Cisco StrataCom
BPX Service Node Installation

Release 8.5

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About this Publication

This publication provides installation instructions for the BPX.

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What's in This Publication?

This publication is organized as follows:

Chapter 1	**Introduction**
	Provides a brief introduction to the document, including a flow diagram that shows which procedures are applicable to the various options, Stratm Cabinet or Customer Cabinet, ac cabinet or dc cabinet
Chapter 2	**Installation, Preliminary**
	Provides preliminary installation instructions for the BPX .
Chapter 3	**Installation, with STRATM Cabinet**
	This chapter provides installation steps for the mechanical placement of a BPX shelf in a standard STRATM cabinet. This cabinet provides rear rails at a 19.86 inch (50.5 cm) setback from the front of the cabinet.
Chapter 4	**Installation, with Customer Cabinet**
	This chapter provides installation steps for the mechanical placement of a BPX shelf in a standard 19-inch customer supplied equipment cabinet or rack with a rear rail setback at 30 inches.
Chapter 5	**Installation, DC Shelf Initial Setup**
	This chapter describes how to make the DC power connections.

Chapter 6   **Installation, AC Shelf Initial Setup**

This chapter explains how to install the AC power supply tray, power supplies, and make AC power connections.

Chapter 7   **Finishing the Installation**

This chapter explains how to install the BPX cards, connect line and trunk cables, connect peripherals, connect to a network management station, initial power up, and initial configuration.

Chapter 8   **T3/E3 Cable Management Tray**

This appendix provide details on the peripherals used with the BPX including printers and modems.

Appendix A   **STRATM Cabinet Dimensions**

Illustrates typical cable management and space requirements for various system configurations in the STRATM cabinet. It also lists the height of StrataCom components in inches, centimeters, and rack-mount units (RMUs).

Appendix B   **BPX Cabling Summary**

This appendix provides details on the cabling required to install the BPX node.

Appendix C   **BPX Peripherals**

This appendix provide details on the peripherals used with the BPX including printers and modems.

Related Documentation

- *StrataView Plus Operations Guide* providing for procedures for using the StrataView Plus network management system.

- StrataSphere Network Design Tools providing procedures for modeling networks.

- Release 8.4 of the IGX/IPX/BPX Documentation set, including:

  — *BPX Reference* providing a general description and technical details of the BPX broadband node.

  — *IPX Reference* providing a general description and technical details of the IPX narrowband node.

  — *IPX Installation* providing installation instructions for the IPX.

  — *IGX Reference* providing a general description and technical details of the IGX node.

  — *IGX Installation* providing installation instructions for the IGX.

  — *AXIS Reference* providing a general description and technical details of the AXIS node.

  — *AXIS Command Reference* providing detailed information for AXIS command line usage.

  — *Command Reference* providing detailed information on operating the BPX, IGX, and IPX systems through their command line interfaces.

  — *SuperUser Command Reference* providing detailed information on their command line interfaces special commands requiring SuperUser access authorization.

Conventions

This publication uses the following conventions to convey instructions and information.

Command descriptions use these conventions:

- Commands and keywords are in **boldface**.

- Arguments for which you supply values are in *italics*.

- Elements in square brackets ([ ]) are optional.

- Alternative but required keywords are grouped in braces ({ }) and are separated by vertical bars (|).

Examples use these conventions:

- Terminal sessions and information the system displays are in screen font.

- Information you enter is in **boldface screen** font.

- Nonprinting characters, such as passwords, are in angle brackets (< >).

- Default responses to system prompts are in square brackets ([ ]).

Note   Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Timesaver   Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Caution   Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning   This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and familiar with standard practices for preventing accidents. (To see translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment.)

Introduction

Introduction

This document provides installation instructions for the BPX.

For additional information on the BPX, including card descriptions and additional information on configuration, refer to the *BPX Service Node Reference*. For a description of the commands used to operate a BPX, refer to the *Command Reference*. Refer to the *System Overview* for system and network information. Refer to the StrataView Plus manuals for information on network management.

Installation Sequence

Figure 1-1 shows the sequence of operations followed during the installation of the BPX. A summary of this sequence is as follows:

— Chapter 2, Introduction, provides preliminary setup instructions for the mechanical installation of a BPX shelf. Depending on the type of rack or cabinet, the installer is then directed to either:

— Chapter 3, Installation, with STRATM Cabinet with rear rail setback at 19.86 inches, or

— Chapter 4, Installation, with Customer Cabinet that is 19 inches wide with a rear rail setback of 30 inches.

— Otherwise, the installation is non-standard and requires that Customer Service be contacted.

The BPX shelves are either AC or DC powered. At the completion of the procedures in Chapter 3 or Chapter 4, the installer is directed to the appropriate power setup and connection chapter:

— Chapter 5, Installation, DC Shelf Initial Setup, or

— Chapter 6, Installation, AC Shelf Initial Setup.

The remaining procedures are common and the installer is directed to the final setup and configuration procedures in:

— Chapter 7, Finishing the Installation

An optional cable management tray and optional BXM T3/E3 cable management brackets are available for use with T3/E3 BXM cards. The brackets are for use with cards set up as non-redundant (single cables rather than Y-cabling). The tray is designed primarily for use in a mid-mount open rack configuration. Instructions for installing the optional tray are provided in:

— Chapter 8, T3/E3 Cable Management Tray

Figure 1-1   Installation Sequence


```
┌─────────────────┐
│ Chapter 2       │
│ Installation,   │
│ Preliminary     │
└────────┬────────┘
         │
         ▼
┌─────────────┐  No   ┌──────────────────┐  No   ┌───────────────────────┐
│ STRATM      ├──────▶│ Standard 19-inch │──────▶│ Special installation. │
│ cabinet?    │       │ customer cabinet │       │ Contact customer      │
└──────┬──────┘       │ or rack?         │       │ service.              │
       │ Yes          └────────┬─────────┘       └───────────────────────┘
       │                       │ Yes
       ▼                       ▼
┌──────────────────┐  ┌──────────────────────┐
│ Chapter 3        │  │ Chapter 4            │
│ Installation with│  │ Installation with    │
│ STRATM cabinet.  │  │ standard 19-inch wide│
│ Rear rail setback│  │ customer cabinet or  │
│ at 19.86 inches. │  │ rack. Rear rail      │
│                  │  │ setback at 30 inches.│
└────────┬─────────┘  └──────────┬───────────┘
         │◀──────────────────────┘
         ▼
┌──────────────┐  No
│ Is BPX a     ├────────────┐
│ DC shelf?    │            │
└──────┬───────┘            │
       │ Yes                │
       ▼                    ▼
┌──────────────┐     ┌──────────────┐
│ Chapter 5    │     │ Chapter 6    │
│ Installation,│     │ Installation,│
│ DC shelf,    │     │ AC shelf,    │
│ Initial setup│     │ Initial setup│
└──────┬───────┘     └──────┬───────┘
       └────────────┬───────┘
                    ▼
          ┌──────────────┐   ┌──────────────────┐
          │ Chapter 7    │   │ Chapter 8,       │
          │ Finishing the│   │ Optional T3/E3   │
          │ installation │   │ cable tray       │
          └──────────────┘   └──────────────────┘
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Support

Contact Customer Service for more information. In North America, call Customer Support toll free at 800-553-6387. International customers should contact your local Cisco sales office or call 408-526-400 and ask for Customer Service.

Installation, Preliminary

This chapter provides preliminary installation steps for the BPX, including the mechanical installation of the BPX shelf in a STRATM cabinet or vendor supplied standard 19 inch (48.25 cm) equipment rack.

This chapter contains the following sections:

Site Preparation

Parts Checklist

Safety Requirements

Mechanical Installation

Warning   Installation should be performed by authorized personnel only.

Site Preparation

The BPX has the following site preparation requirements.

- **Space**
  Each BPX shelf requires floor space of 22 inches (55.9 cm) wide and 80 inches (203.2 cm) deep to assure sufficient clearance around the cabinet to allow access to the front and back of the unit.

- **Power**
  An AC or DC power source must be available within 6 feet (2 m.) of the rear of the BPX shelf. A maximum configuration for an AC powered BPX may require up to 2333 VA (13 A at 180 VAC, 10 A at 230 VAC). A maximum configuration for a DC powered BPX may require up to 1680 Watts (40 A at –42 VDC, 35 A at -48 VDC).

- **Cooling**
  The site must be capable of maintaining an ambient temperature of 40°C maximum (recommended range 20°C to 30°C) while the system is operating. A fully loaded BPX may dissipate up to 7200 BTUs. It is extremely important that the BPX is positioned to assure an unrestricted air flow through the enclosure.

Parts Checklist

Before proceeding, go through this parts checklist to verify that all the parts you ordered are present, and that they are all in good condition. If there is anything missing or damaged, report it to your Cisco Order Administration representative.

Plug-in cards may be shipped installed or under separate cover. The exact number of cards will vary from site to site, depending on the selected configuration. The BPX is shipped with all unused slots covered by backplane inserts which prevent radio frequency emissions from the equipment. The unit must not be operated with any unused slots left uncovered.

Refer to the list below and check the number and type of cards shipped against the number and type of card you ordered.

_____ If a DC version, the correct number of Power Entry modules.

_____ If an AC version, the unit has the correct number of power supplies (1 or 2).

_____ For non- redundant configuration, one Broadband Controller Card. This can be a BCC-4, BCC-3, or a BCC-32 depending on system configuration

_____ For a non-redundant configuration, one Broadband Controller backcard. For a BCC-4 or BCC-3 front card, a BCC-3-bc backcard must be used. For a BCC-32 front card, a BCC-bc backcard must be used.

_____ For a redundant configuration, two Broadband Controller Cards. These can be two BCC-3s or two BCC-32s.

_____ For a redundant configuration, two Broadband Controller backcards. For BCC-4 or BCC-3 front cards, these must be BCC-3-bc backcards. For BCC-32 front cards, these must be BCC-bc backcards.

_____ One ASM card.

_____ One LM-ASM card.

_____ Correct number of BXM cards.

_____ Correct number of BNI cards.

_____ Correct number of ASI cards.

_____ One line module backcard for each BXM, as applicable (e.g., BPX-T3/E3-BC, MMF-155-4, SMF-155-4, SMFLR-155-4, MMF-155-8, SMF-155-8, SMFLR-155-8, SMF-622, SMFLR-622, SMF-622-2, or SMFLR-622-2).

_____ One line module backcard (e.g., BPX-T3-BC, BPX-E3-BC, MMF-2-BC, SMF-2-BC, or SMFLR-2-BC) for each BNI, as applicable.

_____ One line module backcard (e.g., BPX-T3-BC, BPX-E3-BC, MMF-2-BC, SMF-2-BC, or SMFLR-2-BC) for each ASI, as applicable.

_____ All cables specified in the order.

Note An inventory of the installed cards is taped to the BPX stating each card's serial number, revision number, and slot number (serial and revision numbers are also found on the component side of each card).

Safety Requirements

The following paragraphs contain safety information for system planners, installers, and maintenance personnel. The mechanical design of the BPX prevents any access to exposed voltages without the use of tools. When installed properly, all front and rear cards are held captive mechanically.

Warning   For protection against shock hazard, verify all power cords or cables are disconnected before servicing unit (there may be more than one). The highest voltage that may be present in the node when powered up is 264 VAC (AC systems) or 56 VDC (DC systems).

Laser Safety Guidelines

The optical ports contain an information label as shown in Figure 2-1.

Figure 2-1   Laser Information Label

Warning   Invisible laser radiation may be emitted from the optical ports of the single-mode or multi-mode products when no fiber cable is connected. Avoid exposure and do not look into open apertures. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Warning   Class 1 laser product. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Warning   Laser radiation when open. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Power and Grounding

Step 1 In order for the BPX to function safely and correctly, along with peripheral equipment, use only the power cords, cables, and connectors specified for the attached peripheral equipment, and make sure they are in good condition.

Step 2 Certain BPX nodes are supplied with two power feeds (cords). Before commencing installation or maintenance inside the cabinet, be sure both power feeds are disconnected from their respective sources.

Step 3 Ensure that the BPX frame is attached to an isolated ground connection (connection attached directly to ground through an uninterrupted line).

Step 4 A conduit hookup box is factory-installed on each DC Power Entry Module for sites requiring wiring to be enclosed in conduit. A plastic terminal block cover is also provided for installations that do not require conduit hookup. Install one or the other as protection for the DC input.

Step 5 For an AC system, verify that the node is powered from a dedicated AC branch circuit. The circuit shall be protected by a dedicated 2-pole circuit breaker sized such that the rated current and the trip delay is higher and longer than the BPX circuit breaker. A dedicated 20A, 2-pole AC circuit breaker with a long trip delay is recommended for installation.

Note The BPX uses a 15A (or in newer models a 20_A), 2-pole AC circuit breaker with a medium trip delay on each AC input. The circuit breaker manufacture is either Carlingswitch (p/n CA2-B0-34-615-121-C) or Heinemann (p/n AM2-A3-A-0015-02E).

Step 6 For a DC system, verify that the node is powered from a dedicated DC branch circuit. The circuit shall be protected by a dedicated circuit breaker sized such that the rated current and the trip delay is higher and longer than the BPX circuit breaker. A dedicated 50A, 1-pole DC circuit breaker with a long trip delay is recommended for installation.

Note The BPX uses a 50A, 1-pole DC circuit breaker with medium trip delay on the -48V input. The circuit breaker manufacture is Heinemann (p/n AM1S-B3-A-0050-02-H).

Step 7 An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors, but is green with yellow stripes, is to be installed as part of the branch circuit that supplies the unit.

CEPT Requirements

All apparatus (e.g., 48 VDC power supplies) connected to the BPX must comply with BS6301 or EN60950

EMI Requirements

Compliance with emission regulations depends upon adherence to the installation steps in this manual, including installation of faceplates for all slots and the use of shielded cables between systems.

Mechanical Installation

Weight
A fully loaded, AC-version, BPX node can weigh up to 213 pounds (97 Kgs). A fully-loaded DC-version BPX may weigh up to 163 pounds (74 Kgs).

Cooling

Caution   If the BPX is to be mounted in an enclosed cabinet, assure that a free flow of air in and out of the enclosure is provided. Contact Customer Service for further information.

Horizontal Positioning
BPX shelves are designed to be mounted to two sets of vertical mounting rails in either a STRATM cabinet or a standard 19-inch equipment rack with unrestricted front to rear air flow. When installed in a STRATM cabinet (Figure 2-2), the front flanges of the BPX are secured to the front rails of the STRATM cabinet. In factory installations, rear support is provided by rear mounting rails in the cabinet at a setback of 19.86 inches. As an option, a rear set of rails located at a setback of approximately 30 inches may be used for rear support.

BPX shelves can also be mid-mounted to an open T-Rail type rack (Figure 2-3) with unrestricted front to rear air flow. To facilitate this type of installation, brackets may be fastened to the BPX shelf at a 5 or 10 inch setback for supporting the front of the BPX shelf. Additional rear mounting support is also recommended. Contact Customer Service for further information.

Vertical Positioning
For recommended typical equipment configurations in a STRATM cabinet, refer to Appendix A, STRATM Cabinet Dimensions.

Figure 2-2   Cabinet Mounting Options for the BPX Shelf
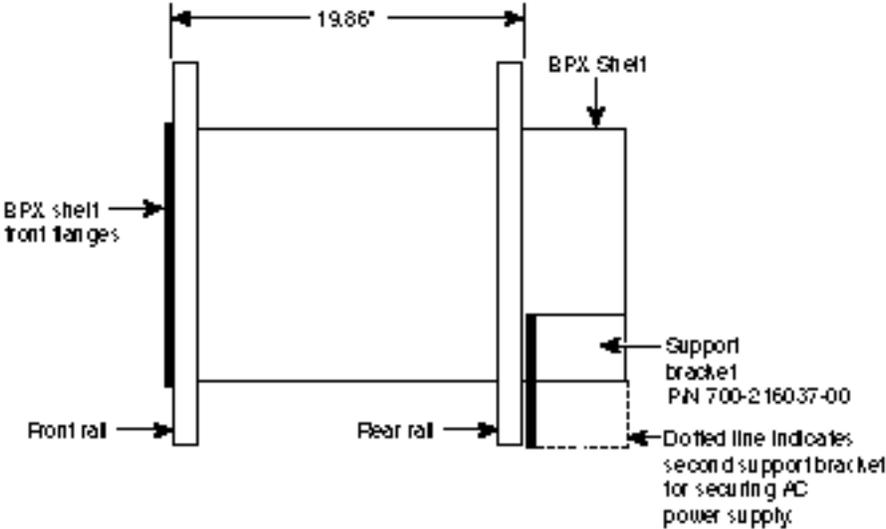
A. STRATM Cabinet mounting with rear rail at 19.86 inches setback.
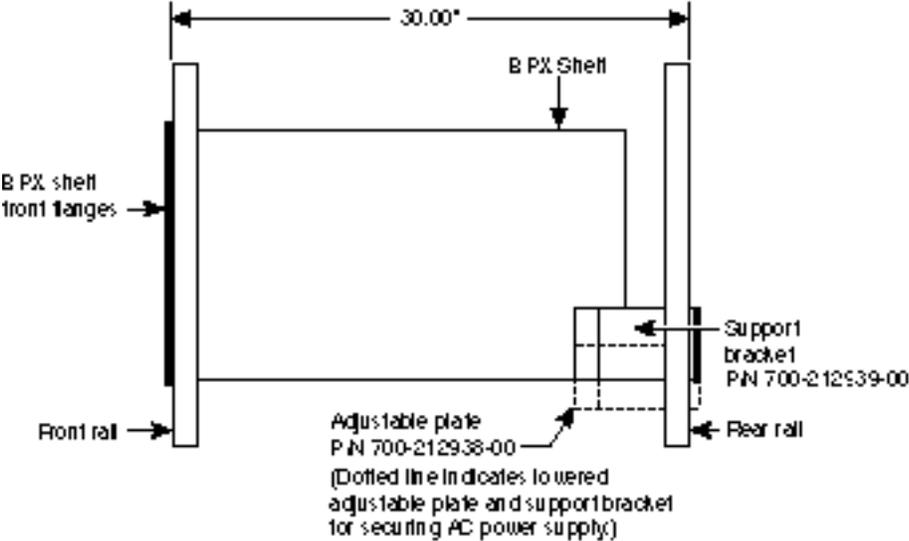
B. Customer furnished cabinet mounting with rear rail set at approximately 30 inches.

Figure 2-3   BPX Shelf and T-Rail (Open Rack) or Equivalent Mounting Options
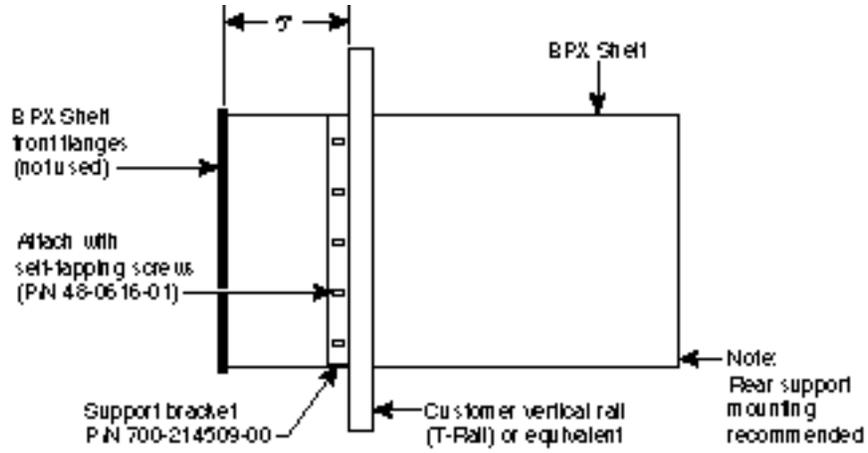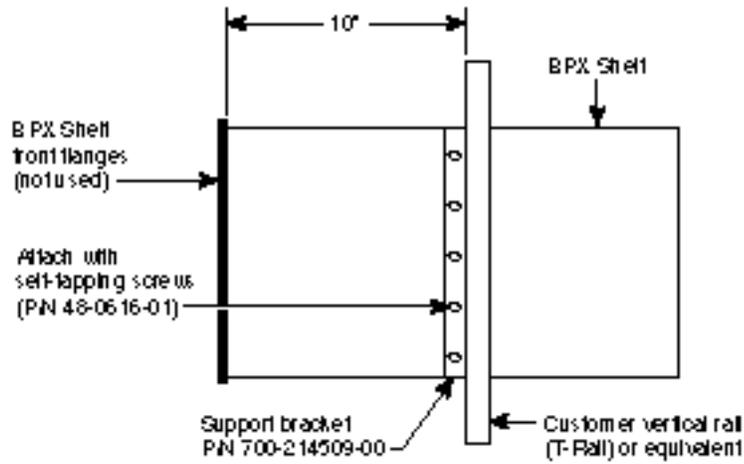
Installing a BPX Shelf, Preliminary Steps

The BPX is designed for mounting in a standard 19-inch (48.25 cm.) equipment rack such as the standard STRATM cabinet. A minimum width between rails of 17.750 inches (44.45 cm) is required (Figure 2-5 and Figure 2-6). Mounting flanges are permanently attached to the front edge of the BPX shelf. It is recommended that the shelf be mounted with all plug-in cards temporarily removed to lessen the weight.

There are two types of BPX shelves, AC powered and DC powered. When an AC powered BPX shelf is installed, an AC Power Supply Tray is installed directly below it. The DC Powered BPX Shelf contains factory installed DC power entry modules (PEMs) within the shelf itself.

A temporary support bracket and spacer bracket is furnished to ease installation. The pallet tray part of the shipping container is used in the installation of the BPX. This wooden pallet tray that is shipped under the BPX chassis is used to lift, align, and support the chassis during installation in a rack.

The following instructions are for BPX Shelf installation in a STRATM cabinet which has rear rails at 19.86 inches (50.5 cm) or in a customer supplied standard 19-inch (48.25 cm)_ equipment rack with rear rails at a 30 inch (76.2 cm) setback.

Note Installation in a non-STRATM cabinet or T-Rail type rack is similar to installation in a STRATM cabinet. Contact Customer Service for recommended rear support details.

To install the BPX in a rack proceed as follows:

Step 1 Position the shipping container and pallet in front of the cabinet with the rear of the chassis towards the cabinet. Remove the foam strips on the sides, front, and rear.

Step 2 Remove the card retaining bracket from the front of the chassis by unscrewing the four Phillips screws. This bracket is used to retain the boards during shipping.

Step 3 Remove the Air Intake Grill and all front and rear cards from the shelf and temporarily set aside as follows:

(a) Locate the small access hole in the top center of the front Air Intake Grille below the card slots (see Figure 2-4 for location).

(b) Insert a small slotted blade screwdriver (0.20/0.25 inch blade width) into the access hole until it stops (approximately 1 inch).

(c) Carefully rotate the screwdriver approximately a quarter turn in either direction. The top of the Air Intake Grille should spring out.

(d) Remove Air Intake Grille.

Caution Ground yourself before handling BPX cards by placing a wrist strap on your wrist and clipping the strap lead to the cabinet.

(e) To remove the cards, rotate the extractor handles at the top and bottom of each card to release the card and slide it out.

Figure 2-4   Removing an Air Intake Grille
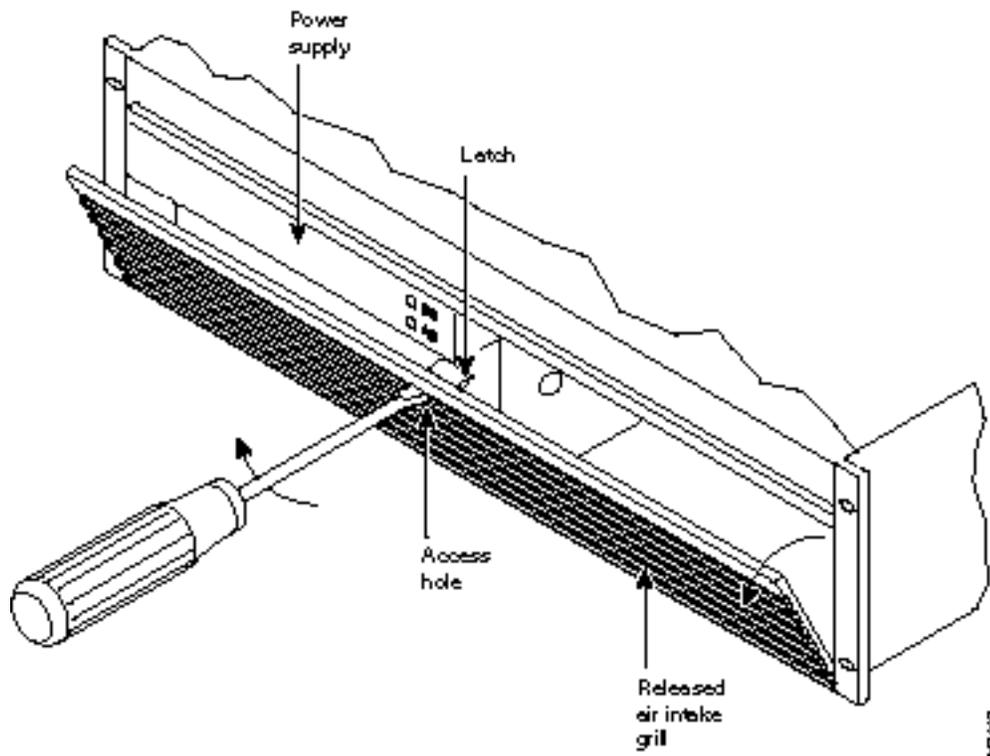
Step 4   Decide where the BPX is to be located. Refer to Figure 2-2 through Figure 2-6 for typical mounting dimensions. Also, for typical mounting configuration examples, refer to Appendix A, STRATM Cabinet Dimensions. The appendix lists dimensions in inches, centimeters, and rack mounting units (RMUs). The top of the spacer bracket should be temporarily installed in the rack 22.75" (57.8 cm.) below the location selected for the top of the BPX chassis.

Step 5   Install the temporary support brackets and spacer bracket (shipped with the unit). Use two mounting screws to attach each temporary support bracket and two screws to attach the temporary spacer bracket to the rack (Figure 2-7 and Figure 2-8).

Figure 2-5   Rack Mounting Dimensions, DC Powered Shelf
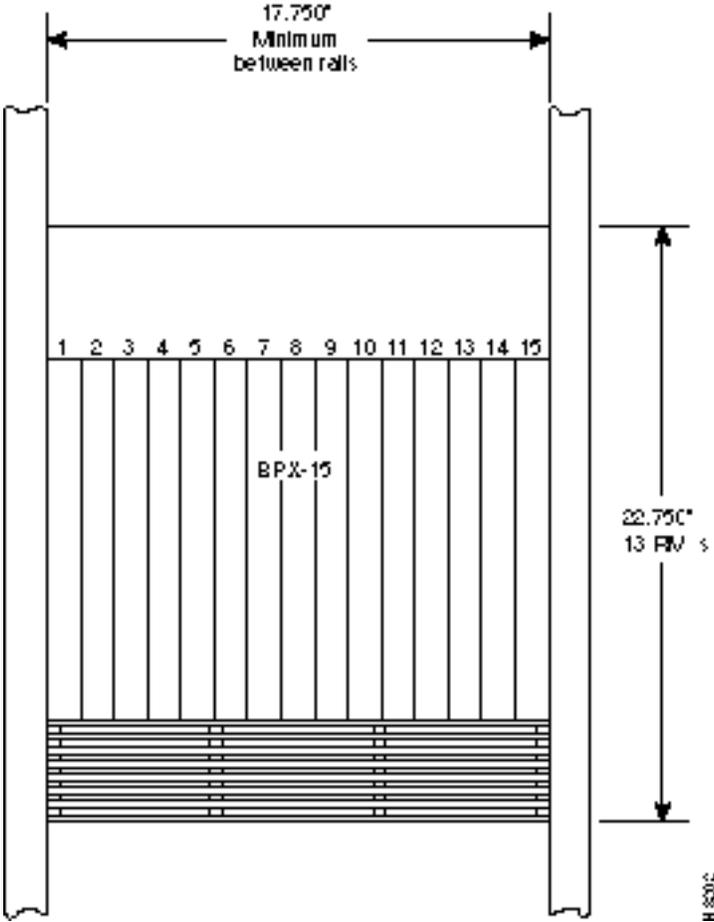
Figure 2-6   Rack Mounting Dimensions, AC Powered Shelf
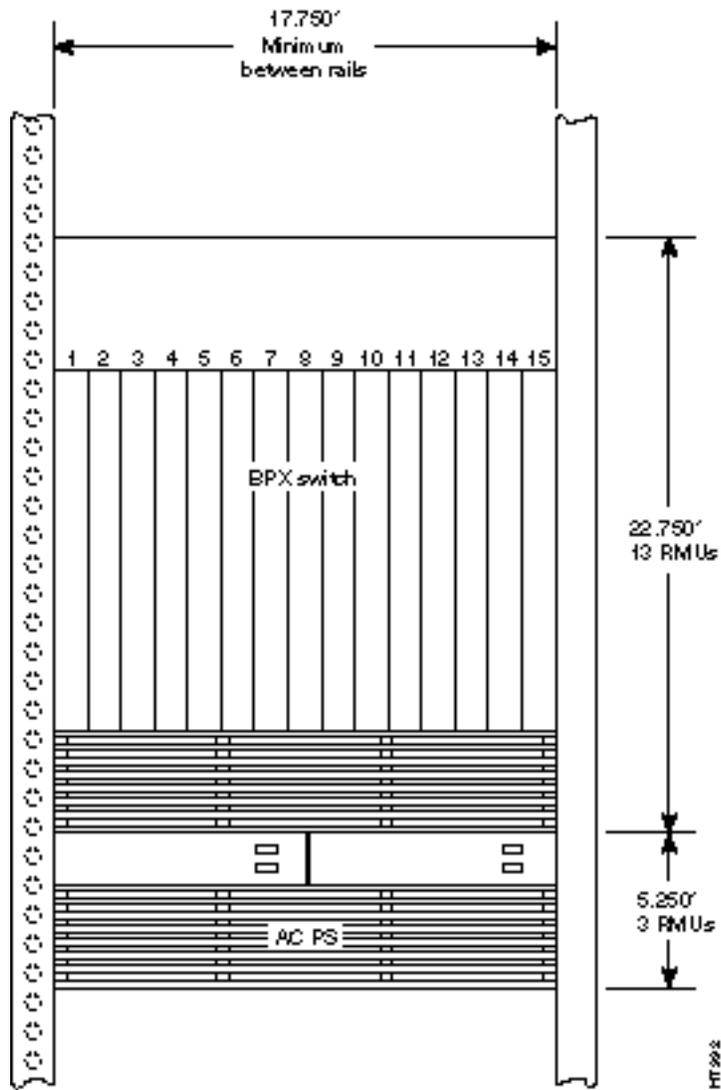
Figure 2-7   **Temporary Spacer Bracket and Support Bracket Installation**
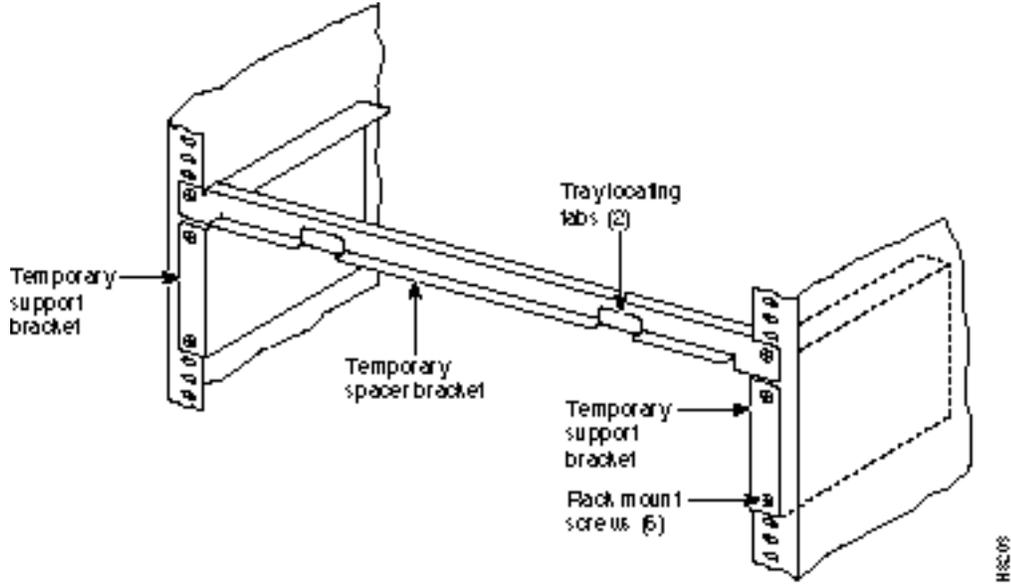
Figure 2-8   **BPX Shelf Aligned with Temporary Support Brackets and Bar**
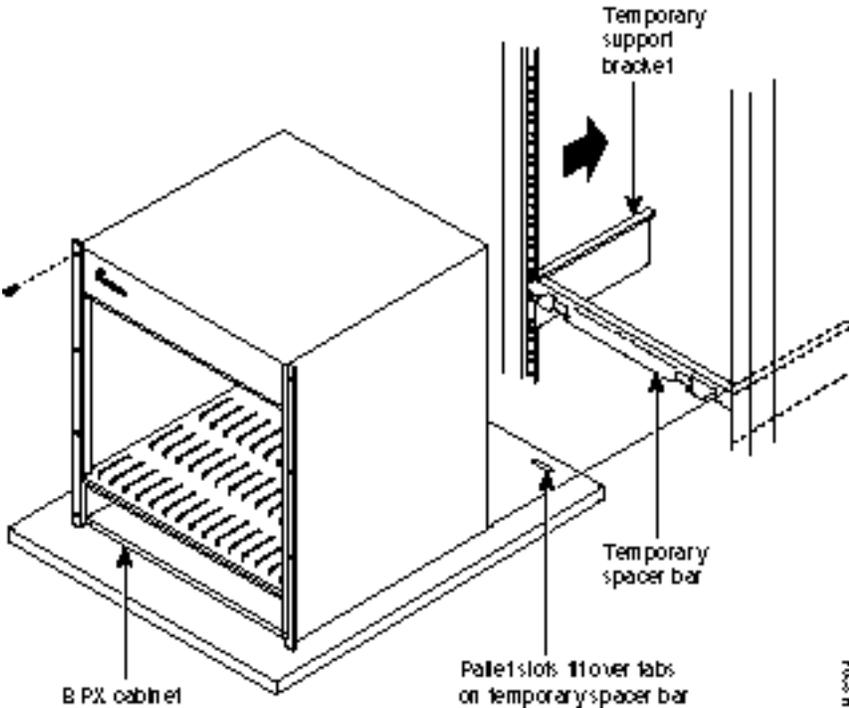
Note   It is recommended that all BPX systems use a set of vertical support rails to provide additional support for the rear of the chassis. In the STRATM cabinet these are located at a 19.86 inch setback from the front in factory installations.

Step 6   If the BPX Shelf is being installed in a STRATM cabinet and is using factory installed rear rails located at a 19.86 inch setback from the front, go to Chapter 3, Installation, with STRATM Cabinet.

Step 7   If the BPX Shelf is being installed in a customer supplied cabinet using rear rail mounting support brackets located at a setback of approximately 30 inches from the front, go to Chapter 4, Installation, with Customer Cabinet.

Installation, with STRATM Cabinet

This chapter provides installation steps for the mechanical placement of a BPX shelf in a standard STRATM cabinet. This cabinet provides rear rails at a 19.86 inch (50.5 cm) setback from the front of the cabinet.

Before proceeding to this chapter, the procedures should be completed, in:

— Chapter 2, Installation, Preliminary

Installing a BPX Shelf, Rear-Rail Setback at 19.86 Inch

The steps in this procedure apply to a BPX Shelf that is being installed in a STRATM cabinet and using factory installed rear rails located at 19.86 inches from the front.

If the BPX shelf is DC-powered, the DC Power Entry Modules are factory-installed in the lower portion of the rear of the BPX shelf (Figure 3-1). Locate the DC Power Entry Module(s) and make sure it/they are equipped as ordered. If the BPX shelf is AC-powered, an AC Power Tray is installed below it as part of the installation process.

Figure 3-1   Location of DC Power Entry Module(s), Cabinet Rear View
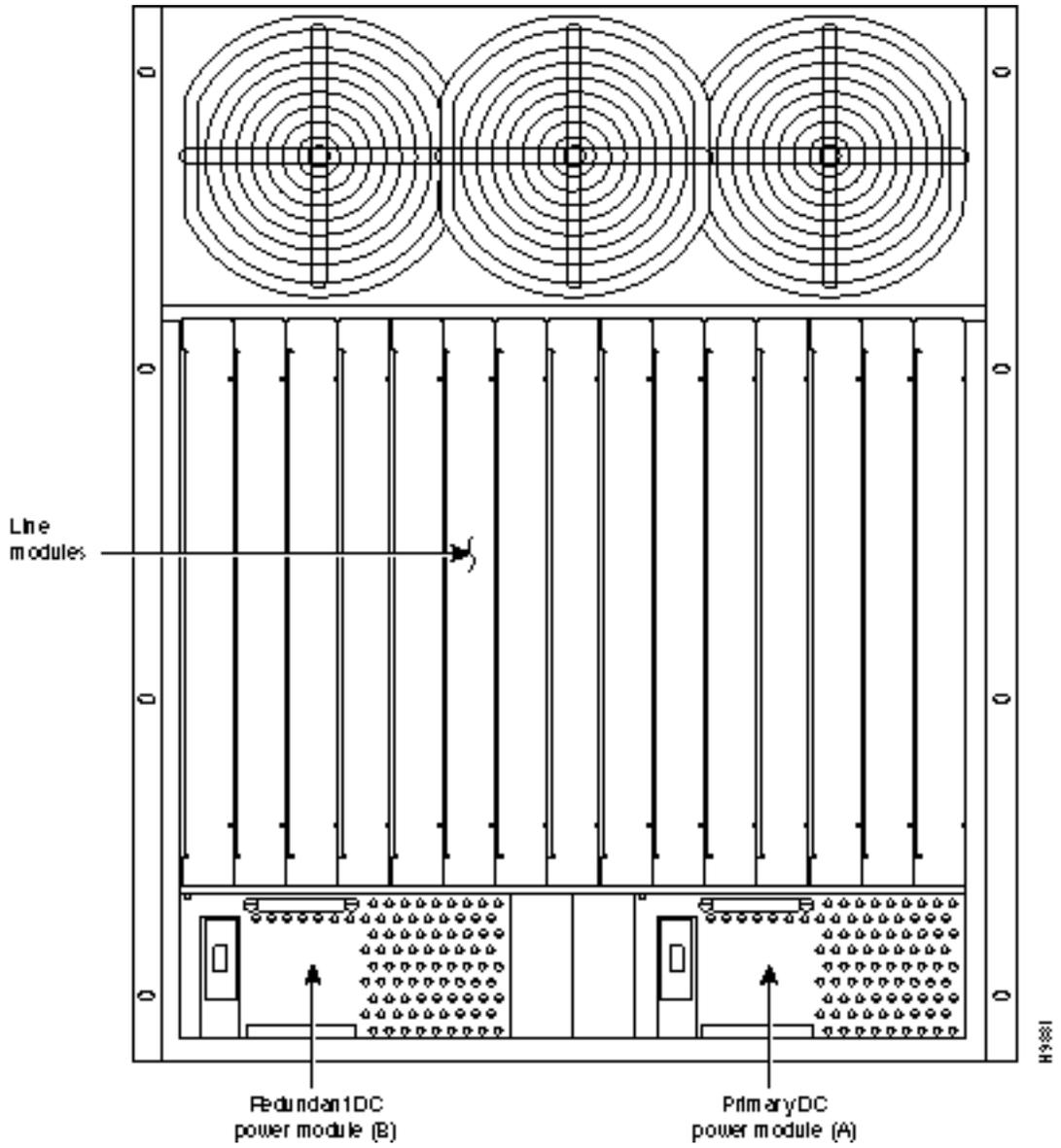
Preliminary Procedure:

Proceed as follows to install either an AC or DC powered BPX shelf, referring to Figure 3-2 and Figure 3-3 and to either Figure 3-4 for DC powered systems or Figure 3-5 for AC powered systems:

Step 1 Locate the two rear support brackets (P/N 700-216037-00) in the miscellaneous parts kit.

Step 2 Secure one each support bracket to the back of the rear rail located at 19.86 inches from the front flange of the STRATM cabinet using #10-32 machine screws and flat washers.

Note European installation may use a size M6 metric screw.

Warning An empty BPX enclosure weighs 75 pounds (34 Kgs.) and requires a 2 or 3-person lift to move into place.

Step 3 With one person on each side of the BPX shelf, lift the pallet tray and BPX chassis positioning the slots at the rear of the pallet tray over the locating tabs on the spacer bracket (Figure 3-2).

Step 4 Slide the BPX shelf back over the temporary support brackets and into place.

Figure 3-2   **BPX Shelf Aligned with Temporary Support Brackets and Bar**
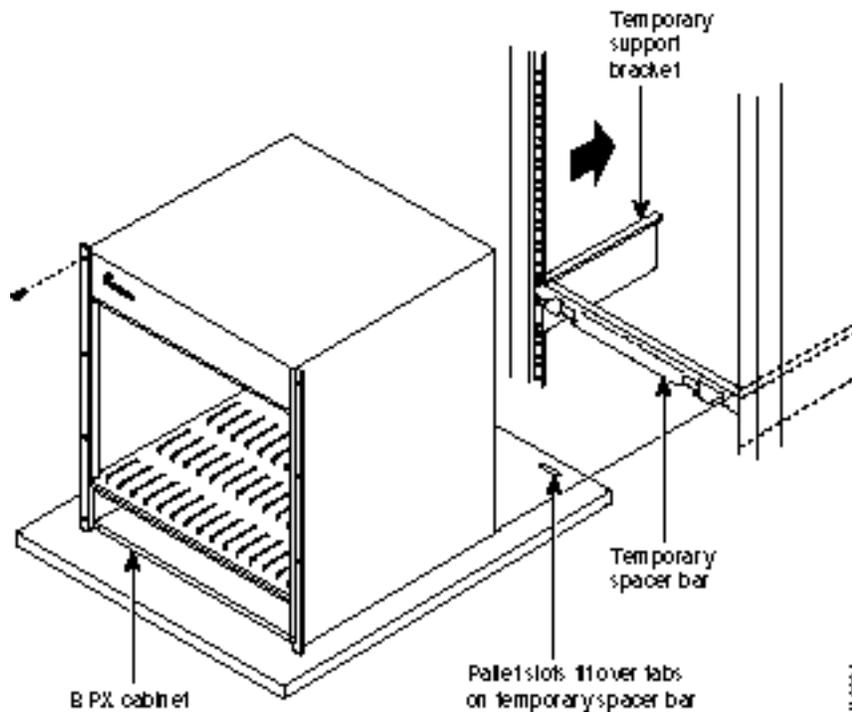
Step 5 Attach the BPX shelf to the cabinet front rail using 8 each # 10-32 screws.

Step 6 Attach the BPX shelf to the previously installed support brackets by inserting 8 each #10-32 machine screws and flat washers from inside the back of the BPX shelf.

Step 7   Remove the temporary support brackets and spacer bracket.

Step 8   If this is a DC powered shelf, proceed to Chapter 5, Installation, DC Shelf Initial Setup.

Step 9   If this is an AC powered shelf, proceed to Chapter 6, Installation, AC Shelf Initial Setup.

Figure 3-3 **BPX Shelf with Rear Rail Mounting at Setback of 19.86 inches**
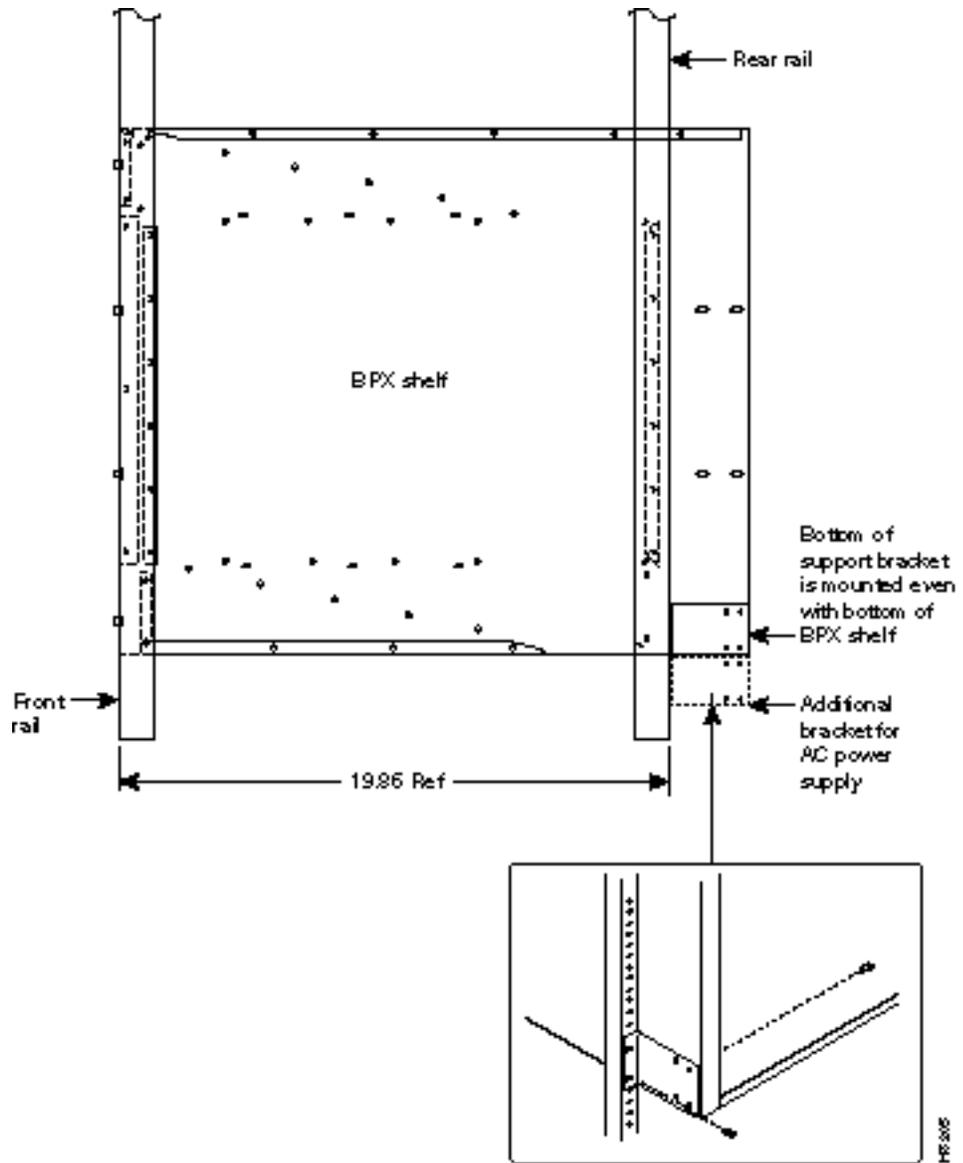
Figure 3-4   **Rear Mounting Brackets, with 19.86 Inch Rear Rail Setback (DC Systems)**
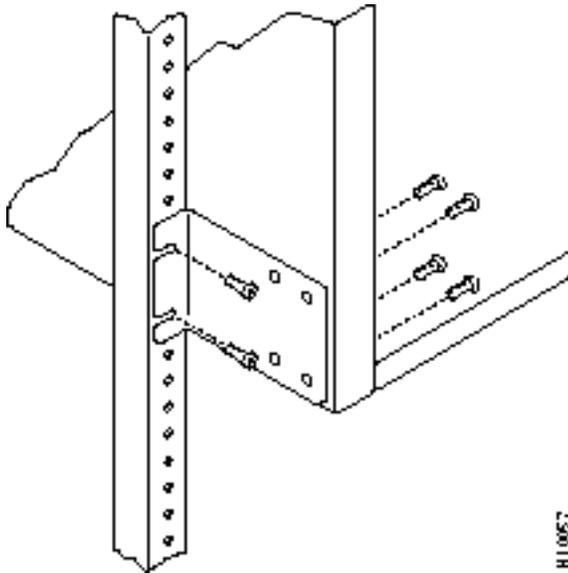
Figure 3-5   **Rear Mounting Brackets, 19.86 Inch Rear Rail Setback (AC-Systems)**
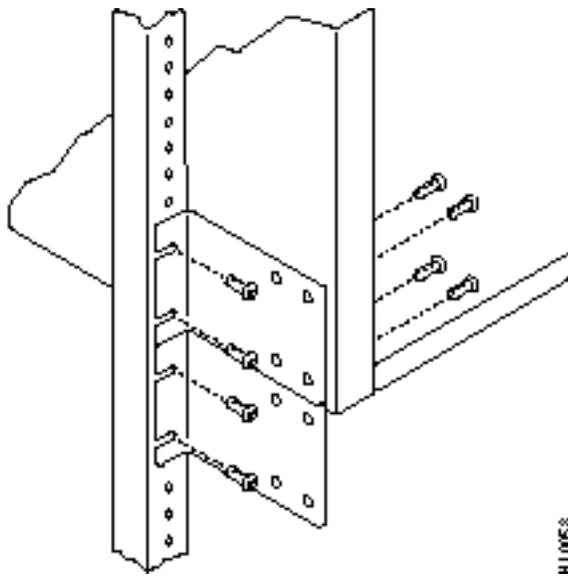
Installation, with Customer Cabinet

This chapter provides installation steps for the mechanical placement of a BPX shelf in a standard 19-inch customer supplied equipment cabinet or rack with a rear rail setback at 30 inches.

Before proceeding to this chapter, the procedures should be completed, in:

— Chapter 2, Installation, Preliminary

Installing a BPX Shelf, Rear Rail Setback at 30-Inch

The steps in this procedure apply to a BPX shelf that is being installed in a customer supplied cabinet with rear vertical rails located at a setback of approximately 30 inches from the front.

If the BPX shelf is DC-powered, the DC Power Entry Modules are factory-installed in the lower portion of the rear of the BPX shelf itself. Locate the DC Power Entry Module(s) and make sure it/they are equipped as ordered. If the BPX shelf is AC-powered, an AC Power Assembly will be installed below it.

Figure 4-2 shows the location of the rear located third rails in a customer supplied cabinet and of the corresponding adjustable plates and support brackets on the BPX shelf.

Preliminary Procedure:

Proceed as follows to install the BPX shelf, referring to Figure 4-1 through Figure 4-3, and to either Figure 4-4 for DC powered systems or Figure 4-5 for AC powered systems.

Step 1 With one person on each side of the BPX shelf, lift the pallet tray and BPX shelf positioning the slots at the rear of the pallet tray over the locating tabs on the spacer bracket (Figure 4-1).

Step 2 Slide the BPX shelf back over the support brackets and into place.

Step 3 Secure the BPX shelf to the front rail using 8 each #10-32 screws.

Note European installation may use a size M6 metric screw.

Step 4 Locate the two rear support brackets and adjustable plates in the miscellaneous parts kit.

Step 5 Position the adjustable plates with the tabs in the three punchouts facing up as shown in Figure 4-3.

Figure 4-1   BPX Cabinet Aligned with Temporary Support Brackets and Bar
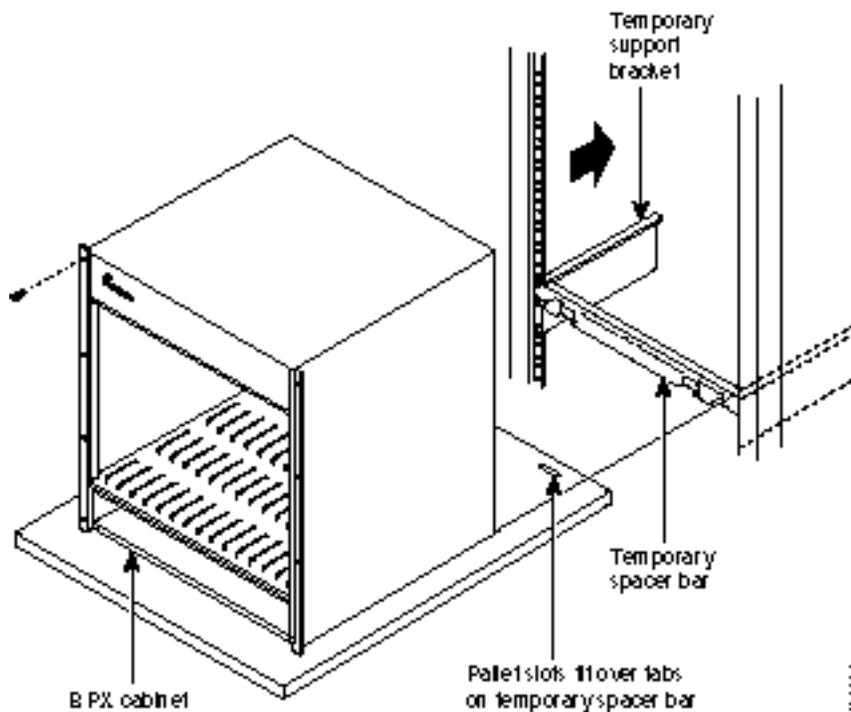
Step 6   Align the top and bottom holes in the adjustable plates with corresponding holes in the side panel of the BPX shelf. (The bottom of the plates should be approximately aligned with the bottom of a DC powered BPX shelf. They should be extended below the bottom of an AC powered BPX shelf so that the AC Power Supplies can be secured to the shelf.)

Step 7   Secure one each adjustable plate to each side of the BPX shelf using (2) each #10-32 machine screws and flat washers.

Step 8   Attach a rear support bracket to each one of the adjustable plates with 2 each 10-32 screws and washers. Do not tighten yet.

Step 9   Secure the support brackets to the rear located vertical rails using 2 each #10-32 screws (or up to M6 metric screws). You may have to lift the BPX shelf slightly to align the holes in the bracket to the holes in the rack.

Step 10   Tighten the screws attaching the support bracket to the adjustable plate.

Step 11   Slide a cable strap over each of the three tabs on the support brackets.

Step 12   Remove the temporary support bracket and spacer bracket from the front of the cabinet.

Step 13   If this is a DC powered shelf, proceed to Chapter 5, Installation, DC Shelf Initial Setup.

Step 14   If this is an AC powered shelf, proceed to Chapter 6, Installation, AC Shelf Initial Setup.

Figure 4-2   BPX Shelf with Rear Rail Mounting at Setback of 30 Inches
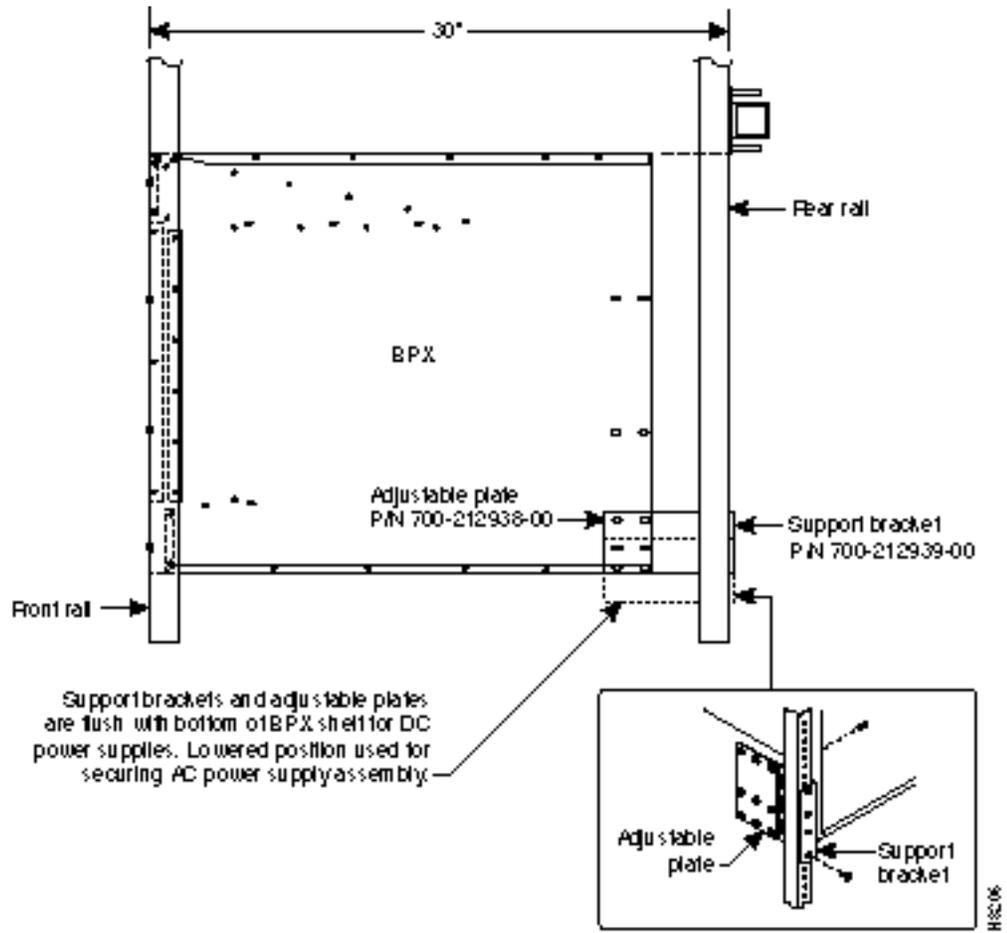
Figure 4-3   Rear Mounting Brackets, Detail
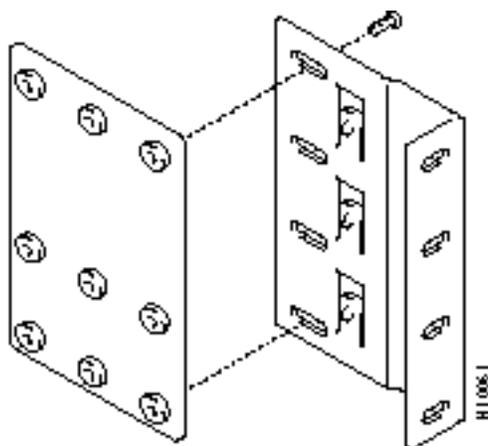
Figure 4-4   Rear Mounting Brackets, with 30 Inch Rear Rail Setback (DC Systems)
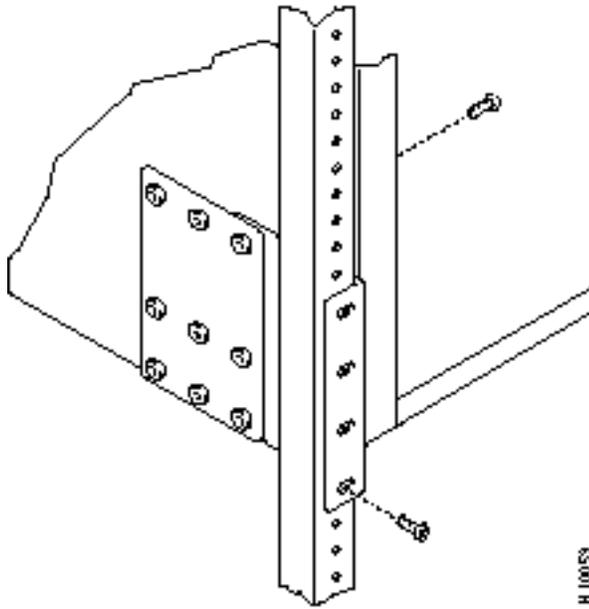
Figure 4-5   Rear Mounting Brackets, 30 Inch Rear Rail Setback (AC-Powered Systems)
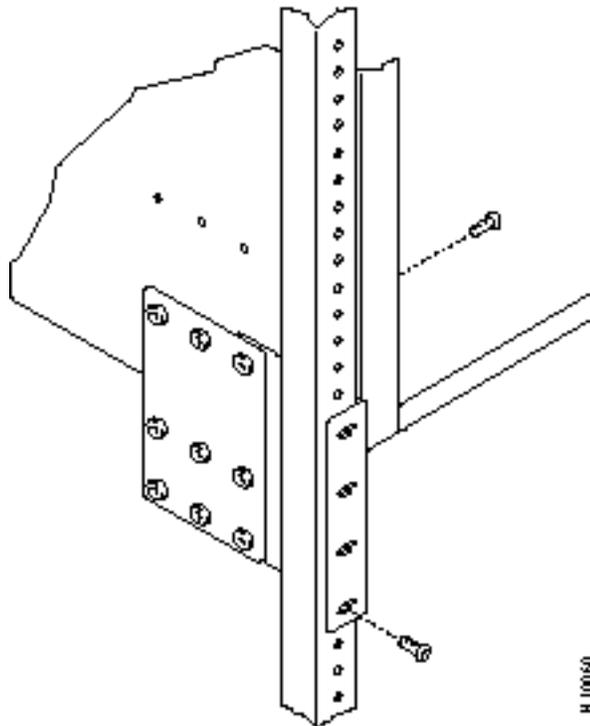
Installation, DC Shelf Initial Setup

This chapter describes how to make the DC power connections.

Before proceeding to this chapter, the procedures should be completed, in either:

— Chapter 3, Installation, with STRATM Cabinet, or

— Chapter 4, Installation, with Customer Cabinet.

This chapter contains the following sections:

DC Power Input Connections

Card Slot Fuses

Fan Power Fuses

DC Power Input Connections

There are two versions of the DC-powered BPX cabinet as follows:

- Single DC Power Entry Module, single power feed.

- Dual DC Power Entry Module, dual power feed.

For DC systems, the wiring is connected from a 48 VDC power source to one or two DC Power Entry Modules (Figure 5-1). This wiring is provided by the installer. A metallic conduit box that meets all electrical codes for attaching electrical conduit is factory-installed Figure 5-2. A simple plastic cover is also enclosed for customers who do not require conduit protection for the input power leads Figure 5-3. Use conduit if required by local electrical code.

To make DC power connections to the BPX:

Step 1   Locate the conduit terminating box, one for each Power Entry Module. (Figure 5-2). Remove the two cover screws and lift off the cover. If conduit is required, proceed to step 2. If conduit is not required, proceed to step 3.

Step 2   Determine which knockout to remove (rear or bottom). Remove knockout and install conduit fitting.

Step 3   If conduit is not required, remove the conduit box by removing the two screws, one above the terminal block and one below it.

Step 4   Run three wires from the DC terminal block to a source of 48 VDC. Use 8 AWG wire (or metric equivalent for E1 systems). Use a #10 screw ring lug designed for 8 AWG wire (90° lug if using conduit box) to terminate the wires.

Caution   Ensure that polarity of the DC input wiring is correct! Connections with reversed polarity may damage the equipment.

Warning   Remember that this is a positive ground system. Connect the positive lead to the +RTN terminal. Connect the negative lead to the –48V terminal. Connect the earth ground to the middle terminal labeled SAFETY GROUND. See Figure 5-1, Figure 5-2 and Figure 5-3. For personnel safety, the green/yellow wire must be connected to safety (earth) ground at both the equipment and at the supply side of the dc wiring.

Figure 5-1   DC Power
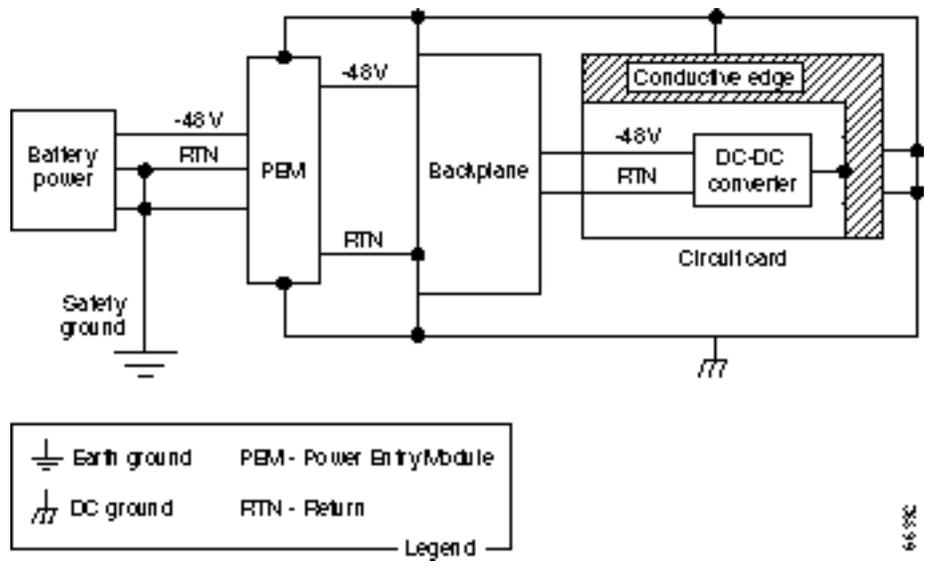
Step 5   Terminate the DC input wiring to a DC source capable of supplying at least 50 amperes. A 50A dc circuit breaker is required at the 48 VDC facility power source. An easily accessible disconnect device should be incorporated into the facility wiring. Be sure to connect the ground wire/conduit to a solid office (earth) ground.

Note   Primary overcurrent protection is provided by the building circuit breaker. In North America, this breaker should protect against excess currents, short circuits, earth faults in accordance with NEC/CEC.

Step 6   If the system is equipped with dual power feed, repeat steps 1 through 6 for the second power feed.

Step 7   Either replace the cover on the conduit terminating box(es) or attach the plastic cover plate(s) to the terminal block with screws into the two terminal block standoffs. See Figure 5-2 and Figure 5-3.

Step 8   Proceed to Chapter 7, Finishing the Installation.

Figure 5-2   DC Power Connections—With Conduit Box
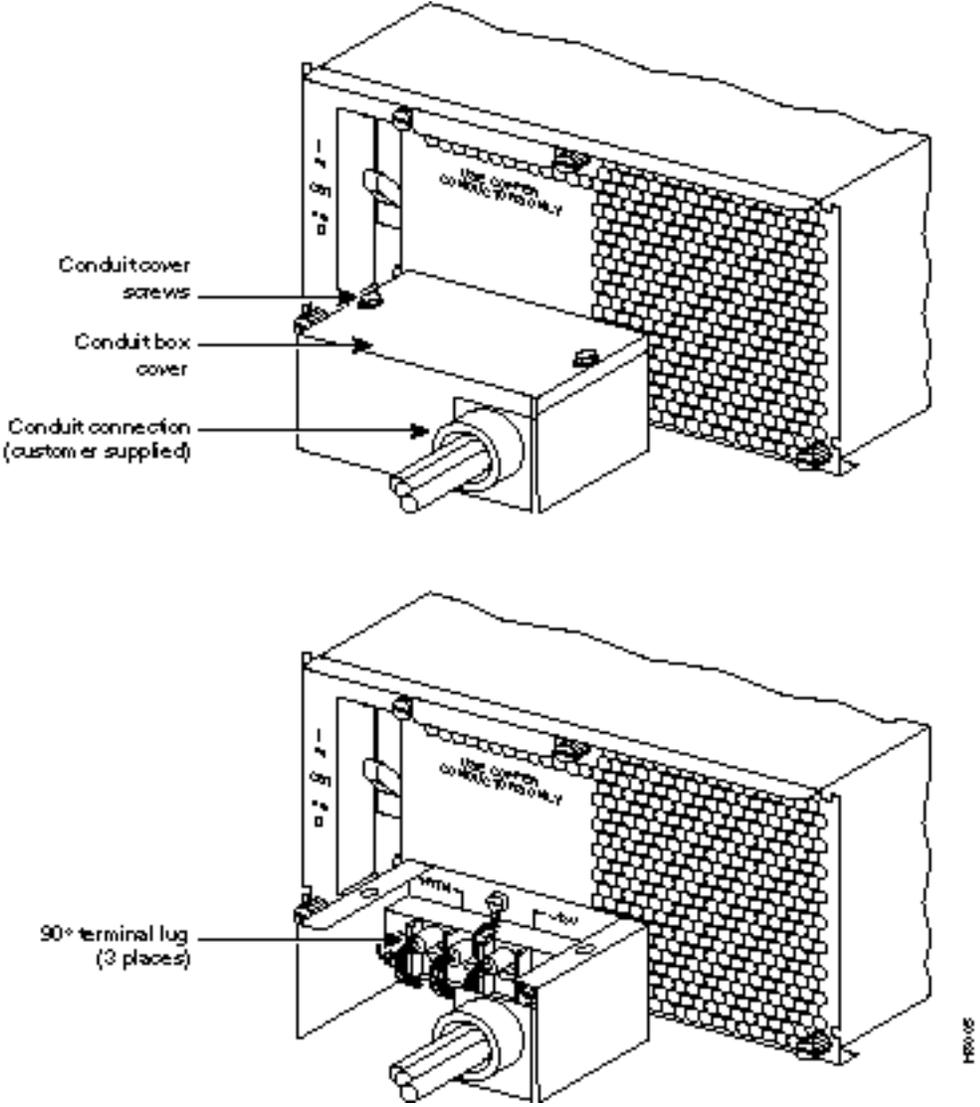
Figure 5-3   DC Power Connections—Without Conduit Box

Card Slot Fuses

Fuses for each card slot have been added to the backplane of later versions of the BPX to protect against catastrophic backplane damage in the event of a shorted connector power pin. Backplane fuses should rarely, if ever, need replacement. The card slot fuses are designated F4 through F18, corresponding to card slot numbers 1 through 15, respectively.

Refer to the *BPX Service Node Reference* document*, Repair and Replacement* chapter, for instructions on replacement of these fuses, and contact Cisco Customer Service for assistance regarding their replacement.

Caution   For continued protection against risk of fire, replace only with the same type and rating of fuse. Fuses should only be replaced after all power to the BPX has been turned off.

Fan Power Fuses

Fan fuses are located on the backplane of the BPX to protect against catastrophic backplane damage in the event of a shorted fan cable. Backplane fuses should rarely, if ever, need replacement. The fuses are designated F1 through F3, corresponding to fans 1 through 3.

Caution   Refer to the *BPX Service Node Reference* document, *Repair and Replacement* chapter, for instructions on replacement of these fuses, and contact Cisco Customer Service for assistance regarding their replacement.

Warning   For continued protection against risk of fire, replace only with the same type and rating of fuse.   **Replace fuses only after all power to the BPX has been turned off.**

Installation, AC Shelf Initial Setup

This chapter explains how to install the AC power supply tray, power supplies, and make AC power connections.

Before proceeding to this chapter, the procedures should be completed, in either:

— Chapter 3, Installation, with STRATM Cabinet, or

— Chapter 4, Installation, with Customer Cabinet.

This chapter contains the following sections:

Installing an AC Power Supply Tray

Installing an AC Power Supply

AC Power Input Connections

Card Slot Fuses

Fan Power Fuses

Installing an AC Power Supply Tray

The AC Power Supply Assembly is shipped separately and must be mounted directly below the BPX shelf. It consists of a Power Supply Tray and one or two AC power supplies. The power supplies are shipped separately from the AC Power Supply Tray and are installed after the BPX shelf is mounted in place.

All AC-powered systems are required to use a set of rear support brackets to provide additional support for the rear of the Power Supply Tray. To install the AC Power Supply Tray proceed as follows:

Step 1 Use two screws to attach each of two temporary support brackets and a temporary spacer bar to the rack (Figure 6-1 and Figure 6-2).

Step 2 Locate the small access hole in the top center of the front Air Intake Grille on the Power Supply Tray (Figure 6-3).

Step 3 Insert a slotted blade screwdriver (0.20/0.25 inch blade width) into the access hole until it stops (approximately 1 inch).

Step 4 Carefully rotate the screwdriver approximately a quarter turn in either direction. The top of the Air Intake Grille should spring out.

Step 5 Remove the Air Intake Grille.

Figure 6-1   **Temporary Spacer Bracket and Support Bracket Installation**
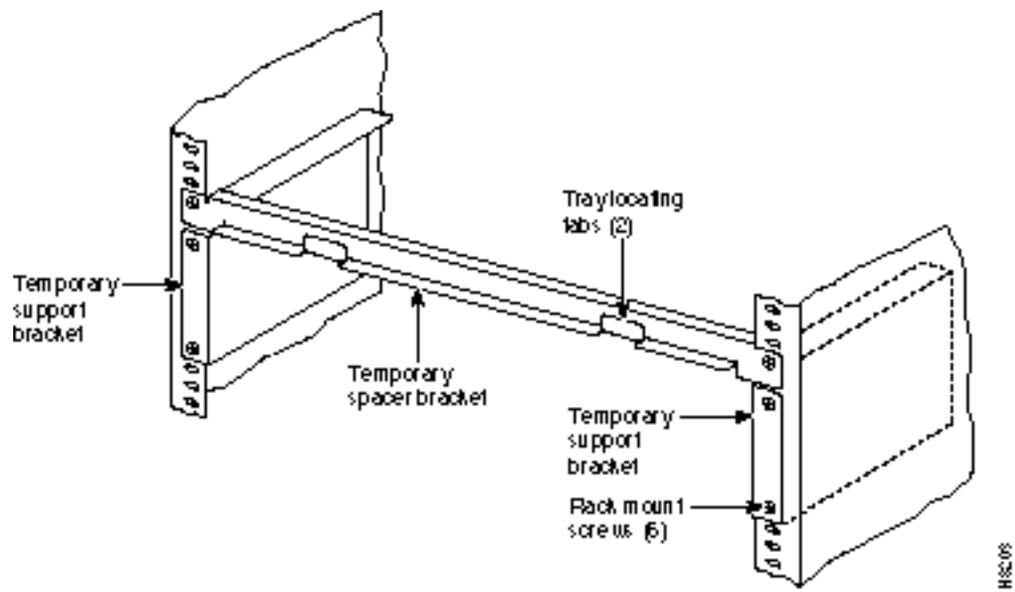
Figure 6-2   Power Supply Tray aligned with Temporary Support Brackets and Bar
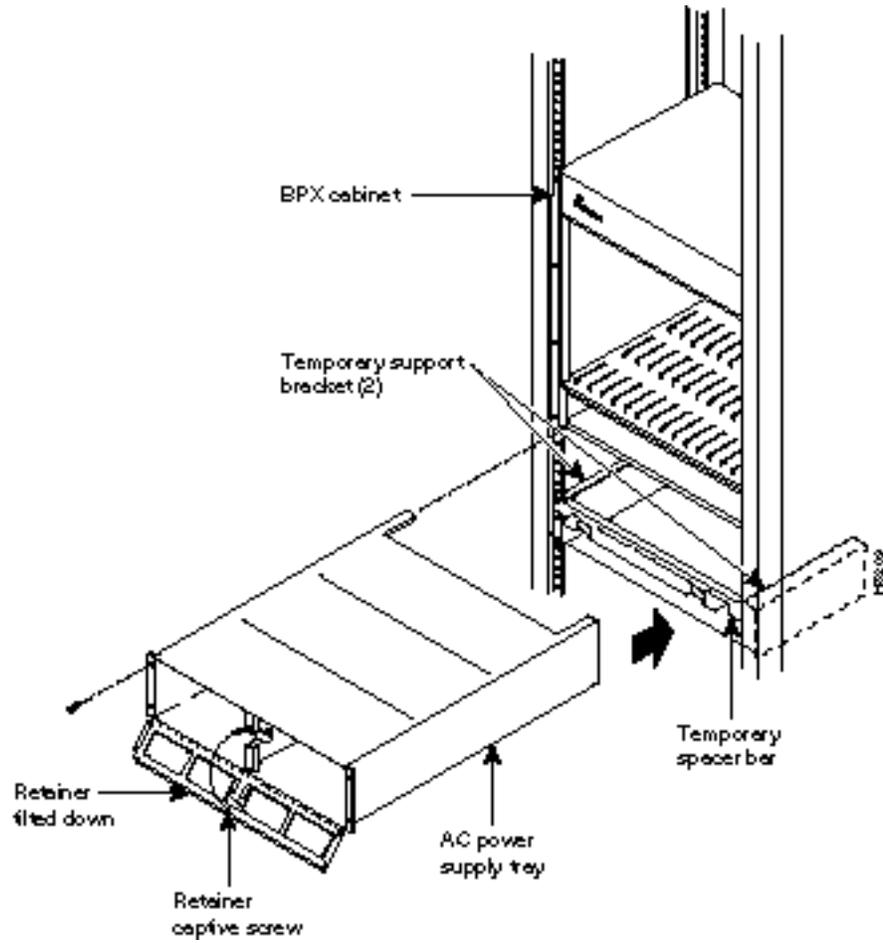
Figure 6-3   Removing an Air Intake Grille
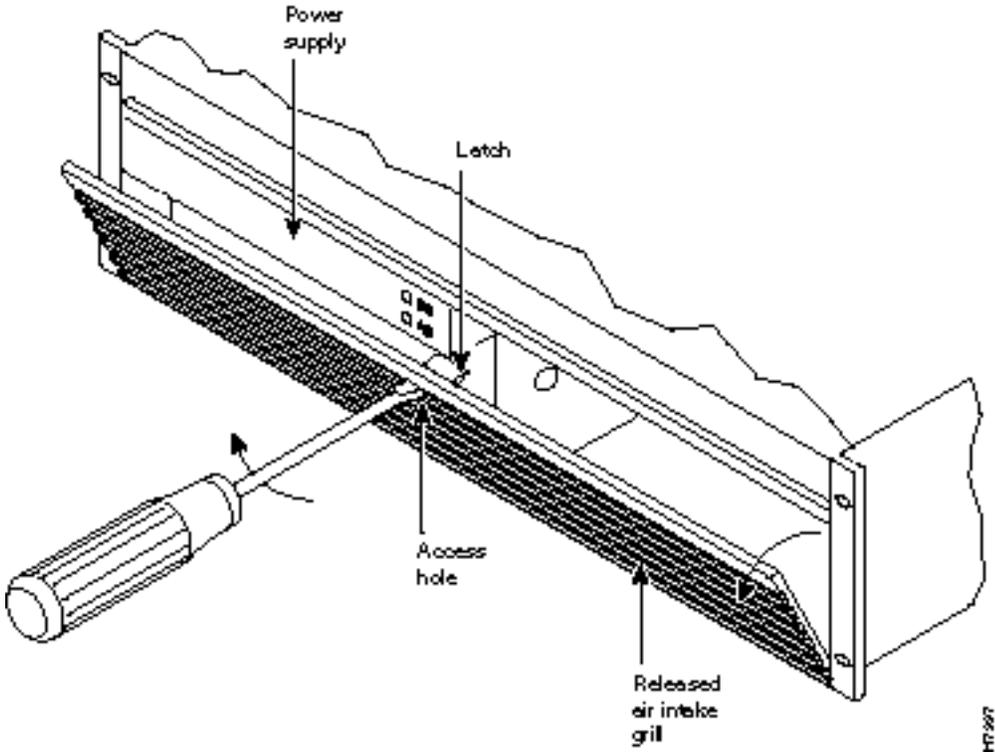
Step 6 Slide the Power Supply Tray in the rack between the BPX shelf and the temporary support brackets and spacer bar (Figure 6-2). If cables are attached, use care to avoid damaging them.

Step 7 Install screws and washers to loosely secure power supply assembly to the front of the BPX shelf. Align the front flanges of the Power Supply Tray with the flanges on the BPX shelf and tighten screws. There should be approximately 1/16" clearance between the BPX shelf and the Power Supply Tray to provide sufficient clearance for inserting power supplies.

Step 8 Secure the Power Supply Tray to the rear support bracket (plate) using one #10-32 screw and flat washer on each side. Use the lower hole in the brackets. Figure 6-4 shows the setup for a configuration with the vertical rails at a 30 inch setback.

For a configuration with vertical rails at a 19.86 inch rail setback, attach one #10-32 screw and flat washer to the single bracket on each side. Use the lower hole in the brackets. Figure 6-5 shows the bracket configuration only; the power supply tray position is the same as shown for in Figure 6-4.

Figure 6-4   Securing AC Power Supply Tray, 30-Inch Rail Setback
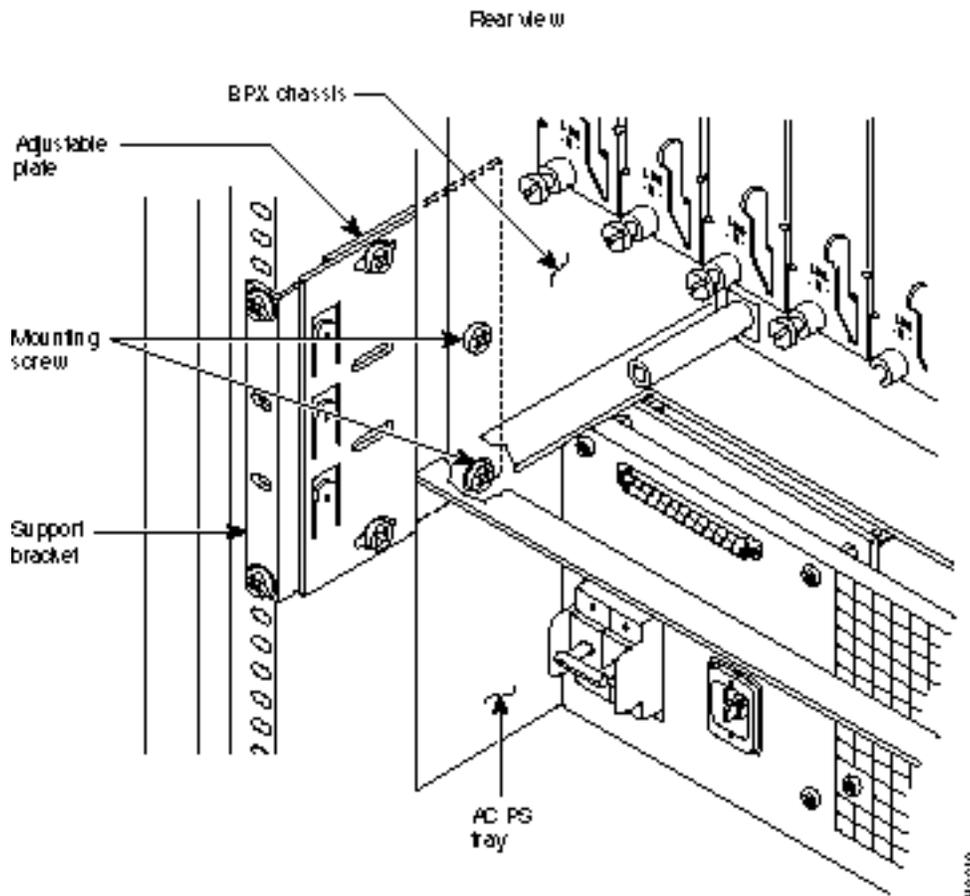
Figure 6-5   Securing an AC Power Supply Tray, 19.86 inch Rear Rail Setback
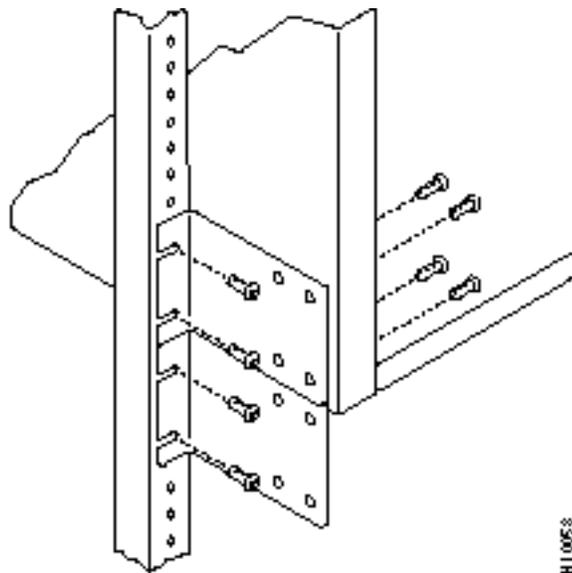
Step 9 Connect and secure a power supply interconnect cable (Cable A in Figure 6-6) between the primary AC Power Supply and the BPX backplane power connector.

Step 10 Connect and secure a second power supply interconnect cable (Cable B in Figure 6-6) between the redundant AC Power Supply and the BPX backplane power connector.

Step 11 Remove the temporary support bracket and spacer bracket from the front of the cabinet.

Figure 6-6   AC Power Supply Tray with Redundant AC Inputs (view from rear)
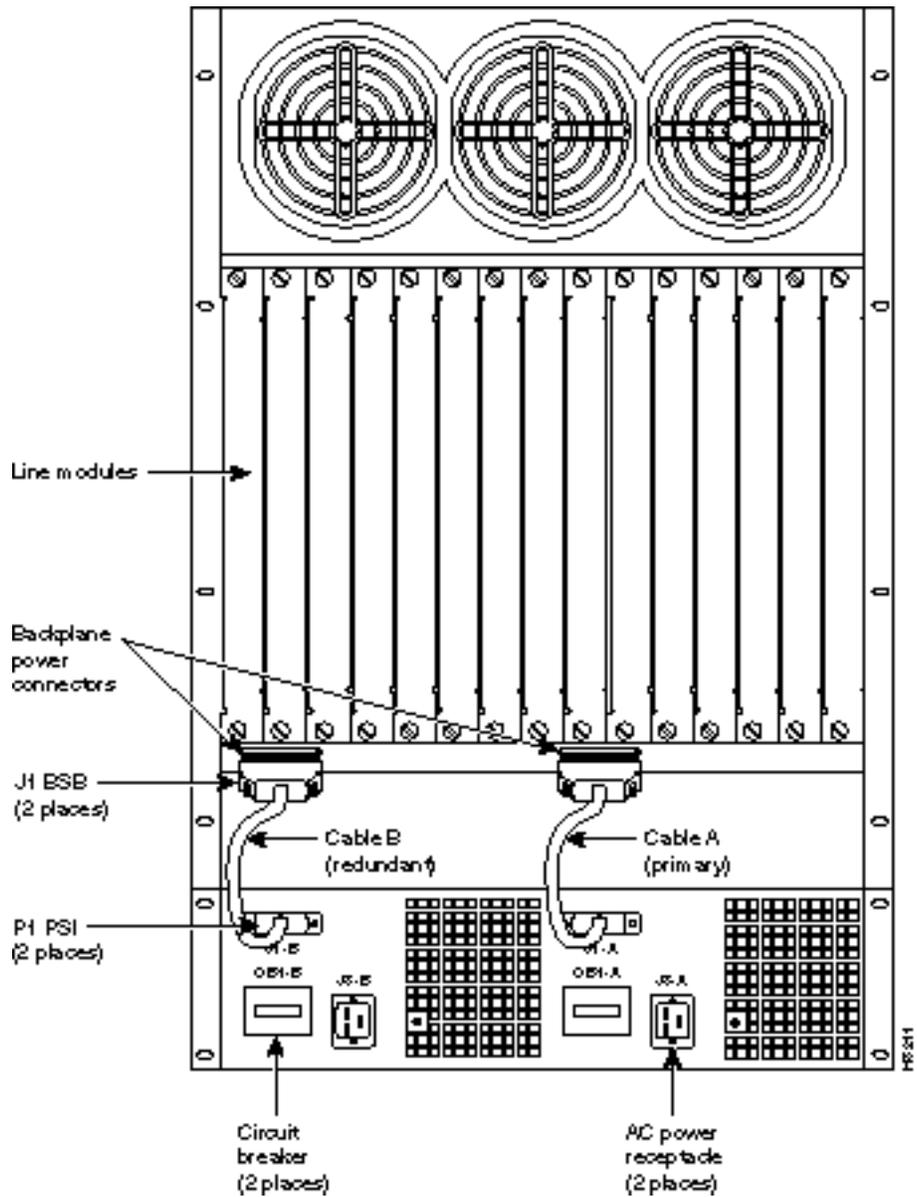
Installing an AC Power Supply

The AC Power Supply is an assembly consisting of an AC-DC Converter, cooling fan, LED bezel, and mounting frame. The AC Power Supply is installed and removed as an integral unit. There may be one or two AC Power Supplies depending on node configuration. They are housed in the Power Supply Tray.

Proceed as follows to remove and reinstall an AC Power Supply in the Power Supply Tray:

Step 1   First install the Power Supply Tray in a rack (see "Installing an AC Power Supply Tray" section).

Step 2   Set the circuit breaker(s) at the rear of the Power Supply Tray to OFF.

Step 3   If not already removed, remove the Power Supply Tray front Air Intake Grille. Locate the small access hole in the top, center of the front Air Intake Grille for the Power Supply Tray (Figure 6-7).

Figure 6-7   Removing an Air Intake Grille
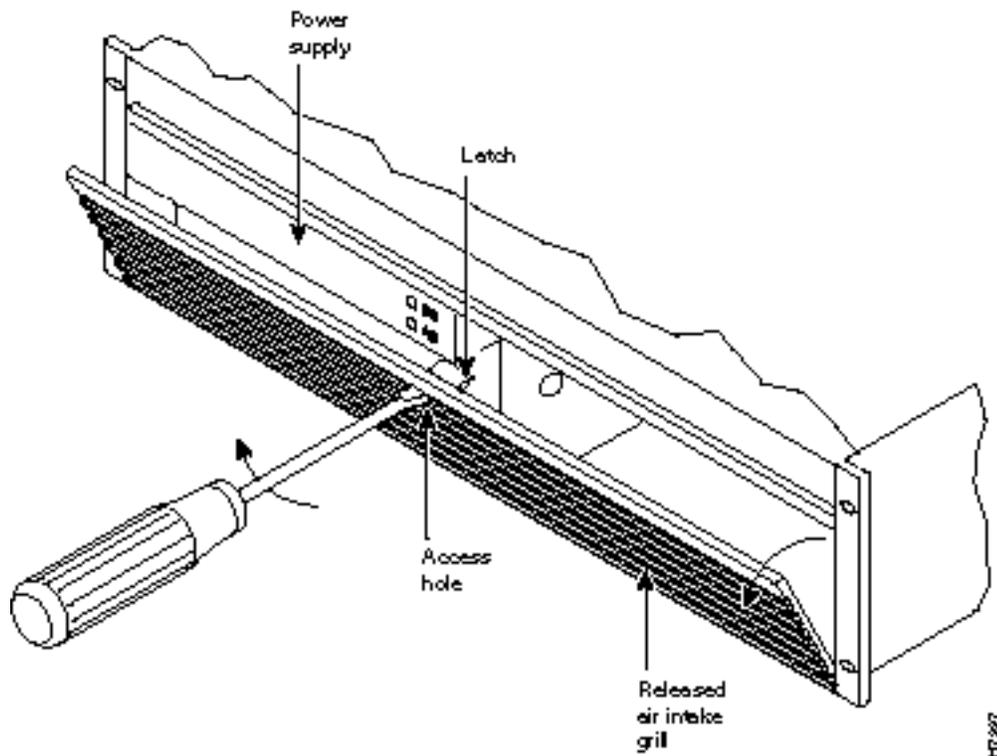
Step 4   Insert a small slotted blade screwdriver (0.20/0.25 inch blade width) into the access hole until it stops, approximately 1 inch (2.5 cm).

Step 5   Carefully rotate the screwdriver approximately a quarter turn in either direction. The top of the Air Intake Grille should spring out.

Step 6   Loosen the captive screw in the center of the power supply retainer and rotate the hinged retainer frame down (Figure 6-7).

Figure 6-8   **AC Power Supply Installation**
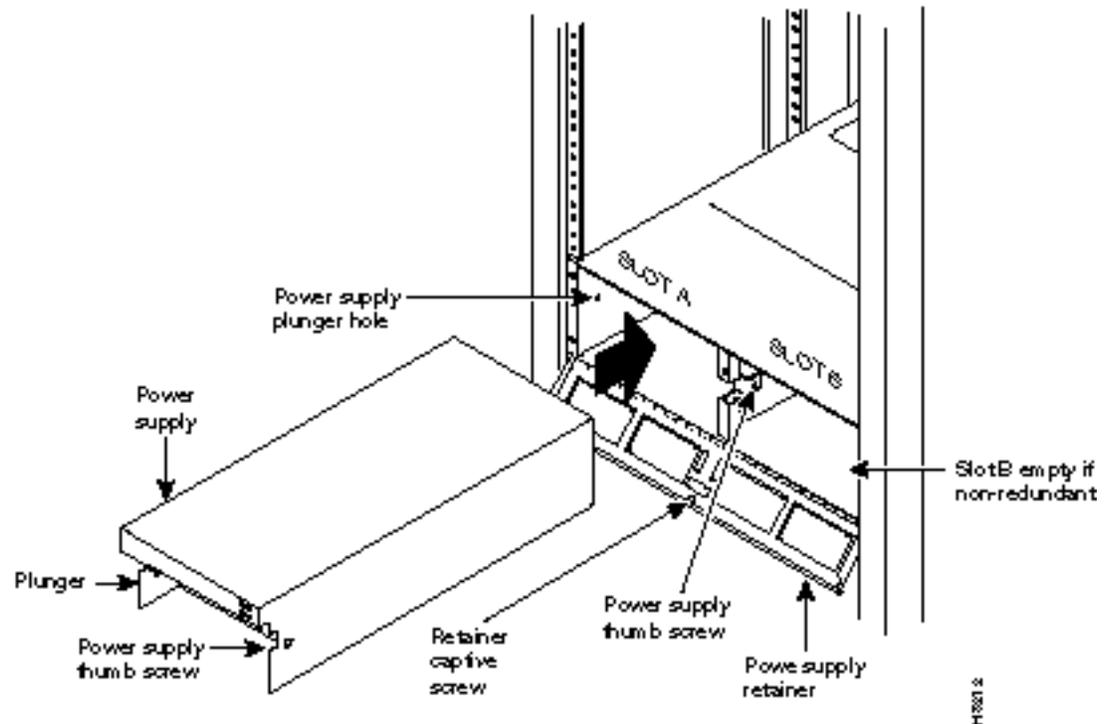
Step 7   Align the power supply in the PS-A slots at the bottom of the Power Supply Tray and gently slide it in part way (Figure 6-8).

Step 8   Continue to slide the power supply in until it mates with the rear connector.

Step 9   When the power supply is completely seated in its connector, the pin plunger on the left side of the supply will engage with a hole in the tray. If not, push firmly on the front edge until the power supply assembly seats in the connector.

Step 10   Screw the right-hand thumbscrew in finger tight.

Step 11   When a second power supply is provided, install it in the PS-B slot in the same manner after removing the Blank Panel from Slot B.

Step 12   Rotate the power supply retainer up and tighten the center captive screw.

Step 13   Install the Air Intake Grille. Press on the top center until the latch snaps into place.

AC Power Input Connections

There are three configurations of the AC-powered BPX cabinet as follows:

- Single power supply, single AC power feed.

- Dual power supplies, single AC power feed.

- Dual power supplies, dual AC power feed.

An 8 ft. (3 m.) power cord is supplied with each AC Power Supply Assembly. To make AC power connections to the BPX:

Step 1   Plug the power cord(s) into the applicable IEC connector(s) as shown in Figure 6-9 and tighten the cord retainers. A separate power cord connects to each of one or two IEC connectors depending on the version of power supply shelf provided.

Step 2   Plug the BPX cord into a 220 to 240 VAC, single-phase, wall outlet capable of supplying 15A. The building circuit should be protected with a 20A circuit breaker.

Step 3   For the dual power feed version, plug each power cord into receptacles on separate building circuits to provide protection against a power feed failure. Each building circuit should be protected with a 20A circuit breaker.

Figure 6-9   AC Power Supply Connections (Dual and Single Versions Shown)
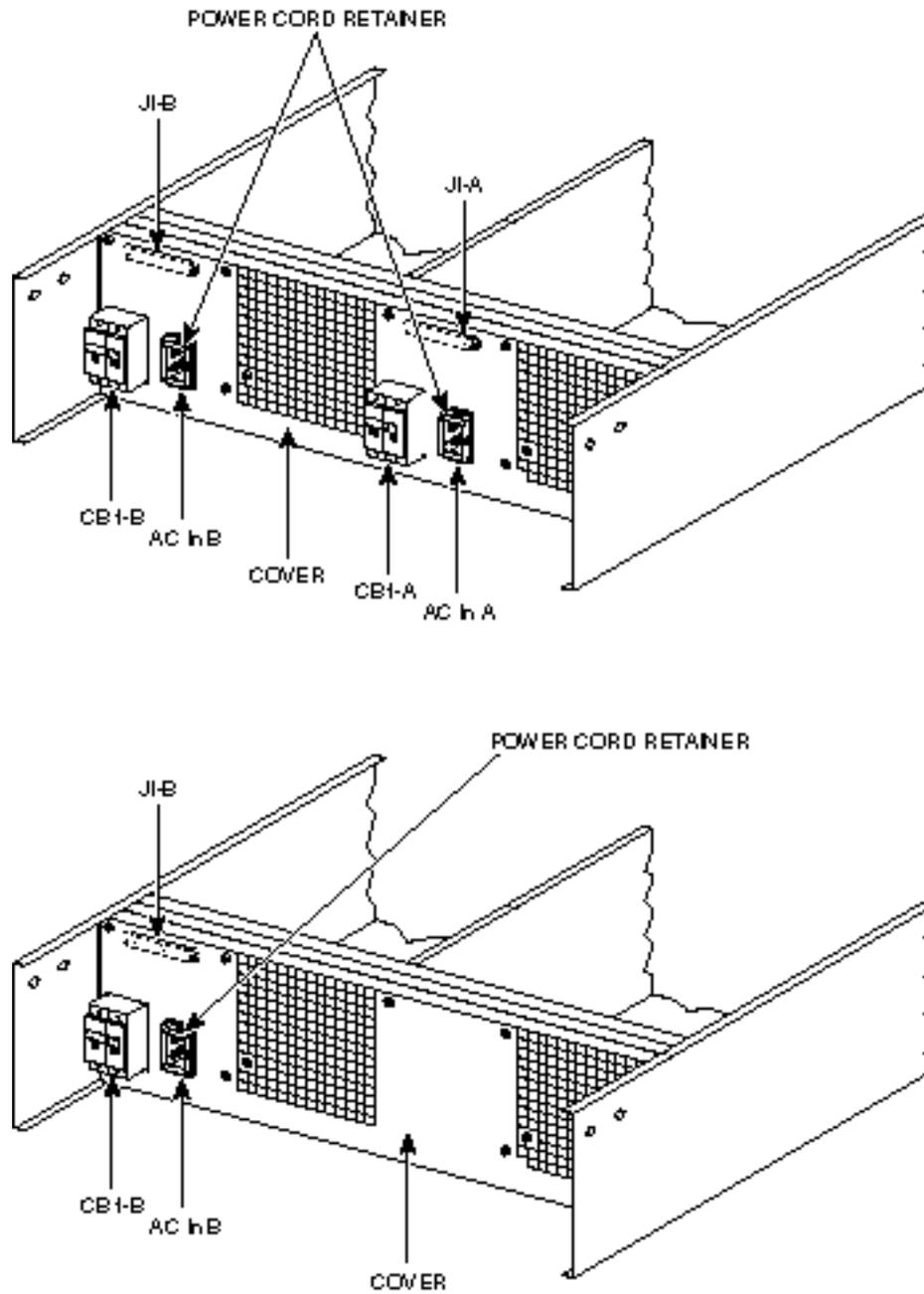
Step 4 The ground (green/yellow) wire of the AC power cord provides the safety ground to the BPX via the grounding prong on the three-prong connectors. Make sure the building AC receptacle is also properly grounded (Figure 6-10).

Figure 6-10   AC Power

.
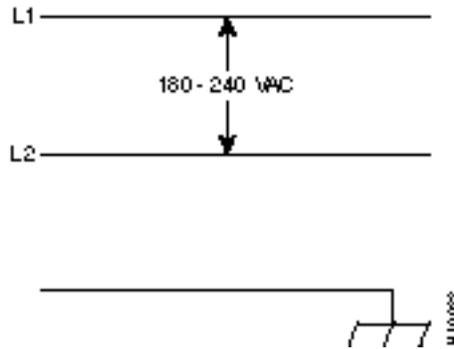
Step 5 As applicable, provide a convenience AC outlet strip, with at least four outlets, near the BPX node to power optional modems, CSU, or DSUs, test equipment, etc. There is no accessory AC outlet supplied on the BPX. This outlet strip should be connected to a source of AC voltage normal for the region (e.g., 115 VAC for domestic US use).

Step 6 Proceed to Chapter 7, Finishing the Installation.

Card Slot Fuses

Fuses for each card slot have been added to the backplane of later versions of the BPX to protect against catastrophic backplane damage in the event of a shorted connector power pin. Backplane fuses should rarely, if ever, need replacement. The card slot fuses are designated F4 through F18, corresponding to card slot numbers 1 through 15, respectively.

Refer to the *BPX Service Node Reference* document*, Repair and Replacement* chapter, for instructions on replacement of these fuses, and contact Customer Service for assistance regarding their replacement.

Caution   For continued protection against risk of fire, replace only with the same type and rating of fuse. Fuses should only be replaced after all power to the BPX has been turned off.

Fan Power Fuses

Fan fuses are located on the backplane of the BPX to protect against catastrophic backplane damage in the event of a shorted fan cable. Backplane fuses should rarely, if ever, need replacement. The fuses are designated F1 through F3, corresponding to fans 1 through 3.

Caution   Refer to the *BPX Service Node Reference* document, *Repair and Replacement* chapter, for instructions on replacement of these fuses, and contact Customer Service for assistance regarding their replacement.

Caution   For continued protection against risk of fire, replace only with the same type and rating of fuse.   Replace fuses only after all power to the BPX has been turned off.

Finishing the Installation

This chapter explains how to install the BPX cards, check for a 9.6 or 19.2 Gbps backplane, connect line and trunk cables, connect peripherals, connect to a network management station, initial power up, and initial configuration.

Before proceeding to this chapter, the procedures should be completed, in either:

— Chapter 5, Installation, DC Shelf Initial Setup, or

— Chapter 6, Installation, AC Shelf Initial Setup.

This chapter contains the following sections:

- Installing the BPX Cards

- Verifying 9.6 or 19.2 Gbps Backplane

- Making T3 or E3 Connections

- Making an ASI-155 or BNI-155 Connection

- Making a BXM OC3 or OC12 Connection

- Making a BXM T3/E3 Connection

- Alarm Output Connections

- Attaching Peripherals

- LAN Connection for the Network Management Station

- Connecting a Network Printer to the BPX

- Connecting Modems

- Making External Clock Connections

- Initial Startup of the BPX

- BPX Management

- Initial Node Configuration Summary

- IP Setup and IP Relay Configuration

- Configuring the LAN Port

- Configuring the AXIS for StrataView Plus NMS Operation (example)

- Adding Virtual Trunks

- Provisioning the BPX Service Node

Installing the BPX Cards

Caution   Ground yourself before handling BPX cards by placing a wrist strap on your wrist and clipping the strap lead to the cabinet, or use the wrist strap that is connected to the cabinet.

The card shelf in the BPX has card slots numbered from 1 to 15, as viewed from left to right from the front of the cabinet. Front and rear views of the BPX card shelf are shown in Figure 7-1 and Figure 7-2, respectively. The configuration rules for the BPX are summarized as follows.

- For non-redundant nodes, either a Broadband Controller Card BCC-4, BCC-3, or BCC-32 is used in front slot number 7.

- For non-redundant nodes, a BCC-3-bc backcard must be used in back slot number 7 with a BCC-4 or BCC-3 front card, or a BCC-bc (also known as BCC backcard) must be used in back slot number 7 with a BCC-32 front card.

- For redundant nodes, two Broadband Controller Cards, a pair of BCC-4s, BCC-3s, or BCC-32s are used in front slot numbers 7 and 8.

- For redundant nodes, BCC-3 bc backcards must be used in back slot numbers 7 and 8 with BCC-4 or BCC-3 front cards, or BCC-c (also known as BCC backcards) backcards must be used in back slot numbers 7 and 8 with BCC-32 front cards.

Note   In some cases it may be possible to operate two of the three types of BCCs with their proper backcards temporarily for maintenance purposes, i.e., replacing a failed controller card. Contact Customer Service for assistance.

- ASM in front slot number 15.

- LM -ASM in back slot number 15.

- BNI-3T3, BNI-3E3, BNI-155 in any other front slot than 7, 8, or 15.

- LM -3T3, LM-3E3, 2OC3-SMF, 2OC3-MMF in all back slots with a BNI in the corresponding front slot

- ASI-2T3, ASI-2E3, ASI-155 in any other front slot than 7, 8, or 15.

- LM -2T3, LM-2E3, 2OC3-SMF, 2OC3-MMF in all back slots with an ASI in the front other than 7, 8, or 15.

Figure 7-1 BPX Shelf (front view)
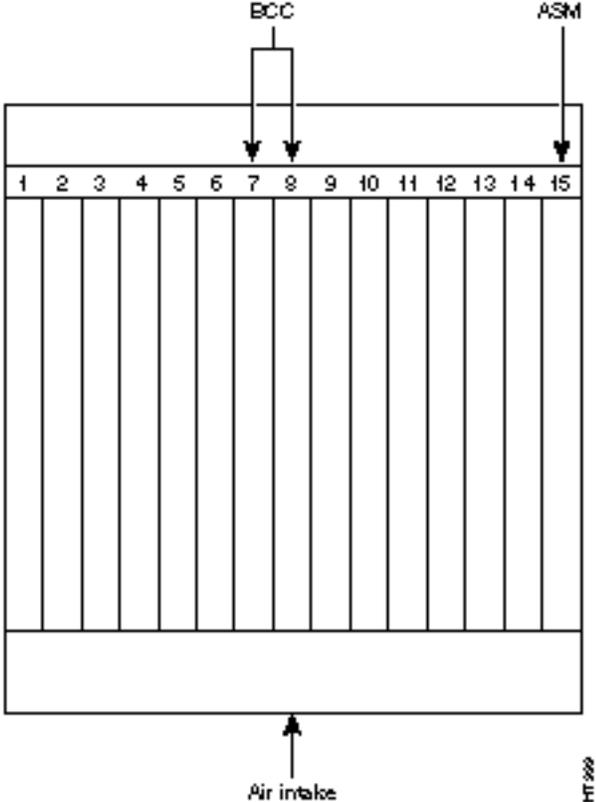
Figure 7-2 BPX Shelf (rear view, DC shelf shown)
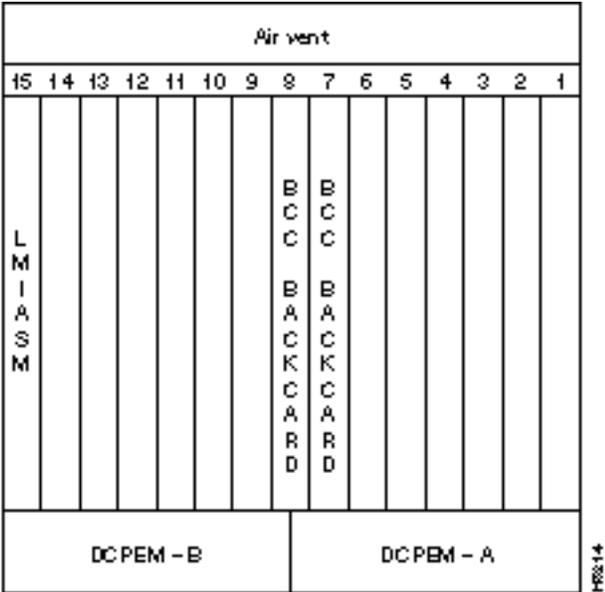
Installing Front Cards

Caution   Ground yourself before handling BPX cards by placing a wrist strap on your wrist and clipping the strap lead to the cabinet, or use the wrist strap that is connected to the cabinet.

Caution   Blank Front Card and Rear Face Plates must be used to fill/cover empty card slots to eliminate Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) and to ensure correct air flow through the card cage.

Systems may be shipped with empty shelves, with filler cards or with plug-in cards installed. If filler cards are installed in each slot, some of them may need to be replaced with functional cards. The front cards are held captive mechanically by the Air Intake Grille and can not be removed until the lower Air Intake Grille is released.

Caution   Do not attempt to remove a front card from the BPX cabinet until the Air Intake Grille is released and lowered or the Air Intake Grille and/or card extractors may be damaged.

Proceed as follows to remove/install a front card.

Caution   Before any card is installed, always examine the chassis backplane and card cage guides for any signs of loose or misplaced EMI gasketing. Examine the backplane connectors for bent or damaged connection or pre-power pins.

Step 1   Turn off all power to the BPX.

Note   While it is a good idea to turn off power when initially installing cards, when replacing cards, on an operating BPX, it is not necessary to turn off power as the cards are hot pluggable replaceable.

Step 2   Locate the small access hole in the top center of the front Air Intake Grille below the card slots (see Figure 7-3 for location).

Figure 7-3   Removing an Air Intake Grille
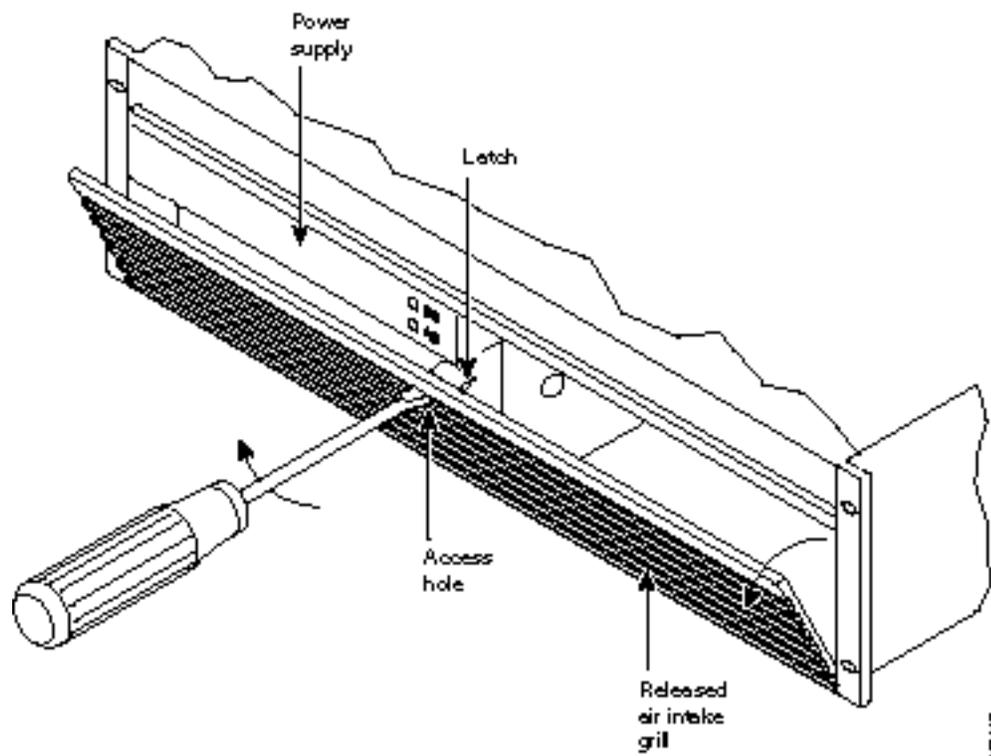
Step 3   Insert a small slotted blade screwdriver (0.20/0.25 inch blade width) into the access hole until it stops (approximately 1 inch).

Step 4   Carefully rotate the screwdriver approximately a quarter turn in either direction. The top of the Air Intake Grille should spring out.

Step 5   Remove Air Intake Grille.

Step 6   To remove a card, rotate the extractor handles at the top and bottom of the card to release the card and slide it out.

Step 7   To insert a new card, position the rear card guides over the appropriate slots at the top and bottom of the card cage.

Step 8   Gently slide the card in all the way to the rear of the slot and seat the board by fully seating both extractor handles. The handles should snap back to a vertical position when seated.

Note   The card should slide in with slight friction on the adjacent board's EMI gaskets. Investigate any binding. Do not use excessive force.

Installing Back Cards

Caution Ground yourself before handling BPX cards by placing a wrist strap on your wrist and clipping the strap lead to the cabinet, or use the wrist strap that is connected to the cabinet.

The optical ports contain an information label as shown in Figure 7-4.

Figure 7-4   **Laser Information Label**

Warning Invisible laser radiation may be emitted from the optical ports of the single-mode or multi-mode products when no fiber cable is connected. Avoid exposure and do not look into open apertures. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Warning Class 1 laser product. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Warning Laser radiation when open. (For translated versions of this warning, refer to the *Regulatory Compliance and Safety Information* that accompanied your equipment).

Proceed as follows to install back cards:

Step 1   Locate the card to remove.

Step 2   For existing installations, remove any cable(s) that may be attached and tag them so they may be replaced in the same location.

Step 3   Loosen the captive mounting screws on both top and bottom of the line module faceplate with a slotted blade screwdriver (Figure 7-5)

Step 4   Lift the extractor handles at the top and bottom, and slide out the line module.

Step 5   To re-insert the line module, locate the corner edges of the card into the appropriate guide slots at the top and bottom of the card cage. Gently slide the card in all the way to the rear of the slot and push to seat the card in the connector.

Note The card should slide in easily. Investigate any binding. Do not use excessive force.

Step 6   Screw in the captive screws.

Step 7   Replace any cables that may have been removed in step 2.

Figure 7-5   Installing a Back Card
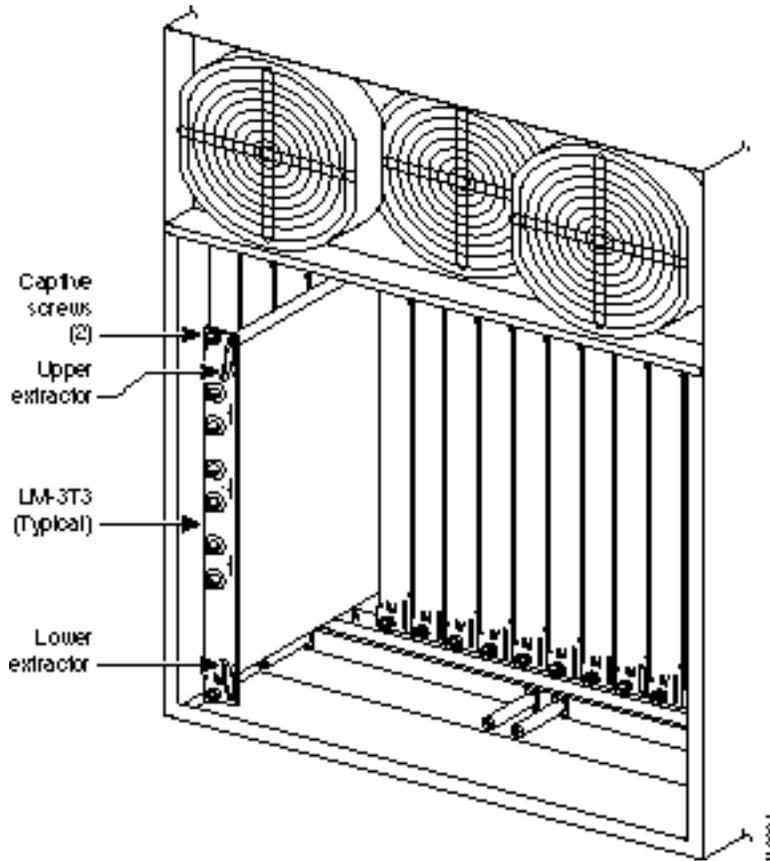
Verifying 9.6 or 19.2 Gbps Backplane

In order to operate the BPX Service Node at 19.2 Gbps the following is required:

- A 19.2 Gbps backplane

- BCC-4 or later controller cards

- One or more BXM cards

- Release 8.4.00 or later switch software

- A backplane NOVRAM that is programmed to identify the backplane as a 19.2 Gbps backplane.

  Switch software will not allow node operation at 19.2 Gpbs unless it can read the backplane NOVRAM to verify that the backplane is a 19.2 Gbps backplane.

The 19.2 backplane can be visually identified by the small white card slot fuses at the bottom rear of the backplane. These fuses are approximately 1/4 inch high and 1/8 inch wide. The 9.6 Gbps backplane does not have these fuses. If the BPX Service Node is a late model, then a 19.2 Gbps backplane is installed. This can be verified by running the **dspbpnv** command which will display "Word #2 =0001" if the backplane NOVRAM has been programmed. If anything else is displayed, you'll have to visually check the backplane for the fuses.

If the backplane is a 19.2 Gbps backplane, but the backplane NOVRAM has not been set to display Word #2 =0001, then the **cnfbpnw** command may be used to program the NOVRAM as follows:

Step 1 Enter **cnfbpnv**, and the response should be:

```
Are you sure this is a new backplane (y/n).
```

Step 2 Enter **y**

Step 3 Confirm that the change has been made by entering **dspbpnv** to confirm the response:

```
Word #2 =0001
```

Note If for some reason the change does not take place, it will be necessary to change the backplane NOVRAM. Contact customer service.

Step 4 Enter **switchcc** in order for the change to be recognized by the switch software.

If the backplane is not a 19.2 Gbps backplane, then it will be necessary to install a 19.2 Gbps backplane to obtain 19.2 Gbps operation. Contact Customer Service.

Making T3 or E3 Connections

Each LM-3T3 and LM-3E3 line module (BNI backcard) provides three ports with a BNC connector each for the XMT trunk output and for the RCV trunk input. Each LM-2T3 and LM-2E3 line module (ASI backcard) provides two ports with a BNC connector each for the XMT line output.and for the RCV line input.Make the T3/E3 connections to each port as follows.

Step 1 Bring each cable through the opening at the bottom of the cabinet at the back and route them up the side.

Step 2 The BPX has tie-downs inside the cabinet to hold cabling in place. Pull them apart as applicable, place the routed cable in position, wrap the ties around the cable and remake the loops by pressing the two sections together.

Step 3 Connect the cables to the BNC connectors on the LM-3T3 or LM-3E3 line modules. Remember, the RCV is an input to the BPX and XMT is an output from the BPX. The ports are numbered from top to bottom as indicated in Figure 7-6.

Note Maximum distance from a BPX to a DSX3 cross connect point is approximately 450 feet (150 meters).

Step 4 Record which slot and port number are used for each trunk or line. You'll need the information later when configuring the network.

Step 5 If optional Y-cable redundancy is desired, locate a 3-way BNC Y-cable adapter for each port to be so equipped. As an alternative to the Y-cable, use a BNC "T" and two short BNC-BNC cables.

Step 6 For card redundancy, make sure there are two appropriate line modules equipped in adjacent slots.

Step 7 Connect two legs of the Y-cable to the XMT T3 or E3 connectors on the same port on each of the two line modules (Figure 7-7).   Do the same with the two RCV T3 or E3 connectors.

Step 8 Connect the third leg of the XMT and RCV Y-cable adapters to the XMT and RCV trunk cable.

Figure 7-6   Connecting T3 Cables to BPX LM-T3 (BNI T3 backcard)
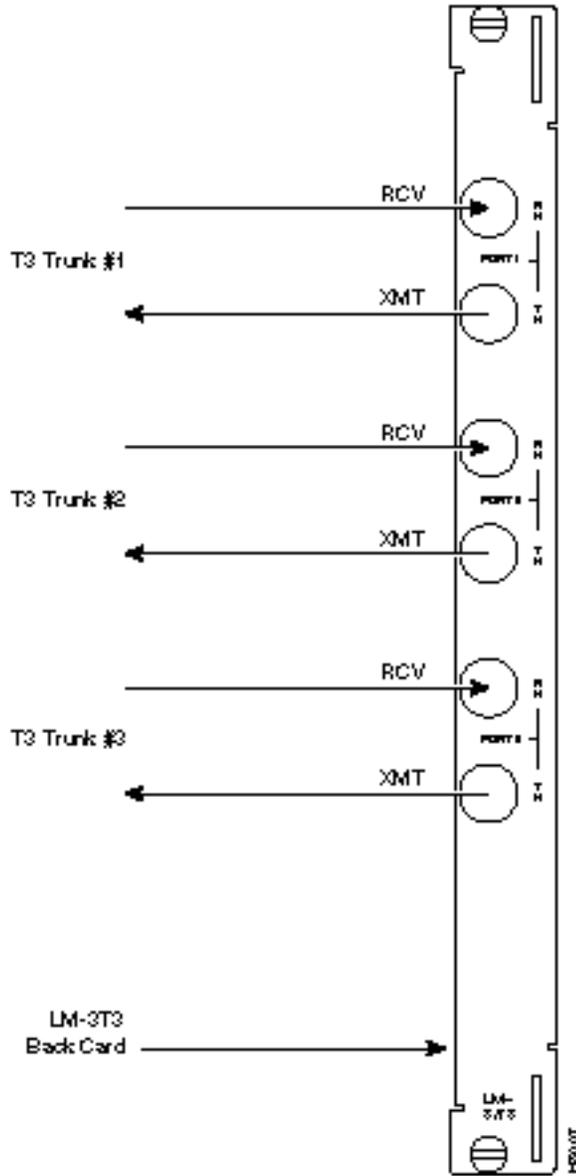
Figure 7-7 **Connecting Y-Cable Adapters to a T3 Port**
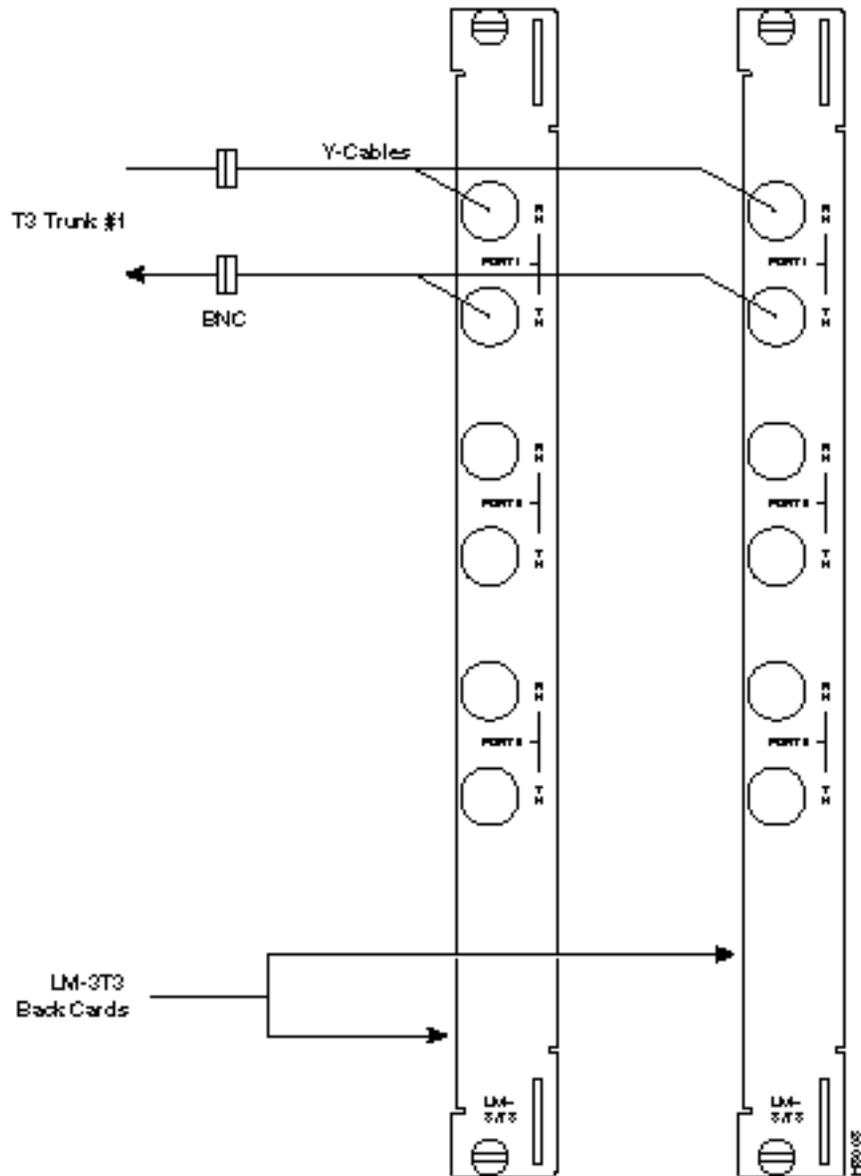
Making an ASI-155 or BNI-155 Connection

Each OC3 line module provides two ports with both a transmit and receiver connector for each port. The following applies to the 2OC3-SMF and 2OC3-MMF backcards, except that Y-Cabling redundancy is supported only for the 2OC3-SMF card. Make connections as follows:

Step 1   At the back of the cabinet, route each cable up the inside of the cabinet, as applicable.

Step 2   The STRATM cabinet has tie-downs inside the cabinet to hold cabling in place. If using a STRATM cabinet, pull the tie downs apart as applicable, place the routed cable in position, wrap the ties around the cable and remake the loops by pressing the two sections together.

Step 3   Connect the cables to the applicable connectors on the OC3 line modules. Remember, the RCV is an input to the BPX and XMT is an output from the BPX. The ports are numbered from top to bottom as indicated in Figure 7-8.

Making a BXM OC3 or OC12 Connection

Each OC3 or OC12 line module provides ports with both a transmit and receiver connector for each port. The following applies to OC3 and OC12 backcards, except that Y-Cabling redundancy is supported only for the SMF cards. Make connections as follows:

Step 1   At the back of the cabinet, route each cable up the inside of the cabinet, as applicable.

Step 2   The STRATM cabinet has tie-downs inside the cabinet to hold cabling in place. If using a STRATM cabinet, pull the tie downs apart as applicable, place the routed cable in position, wrap the ties around the cable and remake the loops by pressing the two sections together.

Step 3   Connect the cables to the applicable connectors on the line modules. Remember, the RCV is an input to the BPX and XMT is an output from the BPX. The ports are numbered from top to bottom.

Step 4   Record which slot and port number are used for each trunk or line. You'll need the information later when configuring the network.

Step 5   A Y-Cable redundancy connection for the SMF-2-BC backcard is shown in Figure 7-8. Y-Cable redundancy is supported only for the SMF-2-BC backcard which is used with either the BNI-155 or the ASI-155.

Step 6   For card redundancy, make sure there are two appropriate line modules equipped in adjacent slots.

Step 7   Connect two legs of the Y-cable to the XMT connectors on the same port on each of the two line modules (Figure 7-8).   Do the same with the two RCV connectors.

Figure 7-8   Connecting Y-Cables to an OC3-SMF Backcard
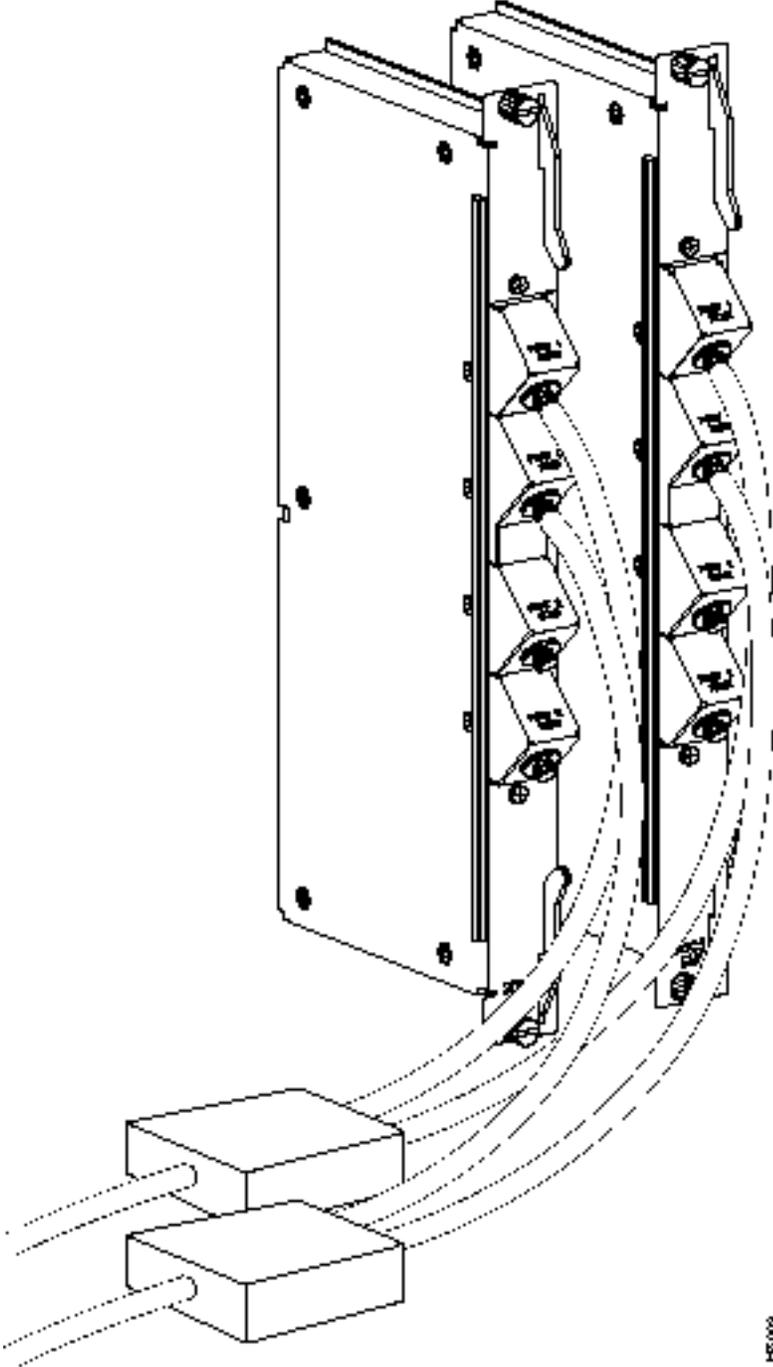
Making a BXM T3/E3 Connection

Each T3/E3 line module provides ports with both a transmit and receiver connector for each port. The backcards can provide 4, 8, or 12 ports. Figure 7-9 shows a typical T3/E3 cable connector that connects to the BXM T3/E3 cards. Y-Cabling redundancy is supported on the BXM T3/E3 cards. An example of a Y-cable is shown in Figure 7-10.

Make connections as follows:

Step 1   At the back of the cabinet, route each cable up the inside of the cabinet, as applicable. If Y-cables are used, the Y-cable connects to the corresponding connectors on adjacent cards.

Step 2   The STRATM cabinet has tie-downs inside the cabinet to hold cabling in place. If using a STRATM cabinet, pull the tie downs apart as applicable, place the routed cable in position, wrap the ties around the cable and remake the loops by pressing the two sections together.

Step 3   Connect the cables to the applicable connectors on the T3/E3 line modules. Remember, the RCV is an input to the BPX and XMT is an output from the BPX. The ports are numbered from top to bottom.

Step 4   For an open rack configuration and where Y-redundancy is not being used, an optional cable management tray is available to help route cables when a number of DS3/T3 cards are installed resulting a large number of cables to handle. Refer to Chapter 8, T3/E3 Cable Management Tray

Figure 7-9   BXM T3/E3 Cable Connector Detail
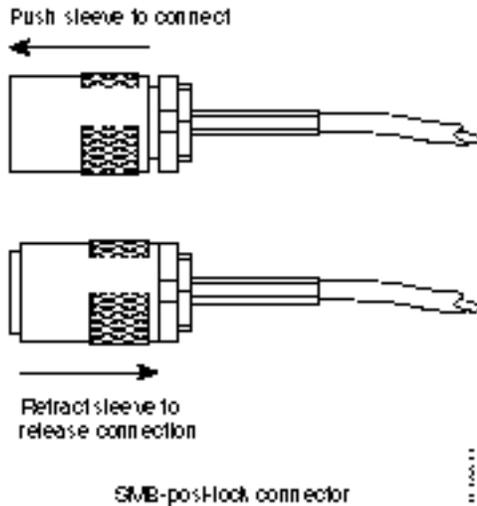
Figure 7-10   Y-Cable for BXM T3/E3 Cards
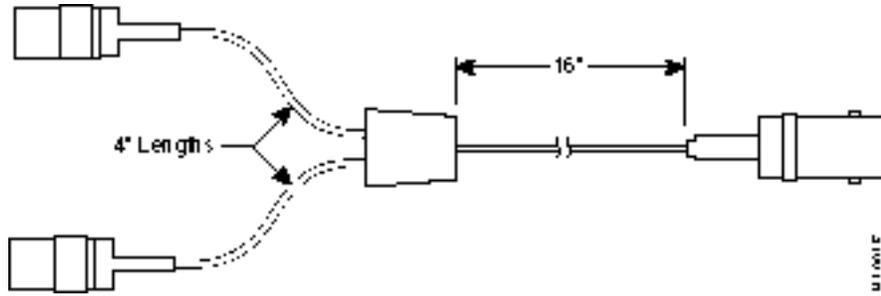
Alarm Output Connections

Dry contact relay closures are available for forwarding BPX system alarms to a user office alarm system. Separate visual and audible alarm outputs are available for both major as well as minor alarm outputs. These outputs are available from a DB15 connector on the LM-ASM faceplate (Figure 7-11). Refer to *Appendix B, BPX Cabling Summary*, for a list of the pinouts for this connector. Use switchboard cable for running these connections.

Figure 7-11   **Alarm Output Connector**
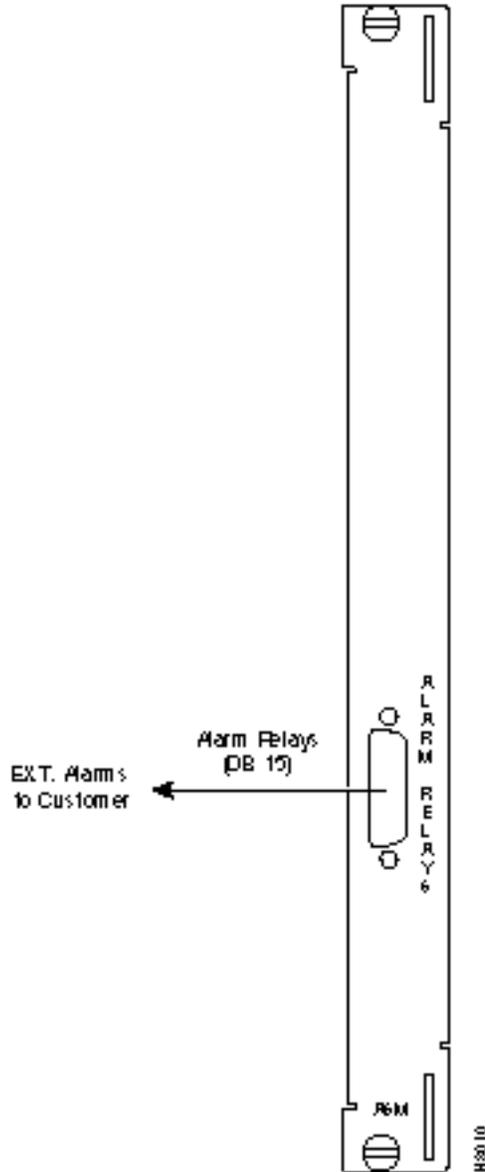
Attaching Peripherals

The BPX has two RS-232 serial data ports (labeled CONTROL port and AUXILIARY port) and an Ethernet port (labeled LAN) on the LM-BCC back card for attaching peripherals.

A network (or each domain in a structured network) must have at least one connection to a control terminal or StrataView Plus network management workstation. The StrataView Plus NMS workstation is used to configure and maintain all nodes in a network and report network statistical data. In addition, a network printer must be connected to the AUXILIARY port if you wish to print.

If it is desired to have Customer Service perform remote troubleshooting, a dial-in modem must be attached to the network. Procedures for attaching peripherals to the BPX are contained in the following paragraphs. Be sure to read the manufacturers literature to ensure that you have made the equipment ready for attachment, before attempting to attach it to the BPX.

Refer to the following for additional information on the following related subjects:

- *Appendix B, BPX Cabling Summary*, lists the pin assignments for the BPX control terminal port.

- *Appendix C, BPX Peripherals,* lists the control terminals supported and their required configuration settings.

- For instructions on using the BPX/IPX commands, see the *Command Reference Manual.*

- For instructions on using the StrataView Plus workstation, see the *StrataView Plus Operations Guide.*

Connecting a terminal or NMS to the Control Port

A basic VT-100 type terminal may be connected to this port for use in entering commands to bring up a new node. (Note: Since the StrataView Plus NMS workstation requires a LAN connection to a node in the network in order to perform its management functions, it is not connected to the Control Port during normal operation.)   In these procedures, the term BCC is used to refer to the BCC-4, BCC-3 or BCC-32. The BCC-4 and BCC-3 require BCC-3-bc backcards, and the BCC-32 requires the BCC-bc backcard.

Attach a terminal to the BPX as follows:

Step 1   From the back of the cabinet, run the control terminal RS-232/V.24 cable through the opening at the bottom and up to the LM-BCC card in back slot 7.

Step 2   **For nodes with a single BCC:** Locate the CONTROL port connector on the LM-BCC in slot 7. Attach the RS-232/V.24 cable as shown in Figure 7-12, the proceed to Step 5.

Step 3   **For nodes with redundant BCCs:** A Y-cable is required for this application. Connect one leg of the Y-cable to the CONTROL port connector on the backcard in slot 7 and the other leg to the slot 8 CONTROL port connector.

Step 4   Attach a RS-232/V.24 cable to the remaining leg of the Y-cable as shown in Figure 7-13.

Step 5   Fasten the cable connector to the CONTROL port connector with the captive screws on the connector hood.

Step 6   Plug the control terminal (or StrataView Plus) power cord into the appropriate wall receptacle (115 VAC or 240 VAC) and switch it on.

Step 7   Set the port function for VT100/StrataView using the **cnftermfunc** command if connecting to a StrataView Plus workstation. If using a "dumb" terminal, select VT100 only (# 5).

Step 8   Make sure that the CONTROL port and the terminal or workstation are set to the same baud rate and check the other communication parameters using the **cnfterm** command.

> **Note** When a node is powered up, it enters "boot mode" which has a default speed of 9600 bps. If the node's control port has been previously configured to 19,200, the first messages will appear garbled because the terminal is at 19,200 bps, but the control port (in "boot mode") is temporarily at 9,600 bps. When the "transition to on-line" occurs, then the speeds will match and the terminal display will be readable.

Figure 7-12   Connections to NMS (Single BCC), LM-BCC Backcard Shown
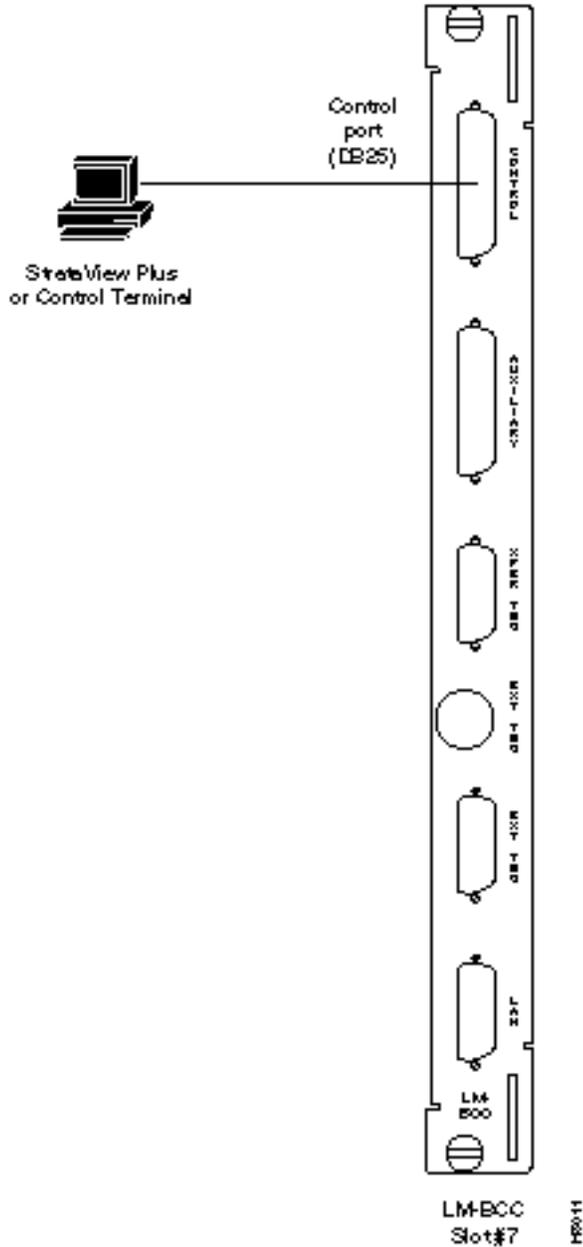
Figure 7-13   NMS Connections via Control Port (Redundant BCCs), LM-BCCs Shown
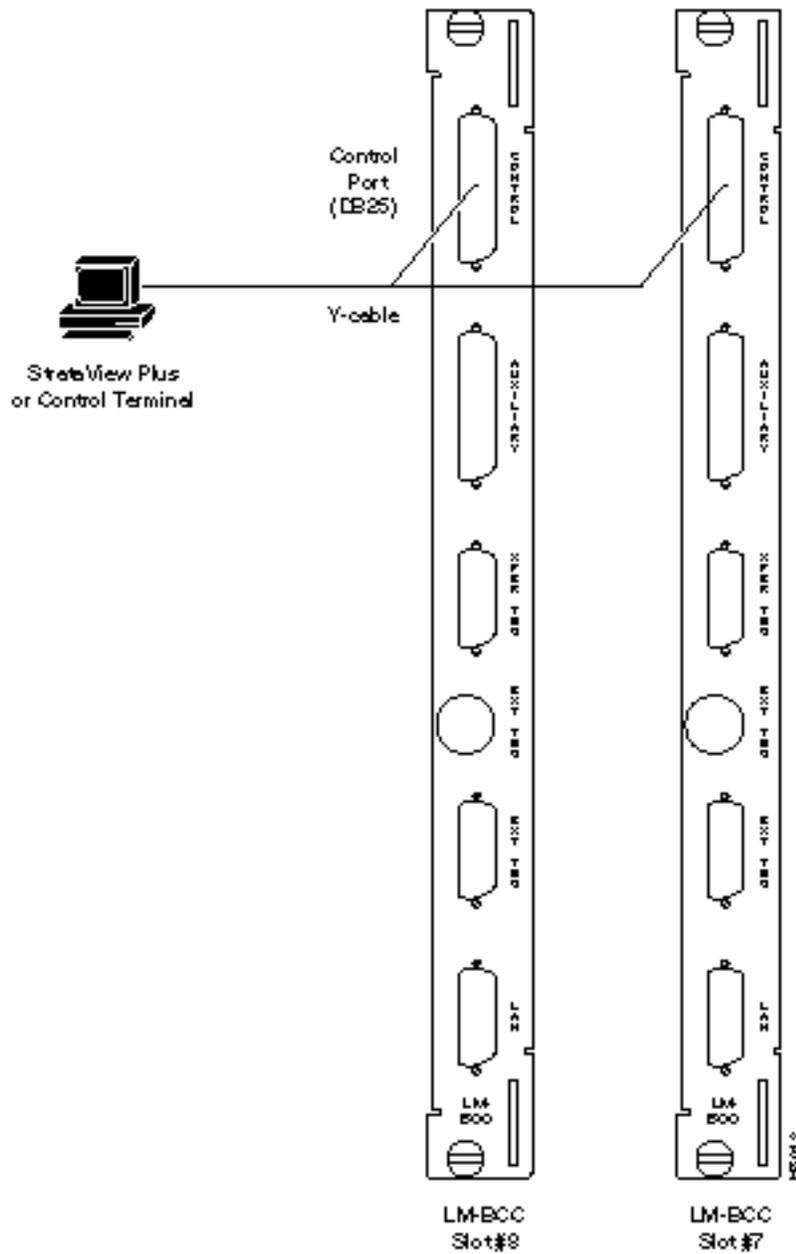
LAN Connection for the Network Management Station

The StrataView Plus NMS is connected to an Ethernet port (LAN port) on a node in the network for the purpose of network management. The LAN port provides the capacity necessary for the network management traffic and network statistics collection. See Figure 7-14 illustrating this connection.

For access to the node using an Internet connection, the Internet Protocol (IP) address, IP subnet mask, TCP service port, and gateway IP address must be entered by the user with the **cnflan** command.

Figure 7-14   LAN Connections to BCC Backcards, LM-BCCs Shown
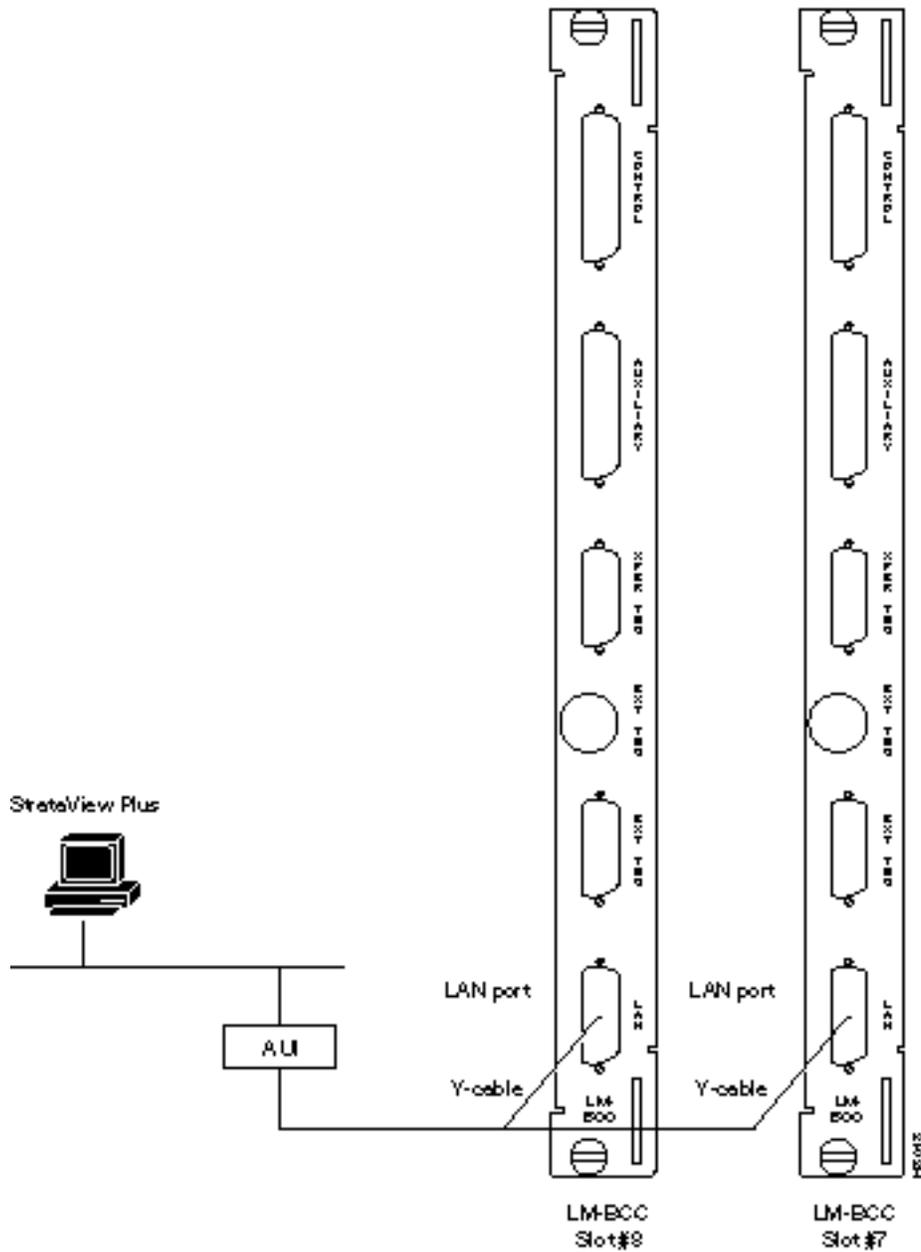
Connecting a Network Printer to the BPX

In most systems, the network printer will be connected to a serial port on the StrataView Plus NMS terminal server. The maintenance log and all statistics data will reside on the StrataView Plus. However, it is possible to connect a printer to a node and use various BPX system software print BPX Peripheralscommands to print locally. This may be helpful during the initial network installation phase.

Appendix C, BPX Peripherals, lists the types of printers supported by the BPX along with configuration settings. Appendix B, BPX Cabling Summary lists the pin assignments for the AUXILIARY port on the BPX and the recommended RS-232/V.24 cable pinout and printer DIP switch settings. Attach the printer to the BPX as follows:

Step 1   Check the printer RS-232/V.24 cabling pinout, and if required adjust the DIP switches to the settings indicated for the type of printer to be connected to the BPX.

Step 2   **For nodes with single BCC:** Connect the RS-232/V.24 printer cable to the AUXILIARY port on the LM-BCC back card (Figure 7-15). Go to Step 4.

Step 3   **For nodes with redundant BCCs:** A Y-cable is required for this application. Connect one leg of the Y-cable to the AUXILIARY port connector on the LM-BCC in slot 7 and the other leg to the AUXILIARY port connector on the LM-BCC in slot 8.

Step 4   Plug the printer power cord into the appropriate AC outlet (115 VAC or 240 VAC).

Step 5   Set the port function for printer using the **cnftermfunc** command.

Step 6   Make sure the control port and the printer are set to the same baud rate and check the other communication parameters using the **cnfterm** command.

Figure 7-15   Connections to a Network Printer, LM-BCC Shown
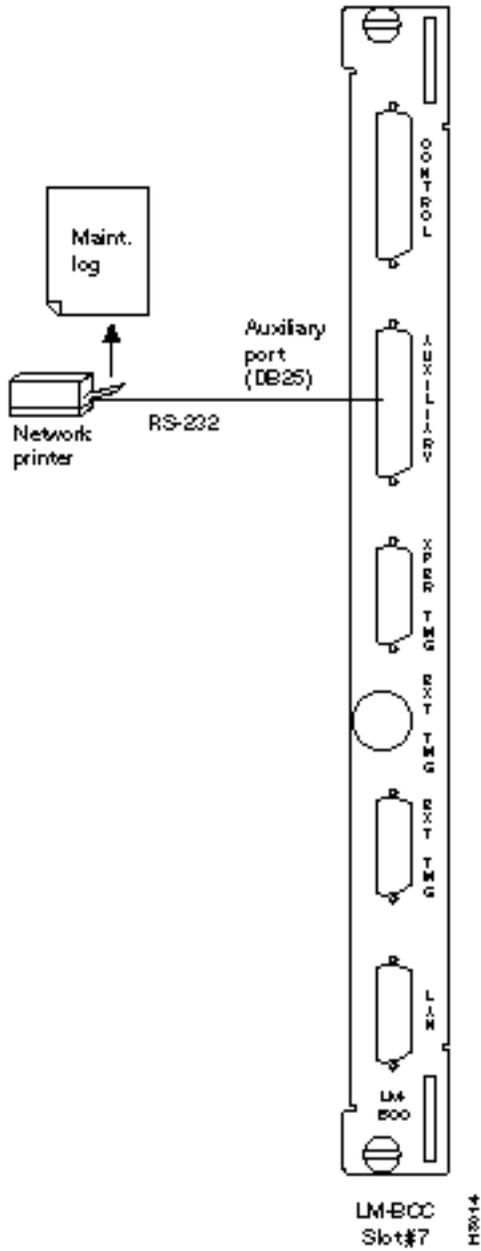
Connecting Modems

A modem may be connected to each BPX node to provide remote access by Customer Service (Figure 7-16). For information on connecting and configuring a modem refer to Appendix C, BPX Peripherals.

Figure 7-16   Connecting Modems to the BPX, LM-BCC Shown
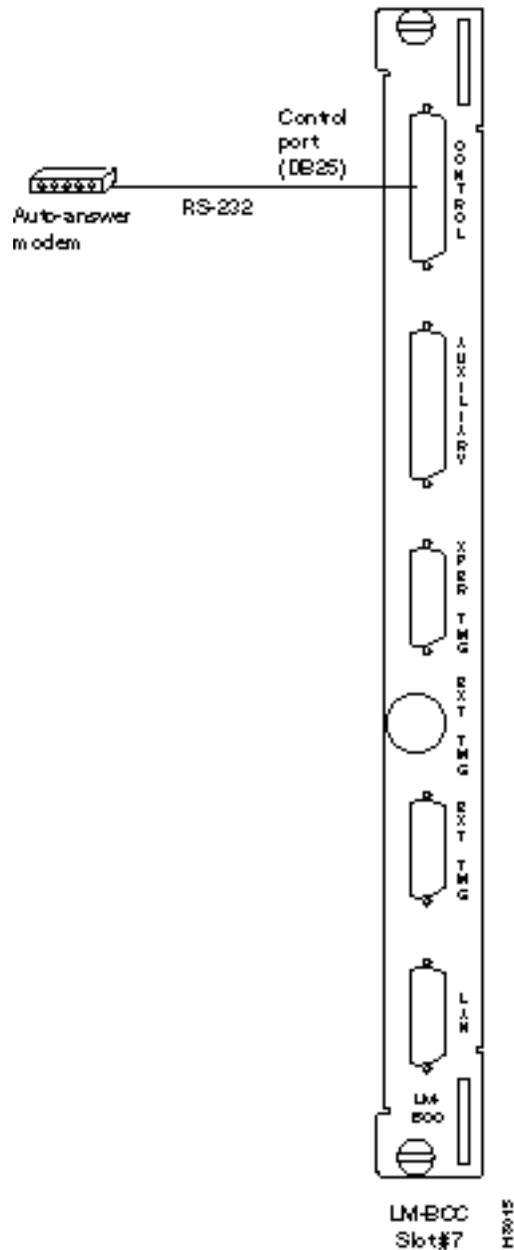
- An auto-answer modem is used to provide access for remote access. It is connected to the CONTROL port connector. This port is bi-directional transmit and receive.

These modems connect to a standard telephone line wall jack. The modem connections require special cables and setup procedures. Refer to *Appendix C, BPX Peripherals*, for instructions on connecting and setting up the modems. If the BPX is equipped with redundant BCCs, an RS-232 Y-cable must be used for these connections.

Making External Clock Connections

The BPX provides connections for supplying a timing signal to synchronize the operation of an adjacent IPX node. A connector on the BPX LM-BCC back card, labeled EXT CLK OUT supplies a clock signal at either a T1 or E1 rate which can be connected to the IPX EXTERNAL CLOCKS connector on the IPX SCC back card (Figure 7-17*)*. This uses a straight-through DB15 to DB15 cable, male to male. See *Appendix B, BPX Cabling Summary*, for pin-outs.

If the BPX node is to be synchronized to some other external equipment or a local digital central office, one of two other connectors on the LM-BCC can be used to provide a clock input. A DB15 connector labeled EXT CLK IN can be used to connect a balanced T1 or E1 signal, synchronized from some higher-level source, to the BPX. If an unbalanced 75-ohm E1 signal is available as the timing source, a BNC EXT CLK IN connector is also provided. The BPX senses an active signal at any of these inputs and automatically synchronizes to this source rather than the internal Stratum 3 clock source.

Note   Contact Customer Service for information on setting up either a 75-ohm or 120 ohm clock interface on the BCC backcard.

Figure 7-17   Synchronizing a Local IPX to BPX Node, LM-BCCs Shown
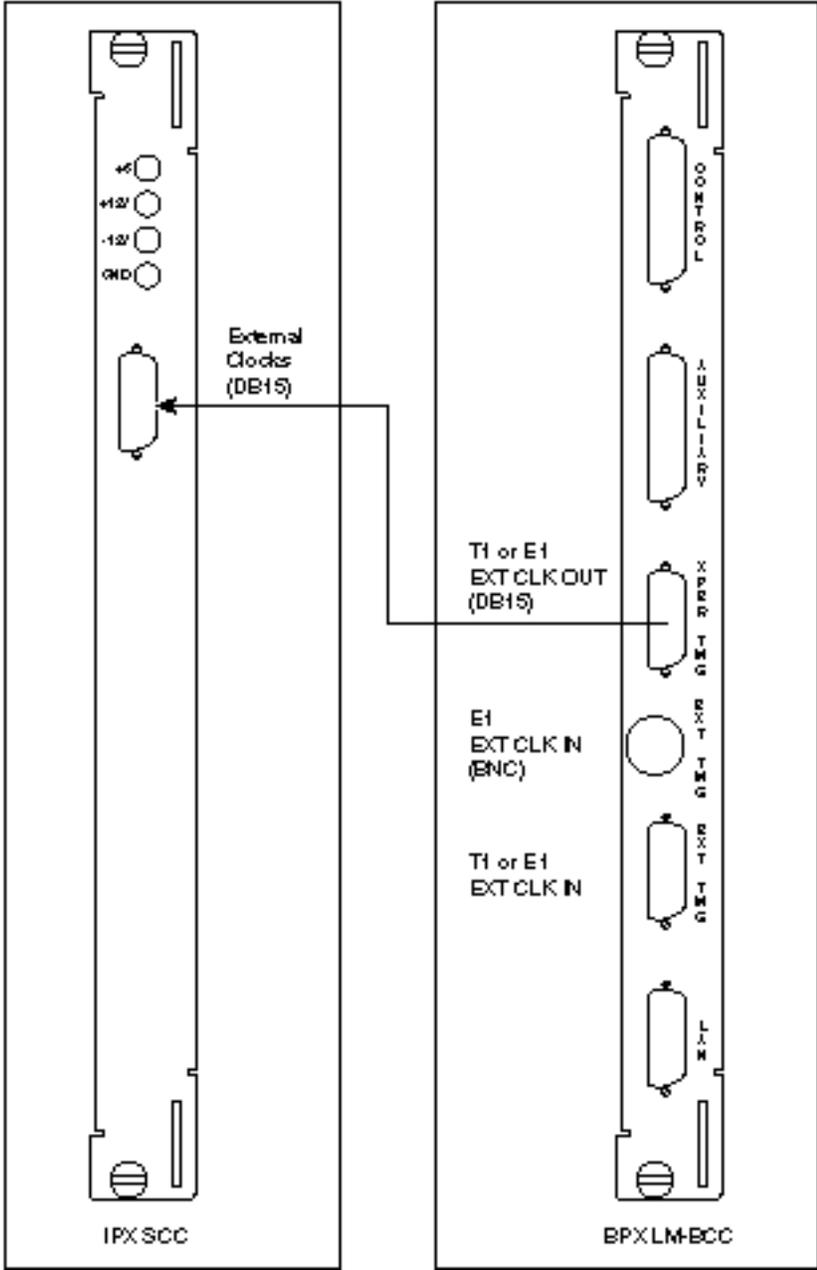
Initial Startup of the BPX

Before operating the BPX, check that the following procedures have been performed:

Step 1 The BPX is connected to an appropriate power source with an isolated ground connection, per the procedures in Chapter 5, Installation, DC Shelf Initial Setup, or Chapter 6, Installation, AC Shelf Initial Setup, as applicable.

Step 2 The BPX power cord is plugged into an appropriate power outlet.

Step 3 The full complement of cards for the specific node are mounted in the correct slots, correctly seated, and locked in place.

Step 4 The T3 or E3 connections are attached to the appropriate LM-3T3/3E3 faceplate.

Step 5 A control terminal (or StrataView Plus Work Station) is connected to the CONTROL port on the LM-BCC in back slot 7/8, and the terminal's power cord plugged into the appropriate voltage wall outlet.

Step 6 If needed, a printer may be connected to the AUXILIARY port on the LM-BCC in back slot 7/8 and the printer power cord plugged into the appropriate power outlet.

Step 7 If needed, a modem(s) may be connected to the CONTROL port or AUXILIARY port, as applicable, on the LM-BCC in back slot 7/8, and the modem(s) power cord(s) plugged into the appropriate power wall outlet.

Step 8 From the back of the BPX cabinet, turn the power switches to the ON position.

Step 9 From the front of the BPX, observe the cards go through initial diagnostic self-tests.

- The AC power supply(ies) –48V indicator will be on.

- The standby BCCs red "FAIL" light flashes until self-testing and configuration updates are completed. The other BCC becomes active immediately, but also performs self-testing and configuration updating. The entire process may take several minutes to complete.

- The remaining cards will show "FAIL" for a few seconds, then become active or standby.

- There may or may not be alarms showing on the BNIs and ASIs. Alarms may be present on ATM trunk connectors that have not been physically connected to T3 lines.

BPX Startup Diagnostic

The BPX software provides a group of diagnostic tests to be run on the system's hardware at power-up. The startup diagnostic either passes or fails the BCC(s) tests. The test result is displayed on the control terminal screen as pass or fail. Figure 7-18 illustrates a successful power-up diagnostics sequence.

Figure 7-18   Successful Power-Up Diagnostic Screen

If a BCC fails the power-up diagnostic, it will not boot. When that happens, do the following:

Note   On power-up, the BCC in slot 7 is always the active BCC.

Step 1   Remove the failed BCC from its slot.

Step 2   Reseat the BCC in the same slot.

Step 3   Wait for the power-up diagnostic to run.

Step 4   If the BCC fails the power-up diagnostics a second time, replace it with another BCC that is known to have passed the test.

Once the software has successfully booted up, the NMS terminal will display the software on-line screen (Figure 7-19). At this point, you may login as a user to the node.

Figure 7-19   On-Line Screen

```
Sotware On-Line




















Last Comm                        Transition to On-Line

Next Comm

Diagnostic
                                                              BX/A<<
Sotware On-Line

                        StataCom Rev: H.A.1



Enter User ID:




Next Command:

Diagnostic Passed
                                                              BX/A<<
```
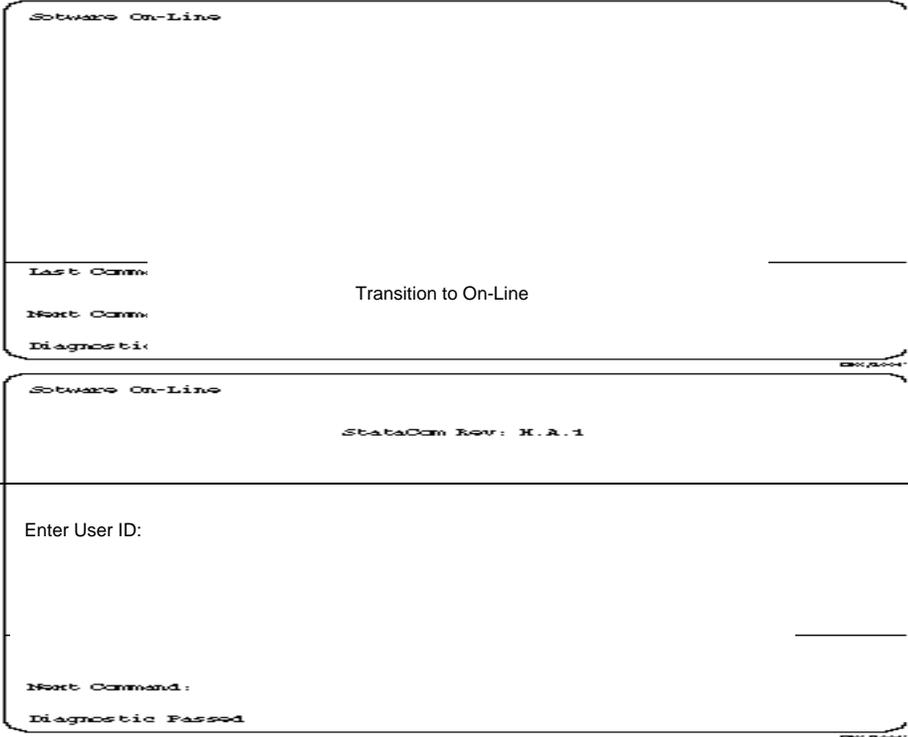
BPX Management

You can monitor, manage and troubleshoot the BPX using the StrataView Plus Network Management Station. Commands are issued to a BPX node through the Node Administration window. Frame Relay connections are added via the StrataView Plus Connection Manager. You can display and monitor the network's topology, monitor alarms, events, and statistics. Refer to the *Cisco StrataCom StrataView Plus Operations Guide* for more information.

For detailed configuration information, refer to the *Cisco StrataCom Command Referen*ce publication.

Initial Node Configuration Summary

Adding Nodes, Adding Trunks, Shelves, etc.

Refer to the applicable reference publications, *Cisco StrataCom IPX Reference*, *Cisco StrataCom BPX Service Node Reference*, *Cisco StrataCom IGX Reference*, *Cisco StrataCom AXIS Reference*, for node installation and operation.

As a minimum, the nodes need to be configured with name (**cnfname**), date (**cnfdate**), time (**cnftime**), timezone (**cnftmzn**), and trunks upped (**uptrk**) and added (**addtrk** or **addshelf**), as applicable. Connections can also be added now or later, after configuring the nodes for operation with the SV+ NMS manager.

The basic tasks to configure a BPX are as follows:

- Set up the node.

    — Configure the node name (**cnfname**).

    — Configure the time zone (**cnftmzn**).

    — Configure date (**cnfdate**).

    — Configure time (**cnftime**).

    — Configure the LAN interface (**cnflan**).

    — Configure the auxiliary or terminal ports to support any necessary external devices such as a local printer, an autodial modem, or an external multiplexer attached to the unit (**cnfprt**, **cnfterm**, **cnftermfunc**).

- Set up the trunks to other routing nodes. Verify the correct cards are in both the local and remote nodes (**dspcds**).

    — Up the trunk(s) at each node (**uptrk**).

    — Configure any parameters required for the trunk at each node (**cnftrk**).

    — Add the trunk(s) at each node (**addtrk**).

    — Set up Y redundancy if desired (**addyred**).

- If using an IPX/IGX Interface Shelf, configure it as shelf.

    — Up the trunk from the AIT/BTM to the BPX using (**uptrk**). Shelf trunks for the IPX/IGX must be upped on both the BPX routing hub and the shelf before the shelf can be joined to the Routing Network.

    — Contact Customer Service to configure the IPX/IGX shelf option.

    — At the BPX, add the IPX/IGX as a shelf to the BPX (**addshelf**).

The following two examples are of the screens displayed when "**dspnode**" is entered at a BPX and at one of its IPX shelves, respectively. The "**dspnode**" screen displayed at the "**hubone**' bpx node shows that it is connected to the "shlf3ipx" node via BNI trunk 3.3. The "**dspnode**" screen displayed at the "shlf3ipx" node show that it is connected to the bpx via AIT trunk 8.

Example of dspnode at node "hubone" BPX15 showing feeder shelves

```
hubone            TN    edgar       BPX 15    8.5      Nov. 20 1996 08:09 PST

                          BPX Interface Shelf Information

Trunk    Name      Type       Alarm
 1.2    shlf1Axis  AXIS        OK
 1.3    shlf2Axis  AXIS        OK
 3.1    shlf1IPX   IPX/AF      OK
 3.2    shlf2IPX   IPX/AF      OK
 3.3    shlf3IPX   IPX/AF      OK
 4.1    shlf4IPX   IPX/AF      OK
 4.3    shlf5IPX   IPX/AF      OK


Last Command: dspnode
```

Example of dspnode at node Shlf3IPX showing connection to "hubone"

```
shlf3IPX            TN    edgar       IPX 8     8.5    Nov. 20 1995 09:24 PDT

                        BPX Switching Shelf Information

Trunk    Name     Type       Alarm
  8     hubone    BPX         MAJ




Last Command: dspnode


Next Command:
```

- Adding the Axis Shelf .

    — At the BPX, add the AXIS as a shelf to the BPX (**addshelf**).

- Set up ATM service lines and ports.

    — Activate the line (**upln**).

    — Configure the line (**cnfln**).

    — Activate the ports (**upport**).

    — Configure the ports (**cnfport**).

- Set up ATM connections.

    — Add connections (**addcon**).

    — Configure a connection type (**cnfcontyp**).

- Set up ATM to frame relay (ATF) connections.

  — Add the connections (**addcon**).

  — Configure connection classes (**cnfcls**).

  — Configure connection groups (**addcongrp**).

- Set up Interface Shelf Frame Relay Connections in Tiered Networks.

  — Refer to the *Cisco StrataView Plus Operations Guide.*

  — Only frame relay connections are supported from the IPX Interface Shelf and these are added and managed by the SV+ Connection Manager via the SNMP protocol. All connections are treated as end-to-end.

  — Frame relay connections terminated at an AXIS Shelf are added and managed by the SV+ Connection Manager via the SNMP protocol. All connections are treated as end-to-end.

  — ATM connections terminated at an AXIS IPX Shelf are added and managed using the Command Line Interface on the AXIS. All connections are treated as end-to-end.

IP Setup and IP Relay Configuration

In setting up network management for a network, both the SV+ workstation and network nodes need to be configured. SV+ communicates over a standard physical LAN network to a gateway node or nodes, but a separate in-band IP relay network is setup for all nodes via a gateway node for SNMP and TFTP in-band communication over the node trunks.

On IPX, BPX, IGX nodes the following commands are used to configure the nodes for operation with SV+: **cnflan, cnfnwip, cnfstatmast, cnfsnmp**. The AXIS is configured with **cnfifip** and **cnfstatsmgr**. The **cnflan** command is only necessary for nodes or shelves in which the LAN port is actually connected to a physical Ethernet LAN as shown in Figure 7-20.

Figure 7-20   SV+ Physical LAN and IP Relay Network

Installing StrataView Plus and Associated Applications

Refer to the *Cisco StrataView Plus Operations Guide*, *Cisco StrataView Plus Installation Guide*, *Cisco StrataCom Command Reference*, and *Cisco StrataCom AXIS Reference* publications for additional information.

Configure StrataView Plus Workstation (example)

Step 1   Enter physical IP addresses and physcial LAN node names (with a letter"p", for example to differentiate from IP relay name) in /etc/hosts and enter IP relay addresses and actual node names.

```
beacon% more /etc/hosts
#
# Sun Host Database
#
# If the NIS is running, this file is only consulted when booting
#
127.0.0.1       localhost
#
204.179.61.121  beacon loghost


# node physical ethernet LAN addresses

204.179.61.104 nw1bpx1p
204.179.61.71 nw1axi1p

# node ip relay addresses

204.179.55.101 nw1ipx1
204.179.55.102 nw1ipx2
204.179.55.103 nw1ipx3
204.179.55.123 nw1igx1
204.179.55.111 nw1bpx1
204.179.55.105 nw1axi1
```

If the workstation is connected to the corporate network, add any IP addresses and associated names of hosts that you may want to connect to your workstation, as the NIS is disabled.

Step 2   Enter name of gateway node in config.sv, using physical LAN name.g., nw1bpx1p. Note; normally, a bpx is used for the gateway node because of its greater processing power.

0|Network1|nw1bpx1p|9600|0|7|6|0|30|1024|8.1|

Step 3   Enter IP Relay subnet mask at end of rc.local file:

 # route add for SV+

route add net 204.179.55.0 nw1ipx1p 1

Note   The route add command is for all nodes in the 204.179.55.0 subnetwork. The name "nw1bpx1p" is the name associated with the physical LAN port on the gateway node, e.g., nw1bpx1.

Step 4   Contact Customer Service. For the workstation to use /etc/hosts, it must not be able to access the NIS directory. A work around for "Solaris" is to perform the following:

cd /usr/lib/netsvc/ypbind

mv ypbind ypbind_old

Configuring the LAN Port

Note   Configure the LAN parameters of the nodes before connecting them to a LAN.

Note   Refer to the *StrataView Plus Operations* document and the *Commands Reference* for additional information.

Step 1   Contact your System Administrator to obtain IP addresses for your workstation and for the BPX/IPX node you are going to configure.

Step 2   Normally, the System Administrator will provide the IP addresses for the workstation and node. Refer to the SV+ Operations manual for instructions on configuring the SV+ workstation.

The addresses shown are just examples. Use the addresses obtained from your System Administrator. (This example is for a workstation named "hedgehog" at address 192.187.207.200. It also assumes that the BPX, IGX, or IPX node LAN port for node sanfran has been assigned an IP address of 192.187.210.30 and a hostname of sanfran. Your own host name and addresses will be different.)

```
192.187.207.200   hedgehog
192.187.210.30    sanfran
```

Note   If an NIS is being used (e.g., corporate network), you will need to contact the System Administrator.

Note   5120 is used for the LAN ports on all BPX/IPX ports.

Step 3   Configure the LAN port on the BPX/IPX node using a dumb terminal or an RS-232 connection via the workstation (using the **vt** command, as applicable) to enter the appropriate **cnflan** parameters.

The **cnflan** command configures the node's communication parameters so that the node can communicate with a StrataView Plus terminal over an Ethernet LAN using the TCP/IP protocol. The parameters contain address information about the Ethernet TCP/IP network that is used to connect the StrataView Plus station to an IPX or BPX node. The values used must conform to those of the network and should be supplied by the Ethernet network administrator.

The **cnflan** command has the following parameters:

- **Active IP Address** is the Internet Protocol address of the node used in the TCP/IP protocol.

- **IP Subnet Mask** is a 32-bit mask. The default for a Class C LAN network is 255.255.255.0. (Other than C Class masks may be used.)

- **IP Service Port** is the BPX/IPX LAN port number entered in the **/etc/service** file on the workstation. It is 5120 for all BPX/IPX nodes.

- **Default Gateway IP Address** is the Internet gateway address. This is the gateway that traffic is routed through if the BPX, IGX, or IPX node and workstation are on different networks. If they are on the same network, the gateway is not used. The default "none" is displayed in this case. (Note: If a gateway IP is entered and later you want to remove it, enter 255.255.255.255 opposite the "IP Subnet Mask" prompt and 192.0.0.0 opposite the "Default Gateway IP Address" prompt and "none" will again be displayed. (Note: The node will reset itself if you do this.)

A **cnflan** screen is shown in Figure 7-21 for the LAN setup shown in Figure 7-22. An IP address of 192.187.210.30 has been entered as the active IP address for the node. The IP Subnet mask is entered as 255.255.255.0 for a Class C LAN network. The TCP service port is entered as 5120. Since the workstation and node are on different networks in this example, a gateway address of 192.187.207.1 (the address of the node serving as a gateway for SV+, in this example), which must be obtained from your System Administrator, has been entered. If the workstation and node are both on the same network, no gateway address is needed. The "Maximum LAN Transmit Unit" and "Ethernet Address" parameters are not configurable by the **cnflan** command. The "Ethernet Address" is a hardware address that is different for every node controller card, e.g., BCC.

Figure 7-21   Configuring a Node's Control Port (Gateway Router Example)

```
beta        TN     YourID.1      BPX 15    8.5    Mar. 3 1997  02:16 PST


Active IP Address:                    192.187.210.30
IP Subnet Mask:                       255.255.255.0
IP Service Port:                      5120
Default Gateway IP Address:           192.187.207.1
Maximum LAN Transmit Unit:            1500
Ethernet Address:                     00.C0.43.00.00.20


Type      State
TCP       UNAVAIL
UDP       READY
Telnet    READY

This Command: cnflan


Enter IP Address:
```

Step 4   Connect the StrataView Plus workstation and the BPX node to a LAN network. The LAN port on the BPX node provides a DB-15 connector that can be connected to a Y-cable which in turn is connected to an AUI.

Step 5 To test that a LAN connection to the BPX LAN port is okay, for example, for a hostname of "sanfran" entered in the **config.sv** file, you could enter the following at the SV+ workstation:

```
ping sanfran
```

Step 6 An IP Relay address needs to be configured for each node. Figure 7-23 shows an example of using the **cnfnwip** command to configure the IP Relay address for a node. Also, at the workstation, the /etc/hosts table and routing need to be set up for each node in the network. This is so that network management using SNMP and statistics collection using TFTP via inband ILMI may be carried out. Also, assuming an isolated network for the nodes, the workstation must be isolated from the NIS reference pages in order that the SV+ workstation consults the /etc/hosts table. Refer to the StrataView Plus Installation and Operation manuals for further information.

Step 7 Once the workstation and BPX node interface have been set up, SV+ can be started. Figure 7-24 shows the **dsplan** screen after SV+ has been started and the communication sockets are active.

Note "Sockets" is the BSD Unix name for connections between processes, typically used in network communication.

Figure 7-22   SV+ LAN Connection via Gateway Router to a BPX Node
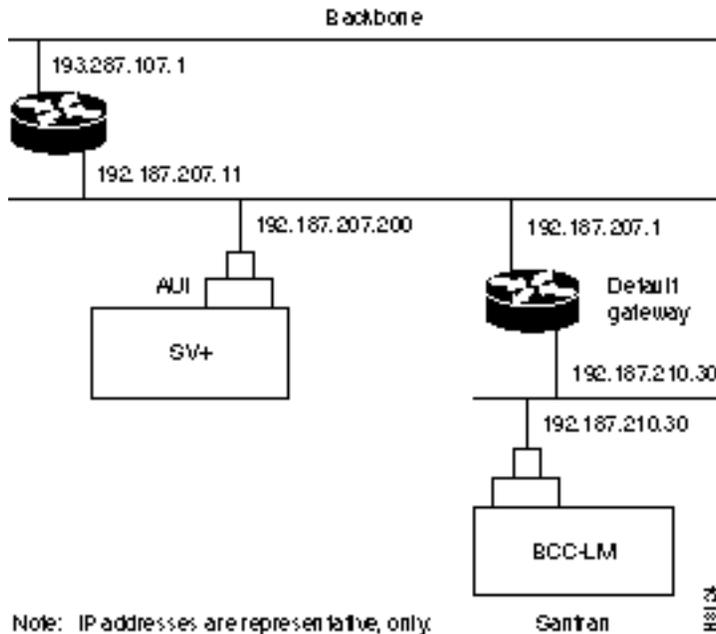
Figure 7-23   Configuring the IP Relay Parameters (Required for each node)

```
beta       TN      YourID       BPX 15   8.5       Dec. 3 1996  02:11 PST

 Active Network IP Address:              192.187.57.10
 Active Network IP Subnet Mask:          255.255.255.192







 Last Command: cnfnwip


 Next Command:
```

Figure 7-24   dsplan after SV+ Startup (Gateway Router Example)

```
beta       TN     YourID.1      BPX 15    8.5      Dec. 3 1996  02:16
 PST


 Active IP Address:                     192.187.210.30
 IP Subnet Mask:                        255.255.255.0
 IP Service Port:                       5120
 Default Gateway IP Address:            192.187.207.1
 Maximum LAN Transmit Unit:             1500
 Ethernet Address:                      00.C0.43.00.00.20


 Control Socket - Ready

 Open Socket Descriptor - 2


 Last Command: dsplan

 Next Command:
```

Figure 7-25 shows an example of a StrataView Plus workstation LAN connection to a BPX on a network with no gateway router, nor connection to another LAN. This type of LAN connection could also be connected through a "Hub" which is essentially a signal splitter (passive or active).

Figure 7-25   SV+ LAN Connection to an IPX Node (no gateway)
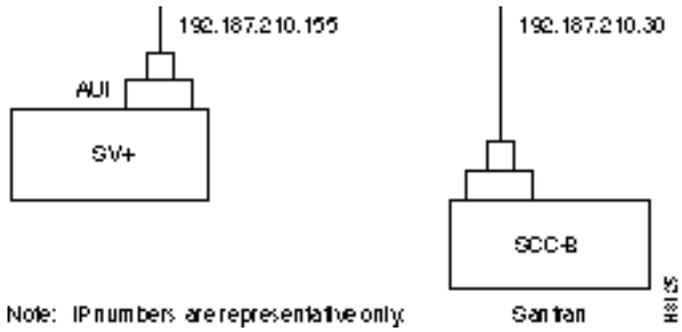
Configuring the AXIS for StrataView Plus NMS Operation (example)

At installation, initial access to the AXIS is provided by the control port. The following is a brief overview of initital configuration. Refer to the Cisco StrataCom AXIS Reference manual for detailed information. Also refer to appropriate release notes for applicable firmware and software versions.

Step 1   Connect a terminal to the control port on the AXIS workstation.

Step 2   Login.

```
login: "LoginID"

password:
card number: 3

xxxxAXIS.1.3.ASC.a >
```

Step 3   Name the shelf.

```
xxxxAXIS.1.3.ASC.a > cnfname nw1axi1
```

Step 4   Set the date.

```
nw1nw1axi1.1.3.ASC.a > cnfdate 05/02/96
```

Step 5   Set the time.

```
nw1saxi1.1.3.ASC.a > cnftime 15:31:00
```

Step 6   Enter Help for a list of commands.

```
nw1saxi1.1.3.ASC.a > Help
```

Step 7   Check versions of ASC, and Service Module (e.g., FRSM, AUSM) Firmware.

```
nw1axi1.1.3.ASC.a > version
***** Stratacom Inc. AXIS ASC Card *****2
    Firmware Version    = 2.1.12b_____
    Backup Boot version = model-B BT_2.0.0_____
    ASCFRSM Xilinx file = asc025.h
    ASCBNM Xilinx file  = bnmt3andsrefix
VxWorks (for STRATACOM) version 5.1.1-R3000.
Kernel: WIND version 2.4.
Made on Thu May 2 16:42:36 PDT 1996.
Boot line:
sl(0,0)

cc
```

Step 8   Enter Ethernet LAN port IP address.

```
nw1axi1.1.3.ASC.a > cnfifip
cnfifip "-ip <ip addr> -if <Interface> -msk <NetMask> -bc <Brocast addr>
"
  -ip <IP addr> where IP addr = nnn.nnn.nnn.nnn
  -if <Interface> where Interface = 26,28,37, 26: Ethernet, 28: Slip 37: ATM
  -msk <NetMask> where NetMask = nnn.nnn.nnn.nnn
  -bc <BrocastAddr> where BrocastAddr = nnnnnnnn,  n is hexdecimal, ethernet only


nw1axi1.1.3.ASC.a > cnfifip -ip 204.179.61.71 -if 26
```

You are configuring ethernet port are you sure? enter yes/no: yes

Step 9   Enter IP Relay Address for SNMP Management and Stats Collection.

    nwlaxi1.1.3.ASC.a > **cnfifip -ip 204.179.55.105 -if 37**

    You are configuring atm port are you sure? enter yes/no: yes

Step 10   Configure stat master address (IP of SV+ workstation).

    cnfstatsmgr "<ip address>"

    nwlaxi1.1.3.ASC.a > **cnfstatsmgr 204.179.61.121**   {this is IP address of SV+ workstn}

Adding Virtual Trunks

This section details the steps for setting up a virtual trunk. Virtual trunking is an optional feature that
must be enabled by Cisco prior to adding virtual trunks. Also, revision levels of ASI and BNI
firmware must be current. The following procedure assumes that Cisco equipment is used in the
ATM Cloud as well as in the Cisco StrataCom subnetworks. In this case, a BNI output from the
subnetwork is connected to an ASI UNI input at the ATM Cloud (Figure 7-26). Proceed as follows:

Step 1   In the ATM cloud network, physically connect an ASI port at the cloud edge to each BNI
           port in the Cisco StrataCom Network that is intended to have virtual trunks.

Figure 7-26   Virtual Trunks across a Cisco StrataCom ATM Cloud
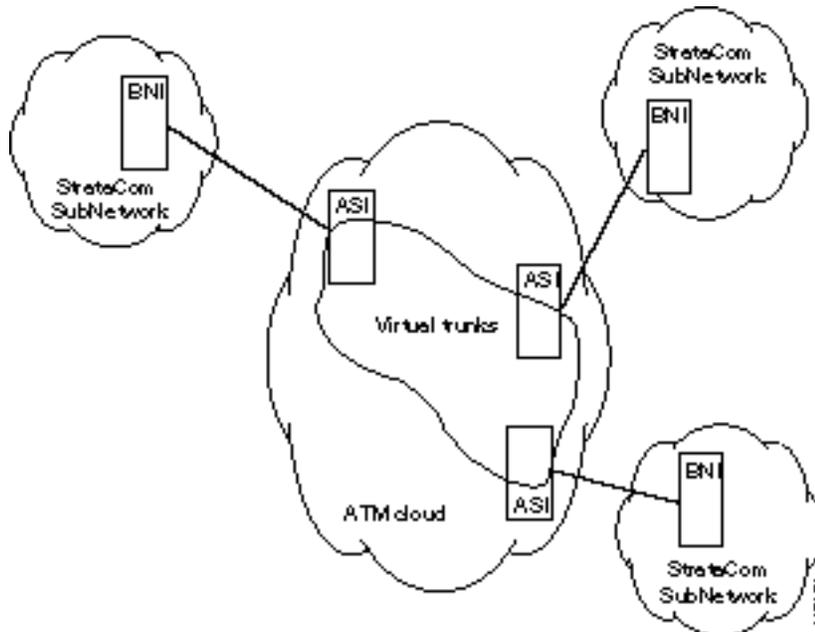
Step 2   Configure the cloud ASI ports. For each ASI port connected to a BNI virtual trunk port,
           do the following:

           upln <slot.port>

           upport <slot.port>

           cnfport <slot.port> and set the *shift* parameter to "N" for no shift if the cloud contains
           BPX nodes

Step 3   Execute **addcon**. In the cloud network, add a virtual path ASI connection for each virtual trunk that is to route through the cloud. An example of this syntax is:

addcon joker 5.1.1.* swstorm 6.2.10.*

Where 5.1 and 6.2 are ASI ports hooked up and configured for virtual trunking. Daxcons are acceptable.

Note that the third number is the VPI which must correspond to the virtual trunk VPI configured with cnftrk in step 4.

When the cloud is a public ATM service and not a Cisco StrataCom cloud, the VPI is provided by the carrier, as well as the guaranteed BW associated with the VPI.

The CBR/VBR/ABR parameters must also correspond to the Virtual Trunk Type of the virtual trunk. For T3, set PCR to the bandwidth of the virtual trunk, and CDVT to 24000 for the connection so that the ASI does not drop cells. These are values that Cisco recommends based on testing.

Step 4   Configure BNI virtual trunks. On the BNIs that connect to the cloud ASI ports, configure up to 32 virtual trunks, as follows:

uptrk <slot.port.vtrk>

cnftrk <slot.port.vtrk>

For **cnftrk**, make sure that the virtual trunk type and the VPI correspond to the ASI Virtual Path connections that have been set up.

addtrk <slot.port.vtrk>

Provisioning the BPX Service Node

For additional information on provisioning the BPX, including configuring ports, lines, trunks, and adding connections refer to the following documents:

- Cisco StrataCom BPX Service Node Reference

- StrataView Plus Operations Guide

- Cisco StrataCom BPX Service Node Extended Services Processor Installation and Configuration

- Cisco StrataCom Command Reference

- Cisco StrataCom SuperUser Command Reference

T3/E3 Cable Management Tray

This chapter provides instructions for the installation of the optional cable management tray that may be used to route cables in an open rack non-redundant configuration.

You'll need to obtain the optional cable management tray kit and one each BXM T3/E3 cable bracket kit for each BXM T3/E3 card.

This chapter contains the following:

Installation of Cable Management Tray

Raising Tray for Access to PEMs

Installing BXM T3/E3 Cable Management Bracket

Connecting Cables to T3/E3 Cards

Routing Cables from Cards through Cable Management Tray

Tray Raised with Cables in Place

Installation of Cable Management Tray

Installing Tray Brackets

Step 1   Obtain brackets and associated hardware from kit.

Step 2   Install left and right brackets, using 2 nuts to secure each bracket, Figure 8-1.

Figure 8-1   **Installation of Cable Management Tray Brackets**
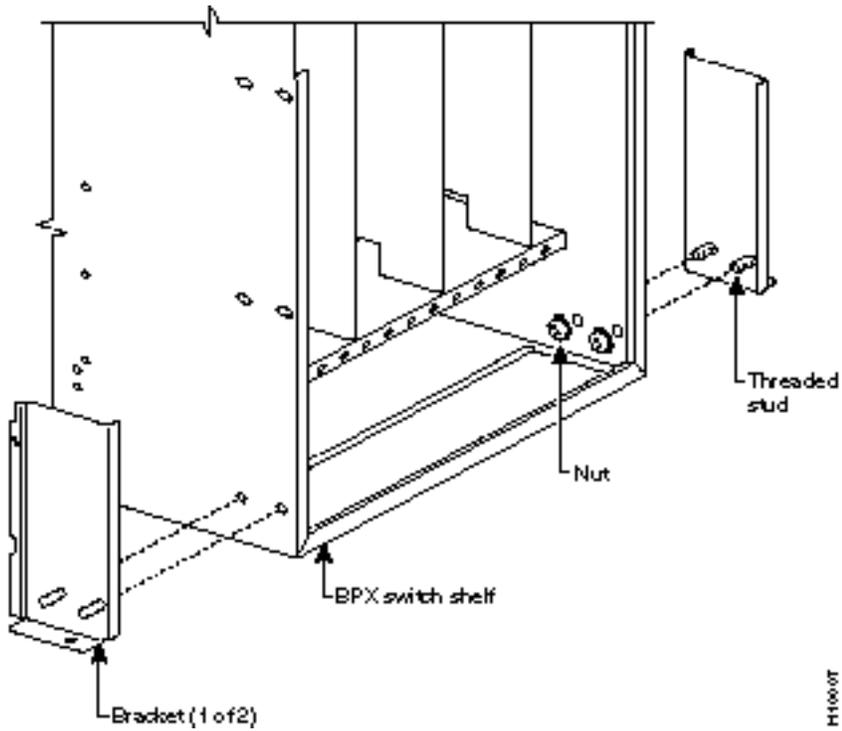
Installing Tray

Step 1 Using two hands to hold cable management tray, slide over brackets Figure 8-2.

Step 2 Lower tray into lower rest position Figure 8-3.

Figure 8-2 **Sliding Cable Management Tray over Brackets**
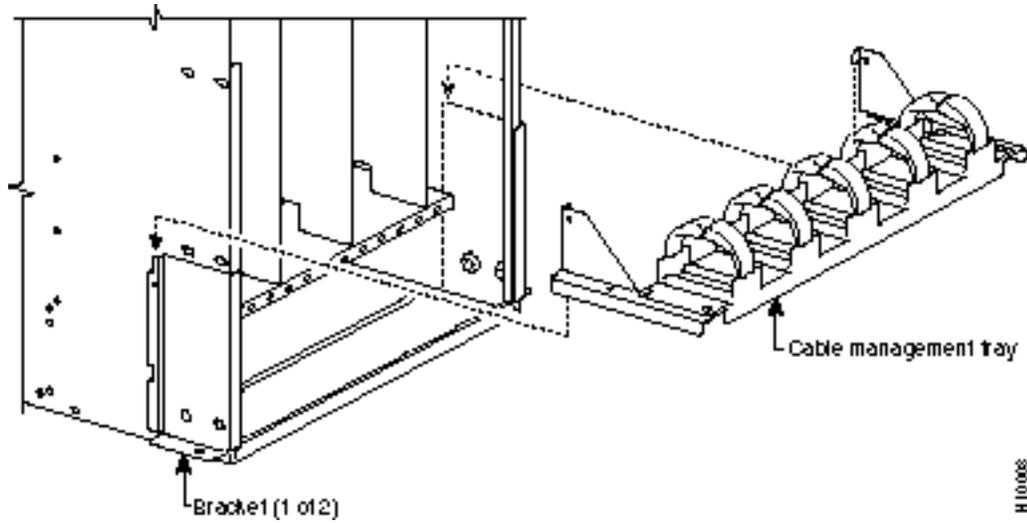
Figure 8-3   Cable Management Tray in Lowered Home Position

Upper notch

Lower notch

Cable
management
tray
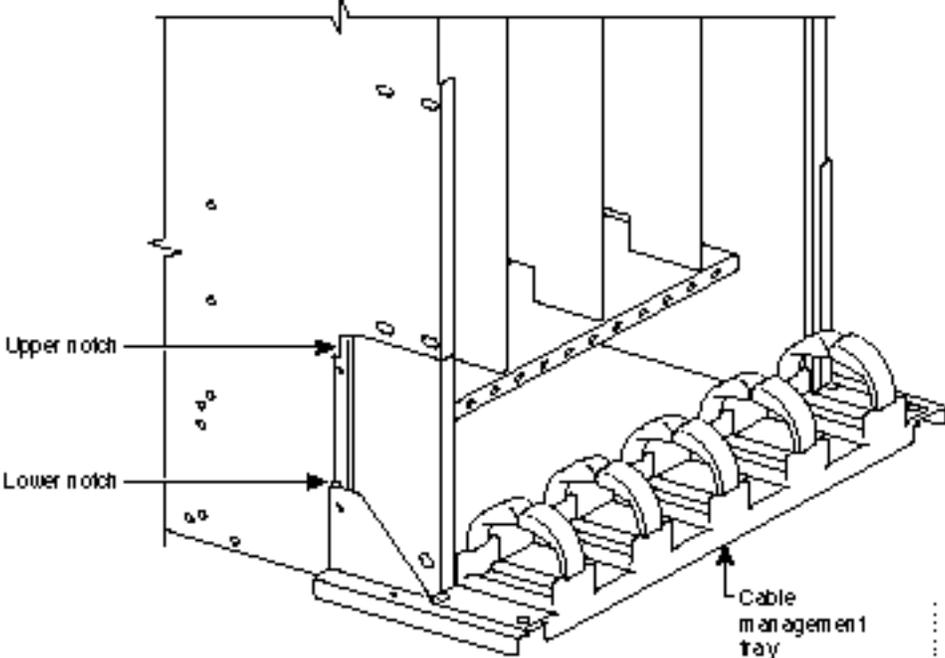
Raising Tray for Access to PEMs

The tray is raised only when necessary to access the Power Entry Modules (PEMs), typically for replacement or to install a second PEM. Figure 8-4 shows the tray in the raised position. To raise the tray to provide access to the PEMs proceed as follows:

Step 1   Remove securing screws as necessary.

Step 2   With two hands, pull tray towards you and up.

Step 3   Raise tray to upper position and lower onto upper slots.

Figure 8-4   **Cable Management Tray in Raised Position**
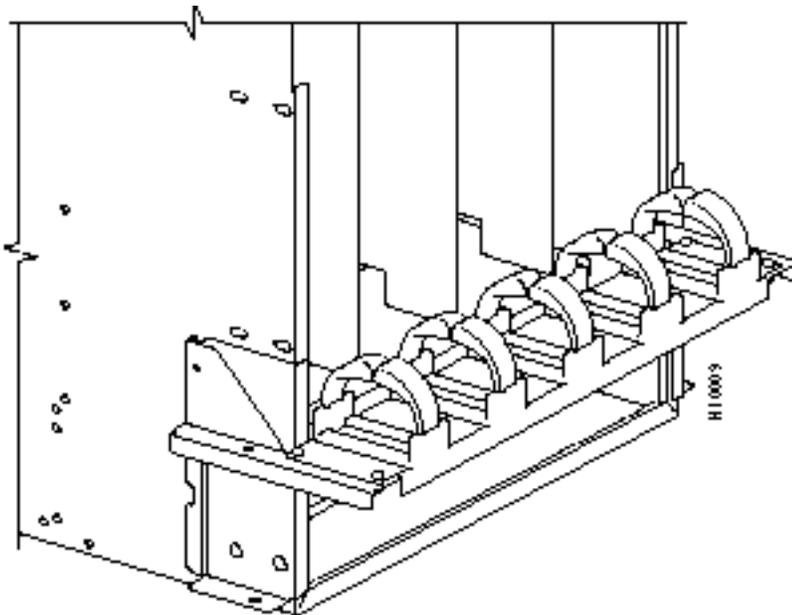
Installing BXM T3/E3 Cable Bracket

Attach the BXM T3/E3 cable bracket to each BXM T3/E3 card as follows, Figure 8-5:

Step 1   Remove bracket from kit.

Step 2   Place bracket in position as shown.

Step 3   Screw in and tighten captive screw.

Step 4   Insert one end of cable tie through hole in bracket.

Figure 8-5   **Installing BXM T3/E3 Cable Bracket**
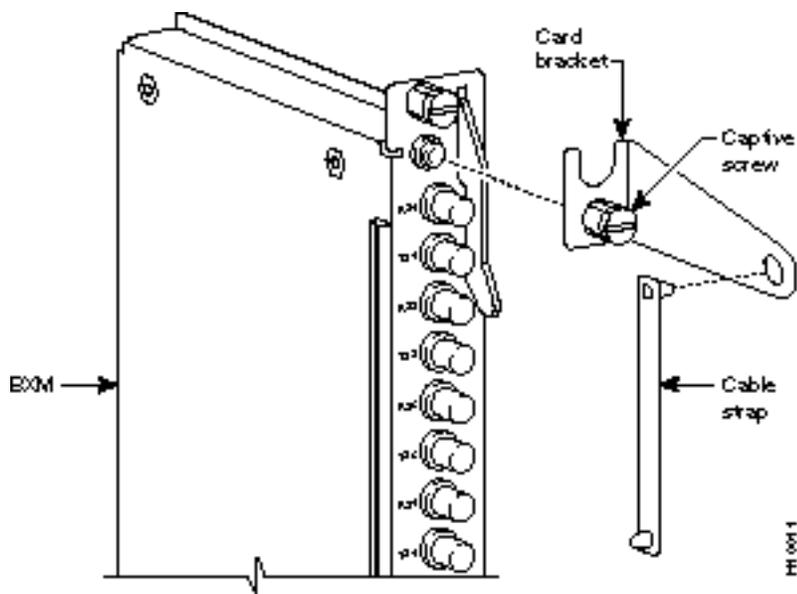
Connecting Cables to BXM T3/E3 Cards

Route cables as follows, Figure 8-6 and Figure 8-7:

Step 1 Connect cables to card by pushing on SMB connector locking sleeves as you push cable connectors on to card connectors.

Step 2 Dress cables upward to provide service loop.

Step 3 Bundle cables using cable ties.

Step 4 Wrap cable strap around cables and secure to cable management bracket.

Note Cables are disconnected from a card by pulling on the cable connector locking sleeve as you pull cable connector away from card connector.

Figure 8-6   **Connecting Cables to T3/E3 Card**
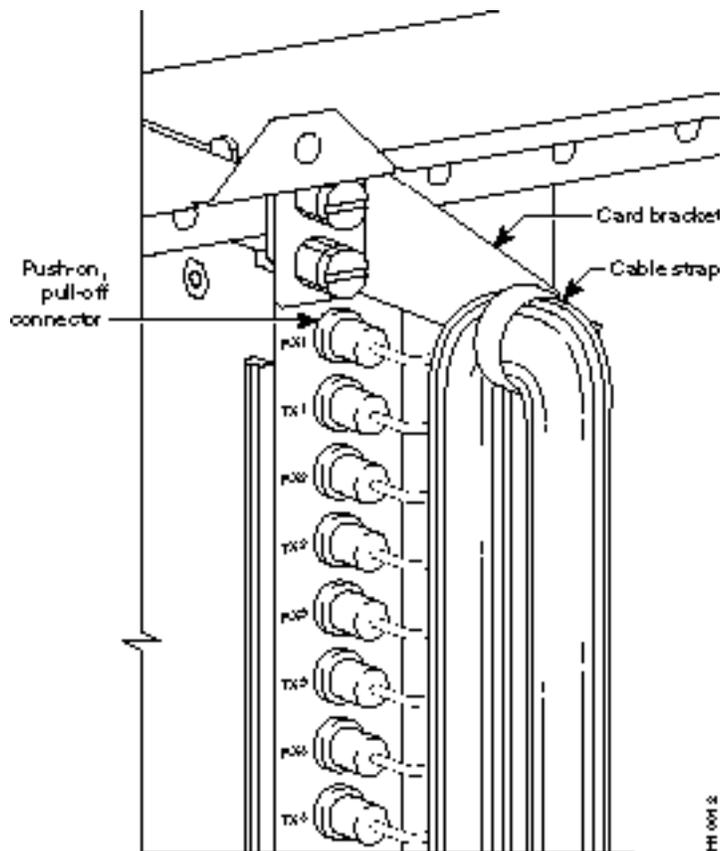
Figure 8-7   T3/E3 SMB Connector Detail

Push sleeve to connect

Retract sleeve to
release connection

SMB-post-lock connector
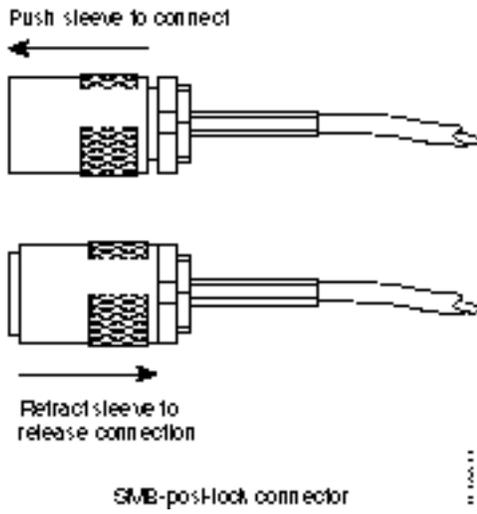
Routing Cables from Cards through Cable Management Tray

Route cables as follows, Figure 8-8:

Step 1   Verify that cable management tray is in lowered home position.

Step 2   Route cables from cards through cable clamps on cable management tray.

Step 3   Secure cable management tray to cable tray brackets by inserted and tightening securing screw, one to each bracket.

Figure 8-8   Cables Routed through Cable Management Tray in Lowered Position
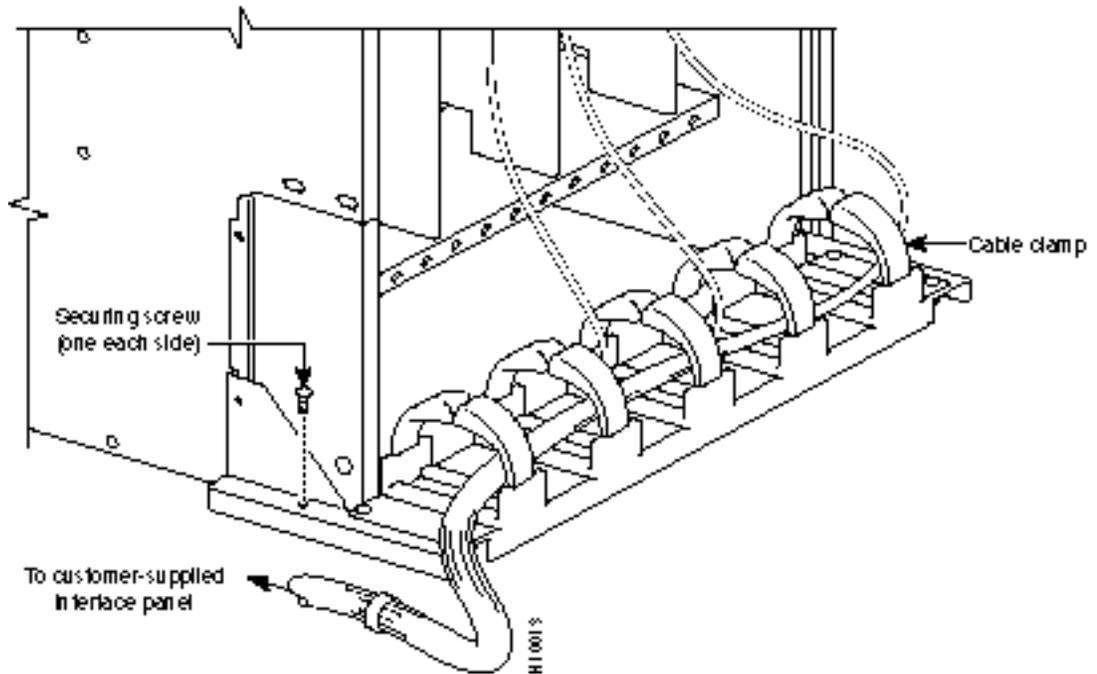
Tray Raised with Cables in Place

Figure 8-9 shows how the cable management tray is raised with cables in place, to provide access to the Power Entry Modules (PEMs).

Figure 8-9   Tray Raised with Cables in Place
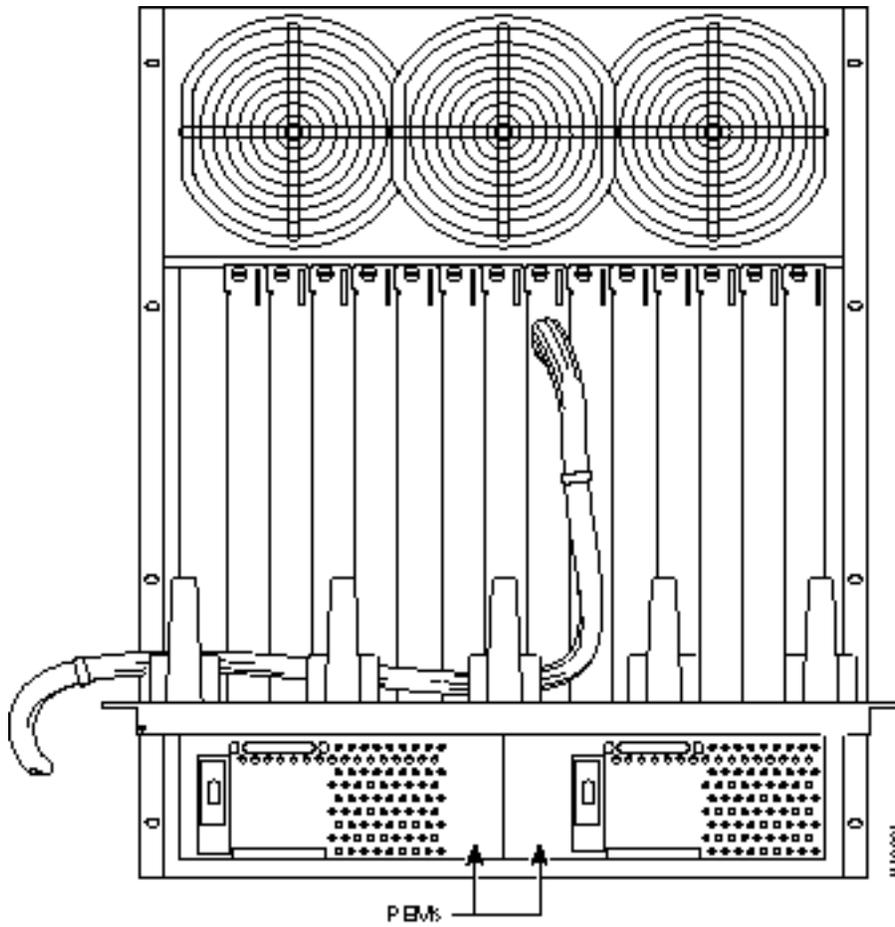
STRATM Cabinet Dimensions

This appendix illustrates typical cable management and space requirements for various system configurations in the STRATM cabinet. It also contains a table with the height of StrataCom components in inches, centimeters, and rack-mount units (RMUs). This can help in the calculation of height requirements for individual setups. The last illustration shows the bracket installation in the STRATM (for a BPX, in this case). The information is grouped as follows:

- STRATM Cabinet and Component Heights

- STRATM Cabinet

- Cable Management

- Examples of BPX System Configurations

- Examples of IGX System Configurations

STRATM Cabinet and Component Heights

Table A-1 lists STRATM cabinet dimensions and the heights of components that may be installed in the cabinet.

Table A-1   Table of STRATM Cabinet and Component Heights

Components	Unit Height		
	Inches	CM.	RMUs
AXIS Card Cage	8.75	22.225	5
AXIS AC Power Supply shelf	5.25	13.335	3
AXIS Booster Fan Assembly	3.5	8.89	2
AXIS Cooling Assembly	5.25	13.335	3
AXIS Exhaust Plenum	3.5	8.89	2
BPX AC Power Supply shelf	5.25	13.335	3
BPX Card Cage	22.75	57.785	13
IGX AC Power Supply shelf	5.25	13.335	3
IGX Booster Fan Assembly	3.5	8.89	2
IGX Card Cage	17.5	44.45	10
IGX Cooling Assembly	5.25	13.335	3
IGX Exhaust Plenum	3.5	8.89	2
IGX-8	24.5	62.23	14
INS	5.25	13.335	3
Cabinet	**Unit Height**		
	Inches	CM.	RMUs
STRATM Cabinet	71.75	1822.45	41

STRATM Cabinet

Figure A-1 shows a back view of an empty STRATM cabinet.

Figure A-1   Back View of Empty STRATM Cabinet
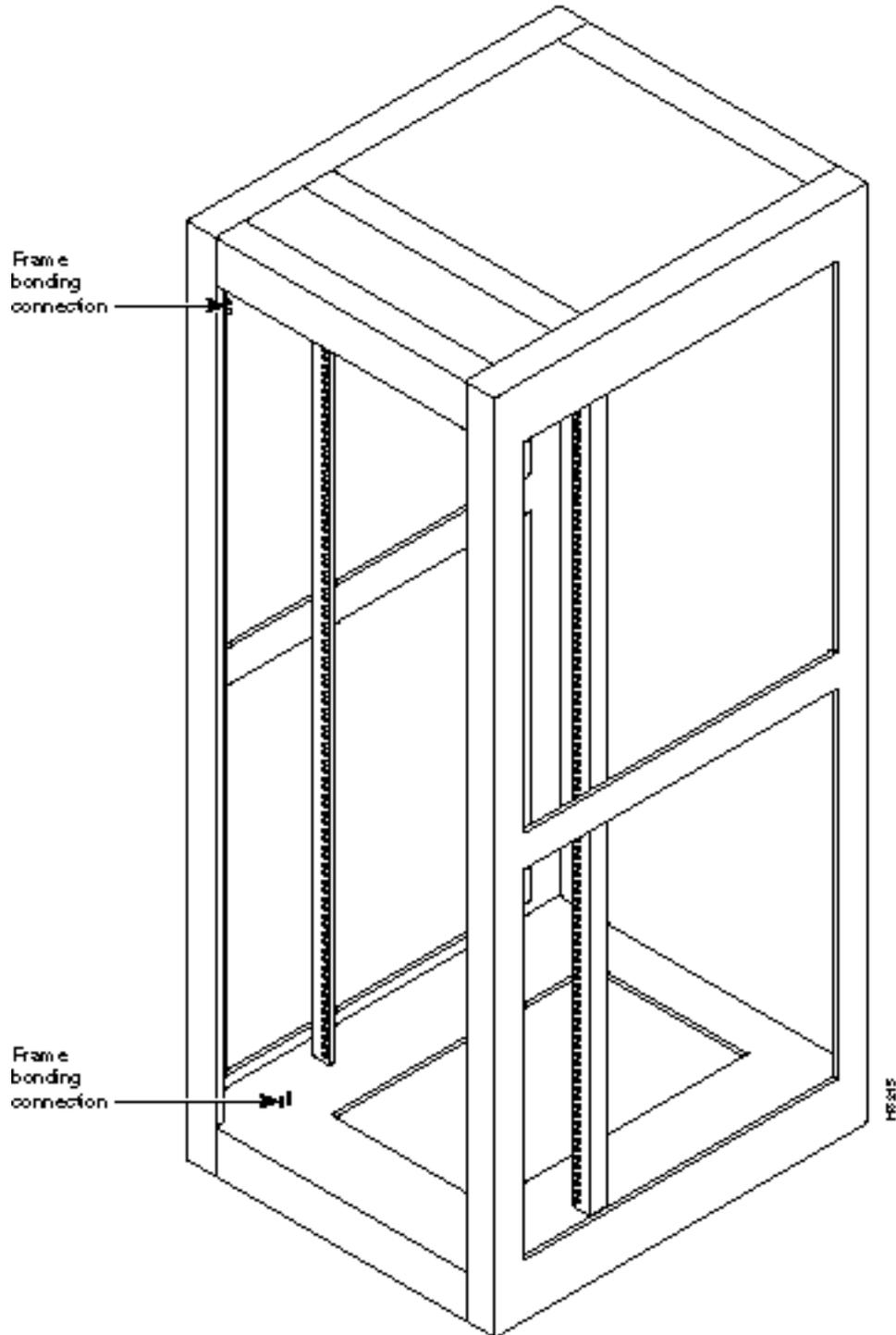
Cable Management

Figure A-2 shows a typical cable management configuation for an IGX-32 in a STRATM cabinet.

Figure A-2 **Typical Cable Management, IGX-32 in STRATM Cabinet**
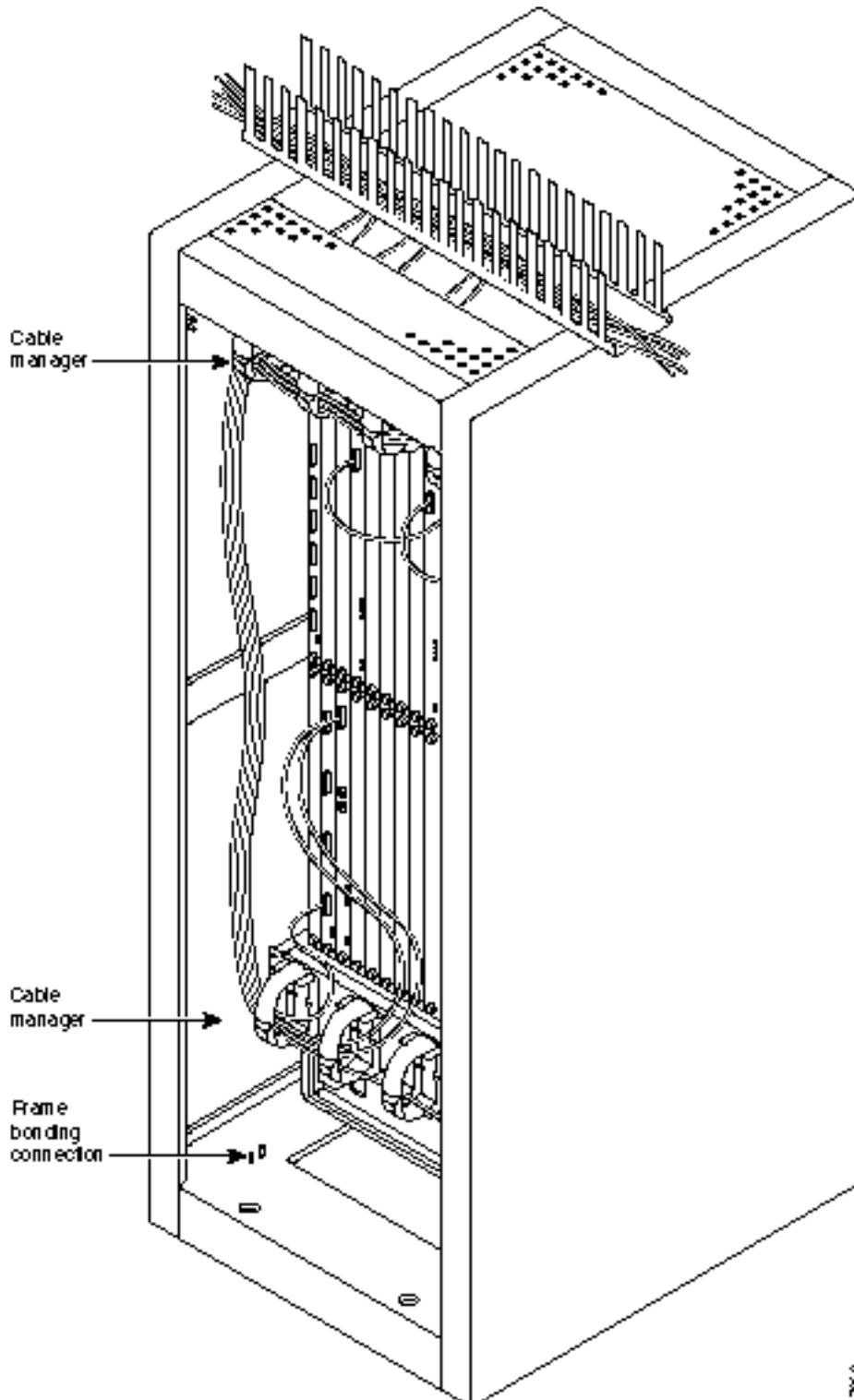
Examples of BPX System Configurations

Figure A-3 through Figure A-10 show various BPX System configurations.

Figure A-3   Single BPX, DC and AC Systems
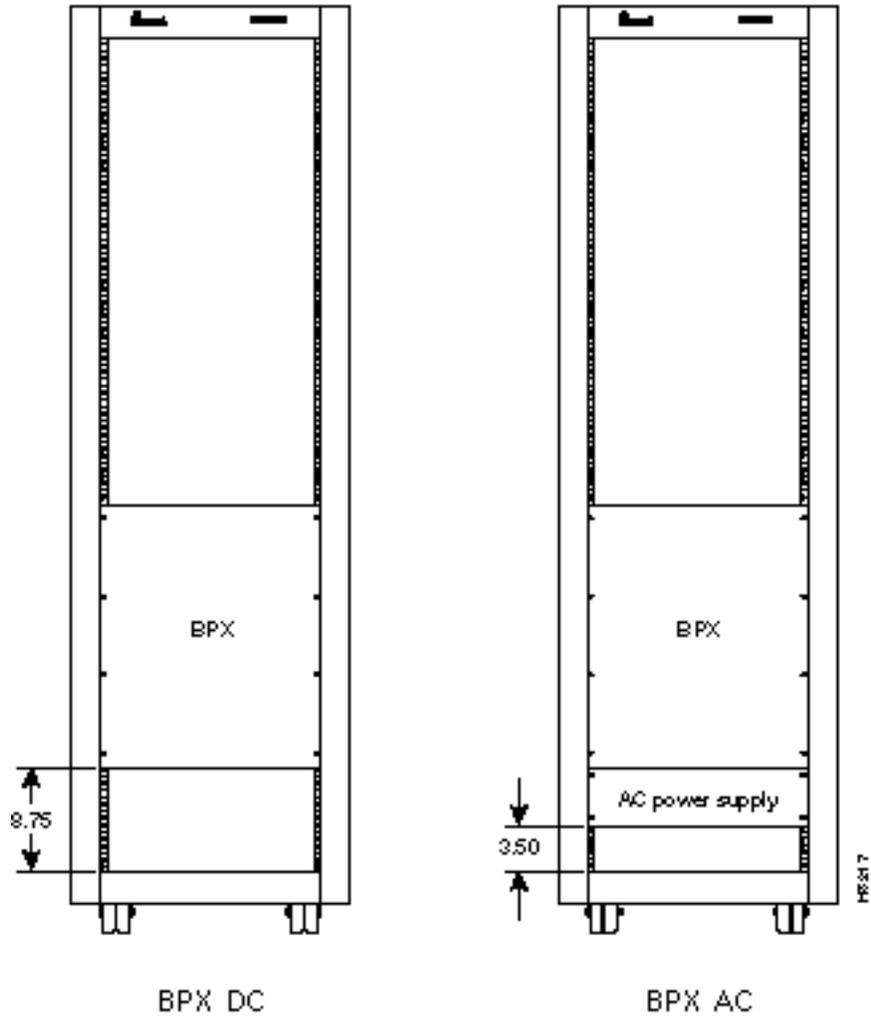
Figure A-4   Single BPX and AXIS, DC and AC Systems
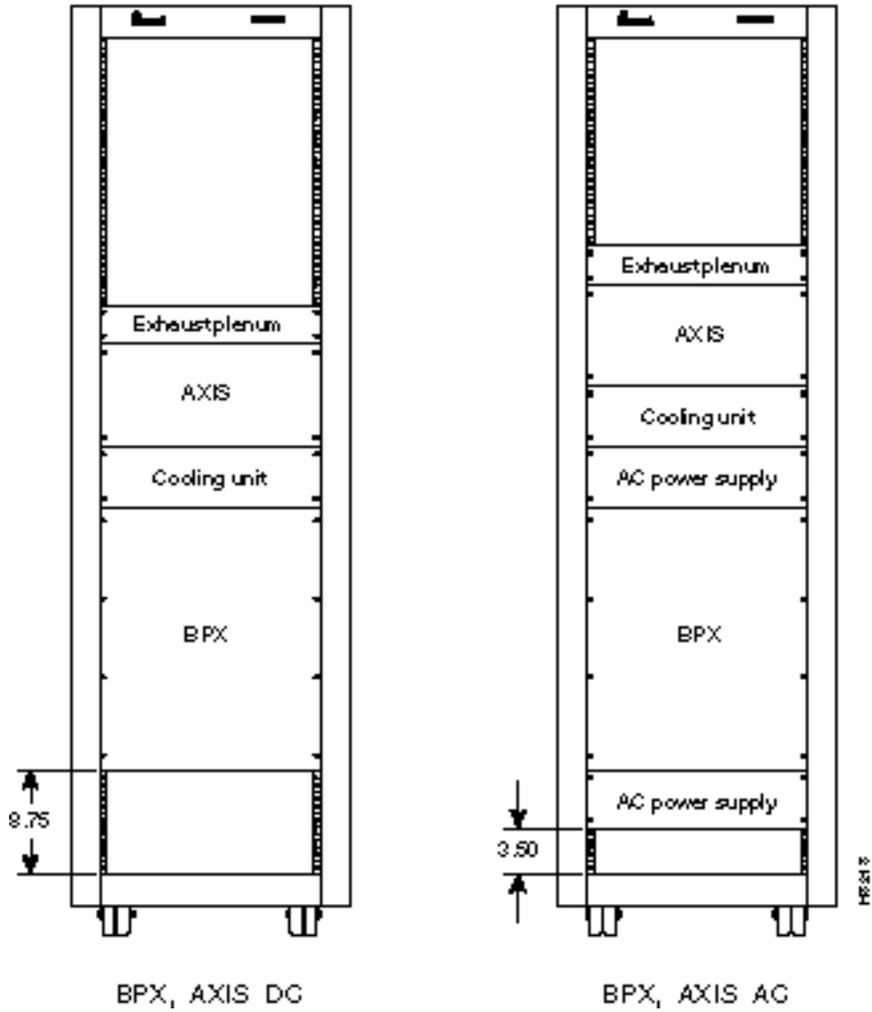
Figure A-5   BPX, AXIS, and INS, DC and AC Systems

WAN Service Node
BPX 8620/MGX 8220/ESP
DC power

WAN Service Node
BPX 8620/MGX 8220/ESP
AC power
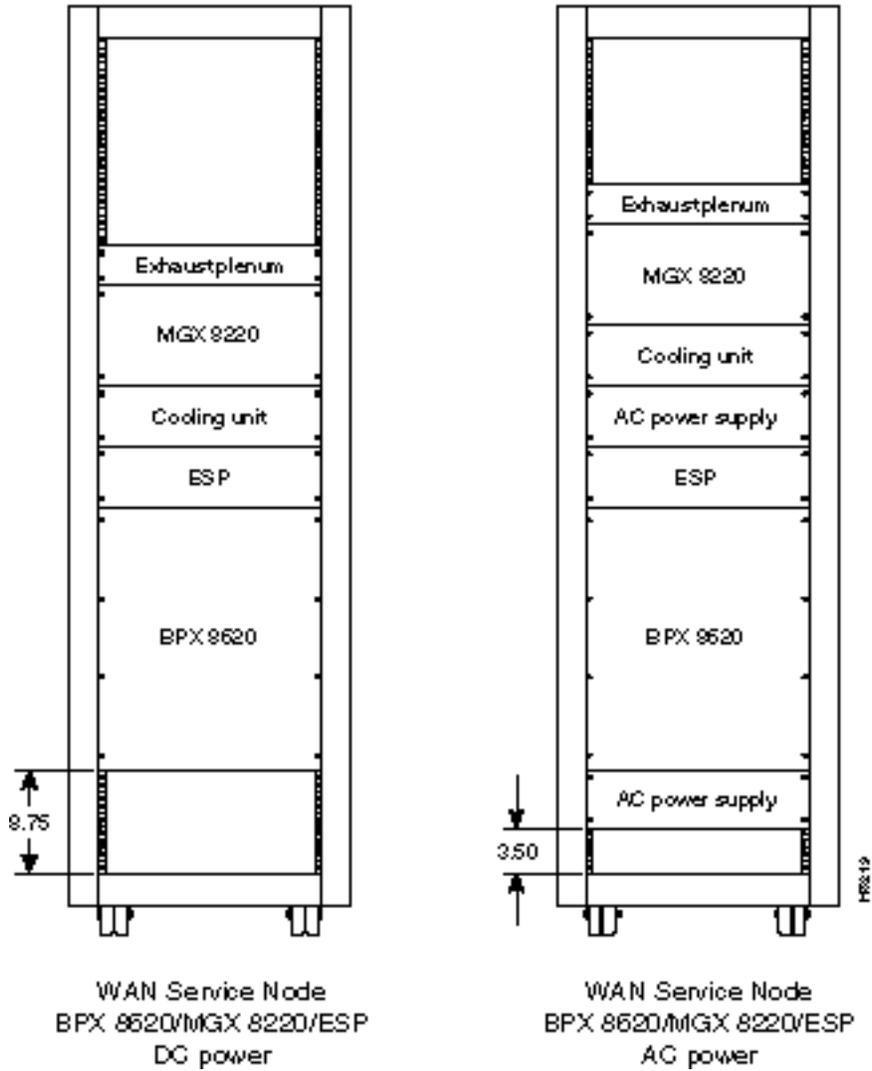
Figure A-6   BPX With 2 INS and 3 AXIS, DC System

Exhaust plenum

MGX 8220

MGX 8220 booster

MGX 8220

MGX 8220

Cooling unit

ESP

ESP

BPX 8620

WAN Service Node
BPX 8620/MGX 8220/ESP
DC power
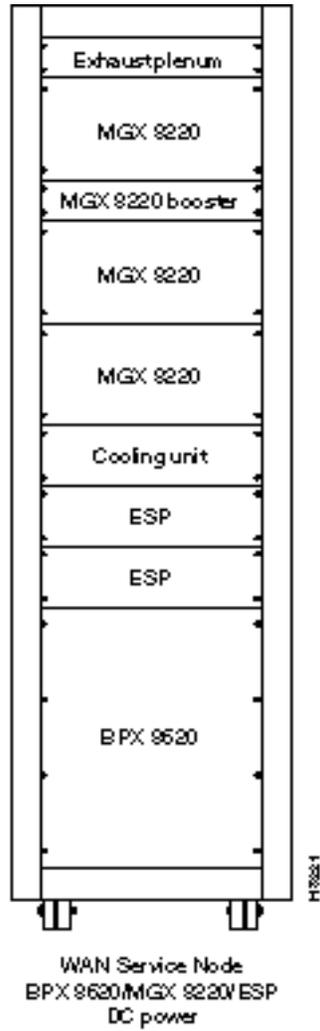
Figure A-7   Six AXIS, DC System

AXIS (6)
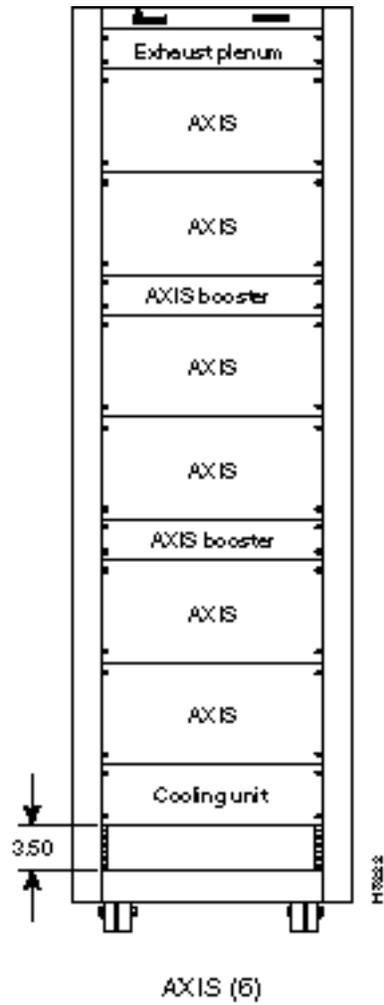
Figure A-8   BPX With Three AXIS, DC System

Exhaustplenum

MGX 9220 Concentrator

MGX 9220 booster

MGX 9220 Concentrator

MGX 9220 Concentrator

Cooling unit

BPX 9620 switch

).50

One BPX 9620 and three MGX 9220 units
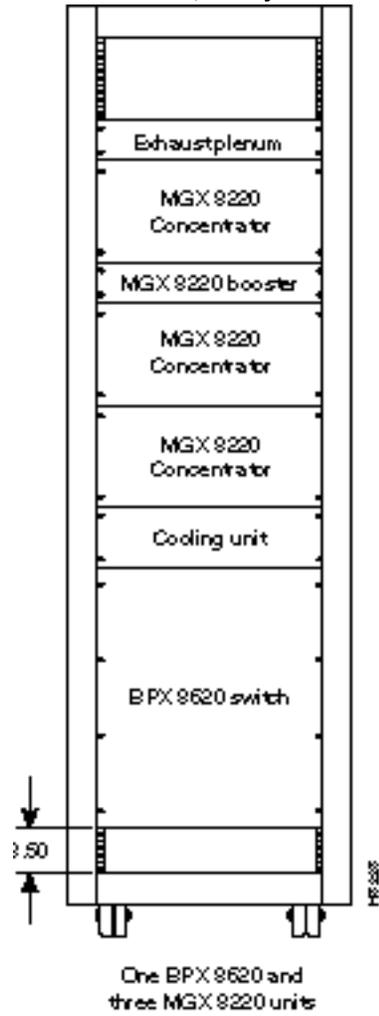
Figure A-9   Mounting Brackets (BPX), Standard Configuration
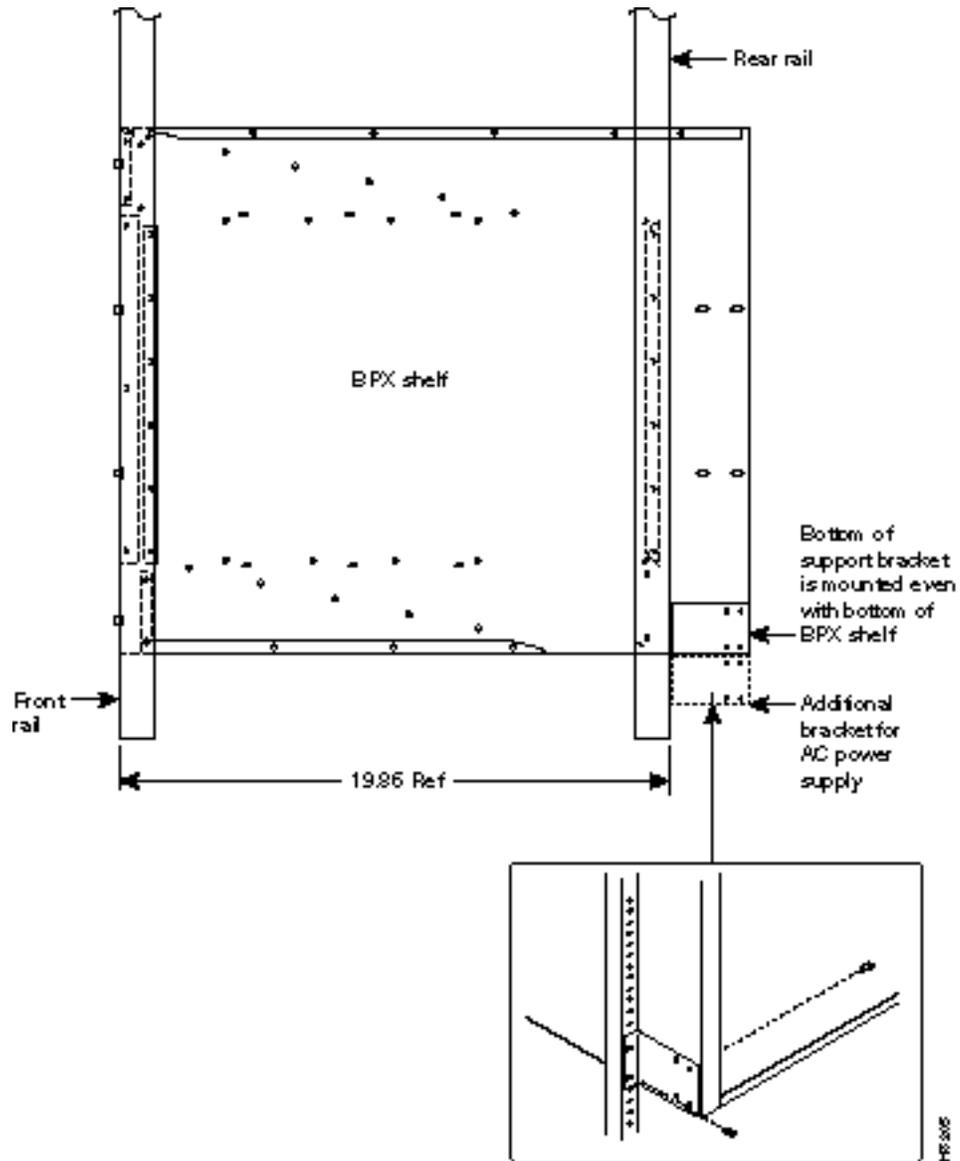
Examples of IGX System Configurations

Figure A-10 through Figure A-12 show various IGX system configurations.

Figure A-10   IGX 32, DC and AC Systems

IGX 32 DC   IGX 32 AC
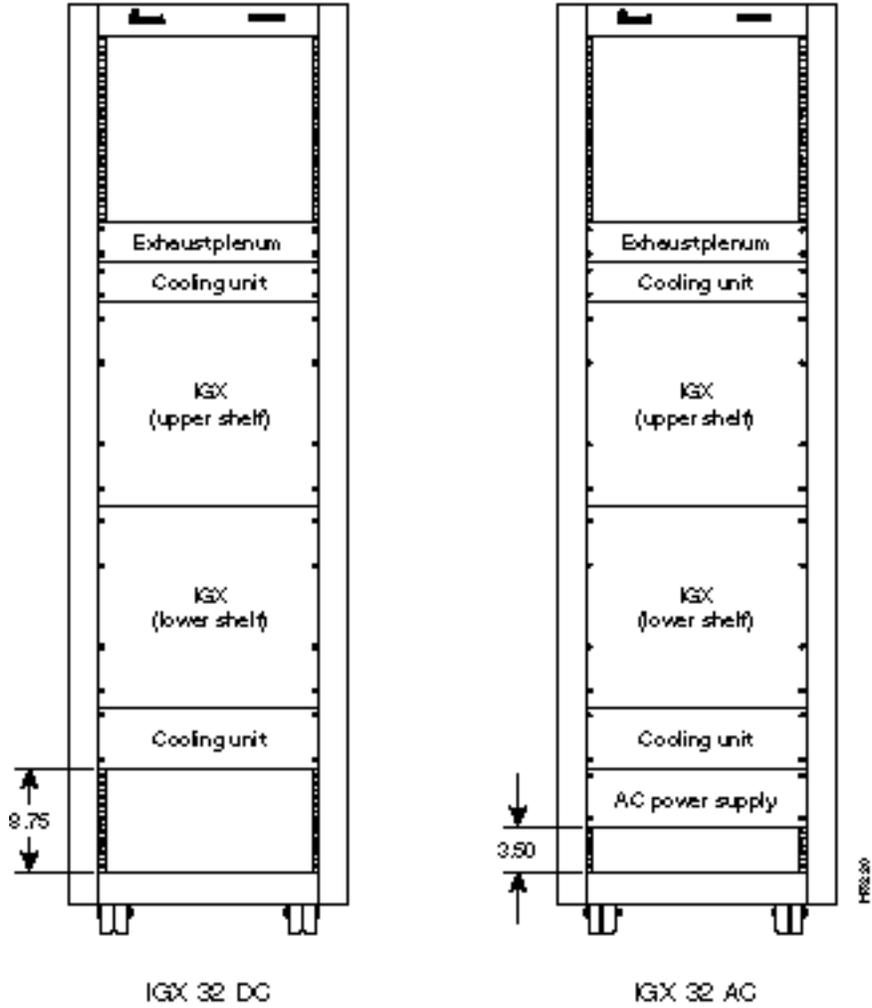
Figure A-11   Single IGX 16, DC and AC Systems
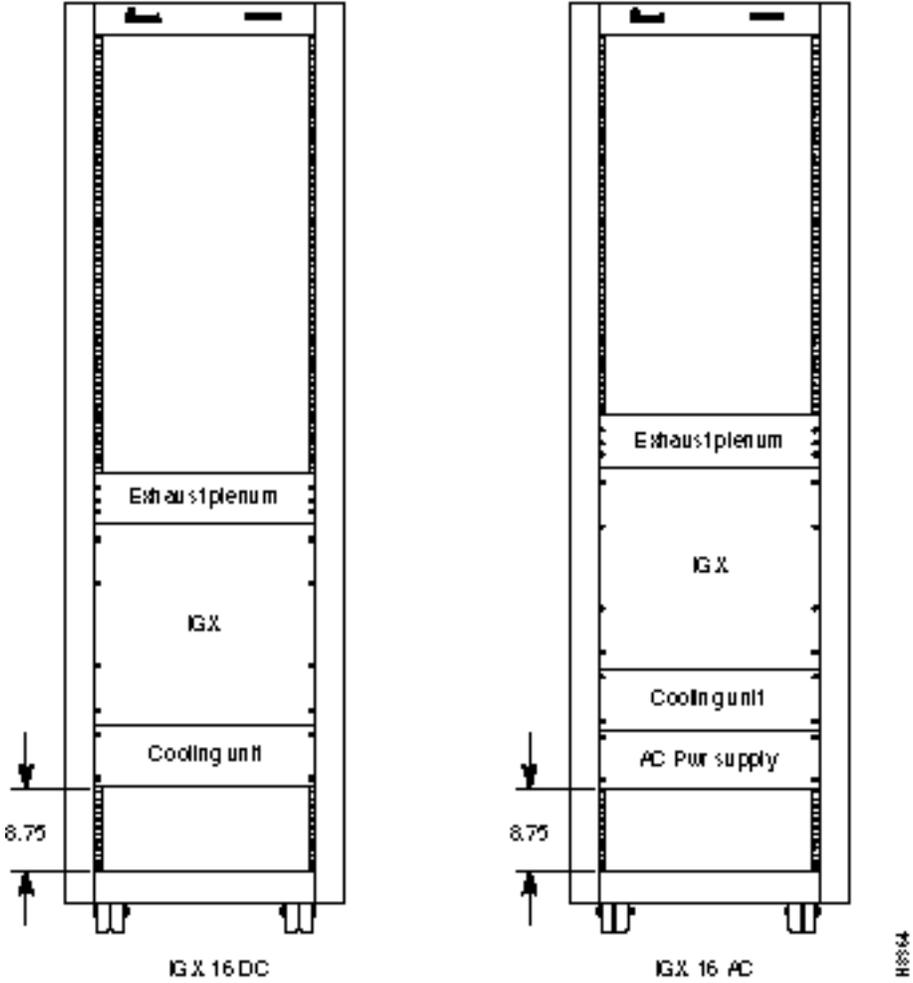
Figure A-12   Single IGX 8, DC and AC Systems
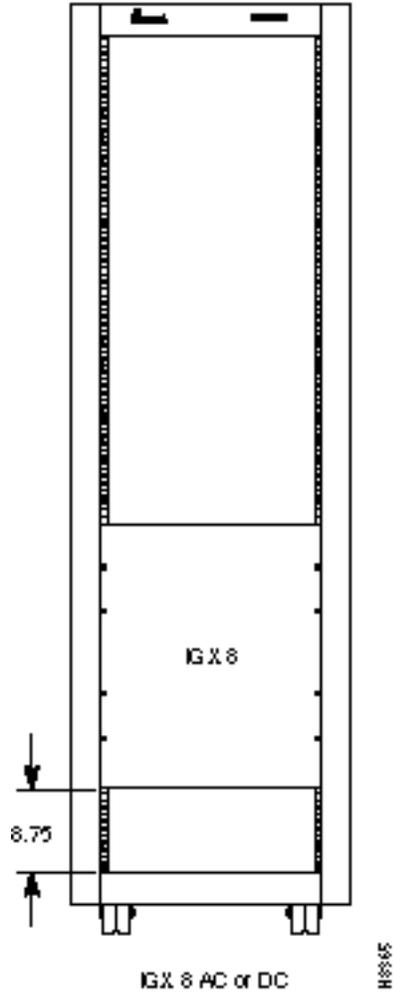
BPX Cabling Summary

This appendix provides details on the cabling required to install the BPX node.

Note In all cable references, the transmit direction is from the BPX, receive is to the BPX.

Trunk Cabling

Trunk cables connect the customer DSX-3 crossconnect point or T3-E3 Interface Module to the BPX node at the LM-3T3 back card. Refer to Table B-1 for details.

Table B-1   Trunk Cables

Cable Parameter	Description
Type:	75-ohm coax cable (RG-59 B/U for short runs, AT&T 734A for longer runs). Two per T3/E3 line (XMT and RCV).
	For European shipment of the BXM-E3 cards, in order to meet CE mark transient test requirement (IEC1000-4-4), RG-17G double shielded SMB cable must be used.
Max. Length:	450 feet max. between the BPX and the DSX-3/E3 point.
Connector:	Terminated in male BNC; Rx is receive from trunk, Tx is transmit to trunk.

Power Cabling

Power connections are made to the AC Power Supply Shelf or the DC Power Entry Module at the rear of the BPX node. Refer to Table B-2 and Table B-3. (next page) for acceptable cable and wire types.

AC Powered Nodes

AC power cables may be provided by the customer or ordered from Cisco. Several standard cables are available (seeTable B-2). AC cables with other plugs or different lengths may be special ordered. For users who wish to construct their own power cable, the cable must mate with an IEC320 16/20A male receptacle on rear of the AC Power Supply Assembly.

Table B-2   AC Power Cables

Cable Parameter	Description
Cable:	Provided with 8 feet (2.3 m.) of 3-conductor wire with plug.
Plug: customer end	20 A NEMA L620, 3-prong plug (domestic) or 13 A 250 Vac BS1363, 3-prong fused plug (UK, Ireland) CEE 7/7 (Continental Europe) AS3112 (Australia/New Zealand) CEI23-16/VII (Italy)

DC Powered Nodes

DC wiring (Table B-3) is generally provided by the customer.

Table B-3   DC Power Wiring

Cable Parameter	Description
Wiring:	Single conductor, 8 AWG recommended wire gauge, 75°C insulation rating, copper conductors only. Provision is provided for attaching conduit.
Connection:	90° ring lug for #10 screw terminal block.

LM-BCC Cabling

This cabling connects data ports on the LM-BCC to StrataView Plus NMS computers, control terminals, and modems. It is also used for external clock inputs from a clock source. See *Appendix C, BPX Cabling Summary*, for more details on peripherals that can be attached to these ports.

Auxiliary and Control Port Cabling

The auxiliary and control ports are used to connect one of the nodes in the network to a control terminal, StrataView NMS workstation, or modem connections for remote alarm reporting or system monitoring. Refer to Table B-4 and Table B-5 for details on this cable.

Table B-4   Auxiliary and Control Port Cabling

Cable Parameter	Description
Interface:	RS-232 DCE ports.
Suggested Cable:	24 AWG, 25-wire. A straight-through RS-232 cable is used for a terminal or printer connection. A null modem cable may be needed when interfacing with modems on either port.
Cable Connector:	DB-25, subminiature, male. Table B-5 contains a list of the port pin assignments.
Max. Cable Length:	50 feet (15 m.)

Table B-5   **Auxiliary and Control Port Pin Assignments**

Pin#	Name	Source	Description
1	FG	both	Frame Ground
2	TxD	DTE	Transmit Data
3	RxD	DCE	Receive Data
4	RTS	DTE	Request to Send
5	CTS	DCE	Clear to Send
6	DSR	DCE	Data Set Ready
7	SG	both	Signal Ground
8	CD	DCE	Carrier Detect
20	DTR	DTE	Data Term Ready

LAN Port Cabling

The LAN connection is used to connect one of the nodes in the network to a StrataView Plus NMS workstation. See Table B-6 and Table B-7 for details.

Table B-6   **LAN Port Cabling**

Cable Parameter	Description
Interface:	Ethernet DCE port.
Suggested Cable:	TBS
Cable Connector:	DB-15, subminiature, male. Table B-7 contains a list of the port pin assignments.
Max. Cable Length:	50 feet (15 m.) max. to interface adapter.

Table B-7   **LAN Port Pin Assignments**

Pin #	Name	Pin #	Name
1	Shield	---	---
2	Collision Presence +	9	Collision Presence -
3	XMT +	10	XMT -
4	Reserved	11	Reserved
5	RCV +	12	RCV -
6	Power return	13	Power (+12V)
7	Reserved	14	Reserved
8	Reserved	15	Reserved

Modem Cabling

Refer to Appendix C, BPX Peripherals, for modem cabling information.

External Clock Input Cabling

This cabling is for making external clock connections for use by the BCC-32, BCC-3, and BCC-4 backcards. The BCC-32 uses the BCC-bc backcard, and the BCC-3 and BCC-4 both use the BCC-3-bc backcard.

T1 Clock Cabling

Table B-8 through Table B-11 lists T1 clock cabling details.

Table B-8   External Clock Cabling

Cable Parameter	Description
Cable Type:	22 AWG, ABAM individually shielded twisted pair. Two pair per T1 line (1 transmit and 1 receive).
Cable Connector:	Male DB-15 subminiature. See Table B-10 through Table B-11 for pinouts.
Max. Cable Length:	533 ft (162 m.) maximum between the BPX and the first repeater or CSU. Selection of cable length equalizers.

Table B-9   T1 Connection to XFER TMG on BCC-bc

Pin #	Description
1	Tranfer timing ring
2	Transfer timing tip
3 & 4	Transfer timing shield

Table B-10   T1 Connection to EXT TMG on BCC-bc

Pin #	Description
2	Receive pair shield
3	Receive tip
11	Receive Ring

Table B-11   T1 Connection to EXT 1 or EXT 2 on BCC-3-bc

Pin #	Description	Function
1	Transmit tip	Transmit T1 timing signal synchronized to the node
2	Transmit pair shield	
3	Receive tip	Receive clock for synchronized clock source for node
4	Receive pair shield	
7	Transfer timing tip	
8	Transfer timing shield	
9	Transmit ring	
11	Receive ring	
15	Transfer timing ring	

E1 Clock Cabling

Table B-12 through Table B-15 lists E1 clock cabling details.

Table B-12   E1 Connector Pin Assignments for External Clock

Connector	Description
Cable Type:	75-ohm coax cable for unbalanced connection or 100–120-ohm twisted pair for balanced connection. Two cables/pairs (1 transmit, 1 receive) per E1 line.
Cable Connector:	Two female BNC for unbalanced connection; male DB15 for balanced connection. See Table B-13 and Table B-15 for pinouts.
Max. Cable Length:	Approx. 100 meters maximum between the BPX and the first repeater or CSU. Equalizer for cable length.

Table B-13   E1 Connection 75 Ohm to EXT TMG on BCC-bc or BCC-3-bc

Connector	Description
BNC	Receive E1 from trunk

Table B-14   E1 Connection 100/120 Ohm to EXT TMG on BCC-bc

Pin #	Description
2	Receive pair shield
3	Receive tip
11	Receive Ring

Table B-15   E1 Connection 100/120 Ohm to EXT 1 or EXT 2 on BCC-3-bc

Pin #	Description	Function
1	Transmit tip	Transmit T1 timing signal synchronized to the node
2	Transmit pair shield	
3	Receive tip	Receive clock for synchronized clock source for node
4	Receive pair shield	
7	Transfer timing tip	
8	Transfer timing shield	
9	Transmit ring	
11	Receive ring	
15	Transfer timing ring	

External Alarm Cabling

This cable (Table B-16) is for connecting network alarm outputs to the LM-ASM ALARM OUTPUT connector only. Table B-17 lists the pinouts for the network alarm outputs.

Table B-16   External Alarm Cabling

Cable Parameter	Description
Interface:	Dry-contact relay closure.
Wire:	24 AWG, shielded, 6-pair.
Connector:	DB-15, Subminiature, male

Table B-17   Network Alarm Pin Assignments

Pin	Alarm	Description
1	Audible—Major	Normally open
2		Common
9		Normally closed
4	Visual—Major	Normally open
5		Common
12		Normally closed
7	unused	n.c.
8	unused	n.c.
3	Audible—Minor	Normally open
11		Common
10		Normally closed
6	Visual—Minor	Normally open
14		Common
13		Normally closed
15	unused	n.c.

Standard BPX Cables

Table B-18 lists the various cables that may be ordered directly from Cisco. Cable lengths are specified as a suffix to the Cisco model number. For example 5610-50 indicates a 50 foot cable. Cables are generally available in standard lengths of 10 ft (3 m.), 25 ft (7.6 m.), 50 ft (15 m.), 75 ft (22.8 m.) and 100 ft (30 m.) Lengths of 101 ft. (30 m.) to 600 ft. (183 m.) are available on a special order.

When a cable is connectorized, the connector gender (male-female) will be indicated as well as the number of pins. For example RS-232/M25-M25 indicates a cable terminated with a male DB25 at both ends.

Table B-18   Standard Cables Available from Cisco

Model#	Description	Usage
T3-E3-10	75 Ω coax/BNC-BNC, 10'	T3 or E3 trunk interface
T3-E3-25	75 Ω coax/BNC-BNC, 25'	
T3-E3-50	75 Ω coax/BNC-BNC, 50'	
T3-E3-75	75 Ω coax/BNC-BNC, 75'	
T3-E3-xx	length to be specified	
5620	RS-232/M25-F25	Control port to control terminal, StrataView, or ext. window device
5621	RS-232/M25-M25 special	Control or Aux. port to modem
5623	RS-232/M25-M25	Aux. port to ext. window device
5601	Ground cable	DC
5670	Molex-pigtail	DC
5671	Spade lug-pigtail	DC

Redundancy "Y" Cable

The redundancy cables are a special "Y" cable available from Cisco. They are required for redundant trunk and data interfaces. Table B-19 lists the Y-cables used with various BPX back cards.

Table B-19   Redundancy Y-Cables

Y - Cable	Used On	Cisco P/N
T3 trunk	LM-3T3	TBS
E3 trunk	LM-3E3	TBS
Aux./Cont. ports	LM-BCC	TBS
Ext. Clk. In	LM-BCC	TBS
Ext. Clk. Out	LM-BCC	TBS

BPX Peripherals

This appendix provide details on BPX peripheral equipment, including printers and modems. The appendix includes the following sections:

Network Management

Printer

Modems, Dial-In and Dial-Out

Network Management

StrataView Plus Terminal

A StrataView Plus workstation is recommended for managing a network containing IPX, IGX, and BPX nodes. Refer to the *StrataView Plus Operation Manual* and *StrataView Plus Installation Manual* for setup instructions and specifications for the StrataView Plus NMS, which is required to provide network alarm, control, and statistics monitoring. Connection of a StrataView Plus workstation for network management is described in Chapter 7, Finishing the Installation.

Note   For network management, a StrataView Plus workstation is connected to the LAN port of one or more network nodes, typically BPX nodes because of their processing power, to provide network management.

Control Port, Local Control

A terminal (pc or workstation, including a StrataView Plus workstation) can be connected to the CONTROL port of a BPX for temporary or local control. This can be especially useful during installation, initial power-up, and configuration. Refer to Table C-1 for configuration data for the BPX CONTROL port.

Table C-1   Control Port Parameters for Local Control (pc or workstation)

Parameter	Setting
BPX Port Used:	Serial CONTROL port, located on a BCC back card, is used to interface to a local terminal.
Code:	Standard 7 or 8-bit ASCII; 1 or 2 stop-bits; even, odd or no parity.
Interface:	RS-232 DCE.
Data Rate:	All standard asynchronous data rates from 300 to 19200 bps, independently software-selectable.
Supported Terminals:	Any terminal compatible with DEC VT-100.
Cable Required:	Straight-through RS-232 cable.

Printer

The standard maintenance printer that is currently being shipped with the BPX is the Okidata Model 184 dot matrix printer. This printer may be connected to any node. Refer to Table C-2 and Table C-3 for printer configuration requirements. Note that this is not the same as the printer that may be provided with the StrataView Plus NMS terminal but in addition to it.

Table C-2   Auxiliary Port Parameters for OkiData 184 Printer

Parameter	Setting
BPX Port Used:	Serial AUXILIARY port, located on the LM-BCC card, is used for the maintenance printer.
Code:	Standard 8-bit ASCII; 8 data bits, 1 stop-bit, odd parity.
Interface:	RS-232 DCE.
Data Rate:	9600 baud.
Supported Printer:	Okidata 184.
Cable Required:	Straight-through RS-232 cable

DIP Switch Settings for Okidata 184

DIP Switch A is an 8-section DIP switch located on the printer's main circuit board. Access to the configuration switches is made by sliding back the switch cover at the top, rear of the printer case. Set Switch A as indicated in Table C-3.

Table C-3   Switch A Settings—Okidata 184 Printer

Switch A	Setting	Description
1	Off	ASCII with non-slashed zero
2	Off	ASCII with non-slashed zero
3	Off	ASCII with non-slashed zero
4	Off	11-inch paper length
5	On	11-inch paper length
6	Off	No Auto Line Feed.

Switch A	Setting	Description
7	On	8- bit data.
8	Off	Enables front panel.

The High Speed Serial Interface DIP Switch consists of two DIP switches, SW1 and SW2, located on a serial-board that is attached to the printer's main board. Set switches 1 and 2 as indicated in Table C-4 and Table C-5.

Table C-4   Switch 1 Settings—Okidata 184 Printer

Switch 1	Setting	Description
1	On	Odd parity.
2	On	No parity.
3	On	8 data bits.
4	On	Ready/busy protocol.
5	On	Test select circuit.
6	On	Print mode.
7	On	Busy line selection.
8	On	DTR pin 2 enabled.

Table C-5   Switch 2 Settings—Okidata 184 Printer

Switch 2	Setting	Description
1	Off	Transmission
2	On	Speed = 9600 baud.
3	On	Speed = 9600 baud.
4	On	DSR active.
5	On	Buffer = 32 bytes.
6	On	Timing = 200 ms.
7	On	Space after power on.
8	Don't care	Not used.

Modems, Dial-In and Dial-Out

Customer service uses modems for diagnosing and correcting customer problems with installed BPX systems. The modem that is currently recommended for use with the BPX is the Codex Model V.34R.

A dial-in connection to a BPX RS-232 from customer service via a modem uses the CONTROL port of the BPX. A dial-out connection from a BPX via a modem to customer service uses the AUXILIARY port of the BPX. Refer to Table C-6 for interface requirements.

Table C-6   Modem Interface Requirements

Parameter	Requirement
BPX Port Used:	CONTROL port on BCC back card is used for auto-answer modem setup. AUXILIARY port on a BCC back card is used for auto-dial modem setup.
Code:	Standard 8-bit ASCII, 1 stop-bit, no parity.
Interface:	RS-232 DCE.
Cable to modem:	Null modem cable: CONTROL or AUXILIARY port to modem (DCE to DCE)
Phone Lines:	Dedicated, dial-up business telephone line for Customer Service-to-BPX modem.
Data Rate:	All standard asynchronous data rates from 300 to 19200 bps, independently software-selectable.
Supported Modems:	Motorola V.34R 28.8 baud modem with or without talk/data button.

Motorola V.34R BPX Dial-In Configuration

BPX Auto-Answer (Dial-In to BPX)

The following is a setup procedure that allows customer service to dial in to the customer's BPX to provide support and troubleshooting:

Step 1   Using the **cnfterm** command, set the BPX CONTROL port speed to 9600 bps.

Step 2   Using the **cnftermfunc** command, set the terminal type to VT100/StrataView.

Step 3   To program the modem, temporarily attach a terminal to the modem using a straight through RS-232 cable (DTE to DCE). The modem EIA port will automatically match the 9600 bps setting of the terminal.

Step 4   Enter the commands listed in Table C-7, to set up the modem for proper operation.

Note   Consult the manual that is supplied with your modem for specific information concerning the modem configuration. Call customer service for latest modem configuration information.

Step 5   Disconnect the terminal and the straight-through cable from the BPX CONTROL port.

Step 6 Connect the modem to the BPX CONTROL port using a null-modem cables Figure C-1. A null modem cable is used, as the connection is essentially a DCE to DCE rather than a DTE to DCE connection.

Step 7 Ask customer service to assist in testing the operation of the modem setup.

Table C-7 **V.34R Modem Configuration for Auto-Answer (Dial-in to BPX)**

Step	Command	Function
1.	AT & F	Reset to factory default.
2	ATL1	Set modem loudness, modem speaker at low volume.
3.	ATSØ=1	Enables Auto-Answer Mode on modem (answer on first ring).
4	AT\N3	Enables automatic MNP error correction.
5	AT%C	Disables data compression.
6.	AT\QØ	Disables XON/XOFF flow control.
7.	AT&S1	Sets DSR to "normal".
8.	ATEØ	Disables local character echo. Modem will not echo what you type.
9.	ATQ1	Disables result codes. (Modem will appear "dead", will stop responding "OK" to commands.)
10.	AT&W	Saves current configuration settings in non-volatile memory. (Writes and stores to configuration location 1.)

Figure C-1   Dial-Modem Cabling for Auto Answer (Dial-In to BPX)

IPX Auto-Dial to Customer Service

The following is a setup procedure for the customer's BPX to dial up customer service.

Step 1   Using the **cnfterm** command, set the BPX AUXILIARY port speed to 9600 bps and enable XON/XOFF flow control.

Step 2   Using the **cnftermfunc** command, select option 7, "Autodial Modem" and enter the customer service-designated Network ID, and the customer service modem phone number.

Step 3   Attach a 9600 bps terminal to the modem using a straight-through cable. The modem EIA port will automatically match the 9600 bps setting of the terminal.

Step 4   Enter the commands listed in either Table C-8 (V.34R modem without talk/data pushbutton) or Table C-9 (V.34R modem with talk/data pushbutton), to set up the modem for proper operation.

Note Consult the manual that is supplied with your modem for specific information concerning the modem configuration. Call customer service for latest modem configuration information.

Step 5 Disconnect the terminal and the straight-through cable from the IPX CONTROL port.

Step 6 Connect the modem to the IPX AUX port using a null modem cable Figure C-2.

**Step 7** Ask customer service to assist in testing the operation of the modem setup.

Table C-8   V.34R Auto-Dial Configuration (dial-out to customer service)*

Step	Command	Function
These configuration commands are for a V.34R modem that does not have a talk/data pushbutton.		
1.	AT&F	Initializes factory defaults.
2.	ATL1	Modem speaker at minimum volume.
3.	AT*SM3	Enables automatic MNP error correction.
4	AT*DC0	Disables data compression.
5.	AT*SC1	Enables DTE speed conversion
6.	AT*FL1	Enables XON/XOFF flow control.
7.	AT*SI1	Enables 5-minute inactivity disconnect.
8.	AT&C1	DCD controlled by modem.
9.	AT&D2	Modem disconnects when IPX toggles DTR.
10.	AT&V	Verify entries.
11.	AT&W	Saves current settings to non-volatile memory.

Table C-9   V.34R with talk/data, Auto-Dial Configuration (dial-out to customer service)*

Step	Command	Function
These configuration commands are for a V.34R modem that has a talk/data pushbutton.		
1.	AT&F	Initializes factory defaults.
2.	ATL1	Modem speaker at minimum volume.
3	AT\N3	To enable MNP error correction
4	AT%C	To disable data compression
5	AT\J	Enables DTE speed conversion
6	AT\Q1	Enables flow control
7	AT\T3	Enables 3-minute inactivity timer
8.	AT&C1	DCD controlled by modem.
9.	AT&D2	Modem disconnects when IPX toggles DTR.
10.	AT&V	Verify entries. *(shows current configuration)*
11.	AT&W	Saves current settings to non-volatile memory.

Figure C-2   Dial Modem Cabling for Auto Dial (dial-out to customer service)
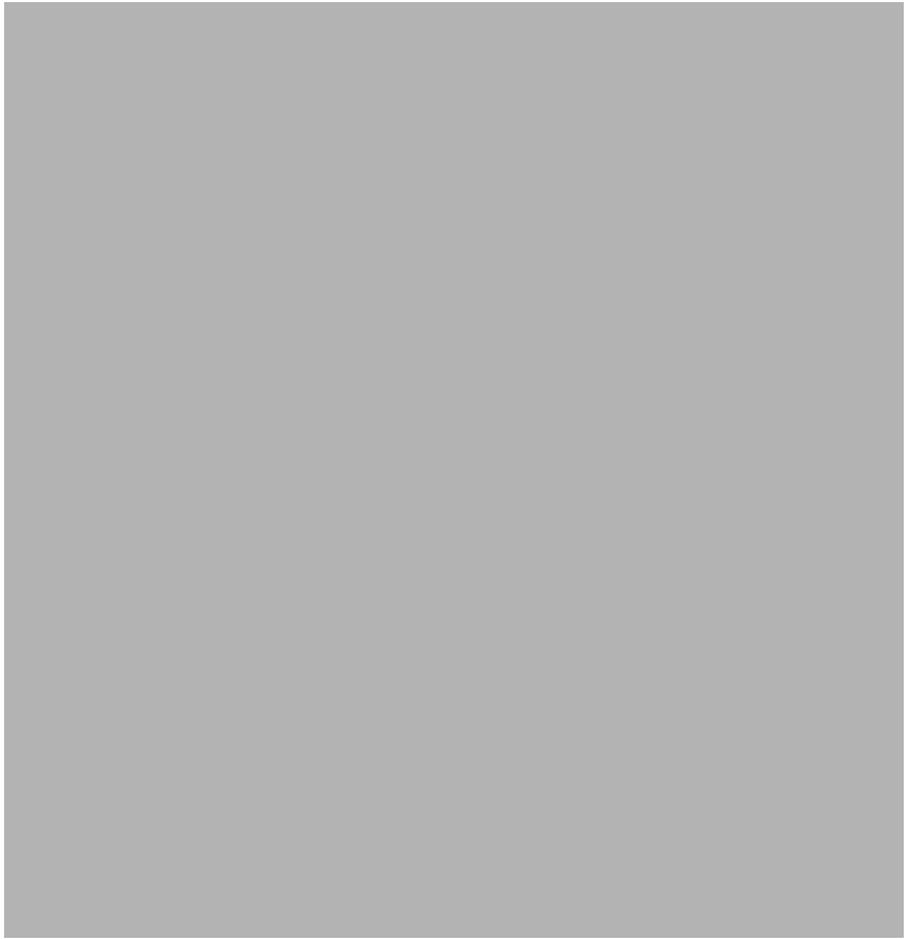
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