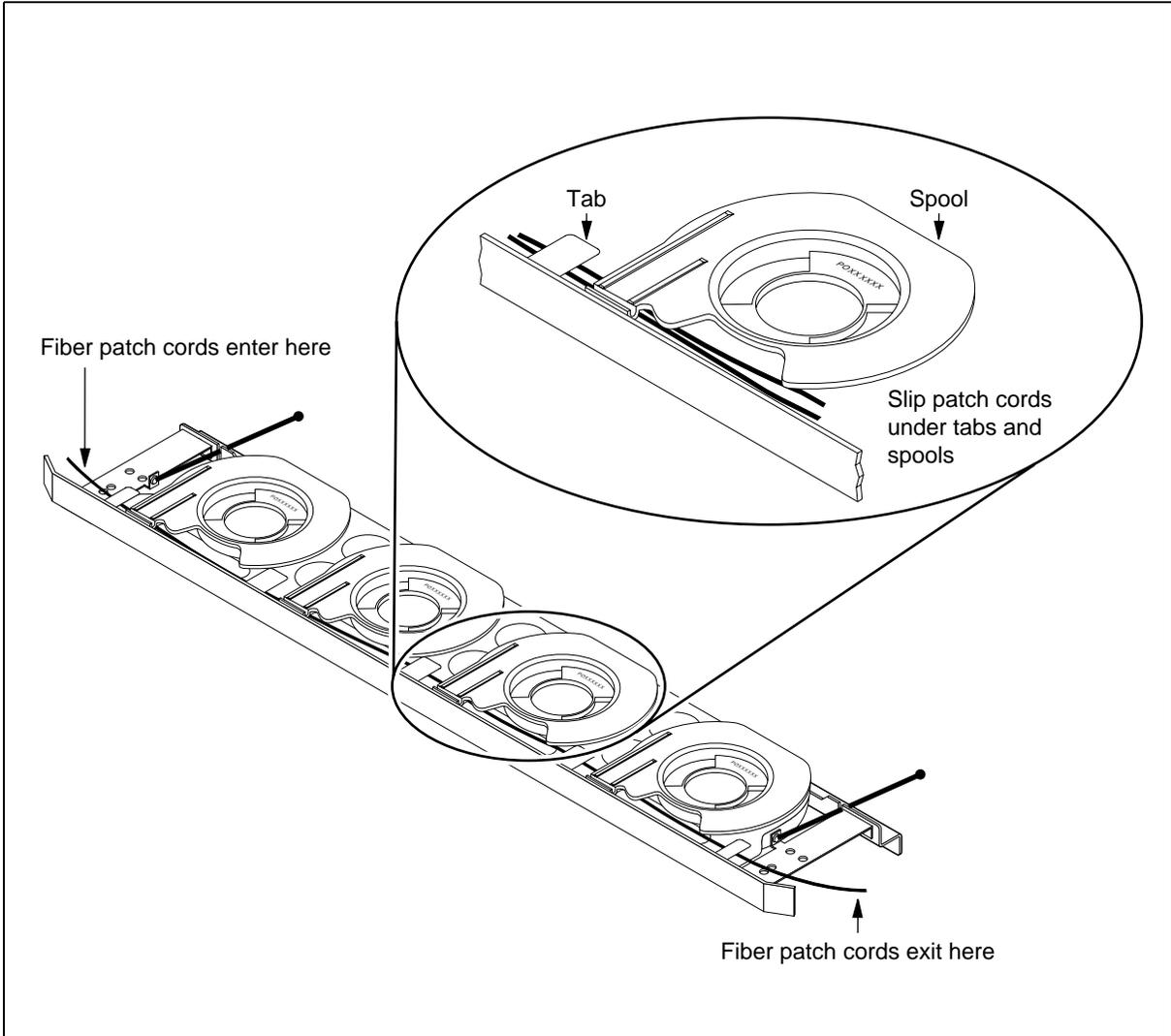
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step Action

Figure 5-25
Threading fibers through the fiber storage tray assembly

PC-11014



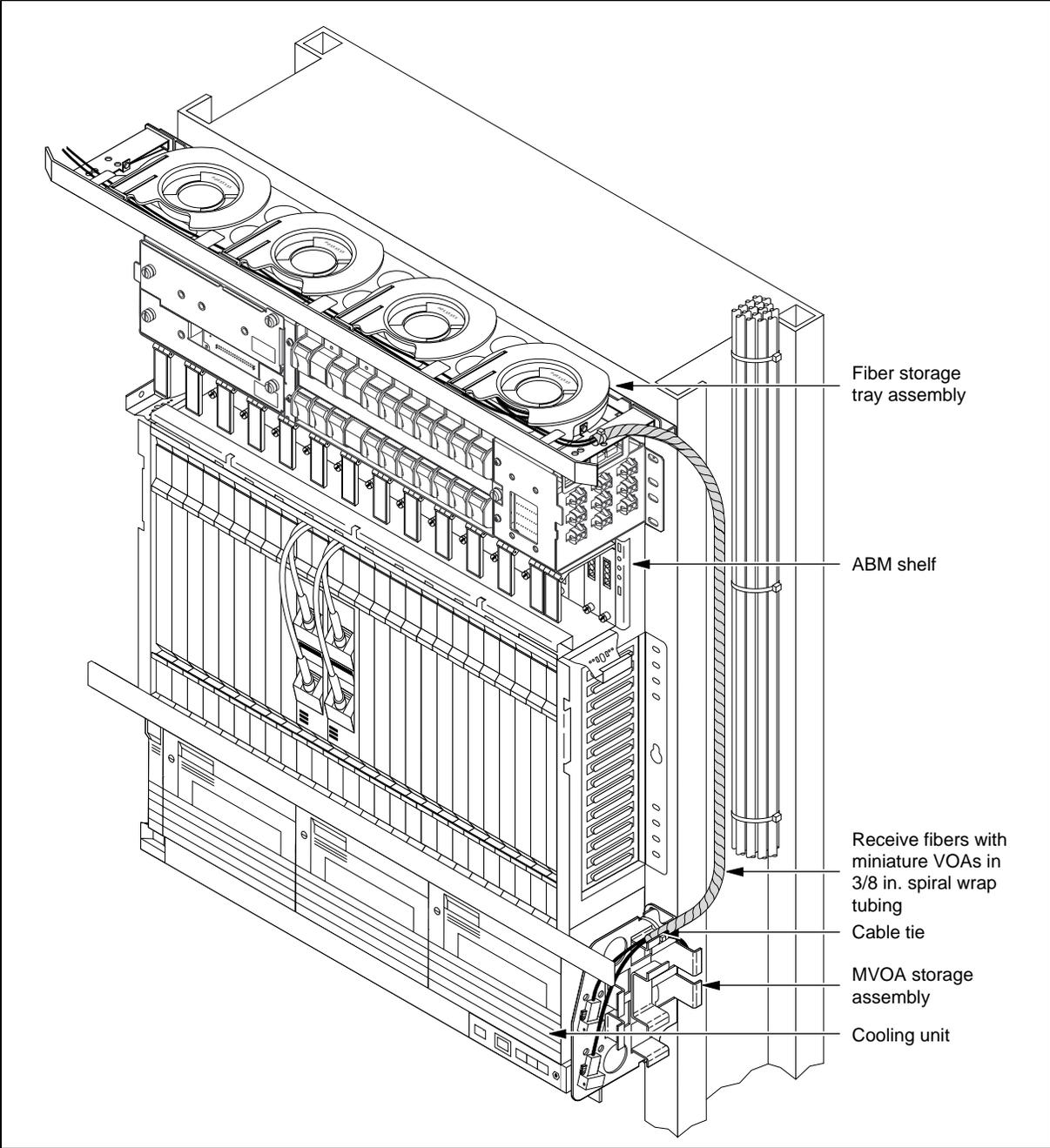
—continued—

Procedure 5-9 (continued)
Installing the fiber patch cords on bays with a low-fiber cable density

Step Action

Figure 5-26
Routing receive fibers with mVOAs from fiber storage tray assembly to the mVOA storage area

PC-16522



—continued—

5-68 Installing the external ABM bay cabling

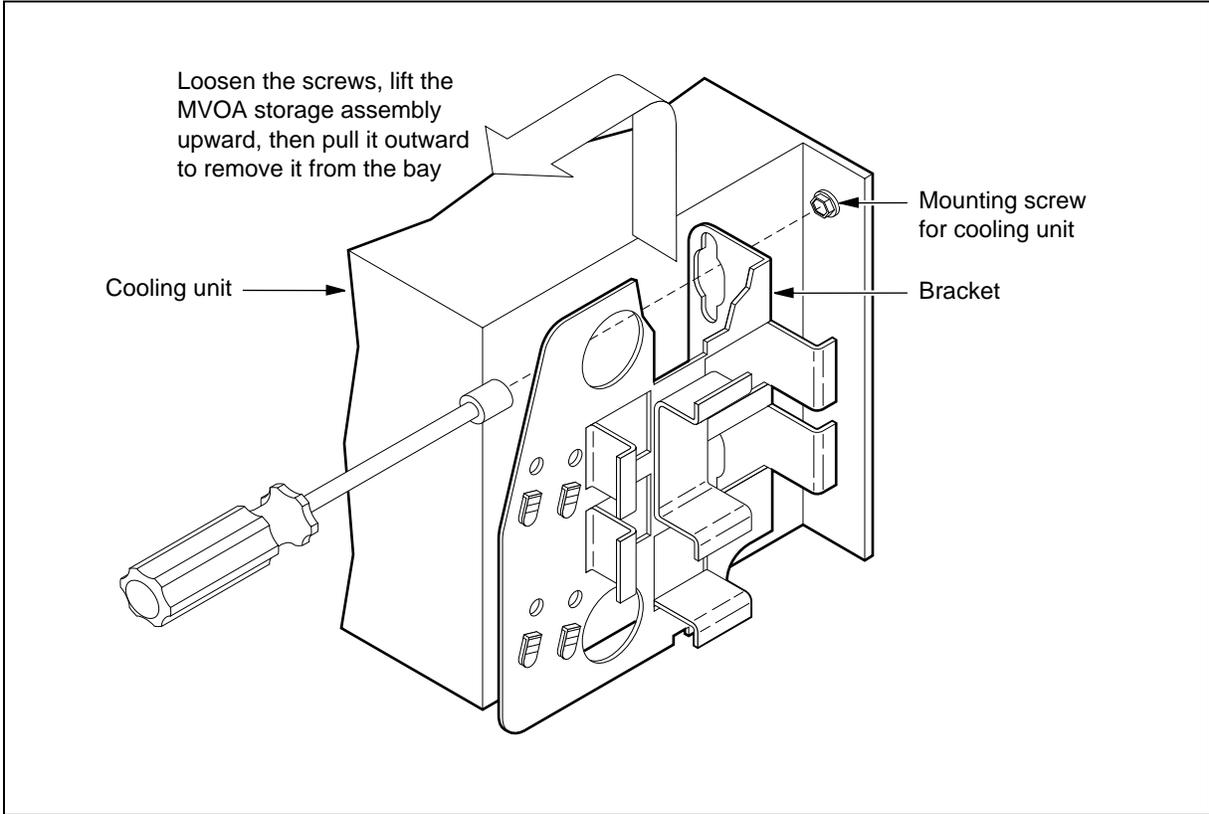
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
9	If another bay is installed at the right side of the bay, remove the mVOA storage assembly by loosening the two hex screws that hold the cooling unit to the bay upright, then lifting the mVOA storage assembly upward and away from the bay, as shown in Figure 5-27.

Figure 5-27
Removing an mVOA storage assembly

PC-11015



—continued—

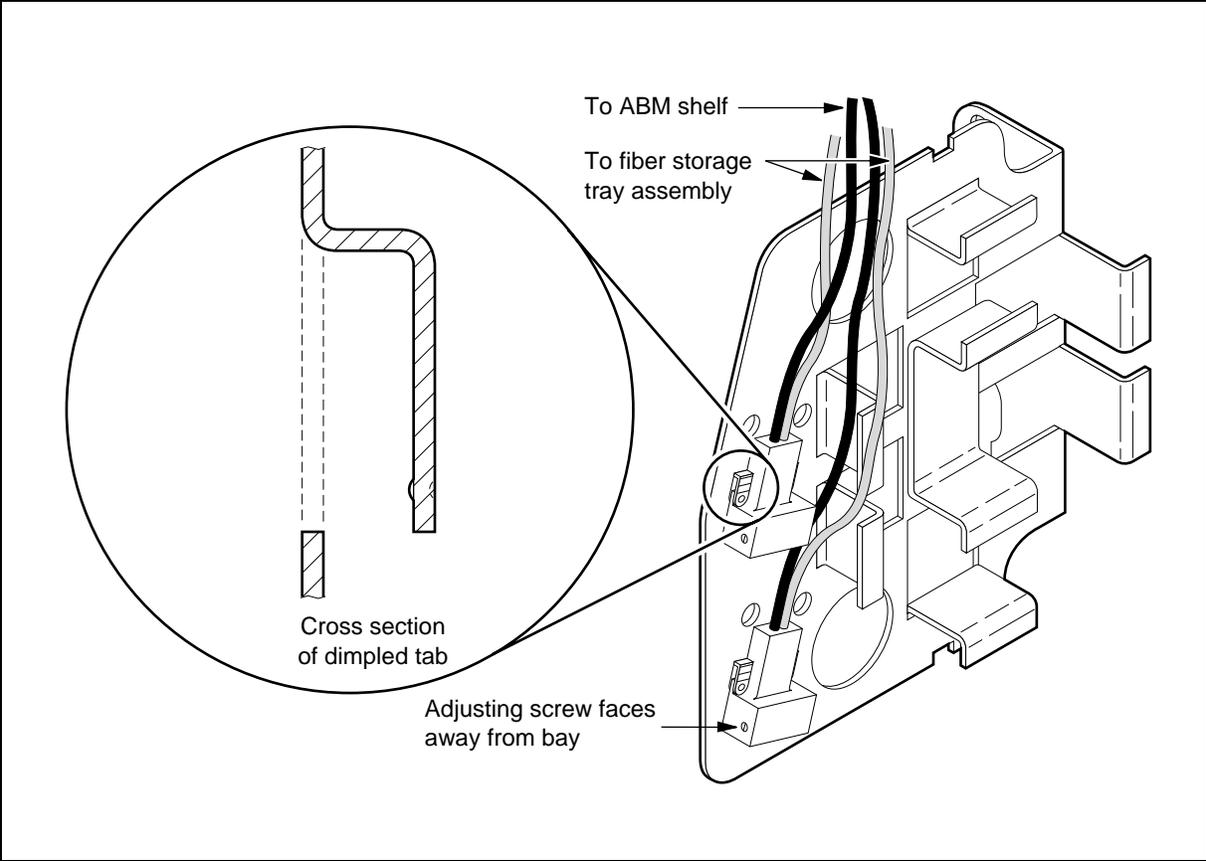
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
10	Insert the mVOAs into the tabs on the mVOA storage assembly, as shown in Figure 5-28.

Figure 5-28
Inserting the mVOAs into the mVOA storage assembly

PC-11016



—continued—

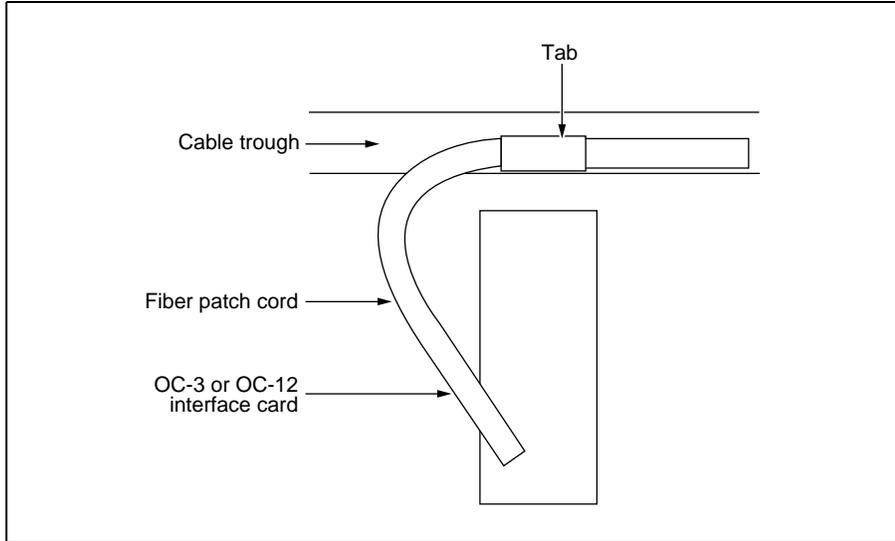
5-70 Installing the external ABM bay cabling

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

- | Step | Action |
|------|--|
| 11 | Route the short ends of the receive fibers equipped with the receive connectors from the mVOA storage assembly up to the right side of the ABM shelf, at the location shown in Figure 5-29 on page 5-71. |
| 12 | Run the receive fibers along the cable trough at the front of the ABM shelf, as shown in Figure 5-29 on page 5-71.
Ensure that each fiber patch cord exits the cable trough to the left of the tab that is located immediately above the OC-3 or OC-12 interface card to which the patch cord connects, as shown in the following figure: |

AX-1019



CAUTION

Risk of damage to the fiber patch cords

Ensure that each fiber patch cord exits the cable trough to the left of the tab that is immediately above the card to which the patch cord connects. If a cord exits the trough to the right of the tab, it may snag and become damaged when an adjacent card is removed.

Also, do not over-tighten the fiber cords when threading them in the mVOA storage assembly—they can be damaged if their surface is squeezed, indented, or broken.

- 13 Hang the receive connectors out of the trough at the intended locations in front of the OC-3 or OC-12 interface card slots assigned.

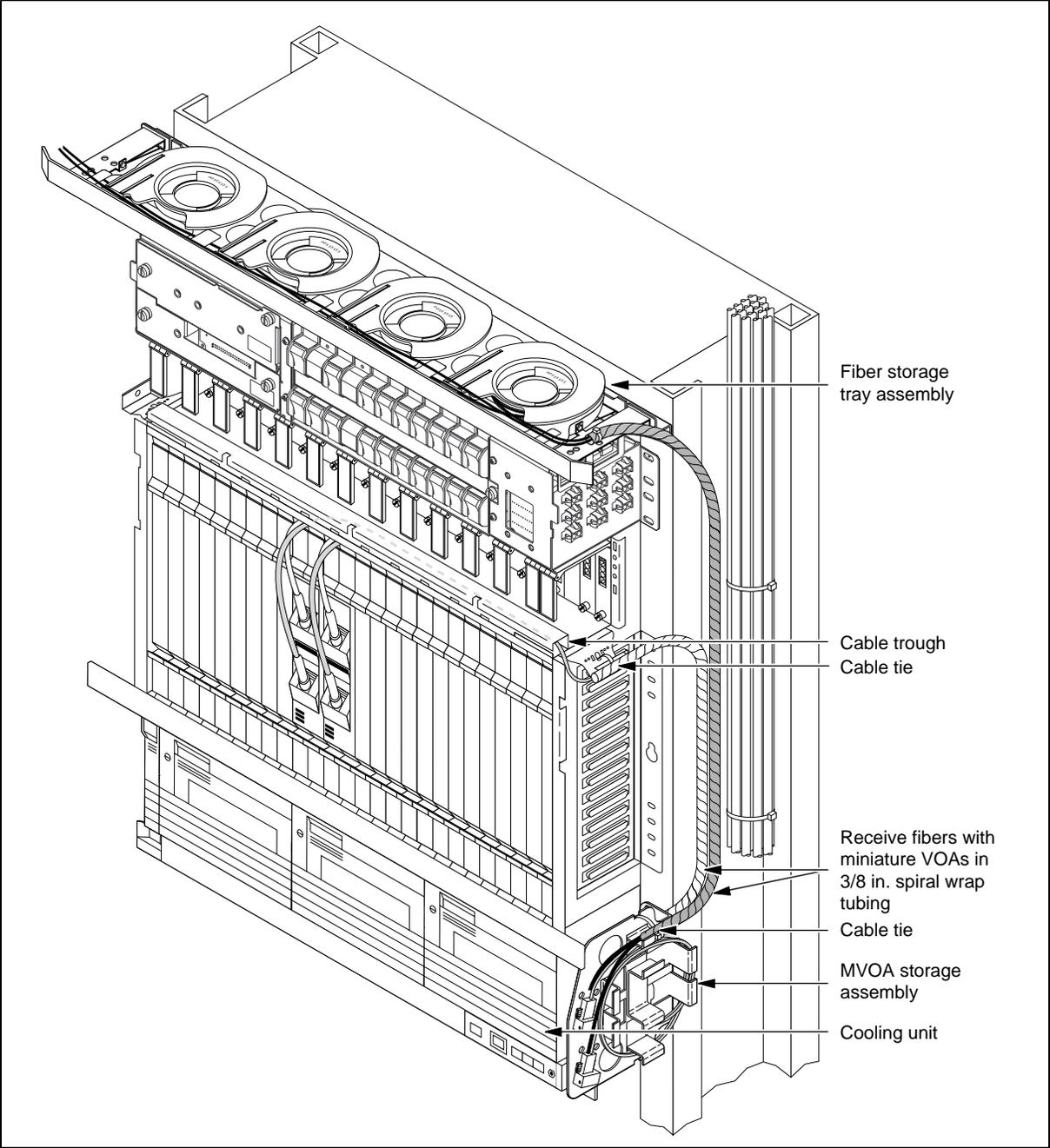
—continued—

Procedure 5-9 (continued)
Installing the fiber patch cords on bays with a low-fiber cable density

Step Action

Figure 5-29
Routing receive fibers from the mVOA storage assembly up to the ABM shelf

PC-16523



—continued—

5-72 Installing the external ABM bay cabling

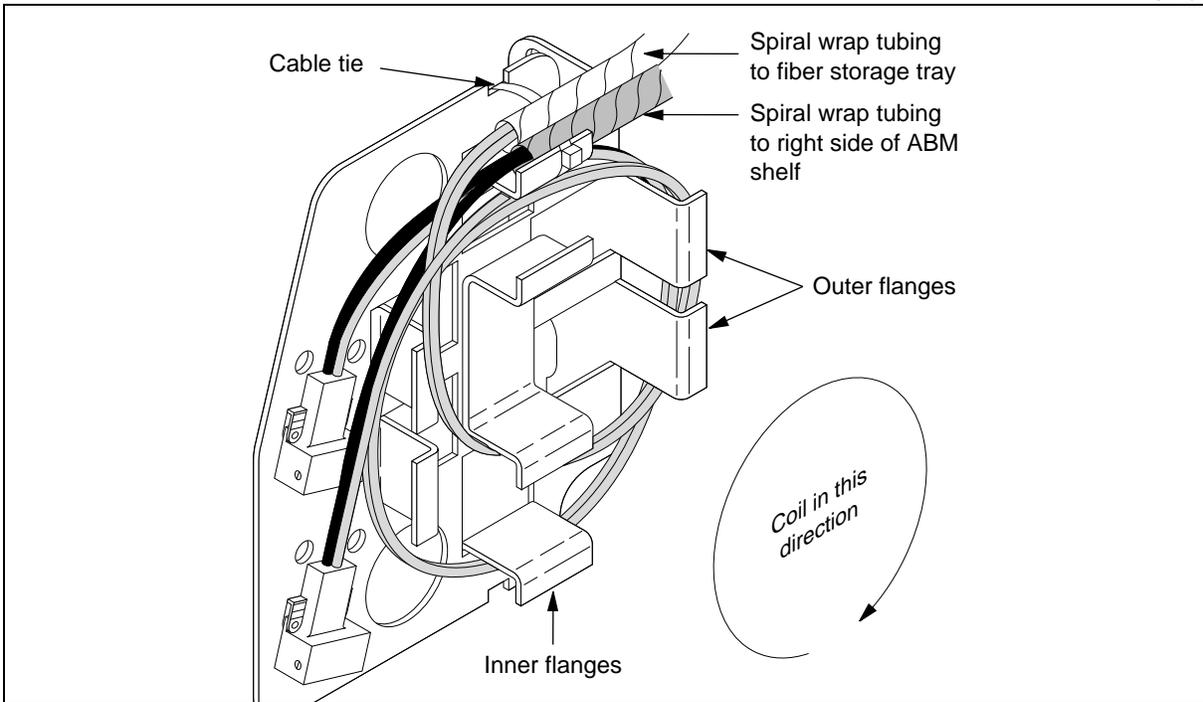
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
14	Adjust the length of the fibers that run from the mVOA storage assembly to the ABM shelf by coiling excess fiber around the flanges of the mVOA storage assembly, as shown in Figure 5-30. Wind the fibers around the outer flanges first. If there is still some fiber left over when you are done, but not enough to complete a full turn around the outer flanges, wind the excess slack around the inner flanges.
15	Cut a 0.5 m (19 in.) length and a 0.3 m (12 in.) length of spiral wrap tubing.
16	Wrap the 0.3 m (12 in.) length of spiral wrap tubing around the receive fibers that run from the mVOA storage assembly to the ABM shelf. Note: Do not secure the spiral wrap tubing at this point in the procedure.
17	Dress the spiral wrap tubing that runs from the mVOA storage assembly to the ABM shelf into the right bay upright (see Figure 5-29 on page 5-71).
18	If you remove the MVO storage assembly in step 9, reinstall the mVOA storage assembly now.
19	Dress the spiral wrap tubing that runs from the fiber storage tray assembly to the mVOA storage assembly into the right bay upright, as shown in Figure 5-29 on page 5-71, and cut off any excess spiral wrap tubing.

Figure 5-30
Coiling up excess receive fiber

PC-11017



—continued—

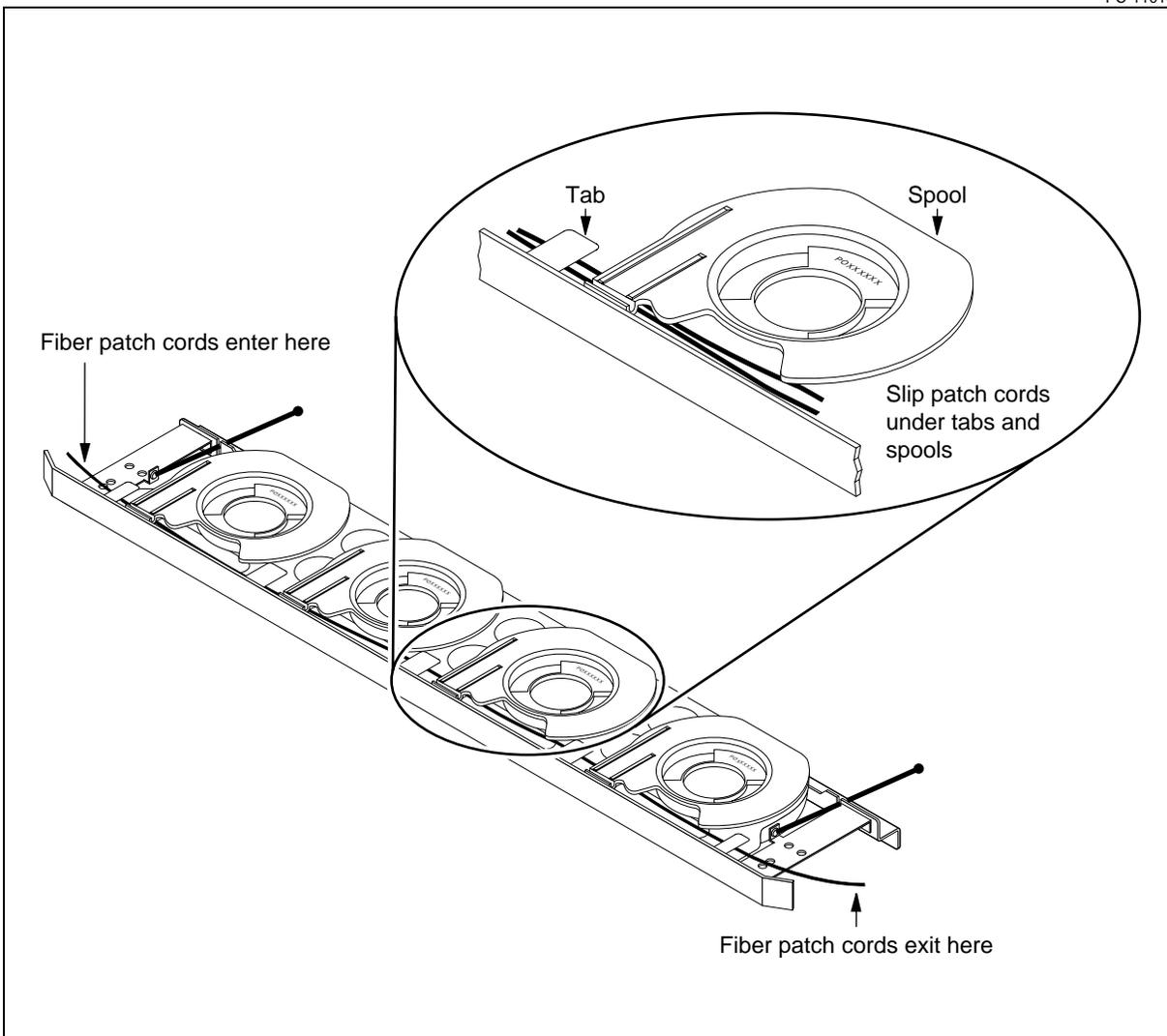
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
20	Thread the transmit fibers (and any receive fibers without mVOAs) into the left side of the fiber storage tray assembly, through the storage tray, and out through the right side of the tray as shown in Figure 5-31.

Figure 5-31
Threading fibers through the fiber storage tray assembly

PC-11014



—continued—

5-74 Installing the external ABM bay cabling

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step Action



CAUTION

Risk of damage to the fiber patch cords

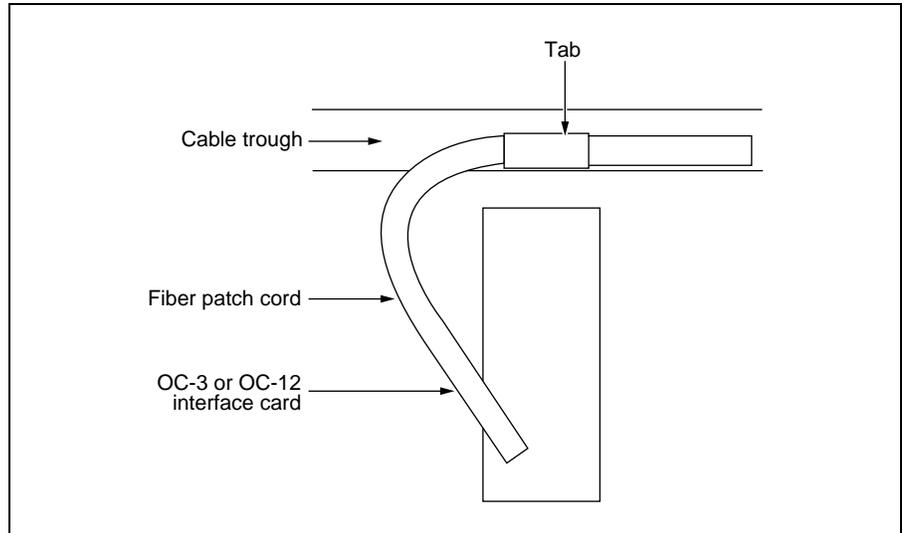
Do not over-tighten the fiber cords—they can be damaged if their surface is squeezed, indented, or broken.

21 Route the fibers down the right side of the bay to the ABM shelf, as shown in Figure 5-32 on page 5-75.

22 Run the fibers along the cable trough at the front of the ABM shelf, as shown in Figure 5-32 on page 5-75.

Ensure that each fiber patch cord exits the cable trough to the left of the tab that is located immediately above the OC-3 or OC-12 interface card to which the patch cord connects, as shown in the following figure:

AX-1019



CAUTION

Risk of damage to fiber patch cords

Ensure that each fiber patch cord exits the cable trough to the left of the tab that is immediately above the card to which the patch cord connects. If a cord exits the trough to the right of the tab, it may snag and become damaged when an adjacent card is removed.

—continued—

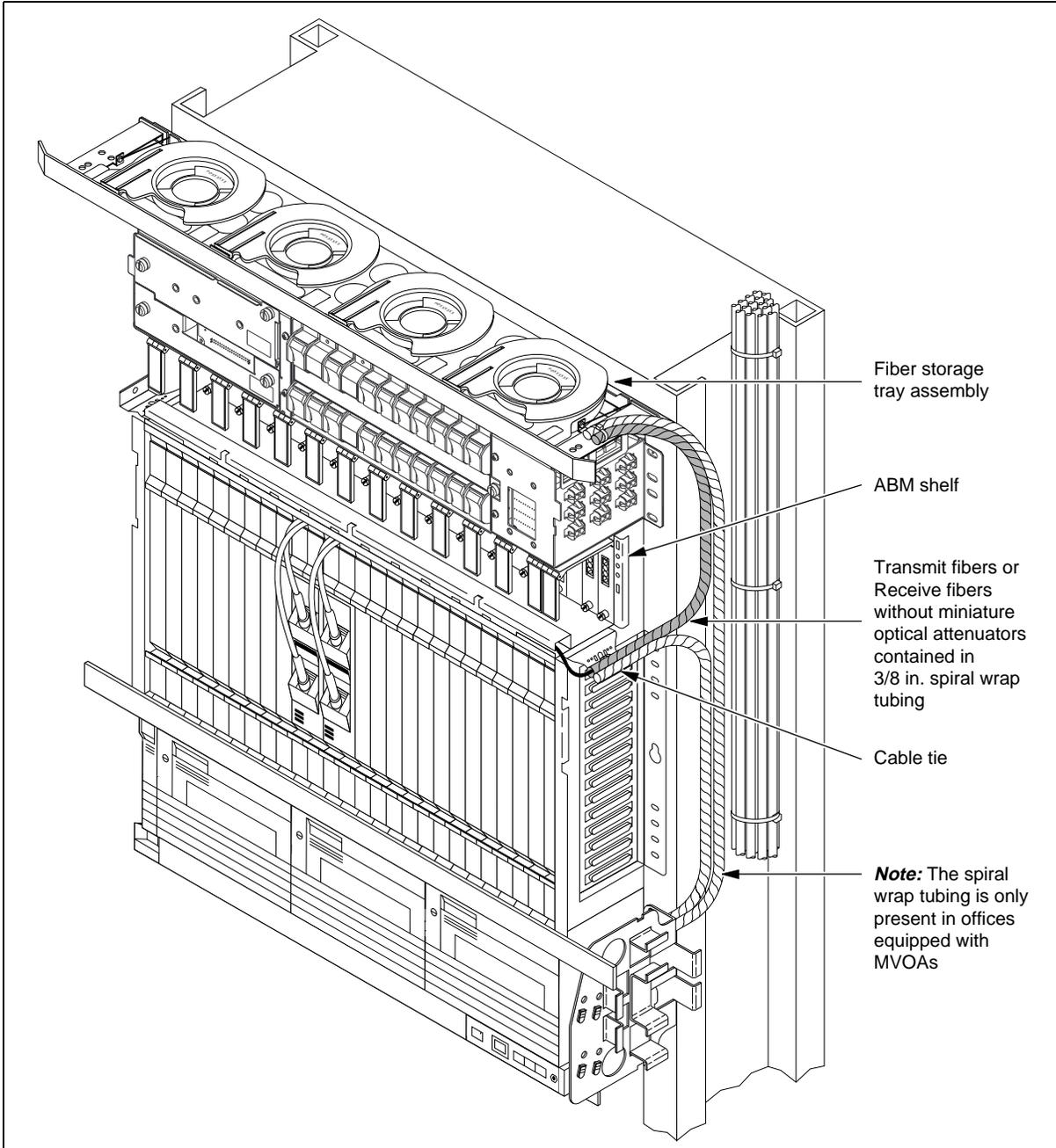
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step Action

Figure 5-32
Routing transmit fibers (and receive fibers without mVOAs) from the fiber storage tray assembly to the ABM shelf

PC-11023



—continued—

5-76 Installing the external ABM bay cabling

Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
23	Cut a 0.6 m (20 in.) length of spiral wrap tubing.
24	Enclose the fibers that run from the ABM shelf to the fiber storage tray assembly in the spiral wrap tubing.
25	Secure the spiral wrap tubing from the fiber storage tray shelf, and any spiral wrap tubing from the mVOA storage assembly to the right side of the ABM shelf by means of a cable tie, as shown in Figure 5-32 on page 5-75.
26	Dress the spiral wrap tubing that runs from the ABM shelf to the fiber storage tray assembly into the right bay upright, as shown in Figure 5-32 on page 5-75, and cut off any excess spiral wrap tubing. Ensure that the bend radius of the tubing and the fibers remains greater than 76 mm (3 in.) when dressing the spiral wrap tubing.

—continued—

Procedure 5-9 (continued)

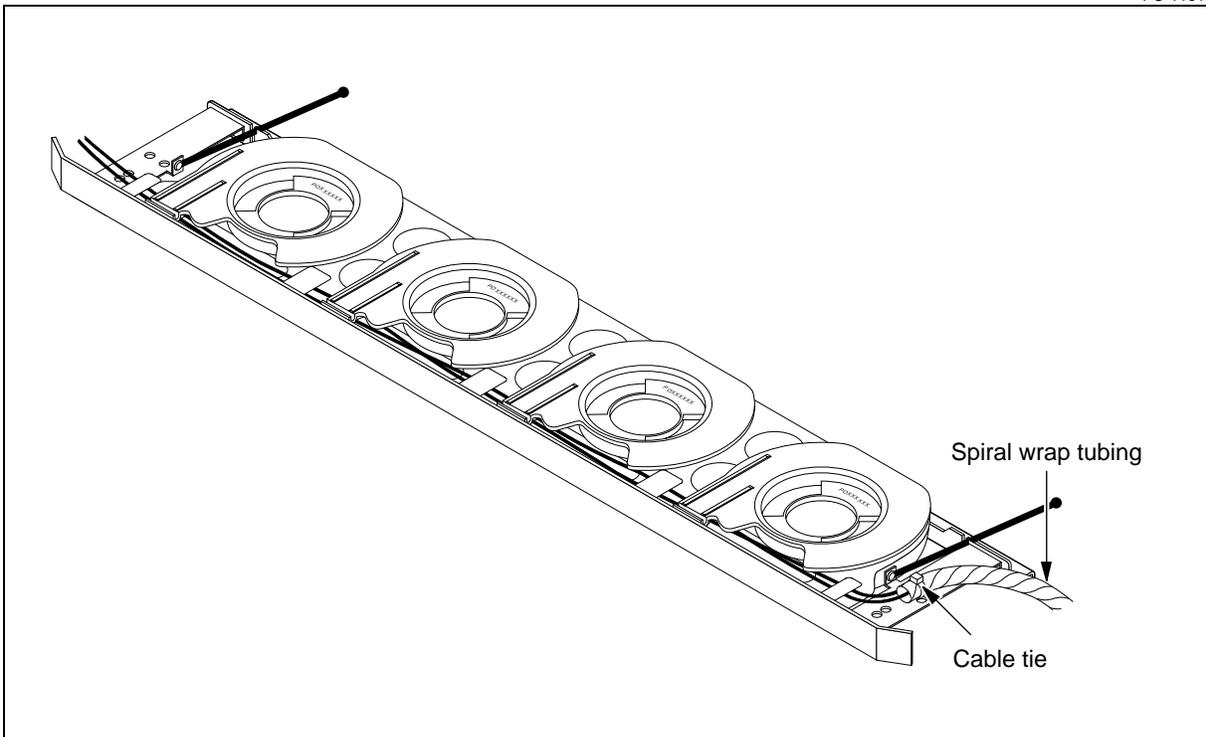
Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
27	Using a cable tie, secure the spiral wrap tubing from the ABM shelf and any spiral wrap tubing from the mVOA storage assembly to the right side of the fiber storage tray assembly, as shown in Figure 5-33.

Figure 5-33

Securing the spiral wrap tubing to the right side of the fiber storage tray assembly

PC-11018



Note: This illustration shows only one piece of spiral wrap tubing entering the right side of the fiber storage tray assembly. If fiber patch cords with mVOAs are connected to the ABM shelf, two pieces of tubing will enter the right side of the fiber storage tray assembly. Secure both pieces of tubing side-by-side using the same cable tie.

—continued—

5-78 Installing the external ABM bay cabling

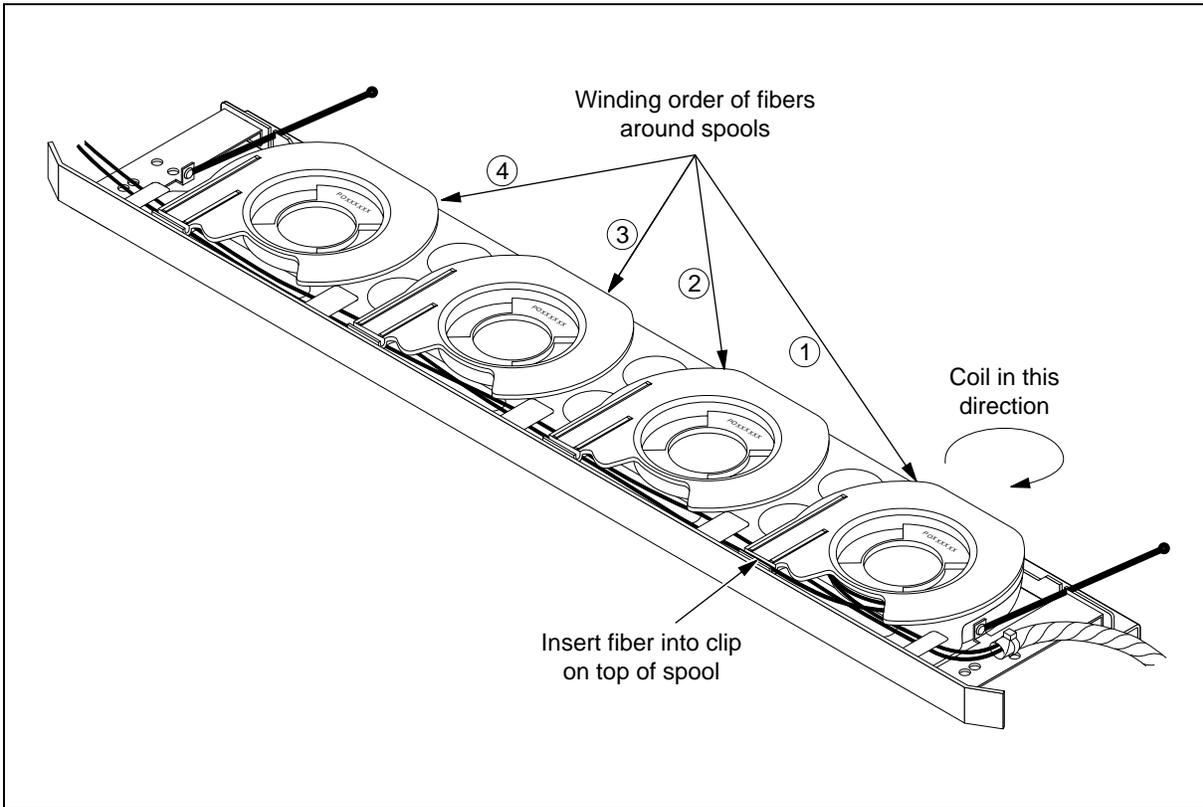
Procedure 5-9 (continued)

Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
28	Coil the excess fibers around the spools in the fiber storage tray assembly, as shown in Figure 5-34. Wind the first fiber around the rightmost spool, the second fiber around the spool immediately to its left, and so on.
29	As the fiber exits the left side of each spool, clip it into the built-in cable clamp in the upper flange of the spool.
30	Route the fiber patch cords from the left side of the fiber storage tray assembly up into the overhead cable rack assembly.
31	Enclose the fibers from the left side of the fiber storage tray assembly in spiral wrap tubing. The tubing must extend at least 0.5 m (18 in.) up into the overhead cable rack.

Figure 5-34
Coiling excess fiber around the spools in the fiber storage tray assembly

PC-11019



—continued—

Procedure 5-9 (continued)

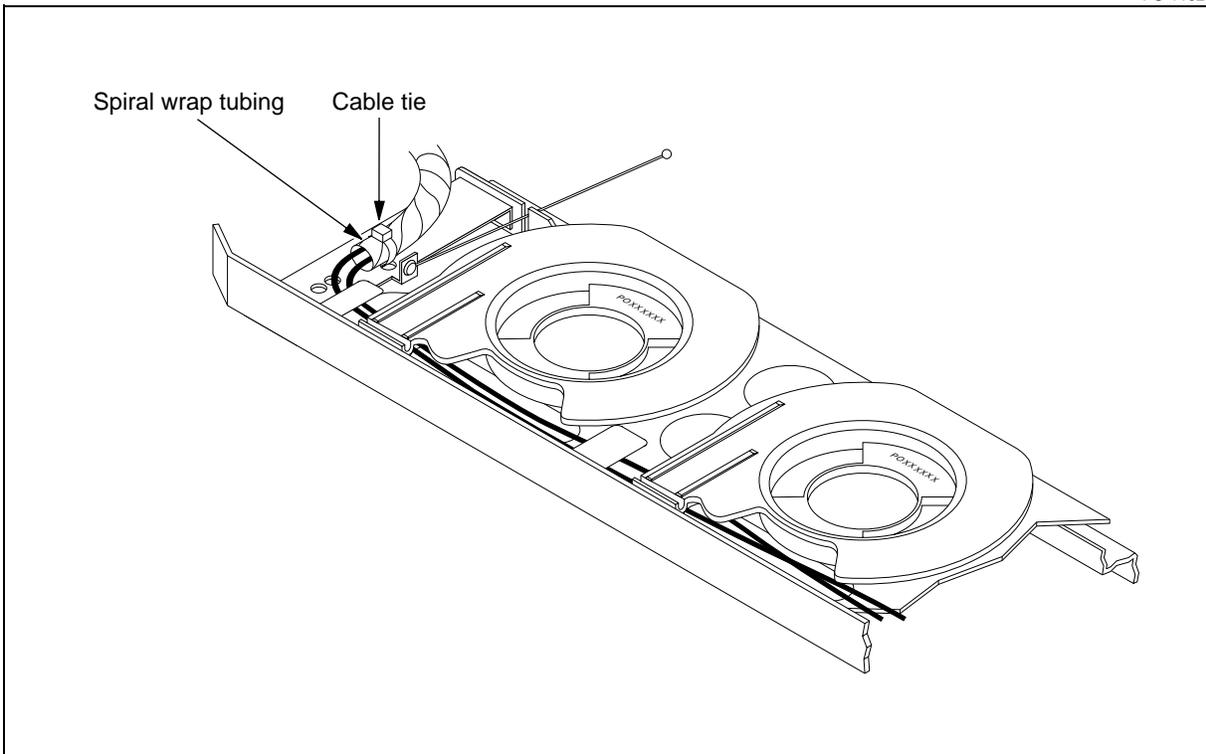
Installing the fiber patch cords on bays with a low-fiber cable density

Step	Action
32	Attach the spiral wrap tubing to the left side of the fiber storage tray assembly with a cable tie, as shown in Figure 5-35.
33	Attach the spiral wrap tubing to the overhead cable rack with cable ties.
34	Protect the patch cords along their entire length by means of spiral wrap tubing, plastic ducting, or the method specified by your operating company.
35	Lift the fiber storage tray up into position on top of the BIP.
36	Remove the BIP cover.
37	Secure the fiber storage tray assembly to the bay by inserting the captive fasteners on the assembly into the cross member, and by turning the fasteners 1/4 turn in the clockwise direction.
38	Reinstall the BIP cover.
39	Secure the BIP cover to the BIP by turning the locking screws on the BIP cover so that the dots on the locking screws and the dots on the cover are offset from one another.

Figure 5-35

Attaching the spiral wrap tubing to the left side of the fiber storage tray assembly

PC-11020



—end—

Procedure 5-10 Installing the fiber management storage tray and routing the fiber cables to the ABM

The fiber management storage tray (NT7E58AC) is used when more than eight fiber patch cords must be routed to an ABM shelf. This tray holds a maximum of 20 fiber cables, 10 of which may have miniature variable-optical attenuators (mVOA). The design of the tray makes each fiber patch cord accessible for rerouting or replacement, while minimizing the risk of disruption of traffic.

Note: The fiber management storage tray (NT7E58AC) cannot be installed in an ABM bay and must be installed in the top of an adjacent bay. If the OC-3 circuit pack is in slots 1 through 11 the adjacent bay must be on the left side of the ABM bay. If the OC-3 circuit pack is in slots 11 through 21 the adjacent bay must be on the right side of the ABM bay.

The storage tray is contained in a pull-out drawer that tilts down for easy access. The tray houses five stacks of spindles. Each stack consists of four fiber reels mounted on a spindle, and each reel can store up to 2.8 meters of slack fiber.

This procedure details the steps required to install a fiber management storage tray, how to route the fiber patch cords to and from the tray, and to and from the shelves. Circuit packs are installed later according to *Commissioning and Testing*, Volume 3.

For installations in which there are short distances between terminals, variable optical attenuators are required at the receive ends of the OC-3 optical interfaces. When variable optical attenuators are required, they are installed in holders located in the fiber management storage tray in the adjacent bay. For instructions to determine when variable attenuators are required, refer to *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

—continued—

Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

Requirements

You need the following tools and materials:

- wire cutters (flush-cutting)
- flathead screwdriver
- cable ties
- fiber management storage tray (NT7E58AC)



CAUTION

Risk of damaging fiber patch cords

Handle fiber patch cords with care. Optical connections to the optical units should be finger-tightened only.



CAUTION

Risk of damaging fiber patch cords

Observe a minimum bending diameter of 76 mm (3 in.) at all times when bending fibers.

Action

Step	Action
1	Label all fiber connectors and mVOAs (if mVOAs are required).
2	Install the fiber management storage tray in the top of a bay adjacent to the ABM bay. Secure it with the screws provided with the tray.
3	Run the office fiber patch cords from the overhead cable rack down the sides of the adjacent bay to the fiber management storage tray.
4	Slide the fiber management storage tray as far to the front as possible.
5	Raise the flip-top cover on the tray. Figure 5-36 on page 5-82 shows the fiber management storage tray.
6	Lower the tray to a working angle by simultaneously pressing on the two release tabs located at the sides and underneath the tray.

—continued—

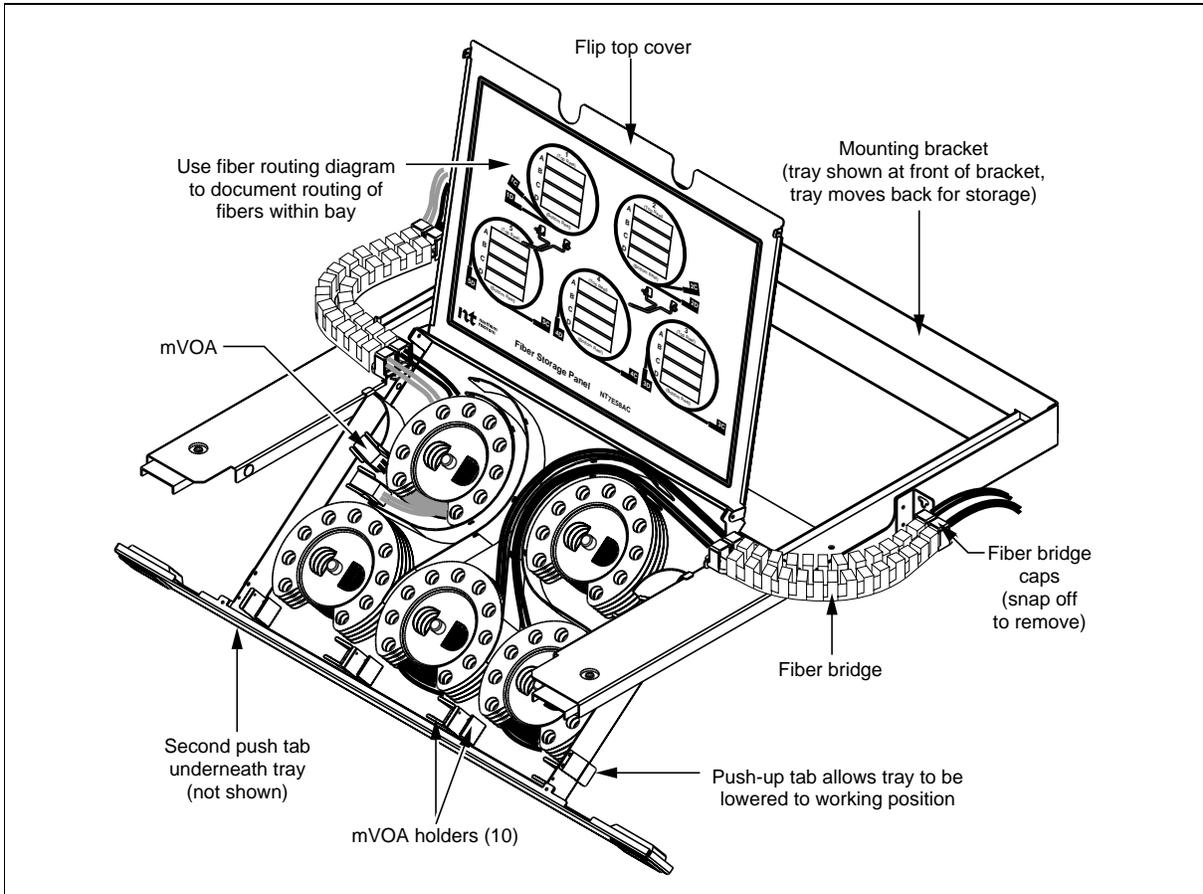
Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

Step	Action
7	Select the reel on which the fiber patch cord will be stored and the fiber bridge(s) through which the fiber patch cord will enter the tray. Receive fiber patch cords with mVOAs must be stored on the reels nearest to the adjacent bay. Note: Fiber patch cords that are stored on reels in reel stacks 2 and 3 must enter and exit the tray through the fiber bridges at the right of the tray. Fiber patch cords that are stored on reels in reel stacks 1 and 5 must enter and exit the tray through the fiber bridges at the left of the tray. Fiber patch cords that are stored on reels in reel stack 4 may enter the tray through a bridge on one side of the tray and exit the tray through a bridge on the other side of the tray.
8	Use a miniature flathead screw driver to pop open each of the caps on the selected bridge.

Figure 5-36
Fiber management storage tray

PC-3013



—continued—

Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

- | Step | Action |
|------|--|
| 9 | Remove the reel on which the fiber is to be stored; see Figure 5-37 on page 5-84. To do this, unscrew the thumbscrew attached to the top reel in the stack. This provides access to all of the reels in the stack. |

**CAUTION****Risk of damaging fiber patch cords**

Handle fiber patch cords with care. Observe a minimum bending diameter of 76 mm (3 in.) at all times when handling optical fiber patch cords.

- | | |
|----|--|
| 10 | Remove the desired reel and gently wind the slack fiber patch cord around the reel, leaving adequate length to pass around the fiber guides and fiber bridge.

If the fiber patch cord contains an mVOA, wind both fiber patch cords from the mVOA around the reel simultaneously.

Note: When unwinding fiber patch cord from a reel, proceed with caution since it is possible for the fiber patch cord to bind in the reel and exceed the minimum bend radius. |
| 11 | Replace the reel on the spindle and make sure the top reel is secured to the spindle with the thumbscrew. If the fiber patch cord contains an mVOA, snap it into one of the two mVOA holders located beside each stack. |
| 12 | Gently route the excess patch cord along the guides and the fiber bridge. |
| 13 | Replace the bridge caps. |
| 14 | Update the fiber routing diagram located on the inside of the fiber management storage tray flip-top cover. This diagram should always show the current routing of fiber patch cords within the tray. |

If	Then
more fiber patch cords are to be added	repeat steps 7 through 14
no more fiber patch cords are to be added, rerouted, or removed	go to step 15

- | | |
|----|--|
| 15 | Close the flip top cover, raise the tray in to the horizontal position, and push the tray to the back of the cabinet. |
| 16 | Enclose all of the fiber patch cords in split flexible tubing. |
| 17 | Run the fiber patch cords from the fiber management storage tray up the side of the adjacent bay nearest to the ABM bay. Continue to the overhead cable rack through flexible tubing conduit to the ABM bay. |

—continued—

5-84 Installing the external ABM bay cabling

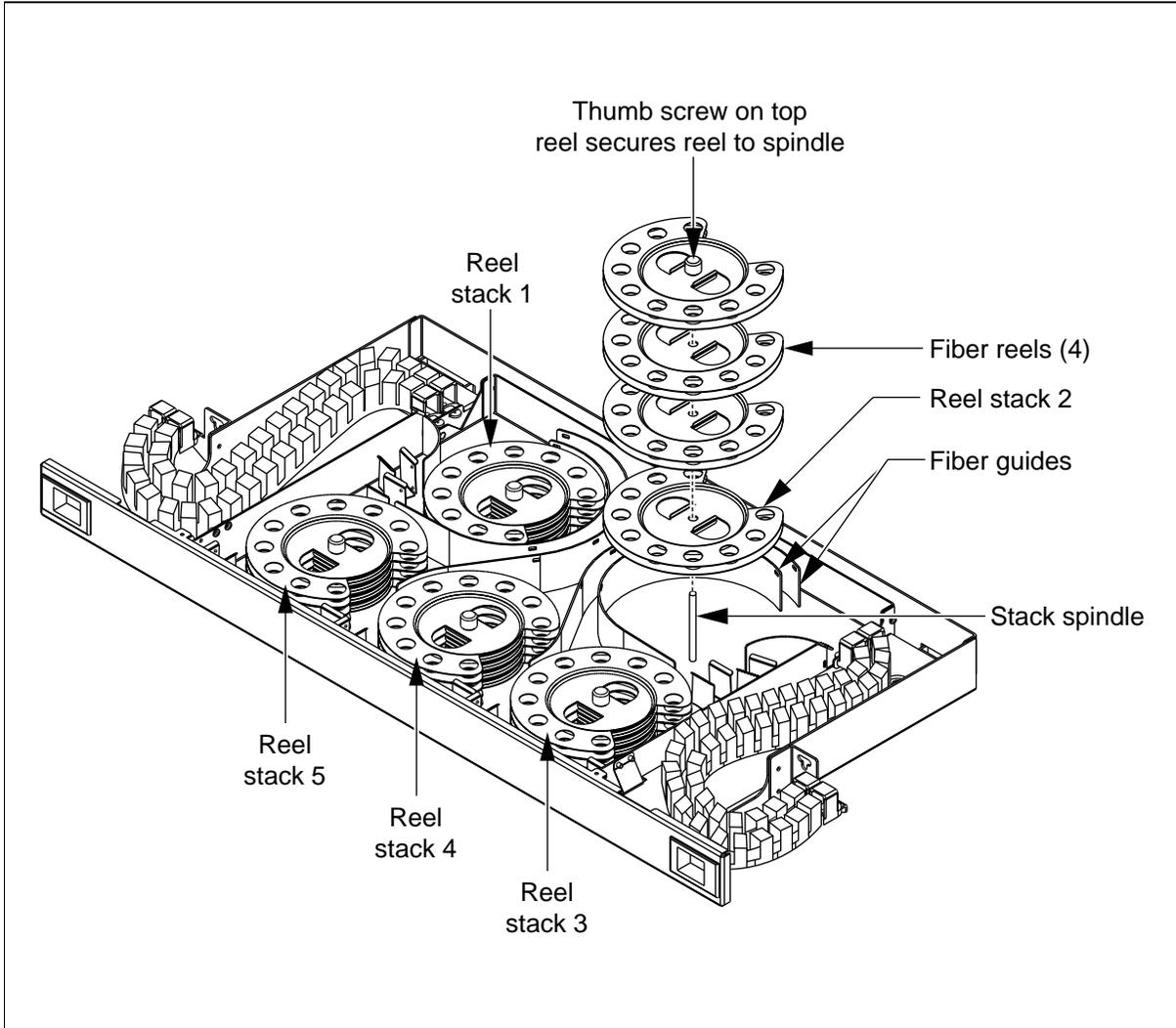
Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

Step Action

Figure 5-37
The fiber management storage tray: stacking reels

PC-3014



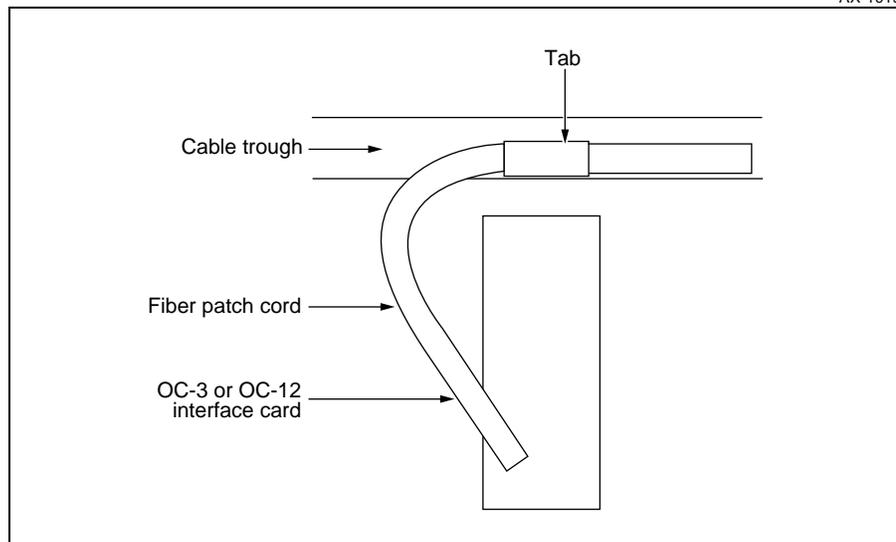
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Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

- | Step | Action |
|------|---|
| 18 | Route the split flexible tubing down the side nearest to the ABM bay. Stop the split flexible tubing 127 mm (5 in.) above the ABM shelf and encase the fiber in spiral wrap tubing where it attaches to the ABM shelf.
Note: Any subsequent cabling should be done with the utmost care to avoid damage to these fiber patch cords. |
| 19 | Run the fiber patch cords along the cable trough at the front of the ABM shelf, as shown in Figure 5-38 on page 5-87.
Ensure that each fiber patch cord exits the cable trough to the left of the tab that is located immediately above the OC-3 interface card to which the patch cord connects, as shown in the following figure: |

AX-1019

**CAUTION****Risk of damage to the fiber patch cords**

Ensure that each fiber patch cord exits the cable trough to the left of the tab that is immediately above the card to which the patch cord connects. If a cord exits the trough to the right of the tab, it may snag and become damaged when an adjacent card is removed.

Also, do not over-tighten the fiber cords when threading them in the mVOA storage assembly—they can be damaged if their surface is squeezed, indented, or broken.

—continued—

5-86 Installing the external ABM bay cabling

Procedure 5-10 (continued)

Installing the fiber management storage tray and routing the fiber cables to the ABM

Step	Action
20	Hang the receive connectors out of the trough at the intended locations in front of the OC-3 or OC-12 interface card slots assigned.
21	Fasten the flexible tubing conduit to the frame uprights using cable ties. Note: The flexible tubing conduit and fiber patch cords must be placed on the bay uprights in such a way that they are easily accessible even after all patch cords have been run and secured.

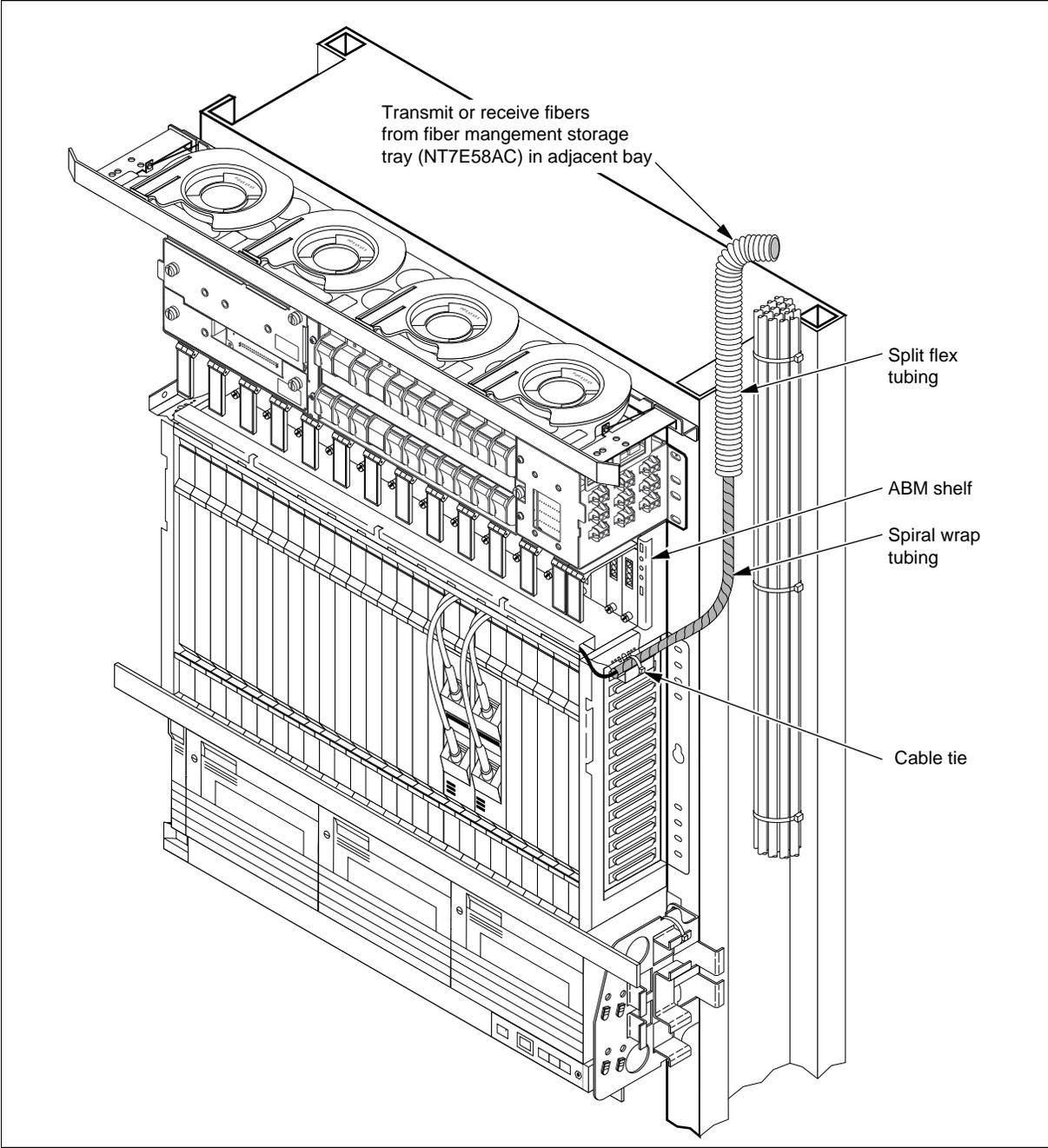
—continued—

Procedure 5-10 (continued)
Installing the fiber management storage tray and routing the fiber cables to the ABM

Step Action

Figure 5-38
Routing the fiber patch cords from the adjacent bay to the ABM shelf

PC-16525

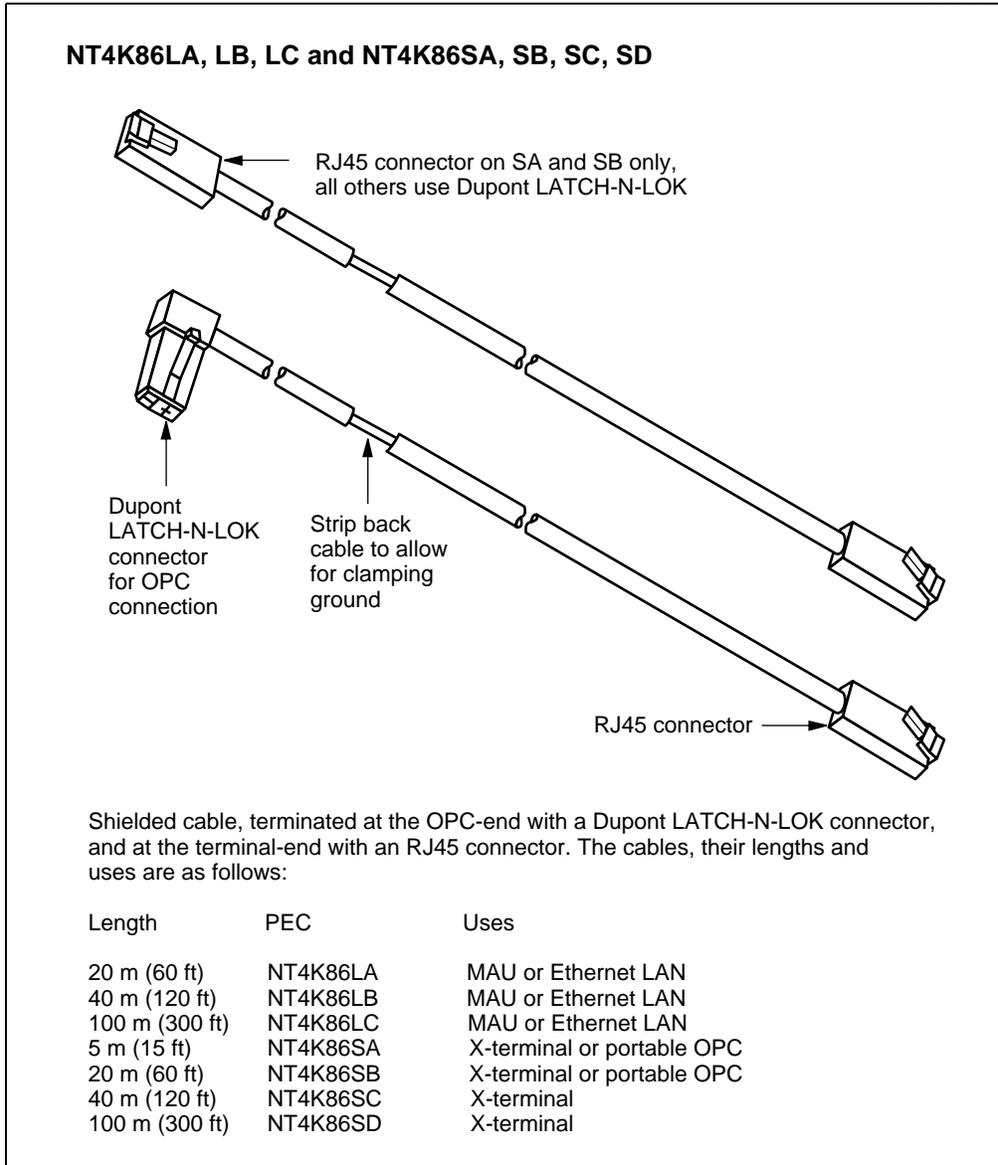


—end—

Procedure 5-11 Installing the OPC Ethernet cable kit

Use this procedure to install the OPC Ethernet cable kit assembly from the connector on the faceplate of the operations controller (OPC) module, to an Ethernet hub, an X-terminal, a MAU, or a portable OPC. The OPC module is installed in *Commissioning and Testing*, Volume 3. Figure 5-39 on page 5-91 shows the OPC module installed for placement only.

PC-10348



—continued—

 Procedure 5-11 (continued)

Installing the OPC Ethernet cable kit

Note: To meet noise and ground current requirements, only connect OPC cables between equipment that is bonded to the same ground point.

Requirement

You need the following tools and materials:

- marker pen
- steel rule
- surgical knife, Exacto, or equivalent
- screwdriver, stubby, flat-bladed, 1/8 in. blade with screw-holder blades (see note)
- cable ties

Note: We recommend the use of a screwdriver with screw-holder blades so that one person can install the grounding clamp. However, if a screwdriver with these blades is not available, two people will be required: one to position the cable and the clamp, and another to insert and tighten the screws.

Action

Step	Action
------	--------

- | | |
|---|---|
| 1 | Measure back from the Dupont LATCH-N-LOCK connector-end of the cable (end of cable with right-angle connector), one of the distances in the following table and mark the cable at that point with the marker pen. |
|---|---|

Slots spanned by the OPC card	Measure back a distance of
1 through 4	112 mm (4 3/8 in.)
5 through 8	182 mm (7 1/8 in.)

- | | |
|---|---|
| 2 | Measure and mark a point 40 mm (1 5/8 in) further along the cable (further away from the LATCH-N-LOCK connector). |
|---|---|

—continued—

5-90 Installing the external ABM bay cabling

Procedure 5-11 (continued)

Installing the OPC Ethernet cable kit

- | Step | Action |
|-------------|---|
| 3 | Using the surgical knife, skin off the cable jacket between the two points you have just marked and expose the cable shielding underneath. |
| 4 | Route the Dupont LATCH-N-LOCK connector to the area above the slots in the ABM shelf, where the OPC module will be installed, as shown in Figure 5-39 on page 5-91.
Do not install the OPC at this time. |
| 5 | Connect the RJ45 connector to the Ethernet hub, MAU, X-Terminal or portable OPC terminal. |
| 6 | Install the cable clamp in the location shown in Figure 5-39 on page 5-91 using the mounting screws and the stubby screwdriver. |
| 7 | Dress the cable slack into the bay upright and secure it into place with cable ties. The following tables show the pin-outs for the NT4K86Lx and NT4K86Sx cables. |

Pin-outs for NT4K86LA, LB, and LC

OPC module faceplate connector		RJ45 connector	
Signal	Pin	Pin	Signal
Tx +	1	1	Tx +
Tx -	2	2	Tx -
Rx -	5	6	Rx -
Rx +	6	3	Rx +

Pin-outs for NT4K86SA, SB, SC, and SD

OPC module faceplate connector		RJ45 connector	
Signal	Pin	Pin	Signal
Tx +	1	3	Rx +
Tx -	2	6	Rx -
Rx -	5	2	Tx -
Rx X	6	1	Tx +

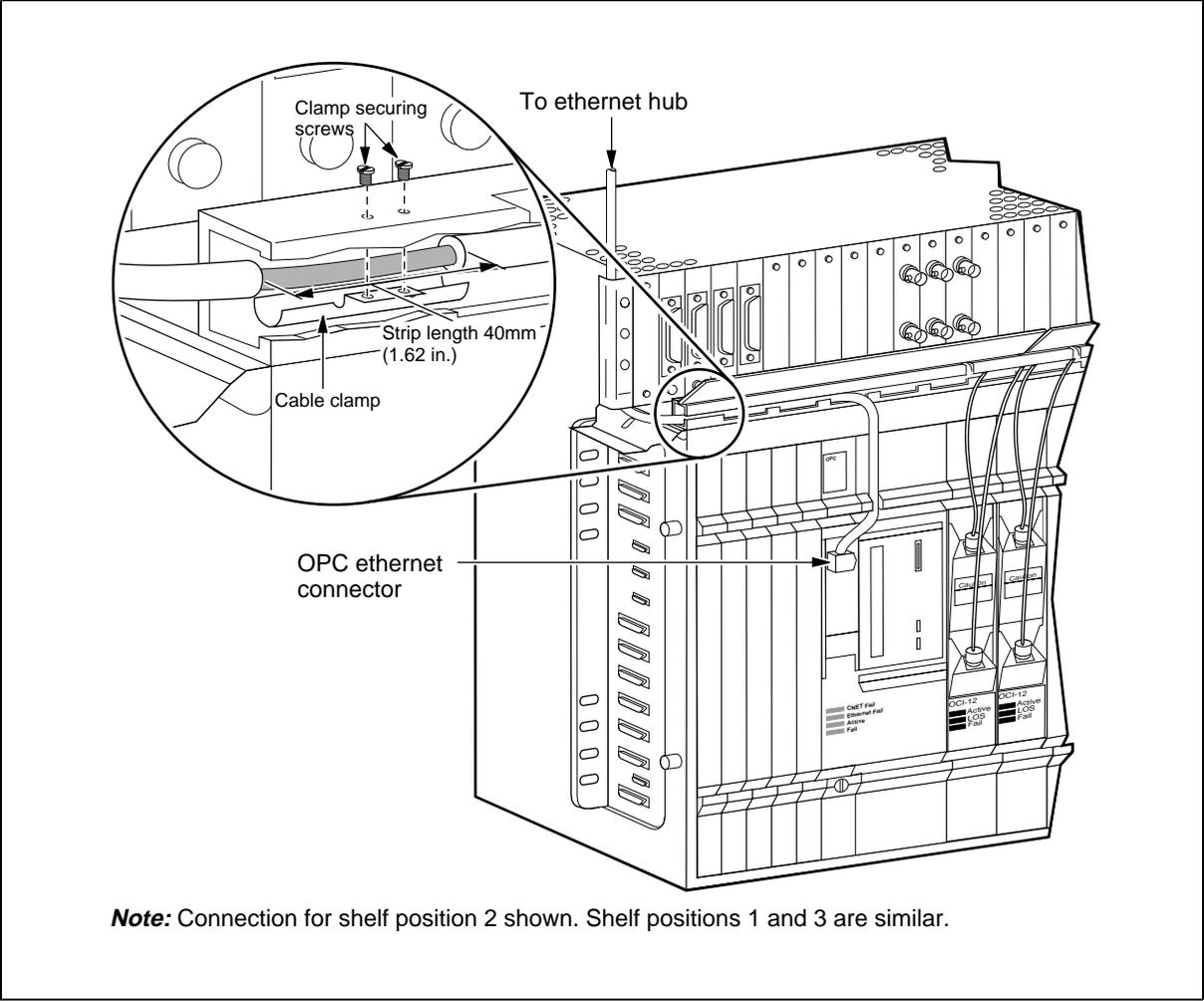
—continued—

Procedure 5-11 (continued)
Installing the OPC Ethernet cable kit

Step Action

Figure 5-39
Clamping the OPC Ethernet cable

PC-10347



—end—

Procedure 5-12 Installing an OPC cable to the I/O area of the ABM shelf

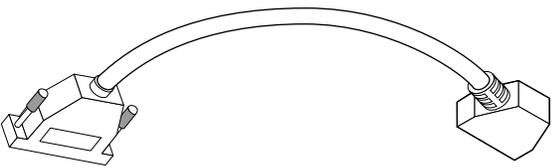
Use this procedure to install one or more of the input-output cables listed in the following table. These cables are only installed if the ABM contains an operations controller (OPC).

Note: To meet noise and ground current requirements, only connect an OPC cable between equipment that is bonded to the same ground point.

Table 5-25
OPC cables that connect to the I/O area of the ABM shelf, and their uses

PEC	Port	Slot in I/O area	Use
NT7E44TA, TB	2	38	EIA 530 synchronous interface for a graphics terminal or a remote operations system
NT7E44VA, VB	3	40	Asynchronous RS232 interface for a VT100 terminal, or a printer

NT7E44TA or TB



25-pin male
D-subminiature

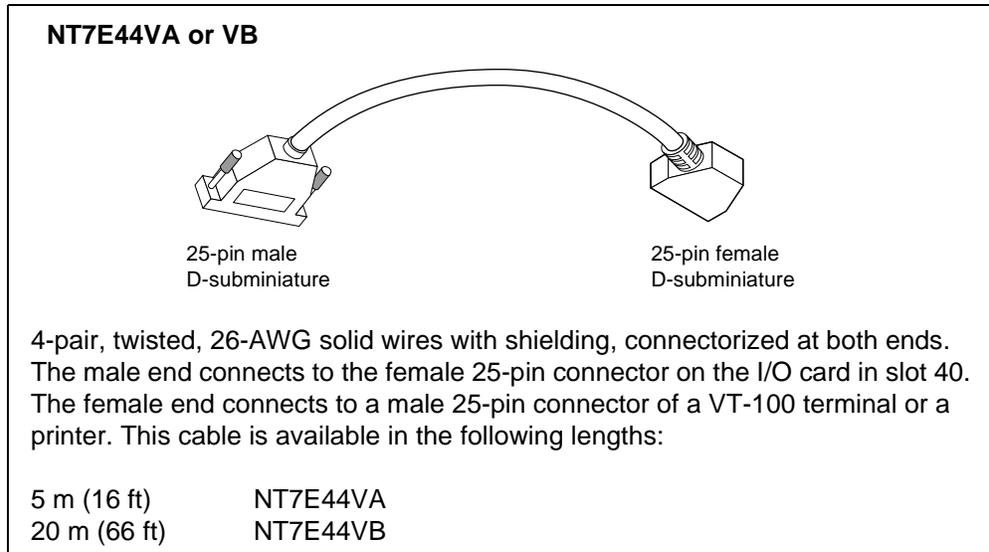
25-pin male
D-subminiature

4-pair, twisted, 26-AWG solid wires with shielding, connectorized at both ends with 25-pin male connectors. One end connects to the 25-pin female connector on the I/O card in slot 38 of the ABM shelf, and the other end connects to a 25-pin female connector of an EIA-530 interface on a graphics terminal or on a remote operations system. This cable is available in the following lengths:

5 m (16 ft)	NT7E44TA
20 m (66 ft)	NT7E44TB

—continued—

Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf**Requirement**

You need the following tools and materials:

- cable cutters
- cable ties

Action**Step Action**

- 1 Do one of the following according to the cable you are installing:

If you are installing an	Then
NT7E44TA or TB	go to step 2
NT7E44VA or VB	go to step 11

- 2 Remove the blank faceplate card from slot 38 and insert a serial I/O (NT4K58LA) card in its place.
- 3 Tighten the hold-down screw at the bottom of the card faceplate.
- 4 Route the cable from the external equipment (graphics terminal or remote operations system) to the right side of the bay.
- 5 Route the cable down the right side of the bay to the cable trough in the ABM shelf, as shown in Figure 5-40 on page 5-94.
- 6 Attach the cable to the connector on the serial I/O card in slot 38, as shown in Figure 5-40 on page 5-94.

—continued—

5-94 Installing the external ABM bay cabling

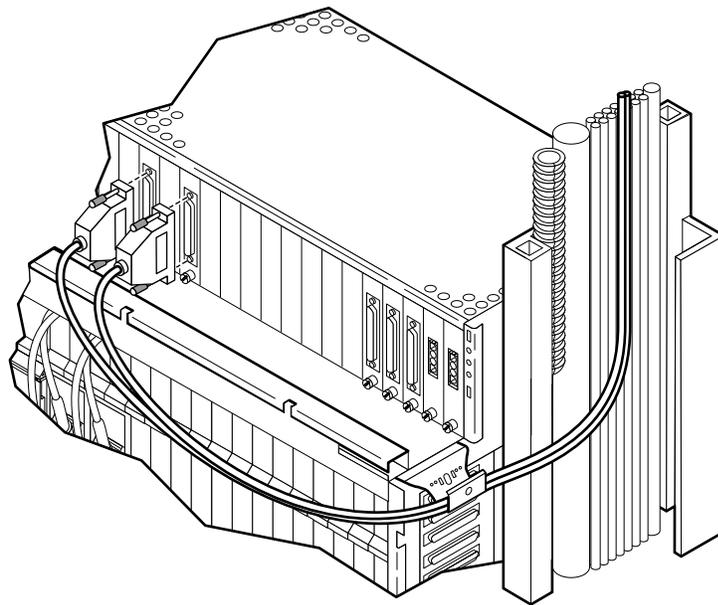
Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf

Step	Action
------	--------

Figure 5-40
Routing OPC cables to the I/O area of the common-equipment shelf

PC-10090



Note: I/O card bar code label mounting plate has been omitted for clarity.

—continued—

Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf

Step	Action
7	Dress the cable into the cable trough as shown in Figure 5-41 on page 5-96.
8	Dress the cable slack into the right bay upright.
9	Place the cable in the position shown in Figure 5-42 on page 5-97, and use cable ties to secure the cable to lances in the bay upright or to bundles of existing cables.
10	Connect the cable to the external equipment. For the pin-outs of the connectors on this cable, see Table 5-26 on page 5-98. You have completed this procedure, do not continue.
11	Remove the blank faceplate card from slot 40 and insert a serial I/O (NT4K58LA) card in its place.
12	Tighten the hold-down screw at the bottom of the card faceplate.
13	Route the cable from the external equipment (graphics terminal or remote operations system) to the right side of the bay.
14	Route the cable down the right side of the bay to the cable trough in the ABM shelf, as shown in Figure 5-40 on page 5-94.
15	Attach the cable to the connector on the serial I/O card in slot 40, as shown in Figure 5-40 on page 5-94.
16	Dress the cable into the cable trough as shown in Figure 5-41 on page 5-96.
17	Dress the cable slack into the right bay upright.
18	Place the cable in the position shown in Figure 5-42 on page 5-97, and use cable ties to secure the cable to lances in the bay upright or to bundles of existing cables.
19	Connect the cable to the external equipment. For the pin-outs of the connectors on this cable, see Table 5-27 on page 5-99.

—continued—

5-96 Installing the external ABM bay cabling

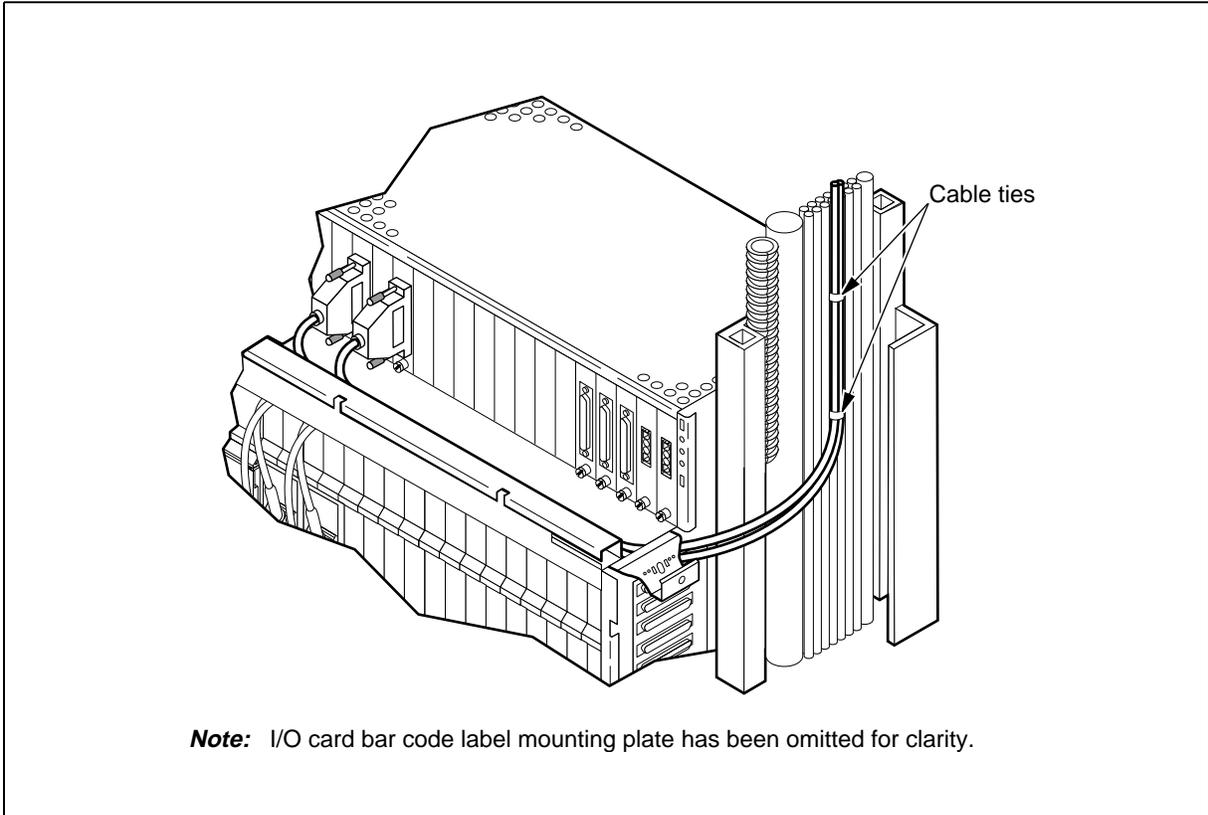
Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf

Step Action

Figure 5-41
Dressing the cable and tying it in the right bay upright

PC-10091

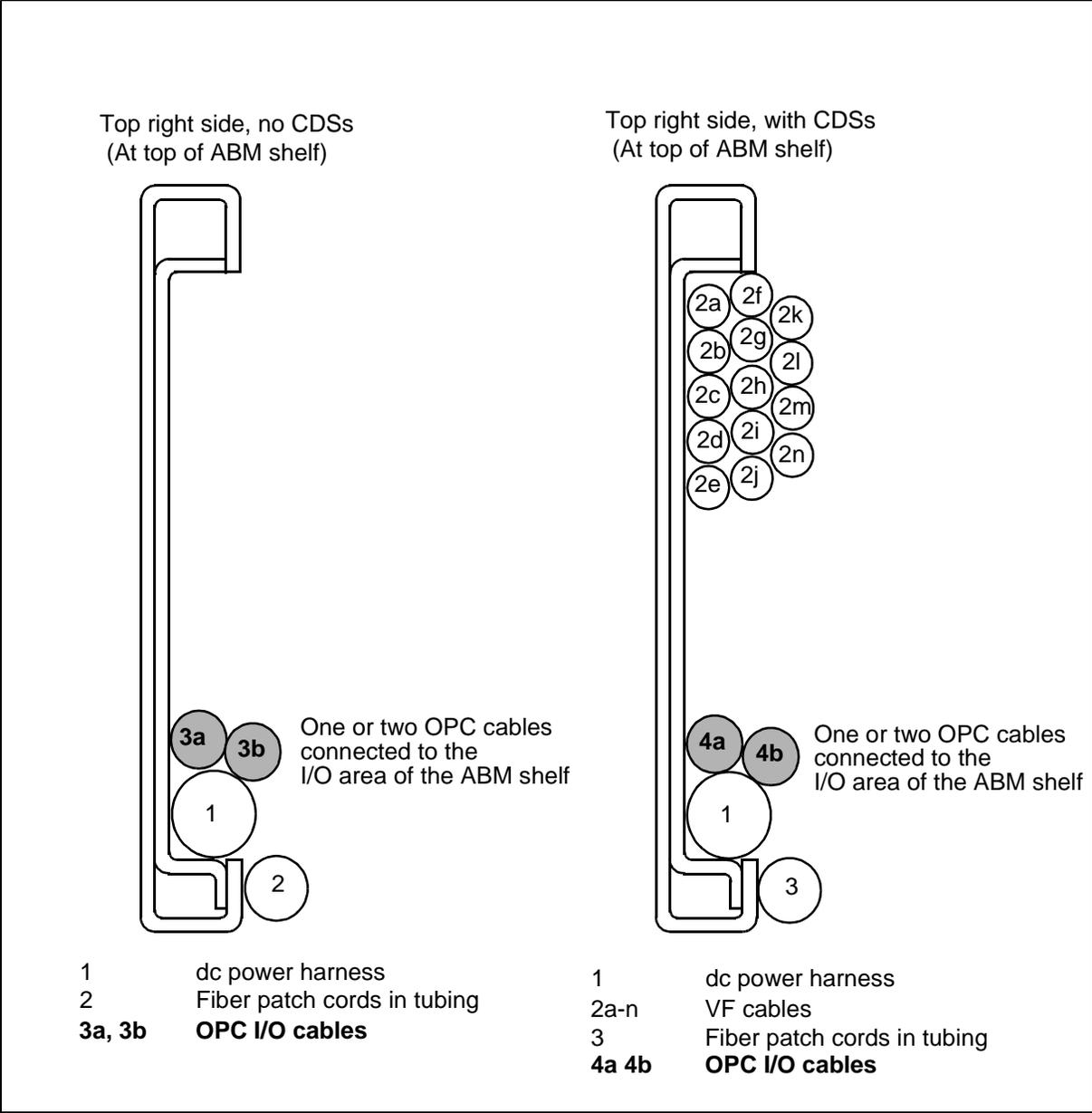


—continued—

Procedure 5-12 (continued)
Installing an OPC cable to the I/O area of the ABM shelf

Step Action

Figure 5-42
Dressing OPC cables into the right bay upright



—continued—

5-98 Installing the external ABM bay cabling

Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf

**Table 5-26
pin-outs for NT7E44TA and TB**

25-pin male connector at the terminal or the remote operations system		25-pin male connector at slot 38 of the I/O area
Pin	Signal	Pin
1	shield	1
2	Tx	2
3	Rx	3
4	RTS	4
5	CTS	5
6	DSR	6
7	signal ground	7
8	DCD	8
9	RxCk-	9
10	CD-	10
11	not used	not used
12	TxCk-	12
13	CTS-	13
14	Tx-	14
15	TxCk	15
16	Rx-	16
17	RxCk	17
18	LL	18
19	RTS-	19
20	DTR	20
21	RL	21
22	DSR-	22
23	DTR-	23
24	not used	not used
25	not used	not used

—continued—

Procedure 5-12 (continued)

Installing an OPC cable to the I/O area of the ABM shelf**Table 5-27**
Pin-outs for NT7E44VA and VB

25-pin male connector at the terminal or the remote operations system		25-pin male connector at slot 40 of the I/O area
Pin	Signal	Pin
1	shield	1
2	Tx	3
3	Rx	2
4	RTS	8
5	CTS	20
6	DSR	20
7	signal ground	7
8	CD	4
9	RxCk-	not used
10	CD-	not used
11	not used	not used
12	TxCk-	not used
13	CTS-	not used
14	Tx-	not used
15	TxCk	not used
16	Rx-	not used
17	RxCk	not used
18	LL	not used
19	RTS-	not used
20	DTR	5 and 6
21	RL	not used
22	DSR-	not used
23	DTR-	not used
24	not used	not used
25	not used	not used

—end—

Procedure 5-13

Installing the DS1 cables

Use this procedure to install the DS1 cables (NT4K85 through HJ) between the DS1 input and DS1 output cards in the access bandwidth manager (ABM) shelf and the DSX-1 cross-connect panel. For information on planning your DS1/DS3 mapper layout, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration and Ordering Guide*, Volume 1.

This procedure applies to ABM shelves that only contain DS1s. To install a mixture of DS1s and DS3s, see Procedure 5-15, “Installing a mix of DS1 and DS3 cables” on page 5-129. If the ABM shelf is intended to act as a stand-alone OPC shelf (for example, to support a single-ended AccessNode), no DS1 (or DS3 cables) need to be installed.

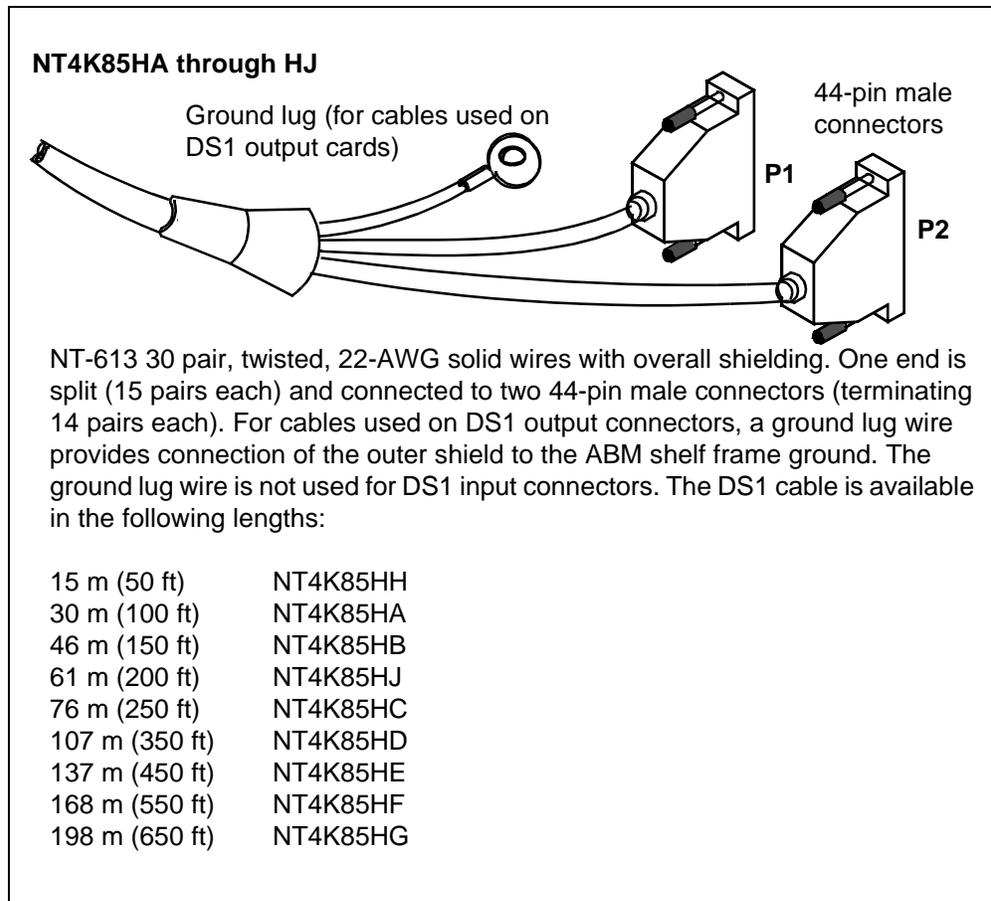
See *Commissioning and Testing*, Volume 3, for information on commissioning a stand-alone OPC shelf in an ABM bay.

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Figure 5-43 presents a diagram of the DS1 cables used in ABM bays (NT4K86HA through HJ). See Table 5-28 on page 5-121 for the color codes and pin-outs of these DS1 cables.

Figure 5-43
DS1 cable for the ABM bay



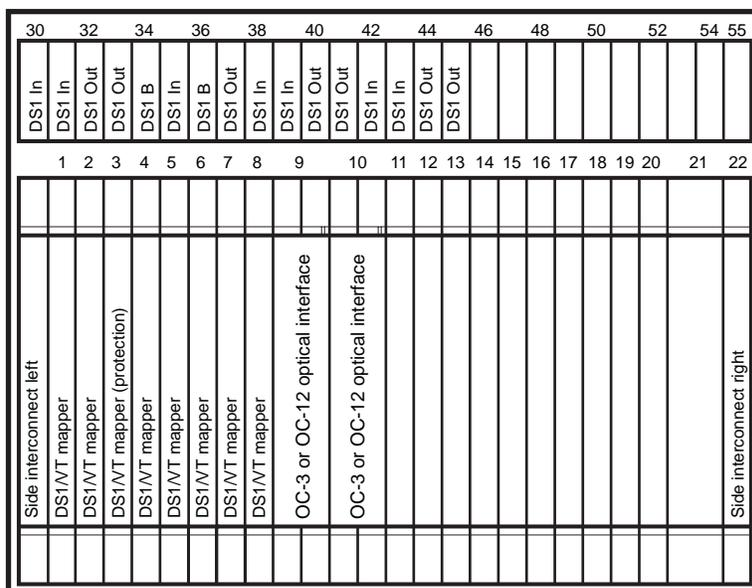
When installing DS1 cables, do not mix transmit (DS1 output) and receive (DS1 input) connections within the same cable; dedicate each cable to transmit or receive functions, but not both.

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Figure 5-44 illustrates a typical fiber-fed ABM shelf with DS1s.

Figure 5-44
Typical configuration for a fiber-fed ABM shelf, without OPC



Mappers		I/O cards	
DS1	1	DS1 In	30 DS1 Out 32
DS1	2	DS1 In	31 DS1 Out 33
DS1 P	3	DS1 B	34 DS1 B 36
DS1	4	DS1 In	35 DS1 Out 37
DS1	5	DS1 In	38 DS1 Out 40
DS1	6	DS1 In	39 DS1 Out 41
DS1	7	DS1 In	42 DS1 Out 44
DS1	8	DS1 In	43 DS1 Out 45

DS1 In DS1 input card (NT4K32AA)
 DS1 Out DS1 output card (NT4K33AA)
 DS1 B DS1 protection bridge card (NT4K31AA)
 P protection

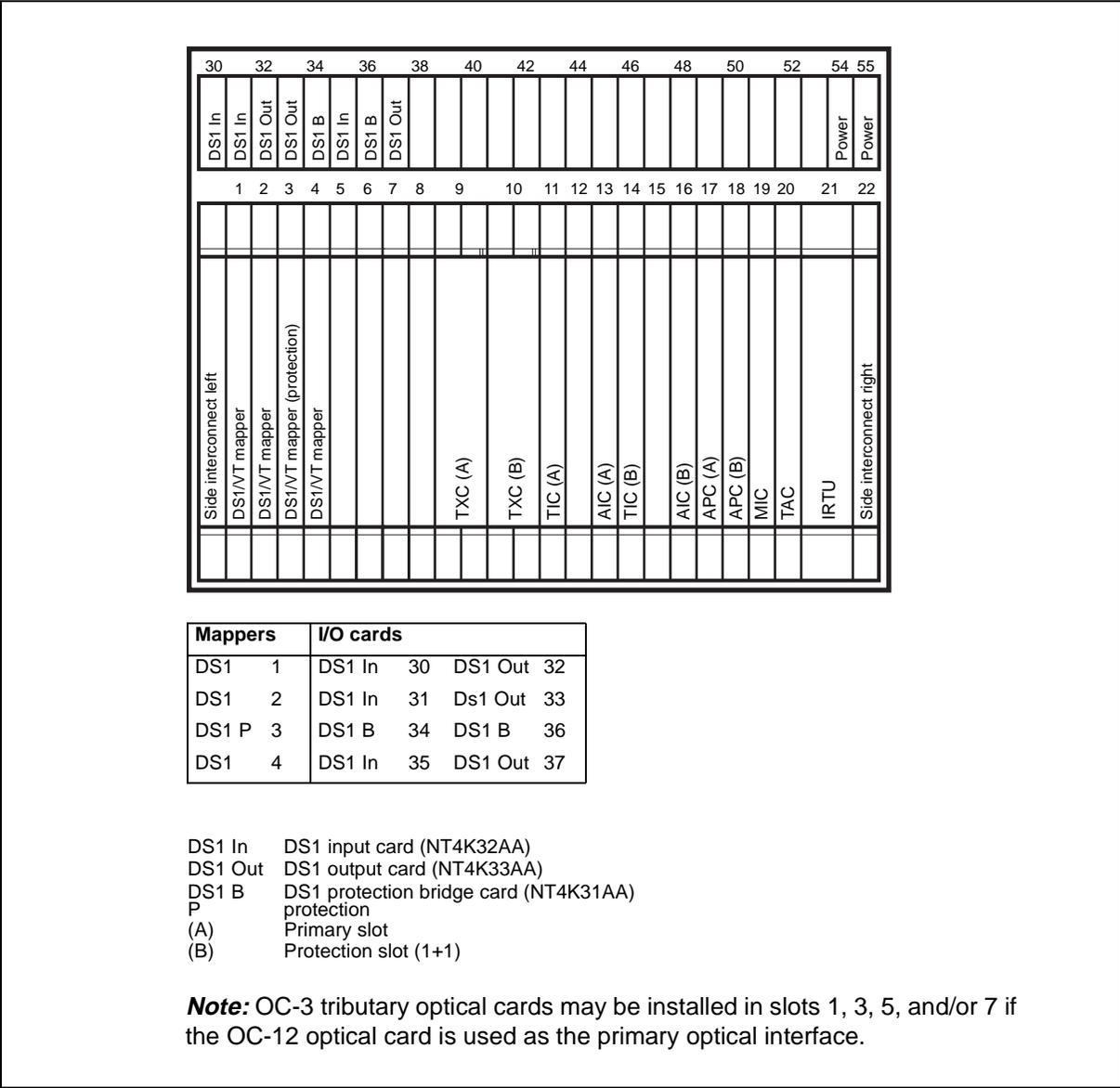
Note: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Figure 5-45 illustrates a typical DS1-fed ABM shelf layout.

Figure 5-45
Typical configuration for a DS1-fed ABM shelf, without OPC (protected)

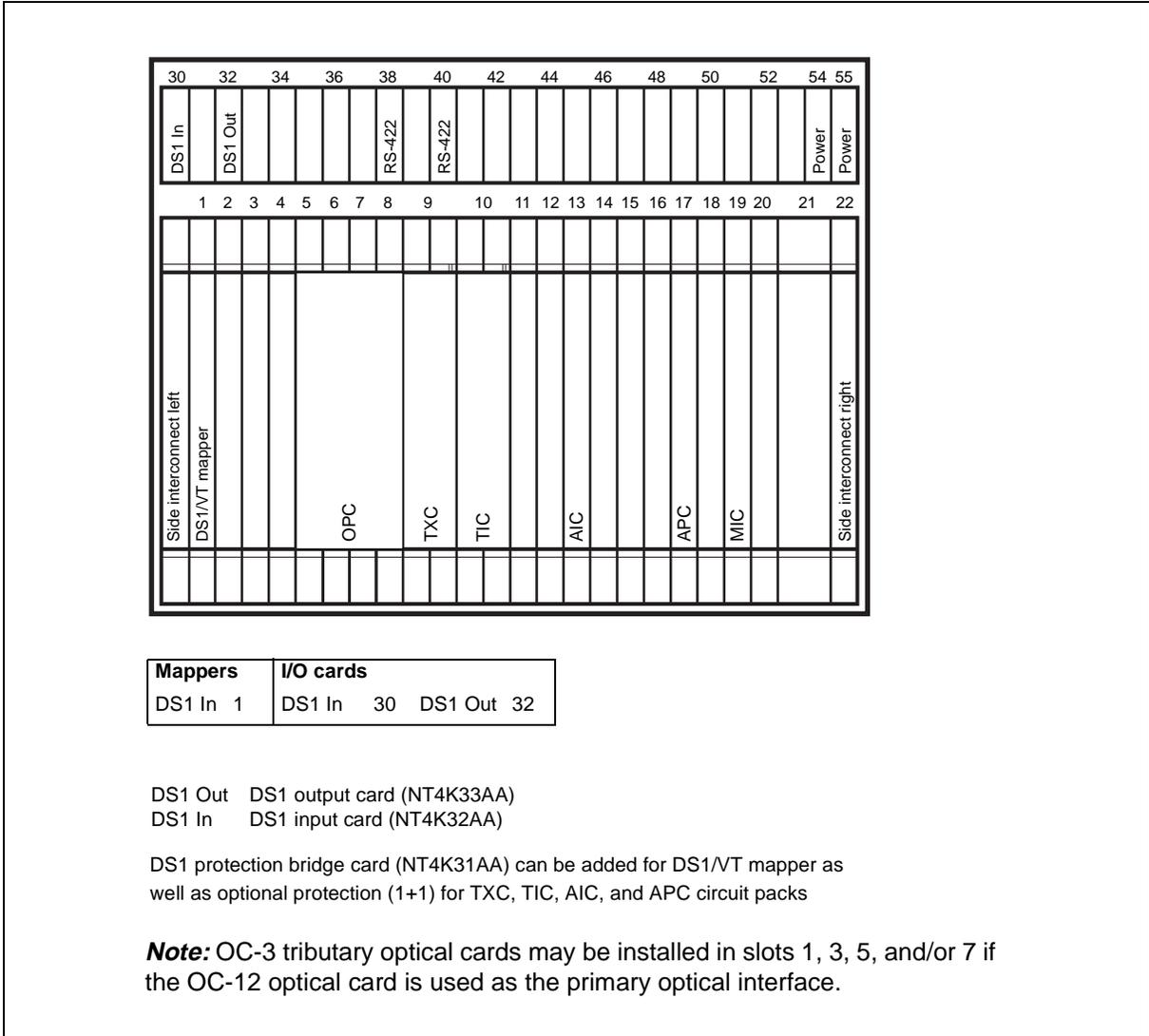


—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Figure 5-46 illustrates an OPC ABM shelf with DS1s and a TXC (Timing and Cross-connect) circuit pack.

Figure 5-46
Typical configuration for a DS1-fed OPC ABM shelf (unprotected)

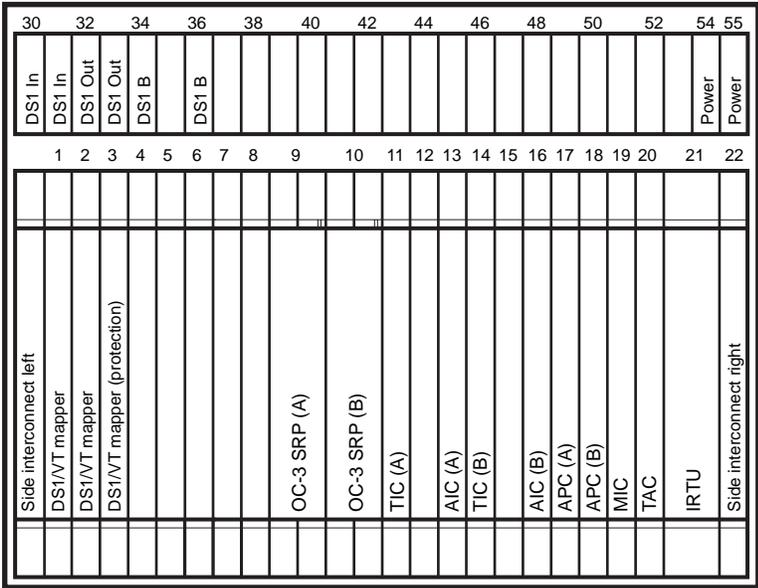


—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Figure 5-47 illustrates a single-ended ABM shelf with DS1s and OC-3 optical circuit packs.

Figure 5-47
Typical configuration for a fiber-fed single-ended ABM shelf (protected)



Mappers		I/O cards	
DS1	1	DS1 In	30 DS1 Out 32
DS1	2	DS1 In	31 Ds1 Out 33
DS1 P	3	DS1 B	34 DS1 B 36

- DS1 In DS1 input card (NT4K32AA)
- DS1 Out DS1 output card (NT4K33AA)
- DS1 B DS1 protection bridge card (NT4K31AA)
- P protection
- (A) Primary slot
- (B) Protection slot (1+1)

Note: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Requirements

You need the following tools and materials:

- cable cutters
- cable ties
- screwdriver, Phillips no. 1
- heat shrinkable tubing, black, 9.3 mm (3/8 in.) diameter, R0113153 or equivalent
- heat shrink gun

Action

Step	Action
1	Use facility records to identify the lower slots in the ABM shelf into which DS1 mapper cards are to be installed.
2	For a description of the shelf configurations and the placement of mappers and I/O cards at the fiber central office terminal (FCOT) and at the remote fiber terminal (RFT), see <i>Mapper Layouts Planning Guide</i> , 323-3001-154, in the <i>Engineering, Configuration and Ordering Guide</i> , Volume 1.
3	Remove the blank I/O faceplate cards from the following I/O slots according to the lower slots in which the DS1 mappers are to be installed.

Slots with DS1 mappers	Remove I/O faceplate cards from slots
1	30 and 32
2	31 and 33
3 (protection)	34 and 36
4	35 and 37
5	38 and 40
6	39 and 41
7	42 and 44
8	43 and 45

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

- 4** Insert I/O cards into the shelf according to the slots in which mappers are to be installed, as follows:

Slots with DS1 mappers	I/O card type	Slot	I/O card type	Slot
1	DS1 In (NT4K32AA)	30	DS1 Out (NT4K33AA)	32
2	DS1 In (NT4K32AA)	31	DS1 Out (NT4K33AA)	33
3 P	DS1 B (NT4K31AA)	34	DS1 B (NT4K31AA)	36
4	DS1 In (NT4K32AA)	35	DS1 Out (NT4K33AA)	37
5	DS1 In (NT4K32AA)	38	DS1 Out (NT4K33AA)	40
6	DS1 In (NT4K32AA)	39	DS1 Out (NT4K33AA)	41
7	DS1 In (NT4K32AA)	42	DS1 Out (NT4K33AA)	44
8	DS1 In (NT4K32AA)	43	DS1 Out (NT4K33AA)	45

- 5** Tighten the hold-down screws at the bottom of the card faceplates.
- 6** Label both ends of each DS1 cable with the range of DS1 numbers (1 to 28, 29 to 42, 43 to 70, or 71 to 98) and the function of the cable: transmit (Tx) or receive (Rx).
- Note:** The function of the DS1 cable (transmit or receive) is determined from the perspective of the DSX-1 cross-connect. Transmit cables carry signals away from the DSX-1 cross-connect, and receive cables carry signals towards the DSX-1 cross-connect.
- 7** Run one DS1 cable into the left side of the bay for each pair of cards (DS1 In, DS1 Out, or DS1 B) that you installed in I/O slots 30 through 41.

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step	Action
8	<p>Starting at slot 30, proceeding from left to right, and ending at slot 41, attach the P1 and P2 connectors of the DS1 cables to the intended I/O cards as shown in Figure 5-48 on page 5-109. As you attach each cable, dress it into the cable trough so that it occupies the position shown in Figure 5-49 on page 5-110.</p> <p><i>Tighten the connector hold down screws just enough to draw the connector into place (2 inch-pounds maximum). Do not over-tighten.</i></p> <p>Note: When installing a DS1 cable to the cards in slots 34 and 35, position the P1 connector in front of the DS1B card in slot 34. This connector is not used. Use a cable tie to attach the P1 connector to the P2 connector that is attached to the card in slot 35. Similarly, when installing a DS1 cable to the cards in slots 36 and 37, position the unused P1 connector in front of card in slot 36, and use a cable tie to secure it to the P2 connector that is attached to the card in slot 37.</p>
9	<p>Use a cable tie to attach the bundle of DS1 cables to the lance at the entrance to the cable trough, as shown in Figure 5-48 on page 5-109.</p>

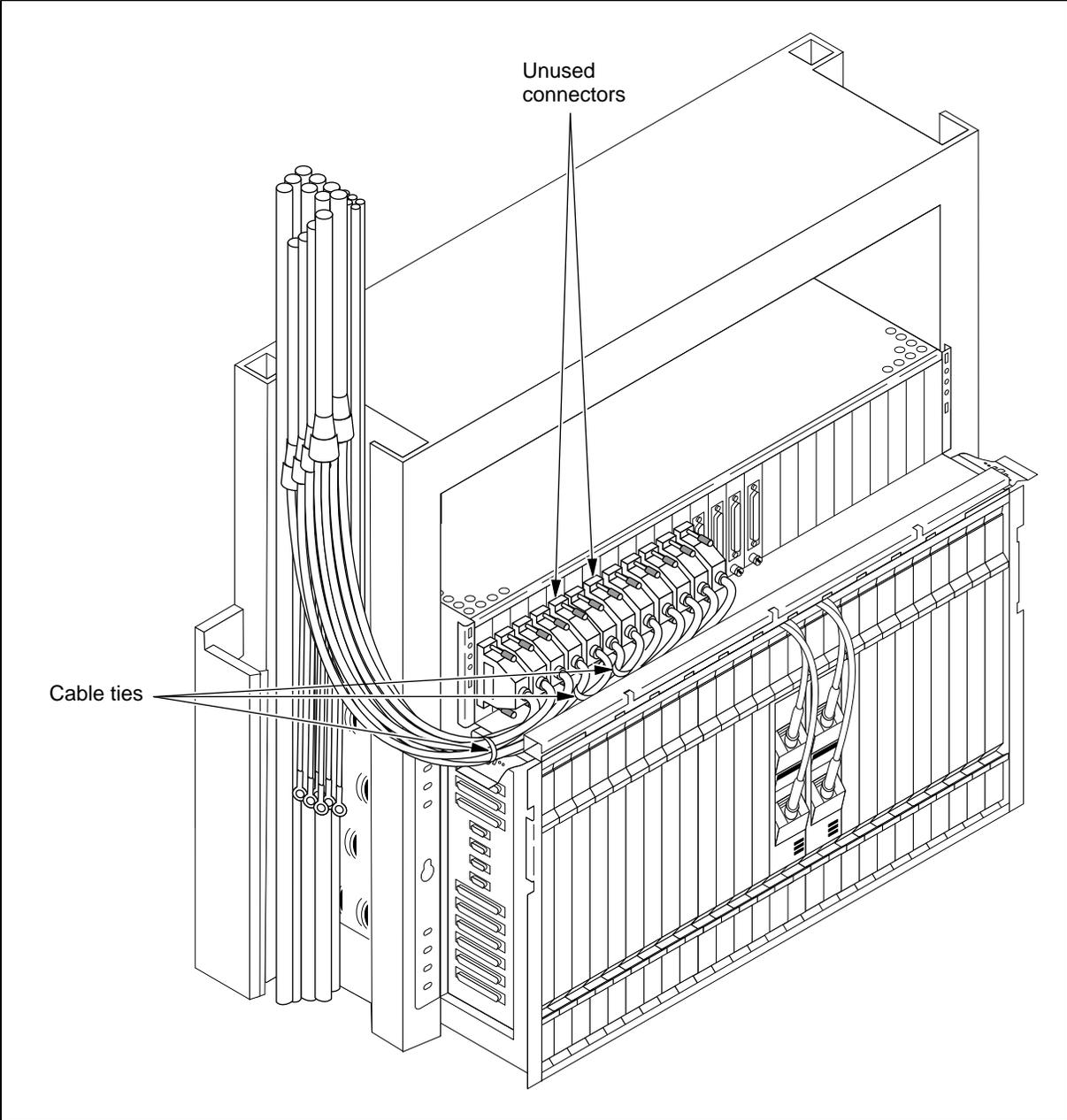
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-48
Routing DS1 cables into the left side of the bay

PC-10986



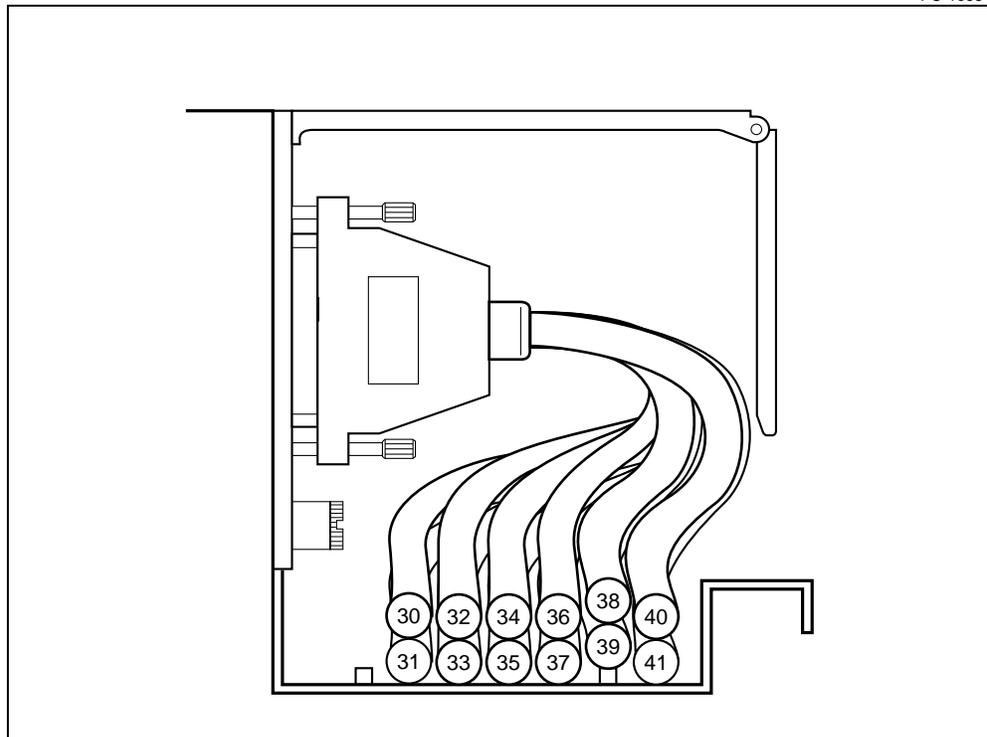
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step	Action
10	Attach the ground lugs of the receive DS1 cables to the left side of the ABM shelf using hex screws, as shown in Figure 5-50 on page 5-111.

Figure 5-49
Positioning cables in the left side of the cable trough

PC-10961



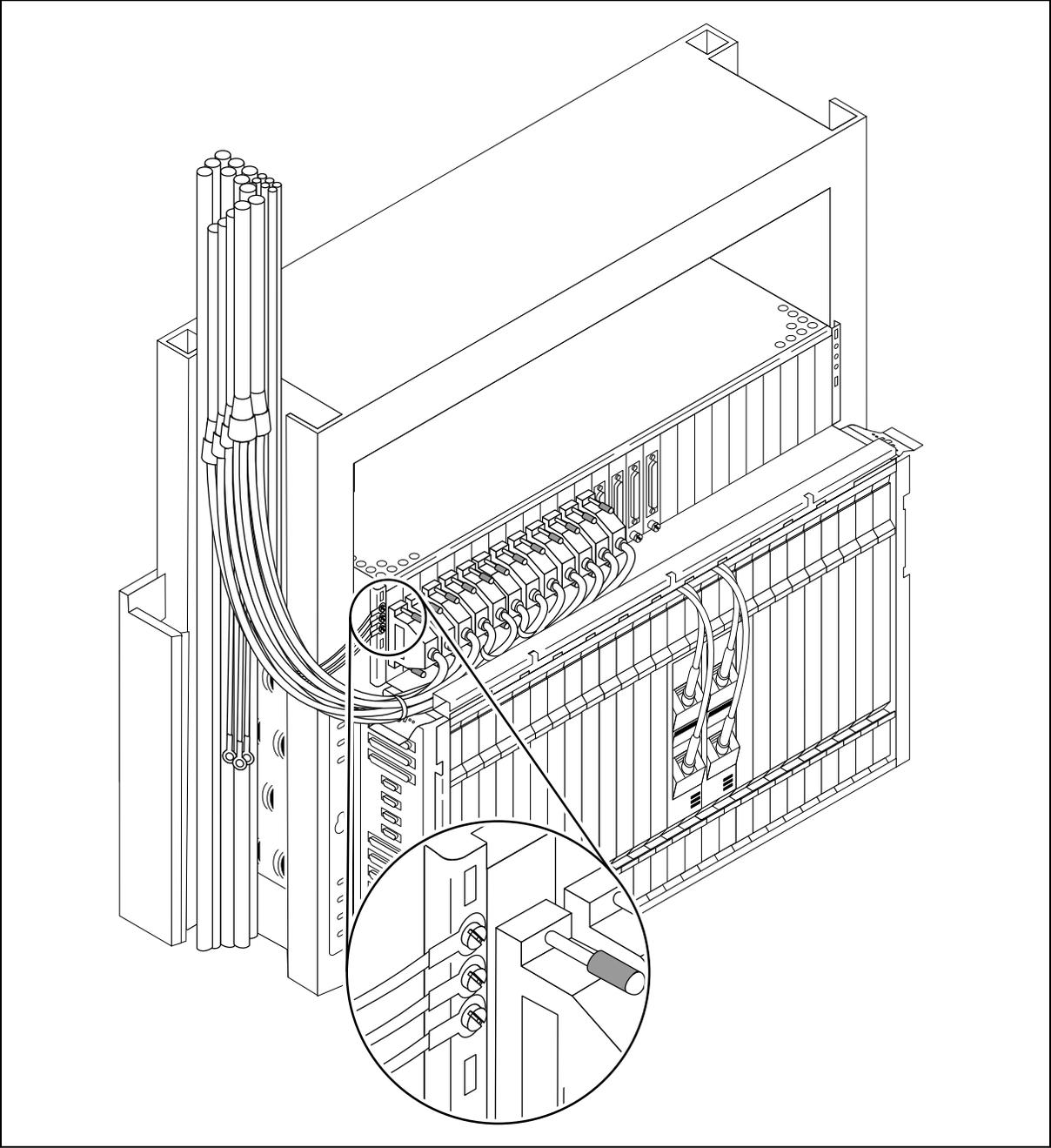
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Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-50
Attaching the ground lugs of the receive DS1 cables

PC-10726



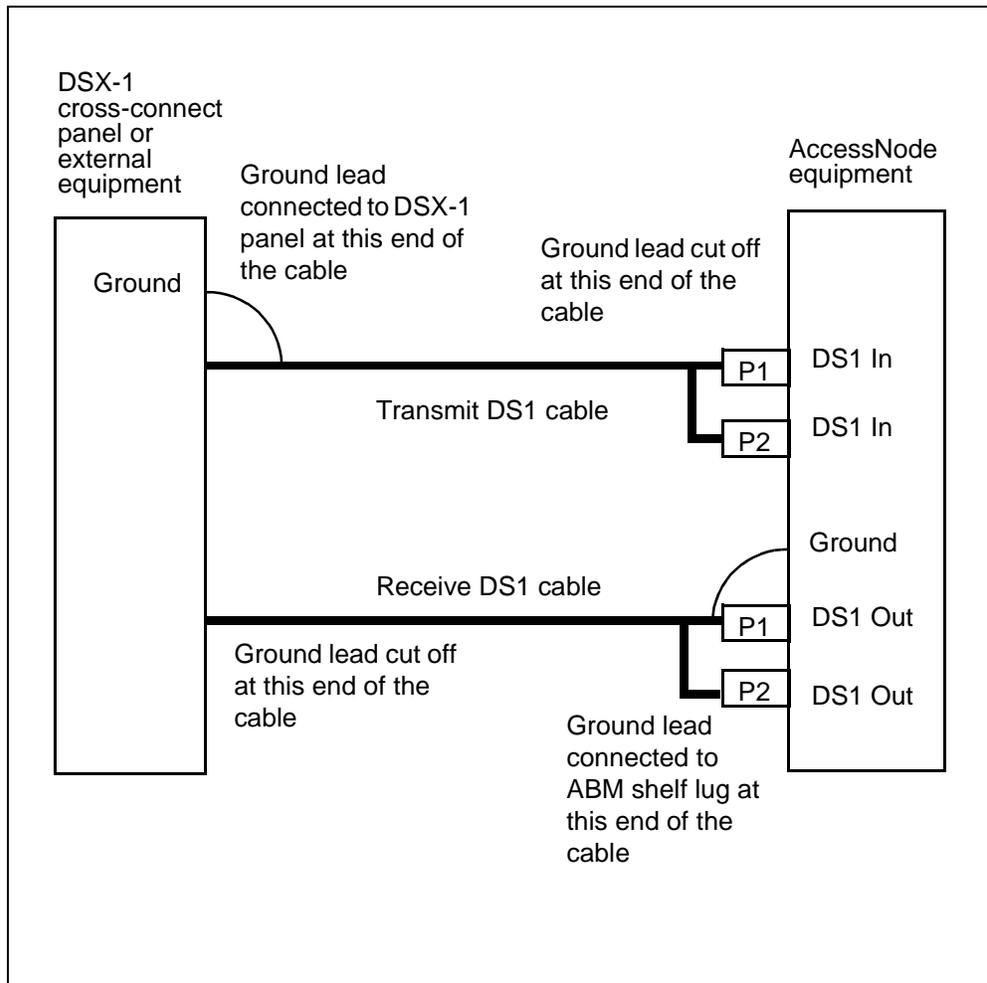
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

- 11** At the shelf-end of the transmit (IN) DS1 cables, cut off the ground lead to within 50 mm (2 in.) of the cable jacket. These ground leads are not used.

Note: When you have finished connecting all of the grounds, the grounding of the transmit and receive cables will be as shown in the following schematic diagram.

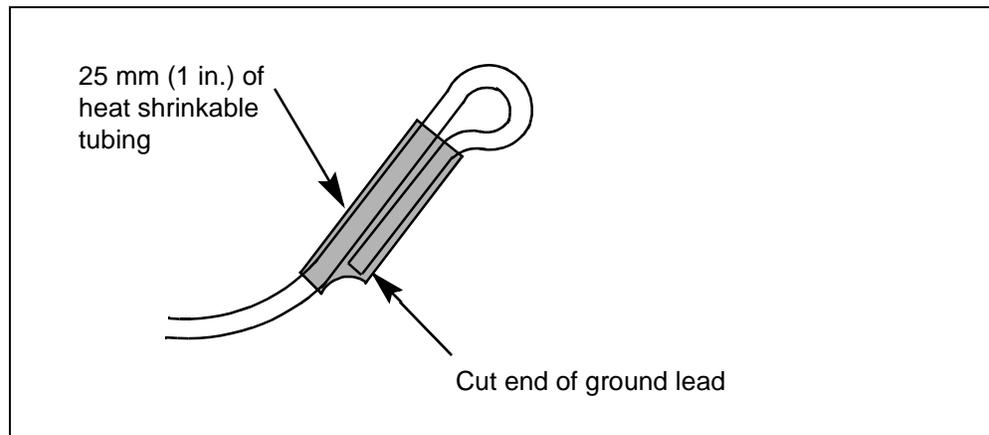


—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step	Action
-------------	---------------

- | | |
|-----------|---|
| 12 | Bend the cut end of the ground lead back on itself and protect it with a 25 mm (1 in.) length of heat shrinkable tubing, as shown in the following diagram. |
|-----------|---|



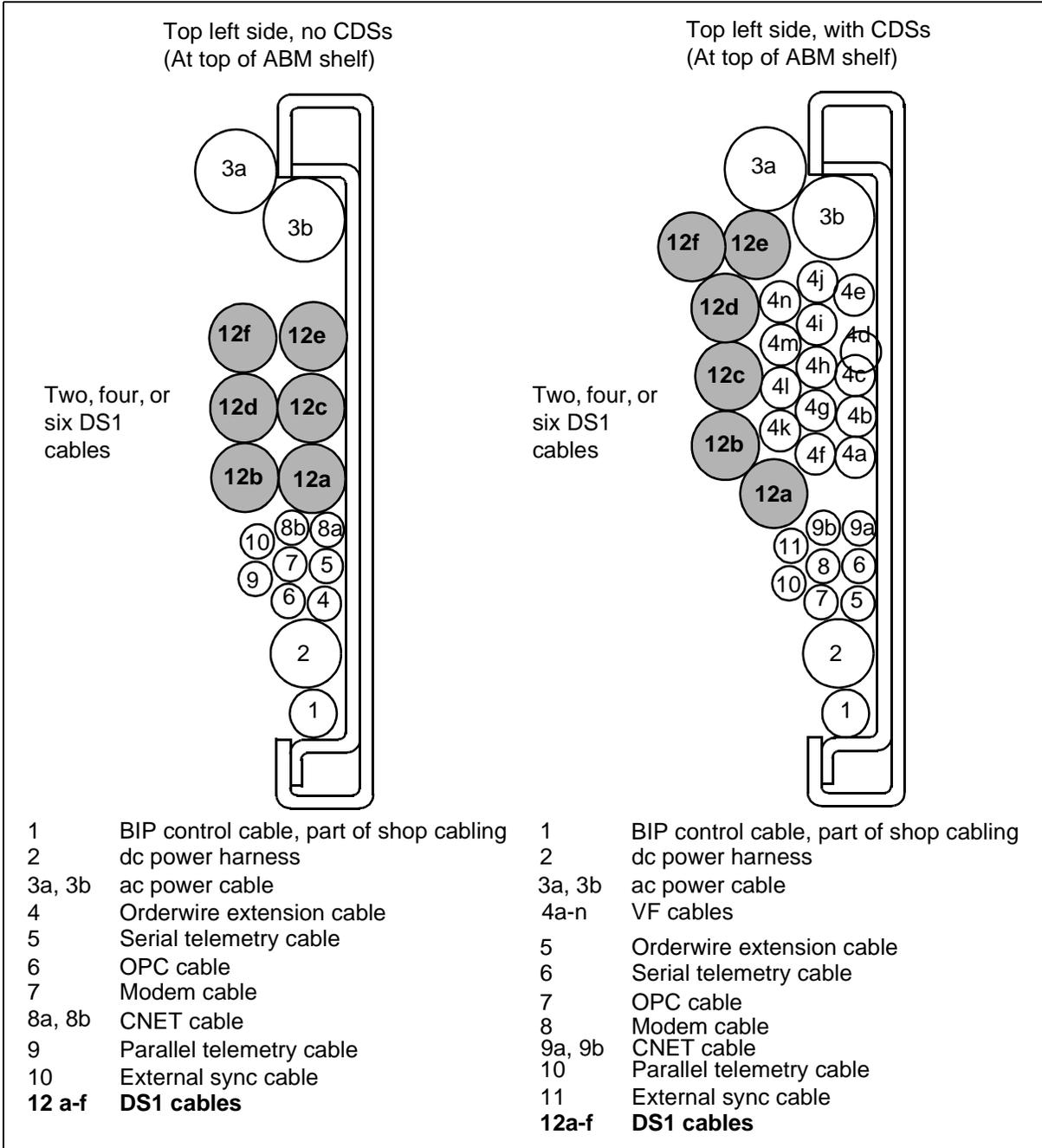
- | | |
|-----------|--|
| 13 | Dress the DS1 cables into the position in the left bay upright, as shown in Figure 5-51 on page 5-114, and use cable ties to fasten them to existing bundles of cables or to the bay upright, as shown in Figure 5-52 on page 5-115. |
| 14 | Lace the DS1 cables at the top of the bay, as shown in Figure 5-52 on page 5-115. |

—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-51
Dressing the cables into the left bay upright



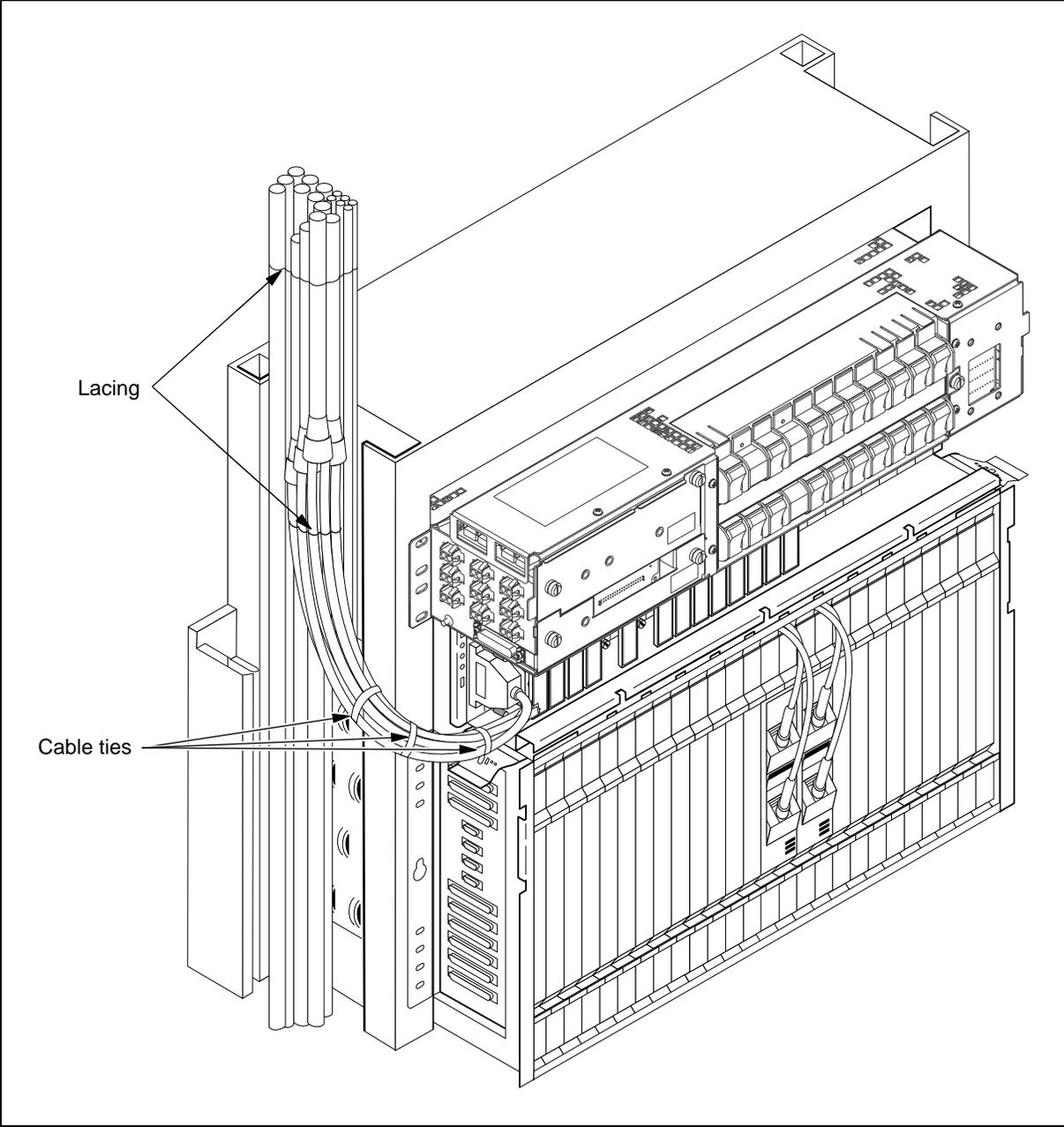
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-52
Securing cables in the left bay upright

PC-16490



—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step	Action
15	Run one DS1 cable to the right side of the bay for each pair of DS1 I/O cards that you installed in I/O slots 42 through 45.
16	Attach the P1 and P2 connectors of each cable to the intended I/O cards from left to right in the shelf, as shown in Figure 5-53 on page 5-117. As you attach each connector, dress it into the cable trough so that it occupies the position shown in Figure 5-54 on page 5-118. Tighten the connector hold down screws just enough to draw the connector into place (2 inch-pounds maximum). Do not over-tighten.
17	Attach the bundle of DS1 cables to the cable trough with a cable tie, as shown in Figure 5-53 on page 5-117.
18	Attach the ground lugs of the receive DS1 cables to the right side of the ABM shelf with hex screws.
19	At the shelf-end of each transmit DS1 cable, cut off the ground lead to within 50 mm (2 in.) of the cable jacket. The ground lead is not used.
20	Bend the cut end of each ground lead back on itself and protect it with a 25 mm (1 in.) length of heat shrinkable tubing.
21	Dress the DS1 cables into the position in the right bay upright as shown in Figure 5-55 on page 5-119, and use cable ties to fasten them to existing bundles of cables or to the bay upright, as shown in Figure 5-53 on page 5-117.
22	Lace the DS1 cables to the top of the bay, as shown in Figure 5-53 on page 5-117.

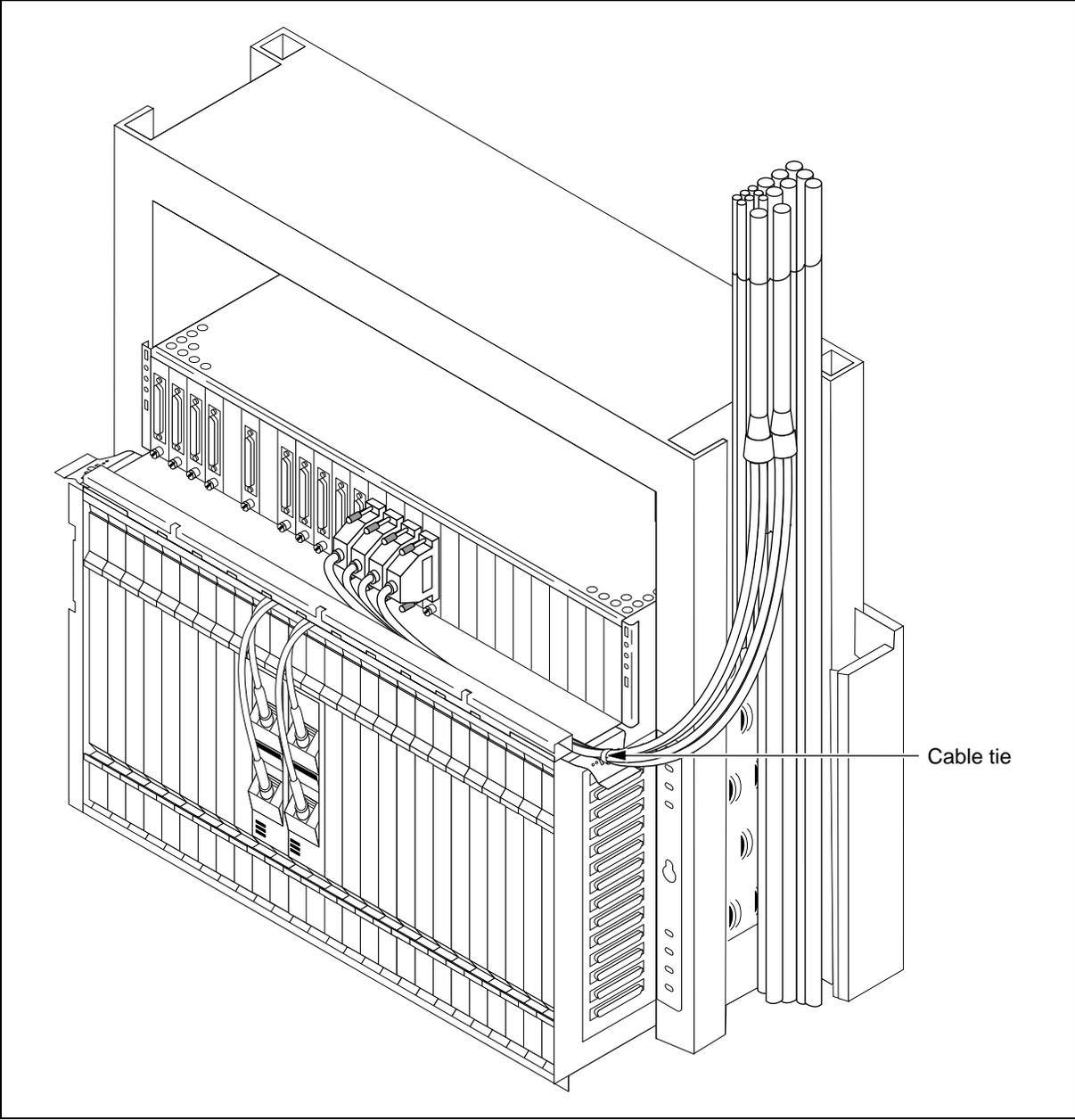
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-53
Routing DS1 cables into the right side of the bay

PC-10989



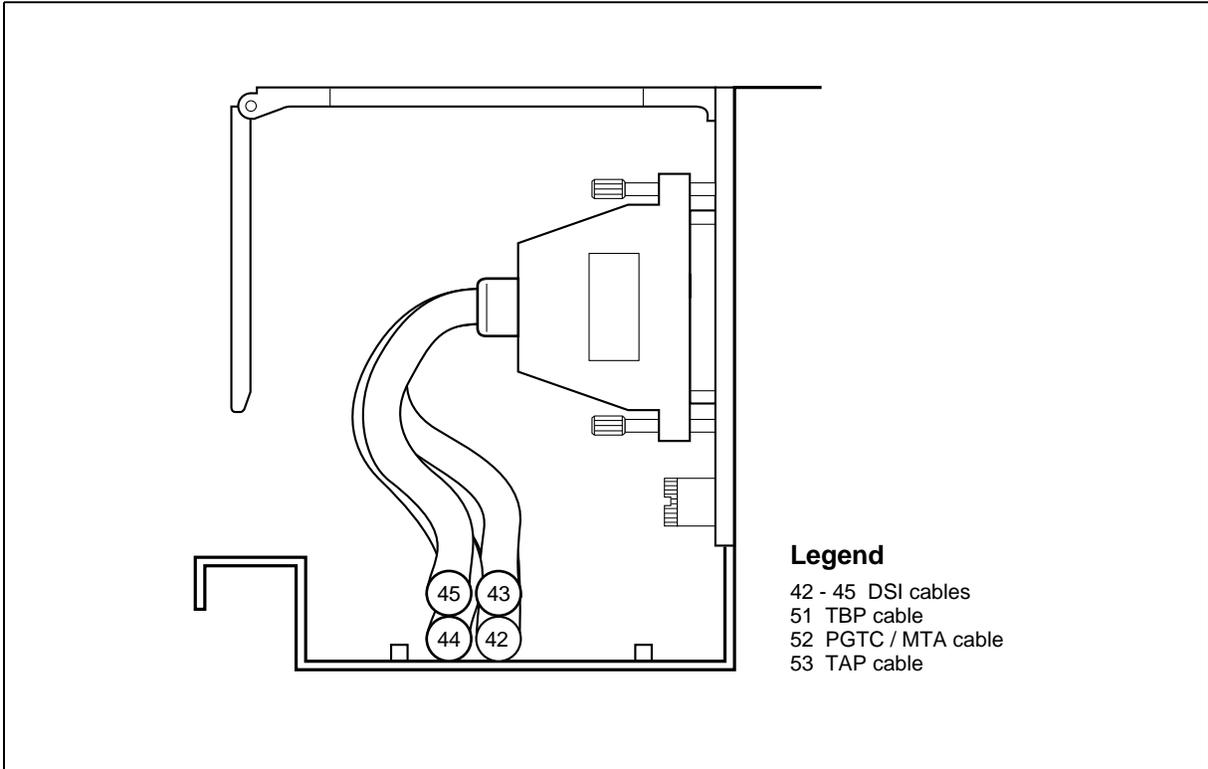
—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-54
Positioning cables in the right side of the cable trough

PC-10962

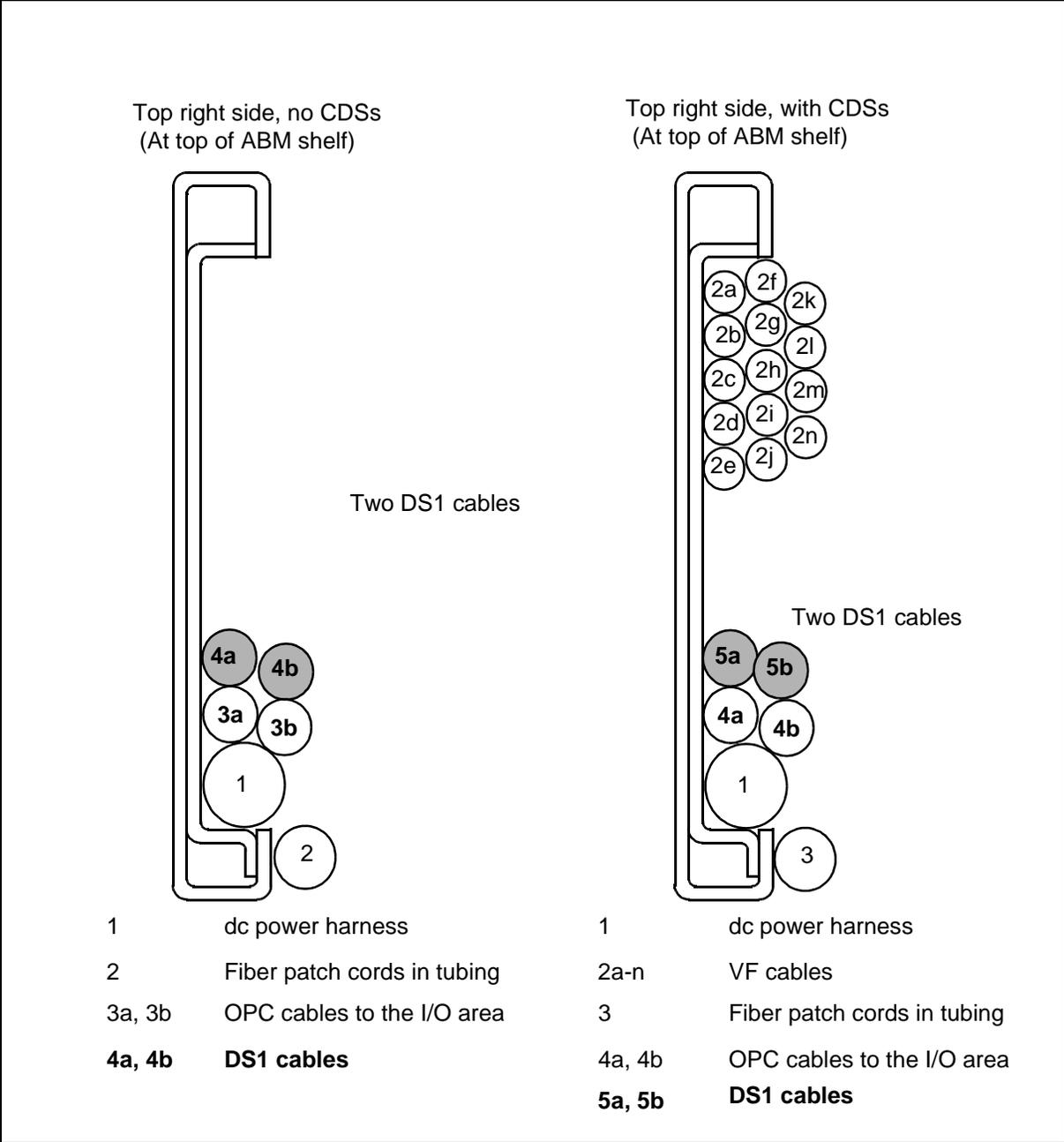


—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step Action

Figure 5-55
Dressing cables into the right bay upright



—continued—

Procedure 5-13 (continued)
Installing the DS1 cables

Step	Action
23	Run the DS1 cables from the bay over to the DSX-1 cross-connect panel.
24	Use Table 5-28 on page 5-121 to terminate the office-end of the DS1 cables to the DSX-1 cross-connect panel.

—end—

Table 5-28
Color codes and pin-out details for the DS1 cables

Connector P1						
Connector pin		Pair or	Color of pair			
Ring	Tip	DS1 no.	Ring		Tip	
31	16	1	BL	1W	W	1 BL
32	17	2	O	1W	W	1O
33	18	3	G	1W	W	1G
34	19	4	BR	1W	W	1BR
35	20	5	S	1W	W	1S
36	21	6	BL	1R	R	1BL
37	22	7	O	1R	R	1O
38	23	8	G	1R	R	1G
39	24	9	BR	1R	R	1BR
40	25	10	S	1R	R	1S
41	26	11	BL	1BK	BK	1BL
42	27	12	O	1BK	BK	1O
43	28	13	G	1BK	BK	1G
44	29	14	BR	1BK	BK	1BR
-	30	-				
—continued—						

Table 5-28 (continued)
Color codes and pin-out details for the DS1 cables

Connector P2						
Connector pin		Pair or DS1 no.	Color of pair			
Ring	Tip		Ring		Tip	
31	16	15	S	1BK	BK	1 S
32	17	16	BL	1Y	Y	1BL
33	18	17	O	1Y	Y	1O
34	19	18	G	1Y	Y	1G
35	20	19	BR	1Y	Y	1BR
36	21	20	S	1Y	Y	1S
37	22	21	BL	1V	V	1BL
38	23	22	O	1V	V	1O
39	24	23	G	1V	V	1G
40	25	24	BR	1V	V	1BR
41	26	25	S	1V	V	1S
The following pairs are contained within a blue binder.						
42	27	26	BL	1W	W	1BL
43	28	27	O	1W	W	1O
44	29	28	G	1W	W	1G
-	30	-				
<p>Note 1: Pins 1 to 15 and pin 30 of connectors P1 and P2 are not connected, and pairs 29 and 30 are not used.</p> <p>Note 2: The tip lead is the positive (+) and the ring lead is the negative (-).</p>						
—end—						

Procedure 5-14

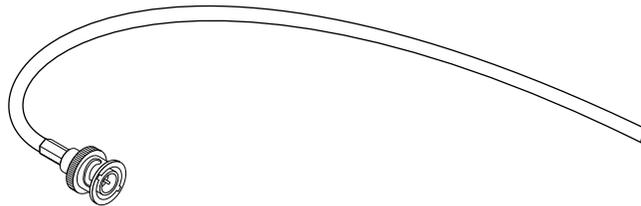
Installing the DS3 cables

Use this procedure to connect the DS3 cables (NT7E43AA through AH, and NT7E43AJ to AL) to the access bandwidth manager (ABM) shelf. For information on planning your DS1/DS3 mapper layout, see *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration and Ordering Guide*, Volume 1.

This procedure applies to ABM shelves that only contain DS3s. For the procedure to install a mix of DS1s and DS3s, see Procedure 5-15 on page 5-129.

FW10068

NT7E43AA through AH, and NT7E43AJ through AL



NT-734-E coaxial cables connectorized at one end with a BNC connector. These cables are available in the following lengths:

5 m	(16.4 ft.)	NT7E43AA
10 m	(32.8 ft.)	NT7E43AB
20 m	(65.6 ft.)	NT7E43AC
30 m	(88.4 ft.)	NT7E43AD
40 m	(131.1 ft.)	NT7E43AE
50 m	(163.9 ft.)	NT7E43AF
60 m	(196.7 ft.)	NT7E43AG
75 m	(245.9 ft.)	NT7E43AH
80 m	(262.3 ft.)	NT7E43AJ
100 m	(327.9 ft.)	NT7E43AL
140 m	(459 ft.)	NT7E43AK

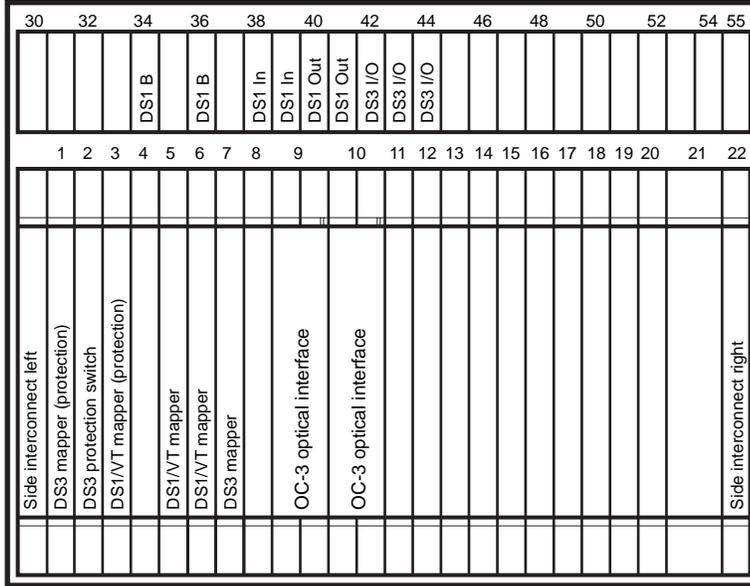
It is recommended that you use a Schleuniger coaxial stripper tool Model HZ207A (Tool room number T00067) and BNC connector kit (Tool room number K000702) when installing BNC connectors in the field.

—continued—

Procedure 5-14 (continued)
Installing the DS3 cables

Figure 5-56 shows a typical ABM shelf configuration with DS3s.

Figure 5-56
Typical configuration for an ABM shelf with DS3s in a central office



Mappers	DS3 I/O cards
DS3 P 1	none
DS3 3	34 35 36
DS3 5	38 39 40
DS3 7	42 43 44

DS3 I/O DS3 input output card (NT4K30AA)
 P protection

Note 1: This illustration shows a universal configuration that is fully equipped with three working DS3 mappers, but no OPC module. When an OPC module is fitted in lower slots 5 through 8, I/O slots 38 through 44 contain blank faceplate cards, and the shelf holds a maximum of one DS3 mapper.

Note 2: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

 Procedure 5-14 (continued)
Installing the DS3 cables

Requirements

You need the following tools and materials:

- wire cutters (flush cutting)
- screwdriver, flat blade, 1/8 in. wide
- Schleuniger coaxial stripper tool Model HZ207A (if installing BNC connectors in the field)
- cable ties



CAUTION

Risk of damage to DS3 cables

Do not bend a DS3 cable into a radius smaller than 38 mm (1.5 in.) to avoid damaging the cable.

Action

Step	Action
------	--------

- | | |
|---|---|
| 1 | Use facility records to identify the slots in the ABM shelf into which DS3 mapper cards are to be installed.

For a description of the shelf configurations and the placement of mappers and I/O cards at the fiber central office terminal (FCOT) and at the remote fiber terminal (RFT), see <i>Mapper Layouts Planning Guide</i> , 323-3001-154, in the <i>Engineering, Configuration and Ordering Guide</i> , Volume 1. |
| 2 | Remove the blank I/O faceplate cards from the following I/O slots according to the lower slots in the shelf into which the DS3 mappers are to be installed. |

If a mapper is to be installed in slot	Remove the blank I/O faceplates from the following slots
1 (protection)	none
3 (working)	34, 35, and 36
5 (working)	38, 39, and 40
7 (working)	42, 43, and 44

- | | |
|---|--|
| 3 | Insert NT4K30AA DS3 I/O cards into the slots from which you removed the blank faceplate cards. |
| 4 | Tighten the hold-down screw on the faceplate of each I/O card. |

—continued—

Procedure 5-14 (continued)
Installing the DS3 cables

Step	Action
5	Label both ends of each DS3 cable with its DS3 number (1 to 9) and its function transmit (Tx) or receive (Rx).
6	Run the connectorized ends of the DS3 cables down into the left side of the bay.
7	Connect the BNC connector of each DS3 cable to its intended I/O card in sequence, starting with the cable that attaches to the Rx connector of the leftmost I/O card in the shelf, and ending with the Tx connector of the rightmost card, as shown in Figure 5-57 on page 5-127.
8	Dress the DS3 cables into the shelf and use a cable tie to attach the bundle of DS3s to the lance at the entrance of the cable trough, as shown in Figure 5-57 on page 5-127.
9	Dress the DS3 cables into the position in the left bay upright shown in Figure 5-58 on page 5-128 and use cable ties to fasten them to the bay upright, or to other bundles of existing cables.
10	Lace the cables to the cable bracket at the top of the bay, as shown in Figure 5-57 on page 5-127.
11	Run the DS3 cables from the bay over to the DS3 cross-connect panel.
12	Connect the free ends of the cables to the DS3 cross-connect panel.

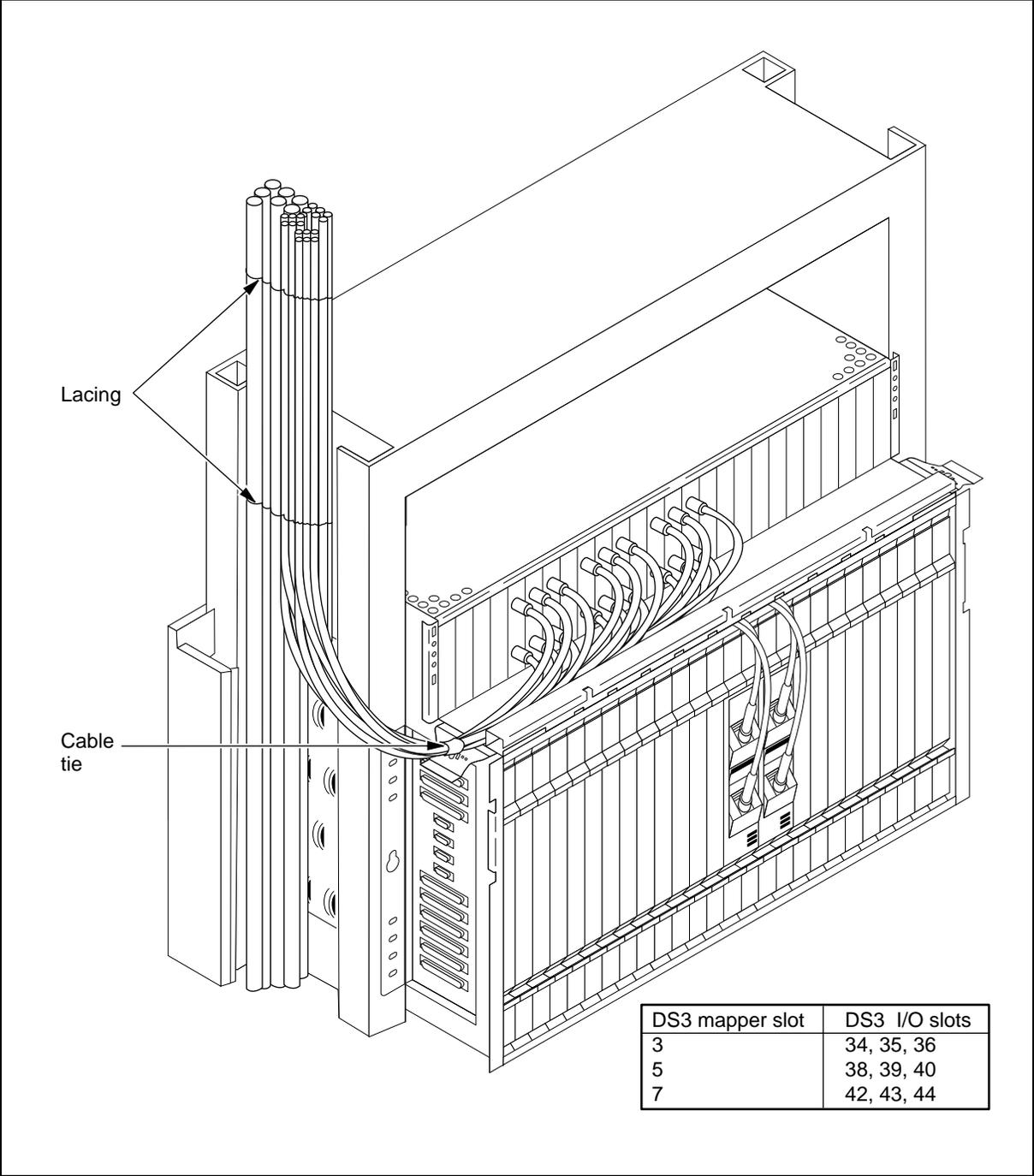
Note: If the bay is installed in an integrated bonding network (IBN) grounding environment, and the DS3s connect to equipment that is located outside the IBN, the DS3s must be isolated from foreign grounds by means of a transmission ground reference panel that is bonded to the single point building ground (SPG) within the IBN.

—continued—

Procedure 5-14 (continued)
Installing the DS3 cables

Figure 5-57
Routing and connecting DS3 cables

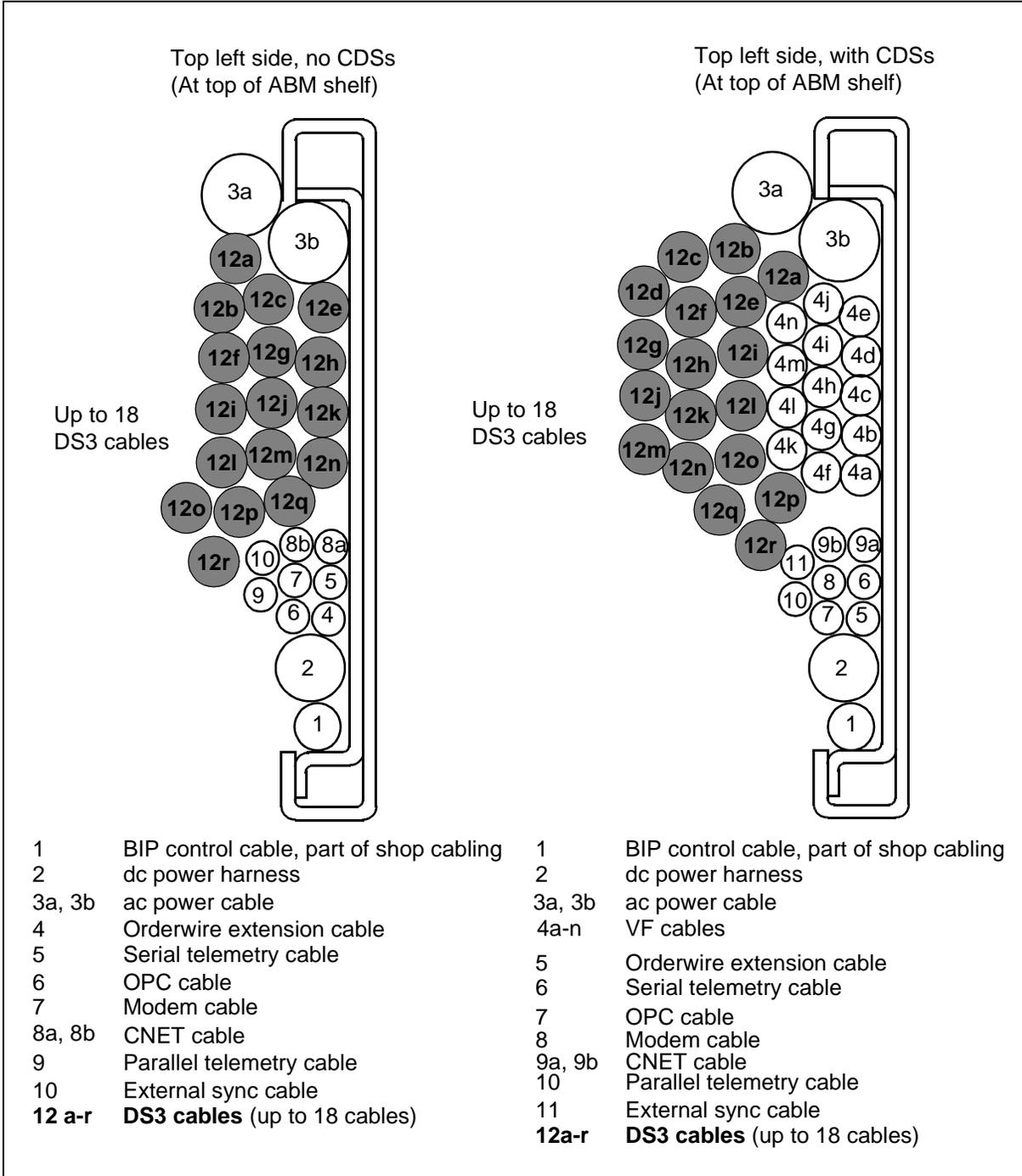
PC-11025



—continued—

Procedure 5-14 (continued)
Installing the DS3 cables

Figure 5-58
Dressing DS3 cables into the left bay upright



—end—

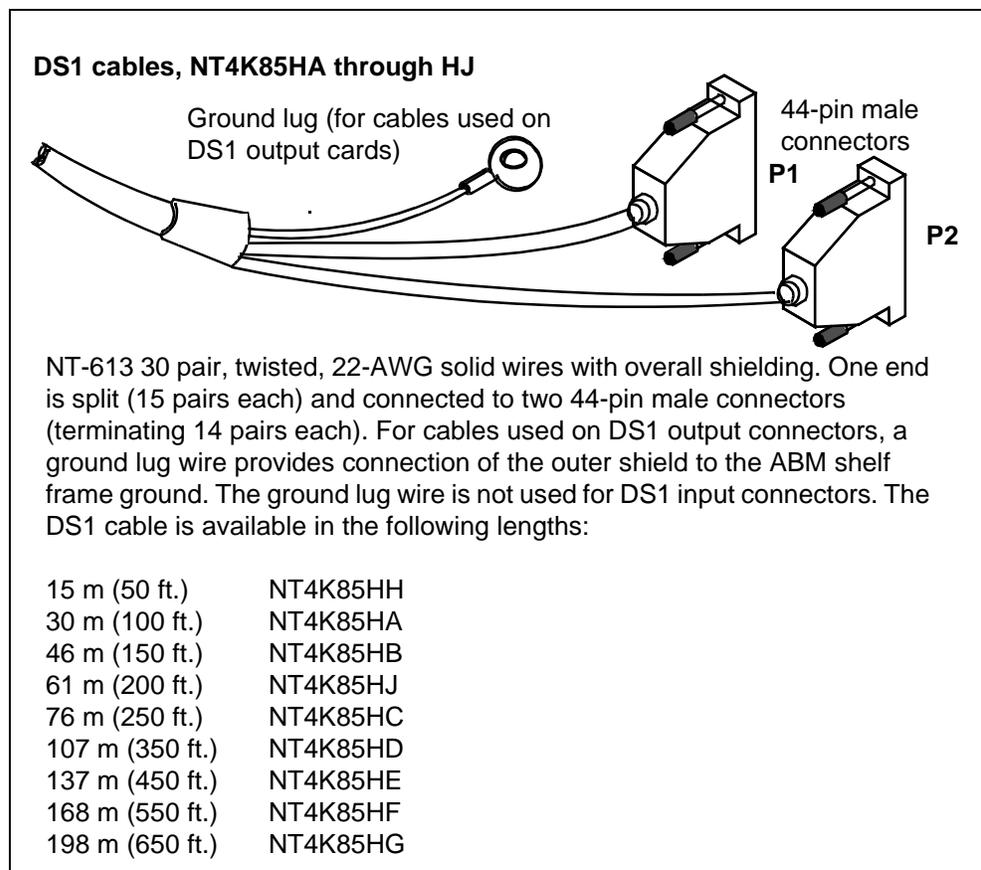
Procedure 5-15 Installing a mix of DS1 and DS3 cables

Use this procedure to install a mix of DS1 cables and DS3 cables to the access bandwidth manager (ABM shelf). For information on planning your DS1/DS3 mapper layout, see *Commissioning and Testing*, Volume 3.

This procedure applies to shelves that contain a mix of DS1 and DS3s. For the procedure to install DS1s to a shelf that only contains DS1s, see Procedure 5-13 on page 5-100, and for the procedure to install DS3s to a shelf that only contains DS3s, see Procedure 5-14 on page 5-123.

Figure 5-59 below presents the DS1 cable lengths available for use in ABM bays. See Table 5-29 on page 5-149 for the color codes and pin-outs of these cables.

Figure 5-59
DS1 cable for the ABM bay

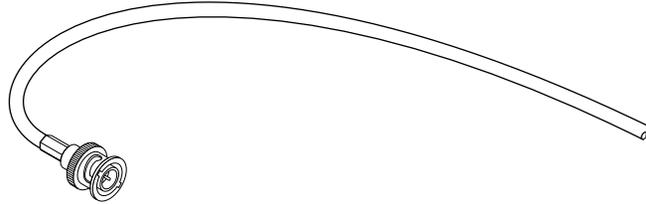


—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

PC-10068

DS3 cables, NT7E43AA through AH, and NT7E43AJ through AL



NT-734-E coaxial cables connectorized at one end with a BNC connector. These cables are available in the following lengths:

5 m	(16.4 ft)	NT7E43AA
10 m	(32.8 ft)	NT7E43AB
20 m	(65.6 ft)	NT7E43AC
30 m	(88.4 ft)	NT7E43AD
40 m	(131.1 ft)	NT7E43AE
50 m	(163.9 ft)	NT7E43AF
60 m	(196.7 ft)	NT7E43AG
75 m	(245.9 ft)	NT7E43AH
80 m	(262.3 ft)	NT7E43AJ
100 m	(327.9 ft)	NT7E43AL
140 m	(459 ft)	NT7E43AK

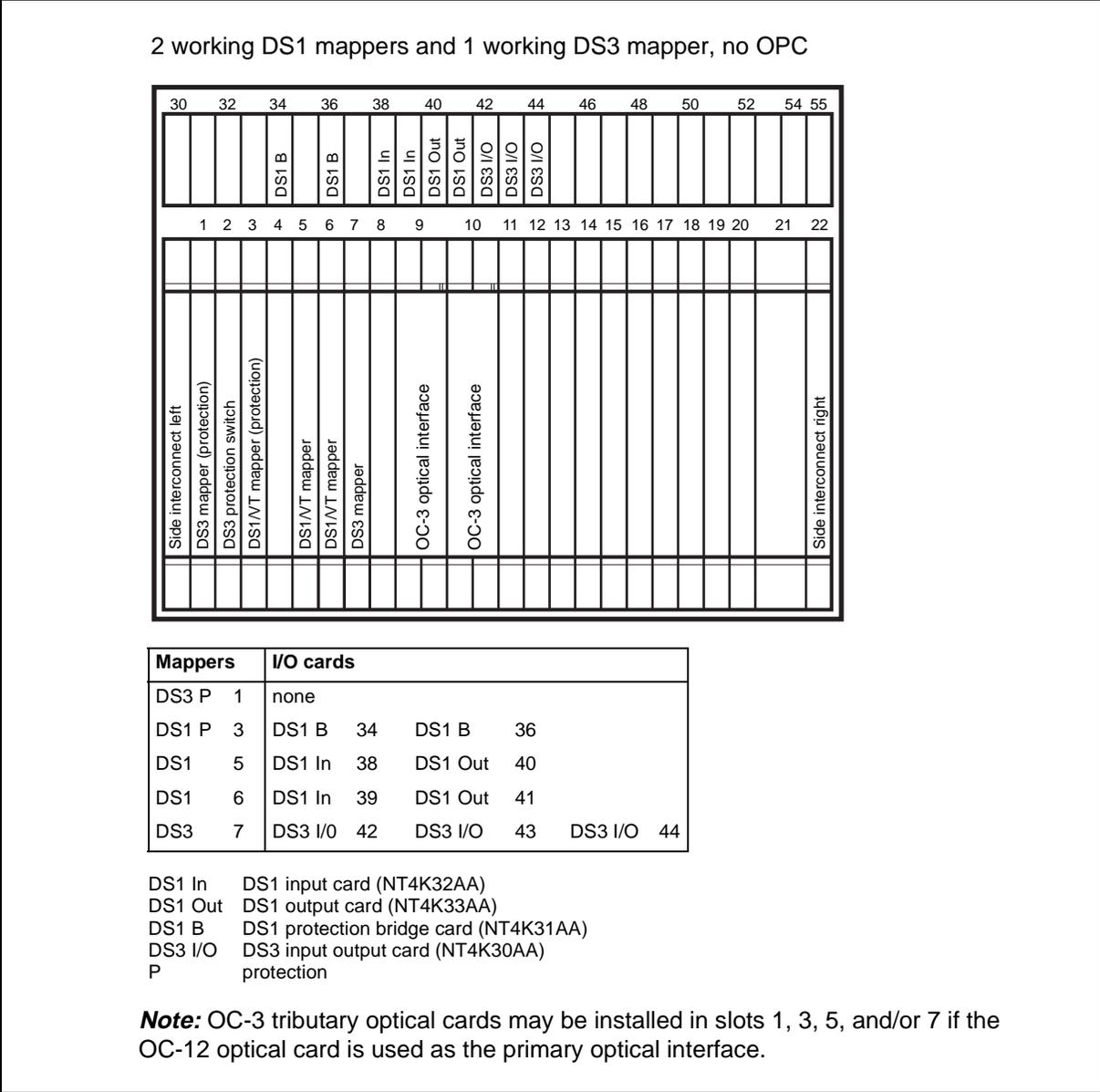
On pages 5-131 through 5-134, Figures 5-60 to 5-63 show typical ABM shelf configurations with a mix of DS1s and DS3s.

When you are installing DS1 cables, do not mix transmit connections (DS1 output) and receive connections (DS1 input) within the same cable; dedicate each cable to transmit or receive functions, but not both.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-60
Typical OC-3 universal configurations for the FCOT and the RFT

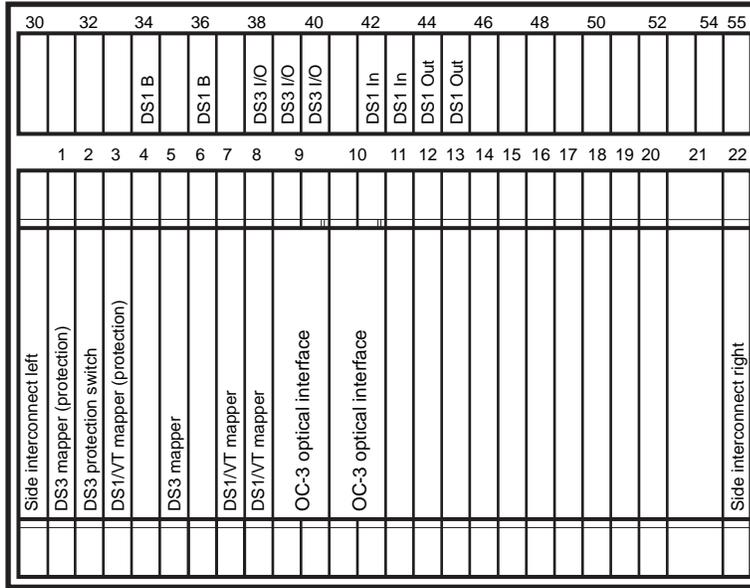


—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-61
Typical OC-3 combined configurations for the FCOT and the RFT

2 working DS1 mappers and 1 working DS3 mapper, no OPC



Mappers	I/O cards
DS3 P 1	none
DS1 P 3	DS1 B 34 DS1 B 36
DS3 5	DS3 I/O 38 DS3 I/O 39 DS3 I/O 40
DS1 7	DS1 In 42 DS1 Out 44
DS1 8	DS1 In 43 DS1 Out 45

- DS1 In DS1 input card (NT4K32AA)
- DS1 Out DS1 output card (NT4K33AA)
- DS1 B DS1 protection bridge card (NT4K31AA)
- DS3 I/O DS3 input output card (NT4K30AA)
- P protection

Note 1: This figure shows a typical combined configuration for the FCOT. At the RFT, a combined configuration contains a DS3 working mapper, but no DS1 mappers. Consequently, lower slots 7 and 8, and I/O slots 42 to 45 contain blank I/O faceplate cards.

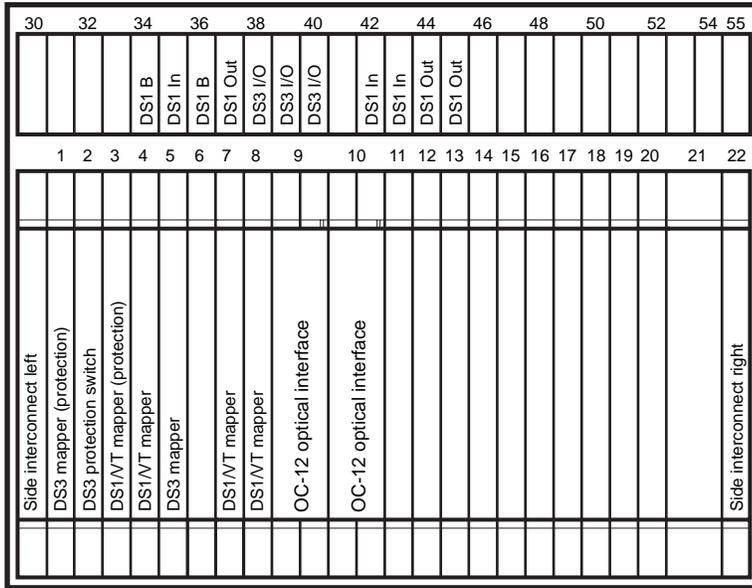
Note 2: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-62
Typical OC-12 integrated configurations for the FCOT and the RFT

3 working DS1 mappers and 1 working DS3 mapper, no OPC



Mappers	I/O cards
DS3 P 1	none
DS1 P 3	DS1 B 34 DS1 B 36
DS1 4	DS1 In 35 DS1 Out 37
DS3 5	DS3 38 DS3 39 DS3 40
DS1 7	DS1 In 42 DS1 Out 44
DS1 8	DS1 In 43 DS1 Out 45

DS1 In DS1 input card (NT4K32AA)
 DS1 Out DS1 output card (NT4K33AA)
 DS1 B DS1 protection bridge card (NT4K31AA)
 DS3 I/O DS3 input output card (NT4K30AA)
 P protection

Note 1: This figure shows a typical integrated configuration for the FCOT. At the RFT, the integrated configuration contains one working DS1 mapper and one working DS3 mapper. Consequently at the RFT, lower slots 7 and 8, and I/O slots 42 to 45 contain blank I/O faceplate cards.

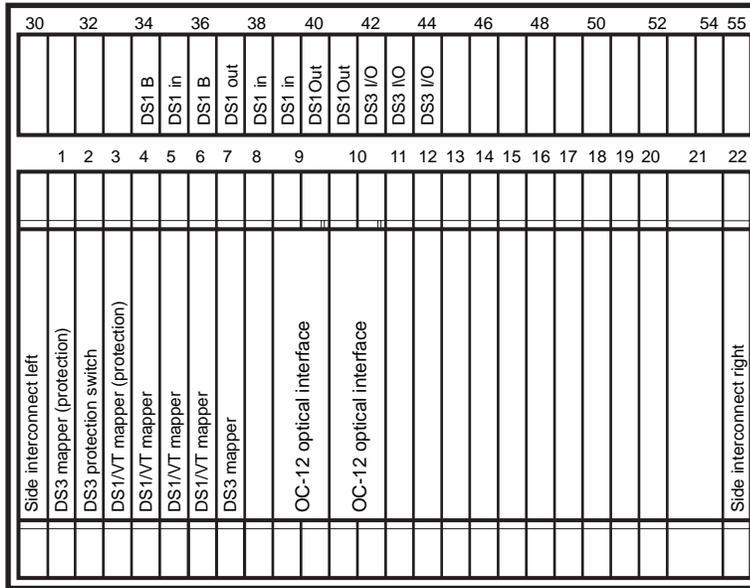
Note 2: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-63
Typical OC-12 universal configurations for the FCOT and the RFT, alternative 1

3 working DS1 mappers and 1 working DS3 mapper, no OPC



Mappers		I/O cards			
DS3 P	1	none			
DS1 P	3	DS1 B	34	DS1 B	36
DS1	4	DS1 In	35	DS1 Out	37
DS1	5	DS1 In	38	DS1 Out	40
DS1	6	DS1 In	39	DS1 Out	41
DS3	7	DS3 I/O	42	DS3 I/O	43 DS3 I/O 44

- DS1 In DS1 input card (NT4K32AA)
- DS1 Out DS1 output card (NT4K33AA)
- DS1 B DS1 protection bridge card (NT4K31AA)
- DS3 I/O DS3 input output card (NT4K30AA)
- P protection

Note 1: This configuration shows an OC-12 universal configuration that is fully equipped with 3 working DS1 mappers. When the shelf is equipped with only two working DS1 mappers, lower slot 6 contains a faceplate card, and I/O slots 39 and 41 contain blank I/O faceplate cards.

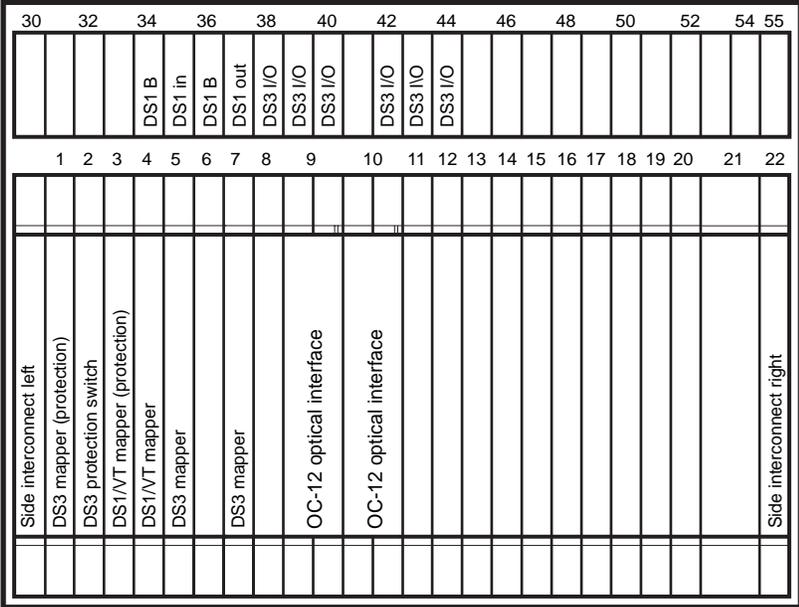
Note 2: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-64
Typical OC-12 universal configurations for the FCOT and the RFT, alternative 2

1 working DS1 mappers and 2 working DS3 mapper, no OPC



Mappers	I/O cards
DS3 P 1	none
DS1 P 3	DS1 B 34 DS1 B 36
DS1 4	DS1 In 35 DS1 Out 37
DS3 5	DS3 I/O 38 DS3 I/O 39 DS3 I/O 40
DS3 7	DS3 I/O 42 DS3 I/O 43 DS3 I/O 44

DS1 In DS1 input card (NT4K32AA)
 DS1 Out DS1 output card (NT4K33AA)
 DS1 B DS1 protection bridge card (NT4K31AA)
 DS3 I/O DS3 input output card (NT4K30AA)
 P protection

Note: OC-3 tributary optical cards may be installed in slots 1, 3, 5, and/or 7 if the OC-12 optical card is used as the primary optical interface.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Requirements

You need the following tools and materials:

- cable cutters
- cable ties
- screwdriver, Phillips No. 1
- heat shrinkable tubing, black, 9.3 mm (3/8 in.) diameter, R0113153, or equivalent
- heat shrink gun

Action

Step Action

- 1 Use facility records to identify the lower slots into which DS1 and DS3 mappers are to be installed.

 For a description of the shelf configurations and the placement of mappers and I/O cards at the fiber central office terminal (FCOT) and at the remote fiber terminal (RFT), see the *Mapper Layouts Planning Guide*, 323-3001-154, in the *Engineering, Configuration and Ordering Guide*, Volume 1.
- 2 Remove the blank I/O faceplate cards from the following I/O slots according to the lower slots in which DS1 and DS3 mappers are to be installed.

Slots with DS1 mappers	Remove faceplate cards from slots	Slots with DS3 mappers	Remove faceplate cards from slots
3 (protection)	34, 36	1 (protection)	none
4	35, 37	5	38, 39, 40
5	38, 40	7	42, 43, 44
7	42, 44		
8	43, 45		

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step Action

- 3** Insert I/O cards into the shelf according to the slots into which mappers are to be installed as follows:

Slots with mappers	Type of mapper	Insert the following types of I/O cards into these slots
1	DS3 P	none
3	DS1 P	DS1 B 34 DS1 B 36
4	DS1	DS1 In 35 DS1 Out 37
5	DS1	DS1 In 38 DS1 Out 40
	DS3	DS3 38 DS3 39 DS3 40
7	DS1	DS1 In 40 DS1 Out 42
	DS3	DS3 42 DS3 43 DS3 44
8	DS1	DS1 In 43 DS1 Out 45
DS1 In	DS1 input card, NT4K32AA	
DS1 Out	DS1 output card, NT4K33AA	
DS1 B	DS1 protection bridge card (NT4K31AA)	
DS3 I/O	DS3 input output card, NT4K30AA	
P	protection	

- 4** Tighten the hold-down screws at the bottom of the card faceplates.
- 5** Label both ends of each DS1 cable and each DS3 cable as follows:
- DS1 cables the range of DS1 numbers (1 to 14, 15 to 42, or 43 to 70), and the function of the cable: Tx (transmit) or Rx (receive)
- DS3 cables the number of the DS3 (1 to 6) and the function of the cable: TX (transmit) or Rx (receive)

Note: The function of the cable (transmit or receive) is determined from the perspective of the cross-connect panel. Transmit cables carry signals away from the cross-connect, and receive cables carry signals toward the cross-connect.

—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step	Action
6	Run one DS1 cable into the left side of the bay for each pair of DS1 I/O cards (DS1 In, DS1 Out, or DS1 B) that you installed in I/O slots 34 to 41.
7	Run one pair of DS3 cables into the left side of the bay for each DS3 I/O card that you installed in I/O slots 38 to 40.
8	<p>Starting at slot 35 and ending at slot 41, attach the DS1 cables and the DS3 cables to the intended connectors on the I/O cards, as shown in Figure 5-65 on page 5-139.</p> <p>When attaching the DS1 cables, tighten the connector hold down screws just enough to draw the connector into position (2 inch-pounds maximum). Do not over-tighten.</p> <p>Note: When installing a DS1 cable to the cards in slots 34 and 35, position the P1 connector in front of the DS1B card in slot 34. This connector is not used. Use a cable tie to secure the P1 connector to the P2 connector that is attached to the card in slot 35. Similarly, when installing a DS1 cable to the cards in slots 36 and 37, position the unused P1 connector in front of the card in slot 36, and use a cable tie to secure it to the P2 connector that is attached to the card in slot 37.</p>
9	Use a cable tie to attach the bundle of cables to the lance at the entrance to the cable trough, as shown in Figure 5-65 on page 5-139.
10	Attach the ground lugs of the receive DS1 cables to the ground lugs at the left side of the ABM shelf, as shown in Figure 5-66 on page 5-140.

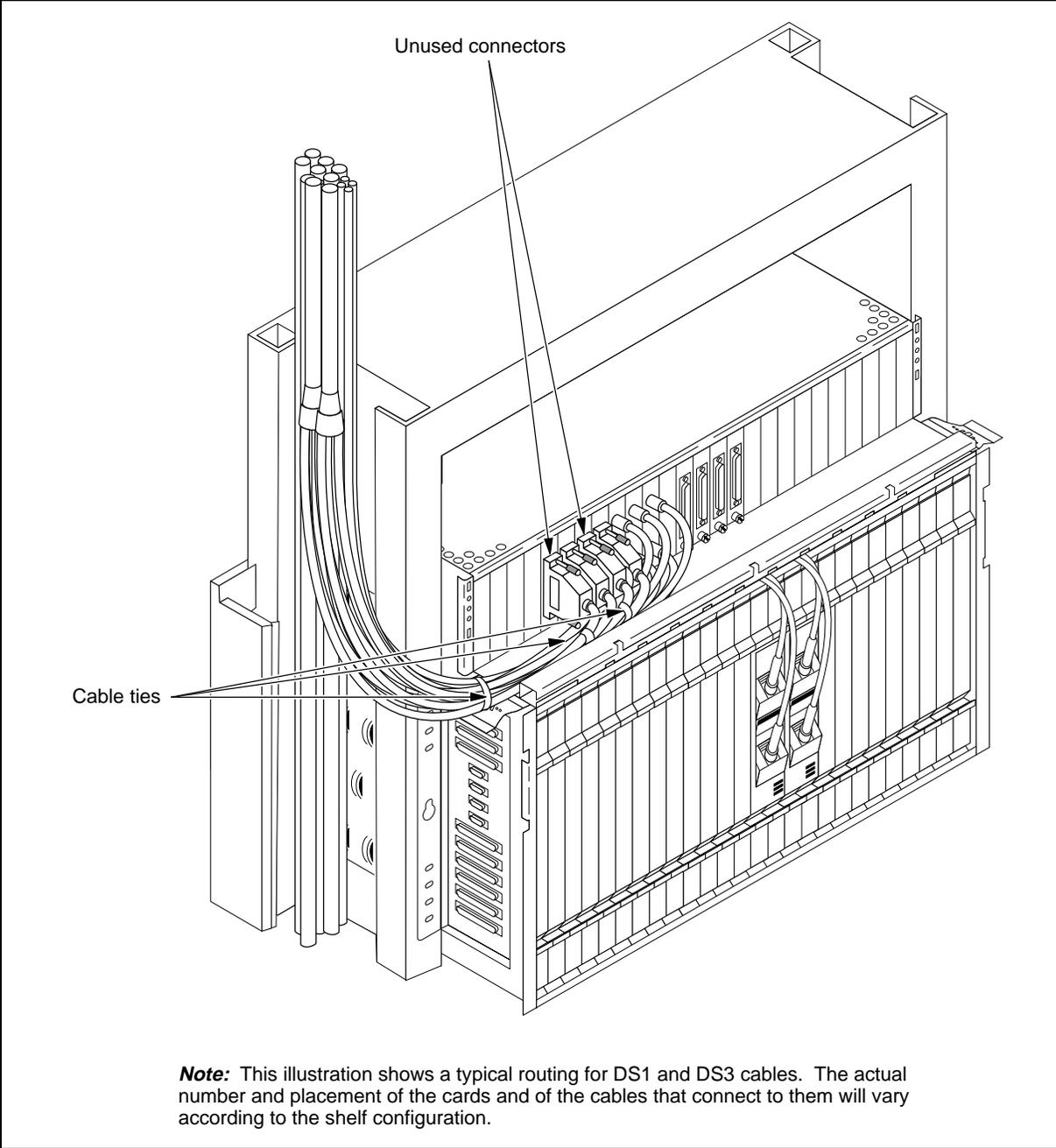
—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step Action

Figure 5-65
Routing DS1 and DS3 cables into the left side of the bay

PC-11032



Note: This illustration shows a typical routing for DS1 and DS3 cables. The actual number and placement of the cards and of the cables that connect to them will vary according to the shelf configuration.

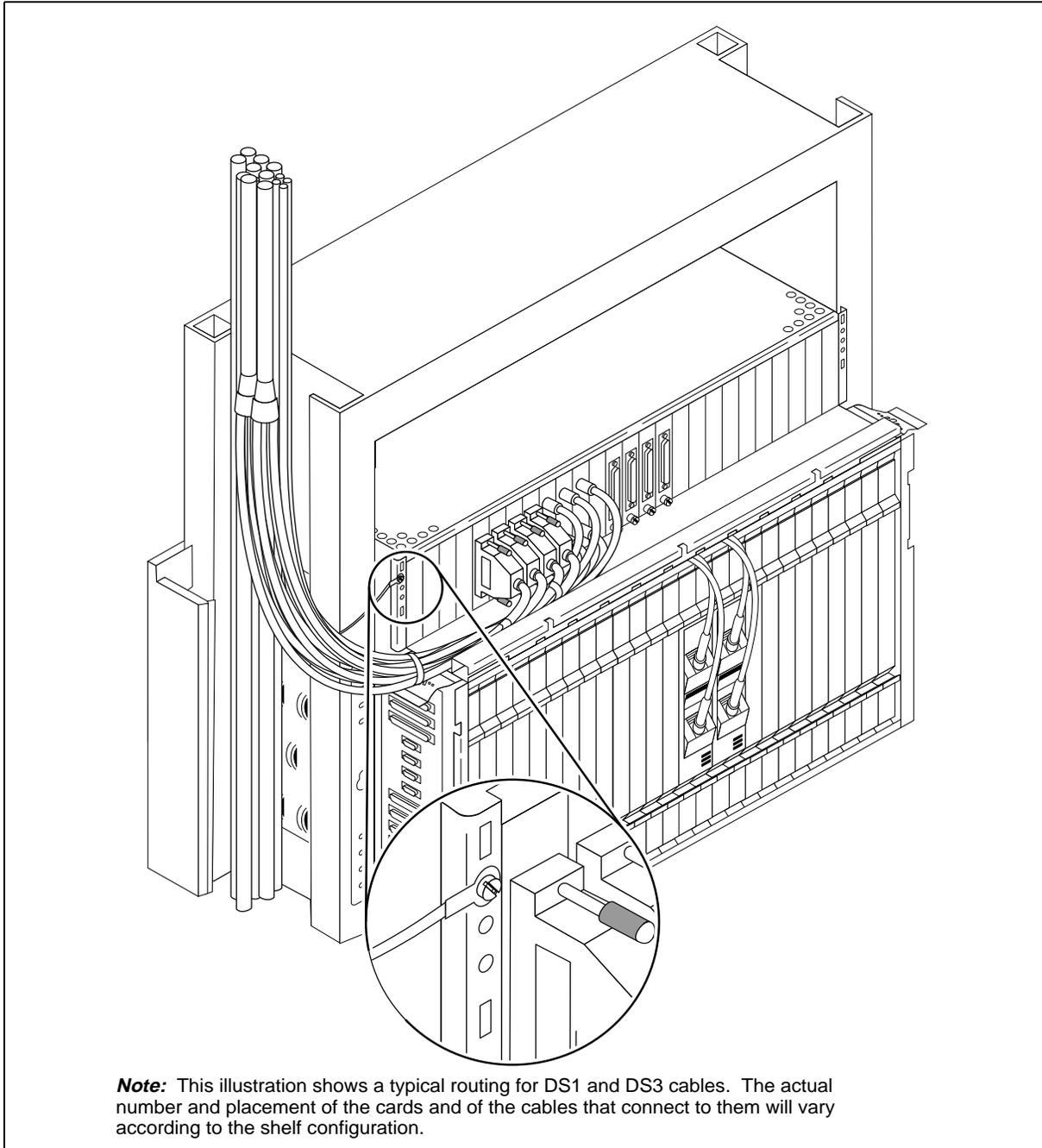
—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step **Action**

Figure 5-66
Attaching the ground lugs of the receive DS1 cables

PC-11090

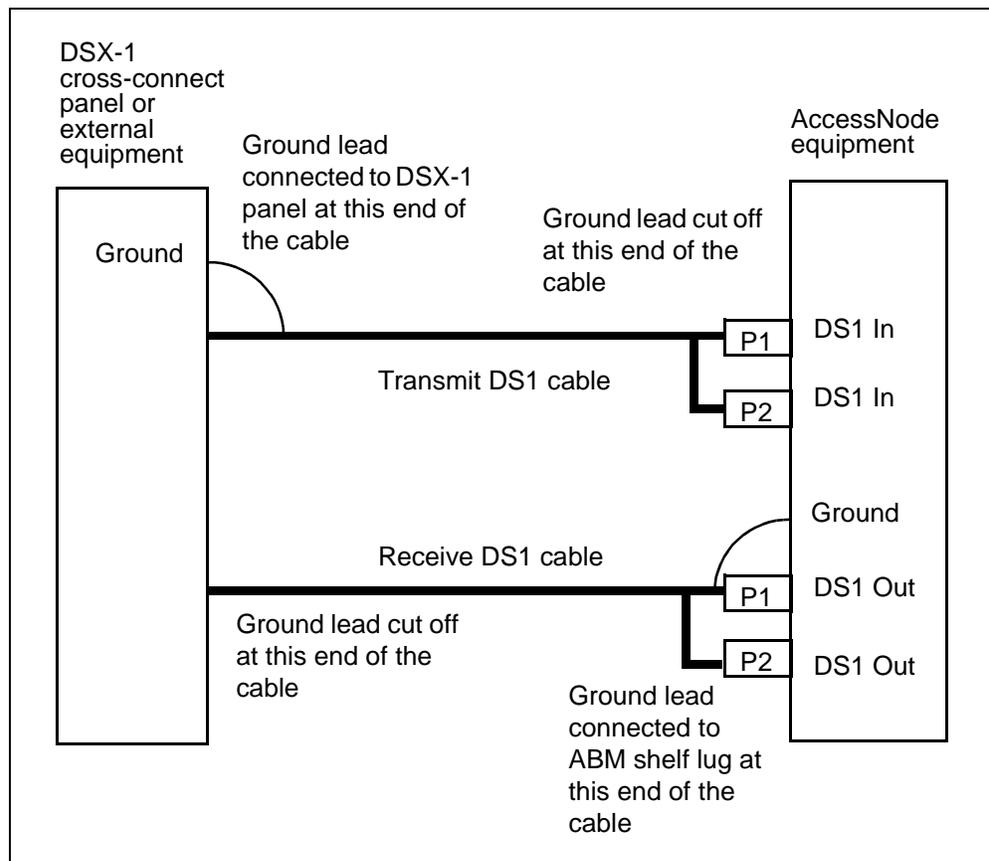


—continued—

Procedure 5-15 (continued)

Installing a mix of DS1 and DS3 cables

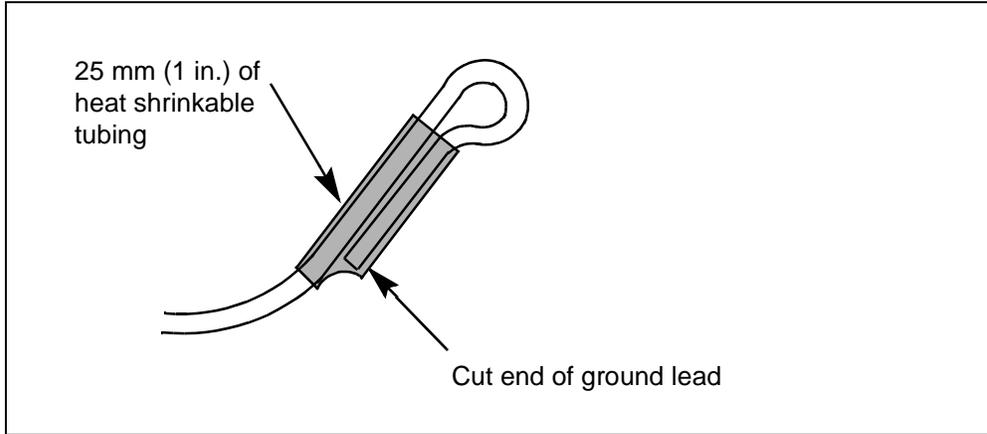
- | Step | Action |
|------|---|
| 11 | <p>At the shelf-end of the transmit DS1 cables, cut off the ground lead to within 50 mm (2 in.) of the cable jacket. These ground leads are not used.</p> <p>Note: When you have finished connecting all of the grounds, the grounding of the transmit and receive DS1 cables will be as shown in the following schematic diagram.</p> |



—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

- | Step | Action |
|-------------|---|
| 12 | Bend the cut end of the ground lead back on itself and protect it with a 25 mm (1 in.) length of heat shrinkable tubing, as shown in the following diagram. |



- | | |
|-----------|--|
| 13 | Dress the DS1 and DS3 cables into the position in the left bay upright shown in Figure 5-68 on page 5-144, and use cable ties to fasten them to existing bundles of cables or to the bay upright, as shown in Figure 5-67 on page 5-143. |
| 14 | Lace the DS1 cables to the cable bracket at the top of the bay, as shown in Figure 5-67 on page 5-143. |

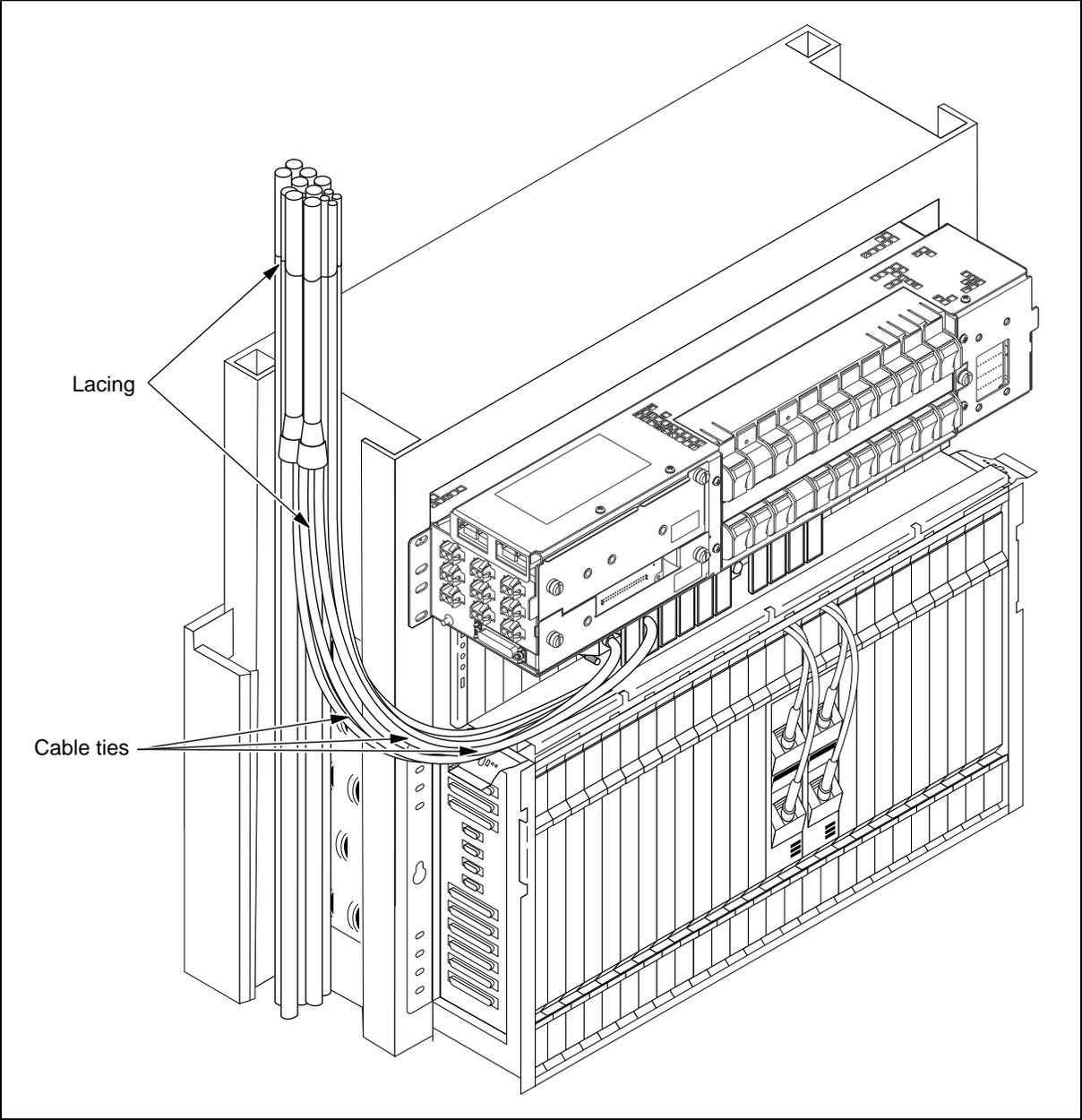
—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step Action

Figure 5-67
Securing cables in the left bay upright

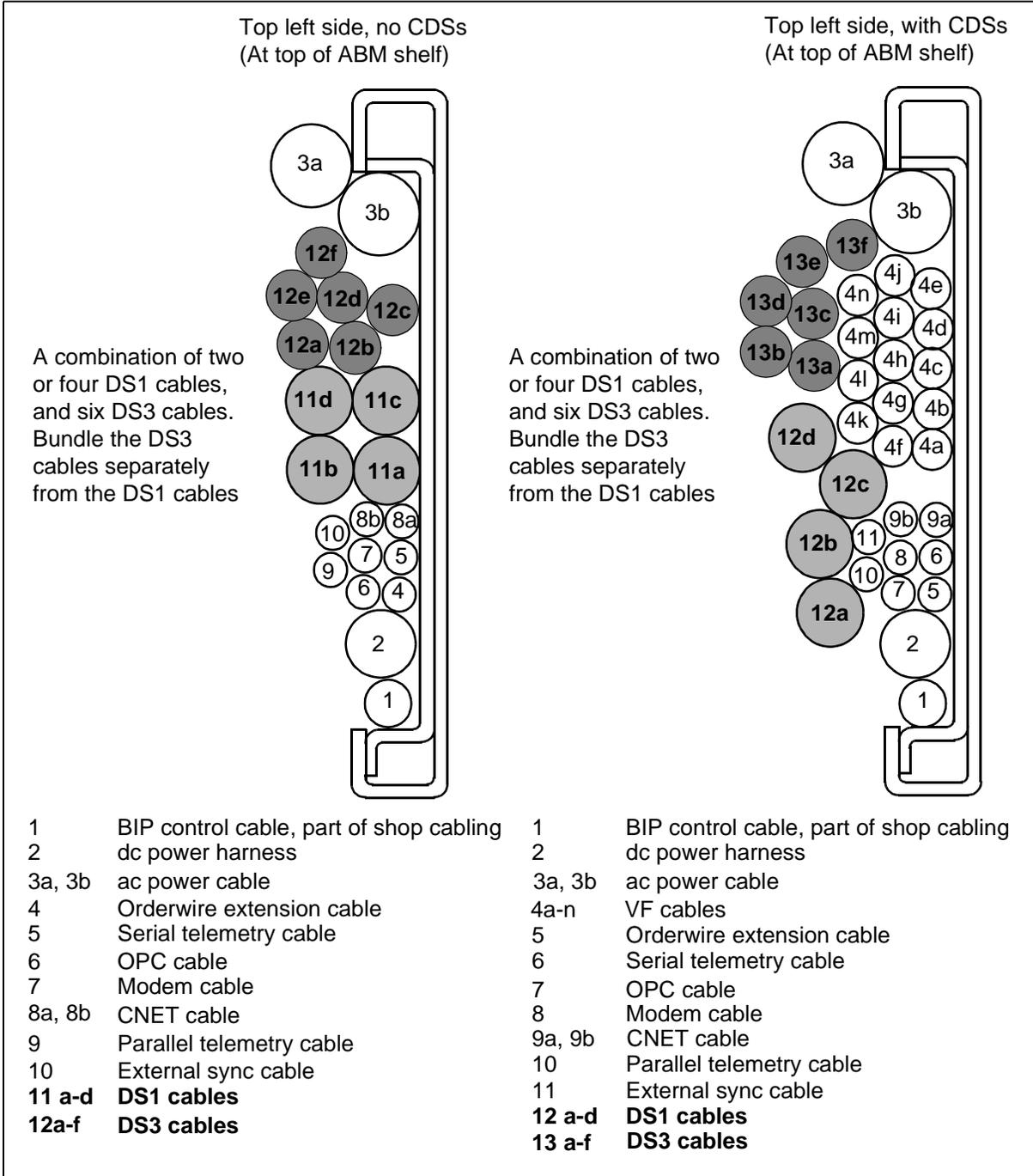
PC-16491



—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Figure 5-68
Dressing the cables into the left bay upright



—continued—

Procedure 5-15 (continued)

Installing a mix of DS1 and DS3 cables

Step	Action
15	Run one DS1 cable into the right side of the bay for each pair of DS1 I/O cards that you installed in I/O slots 42 through 45.
16	Run one pair of DS3 cables into the right side of the bay for each DS3 card that you installed in I/O slots 42 through 44.
17	Starting at slot 42 and ending at slot 45, attach the DS1 cables and the DS3 cables to the intended connectors on the I/O cards, as shown in Figure 5-69 on page 5-146. When attaching the DS1 cables, tighten the connector hold down screws just enough to draw the connector into position (2 inch-pounds maximum). Do not over-tighten.
18	Attach the bundle of cables to the cable trough with a cable tie, as shown in Figure 5-69 on page 5-146.
19	Attach the ground lugs of the receive (IN) DS1 cables to the right side of the ABM shelf with hex screws.
20	At the shelf-end of each transmit DS1 cable, cut off the ground lead to within 50 mm (2 in.) of the cable jacket. The ground lead is not used.
21	Bend the cut end of each ground lead back on itself and protect it with a 25 mm (1 in.) length of heat-shrinkable tubing.
22	Dress the cables into the position in the right bay upright as shown in Figure 5-55 on page 5-119, and use cable ties to fasten them to the right bay upright or to existing bundles of cables, as shown in Figure 5-69 on page 5-146.
23	Lace the cables to the cable bracket on the top of the bay, as shown in Figure 5-69 on page 5-146.

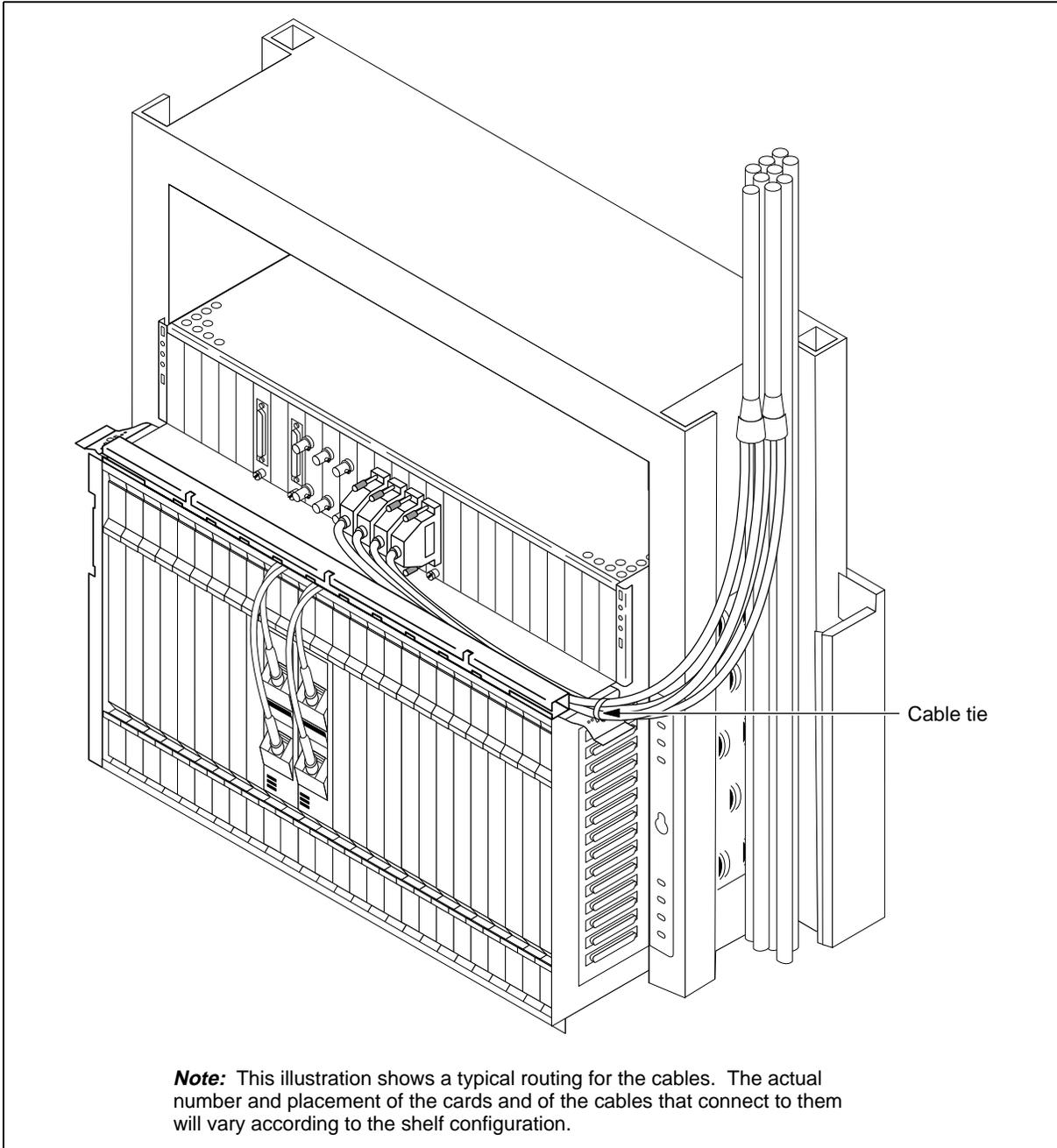
—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step **Action**

Figure 5-69
Routing cables into the right side of the bay

PC-11033

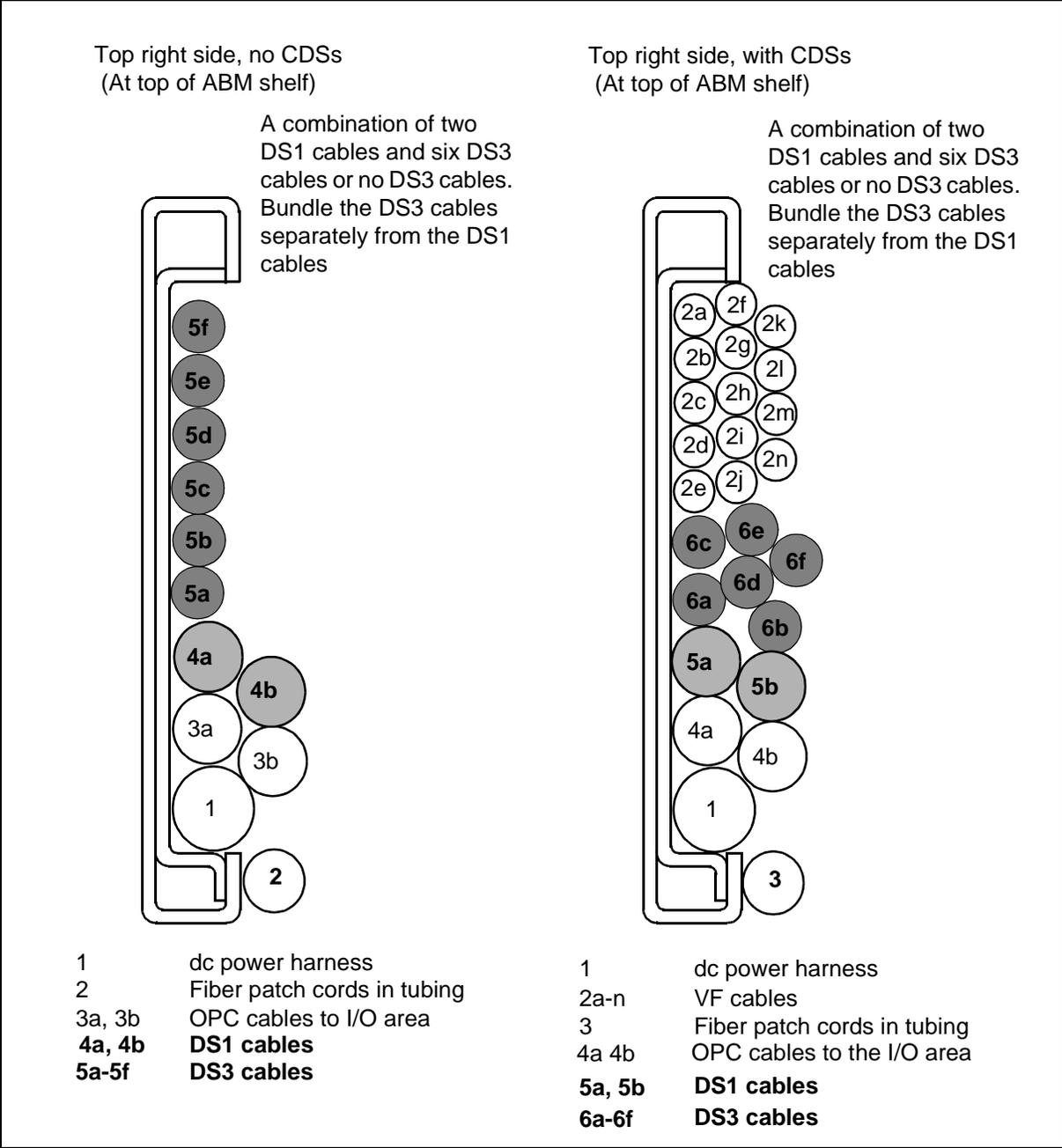


—continued—

Procedure 5-15 (continued)
Installing a mix of DS1 and DS3 cables

Step Action

Figure 5-70
Dressing cables into the right bay upright



—continued—

Procedure 5-15 (continued)

Installing a mix of DS1 and DS3 cables

Step	Action
24	Run the DS1 and DS3 cables from the bay over to the DS1 cross-connect and the DS3 cross-connect panel.
25	Use Table 5-29 to terminate the office-end of the DS1 cables to the DSX-1 cross-connect panel.
26	Terminate the DS3 cables to the DS3 cross-connect panel.

—end—

Table 5-29
Color codes and pin-out details for the DS1 cables

Connector P1						
Connector pin		Pair or DS1 no.	Color of pair			
Ring	Tip		Ring		Tip	
31	16	1	BL	1W	W	1 BL
32	17	2	O	1W	W	1O
33	18	3	G	1W	W	1G
34	19	4	BR	1W	W	1BR
35	20	5	S	1W	W	1S
36	21	6	BL	1R	R	1BL
37	22	7	O	1R	R	1O
38	23	8	G	1R	R	1G
39	24	9	BR	1R	R	1BR
40	25	10	S	1R	R	1S
41	26	11	BL	1BK	BK	1BL
42	27	12	O	1BK	BK	1O
43	28	13	G	1BK	BK	1G
44	29	14	BR	1BK	BK	1BR
-	30	-				
—continued—						

Table 5-29 (continued)
Color codes and pin-out details for the DS1 cables

Connector P2						
Connector pin		Pair or DS1 no.	Color of pair			
Ring	Tip		Ring		Tip	
31	16	15	S	1BK	BK	1 S
32	17	16	BL	1Y	Y	1BL
33	18	17	O	1Y	Y	1O
34	19	18	G	1Y	Y	1G
35	20	19	BR	1Y	Y	1BR
36	21	20	S	1Y	Y	1S
37	22	21	BL	1V	V	1BL
38	23	22	O	1V	V	1O
39	24	23	G	1V	V	1G
40	25	24	BR	1V	V	1BR
41	26	25	S	1V	V	1S
The following pairs are contained within a blue binder.						
42	27	26	BL	1W	W	1BL
43	28	27	O	1W	W	1O
44	29	28	G	1W	W	1G
-	30	-				
<p>Note 1: Pins 1 to 15 and pin 30 of connectors P1 and P2 are not connected, and pairs 29 and 30 are not used.</p> <p>Note 2: The tip lead is the positive (+) and the ring lead is the negative (-).</p>						
—end—						

Procedure 5-16

Installing the NTZX16TG transmission ground reference panel

Use this procedure to install an NTZX16TG transmission ground reference (TGR) panel for DS3 cables. A TGR panel must be installed when AccessNode equipment is installed in an integrated bonding network (IBN) and the DS3 cables extend outside the IBN.

Requirements

You need the following tools and materials:

- 6 AWG grounding lead, 2 m (6 ft)
- wire stripper, for 6 AWG leads
- two 2-hole grounding lugs
- crimping tool, TBM 2, or equivalent
- screwdriver, flat blade, 1/4 in. wide
- socket wrench, 5/8 in. hexagonal



CAUTION

Risk of damage to DS3 cable

Do not bend a DS3 cable into a radius smaller than 38 mm (1.5 in.) to avoid damaging the cable.

Action

Step	Action
1	Mount a non-conductive backboard on an isolated structure within 2 m (6 ft.) of the SPG (single-point ground) or the FGB (floor ground bar). For example, a wall could be used if it is within 2 m of the SPG or the FGB. Note: If a non-conductive backboard is not available, use four nonconductive bushings to mount the conductive panel to a wall or other isolated structure.
2	Secure the TGR panel to the backboard by means of four mounting screws inserted through the rear of the panel at the locations shown in Figure 5-71 on page 5-153.
3	Strip both ends of the 2 m (6 ft) grounding lead back a distance of 13 mm (1/2 in.).
4	Crimp a two-hole grounding lug to each end of the grounding lead.

—continued—

Procedure 5-16 (continued)

Installing the NTZX16TG transmission ground reference panel

Step	Action
5	Attach one of the two-hole grounding lugs to the transmission ground reference panel in the location shown in Figure 5-71 on page 5-153.
6	Run the grounding lead to the SPG, and attach the second grounding lug to the SPG.
7	Route all DS3 cables through the opening in the bottom of the TGR panel, as shown in Figure 5-71 on page 5-153.
8	Label each of the DS3 cables with the following information: <ul style="list-style-type: none">• the DS3 number• the transmission path (input or output)• the cable routing direction (from the AccessNode, or to the DSX-3)
9	Connect the DS3 cables to the IN and OUT connectors. Make sure the cables are not mixed at the TGR panel as IN and OUT. If a cable is for an equipment IN connector, it must go to the DSX3 cross-connect panel as IN. If a cable is for an equipment OUT connector, it must go to the DSX3 cross-connect panel as OUT.
10	Dress the cables, as shown in Figure 5-71 on page 5-153, and secure them with cable ties.
11	Hang the front cover on the TGR front panel by engaging the two clips at the top of the cover.
12	Secure the cover with two self-tapping screws: one at each side of the cover.

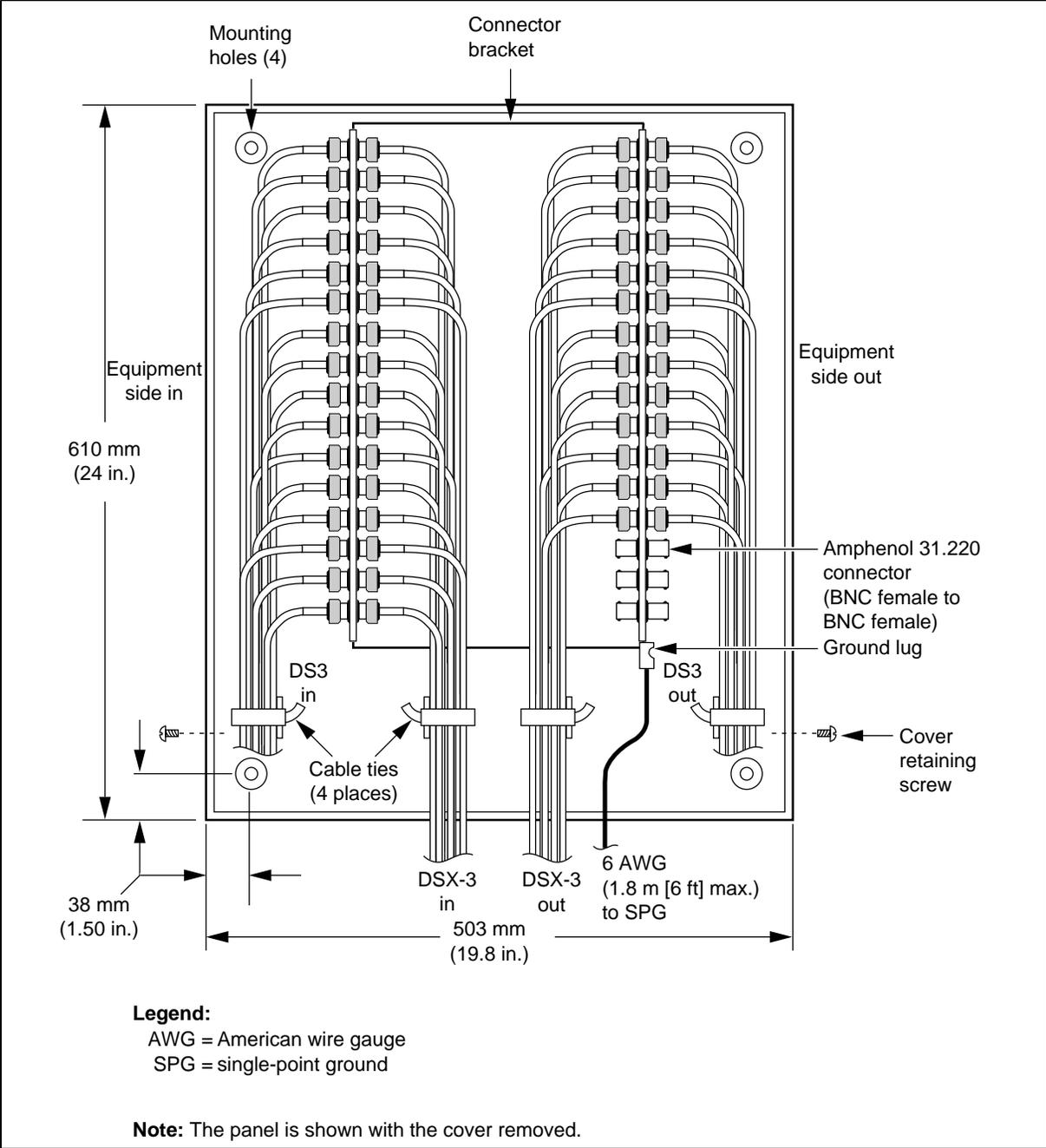
—continued—

Procedure 5-16 (continued)
Installing the NTZX16TG transmission ground reference panel

Step Action

Figure 5-71
Installing a TGR reference panel

PC-10015

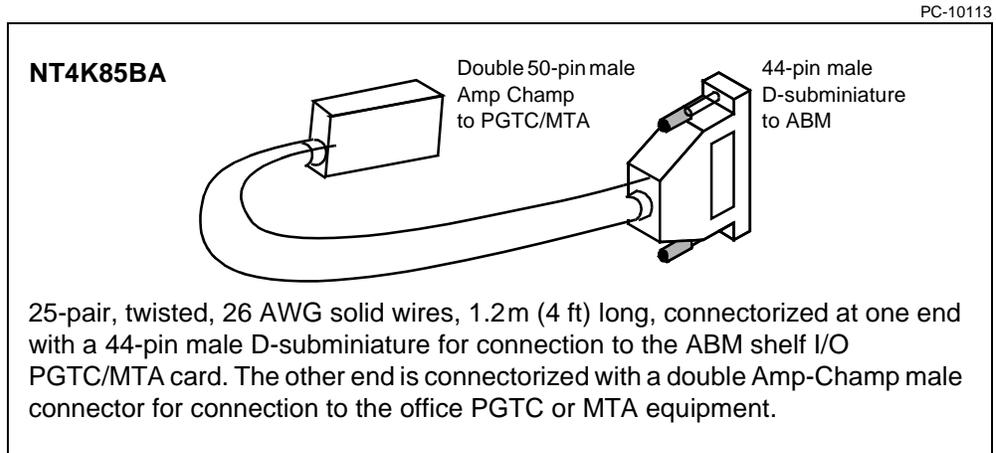


—end—

Procedure 5-17 Installing a pair gain test controller/metallic test access (PGTC/MTA) cable

Use this procedure to install the PGTC/MTA cable (NT4K85BA) from the I/O connector area of the ABM shelf to the office PGTC or MTA equipment. The PGTC/MTA is used in central offices, but not at remote sites.

Note: This cable is not used in VTBM ring applications.



Requirement

You need the following tools and materials:

- cable cutters
- flathead screwdriver, 1/4 in.
- cable ties

Action

Step	Action
1	Remove the blank I/O faceplate card (NT4K58ZA) from slot 52 and insert the PGTC/MTA I/O (NT4K58DA) card.
2	Tighten the hold-down screws on the bottom of the card faceplate.
3	Route the end of the PGTC/MTA cable with the 44-pin connector to the right side of the ABM shelf I/O connector area (see Figure 5-72 on page 5-155).
4	Route the other end of the PGTC/MTA cable assembly into the right bay upright and up into the overhead cable rack, for connection with office cabling.

—continued—

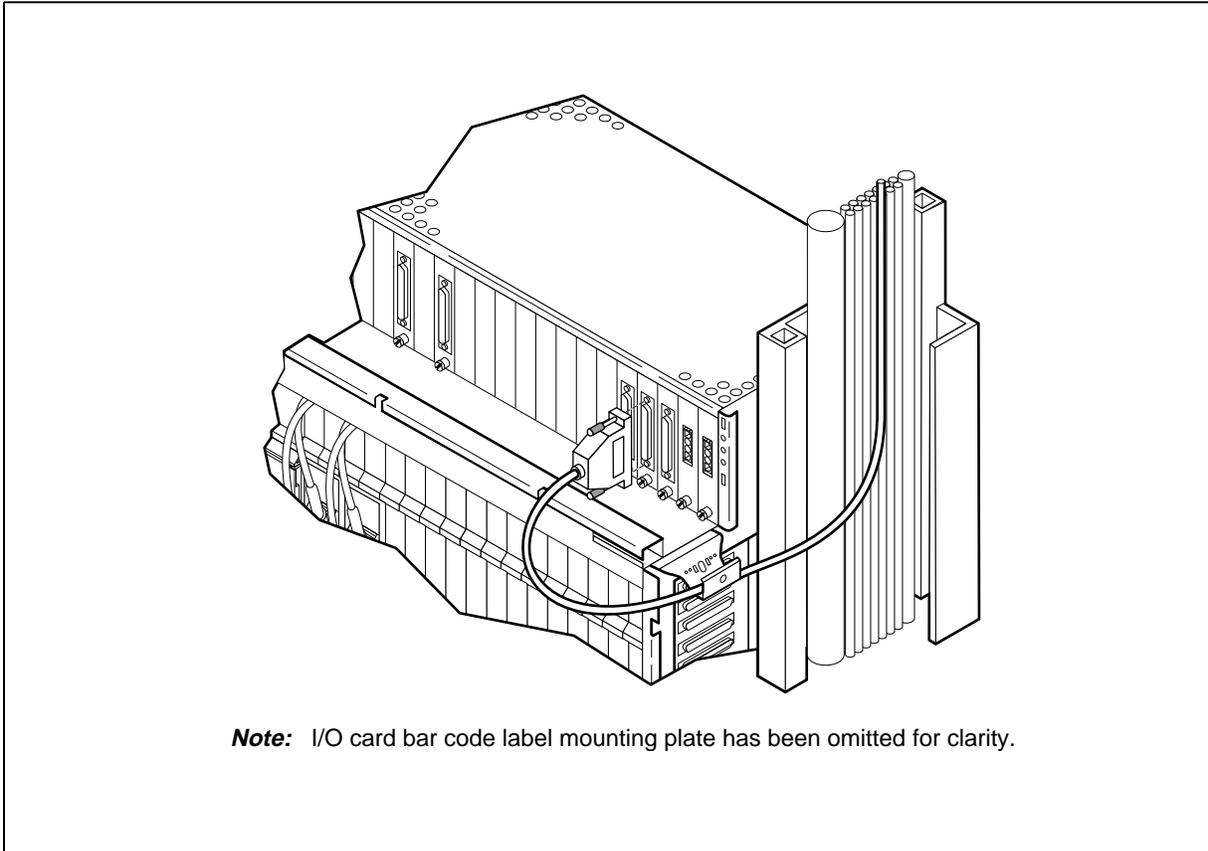
Procedure 5-17 (continued)

Installing a pair gain test controller/metallic test access (PGTC/MTA) cable

Step Action

Figure 5-72
Connecting a PGTC/MTA cable to the ABM shelf

PC-10081



—continued—

Procedure 5-17 (continued)

Installing a pair gain test controller/metallic test access (PGTC/MTA) cable

Step	Action
5	Attach the cable to the connector on the PGTC/MTA I/O card in slot 52, as shown in Figure 5-73 on page 5-157. <i>Tighten the connector hold down screws just enough to draw the connector into place (2 inch-pounds maximum). Do not over-tighten.</i>
6	Dress the PGTC/MTA cable from its connector into the cable trough, as shown in Figure 5-73 on page 5-157.
7	Dress the cable into the bay right upright in the location shown in Figure 5-74 on page 5-158, and use cable ties to fasten it to existing bundles of cables.
8	Route a 25-pair twisted pair cable (customer supplied) from the double connector end of the PGTC/MTA cable to the office PGTC/MTA equipment. Note: The double connector allows for daisy chain connection, if an additional PGTC/MTA connection is required.
9	Terminate the office cable with a 50-pin AMP Champ connector, and connect it to the end of the pigtail assembly. Note: Refer to the table at the end of this procedure for pin-out detail.
10	Refer to Table 5-30 on page 5-159 and terminate the office end of the cable to the main distribution frame cross connect.

—continued—

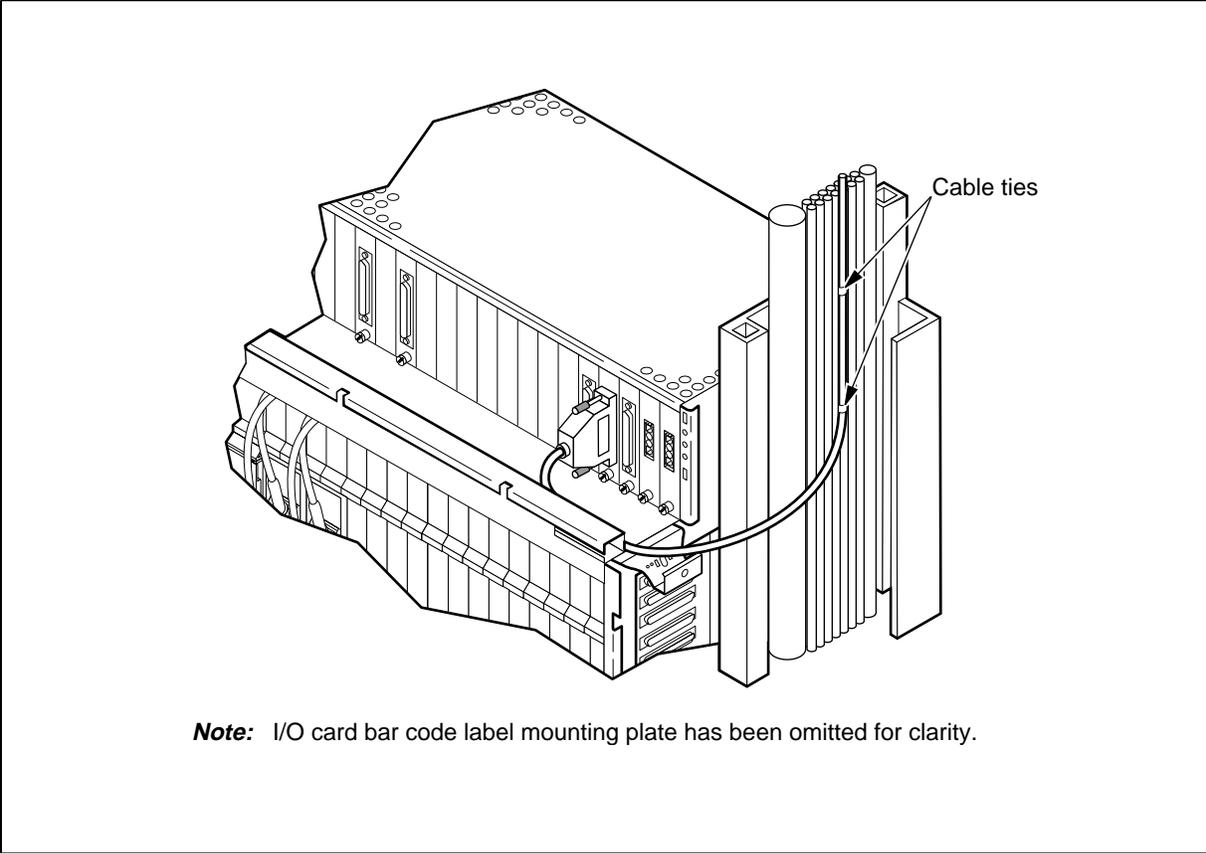
Procedure 5-17 (continued)

Installing a pair gain test controller/metallic test access (PGTC/MTA) cable

Step Action

Figure 5-73
PGTC/MTA cable connected and dressed

PC-10082



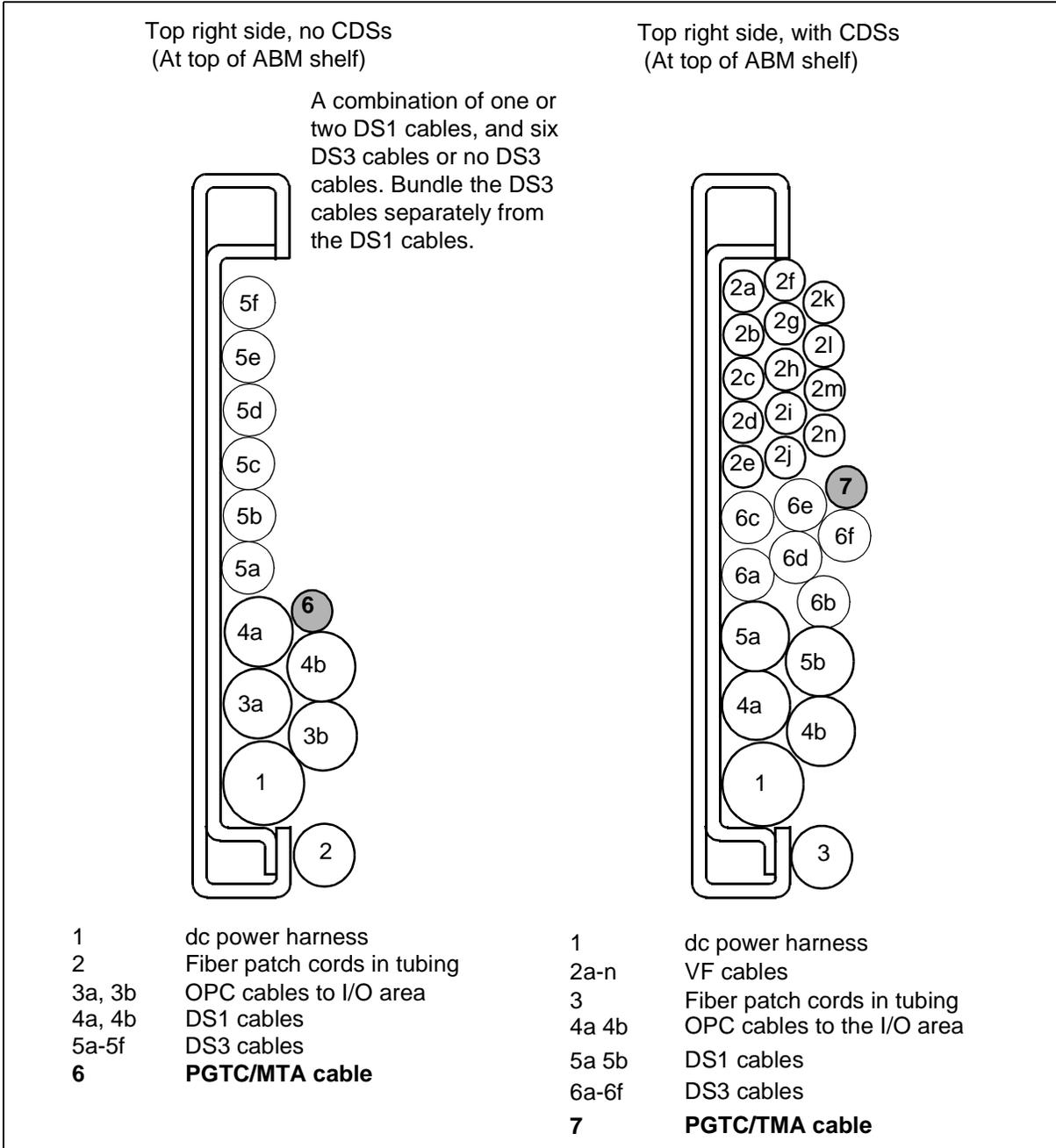
—continued—

Procedure 5-17 (continued)

Installing a pair gain test controller/metallic test access (PGTC/MTA) cable

Step Action

Figure 5-74
Placement of PGTC/MTA cable in bay upright



—continued—

Procedure 5-17 (continued)

Installing a pair gain test controller/metallic test access (PGTC/MTA) cable**Table 5-30**
50-pin Amp Champ connector on pigtail cable

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
1 Ring	1	1	BL 1W	1 Tip	26	1	W 1BL
2 Ring	2	2	O 1W	2 Tip	27	2	W 1O
3 Ring	3	3	G 1W	3 Tip	28	3	W 1G
4 Ring	4	4	BR 1W	4 Tip	29	4	W 1BR
2 Sleeve	5	5	S 1W	1 Sleeve	30	5	W 1S
4 Sleeve	6	6	BL 1R	3 Sleeve	31	6	R 1BL
2 OH	7	7	O 1R	1 OH	32	7	R 1O
4 OH	8	8	G 1R	3 OH	33	8	R 1G
2 Proceed	9	9	BR 1R	1 Proceed	34	9	R 1BR
4 Proceed	10	10	S 1R	3 Proceed	35	10	R 1S
2 Lock	11	11	BL 1BK	1 Lock	36	11	BK 1BL
4 Lock	12	12	O 1BK	3 Lock	37	12	B 1O
		13	NC			38	NC
		14	NC			39	NC
		15	NC			40	NC
		16	NC			41	NC
T Mjr		17	G 1BK	Tst Alm	42	42	BK 1G
		18	NC			43	NC
		19	NC			44	NC
		20	NC			45	NC
		21	NC			46	NC
Sezby		22	BR 1BK	Seize	47	47	BK 1BR
		23	NC			48	NC
		24	NC			49	NC
		25	NC			50	NC

NC = no connection

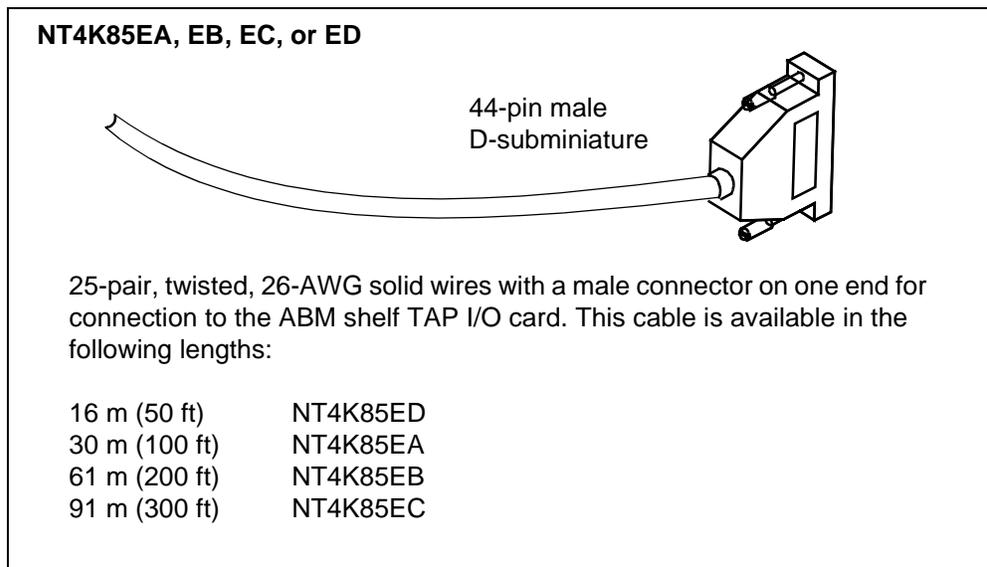
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Procedure 5-18

Installing a test access pair cable (TBP function)

Use this procedure to install a test access pair cable (NT4K85EA through ED) that is being used to perform the function of a test bypass pair cable (NT4K85EA through ED). This cable connects from the TBP I/O card to the main distribution frame (MDF) cross-connect.

Note: The test access bypass pair cable is used in central offices, not at remote sites.



Note 1: The same cable is used to perform test access path (TAP) and test bypass pair (TBP) functions, but the signals and the connection points of the cable are different.

Note 2: See the installation job records to determine if the TBP cable is applicable to your installation.

Requirement

You need the following tools and materials:

- cable cutters
- flathead screwdriver, 1/4 in.
- cable ties

—continued—

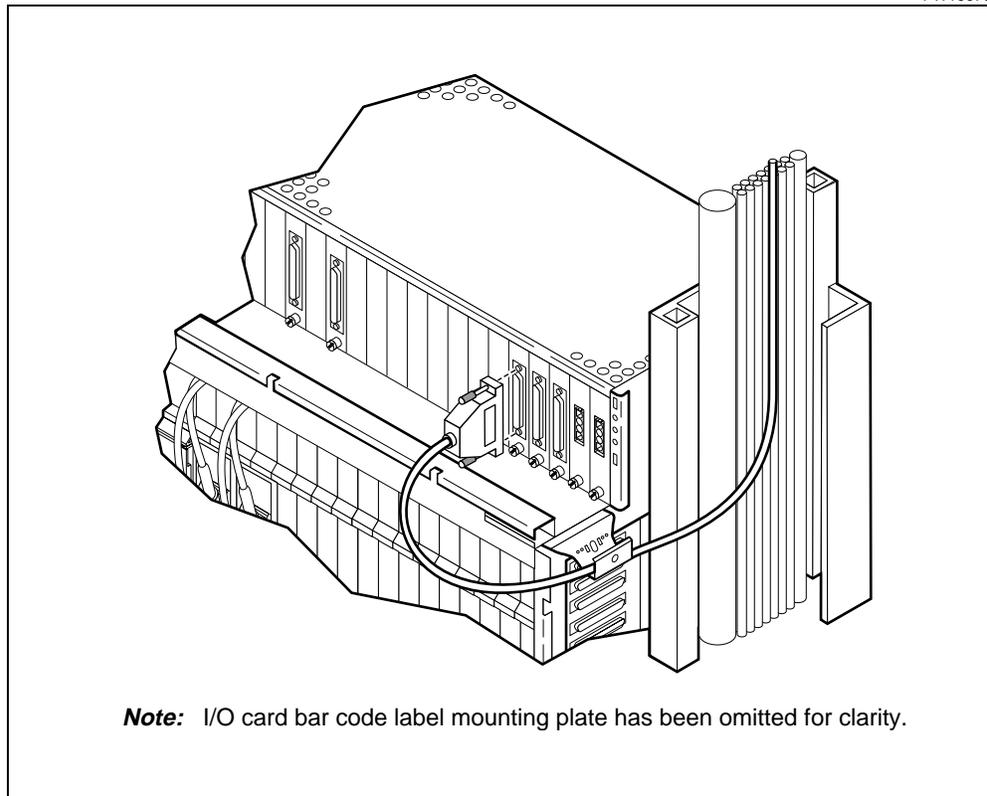
Procedure 5-18 (continued)

Installing a test access pair cable (TBP function)**Action**

Step	Action
1	Remove the blank I/O faceplate card (NT4K58ZA) from slot 51 and insert the test bypass pairs I/O (NT4K58CA) card.
2	Tighten the hold-down screws on the bottom of the card faceplate.
3	Route the test bypass pair cable from the bay to the office MDF, allowing sufficient length to access the connector on the TBP I/O card in the ABM shelf, as shown in Figure 5-75.

Figure 5-75
Connecting a test bypass pair cable to the TBP

FW10079



Note: I/O card bar code label mounting plate has been omitted for clarity.

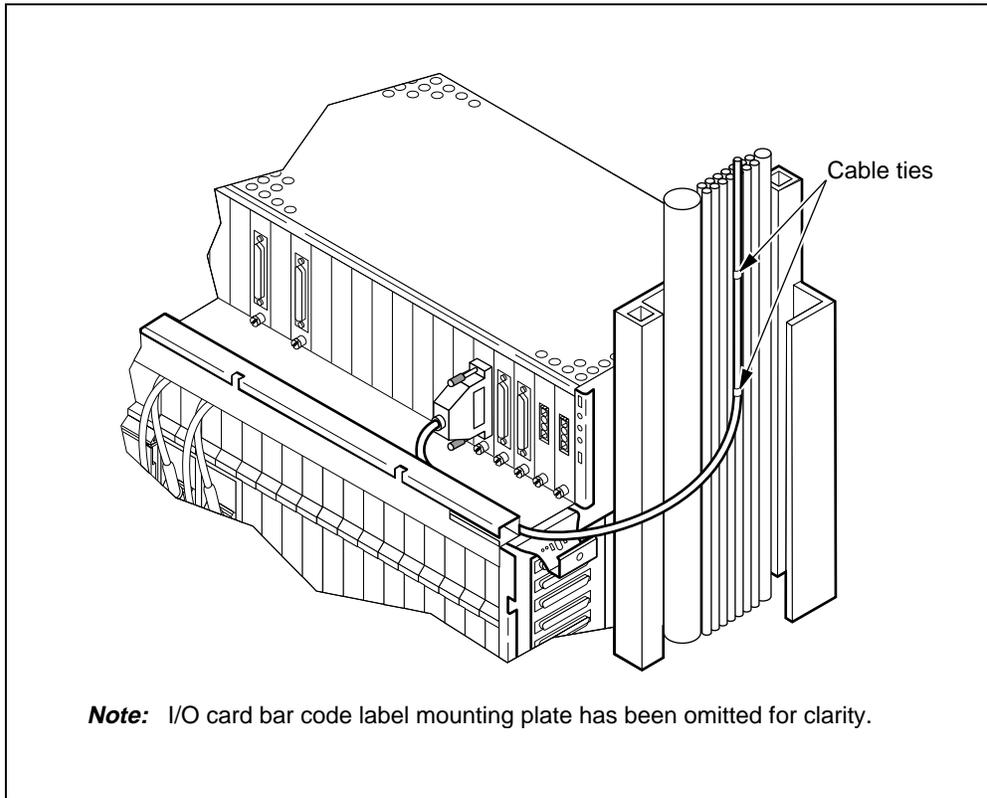
—continued—

Procedure 5-18 (continued)
Installing a test access pair cable (TBP function)

Step	Action
4	Attach the cable to the connector on the test bypass pairs I/O card in slot 51, as shown in Figure 5-76. <i>Tighten the connector hold down screws just enough to draw the connector into place (2 inch-pounds maximum). Do not over-tighten.</i>
5	Secure the connector with the two screws, using a flathead screwdriver.
6	Dress the test bypass pair cable from its connector into the cable trough, as shown in Figure 5-76.
7	Dress the cable into the bay right upright in the location shown in Figure 5-77 on page 5-163, and secure with cable ties.

Figure 5-76
TBP test bypass pair cable connected and dressed

PC-10080

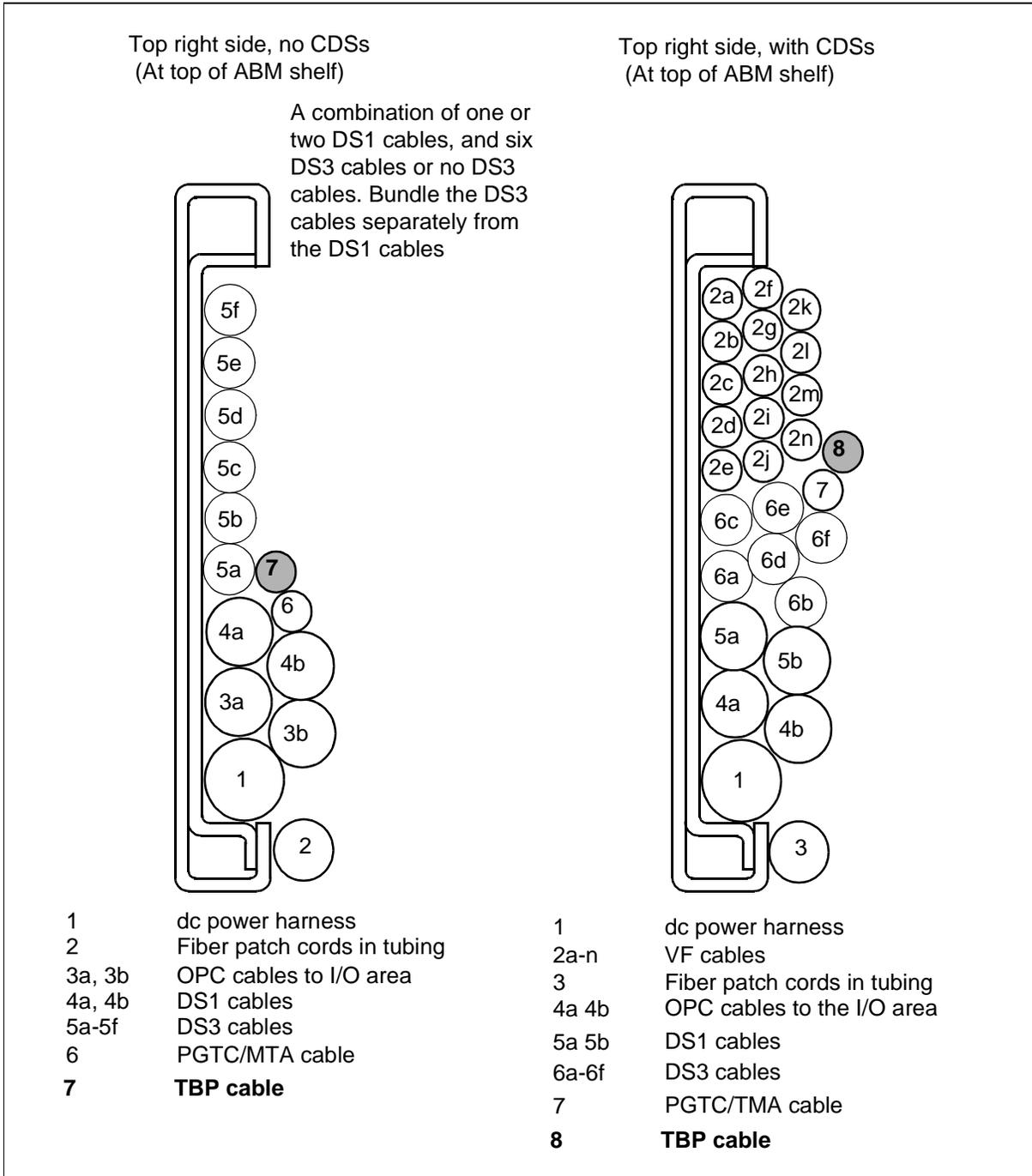


—continued—

Procedure 5-18 (continued)

Installing a test bypass pair cable (TBP function)

Figure 5-77
Placement of TBP test bypass pair cable in bay upright



—continued—

 Procedure 5-18 (continued)

Installing a test access pair cable (TBP function)

Step Action

- 8** Refer to the following table and terminate the office end of the cable to the MDF cross-connect.

Table 5-31
Color code and pin-out detail for the TBP test bypass pair cable

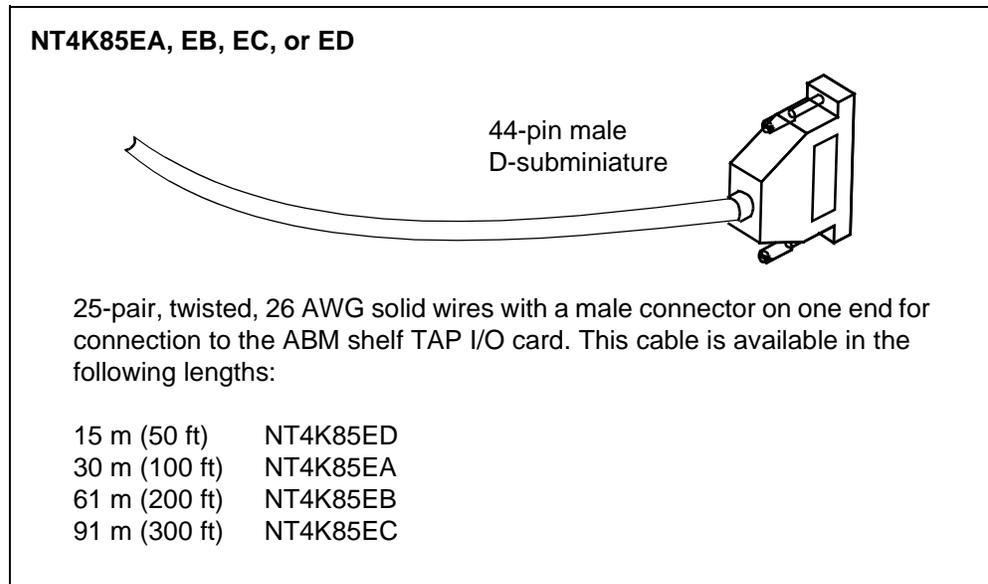
Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
Bypass 1R	1	1	BL 1W	NC	23	12	NC
Bypass 1T	2	1	W 1BL	NC	24	12	NC
Bypass 2R	3	2	O 1W	NC	25	13	NC
Bypass 2T	4	2	W 1O	NC	26	13	NC
Bypass 3R	5	3	G 1W	NC	27	14	NC
Bypass 3T	6	3	W 1G	NC	28	14	NC
Bypass 4R	7	4	BR 1W	NC	29	15	NC
Bypass 4T	8	4	W 1BR	NC	30	15	NC
Bypass 5R	9	5	S 1W	NC	31		NC
Bypass 5T	10	5	W 1S	NC	32		NC
Bypass 6R	11	6	BL 1R	NC	33		NC
Bypass 6T	12	6	R 1BL	NC	34		NC
NC	13	7	NC	NC	35		NC
NC	14	7	NC	NC	36		NC
NC	15	8	NC	NC	37		NC
NC	16	8	NC	NC	38		NC
Inhibit 1	17	9	BR 1R	NC	39		NC
Inhibit 2	18	9	R 1BR	NC	40		NC
Inhibit 3	19	10	S 1R	NC	41		NC
Inhibit 4	20	10	R 1S	NC	42		NC
Inhibit 5	21	11	BL 1BK	NC	43		NC
Inhibit 6	22	11	BK 1BL	NC	44		NC
NC = no connection							

—end—

Procedure 5-19

Installing a test access path cable (TAP function)

Use this procedure to install the test access path cable (NT4K85EA through ED) from the TAP I/O card to the main distribution frame (MDF) cross-connect.



Note 1: The same cable is used to perform test access path (TAP) and test bypass pair (TBP) functions, but the signals and the connection points of the cable are different.

Note 2: See the installation job records to determine if the TAP cable is applicable to your installation. A TAP cable is only installed at a remote site.

Requirement

You need the following tools and materials:

- cable cutters
- cable ties
- flathead screwdriver, 1/4 in.

—continued—

Procedure 5-19 (continued)

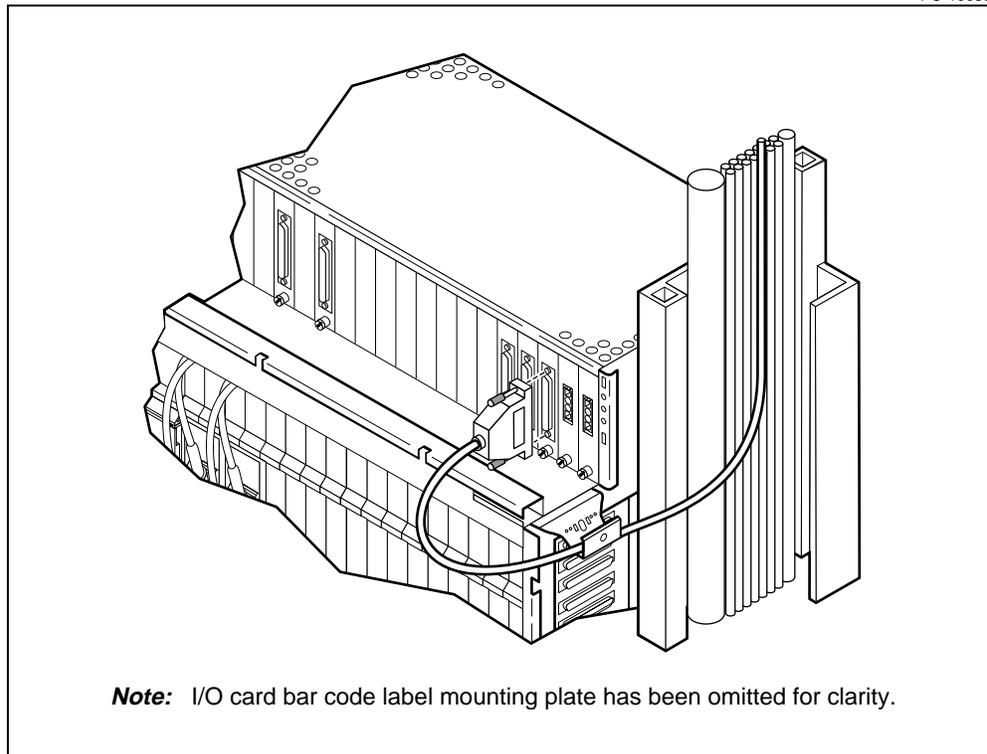
Installing a test access path cable (TAP function)

Action

Step	Action
1	Remove the blank I/O faceplate card (NT4K58ZA) from slot 53 and insert the test access path I/O (NT4K58KA) cards.
2	Tighten the hold-down screws on the bottom of the card faceplate.
3	Route the test access path cable from the bay to the office MDF, allowing sufficient length to access the connector on the TAP I/O card in the ABM shelf, as shown in Figure 5-78.

Figure 5-78
TAP test access path cable

PC-10083



—continued—

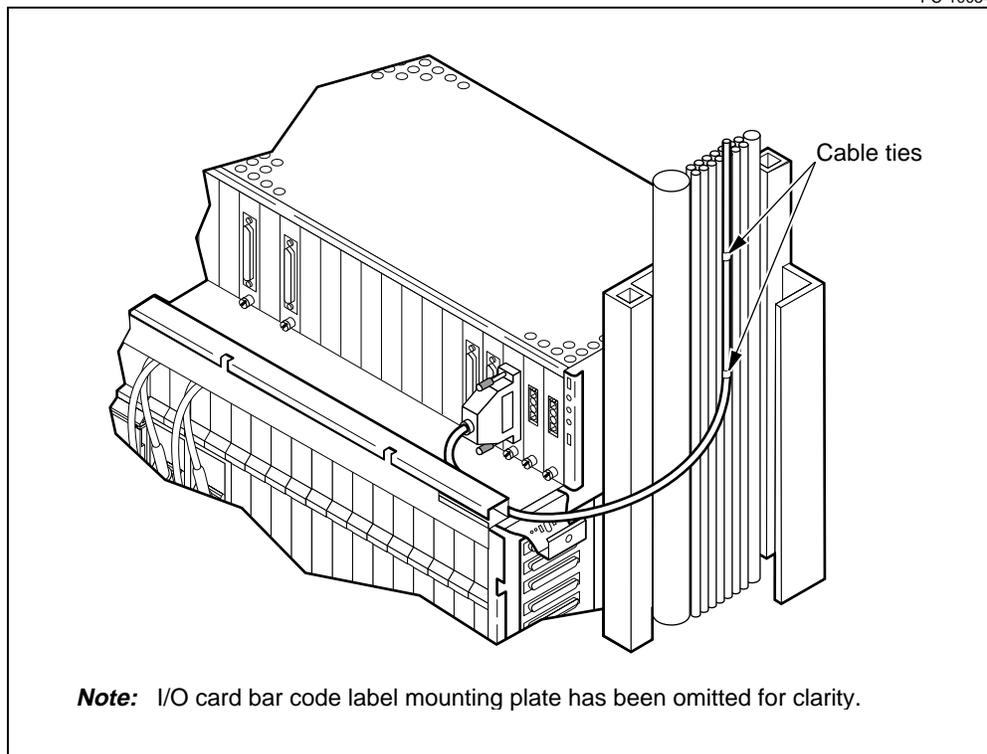
Procedure 5-19 (continued)

Installing a test access path cable (TAP function)

Step	Action
4	Attach the cable to the connector on the test access path I/O card in slot 53, as shown in Figure 5-79. <i>Tighten the connector hold down screws just enough to draw the connector into place (2 inch-pounds maximum). Do not over-tighten.</i>
5	Dress the test access path cable from the connector into the cable trough, as shown in Figure 5-79.
6	Dress the cable slack into the bay right upright in the location shown in Figure 5-80 on page 5-168, and secure with cable ties.

Figure 5-79
TAP test access path cable connected and dressed

PC-10084

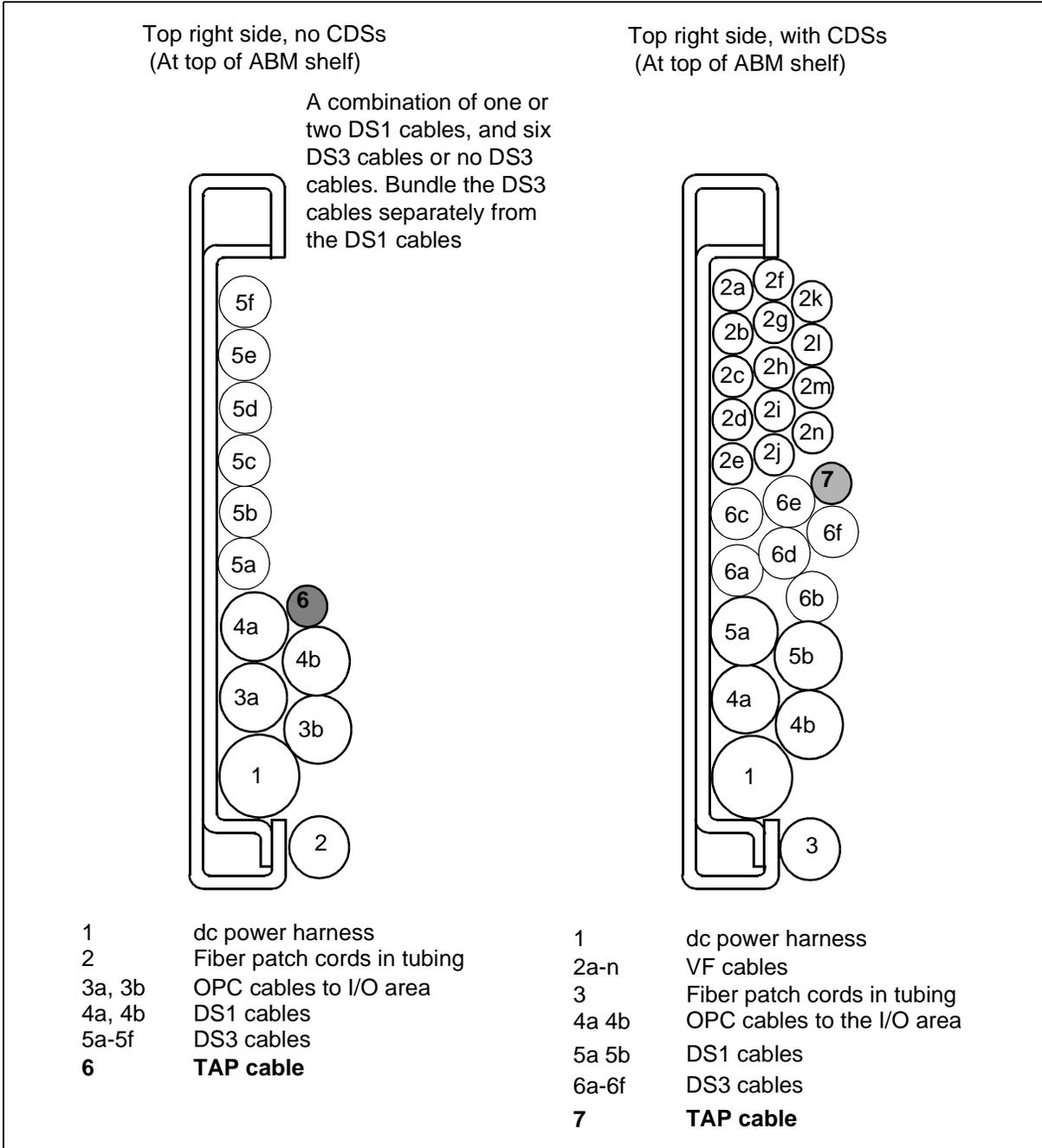


—continued—

Procedure 5-19 (continued)
Installing a test access path cable (TAP function)

Step Action

Figure 5-80
Placement of TAP test access path cable in bay upright



—continued—

Procedure 5-19 (continued)

Installing a test access path cable (TAP function)**Step Action**

- 7 Refer to the following table and terminate the office end of the cable to the MDF cross-connect.

Table 5-32**Pin-out and color code details for the TAP I/O cable, NT4K85EA, EB, EC, and ED**

Signal	Pin	Pair	Color	Signal	Pin	Pair	Color
1 A In R	1	1	BL 1W	2 C Out R	23	12	O 1BK
1 A In T	2	1	W 1BL	2 C Out T	24	12	BK 1O
1 A Out R	3	2	O 1W	MTA R	25	13	G 1BK
1 A Out T	4	2	W 1O	MTA T	26	13	BK 1G
1 B In R	5	3	G 1W	RDT TBP R	27	14	BR 1BK
1 B In T	6	3	W 1G	RDT TBP T	28	14	BK 1BR
1 B Out R	7	4	BR 1W	Ext TBP R	29	15	S 1BK
1 B Out T	8	4	W 1BR	Ext TBP T	30	15	BK 1S
1 C In R	9	5	S 1W	NC	31		NC
1 C In T	10	5	W 1S	NC	32		NC
1 C Out R	11	6	BL 1R	NC	33		NC
1 C Out T	12	6	R 1BL	NC	34		NC
2 A In R	13	7	O 1R	NC	35		NC
2 A In T	14	7	R 1O	NC	36		NC
2 A Out R	15	8	G 1R	NC	37		NC
2 A Out T	16	8	R 1G	NC	38		NC
2 B In R	17	9	BR 1R	NC	39		NC
2 B In T	18	9	R 1BR	NC	40		NC
2 B Out R	19	10	S 1R	NC	41		NC
2 B Out T	20	10	R 1S	NC	42		NC
2 C In R	21	11	BL 1BK	NC	43		NC
2 C In T	22	11	BK 1BL	NC	44		NC

NC = no connection

The following explains some of the symbols used in the Signal column:

1 = external TAP1 connection; 2 = external TAP2 connection

A = T, R pair; B = T1, R1 pair; C = E/M pair

Examples:

1 B In R = external TAP1, T1 R1 pair, towards the line card, Ring lead

2 A Out T = external TAP2, T-R pair towards the loop (drop), Tip lead

Note: When connecting the R-TEC signature module—the Test Bus Termination Unit (TBTU)—for line and loop testing, the MTA R and MTA T pins (pins 25 and 26) on the TAP I/O card are used. Refer to *Line and Loop Testing Overview* (NTP 323-3001-115) for additional information about line and loop testing equipment.

—end—

Procedure 5-20

Installing the wire-wrap connections to the BIP

Use this procedure to complete the external office wire-wrap connections to the NT4K14BA breaker interface panel (BIP).

The wire-wrap cable consists of twisted 22, 24, or 26 AWG solid wire, and requires 42 conductors. This cable is supplied by the customer.

Requirement

You need the following tools and materials:

- wire-wrap cable
- cable cutters
- wire wrapping gun
- cable ties

Action

Step	Action
1	Route the cable from the office cross-connect equipment to the bay, down the left side of the bay, with sufficient length to reach the wire-wrap block on the NT4K64BA Alarm relay card installed in the breaker interface panel (BIP), as shown in Figure 5-81 on page 5-171.
2	Strip the cable sheath to expose 300 mm (1 ft) of the cable pairs, and wrap the wires with electrical tape.
3	Secure the cable to the BIP front face with a cable tie as shown in Figure 5-81 on page 5-171. Note: The lock portion of the cable tie must be positioned as shown in Figure 5-81 on page 5-171, to allow for installation of the cover.
4	Dress the cable up and over the BIP into the bay upright, as shown in Figure 5-81 on page 5-171, and secure with cable ties. Ensure that the cable is dressed up over the top of the BIP so it does not block the connector designations or block access to the connectors on the side of the BIP.
5	Dress the exposed cable pairs down the right side of the wire-wrap block, as shown in Figure 5-81 on page 5-171.
6	Trim and connect each wire lead to the BIP wire-wrap block, according to the pin-out detail contained in Figure 5-82 on page 5-172. Note: The NT4K64BA Alarm relay card can be removed from the BIP, to make it easier to wire the wire-wrap block if desired. Be sure to allow enough slack in the wiring for installing the Alarm relay card into the BIP.

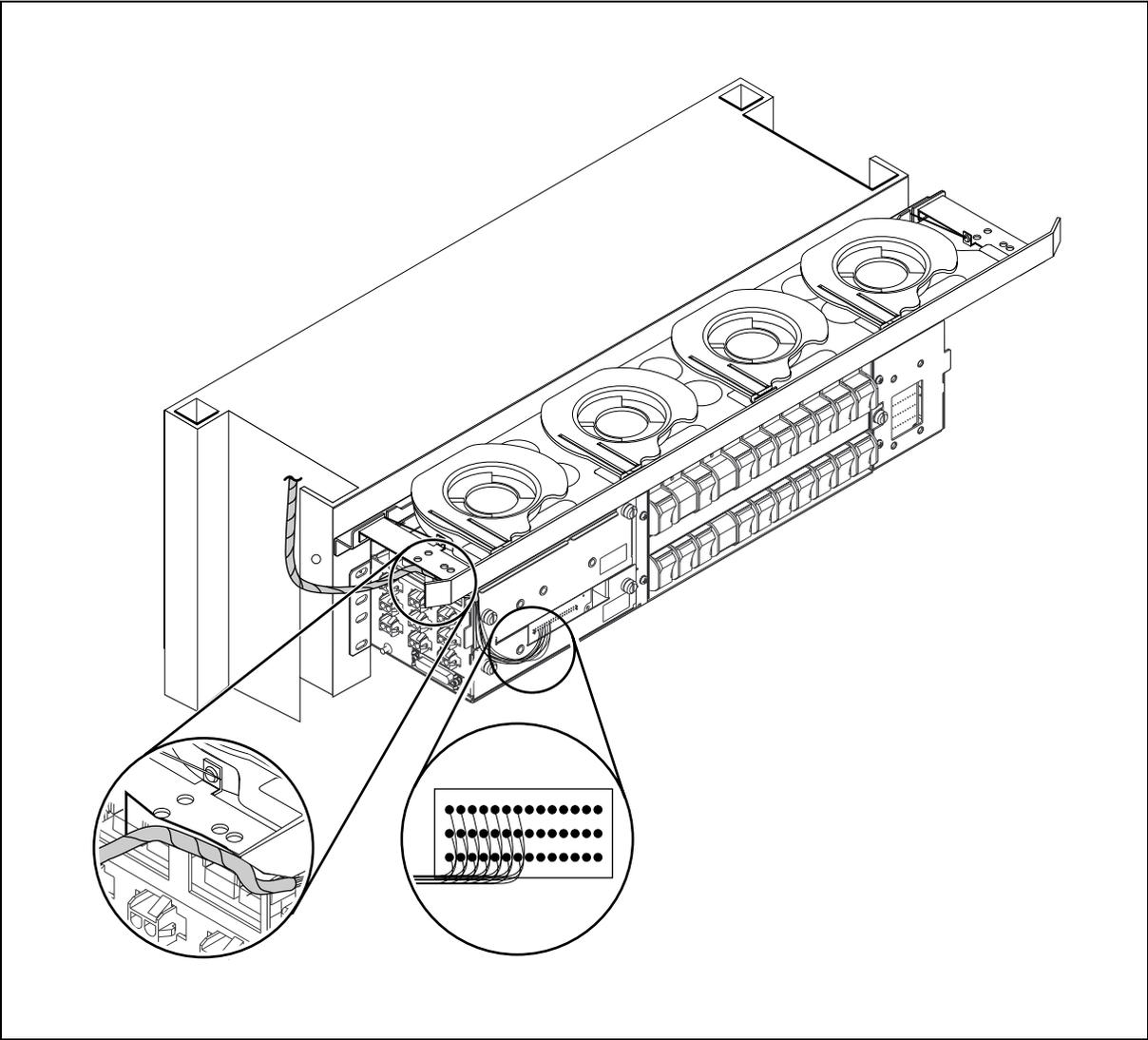
—continued—

Procedure 5-20 (continued)
Installing the wire-wrap connections to the BIP

Step	Action
7	Dress the cable into the bay upright in the location shown in Figure 5-83 on page 5-173, and secure with cable ties.

Figure 5-81
Routing wire-wrap cable pairs to the BIP

PC-16501

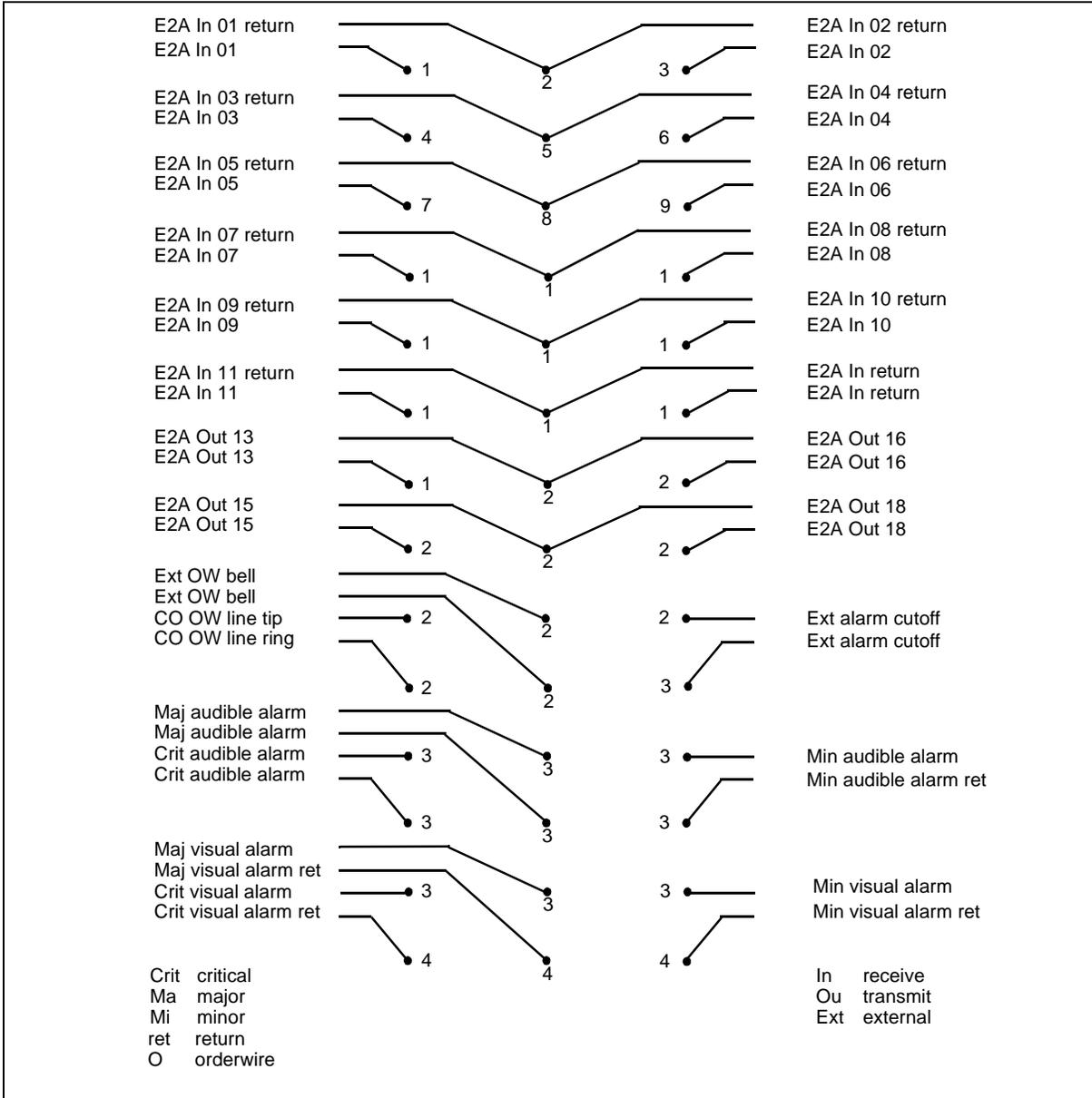


—continued—

Procedure 5-20 (continued)
Installing the wire-wrap connections to the BIP

Step Action

Figure 5-82
Pinout details of wire-wrap pins on the BIP

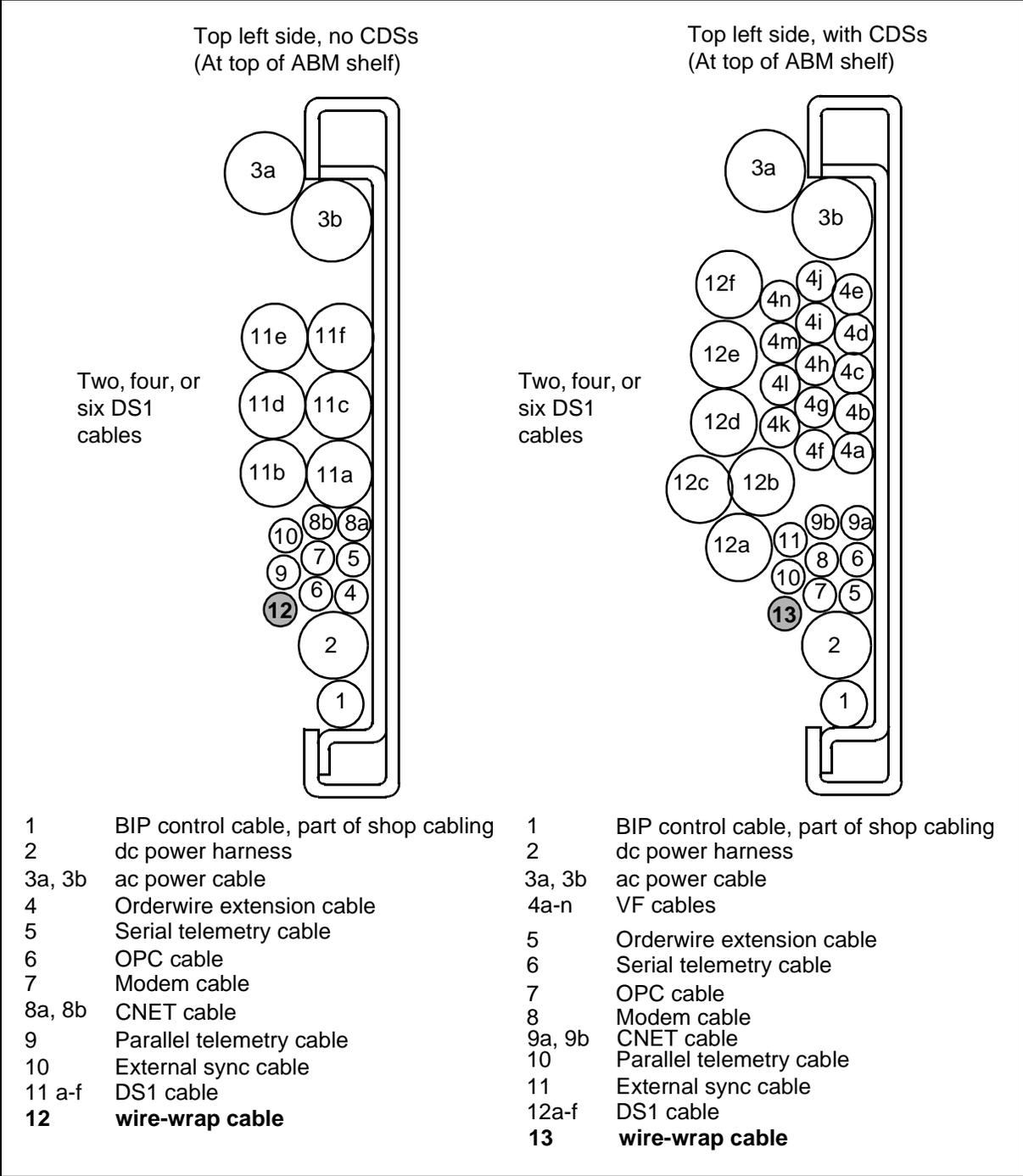


Note: For NT4K14BA the wire-wrap pin field is rotated 90° clockwise.

—continued—

Procedure 5-20 (continued)
Installing the wire-wrap connections to the BIP

Figure 5-83
Placement of the wire-wrap cable in bay upright



—end—

Procedure 5-21

Installing the -48V cabling

Use this procedure to connect –48V power from the central office –48V battery distribution fuse board (BDFB), to the breaker interface panel (BIP) at the top of the AccessNode frame.

For detailed information about power and grounding, see *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1.

Note: For AccessNode frame installations that contain copper-distribution shelves, refer to “Power and ground distribution” in *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1, for information on capacitor requirements at the BDFB before beginning this procedure. If capacitors are required, check your Customer Engineering documentation for the recommended values and capacitor and method of installation.

NT4K84UE,F,G, and H main power cables (4 cables for each bay)

Each cable consists of two 6 AWG stranded conductors (red battery and white or black return), in an overall jacket, 10.6 m (35 ft) in length, and connectorized at one end for connection to the BIP.

Requirements

The following tools, materials, and test apparatus are required:

- cable cutters
- cable ties
- digital multimeter
- power distribution schematics from *Site Installation Planning and Engineering*, 323-3001-200, in the *Engineering, Configuration, and Ordering Guide*, Volume 1

Action

Step	Action
1	Tag each pair of cables at both ends with the following designations: <ul style="list-style-type: none"> • Battery 1, Battery 2, Battery 3, and Battery 4
2	Turn off all the circuit breakers on the BIP. Note: Toggling the breaker by pressing the O symbol sets the breaker off.

—continued—

 Procedure 5-21 (continued)
 Installing the -48V cabling

Step	Action
3	Measure the voltages on the equipment-side of the battery and return leads at the BDFB to ensure that no potentials are present.
4	At the BDFB, remove the four 30 A battery fuses that will be used to power the AccessNode.
5	Route the four cable pairs from the AccessNode bay to the office -48V battery distribution fuse bay (BDFB), leaving sufficient slack for connection to the BIP, and for connection to the BDFB.
6	Route the battery 1 and battery 2 pairs to the right side of the BIP, and route the battery 3 and battery 4 pairs to the left side of the BIP.
7	At the BDFB, connect each of the four battery and return pairs to a separately fused connection: <ul style="list-style-type: none"> • red, - battery • white or black, + return <p>Note: For a schematic showing the distribution of the battery feeders and the ratings for the battery fuses, refer to “Power and ground distribution” in <i>Site Installation Planning and Engineering</i>, 323-3001-200, in the <i>Engineering, Configuration and Ordering Guide</i>, Volume 1.</p>
8	Apply power to one battery/return pair by inserting its associated 30 A fuse at the BDFB. <p>Note: Apply power to only one battery/return pair at a time, starting with Battery 1/Return 1, followed by Battery 2/Return 2, and so on.</p>
9	At the BIP-end of the power cables, connect a digital multimeter across the connector for the one pair under power, as shown, and measure for a voltage between -42 V dc and -56 V dc. If the voltage is not present, check the wiring connections. If the voltage is insufficient check for poor crimps.
10	Disconnect power from the battery/return pair.
11	Repeat from step 8 until each of the four battery/return pairs is tested, then proceed to step 12.

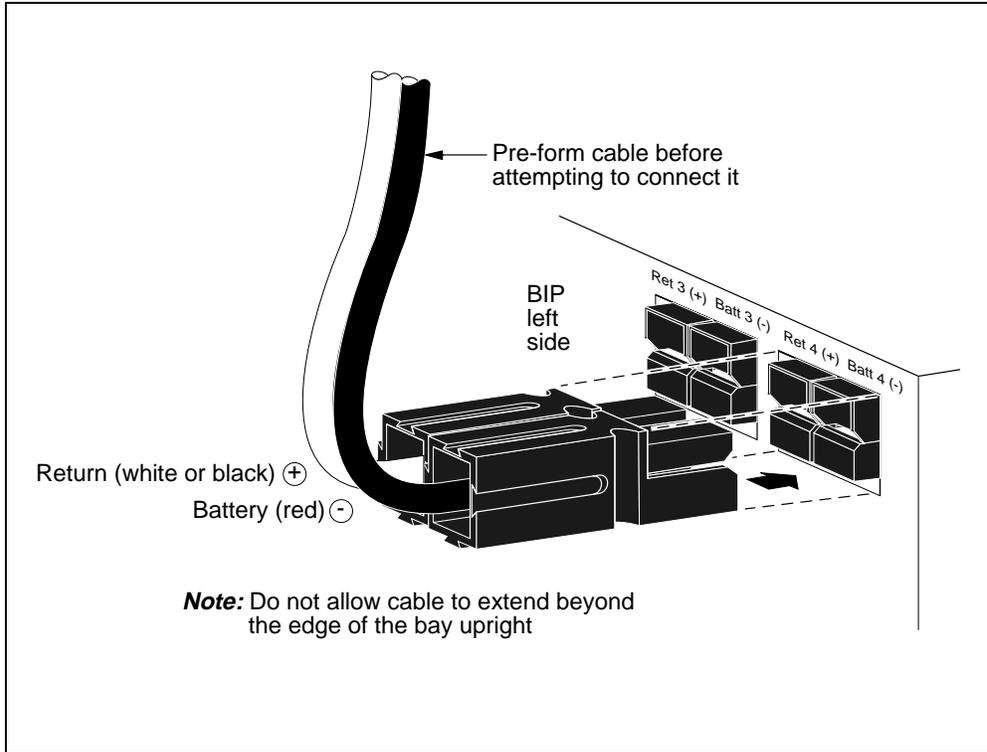
—continued—

Procedure 5-21 (continued)
Installing the -48V cabling

Step	Action
12	Pre-form the cables as shown in Figure 5-84. <i>The cables must be pre-formed so that when connected to the BIP, they do not enter the connectors at an angle, and they do not extend beyond the edge of the bay upright.</i>
13	Insert the connector for battery1 /return 1 and battery 2 /return 2, matching the red wire to the Batt (-) designation on the right side of the BIP, as shown in Figure 5-84.

Figure 5-84
Pre-forming the cables and connecting them to the left side of the BIP

PC-11106

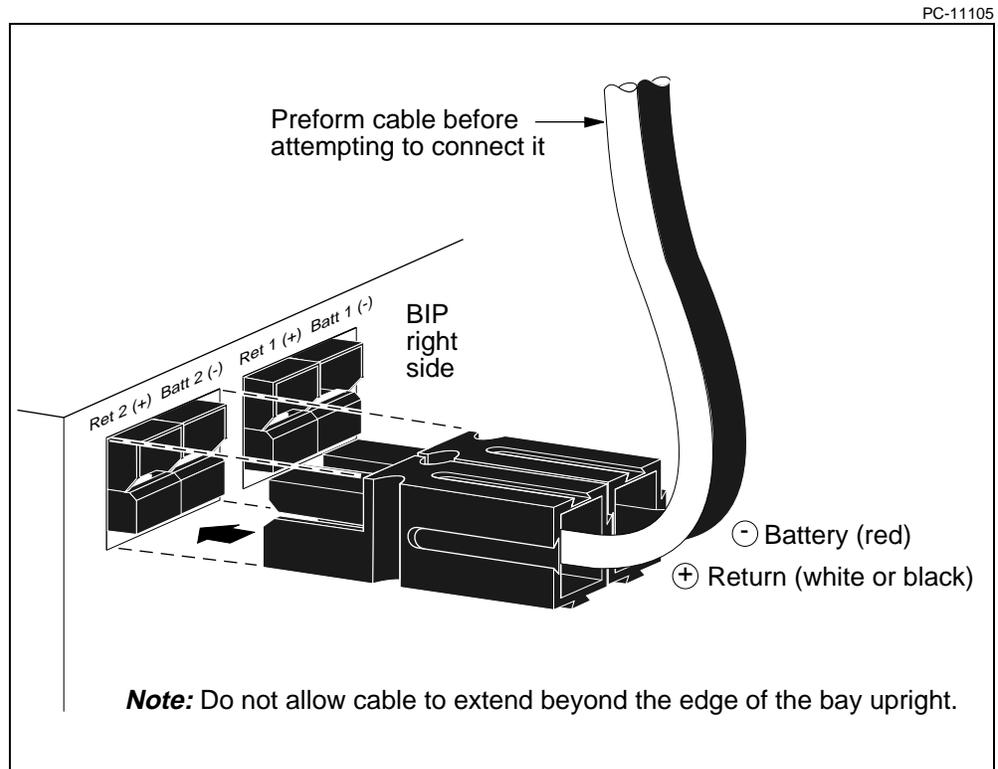


—continued—

Procedure 5-21 (continued)
Installing the -48V cabling

Step	Action
14	Pre-form the cables as shown in Figure 5-85.
15	Insert the connector for battery 3 /return 3, and battery 4 /return 4, matching the red wire to the Batt (-) designation on the left side of the BIP, as shown in Figure 5-85. Note: For a schematic showing distribution of the battery feeders, refer to 323-3001-200, <i>Site Installation Planning and Engineering Manual</i> , in the chapter entitled "Power and ground distribution".

Figure 5-85
Pre-forming the cables and connecting them to the right side of the BIP



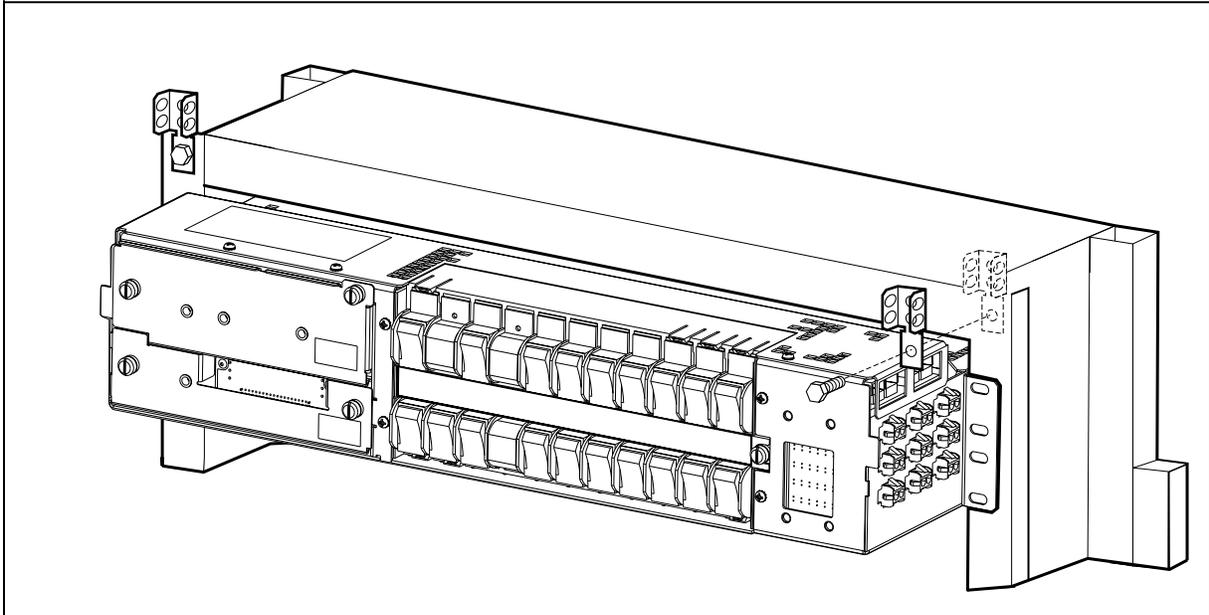
—continued—

Procedure 5-21 (continued)
Installing the -48V cabling

Step	Action
16	Remove and discard the existing screw from the ground bar at the top of the frame, and install the cable bracket using the longer screw supplied as shown in Figure 5-86. Repeat for each side of the frame, as shown in the following figure. Note: Cable brackets and mounting screws are shipped loose with the bay.

Figure 5-86
Installing cable brackets in the frame

PC-16507

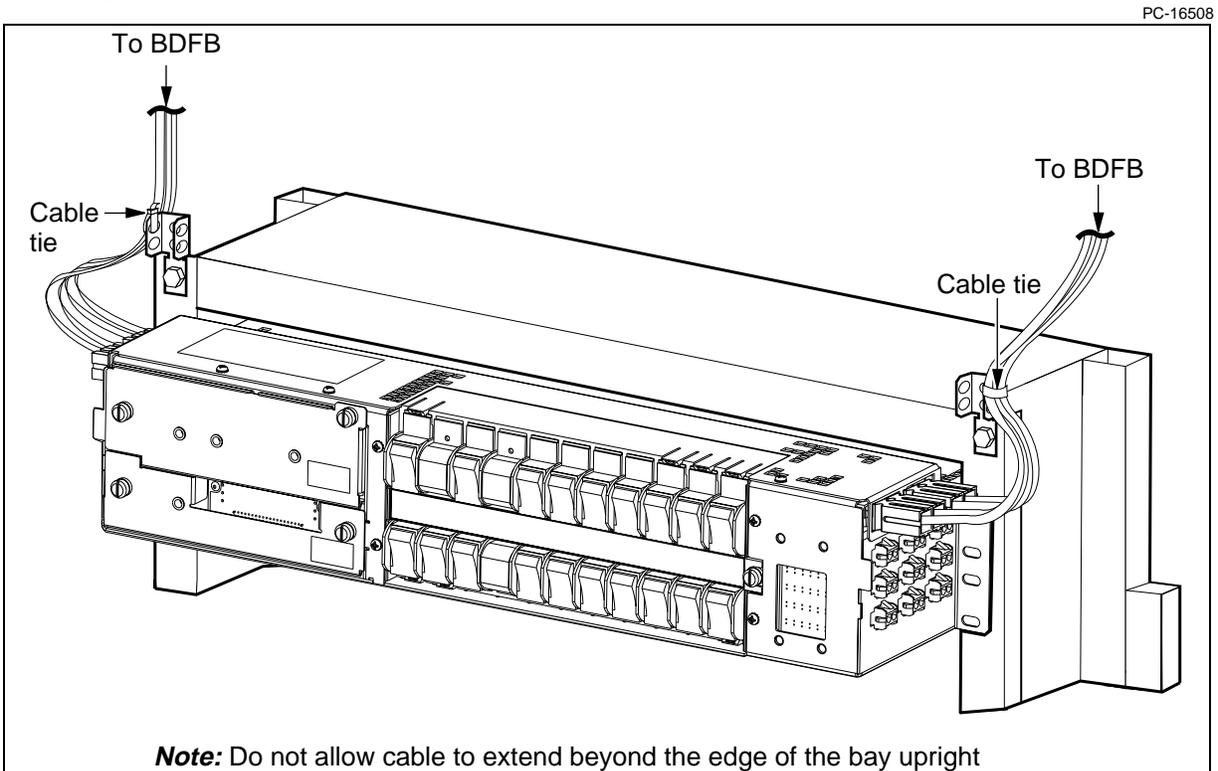


—continued—

Procedure 5-21 (continued)
Installing the -48V cabling

Step	Action
17	On each side of the frame, use a cable tie to secure the conductors to the cable bracket as shown in Figure 5-87.
18	In the <i>Quick Reference Guide</i> , make a record of the battery and return connections to the BDFB. Be sure to include the number of the battery/return pair (1, 2, 3, or 4), the BDFB number, and the number of the BDFB fuse rating. For information about shelf powering schemes, see <i>Site Planning and Engineering Installation</i> , 323-3001-200, in the <i>Engineering, Configuration and Ordering Guide</i> , Volume 1.

Figure 5-87
Securing the cables to the brackets on the frame



- 19 Ensure that the color coded wires are connected as follows:
- Red wire (-48V) must always connect to the RED connector on the BIP marked (-).**
 - Black or White wire (battery return) must always connect to the BLACK connector on the BIP marked (+).**

—end—

Procedure 5-22 Installing a user interface cable to the LCAP

Use this procedure to install an NT7E44FA or FB cable between User Interface Port 2 connector on the front panel of the local craft access panel (LCAP) and a printer, a CRT, or a modem.

If you are connecting the LCAP to a modem, you must connect an NT7E44MB null modem adaptor between the NT7E44FA, FB cable and the modem or printer.

Note: If you are not using a modem, you must install the cables only between equipment that is bonded to the same ground point.

NT7E44FA and FB

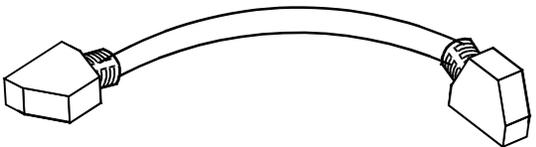


25-pin male D-subminiature 25-pin male D-subminiature

4-pair, twisted, 26 AWG solid wires with shielding, connectorized with 25-pin male connectors at both ends. One end connects to the 25-pin female connector on the faceplate of the LCAP and the other end is for connection to a 25-pin female connector of a VT-100 terminal or null modem adaptor. This cable is available in the following lengths:

5 m (16 ft)	NT7E44FA
20 m (66 ft)	NT7E44FB

NT7E44MB null modem adaptor for connection to a modem



25-pin female D-subminiature 25-pin female D-subminiature

4-pair, 26 AWG solid wire connectorized at both ends with 25-pin female connectors. One end connects to the male connector on the NT7E44FA or FB cable and the other end connects directly to the modem.

—continued—

Procedure 5-22 (continued)

Installing a user interface cable to the LCAP

Requirements

You need a 1/4 in wide, flat blade screwdriver to perform this procedure.

Action

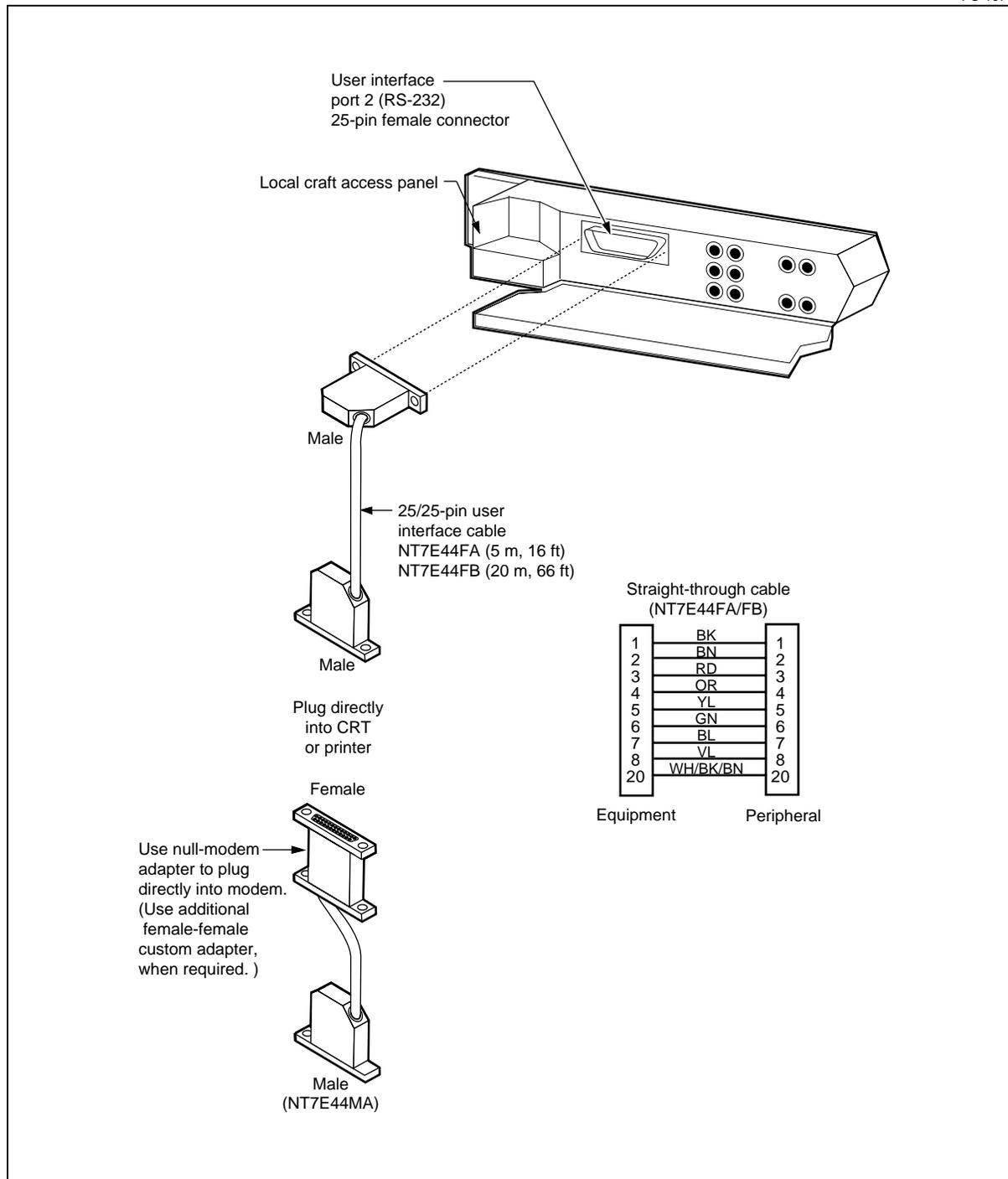
Step	Action
1	Connect the female connector of the NT7E44FA or FB cable to connector User Interface Port 2 on the local craft access panel (LCAP), as shown in Figure 5-88 on page 5-182.
2	Connect the free-end of the cable to the printer or the CRT. If the cable is being connected to a modem, insert an NT7E44 MB null modem adaptor between the NT7E44 cable and the modem. Note: See Table 5-33 on page 5-183 for the pin-outs of the 25-pin male connectors on the NT7E44FA or FB cable.
3	To verify the modem connection, use an external phone line to call 1-800-ASKTRAN. Provide the Nortel Networks technician with the following: <ul style="list-style-type: none">• dialup number• product type (OC-12, OC-48, AccessNode, etc.)• release number• customer name• location Ask the Nortel Networks technician to dial through the modem to see whether the equipment is accessible. If it is not, repeat steps 1 and 2.

—continued—

Procedure 5-22 (continued)
Installing a user interface cable to the LCAP

Figure 5-88
Connecting a user interface cable to the LCAP

PC-10773



—continued—

 Procedure 5-22 (continued)

Installing a user interface cable to the LCAP

The NT7E44 cable has a “straight-through” construction. Pin 1 on one male connector is connected to pin 1 on the other male connector, pin 2 is connected to pin 2, and so on.

Table 5-33
Pin-outs for the 25-pin male connectors on NT7E44FA or FB

Pin on 25-pin male connector	Color code	Signal	Pin on second 25-pin male connector
1	BK	not used	1
2	BR	Rx	2
3	R	Tx	3
4	O	RTS	4
5	Y	CTS	5
6	G	DSR	6
7	BL	signal ground	7
8	V	DCD	8
9 to 19	not connected	not used	9 to 19
20	W BK BR stripes	DTR	20
21 to 25	not connected	not connected	21 to 25

—end—

Finishing the installation of the bay

This chapter contains procedures for completing the installation work before installing the equipment covers on a bay. These procedures include:

- moving the bay into position and securing the bay in place for installations in which the bay was cabled before being inserted into a lineup of bays
- installing junction bracket at the front of adjacent bays
- installing protective fiber sheathing around cables at the top of the bay to prevent chafing of the cable jacket

How to use this chapter

Check the following table for the tasks you must perform to complete the bay installation. Perform the procedures in the order listed.

Chapter task list

The following table lists the procedures necessary to complete the installation work. If you cannot successfully complete these procedures, contact your next level of support.

Task	See
If the bay was cabled before inserting it into a lineup of bay, move the bay into position in the lineup and secure the bay in place	Procedure 6-1 on page 6-2
Install the junction bar at the front of adjacent bays	Procedure 6-2 on page 6-7
Install protective fiber sheeting around the cables	Procedure 6-3 on page 6-8
If there are fewer than seven copper-distribution shelves in the bay and the bay does not have a bottom cover assembly installed, install the bottom cover assembly	Procedure 6-4 on page 6-10
Install the equipment covers and end guards	Chapter 7

Procedure 6-1

Moving a bay into position in a lineup and securing it in place

Use this procedure to move a bay into position in a lineup of bays and to secure the bay in place. Perform this procedure if cables are connected to a bay before it is inserted into a lineup of bays.

Requirement

You need the following tools and materials:

- frame movers
- socket wrench set, 1/2 in. drive
- extra-deep socket, 16 mm (5/8 in.)—for standard anchoring
- extra-deep socket, 19 mm (3/4 in.)—for M12 earthquake anchoring
- torque wrench 1/2 in. drive
- plumb line
- spirit level 610 mm (24 in.) non-metallic
- double sided tape

Action

Step	Action
1	Remove the bracing that was used to secure the top of the bay while it was being cabled.
2	With the frame movers installed, move the bay into position in the lineup, over the isolator pad.
3	Add shims as required beneath the base of the bay, ensuring that the anchor holes are not obstructed. Note: If metallic shims are used, they must be installed underneath the isolation pad.
4	Lift up on the handles of the frame movers, and remove the frame movers.
5	Using the 610 mm (24 in.) non-metallic spirit level, or a plumb bob attached to the top of the frame, check that the bay is vertically aligned, side to side and front to rear within 4.7 mm (0.1875 in.) of the overall bay height.

—continued—

 Procedure 6-1 (continued)

Moving a bay into position in a lineup and securing it in place

Step	Action
6	Insert nonconductive shims (such as plastic) beneath the appropriate corner of the bay frame, to ensure that the bay is vertically aligned. Check the vertical alignment of the bay using the spirit level or plumb bob, after inserting each shim.
7	Tie the end of a roll of twine to the outside top edge of the first bay in the lineup and stretch it along the front edge of the other bays to the last bay in the lineup. <i>With the twine pulled tight to ensure a straight reference line, the top edges of all bays should touch the edge of the twine, with no significant gap.</i>
8	If the bay does not meet this requirement, add shims as required, then re-check the alignment of the bays with the twine.
9	Assemble either four standard anchors or four earthquake anchors (M12), as shown in Figure 6-1 on page 6-5.
10	Into each hole, insert an assembled anchor as shown in Figure 6-1 on page 6-5, and tap the anchor with a hammer until the sleeve of the anchor is no more than 3mm (1/8in.) above the floor.
11	Loosely connect the junction hardware at the base of the bays, as shown in Figure 6-1 on page 6-5.
12	Tighten all the anchors with a torque wrench, as follows: <ul style="list-style-type: none"> • <i>Standard anchor:</i> Use a 16 mm (5/8 in.) socket, and a torque setting of 36 ft-lbs (48.8 N·m). • <i>M12 anchor for earthquake (Zone 4):</i> Use a 19 mm (3/4 in.) socket, and a torque setting of 57 ft-lbs (77.2 N·m)
13	Tighten the junction hardware at the base of the bay.
14	Secure each bay to its adjacent bay at the top rear, as shown in Figure 6-2 on page 6-6.
15	If frame extenders (NT7E71DA or NT7E71EA) are to be installed at the top of the frame, go to step 16. Otherwise, go to step 20.
16	Unpack the frame extenders and their associated components.
17	Use the assembly drawing checklist to ensure that all of the required components have been provided with the frame extenders.
18	Mount and secure the frame extenders to the existing bay frame according to the installation drawing package.
19	Ground the frame extenders according to the installation drawing package.

—continued—

6-4 Finishing the installation of the bay

Procedure 6-1 (continued)

Moving a bay into position in a lineup and securing it in place

Step	Action
20	If required, attach the auxiliary bay supports, as shown in Figure 6-2 on page 6-6. If the bay is being installed in an isolated bonding network (IBN) grounding environment, install isolation hardware between the top of the bay, and the auxiliary bay supports.
21	Secure each bay to its adjacent bay at the top rear, as shown in Figure 6-2 on page 6-6.
22	Remove any tape that was holding the dc distribution harnesses up and out of the way.
23	If CDS 7 was removed to install the frame movers, continue at step 24. Otherwise, you have completed this procedure. Go to the next procedure.
24	Reinstall CDS 7 below CDS 6, using the four screws removed previously.
25	Reinstall the filter unit below CDS 7, and secure it to the bay uprights with the two screws removed previously.
26	To CDS 7, re-connect the dc distribution harnesses, the MTA cable, and the two D/VT link access cables.
27	Reinstall the side cable covers.
28	Go to the next procedure.

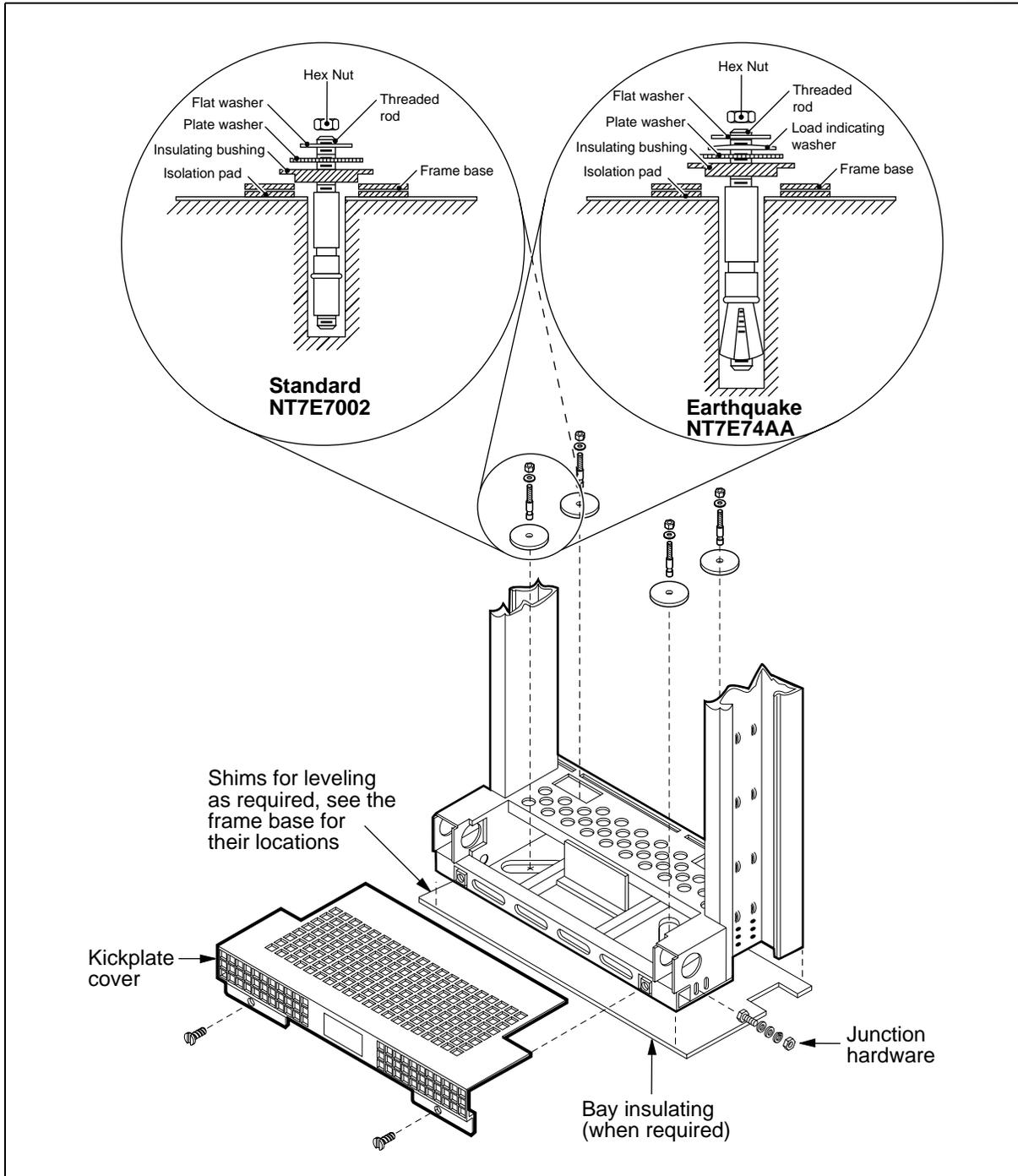
—continued—

Procedure 6-1 (continued)

Moving a bay into position in a lineup and securing it in place

Figure 6-1
Bay framework anchoring

PC-10034



—continued—

6-6 Finishing the installation of the bay

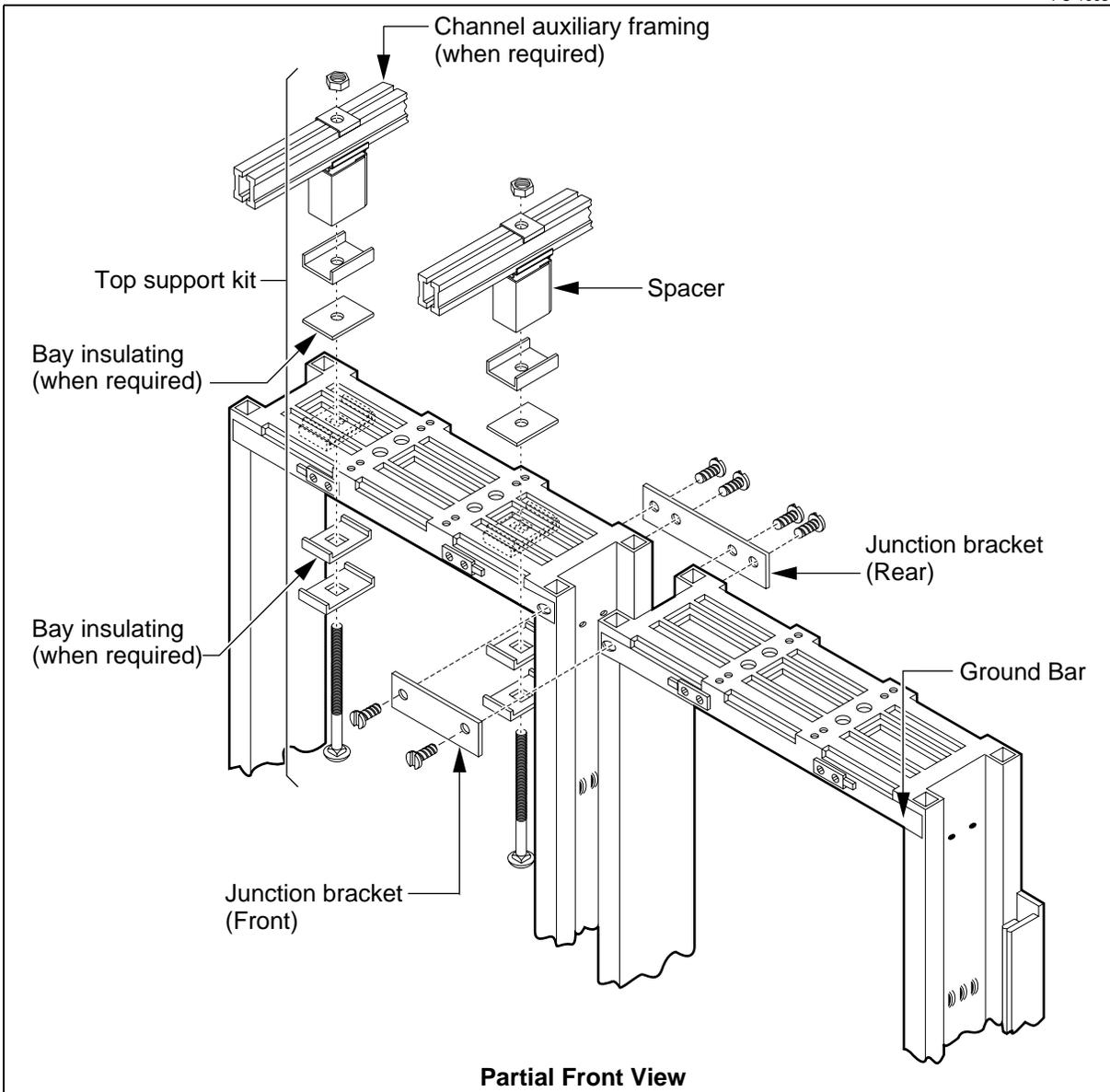
Procedure 6-1 (continued)

Moving a bay into position in a lineup and securing it in place

Figure 6-2

Securing a bay framework to an adjacent bay and overhead channel auxiliary framing

PC-10035



—end—

Procedure 6-2

Installing the front junction bar

Use this procedure to install a junction bar at the front of adjacent bays after cabling is completed.

Requirement

You need the following tools and materials:

- socket wrench set, 1/2 in. drive
- junction hardware kit (NT7E73AA)

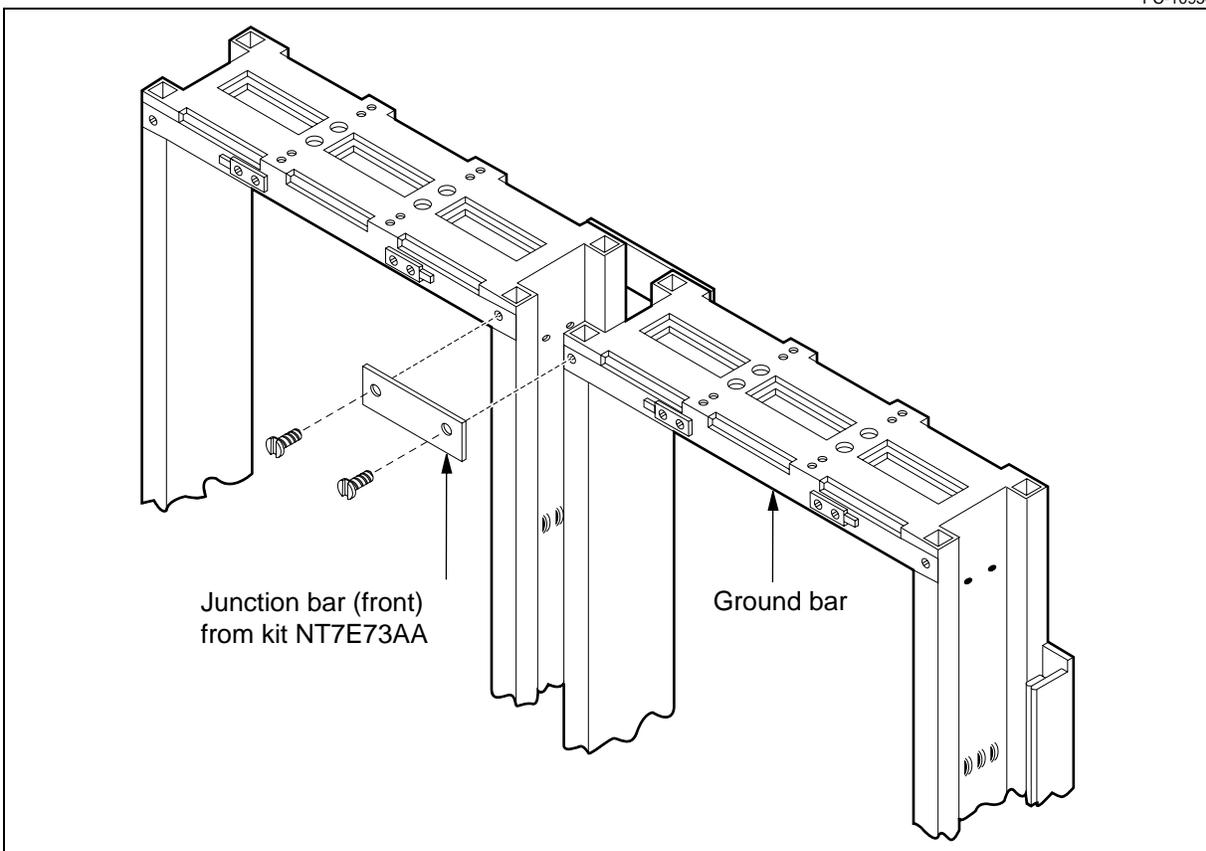
Action

Step	Action
------	--------

- | | |
|---|---|
| 1 | Install the front junction bar with two bolts as shown in Figure 6-3. |
|---|---|

Figure 6-3
Installing the front junction bar

PC-10956



—end—

Procedure 6-3 Installing the protective fiber sheathing

Use this procedure to install protective fiber sheathing around cables at the top of the bay, to prevent chafing of the cables on the top edges of the bay uprights.

Requirement

You need the following tools and materials:

- cable ties
- protective fiber sheathing

Action

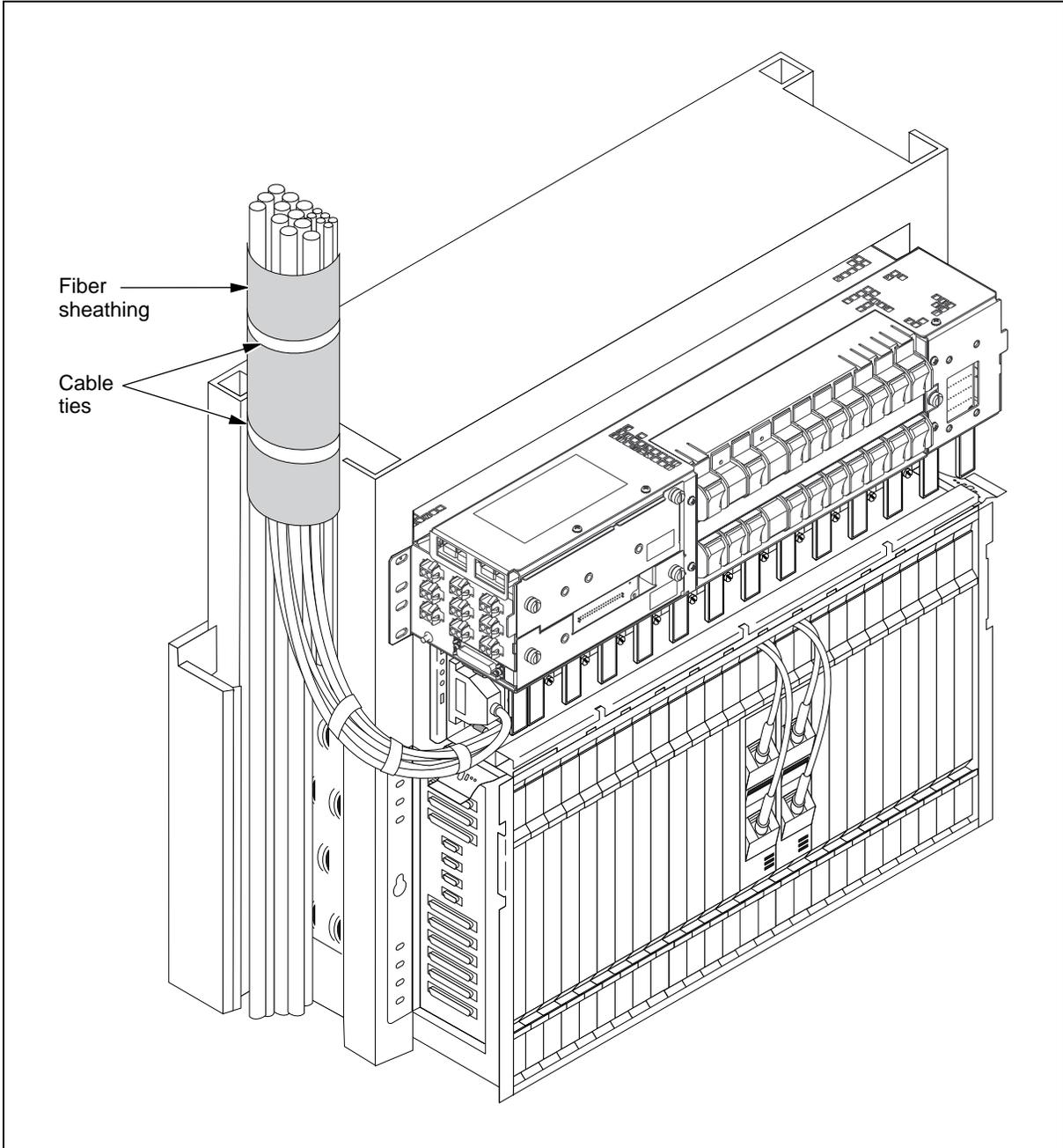
Step	Action
1	Wrap protective fiber sheeting around the cables at the top of the left bay upright and secure it into place with two cable ties, as shown in Figure 6-4 on page 6-9. Ensure that the sheeting is positioned so that it protects the bundles of cables at the top edges of the bay uprights.
2	Install protective sheeting around the cables at the top of the right bay upright in a similar fashion.

—continued—

Procedure 6-3 (continued)
Installing the protective fiber sheathing

Figure 6-4
Installing the protective fiber sheathing

PC-16509



—end—

Procedure 6-4 Installing a bottom cover assembly

Use this procedure to install an NT4K13AA bottom cover assembly below the lowermost shelf in the bay. You need to perform this procedure if the bay will contain six copper-distribution shelves or less when the installation is finished.

Requirement

You need the following tools and materials:

- hex nut driver set
- NT4K13AA bottom cover assembly

Action

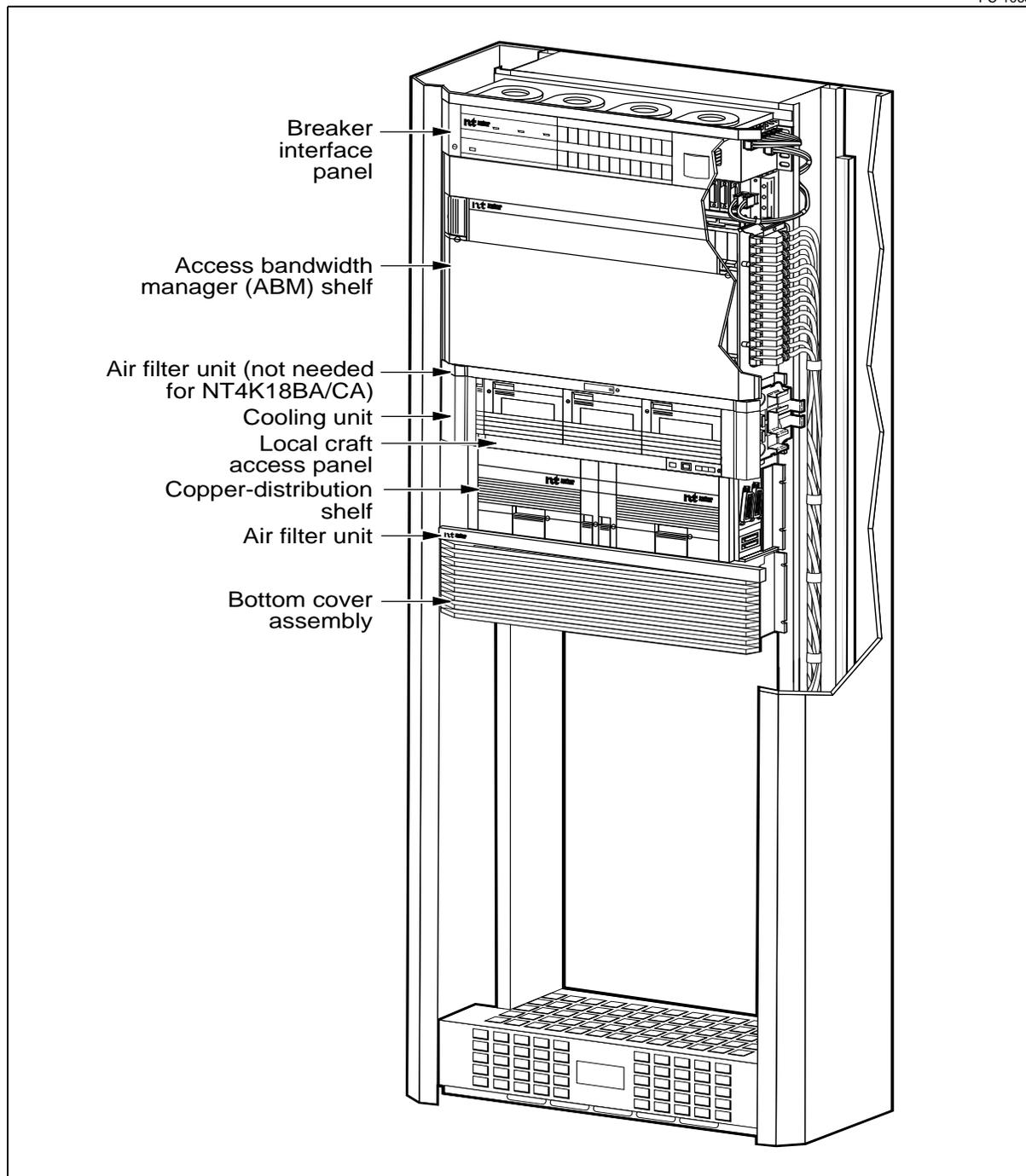
Step	Action
1	Position the bottom cover below the lowermost shelf in the frame, as shown in Figure 6-5 on page 6-11.
2	Secure the bottom cover to the bay with four mounting screws. Do not install the front panel at this time.

—continued—

Procedure 6-4 (continued)
Installing a bottom cover assembly

Figure 6-5
Typical placement of bottom-cover assembly in bay

PC-10681



—end—

6-12 Finishing the installation of the bay

Installing the equipment covers, the bay end guards, and the bay end guard extenders

This chapter provides the installation procedures for the equipment covers, the end guards on the first and last bays in the lineup, and the frame extenders that install at the top of the bay frame.

How to use this chapter

In the following table, look up the task you are required to perform, then proceed to the procedure specified.

If you cannot successfully complete these procedures, contact your next level of support.

Chapter task list

Task	See
Install the side cable covers on copper-distribution shelves	Procedure 7-1 on page 7-2
Install the shelf covers	Procedure 7-2 on page 7-4
Install the environmental control panel cover	Procedure 7-3 on page 7-6
Install the front panel on the bottom cover assembly	Procedure 7-4 on page 7-7
Install the end guards	Procedure 7-5 on page 7-8
Install the bay end guard extenders	Procedure 7-6 on page 7-11

Procedure 7-1

Installing the side cable covers on copper-distribution shelves

Use this procedure to install the cable covers (wings) on either side of a copper-distribution shelf.

Requirement

No tools are required for installing the cable covers.

Procedure

Step	Action
1	From among the covers, find the cover that fits the right side of the copper-distribution shelf. When its finished surface points towards you, the pins on this cover point to the left. You are going to install this cover first.
2	Hold the cover perpendicular to the copper-distribution shelf, and push the cover forward to engage the two hinge pins on the side of the copper-distribution shelf as shown in Figure 7-1 on page 7-3.
3	Rotate the cover 90 degrees and press the cover until the latching stem engages the side of the copper-distribution shelf.
4	Repeat steps 2 and 3 to install the cover that fits the left side of the shelf.

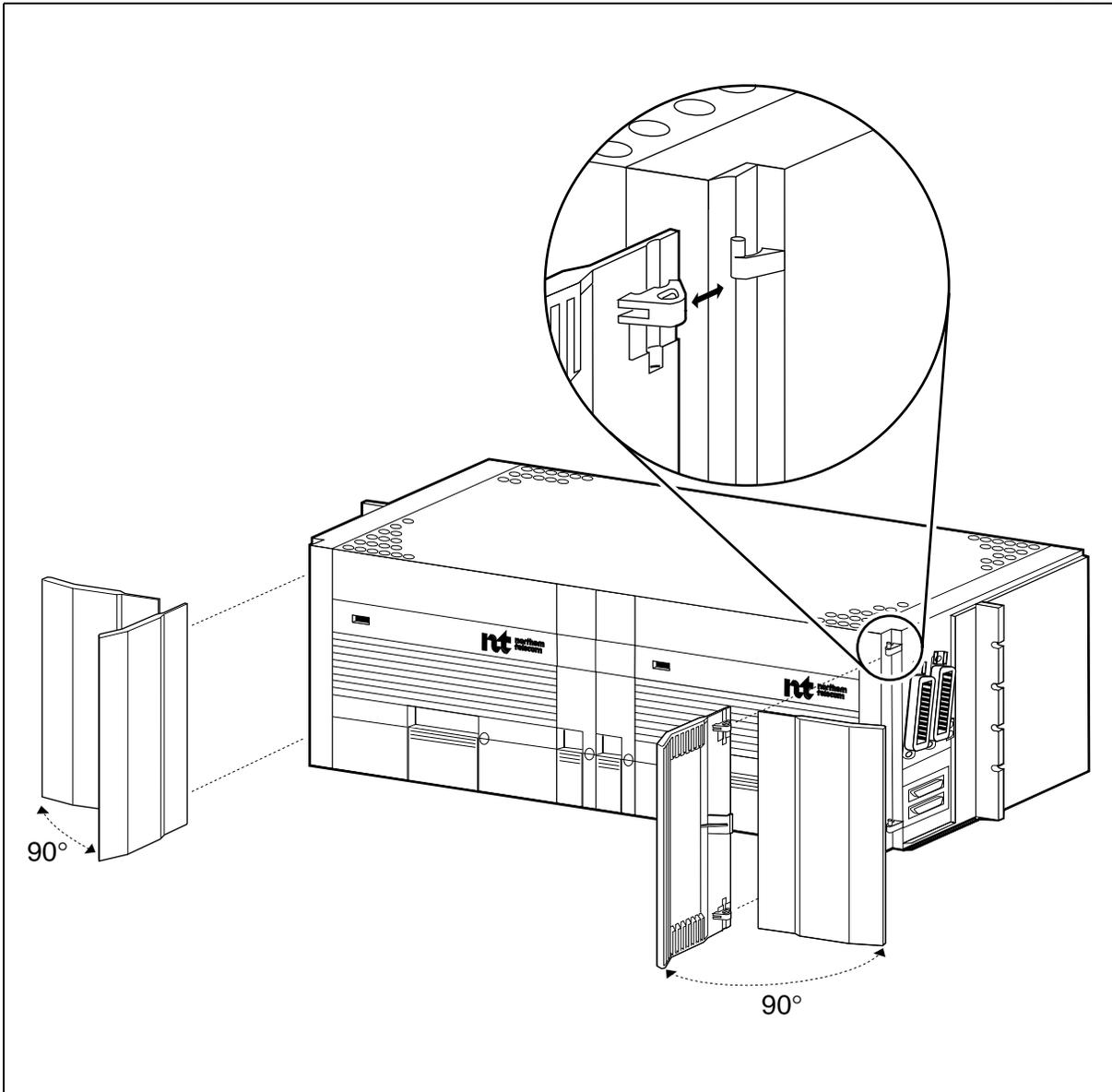
—continued—

Procedure 7-1 (continued)

Installing the side cable covers on copper-distribution shelves

Figure 7-1
Installation of a side cable cover on a copper-distribution shelf

PC-10042



—end—

Procedure 7-2 Installing the shelf covers

Use this procedure to install the shelf cover on a common-equipment shelf.

Requirement

You need a 1/4 in. flathead screwdriver to perform this procedure.

Procedure

Step	Action
1	To install the shelf cover, place the cover to engage the aligning pins at the bottom of the shelf. See Figure 7-2 on page 7-5.
2	Grasp the shelf cover by the two handles and push the cover until the handles snap into the closed position.
3	On the front cover of the shelf, use a flathead screwdriver to rotate the locking screw 90 degrees to the locked (vertical position).



CAUTION

Damage to locking screws and the finish of the equipment covers

Only use a flat-bladed 1/4 in. screwdriver to tighten or release the locking screws on the equipment covers. Do not use a coin or a narrow screwdriver.

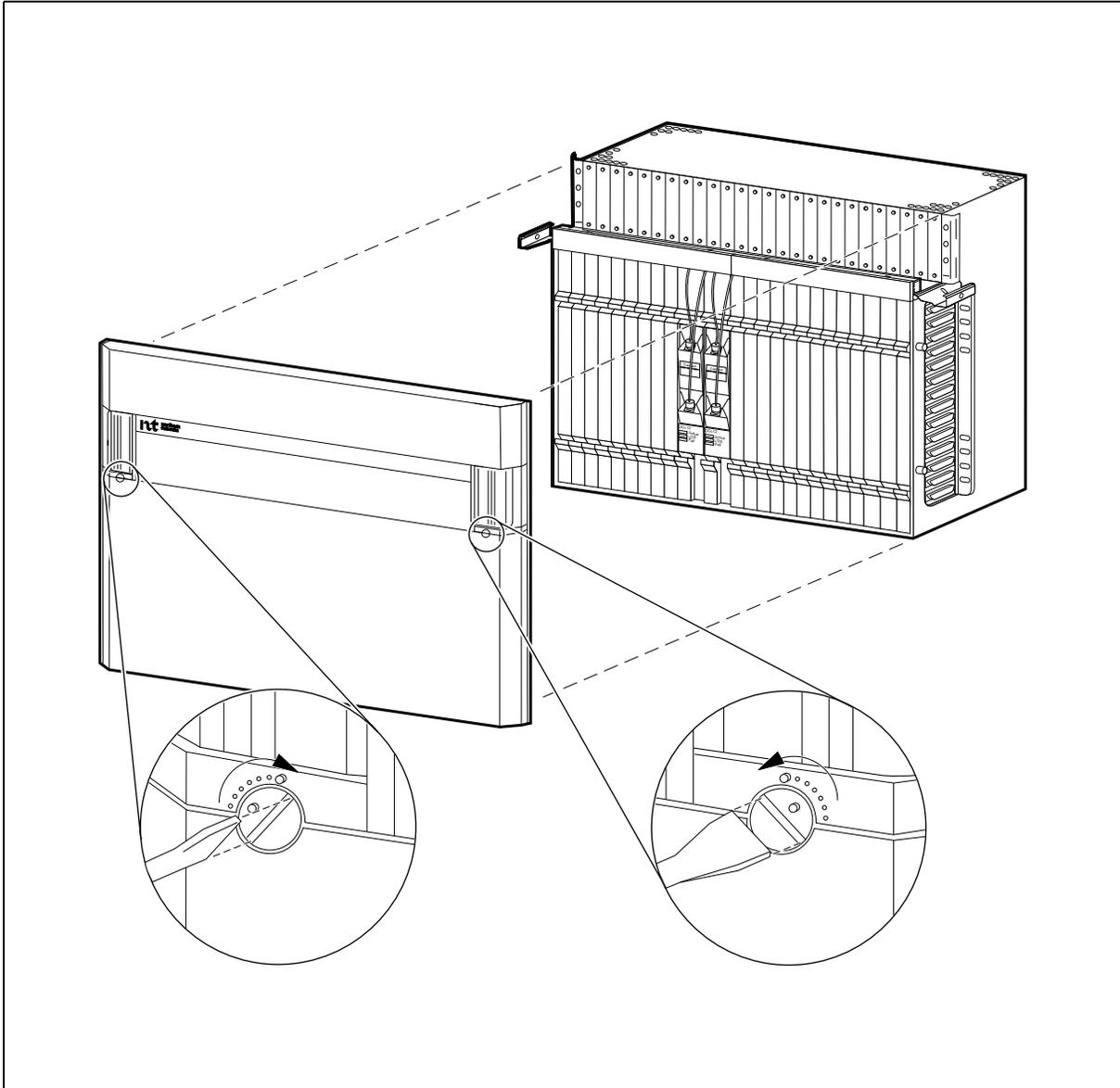
Either of these items will damage the slots on the locking screws and may slip and damage the finish on the equipment covers.

—continued—

Procedure 7-2 (continued)
Installing the shelf covers

Figure 7-2
Installation of the common-equipment shelf cover

PC-10533



—end—

Procedure 7-3 Installing the environmental control panel cover

Use this procedure to install the cover for the environmental control panel.

Requirement

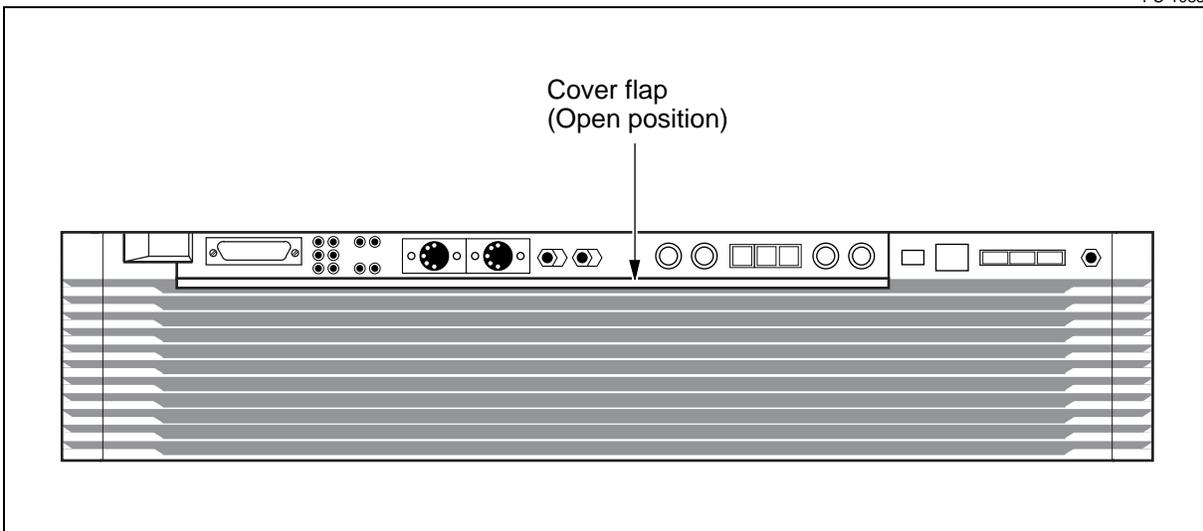
You need a 1/4 in. flathead screwdriver to perform this procedure.

Procedure

Step	Action
1	Place the notched plastic guide that projects from the lower back portion of the cover onto the corresponding brackets on the lower portion located on the side of the shelf. See Figure 7-3.
2	Push the cover onto the mounting brackets until the cover fits tightly.
3	Open the orderwire access cover flap (by flipping it down) and secure the cover in place by turning the two locking screws clockwise.

Figure 7-3
Mounting of the environmental control panel

PC-10835



—end—

Procedure 7-4 Installing the front panel on a bottom cover assembly

Use this procedure to install the front panel on a bottom cover assembly.

Requirement

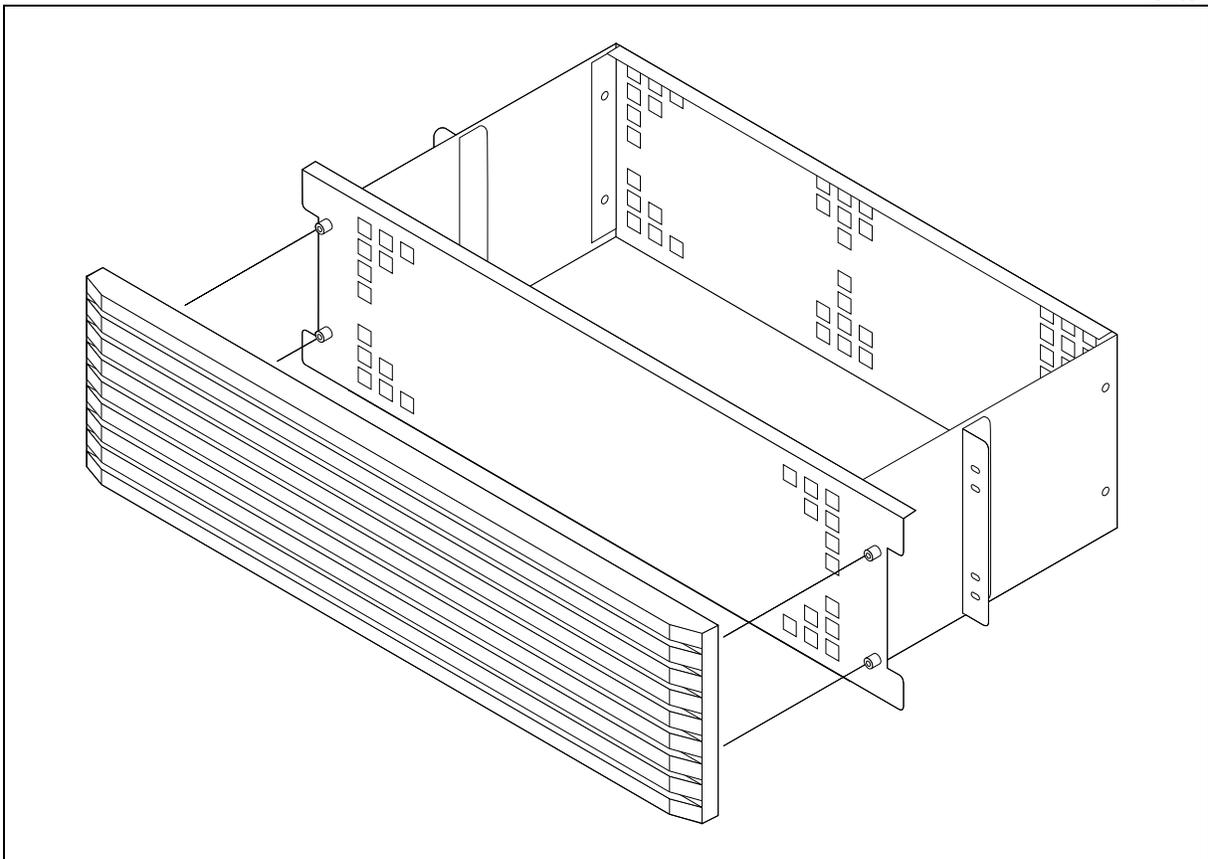
No tools are required to perform this procedure.

Procedure

Step	Action
1	Align the front panel pins with sockets on the bottom cover assembly, as shown in Figure 7-4.
2	Press the cover into place.

Figure 7-4
Installing the front cover on the bottom cover assembly

PC-10819



—end—

Procedure 7-5 Installing the bay end guards

Use this procedure to install the end guards on the first and last bays in a lineup.

Requirements

You need the following tools:

- socket wrench, 3/8 in. drive
- hexnut screwdriver, 1/4 in.
- bay end guard from the following table

Product engineering code	Bay end guard description
NT7E72AA	2.15 m (7 ft) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep
NT7E72CA	2.45 m (8 ft) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep
NT7E72DA	2.75 m (9 ft) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep
NT7E72EA	3.5 m (12 ft 6 in.) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep

Action

Step	Action
------	--------

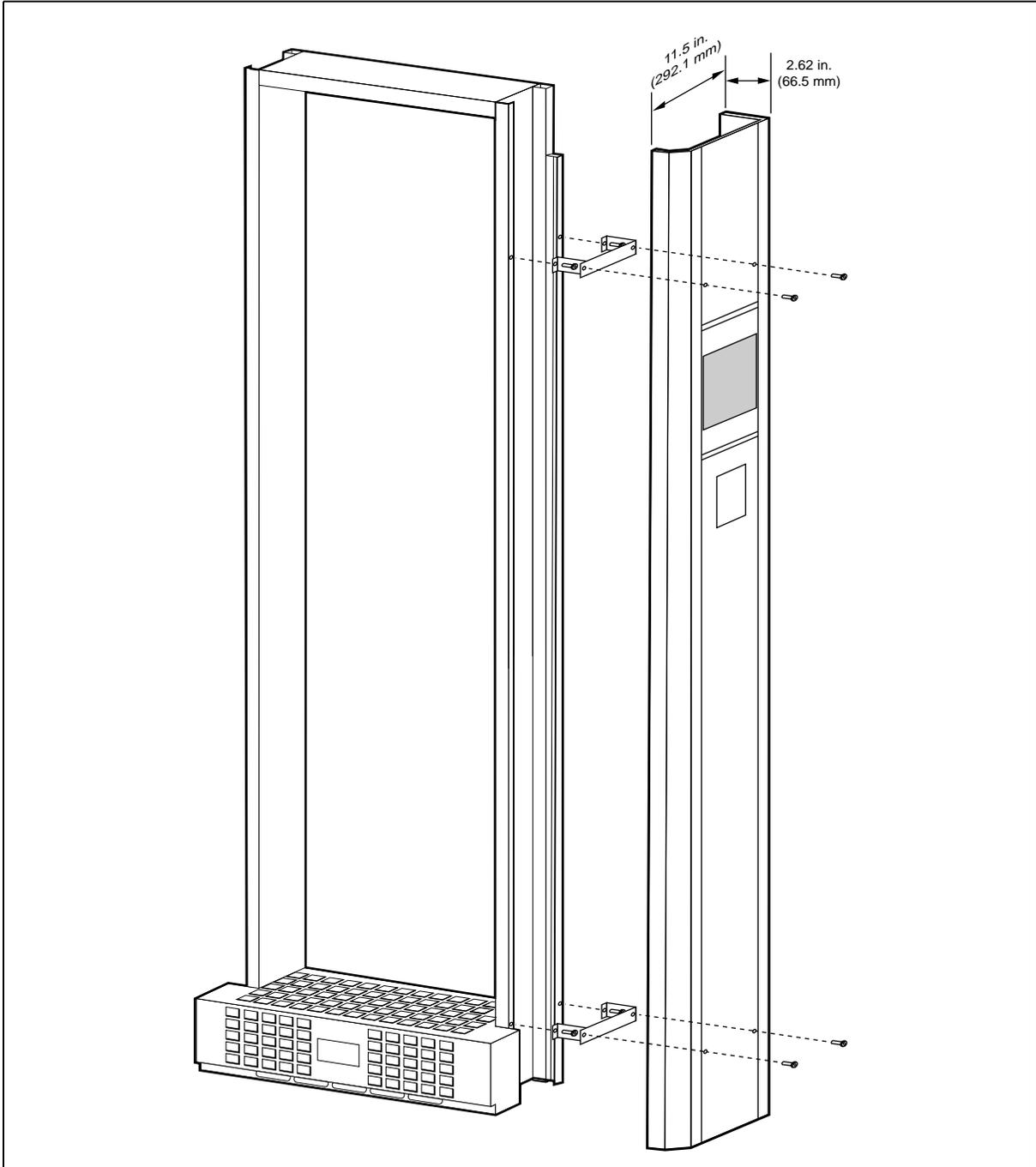
- 1 Ensure that you have selected the correct end guard from the table in "Requirements."
Note: If you are installing a 2.15 m (7 ft) frame with a frame extender, you can use either the NT7E72AA or NT7E72CA bay end guards. The NT7E72DA and EA bay end guards cannot be used with frame extenders.
- 2 Attach two brackets with two screws each to the side of the bay upright, one at the top and one near the bottom, as shown in Figure 7-5 on page 7-9.
- 3 Attach the end guard panel to the brackets with four screws, two at the top and two at the bottom, as shown in Figure 7-5 on page 7-9.
- 4 Press a protective plastic screw cap into place on each of the four screws you just installed.

—continued—

Procedure 7-5 (continued)
Installing the bay end guards

Figure 7-5
Installation of the bay end guards

PC-10022



—continued—

7-10 Installing the equipment covers, the bay end guards, and the bay end guard extenders

Procedure 7-5 (continued) Installing bay end guards

Step	Action
------	--------

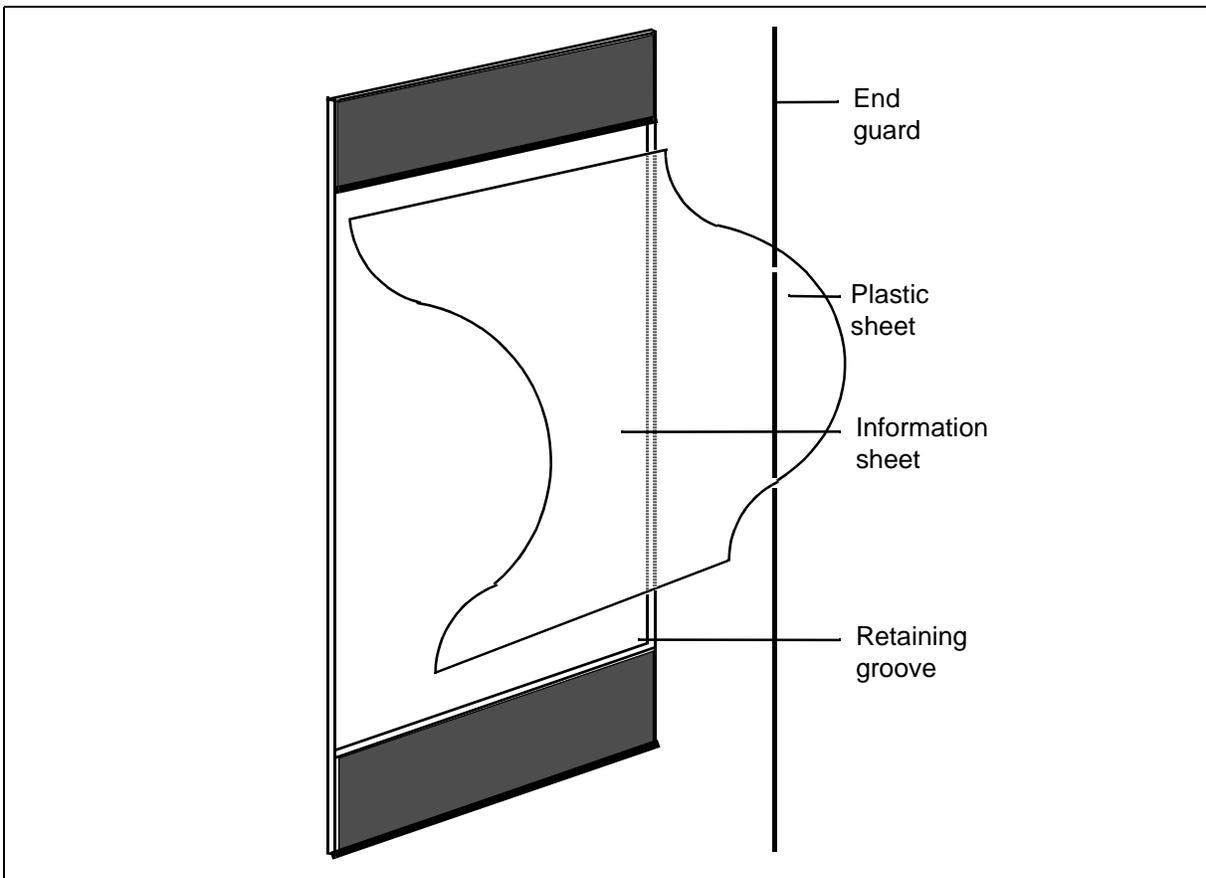
Note: The side of the end guard is equipped with a holder for an information sheet.

5 Access the information sheet by flexing the plastic sheet cover outward to allow the top and bottom edges to clear the retaining grooves, as shown in Figure 7-6.

6 Do one the following:

If the frame is	Then
equipped with bay frame extenders	install the bay end guard extender required as described in Procedure 7-6 on page 7-11.
not equipped with bay frame extenders	installation is completed

Figure 7-6
Installation or removal of the information sheet



—end—

Procedure 7-6

Installing the bay end guard extenders

Use this procedure to install the bay end guard extenders onto the frame extenders at the top of the first and the last bays in a lineup.

There are two types of bay end guard extenders. These are the NT7E75DA end guard extender 0.61 m (2 ft) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep, and the NT7E75EA end guard extender 1.5 m (4.5 ft) high by 292.1 mm (11.5 in.) wide by 66.5 mm(2.62 in.) deep.

Requirement

You need the following tools and materials:

- socket wrench, 3/8 in. drive
- installation drawing package (NT7EXCAA)

Procedure

Step	Action
1	Unpack the bay end guard extenders and their associated components.
2	Use the assembly drawing checklist to ensure that all of the required components have been provided with the bay end guard extenders.
3	Mount and secure the bay end guard extenders to the existing bay frame according to the installation drawing package.
4	Ground the extenders according to the installation drawing package.

—end—

7-12 Installing the equipment covers, the bay end guards, and the bay end guard extenders

Technical support information

This section lists the technical support available for AccessNode.

Note: AccessNode Express products are serviced by the AccessNode support team detailed in this section.

24 hour emergency technical assistance

This section explains how to contact 24 hour emergency technical assistance.

If you are here...	Then call this number...
United States	(800) ASK-ETAS (800) 275-3827
Canada	(613) 226-5456

Non-emergency support and software upgrade support

This section explains how to contact non-emergency support and software upgrade support.

If you are here...	Then call this number...
United States Normal business hours 8:00 am - 5:00 pm local time Monday to Friday	(800) ASK-TRAN (800) 275-8726
All other times (for urgent software upgrade support only)	(800) ASK-ETAS (800) 275-3827
Canada Normal business hours 8:00 am - 4:00 pm local time Monday to Friday	Call your regional field service engineering support group.
All other times (for urgent software upgrade support only)	(800) ASK-ETAS (800) 275-3827

Standard repair service: USA

This section explains how to contact US standard repair service.

US standard repair service consists of like-for-like replacement: a replacement circuit pack is shipped from Nortel Networks within five (5) working days after receiving the order.

Call customer service	and...	ship defective unit prepaid to...
(800) 251-1758 and request a Repair Order Number. 7:00 am - 6:00 pm CST Monday to Friday	Mark the defective item with the following: <ul style="list-style-type: none"> • assigned repair order number • explanation of the problem. 	Nortel Networks 917 Air Park Center Drive Nashville, TN 37217 Attn: Repair and Return

Standard repair service: Canada

This section explains how to contact Canadian standard repair service.

Canadian standard repair service consists of the following options:

- **Like-for-like replacement:** A replacement circuit pack is shipped from Nortel Networks within five (5) working days after receiving the order.
- **Repair of the circuit pack:** The repaired circuit pack is shipped from Nortel Networks within fourteen (14) days after receipt of the defective circuit pack.

Call customer service	and...	ship defective unit prepaid to...
(800) 668-1717 (English) (800) 668-1748 (French) and request a Repair Order Number. Monday to Friday 8:00 am - 5:00 pm local time	Mark the defective item with the following: <ul style="list-style-type: none"> • assigned repair order number • explanation of the problem. 	Northern Telecom Canada Ltd. Repair Customer Service Group 9300 Trans Canada Highway St. Laurent, Québec H4S 1K5 CANADA

Emergency repair service: USA

This section explains how to contact US emergency repair service.
A replacement circuit pack is shipped from Nortel Networks within 24 hours of receiving the order.

Call customer service	and...	ship prepaid to...
(800) 251-1758 and request an emergency replacement.	1) Give the following: <ul style="list-style-type: none"> • name • company name • telephone number • exact unit code and name for emergency replacement • ship-to address 2) Mark the defective item with the assigned emergency repair order number	Nortel Networks 917 Air Park Center Dr. Nashville, TN 37217 Attn: Repair and Return

Emergency repair service: Canada

This section explains how to contact Canadian emergency repair service.
A replacement circuit pack is shipped from Nortel Networks within 24 hours of receiving the order.

Call customer service	and...	ship prepaid to...
Normal business hours Monday to Friday 8:00 am - 5:00 pm local time (800) 668-1717 (English) (800) 668-1748 (French) and request an emergency replacement. All other times: (800) 361-2575 and request an emergency replacement.	1) Give the following: <ul style="list-style-type: none"> • name • company name • telephone number • exact unit code and name for emergency replacement • ship-to address 2) Mark the defective item with the assigned emergency repair order number	Northern Telecom Canada Ltd. Repair Customer Service Group 9300 Trans Canada Highway St. Laurent, Québec H4S 1K5 CANADA

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SONET Products

AccessNode

Bay in Central Office Installation Manual for
ABM

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