Passport 7400

Hardware Description

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General availability. Contains information on Passport 7400 for the PCR5.2 GA release.

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About this document

This document, 241-7401-200 *Passport 7400 Hardware Description*, contains descriptions of Passport models, components, specifications, line rates, cable assemblies and standards compliances.

The following topics are discussed in this section:

- "Who should read this document and why" (page 31)

- "What you need to know" (page 31)

- "How this document is organized" (page 32)

- "What's new in this document" (page 32)

- "Related documents" (page 34)

- "Notational conventions" (page 34)

- "Drawing conventions" (page 35)

- "How to get more help" (page 35)

Who should read this document and why

This document is intended for those who want an overview of Passport 7400 hardware. It is also intended as a reference for those who install, provision, and troubleshoot Passport 7400 hardware.

What you need to know

You should be familiar with fundamental data communications and basic electronic concepts and terms. You can acquire product knowledge by reading 241-5701-030 *Passport 7400, 15000, 20000 Overview*.

> **WARNING**
> **Risk of radio interference**
> Passport 7400 is a class A product. In a domestic
> environment this product may cause radio interference,
> in which case the user may be required to take adequate
> measures.

How this document is organized

This document, 241-7401-200 *Passport 7400 Hardware Description*,
contains the following sections:

- "Processor cards" (page 37)

- "Termination and sparing panels" (page 43)

- "Cables" (page 77)

- "3-slot Passport switch hardware" (page 81)

- "5-slot Passport switch hardware" (page 93)

- "16-slot Passport switch hardware" (page 115)

- "Passport cabinet" (page 151)

- "Seismic cabinet" (page 157)

- "Processor cards" (page 37)c

What's new in this document

The following feature was added to this document:

- "2-port STM-1 electrical channelized CES ATM IMA FPs" (page 33)

Other changes made to this document include the following:

- making "Structural changes" (page 33)

- updated the figure "Control processor with BITS faceplate" (page 167)
  to include port numbers

- The chapters "DS1 function processors" (page 171), "E1 function processors" (page 253), "TTC2M MVP-E function processor" (page 397), and "Passport part numbers" (page 417) were updated to remove references to these MVP FPs which are support discontinued (SDed):

    — 1-port DS1 MVP with cardtype 1pDS1MVP and PEC NTFN62

    — 1-port DS1Voice with cardtype 1pDS1V and PEC NTFP41

    — 1-port E1 MVP with cardtype 1pE1MVP and PEC NTFN20

    — 1-port E1Voice with cardtype 1pE1V and PEC NTFP43

    — 1-port J2MV with cardtype J2MV and PEC NTBP96

    — 1-port TTC2M MVP with cardtype 1pTTC2mMVP and PEC NTFN64

2-port STM-1 electrical channelized CES ATM IMA FPs

This feature introduces new hardware, the channelized version of the 2-port STM-1 electrical function processor (FP) with PEC NTNQ91. This FP provides significantly higher E1 port density than previously available on the Passport 7000, while capable of simultaneously supporting multiple service types that would otherwise require different FP types.

The following sections were added or updated:

- "Function processors" (page 40)
- "2-port STM-1 electrical function processors" (page 349)
- "Passport part numbers" (page 417)

Structural changes

This document was restructured to improve the usability of the information. The following changes were made to this document:

- FP-specific chapters were restructured to align with the structure of 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

- Information about termination and sparing panels was consolidated in the Termination and sparing panels chapter. Cross-references were added from the section on each FP to the appropriate termination or sparing panel.

- Configuration and specification information, including information on clocking, any notes on supported software features, and standards compliances were moved to 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

Related documents

For information about the documentation suite, see the following source:

- 241-5701-001 *Passport 7400, 15000, 20000 Documentation Guide*.

For more information about planning, installing, operating, and maintaining Passport 7400 switches, see the following sources:

- 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*
- 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*
- 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*
- *Passport 7400 Installation Video*

Notational conventions

The following are samples of caution and warning conventions used in this document.

> ⚠️ **WARNING**
> **Risk of personal injury**
> This warning informs you of risk of personal injury.
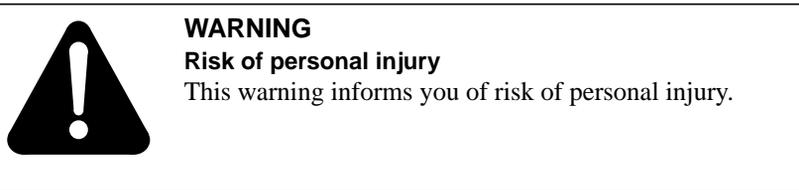
	WARNING
	Risk of personal injury by electrocution
	This warning informs you of risk of personal injury from electrical shock.

	CAUTION
	Risk of service interruption or equipment damage
	This caution informs you of risk of service interruption or equipment damage.

	CAUTION
	Risk of electrostatic damage
	This caution alerts you to the need to wear a grounded antistatic wrist strap or equivalent protection to avoid damaging electronic parts.

Note: Some warnings and cautions appear in German in this document. This is required for compliance with VDE (Verband Deutscher Elektrotechniker) requirements.

Drawing conventions

Most drawings in this book are isometric projections. Isometric drawings represent all three dimensions of an object to convey a sense of overall shape and proportion. Three faces of the object are equally inclined to the drawing surface so that all edges are equally foreshortened.

How to get more help

For information on training, problem reporting, and technical support, see the "Nortel Networks support services" section in the *product overview document.*

Chapter 1
Processor cards

Control processors (CP) and function processors (FP) are the processing elements for performing and managing Passport functions. In most cases, the software providing a service is split into control and function parts. The control part runs on the CP; the function part, on the FP. This results in:

• more efficient data flow since the FP does not do resource-consuming non-data-path processing

• more efficient memory resources for data transmission

Access to the FP and CP is from the front. The front, or faceplate, of each FP or CP has connectors, two ejector latches, two locks, and an LED status indicator.

See these sections for more detailed information:

• "Locks on cards" (page 37)

• "Dimensions and weights" (page 38)

• "Line rate, port configuration, and clocking" (page 39)

• "Function processors" (page 40)

• "Control Processors" (page 41)

Locks on cards

Passport equipment has locks for security reasons and to protect personnel. Improperly seated or removed circuit cards present electrical hazards.

All circuit cards have locking latches so that there is no risk to personnel, even when the chassis is installed in cabinets that do not lock.

> **WARNING**
> **Risk of injury by electric shock**
> High voltages are present in Passport shelf assemblies. There is a risk of electric shock. The CPs and FPs have locking latches, so even cabinets that do not lock pose no risk to personnel.
>
> CPs and FPs from the initial Passport release do not have locking latches. If your CPs or FPs do not have locking latches, you must install them in a cabinet that locks.

> **WARNUNG**
> **Verletzungsgefahr durch Elektroschock**
> In den Passport-Regalbaugruppen liegen hohe Stromspannungen vor. Es besteht die Gefahr eines Elektroschocks. Die CPs und FPs verfügen über selbstverriegelnde Sperrvorrichtungen, so daß selbst bei nicht gesicherten Gehäusen keine Gefahr für das Bedienungspersonal besteht.
>
> Die CPs und FPs der ersten Passport-Version besitzen keine selbstverriegelnden Sperrvorrichtungen. Solche CPs und FPs müssen in einem abschließbaren Gehäuse installiert werden

Dimensions and weights

This table summarizes the approximate dimensions and weights of the hardware you may be handling.

Table 1
Control and function processor dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
Function processor	30.5 cm x 2.5 cm x 39.4 cm (12.0 inch x 1.0 inch x 15.5 inch)	1.5 kg (3.5 lb)
Control processor	30.5 cm x 2.5 cm x 39.4 cm (12.0 inch x 1.0 inch x 15.5 inch)	2 kg (4.5 lb)
Blank processor	30.5 cm 2.5 cm x 39.4 cm (12.0 inch x 1.0 inch x 15.5 inch)	0.5 kg (1.1 lb)

Line rate, port configuration, and clocking

Line rate

The speed at which a function processor (FP) interfaces with a specified line type.

Port configuration

A timeslot represents a 56 kbit/s or 64 kbit/s portion of the total bandwidth of a port.

One channel can support all 24 timeslots (clear channel mode), or fewer than 24 timeslots (fractional mode). Any timeslots that are not used are wasted. Each timeslot can be used only once.

In clear channel mode, the entire payload bandwidth of the Passport trunk is used for one channel.

Timeslots can also be grouped together to form fractions (also known as channels). Fractions allow you to provision n x 56 kbit/s or n x 64 kbit/s links, where, n is a value between 1 and the maximum number of timeslots on the port. The ports act in groups. For example, on a four port FP, the first group can contain ports 0 and 1 and the second group can contain ports 2 and 3. Each of the groups can be configured differently. Ports 0 and 1 could be single clear channel and port 3 could be multiplexed fractional channels.

Clocking

The receive clock is recovered from incoming data. The transmit clock can be generated from a variety of different sources:

- In *local* clocking mode, the crystal on the card generates the transmit clocking reference.

- In *line* clocking mode, the port uses the clock recovered from the receive data as its transmit clock.

- In *module* clocking mode, the port takes the clock generated from the stratum 3 clocking source on the control processor and locks its transmit clock to that source.

- In *otherPort* clocking mode, another port on the same FP is controlling the transmit clock in line mode.

If all applicable ports on a specific node are configured with *module* timing, synchronization status messages (SSM) can be used to identify the clock quality. The SSM can then be used to synchronize a line or port, helping to prevent timing loops. The Passport network clock synchronization system (NCS) chooses the best clock signal (based on the SSM quality level) and makes it available on all ports on those nodes configured to use *module* timing. For more information on network clock synchronization and SSM, refer to 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Function processors

Function processors (FP) provide interface ports that physically connect network communications facilities and Passport switches. They switch data from external sources through the bus and out of the switch through other FPs. FPs have been designed specifically to accommodate high data throughput. Their computational resources support and execute only those real-time processes critical to rapidly delivering a service. These processes include protocol handling, call routing, and packet forwarding.

For hardware description information on specific FPs see:

- "V.11 function processor" (page 359)

- "V.35 function processor" (page 371)

- "DS1 function processors" (page 171)

- "E1 function processors" (page 253)

- "DS3 function processors" (page 235)

- "E3 function processors" (page 319)

- "HSSI function processor" (page 385)

- "JT2 ATM function processor" (page 393)

- "OC-3 function processors" (page 329)

- "E3 function processors" (page 319)

- "2-port STM-1 electrical function processors" (page 349)

- "TTC2M MVP-E function processor" (page 397)

- "Ethernet function processors" (page 339)

- "ILS Forwarder function processor" (page 401)

- "Wireless packet data server" (page 413)

- "Voice services function processors" (page 409)

Control Processors

For hardware description information on control processors see the chapter, "Control processors" (page 163)

Chapter 2
Termination and sparing panels

This chapter contains these sections:

- "Termination panel formats" (page 43)

- "Termination panel functions" (page 44)

- "Termination panel dimensions and weights" (page 46)

- "Termination panel sparing function" (page 47)

- "Termination panel types" (page 49)

- "Sparing panel dimensions and weights" (page 48)

- "Power for a sparing panel" (page 48)

- "Sparing panel compliance with standards" (page 72)

For termination and sparing panel product engineering codes (PECs) see
"Passport part numbers" (page 417).

Termination panel formats

Some of Passport's termination panels are available in two types of
connection formats:

- balanced which uses twisted pair cable connections

- unbalanced which uses coaxial cable connections

Not all processor cards have termination panels associated with them. For those that do, there is a different termination panel for each card and two possible mounting formats:

- 19-inch—mounted in a Passport cabinet or on an EIA standard 19-inch rack

- 13-inch—attached to the rear of a 3-slot or 5-slot Passport switch

See the following sections for more information on termination panels for specific processor cards:

- "Termination panel types" (page 49)

- "Termination panel sparing function" (page 47)

Termination panel functions

Customer equipment can connect to function processors (FPs) directly or through a termination panel. The termination panel is a cable distribution system which can reside in the Passport cabinet or be mounted in another cabinet or rack.

A termination panel provides different functions, depending on the processor card it supports. It can

- provide a break-out (or fanout) for customer-equipment connections so that each port on an FP has its own termination point and access

- provide media conversion

- provide sparing capability

- act as a concentrator, reducing the number of cables that are attached to the front of a switch

- determine the type of connection (DCE or DTE) depending on which connector is used

- provide external timing functionality in the case of a BITS termination panel that works together with a CP with BITS.

For information about termination panels and cabinet layout, see:

- "16-slot Passport switch termination panels" (page 123)

- "5-slot Passport switch termination panels" (page 97)

- "3-slot Passport switch termination panels" (page 85)

For information about installing and connecting termination panels to FPs, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

Termination panel dimensions and weights

The following tables summarize the approximate dimensions and weights of the termination panels you may be handling.

Table 2
Termination panel dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Typical Weight
13-inch termination panel	30.0 cm x 4.6 cm x 1.3 cm (13.0 in. x 1.8 in. x 0.5 in.)	0.45 kg (1.0 lb)
1-unit-high 19-inch termination panel	4.45 cm x 48.3 cm x 1.8 cm (1.75 in. x 19.0 in. x 0.7 in.)	0.44 kg (1.0 lb)
2-unit-high 19-inch termination panel	8.9 cm x 48.3 cm x 1.8 cm (3.5 in. x 19.0 in. x 0.7 in.)	2.3 kg (5.0 lb)

Table 3
MSA32 termination panel dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Typical Weight
1-unit-high 19-inch termination panel (RJ45)	4.45 cm x 48.3 cm x 8.5 cm (1.75 in. x 19.0 in. x 3.35 in.)	1.5 kg (3.3 lb)
3-unit-high 19-inch termination panel (2 port/DB15)	13.35 cm x 48.3 cm x 2.3 cm (5.26 in. x 19.0 in. x 0.9 in.)	2.0 kg (4.4 lb)
4-unit-high 19-inch termination panel (1 port/DB15)	17.8 cm x 48.3 cm x 2.3 cm (7 in. x 19.0 in. x 0.9 in.)	3.5 kg (7.7 lb)
5-unit-high 19-inch termination panel (unbalanced)	22.25 cm x 48.3 cm x 2.9 cm (8.76 in. x 19.0 in. x 1.14 in.)	4.2 kg (9.26 lb)

Some termination panels are a sparing panel, as described in "Termination panel sparing function" (page 47).

Termination panel sparing function

A termination panel with the sparing function is often referred to as a sparing panel. A sparing panel enables you to use a single function processor (FP) as the spare for one or more FPs of the same type and vintage. The use of a single FP as the spare for one other FP is referred to as one-for-one (1:1) sparing. The use of a single FP as the spare for two or more FPs is referred to as one-for-n (1:n) sparing where n is the maximum number of FPs to be spared.

For example, one-for-four (1:4) sparing uses one FP to act as the spare for up to 4 other FPs.

There are two categories of sparing panels, single and modular. Single sparing panels are used for one-for-one or one-for-n sparing for most types of FPs. For example, to achieve a one-for-four sparing configuration, one sparing panel with the appropriate number of connectors must be installed. Modular sparing panels are used for one-for-one or one-for-n sparing for 32-port multi-service access (MSA32) DS1 or E1 FPs. The installation (and cabling) of an MSA32 sparing panel differs from any other kind. For example, to achieve a one-for-four sparing configuration, four MSA32 sparing panels must be installed.

When a main FP connected to a one-for-*n* sparing panel fails, the control processor (CP) identifies which main FP has failed, and instructs the panel to switch the relay contacts for the failed FP to the spare. Traffic for the failed FP switches to the spare.

For information about sparing panels for specific FPs, see

- "DS1 or E1 termination panels" (page 55)
- "DS3 or E3 termination panels" (page 56)
- "DS3, E3, or JT2 ATM termination panels" (page 58)
- "E1 unbalanced termination panels" (page 61)
- "MSA32 E1 unbalanced BNC termination panel" (page 62)
- "MSA32 DS1 or E1 termination panels" (page 63)
- "2-port STM-1 electrical termination panel" (page 66)

For more information about FP sparing, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

For information about installing or replacing a sparing panel, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

For the physical characteristics of sparing panels, see:

- "Sparing panel dimensions and weights" (page 48)

- "Power for a sparing panel" (page 48)

- "Sparing panel compliance with standards" (page 72)

Sparing panel dimensions and weights

This table summarizes the approximate dimensions and weight of sparing panels.

Table 4
Sparing panel dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
one-for-four sparing panel	13.2 cm x 48.3 cm x 2.5 cm (5.2 in. x 19.0 in. x 1.0 in.)	1.9 kg (4.2 lb)
a 1-unit high 2-port STM-1e sparing panel	4.3 cm x 48.3 cm x 2.0 cm (1.7 in. x 19.0 in. x 0.8 in.)	0.68 kg 1.5 lb

Power for a sparing panel

Power is supplied to a sparing panel through at least one control port cable assembly connection between the faceplates of an FP and the sparing panel. When the control port cable is connected from both the main FP and the spare FP, the sparing panel receives power from both and effectively has redundant power input. Some sparing panels indicate by a status LED that power is on. For some sparing panels, the LED also indicates whether the main or spare FP is active, for example, the 2-port STM-1e sparing panel (NTPS92).

Power is supplied to an MSA32 sparing panel from its FP only through the connections labelled P3 at both ends. For the sparing panel to operate, the D-sub connectors at P3 must be cabled.

Power is cut off when one or more of the following occurs:

- all control port cables between the FP and the sparing panel are disconnected

- the main and spare FPs are unseated

- the source of power to the main and spare FPs is switched off or removed

Termination panel types

The Passport 7400 supports the following termination panel types:

- "Ethernet termination panels" (page 49)

- "V.11 termination panels" (page 53)

- "V.35 termination panels" (page 54)

- "DS1 or E1 termination panels" (page 55)

- "DS3 or E3 termination panels" (page 56)

- "DS3, E3, or JT2 ATM termination panels" (page 58)

- "E1 unbalanced termination panels" (page 61)

- "MSA32 E1 unbalanced BNC termination panel" (page 62)

- "MSA32 DS1 or E1 termination panels" (page 63)

- "2-port STM-1 electrical termination panel" (page 66)

- "BITS termination panel" (page 69)

Ethernet termination panels

The Ethernet termination panel provides a break-out for customer equipment connections and provides each Ethernet port with its own access. These termination panels do not support sparing.

Each termination panel has six standard 10BaseT Ethernet connectors for routing signals to external equipment. Any standard 8-pin 10BaseT Ethernet cable connector (customer-supplied) can be attached to these connectors.

Ethernet termination panels are available in two formats:

- "Ethernet 19" termination panel - PEC NTFP23" (page 50)

- "Ethernet 13" termination panel - PEC NTEP42" (page 50)

Figure 1
Ethernet 19" termination panel - PEC NTFP23

PPT 1030 001 AA
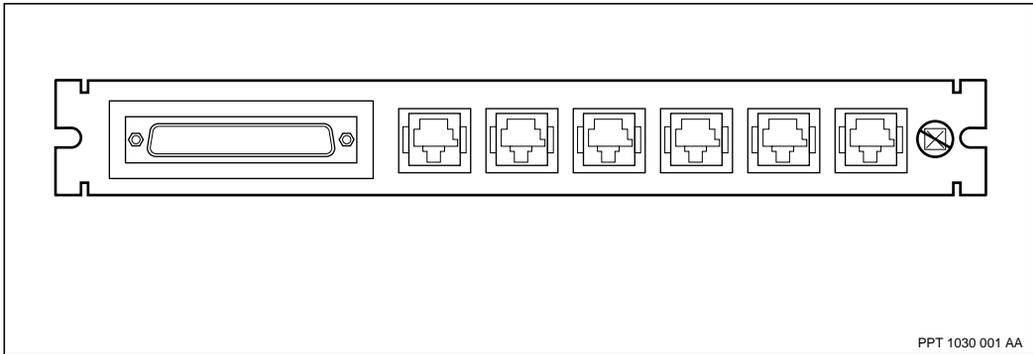
Figure 2
Ethernet 13" termination panel - PEC NTEP42

PPT 1029 001 AA
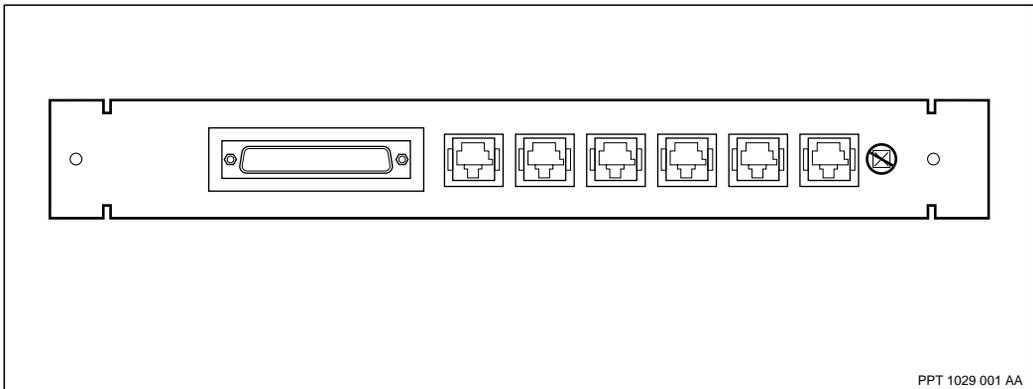
6-port Ethernet 10BaseT redundancy support

The Ethernet termination panels support redundancy through one-for-one
sparing. In one-for-one sparing, one FP carries traffic while a spare FP stands
by. To spare an Ethernet FP, you must attach the active FP to a termination

panel. Attach the spare FP to a separate termination panel. Then, connect both termination panels to the same network. If the main FP fails, traffic switches to the spare.

Figure 3
6-port Ethernet 10BaseT sparing

Termination panel

Active
function
processor

0
1
2
3
4
5

Termination panel

Standby
function
processor

0
1
2
3
4
5

Network
connections
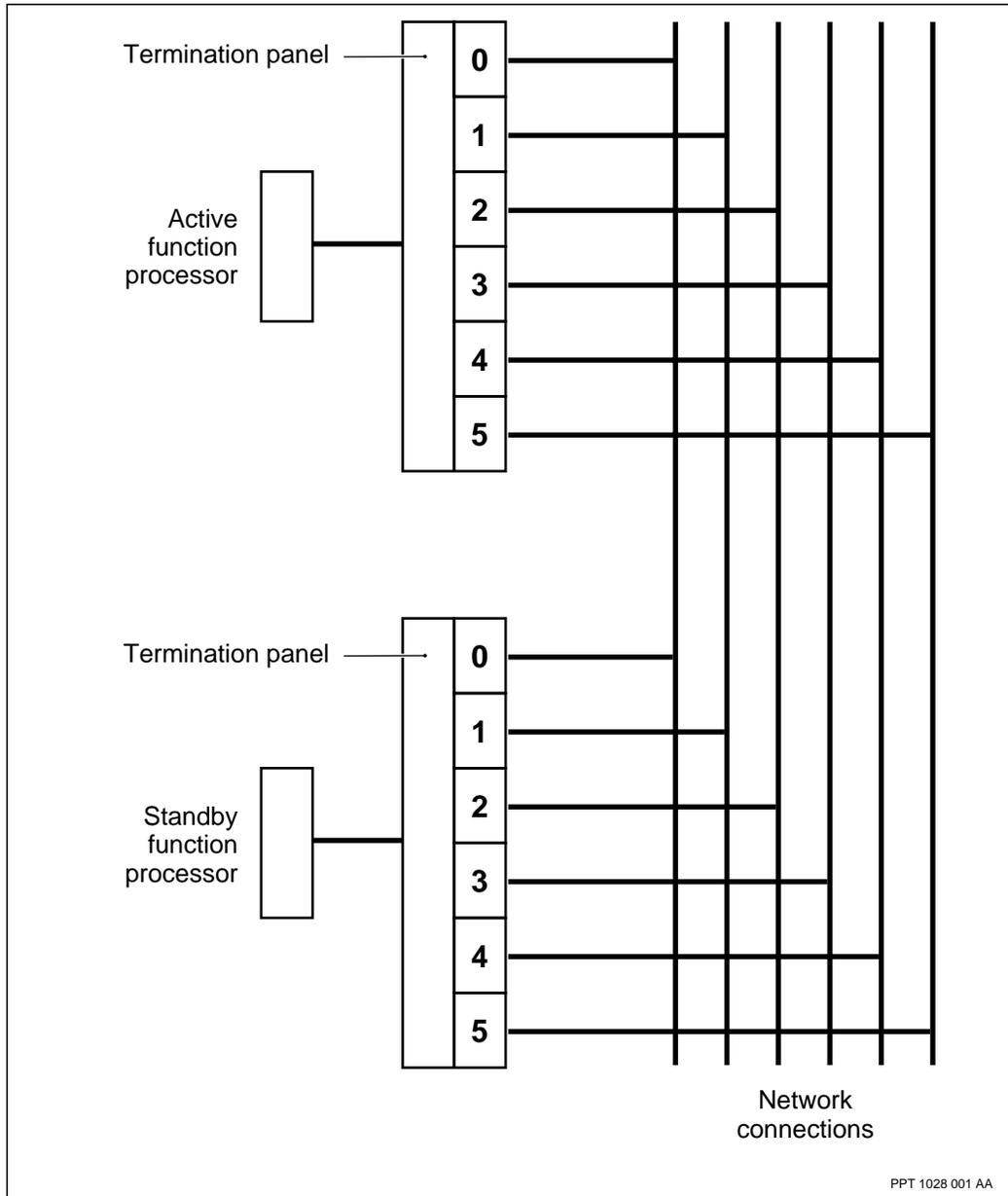
PPT 1028 001 AA

V.11 termination panels

V.11 termination panels provide a break-out for customer-equipment connections so that each V.11 port has its own termination point and access. Termination panels also determine the type of connection (DCE or DTE) depending on which connector is used. These termination panels do not support sparing.

V.11 termination panels are available in two formats:

- "V.11 19" termination panel - PEC NTFP09" (page 53)

- "V.11 13" termination panel - PEC NTEP22" (page 54)

Figure 4
V.11 19" termination panel - PEC NTFP09

PPT 0987 002 AA
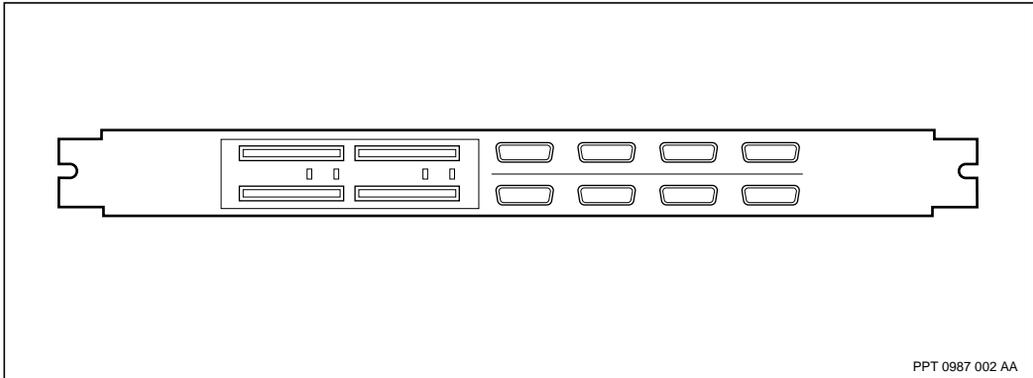
Figure 5
V.11 13" termination panel - PEC NTEP22

PPT 0988 002 AA
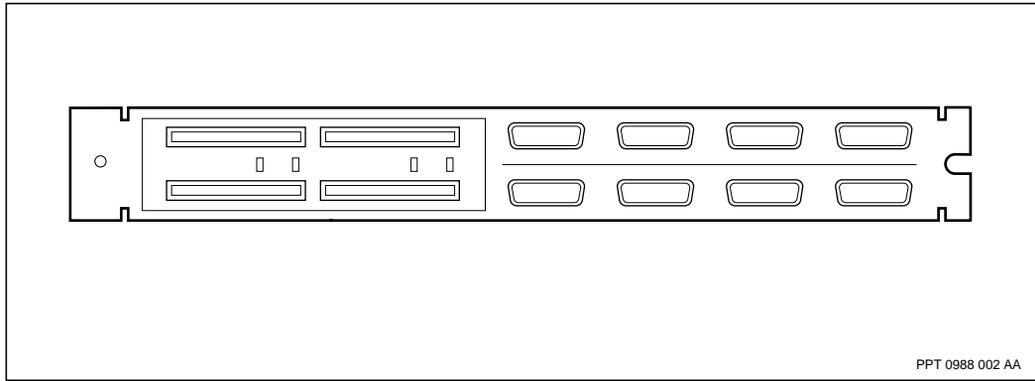
V.35 termination panels

V.35 termination panels provide a break-out for customer-equipment connections so that each V.35 port has its own termination point and access. Termination panels also determine the type of connection (DCE or DTE) depending on which connector is used. These termination panels do not support sparing.

V.35 termination panels are available in two formats:

- "V.35 19" termination panels - PEC NTFP08" (page 55)

- "V.35 13" termination panels - PEC NTEP21" (page 55)

Figure 6
V.35 19" termination panels - PEC NTFP08

PPT 0987 002 AA
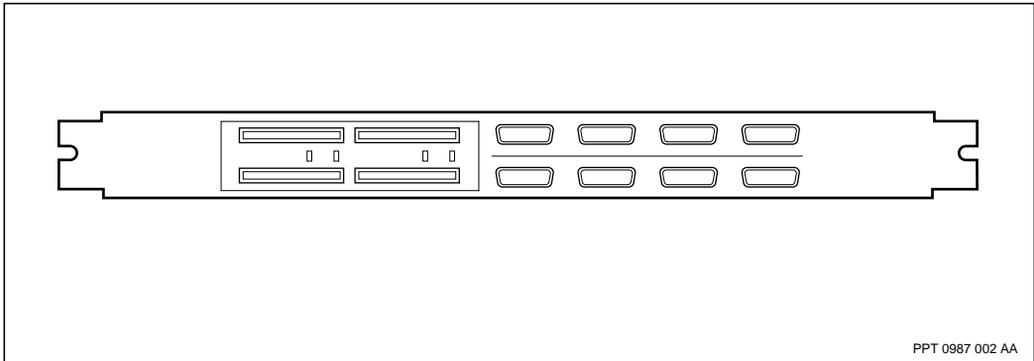
Figure 7
V.35 13" termination panels - PEC NTEP21

PPT 0988 002 AA
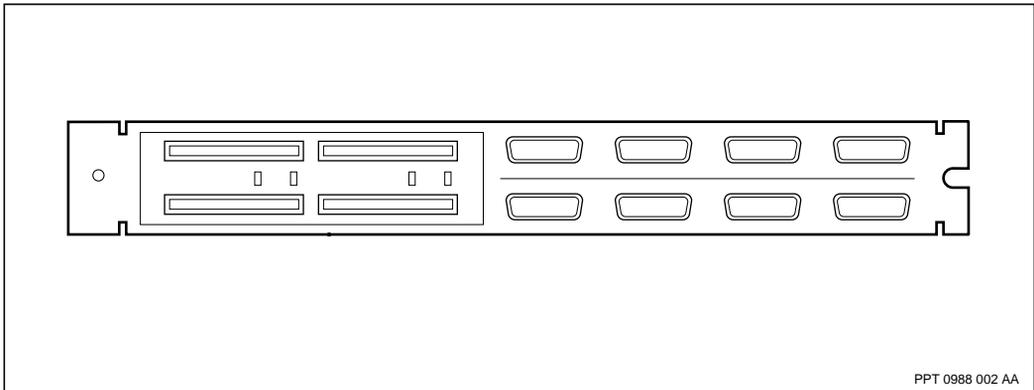
DS1 or E1 termination panels

The DS1 or E1 termination panel provides a break-out for customer-equipment connections so that each DS1 or E1 FP port has its own termination point and access. These termination panels support sparing.

DS/E1 termination panels are available in two formats:

- "DS1 or E1 19" termination panel - PEC NTFP10" (page 56)

- "DS1 or E1 13" termination panel - PEC NTEP23" (page 56)

Figure 8
DS1 or E1 19" termination panel - PEC NTFP10

PPT 2105 001 AA
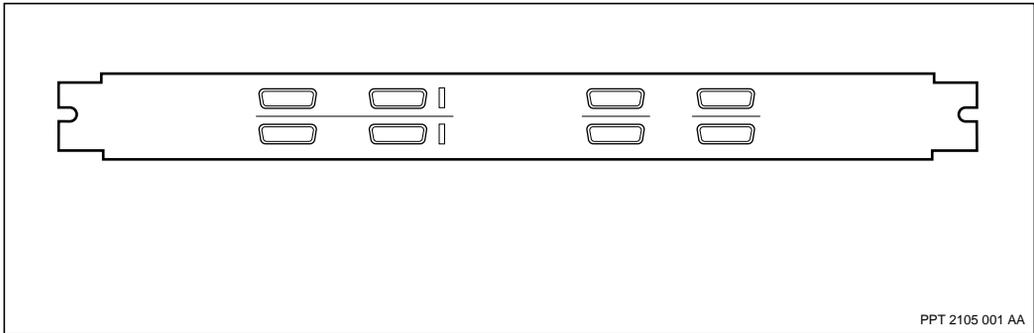
Figure 9
DS1 or E1 13" termination panel - PEC NTEP23

PPT 2106 001 AA
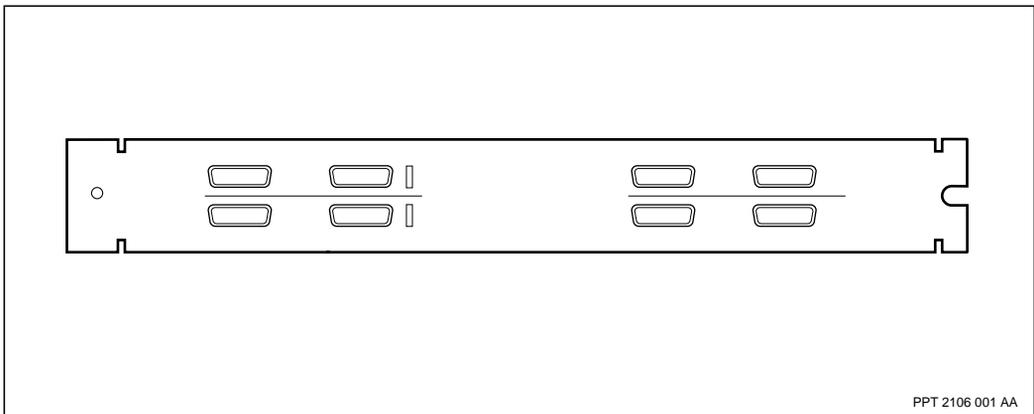
DS3 or E3 termination panels

You can connect customer equipment to a DS3 or E3 FP through a
termination panel. The DS3 or E3 termination panel is a cable distribution
system that also supports sparing.

DS3 or E3 termination panels are available in two formats:

- "DS3 or E3 19" termination panel - PEC NTBP99" (page 57)

- "DS3 or E3 13" termination panel - PEC NTEP37" (page 57)

Figure 10
DS3 or E3 19" termination panel - PEC NTBP99

PPT 0995 001 AA
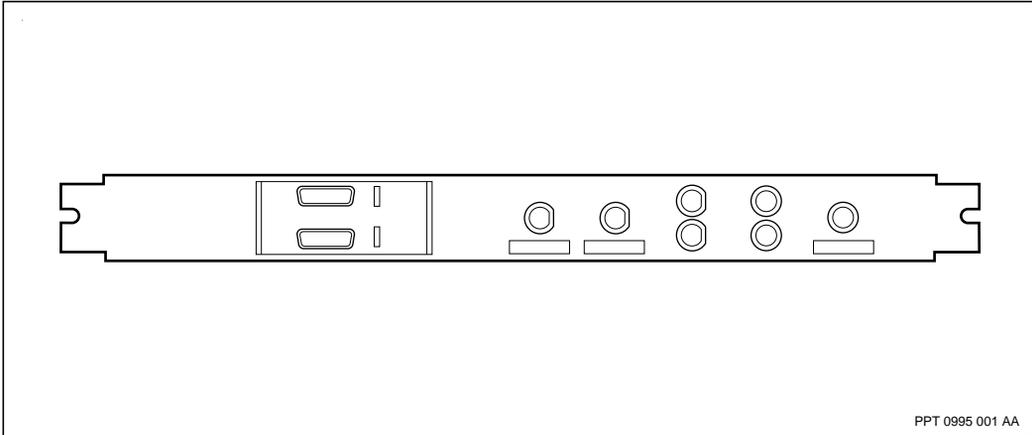
Figure 11
DS3 or E3 13" termination panel - PEC NTEP37

PPT 0995 002 AA
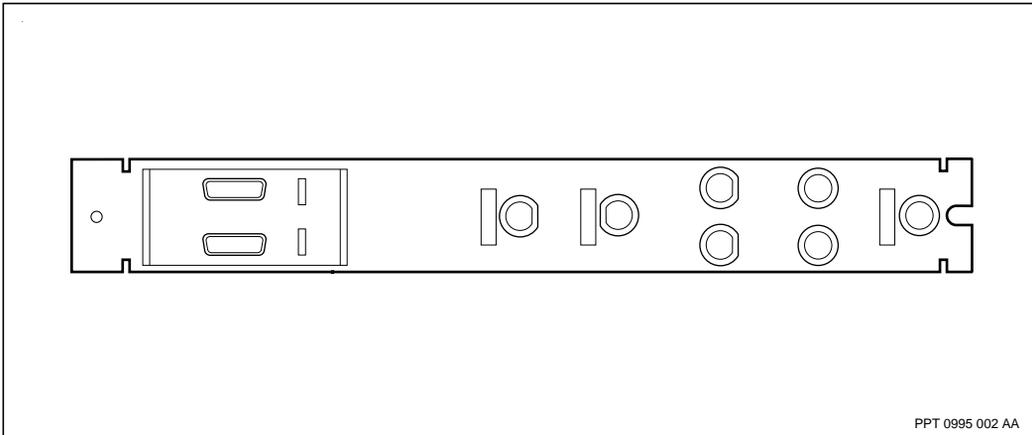
1-port DS3C sparing panel

The 1-port DS3C FP supports both one-for-one and one-for-*n* sparing where
n is one to four. If you want to use one-for-one sparing, you can connect the
spare FP using either a termination panel or a sparing panel. To protect
multiple FPs with a single spare, use the DS3C one-for-n sparing panel.

> ⚠ **CAUTION**
> **Service interruption**
> Sparing requires all ports on the spare FP be connected
> to the termination or sparing panel sparing connectors,
> whether they are provisioned or not. Failure to do so will
> result in the termination or sparing panel dropping all
> ports on the spare FP.

Figure 12
1-port DS3C one-for-n sparing panel

PPT 2267 001 AA
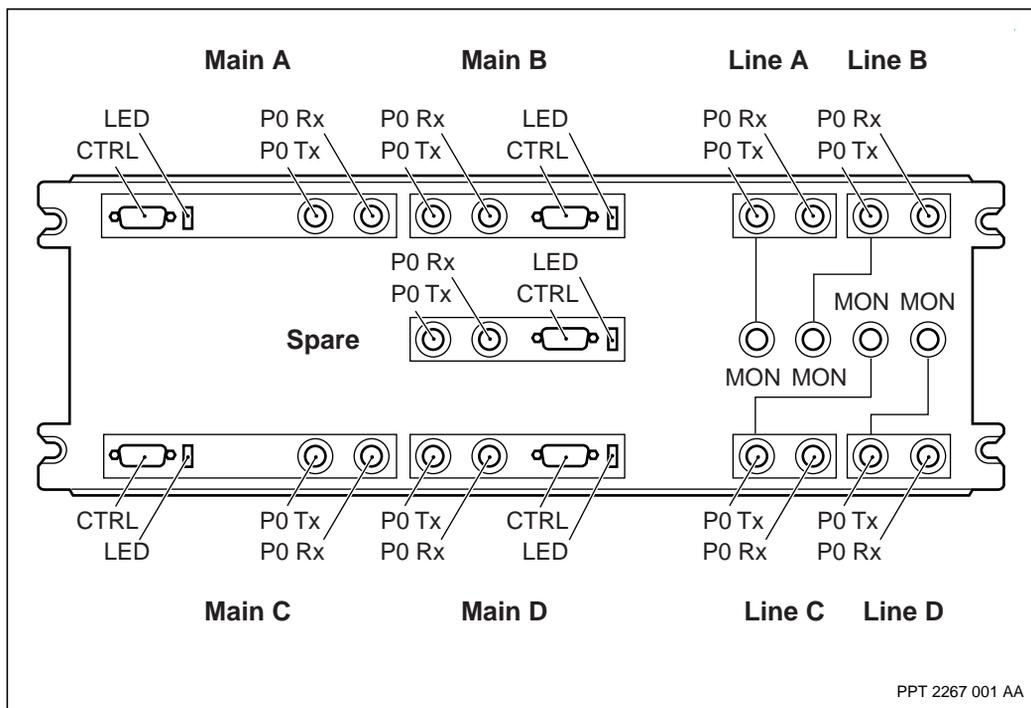
DS3, E3, or JT2 ATM termination panels

You can connect customer equipment directly to the DS3, E3, or JT2 ATM FP
or to its termination panel. These termination panels support sparing.

DS3, E3, or JT2 ATM termination panels are available in two formats:

- "DS3, E3, or JT2 ATM 19" termination panel - PEC NTFP99" (page 59)

- "DS3, E3, or JT2 ATM 13" termination panel - PEC NTEP53" (page 59)

The three ports on the right side of this termination panel are used for monitoring transmit output. This allows you to connect third-party equipment for testing and monitoring purposes. See "DS3, E3, or JT2 ATM 19" termination panel - detailed view" (page 60)

Figure 13
DS3, E3, or JT2 ATM 19" termination panel - PEC NTFP99

PPT 2119 001 AA
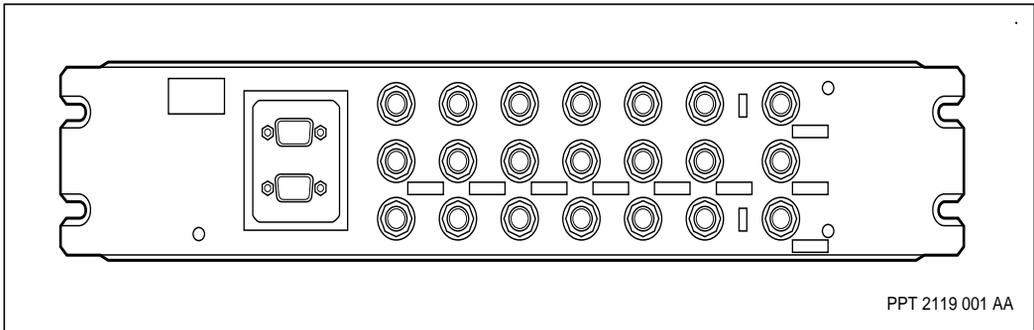
Figure 14
DS3, E3, or JT2 ATM 13" termination panel - PEC NTEP53

PPT 2120 001 AA
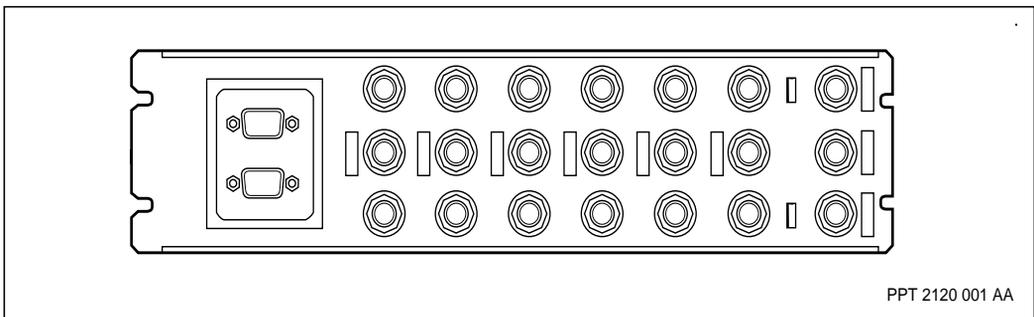
Figure 15
DS3, E3, or JT2 ATM 19" termination panel - detailed view
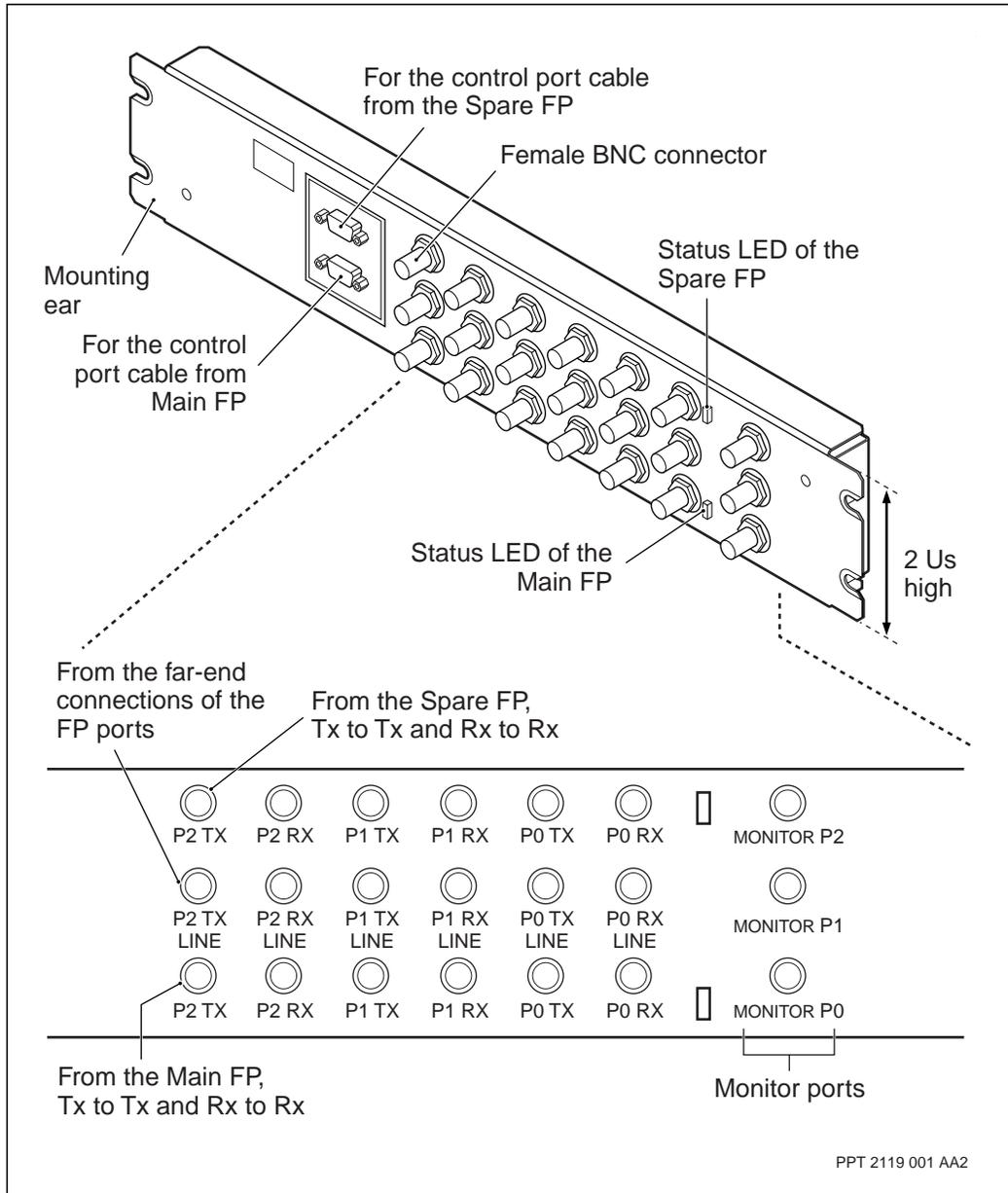
E1 unbalanced termination panels

The E1 unbalanced termination panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. These termination panels support sparing.

One termination panel provides one-for-one sparing for up to four ports. You can spare ports 0–3, or 4–7. For example, a sparing configuration with three ports can use ports 0, 2, and 3, but not ports 0, 2, and 7. Only provision ports that you are going to use. To spare more than four ports, use two E1 termination panels.

E1 unbalanced termination panels are available in two formats:

•   "E1 unbalanced 19" termination panel - PEC NTFP11" (page 61)

•   "E1 unbalanced 13" termination panel - PEC NTEP24" (page 62)

Figure 16
E1 unbalanced 19" termination panel - PEC NTFP11

PPT 2108 001 AA
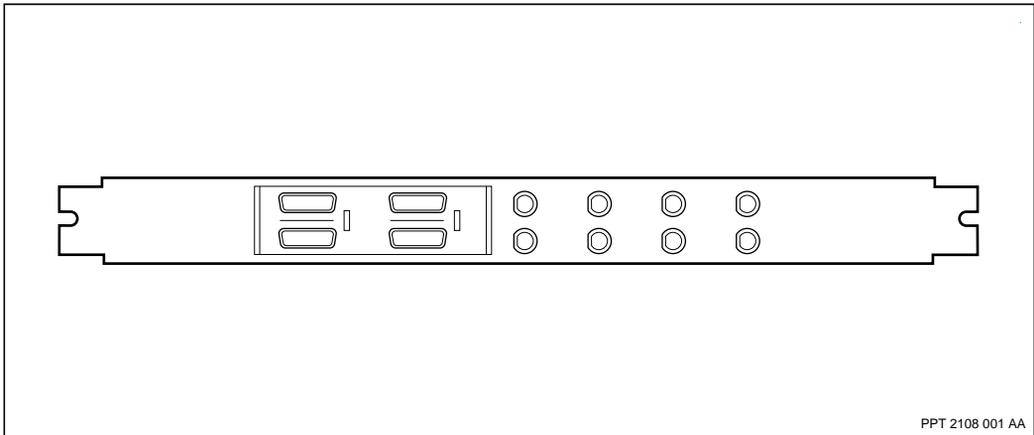
Figure 17
E1 unbalanced 13" termination panel - PEC NTEP24

PPT 2109 001 AA
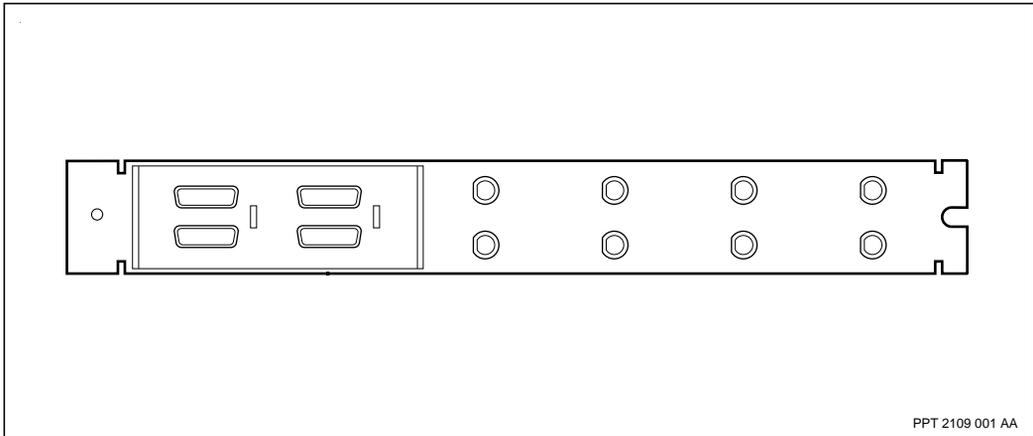
MSA32 E1 unbalanced BNC termination panel

The MSA32 E1 unbalanced BNC termination panel provides a breakout for customer equipment connections, so that each E1 port has its own termination point and access. These termination panels support 1-for-n sparing for the electrical ports on the MSA32 E1 FPs.

These termination panels support one-for-n sparing for up to six panels.

The MSA32 E1 unbalanced termination panel has 1 port per BNC connector, as shown in the figure "MSA32 19" E1 unbalanced BNC termination panel - PEC NTY196" (page 63)

The MSA32 E1 unbalanced termination panel is 5 units high. See "MSA32 termination panel dimensions and weights" (page 46) for additional details.

Figure 18
MSA32 19" E1 unbalanced BNC termination panel - PEC NTY196

Mounting ear   LEDs at bottom position   PPT 2951 001 AA
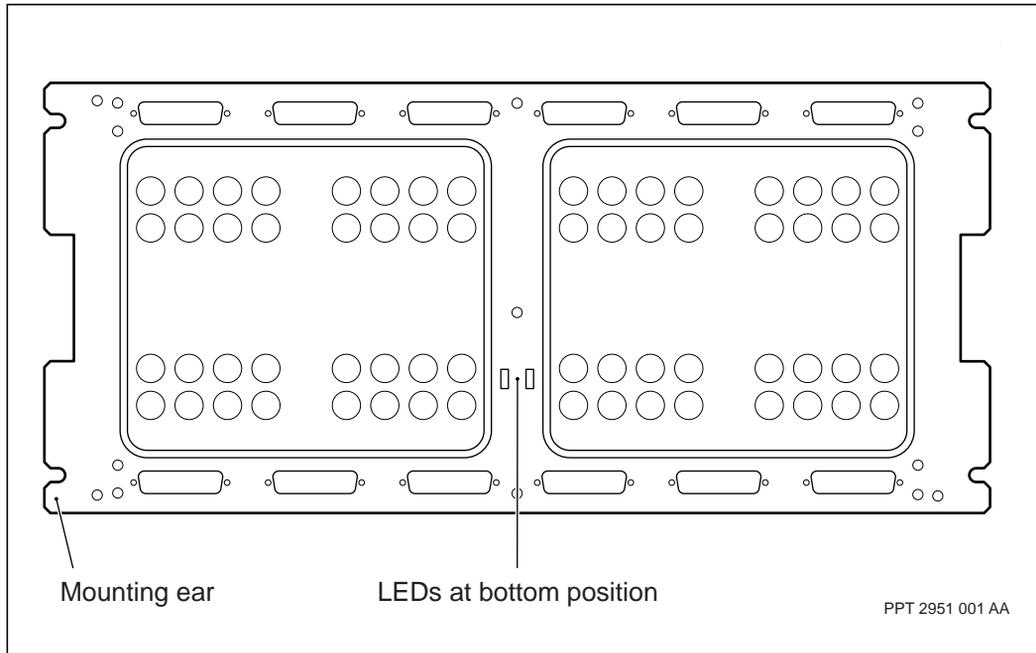
MSA32 DS1 or E1 termination panels

The MSA32 DS1 or E1 termination panels provide a breakout for customer equipment connections, so that each DS1 or E1 port has its own termination point and access. The MSA32 DS1 or E1 termination panels support 1-for-n sparing for the electrical ports on the MSA32 DS1 or E1 FPs.

These termination panels support one-for-n sparing for up to six panels.

MSA32 DS1 or E1 termination panels are available in three formats.

- 1 port per DB15 connector, as shown in the figure "MSA32 19" DS1 or E1 1-port DB15 termination panel - PEC NTY197" (page 64)

- 2 ports per DB15 connector, as shown in the figure "MSA32 19" DS1 or E1 2-port DB15 termination panel - PEC NTY195" (page 65)

- 1 port per RJ45/RJ48C connector, as shown in the figures "MSA32 19" DS1 or E1 RJ45/RJ48C termination panel - PEC NTJS95 (front view)" (page 65) and "MSA32 DS1 or E1 RJ45/RJ48C termination panel (bottom view)" (page 66)

Figure 19
MSA32 19" DS1 or E1 1-port DB15 termination panel - PEC NTY197

Mounting ear   LEDs at bottom position

PPT 2950 002 AA
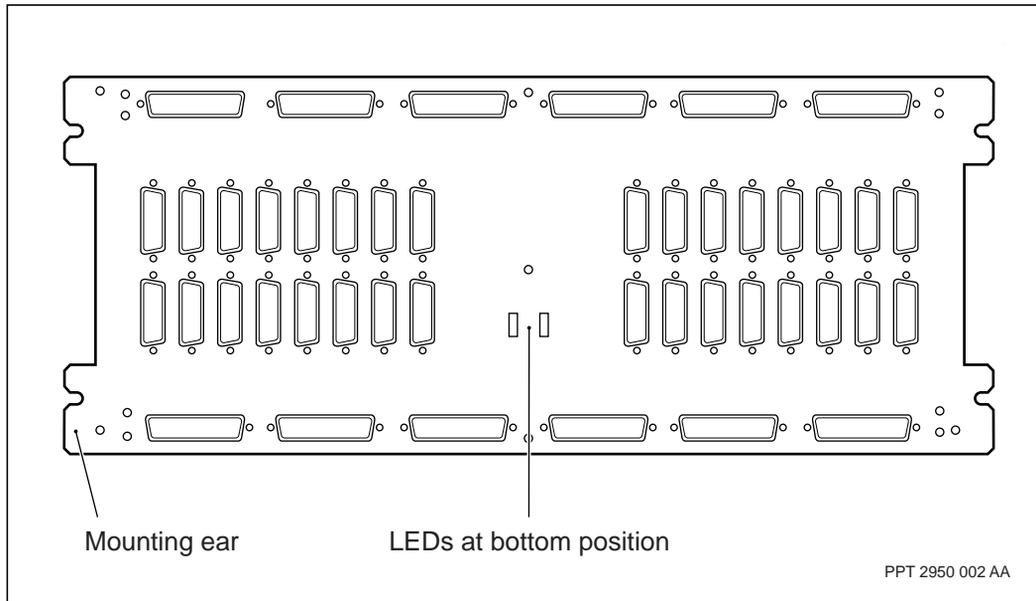
The MSA32 DS1 or E1 19" 1-port/DB15 termination panel is 4 units high. See "MSA32 termination panel dimensions and weights" (page 46) for additional details.

Figure 20
MSA32 19" DS1 or E1 2-port DB15 termination panel - PEC NTY195

Mounting ear   LEDs at bottom position

PPT 2950 003 AA
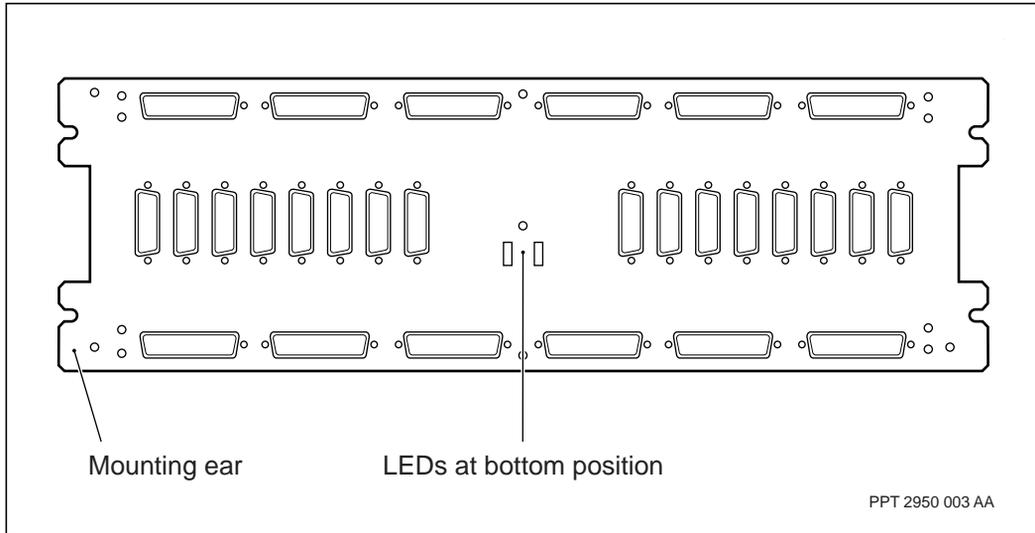
The MSA32 19" DS1 or E1 2-port/DB15 termination panel is 3 units high. See "MSA32 termination panel dimensions and weights" (page 46) for additional details.

Figure 21
MSA32 19" DS1 or E1 RJ45/RJ48C termination panel - PEC NTJS95 (front view)

Mounting ear   LEDs at bottom position

PPT 2951 004 AA
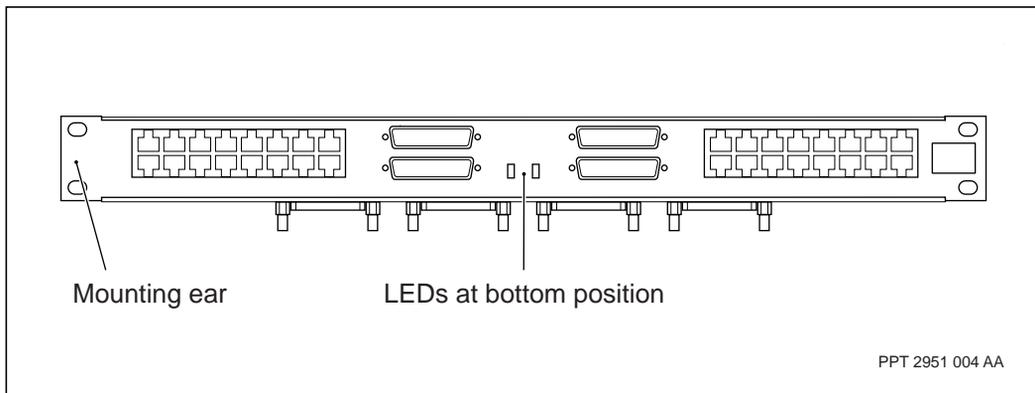
Figure 22
MSA32 DS1 or E1 RJ45/RJ48C termination panel (bottom view)

PPT 2870 007 AA
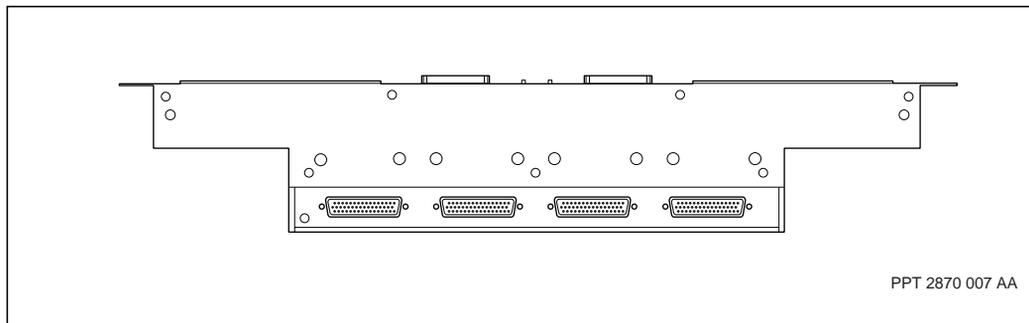
The MSA32 DS/E1 RJ45/RJ48C termination panel is 1 unit high and requires an additional unit of spacing between panels for cable management. See "MSA32 termination panel dimensions and weights" (page 46) for additional details.

2-port STM-1 electrical termination panel

The 2-port STM-1 electrical (STM-1e) termination panel provides one-for-one sparing between two 2-port STM-1 electrical ATM FPs. As with any Passport one-for-one sparing panel, when the active FP fails, the control processor (CP) directs the standby FP to take over the traffic. The duration of the traffic outage resulting from the switchover varies according to the amount of configuring (provisioning) on the FP.

When a failed STM-1e card is replaced, the replaced card then becomes the standby. An automatic switchback does not occur.

The control cable from each FP provides power to the sparing panel. When the sparing panel is powered, the LED beside the label Main or Spare lights to indicate which FP is active, that is, controls the sparing panel and is being used for traffic.

When power is cut off to a 2-port STM-1e sparing panel, neither LED is lit and the switchover relay either stays in or automatically gets switched to the main FP as the default position. If the main FP was active, that is, already controlling the traffic, then no traffic is lost, traffic continues to and from the

sparing panel, and without power a switchover of the traffic to the standby FP can no longer occur. If the standby FP was active, traffic is lost until the sparing panel is powered again.

Loss of power to the sparing panel can be caused by unplugging one end of both control cables, unseating both FPs, or disrupting any leg of power input to both FPs. Without power:

• both sparing panel status LEDs are not lit

• traffic can continue through the main connections

• traffic cannot continue through the spare connections

• a switchover to the spare FP cannot occur

When power to the STM-1e sparing panel resumes:

• the main connection stays or becomes the active FP provided it is in service

• the LED of the active FP connection lights

• a switchover to the spare can occur provided it is in service

• if the spare FP was the active FP at the time power to the sparing panel was lost, a switchback of traffic from the main to the spare connection does not occur automatically, and is not necessary

The PEC of the sparing panel is NTPS92. Physical characteristics are listed in "Sparing panel dimensions and weights" (page 48) and shown in the figure "2-port STM-1e termination panel - PEC NTPS92" (page 68).

Operational specifications are listed in "Compliances of the 2-port STM-1e sparing panel" (page 72).

The 2-port STM-1e sparing panel has SMB BT43 (or SMZ) connectors, the same as the 2-port STM-1 electrical ATM FP. For the description of the cable assemblies, see also "2-port STM-1 electrical cable assemblies" (page 354).

Figure 23
2-port STM-1e termination panel - PEC NTPS92
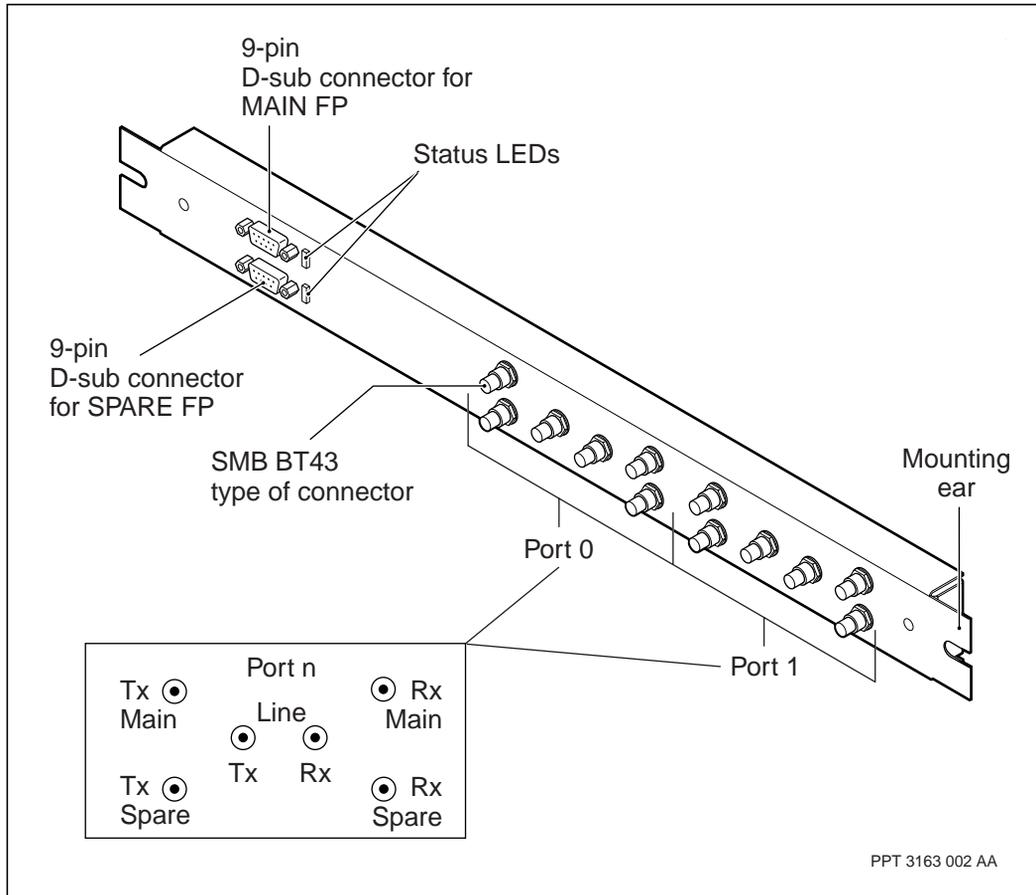
BITS termination panel

The BITS termination panels (NTPS13) work together with the CP-with-BITS (NTNQ03) and BITS termination panel cables (NTPS18) to provide external timing functionality.

See the following sample figures:

- "BITS termination panel - 13" unbalanced (PEC NTPS13BA)" (page 70)

- "BITS termination panel - 19" balanced (PEC NTPS13AB)" (page 71)

A BITS termination panel:

- splits and delivers input timing signals to the active and standby CPs

- provides over-voltage and current protection, plus EMI filtering

- has a dip switch on the faceplate for specifying one-CP or two-CP configurations

- is available in four different formats as listed in the table "BITS termination panels" (page 69)

- uses the cables listed in the table "BITS termination panel cables for CP-with-BITS" (page 70)

Table 5
BITS termination panels

Termination panel	Termination panel PEC
13" balanced (for E1/DS1 balanced sources)	NTPS13AA
13" unbalanced (for E1 unbalanced sources)	NTPS13BA
19" balanced (for E1/DS1 balanced sources)	NTPS13AB
19" unbalanced (for E1 unbalanced sources)	NTPS18BB

Table 6
BITS termination panel cables for CP-with-BITS

Cable	Length	Cable PEC
E1 termination panel cable use with 13" termination panels	81.3cm (32 in)	NTPS18AA
E1 termination panel cable use with 19" rack-mounted termination panels	3m (9.8 ft)	NTPS18BA

For installation information see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

Figure 24
BITS termination panel - 13" unbalanced (PEC NTPS13BA)

PPT 3360 002 AA
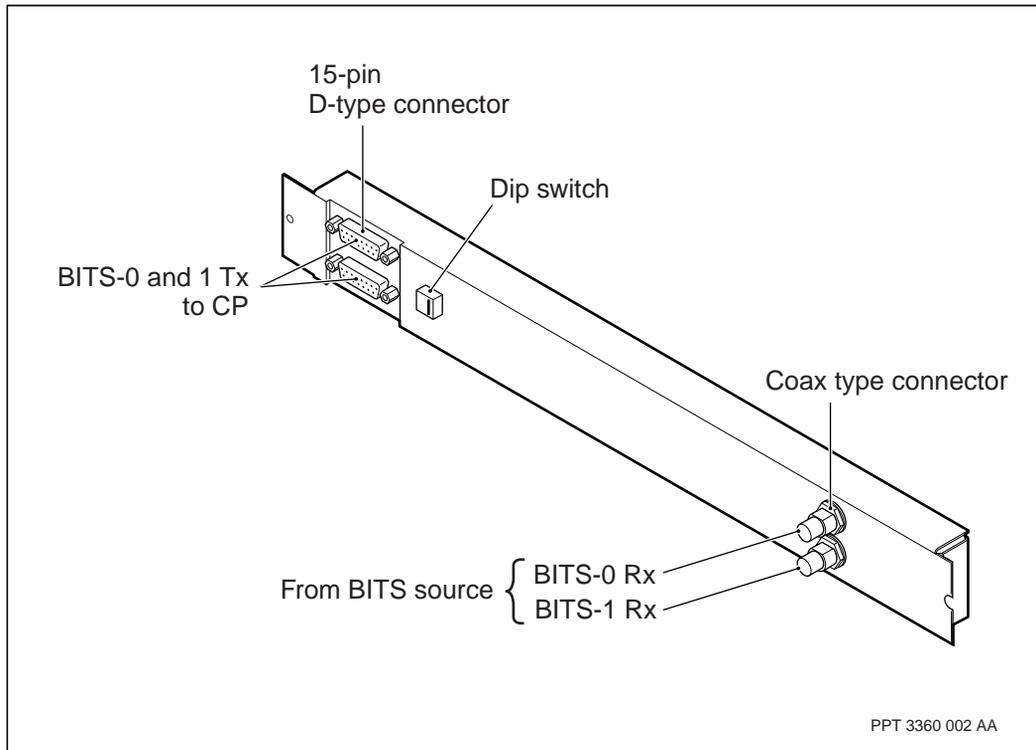
Figure 25
BITS termination panel - 19" balanced (PEC NTPS13AB)

15-pin
D-type connector

Dip switch

BITS-0 and 1 Tx
to CP

9-pin
D-type connector

From BITS source { BITS-0 Rx
BITS-1 Rx

Mounting ear

PPT 3360 001 AA
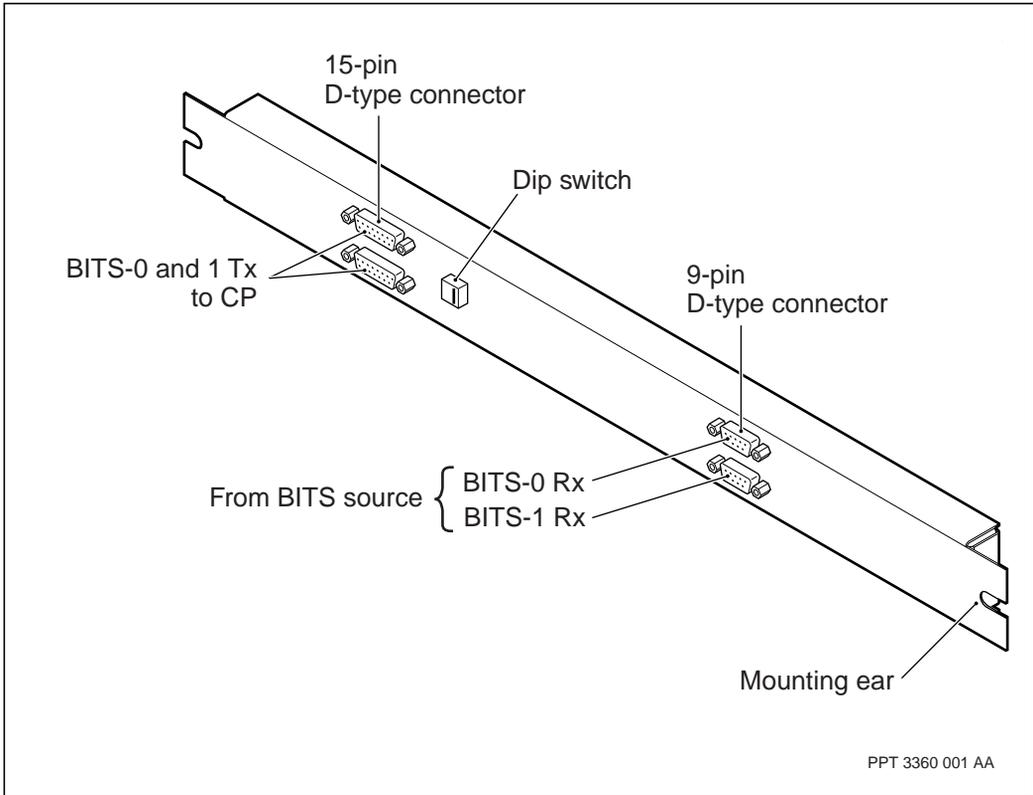
Sparing panel compliance with standards

The Passport sparing panel complies with the applicable sections of these interface and safety standards:

- ANSI T1.102, 1989, section 6.4.2

- ANSI T1.107, 1988

- Telcordia GR-499-CORE issue 1, section 9.6.2

- IEC950, EN60950, EN41003

- EMC

- EN55022, GR-1089, FCC pt15, Class A

- EN50082-1 Immunity standard

Compliances of the 2-port STM-1e sparing panel

- "STM-1e interface compliance" (page 72)

- "STM-1e safety compliance" (page 72)

- "STM-1e EMC compliance" (page 73)

- "STM-1e environmental compliance" (page 73)

The compliances of the 2-port STM-1 electrical sparing panel include:

STM-1e interface compliance
The STM-1 electrical sparing panel complies to the ITU-T specification G.703 ([15]) with the interface at 155.52 Mbit/s. Since the sparing panel uses relays, it is considered part of the cabling and complies to G.703. This means the sparing panel is not required to meet the classifications for port or cross-connect.

STM-1e safety compliance
The STM-1 electrical sparing panel complies to the following

- EN 60950 for European Union, VDE or TUV assessed

- IEC 950 and IEC 60950, national versions for countries that accept CSA C22.2 No. 950, UL 1950, or EN 60950

- EN 60950 and ETS 300 253 for lightening protection, earthing and grounding

- EN 60950 for frame-level fire-resistance criteria

- EN 60950 for fire-resistant materials, components, wiring, and cables

- EN 60529, 1992 ([IP20]) for protection provided by enclosures (customer specific)

STM-1e EMC compliance

The STM-1 electrical sparing panel complies to the following

- EN 300-386-2 sec. 5.1.1.3 (EN 55022, Class B) for radiated emissions

- EN 300-386-2 sec. 5.1.5.3 (ETS 300-386-1, sub clause 7.2.3) and EN 55022 for conducted emissions

- EN 300-386-2 sec. 5.1.1.2 (EN 61000-4-3) for radiated RF immunity

- EN 61000-6-2 replaces EN 50082-2 for conducted RF immunity (customer specific)

- EN 300-386-2 sec. 5.1.3.1, 5.1.5.1 (EN 61000-4-4) and EN 55024 for electrical fast transient signal cables

- EN 300-386-2 sec. 5.1.3.2 (EN 61000-4-5, ETS 300 386-1, sub clause 6.4.2) and EN 55024 for power surges

- EN 300-386-2 sec. 5.1.1.1, 5.1.1.4 (EN 61000-4-2) and EN 55024 for electrostatic discharge (ESD)

STM-1e environmental compliance

The STM-1 electrical sparing panel compliances are as follows:

- ETS 300 753 Oct 97 (Operation Class 3.1 Telecommunications room unattended); the climatic requirement for acoustic noise at 60dBA is ISO 7779 (1).

- ETS 300 019-2-1 (2000-09), Storage Class 1.2 weather-protected not temperature controlled in the table "ETS 300 019-2-1 storage compliance for an STM-1e sparing panel" (page 74)

- ETS 300 019-2-2 (1999-09), Transportation Class 2.3 public transportation in the table "ETS 300 019-2-2 transportation compliance for an STM-1e sparing panel" (page 74)

- ETS 300 019-2-3 (1999-09), Operation Class 3.1E temperature controlled in the table "ETS 300 019-2-3 operation compliance for an STM-1e sparing panel" (page 75)

- in the table "Thermal compliance for the 2-port STM-1e sparing panel" (page 76)

Table 7
ETS 300 019-2-1 storage compliance for an STM-1e sparing panel

Compliance name		Compliance
low temperature storage	-25º C (-13º Fahrenheit) for 72 hours	IEC 60068-2-1 Ab, cold
high temperature storage	+55º C (+131º F) for 72 hours	IEC 60068-2-2 Bb, dry heat
high humidity storage (relative)	93% RH at +30º C (+86º F) for 4 days	IEC 60068-2-56 Cb, damp heat steady state
condensation humidity storage (relative)	90 to 100% RH at +30º C (+86º F) for 2 cycles	IEC 60068-2-30 Db, damp heat cyclic variant 1
storage vibration		IEC 60068-2-6 Fc, vibration sinusoidal IEC 60068-2-64 Fh, vibration random

Table 8
ETS 300 019-2-2 transportation compliance for an STM-1e sparing panel

Compliance name		Compliance
low temperature	-40º C (-40º F) for 72 hours	IEC 60068-2-1 Ab, cold
high temperature	+70º C (+158º F) for 72 hours	IEC 60068-2-2 Bb, dry heat
(Sheet 1 of 2)		

Table 8 (continued)
ETS 300 019-2-2 transportation compliance for an STM-1e sparing panel

Compliance name		Compliance
air temperature change	-40 to +30º C (-40 to +86º F) at 1º C (33.8º F) per minute for 5 cycles	IEC 60068-2-14 Nb, change of temperature
humidity (relative) for slow temperature change	93% RH at 40º C (104º F) for 4 days	IEC 60068-2-56 Cb, damp heat steady state
humidity (relative) for rapid temperature change	90 to 100% RH at 40º C (104º F) for 2 cycles	IEC 60068-2-30 Db, damp heat cyclic variant 1
vibration		IEC 60068-2-36 Fdb, random, vibration, wideband
shock		IEC 60068-2-29 Eb, bump
fall		IEC 60068-2-32 Ed, free fall procedure 1
(Sheet 2 of 2)		

Table 9
ETS 300 019-2-3 operation compliance for an STM-1e sparing panel

Compliance name		Compliance
low temperature	-5º C (23º F) for 16 hours	IEC 60068-2-1 Ab/Ad, cold
high temperature	45º C (113º F) for 16 hours	IEC 60068-2-2 Bb/Bd, dry heat
air temperature change	25 to 45º C (77 to 113º F) at 0.5º C (32.9º F) per minute for 1/2 cycle	IEC 60068-2-14 Nb, change of temperature
(Sheet 1 of 2)		

Table 9 (continued)
ETS 300 019-2-3 operation compliance for an STM-1e sparing panel

Compliance name		Compliance
high humidity (relative)	93% RH at 30º C (86º F) for 4 days	IEC 60068-2-56 Cb, damp heat steady state
shock, 3 in each direction		IEC 60068-2-27 Ea, shock
(Sheet 2 of 2)		

Table 10
Thermal compliance for the 2-port STM-1e sparing panel

Compliance name	Compliance, test method, or distinction
heat dissipation	GR-63-CORE Iss. 1 Oct. 1995, R4-11, O4-12, O4-13, tested by office fluoroscope
operational altitude at -60 to 1800 m (-192.86 ft to 2,624 ft) above sea level	GR-63-CORE Iss. 1 Oct. 1995, R4-8
operational altitude at 4000 m (13,124 ft) above sea level	GR-63-CORE Iss. 1 Oct. 1995, R4-9

Chapter 3
Cables

See these sections for information on cables:

- "Cable description" (page 78)

- "Cable considerations" (page 78)

- "Function processor cable assembly" (page 79)

> **WARNING**
> **Risk of personal injury**
> Passport interfaces must only be connected to Safety
> Extra-Low Voltage (SELV) circuits. Connections to
> Telephone Network Voltage (TNV) circuits must be
> through an external device that provides current protection
> and isolation, such as an approved Channel Service Unit
> (CSU). All such devices must meet the equipment safety
> standards of the country of installation.

> **WARNUNG**
> **Verletzungsgefahr**
> Verbinden Sie Passport-Schnittstellen nur mit SELV-
> Schaltungen (Schutzkleinspannung). Verbindungen zu
> TNV-Schaltungen müssen über ein externes Gerät
> erfolgen, das Stromschutz und -isolierung bietet, z.B. eine
> geprüfte Kanaldiensteinheit (CSU, Channel Service Unit).
> Alle Geräte müssen den Sicherheitsstandards des
> jeweiligen Landes entsprechen.

Cable description

There are two types of cables used to connect a function processor (FP) to the network:

- card cables, which connect the FP to the termination panel (available from Nortel Networks)

- customer-equipment cables, which connect Nortel Networks equipment to equipment supplied by the customer

Customers are responsible for providing the cable to connect from line equipment to the FPs. Cables should conform to standards available from Nortel Networks.

There are three standard card cable lengths available from Nortel Networks:

- 1-m (3-ft) cable, used to connect the FP to the 13-inch termination panel mounted on the back of a 3-slot or 5-slot Passport switch

- 3-m (10-ft) cable, used to connect the FP to a 19-inch termination panel mounted in the same cabinet or rack

- 15-m (49-ft) cable, used to connect the FP to a termination panel mounted in a separate cabinet or rack

Card cables procured from Nortel Networks are shielded. The shield is grounded at both ends of the cable. Cable ends are grounded to a common grounding point via the card connector, card faceplate, and shelf assembly. For more information about grounding, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

Cable considerations

Since the maximum cable length provided by Nortel Networks is 15 m (49 feet) the distance between a switch and an associated termination panel is also limited. The worst-case scenario is when a switch is in a Passport cabinet and a termination panel is in a separate, 2 m (6.5-ft) high 19-in. rack. If cables must be routed from the base of the switch to the base of the rack via the top of these units, the rack must be within 9 m (29 feet) of the switch.

In some cases, a 15 meter (49 foot) cable can reduce the permissible data rate of the link.

Cables between termination panels and switches are UL1581 type and not suitable for routing in plenums or ducts. If you are routing in a vertical shaft or plenum, use cables that meet UL1666 requirements. If you are routing in an air duct, use cables that meet UL910 requirements. Cables supplied by Nortel Networks meet UL1581 requirements and have passed the UW-1 vertical wire flame test.

Function processor cable assembly

For more information about cable assembly for specific function processors (FPs), see:

Chapter 4
3-slot Passport switch hardware

See the following sections for information about the 3-slot Passport switch:

3-slot Passport switch shelf assembly

A fully-installed 3-slot Passport switch consists of a CP installed in slot 0 of a three-slot chassis and an integrated dc power supply. The remaining two slots support function processors (FPs). The Passport 7420 supports all CPs and FPs offered with the Passport 7400 family with the exception of VSP1, VSP2, and the VPN extender card.

All hardware modules for power conversion, cooling, and cable management integrate into its chassis. See "3-slot Passport switch" on page 82 for an illustration of the front and rear views of a 3-slot Passport switch.

Figure 26
3-slot Passport switch

PPT 3221 001 AA
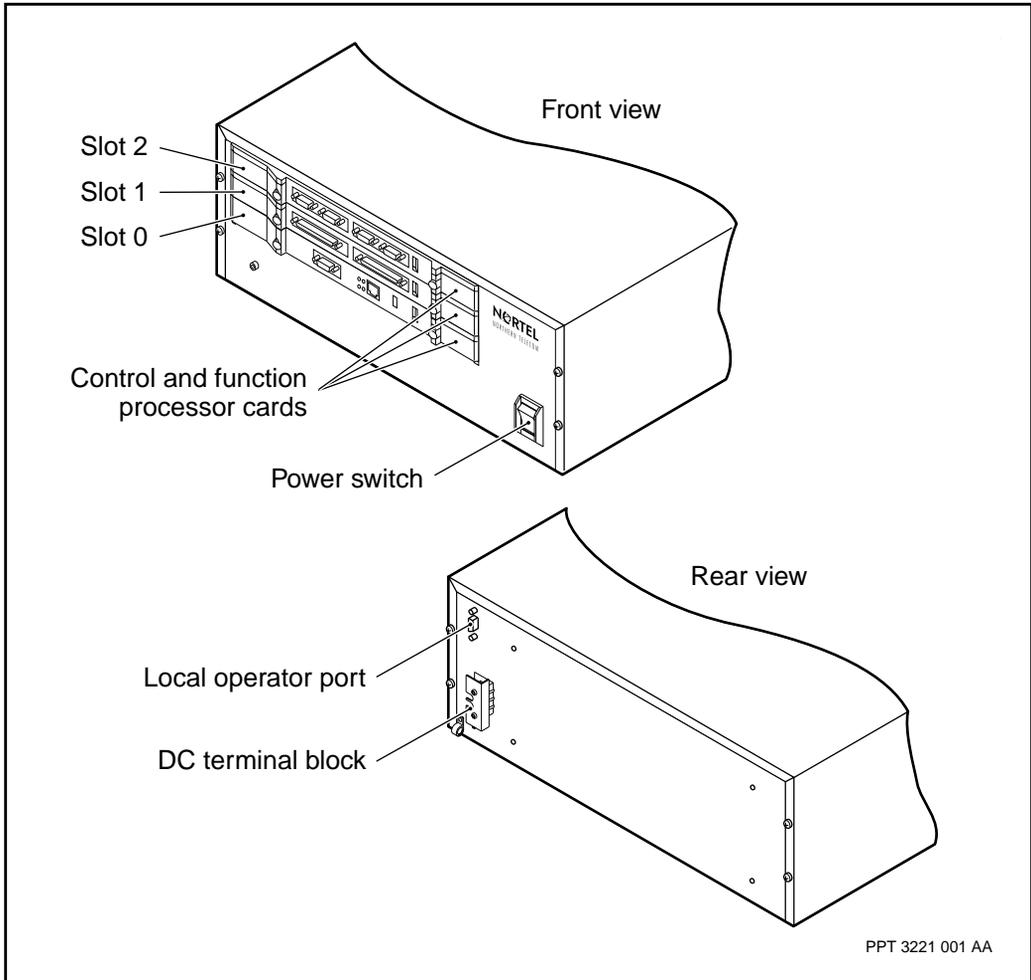
3-slot Passport switch dimensions and weights

The following table summarizes the approximate dimensions and weights of the 3-slot Passport switch hardware.

Table 11
3-slot Passport switch equipment dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
fully-configured, 1 chassis, 1 CP, 2 FPs, 2 termination panels (excluding cables), with 4 feet in a desktop mount installation	15.8 x 40.6 x 52.4 cm (6.25 x 16.0 x 20.63 inches)	16.82 kg (37 lb)
fully-configured, 1 chassis, 1 CP, 2 FPs, 2 termination panels (excluding cables), in a rack-mount installation	13.3 x 49.2 x 52.4 cm (5.25 x 19.38 x 20.38 inches)	17.05 kg (37.5 lb)
fully-configured, 1 chassis, 1 CP, 2 FPs, 2 termination panels (excluding cables), in a seismic cabinet	14.1 x 49.2 x 52.4 cm (5.53 x 19.38 x 20.38 inches)	17.73 Kg (39.0 lb)
fully-configured, 1 chassis, 1 CP, 2 FPs, 2 termination panels (excluding cables), in a vertical mount installation	51.7 x 18.8 x 51.7 cm (20.45 x 7.40 x 20.75 inches)	17.27 kg (38 lb)
chassis (empty) in a desktop mount installation	15.8 cm x 40.64 cm x 48.74 cm (6.25 x 16.0 x 20.35 inches)	11.48 kg (25.3 lb)
chassis (empty) in a rack-mount installation	13.3 x 49.2 x 51.7 cm (5.25 x 19.38 x 20.35 inches)	12.18kg (26.8 lb)
chassis (empty) in a vertical mount installation	51.9 x 18.8 x 51.7 cm 20.43 x 7.40 x 20.35 inches)	12.20 kg (26.8 lb)

3-slot Passport switch hardware configurations

The 3-slot Passport switch supports four different mounting configurations. See the figure "Mounting options for 3-slot Passport switch" on page 84:

In the desktop and rack-mount configurations, the cable guides are located on the left side. In a vertical configuration, cable guides are located at the top. Cable guides route the cables from the FPs at the front to the termination panels at the rear.

Figure 27
Mounting options for 3-slot Passport switch

Free standing
vertical

Rack mounted

Rack mounted
with seismic
brackets

Free standing
horizontal

PPT 2030 001 AA
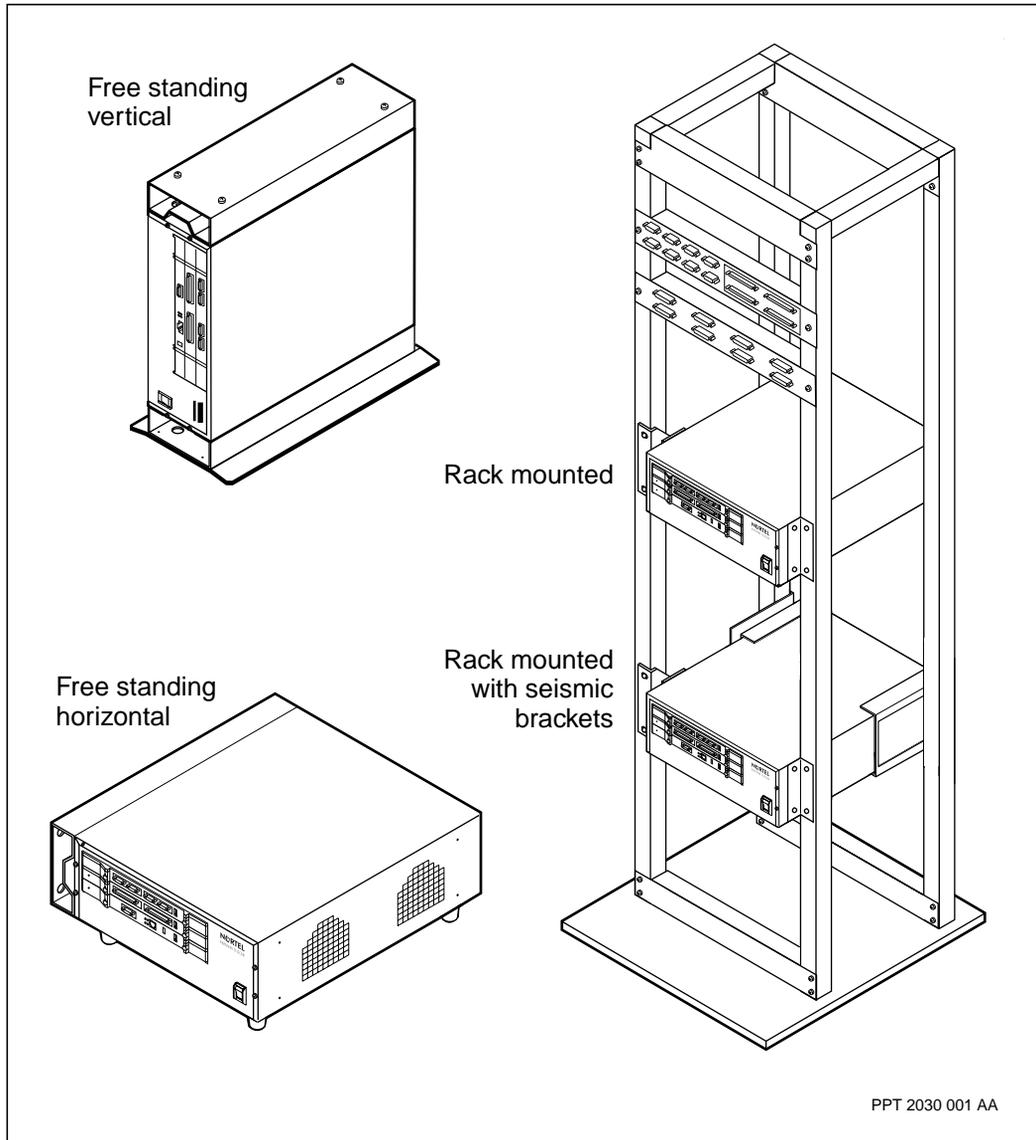
3-slot Passport switch termination panels

You can install 13" termination panels on the rear of a 3-slot Passport switch using the brackets in the termination panel kit (NTHQ09). See the figure "13" termination panels mounted on the rear of a 3-slot Passport switch" on page 85.

If you install a 3-slot Passport switch in a cabinet or rack, you can use 19" termination panels.

Figure 28
13" termination panels mounted on the rear of a 3-slot Passport switch

PPT 3221 015 AA
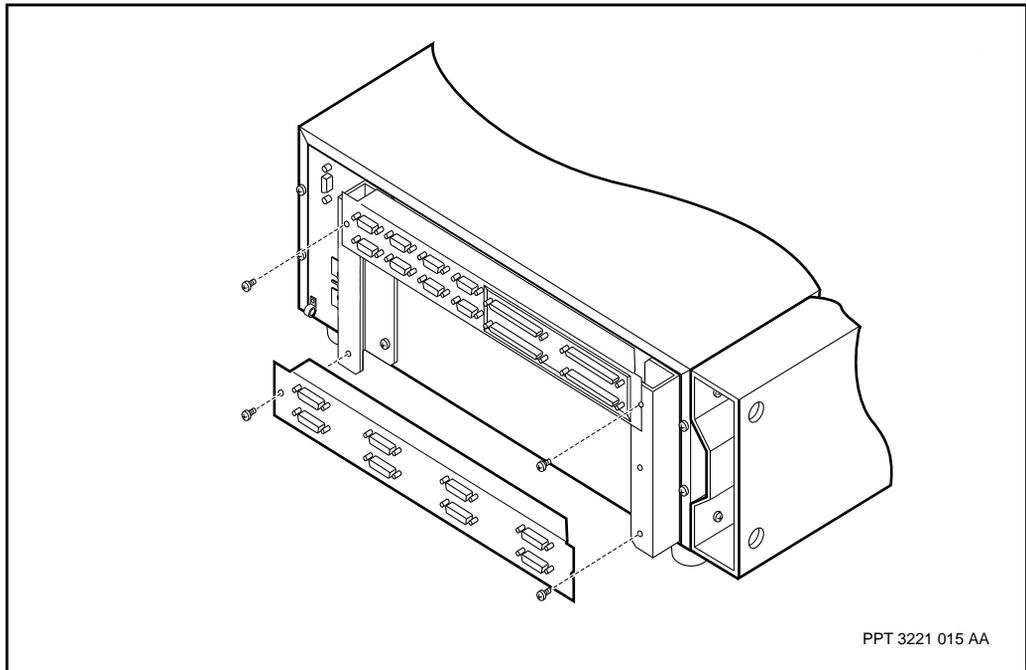
For installation instructions see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*

3-slot Passport switch environmental requirements

The following table outlines the required environmental tolerances for 3-slot Passport switch hardware.

Table 12
Environmental tolerances

Environmental factor	Mode	Specification
Temperature	operating	10 to 40˚ C (two 3-slot Passport switches installed in a cabinet with doors)
		10 to 30˚ C (one 16-slot Passport switch and one 3-slot Passport switch installed in a cabinet with doors)
		10 to 35˚ C (one 16-slot Passport switch and one 3-slot Passport switch installed in a cabinet without doors)
	Rate of change	<10˚ C/hr
	Storage	-40 to +70˚C
	Rate of change	<100˚C/hr
Relative Humidity	operating	10% to 80% non condensing (5.2 kPa pressure maximum)
	Storage	10% to 80% non condensing (5.2 kPa pressure maximum)
Altitude	operating	61 m (200ft) below sea level to 2000 m (6600 ft) above sea level
Particulate atmosphere		Class 100,000 (Fed. Std. No. 209B)

Thermal engineering

Use the following information to find temperature needs for Passport switches. The 3-slot Passport switch can be installed in a desktop or vertical mount, placed in an office environment. In this case, standard room temperatures are acceptable.

Note: You should keep temperatures low. Conventional theory suggests that MTBF halves for every 5°C rise in temperature.

Air Inlet temperature:
Maximum 40° C for long term reliability

Maximum 55° C for short term functionality (as defined in Telcordia GR-63-CORE and IEC 60068-2) and no more than a total of 96 hours for not more than 15 days in a year

Air outlet temperature:
Maximum 60° C for long term reliability

Maximum 75° C for short term functionality

3-slot Passport switch ventilation and access clearances

Total heat dissipation of a fully populated 3-slot Passport switch is approximately 200 W.

Desktop mounted (placed on a table) 3-slot Passport switches and vertically-mounted switches need the following clearances:

- Top: 5 cm (2 inches)

- Front and sides: 2.5 cm (1 inch)

- Rear: 5 cm (2 inches)

A rack-mounted 3-slot Passport switch needs 5 cm (2-inch) clearance on all sides. The maximum depth of the rack-mounting bracket must not exceed 20 cm (8 inches).

Noise levels

The noise level for a 3-slot Passport switch is within the limits specified in the Telcordia GR-63-CORE and the ETSI EN 300 753 standard.

The specific measurement for a front-facing switch in an open frame with no cover or door is 44 dBA.

3-slot Passport switch dc power source requirements

The 3-slot Passport switch has an integrated 300W power supply. The terminal block for the -48V dc power input is located on the rear panel of the shelf.

To maintain an IEC 950 safety classification, you must protect the power feeds to a dc power supply with external circuit breakers or fuses. Doing so is critical to the safe operation of a Passport switch. In -48 V dc installations (typically North American), power feeds into the system require a 60 V dc rated circuit breaker or fuse. In -60 V dc installations (typically European), power feeds into the system require an 80 V dc rated circuit breaker or fuse. In all cases the circuit breaker or fuse must be rated for 10 A dc and have appropriate regulatory approvals.

The power source must be connected to a reliably grounded dc source obtained from an isolation transformer. The dc power source must be within the range of -39 to -72 V dc and capable of providing 300 W per unit, rated at 8 A dc for -41 V dc, and 4 A dc for -72 V dc.

3-slot Passport switch dc power input and wiring requirements

You must supply your own 12 AWG or 14 AWG dc power wiring. Wiring must be

*   approved for use in the country of installation

*   rated for 10 A dc

*   protected with a 10 A circuit breaker or fuse

The nominal input voltage can be -48/-60 V with an input operational range of -39 to -72 V. The maximum output power for each dc supply is 300 W.

Input voltage under minimum battery operating conditions must supply a minimum of -36.0 V to the power supply. For example, if the minimum battery specification for your site is -42 V, then the voltage can drop only 6.0 V. The maximum dc wire length for a voltage drop of 1 V using 14 AWG wire is 12.2 m (39 ft) and for 12 AWG wire is 19.6 m (62 ft).

Note: A length of 12.2 m is the distance from the power source to the unit. Total loop length (battery and battery return) is double this length.

Dc power wiring is connected to a two-position, barrier-type terminal strip on the rear of the power supply. The strip has a protective plastic cover.

North American installations must use plain crimp ring lugs (insulated) with a #8 stud size and either a 12 AWG or 14 AWG wire to connect to the power supply terminal strip. European installations must use plain double crimp ring lugs (insulated) approved for European requirements with a #8 stud size and either a 12 AWG or 14 AWG wire. The screws are 164-32 (#8).

Note: Ring lugs must be insulated to prevent accidental electric shock.

You must relieve strain on the wire connected to the terminal strip. To relieve any strain, use the P-clip beneath the terminal strip on the rear housing of the switch. You must replace the protective cover of the strip after you finish wiring the switch.

3-slot Passport switch grounding requirements

Passport is grounded to protect both personnel and equipment.

A 3-slot Passport switch contains a separate ground stud located on the rear housing. Processors are grounded through the backplane connectors. 13" termination panels mounted on the rear of the switch are grounded through the mounting hardware.

The shelf assembly contains an electrostatic discharge (ESD) jack. You should plug the antistatic wrist strap into the ESD jack and wear the strap whenever you handle processor cards or other hardware that is sensitive to electrostatic discharge.

For further information on grounding, see 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

3-slot Passport switch cabling requirements

If you have a fully-configured switch with 13" rear-mounted termination panels, you will get the best cable routing between the lower cable organizer and the cable-support guide if

- cable diameters do not exceed 0.8 cm (5/16 inch)

- cable flexibility allows for a bend radius of 2.5 cm (1 inch)

For more information see "Cables" on page 77

Compliance to electrical and safety standards

<table>
<tr><td>⚠️</td><td>**WARNING**
Damage to equipment by electromagnetic interference
To meet electromagnetic interference (EMI) regulatory requirements and thermal specifications, all blank slots must be fitted with a blank FP faceplate.</td></tr>
</table>

Passport switches comply with both North American and international regulatory safety requirements.

3-slot Passport switch standards compliances

The 3-slot Passport switch complies with the following standards:

- UL 60950, 3rd edition - Safety of Information Technology Equipment

- CSA C22.2 No. 60950, 3rd edition - Safety of Information Technology Equipment

- EN 60950, 2000 - Safety of Information Technology Equipment, including Electrical Business Equipment

- IEC 60950, 3rd edition - Safety of Information Technology Equipment, including Electrical Business Equipment.

- European Norm EN60950 (VDE)

- GR-63-CORE, Issue 1, April 2002- Network Equipment Building Systems - Physical Protection

- ETSI EN 300 019-2-1 - Equipment Engineering; Environmental Conditions & Environmental Tests for Telecommunications Equipment Part 1-2: Classification of Environmental Conditions: Storage

- ETSI EN 300 019-2-2 - Equipment Engineering; Environmental Conditions & Environmental Tests for Telecommunications Equipment Part 1-2: Classification of Environmental Conditions: Transportation

- ETSI EN 300 019-2-3 - Equipment Engineering; Environmental Conditions & Environmental Tests for Telecommunications Equipment Part 1-2: Classification of Environmental Conditions: Stationary Use at Weather-Protected Locations

- ETSI EN 300 753 - Equipment Engineering: Acoustic Noise Emitted by Telecommunications Equipment

- GR-1089 - CORE, Issue 2, December 1997 with Revision 1, February 1999 (Section 2-3, 3.2.5, 4-9) - Electro-Magnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment.

- FCC Part 15, class B- Code of Federal Regulations Title 47 - Telecommunications Part 15 - Radio Frequency Devices.

- EN 55022, class B: 1998 (Emissions) - Limits & Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

- EN 55024: 1998 (Immunity) - Electromagnetic Compatibility- Immunity of Information Technology Equipment (ITE)

- ETSI - EN 300 386: 2001 - Electromagnetic Compatibility and Radio Spectrum Matters; Telecommunication Network Equipment; Electro-Magnetic Compatibility Requirements - Telecommunication Equipment in Telecommunication Centres

- ETSI - EN 300 132-2: 1996 - Equipment Engineering (EE); Power Supply Interface at the Input to Telecommunications Equipment Interface - Part 2: Interface Operated by Direct Current

- ETSI - EN 300 253 V2.1.0 2002 - Lightning Protection Earthing and Grounding

Chapter 5
5-slot Passport switch hardware

See the following sections for information on the 5-slot Passport switch:

• "5-slot Passport switch standards compliances" (page 112)

5-slot Passport switch shelf assembly

The 5-slot Passport switch is available in ac or dc versions. Both versions have replaceable power supplies.

A 5-slot Passport switch cooling unit draws air through the base and front louvre of the switch. The unit expels the air at the top of the back louvre. The cooling unit is replaceable and consists of four fans fastened to a tray.

Figure 29
5-slot Passport switch shelf assembly
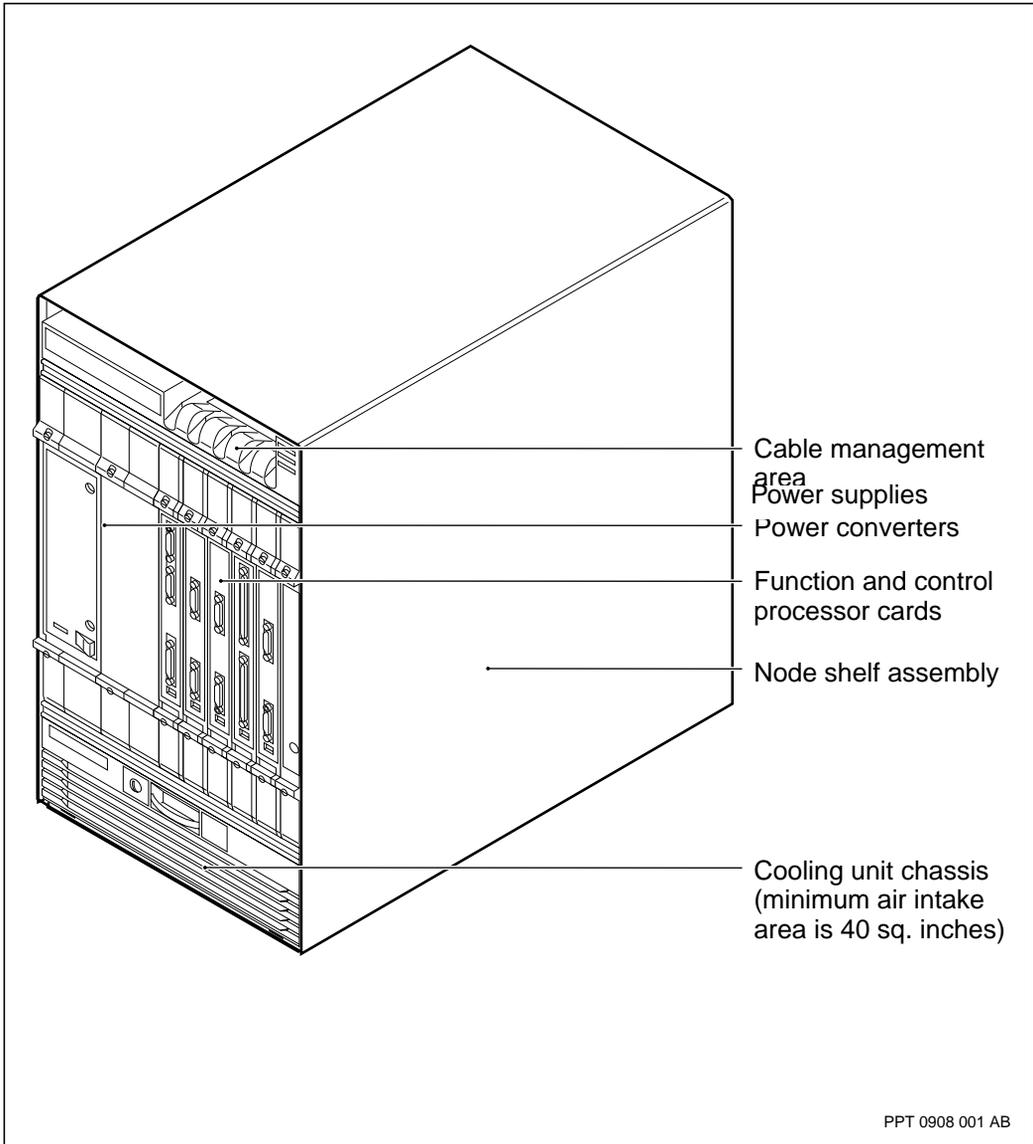
Cable management area

Power supplies

Power converters

Function and control processor cards

Node shelf assembly

Cooling unit chassis (minimum air intake area is 40 sq. inches)

PPT 0908 001 AB

5-slot Passport switch dimensions and weights

This table summarizes the approximate dimensions and weights of the hardware you may be handling.

Table 13
5-slot Passport switch equipment dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
Fully-configured, shelf assembly, cooling unit, air filter assembly, cable management unit, 2 power supplies, 1 CP, 4 FPs, and 4 termination panels (excluding cables)	44.5 cm x 26.7 cm x 55.9 cm (17.5 in x 10.5 in x 22.0 in)	37.2 kg (81.9 lb)
Fully-configured, shelf assembly, cooling unit, air filter assembly, cable management unit, 2 power supplies, 1 CP, 4 FPs, 4 termination panels (excluding cables), 1 front cover, 1 rear cover, and 4 feet	47.0 cm x 26.7 cm x 57.2 cm (18.5 in x 10.5 in x 22.5 in)	38.8 kg (85.4 lb)
Empty shelf assembly	44.5 cm x 26.7 cm x 55.9 cm (17.5 in x 10.5 in x 22.0 in)	15.1 kg (33.3 lb)
Fan tray assembly	5.1 cm x 25.7 cm x 38.1 cm (2.0 in x 10.1 in x 15 in)	3.0 kg (6.5 lb)
Air filter assembly	1.3 cm x 25.7 cm x 38.1 cm (0.5 in x 10.1 in x 15.0 in)	0.1 kg (0.3 lb)
Power supply (PS)	30.5 cm x 5.3 cm x 43.2 cm (12 in x 2.1 in x 17.0 in)	4.3 kg (9.5 lb)
Power supply (blank)	30.5 cm x 5.3 cm x 35.8 cm (12.0 in x 2.1 in x 14.1 in)	0.8 kg (1.8 lb)

5-slot Passport switch hardware configurations

You can mount a 5-slot Passport switch on the floor or in a rack or cabinet. A floor-mounted 5-slot Passport switch sits on four rubber feet, required for proper ventilation. Press-fit covers are available for the floor-mounted 5-slot Passport switches.

To mount a 5-slot Passport switch in a standard 19-inch rack or cabinet, you must use brackets (available from Nortel Networks). In the United States, when dc-powered 5-slot Passport switches are rack-mounted, the racks must have conduit entries, knock-outs or glands.

See the section "5-slot Passport switch termination panels" (page 97) for more information about hardware configurations.

5-slot Passport switch termination panels

A 5-slot Passport switch support both 13" and 19" termination panels. 13" termination panels attaches to the rear of a 5-slot Passport switch. Standard 19-inch racks and cabinets hold 19" termination panels.

Some of the possible hardware configurations for a 5-slot Passport switch include:

- "Floor-mounted 5-slot Passport switch with 13" rear-mounted termination panels" (page 98)

- "Rack-mounted 5-slot Passport switch with 13" rear-mounted termination panels" (page 99)

- "Rack-mounted 5-slot Passport switch with 19" rack-mounted termination panels" (page 100)

- "5-slot Passport switch termination panels mounted in a separate rack" (page 101)

Figure 30
Floor-mounted 5-slot Passport switch with 13" rear-mounted termination panels
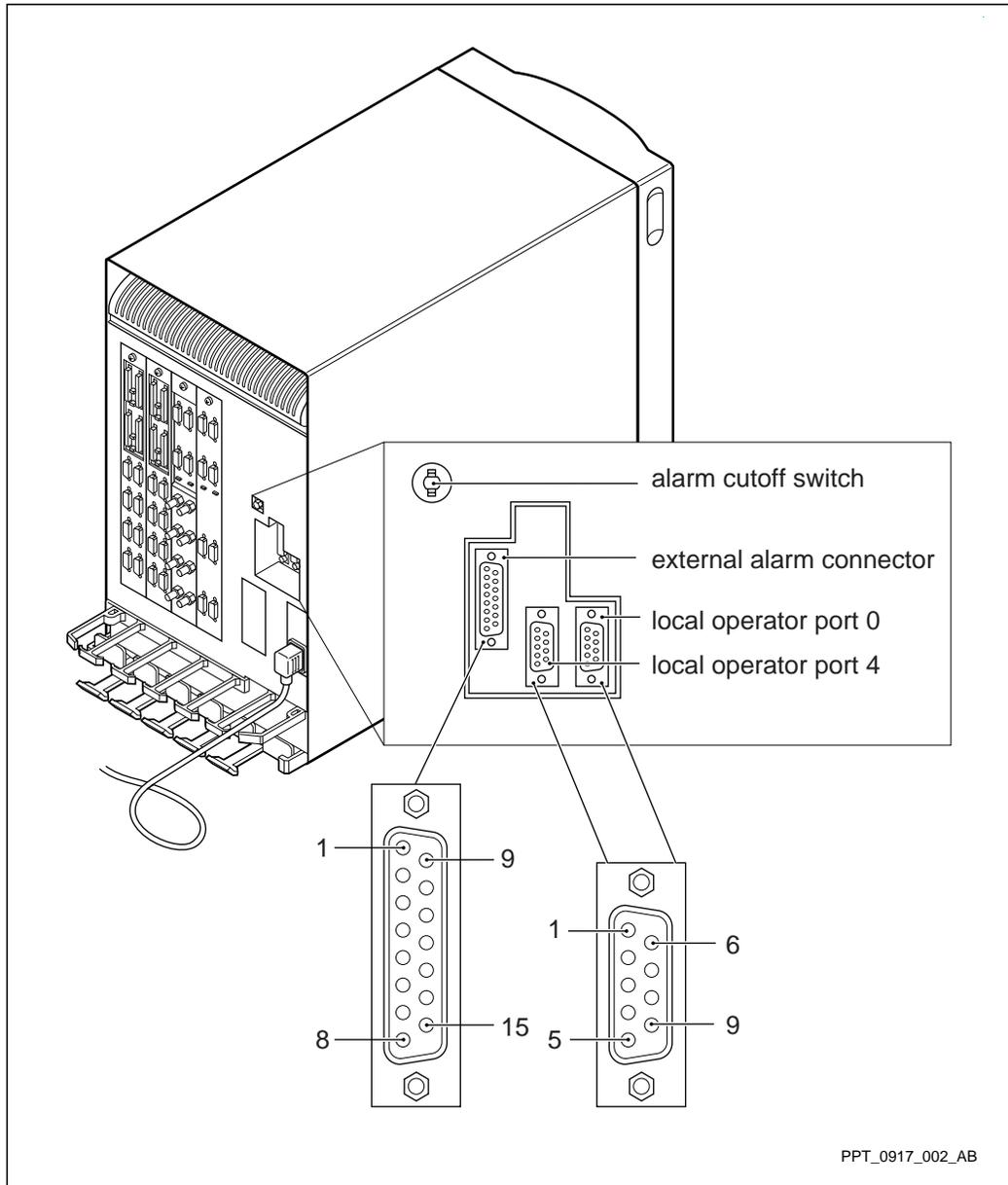
Figure 31
Rack-mounted 5-slot Passport switch with 13" rear-mounted termination panels

Standard 19-inch rack
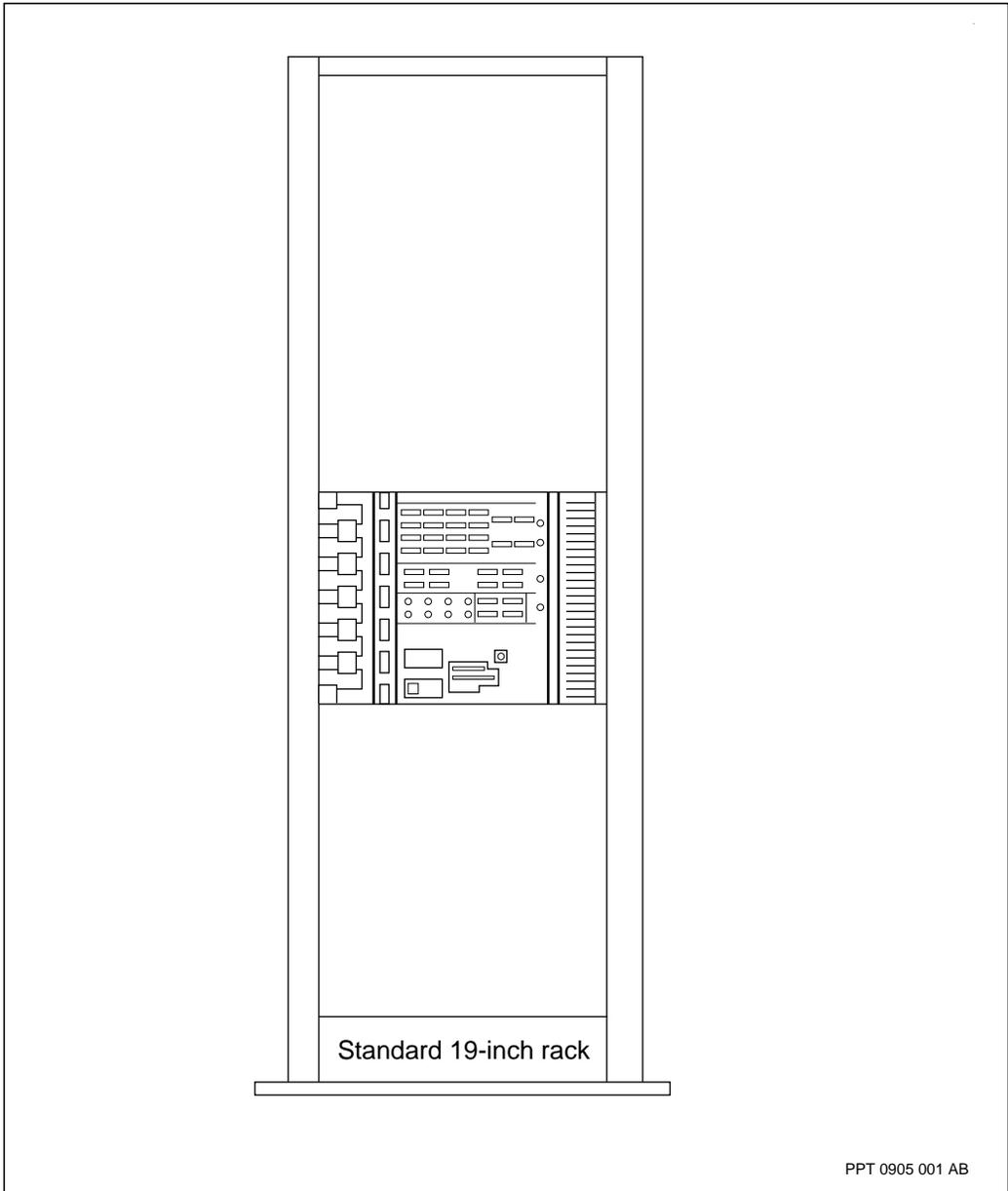
PPT 0905 001 AB

Figure 32
Rack-mounted 5-slot Passport switch with 19" rack-mounted termination panels

PPT 2121 001 AA
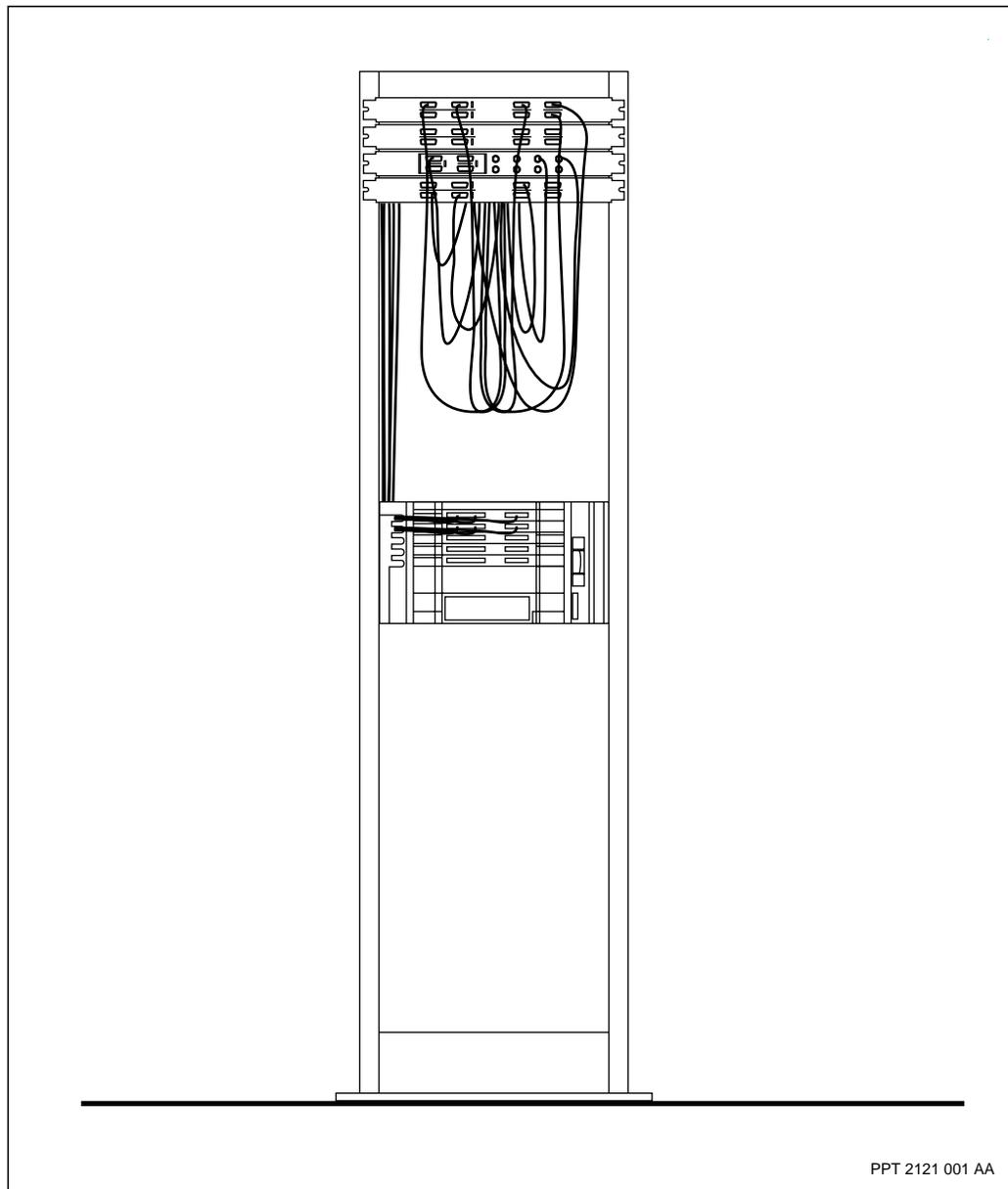
Figure 33
5-slot Passport switch termination panels mounted in a separate rack
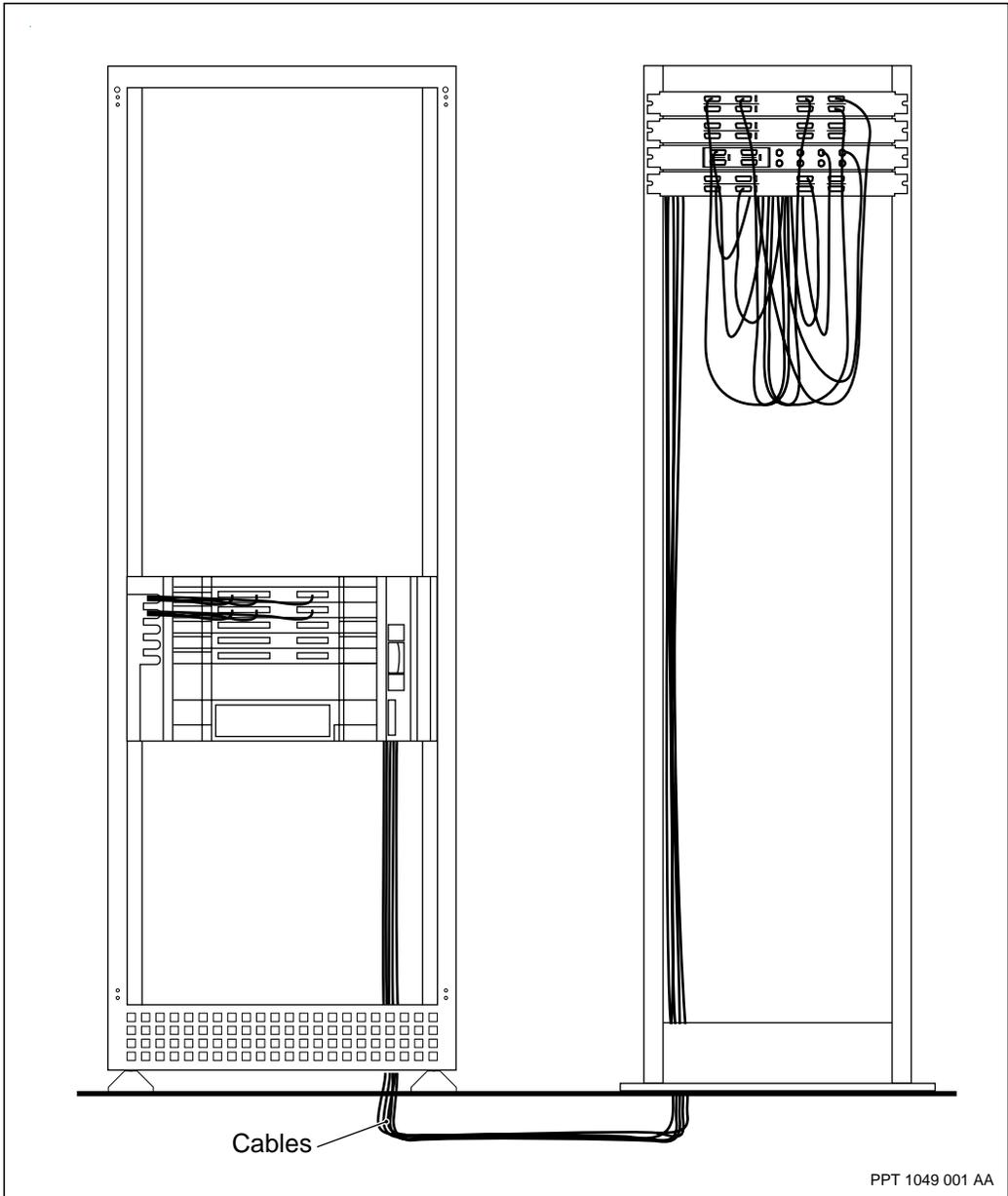
Cables

PPT 1049 001 AA

5-slot Passport switch environmental requirements

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> To meet EMI regulatory requirements and thermal specifications, all blank slots must be fitted with a blank FP faceplate. Additionally, empty power supply bays require power supply blanks to meet both EMI and thermal specifications.

The recommended environmental conditions for Passport hardware are given in this table.

Table 14
Environmental requirements

Environmental factor	Mode	Specification
Temperature	Operating	10˚C to 40˚C 16-slot Passport switch or one 5-slot Passport switch installed in a cabinet with doors)
		10˚C to 30˚C (two Passport 7400 16-slot Passport switches or one 16-slot Passport switch and one 5-slot Passport switch installed in a cabinet with doors)
		10˚C to 35˚C (two Passport 7400 16-slot Passport switches or one 16-slot Passport switch and one 5-slot Passport switch installed in a cabinet without doors)
	Rate of Change	<10˚C/hr
	Storage	-40˚C to +70˚C
	Rate of Change	<100˚C/hr
Relative Humidity	Operating	10% to 80% non-condensing (5.2 kPa pressure maximum)
	Storage	10% to 80% non-condensing (5.2 kPa pressure maximum)
(Sheet 1 of 2)		

Table 14 (continued)
Environmental requirements

Environmental factor	Mode	Specification
Altitude	Operating	61 m (200 ft) below sea level to 2000 m (6600 ft) above sea level
Particulate atmosphere		Class 100,000 (Fed. Std. No. 209B)
(Sheet 2 of 2)		

Thermal engineering

Use the following information to find temperature needs for Passport switches.

Note: You should keep temperatures low. Conventional theory suggests that MTBF halves for every 5 C rise in temperature.

Air Inlet temperature:
Maximum 40° C for long term reliability
Maximum 55° C for short term functionality (as defined in Telcordia GR-63-CORE, no more than a total of 96 hours for not more than 15 days in a year)

Air outlet temperature:
Maximum 60° C for long term reliability
Maximum 75° C for short term functionality

5-slot Passport switch ventilation and access clearances

A fully-configured 5-slot Passport switch generates 530 W and requires specific clearances for ventilation and access. Failure to satisfy these conditions interferes with the unit's cooling system air flow and can damage a switch.

Figure 34
5-slot Passport switch clearances

Note: the feet must be properly installed to enable adequate ventilation when the node is in the standalone configuration.

PPT 0907 001 AA
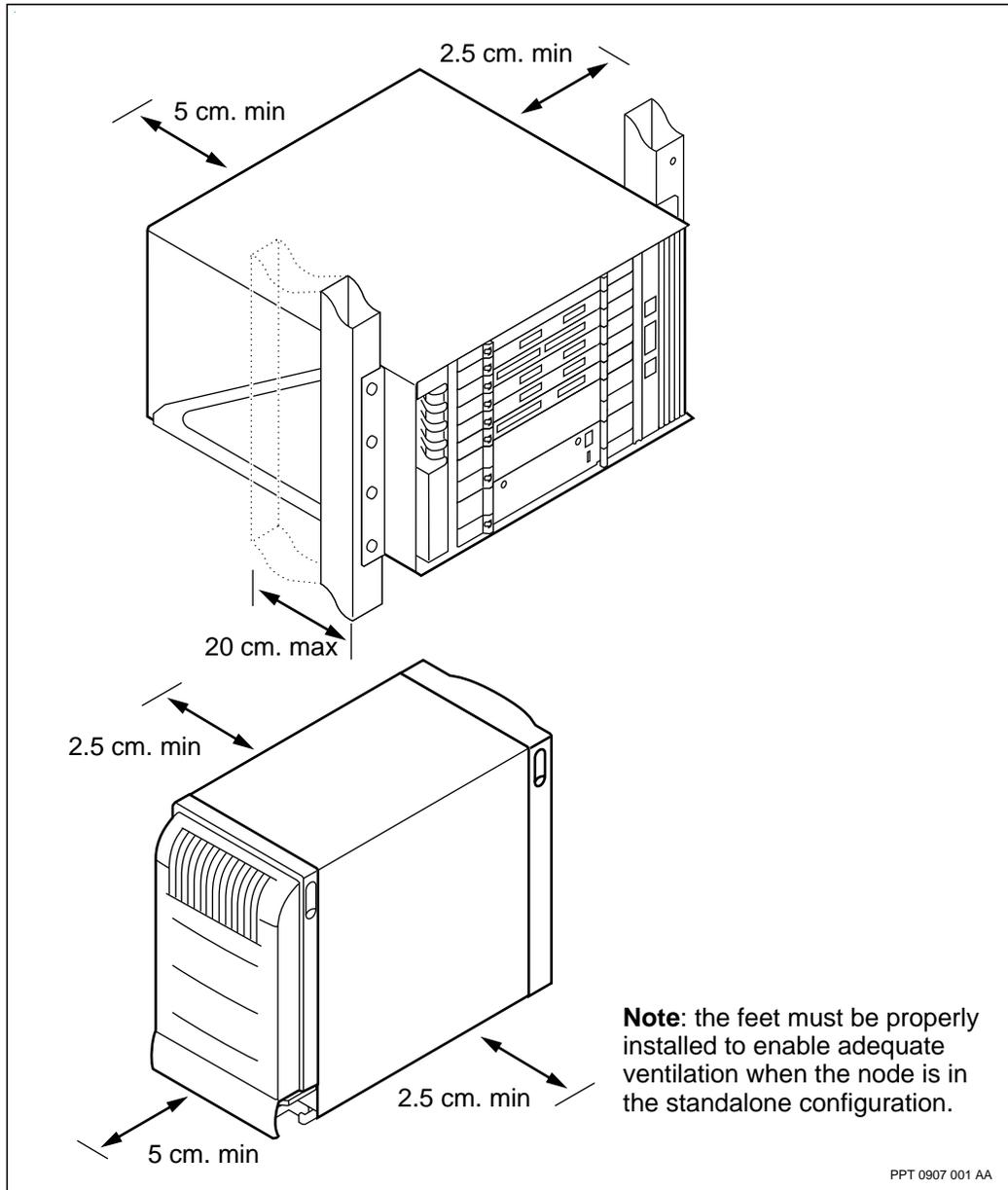
Noise levels

The noise level for a 5-slot Passport switch is within the limits specified in the Telcordia GR-63-CORE standard.

The specific measurement for a front-facing switch in an open frame with no cover or door is 57.37 dBA.

5-slot Passport switch processor card and power requirements

The following table lists five configurations that meet the minimum processor card requirements for a 5-slot Passport switch. This table also identifies whether the configuration requires you to use power supply models NTEP26CA (ac) or NTEP27CA (dc).

Table 15
5-slot Passport switch processor card and power requirements

Configuration	CA power supply
CP in slot 0, plus one FP	Required
CP in slot 0, plus two FPs	Optional
CP in slots 0 and 4, plus one FP	Optional

5-slot Passport switch power supply locks

Each 5-slot Passport switch power supply has locks on the faceplate to protect personnel.

5-slot Passport switch ac power source requirements

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> Empty power supply bays must be fitted with power supply blanks in order to meet EMI regulatory requirements and thermal specifications.

For ac installations, the power supply must be within 3 m (10 ft) of an individually-fused wall outlet. The wall outlet must accept a 3-pin plug.

Each ac power supply must come from a separate disconnect device at the ac distribution panel. Each ac outlet must be wired separately to the ac distribution panel. The protection circuit current rating must be:

- 15 A (120 V ac) for North America

- 6.3 A (240 V ac) for Europe

Ac power supplies are self-adjusting to the ac primary voltage input in the ranges of:

- 100 to 120 V ac for North America

- 200 to 240 V ac for Europe

5-slot Passport switch ac power input requirements

For ac installations, the power source can be either 120 or 220 V ac, single-phase.

Table 16
5-slot Passport switch ac power requirements

Parameter	220 V ac Input	120 V ac Input
Nominal input voltage	200 to 240 V ac with input operational range of 180 to 250 V ac	100 to 120 V ac with input operational range of 92 to 132 V ac
Current	3 A max	7 A max
Frequency	47 to 63 Hz	47 to 63 Hz
Output power	438 W	438 W

To prevent interruption of service, the power for each supply of a fully equipped switch should be supplied from an uninterruptable power supply rated at 800 W. This rating accounts for inefficiencies in the uninterruptable supply itself, and ensures that the Passport power requirements are met under all circumstances.

5-slot Passport switch ac power cords

Power cords are not shipped with Passport ac shelves but you can order them from Nortel Networks or use your own. ac power cords from Nortel Networks are regulatory-approved for use with Passport and are 3 m (9.8 ft) long. Do not use extension cords.

Power cords should meet safety standards for the country of installation and should be marked with the appropriate certification marks. (For details on common certification marks, approved organizations, and harmonization markings, see the *Power Cord Selection Guide* delivered with your Passport equipment.)

If you are installing in North America, see "North American power cord specifications" (page 107).

If you are installing in Europe, see "European power cord specifications" (page 107).

North American power cord specifications

Your power cords must meet these specifications:

- Plug: grounding plug (North American) NEMA 5-15P

- Rating: 13A, 125 V ac

- Conductor size: type SJT, 16 AWG (1.0 mm^2)

- Receptacle/Termination: grounding receptacle IEC 320/CEE22 Type 1B

European power cord specifications

Your power cords must meet these specifications:

- Plug: continental European set plug

- Rating: 10A, 250 V ac

- Conductor size: HAR flexible cord, 16 AWG (1.0 mm^2)

- Receptacle/Termination: grounding receptacle IEC 320/CEE22 type 1B

5-slot Passport switch dc power source requirements

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> Empty power supply bays must be fitted with power supply blanks in order to meet EMI regulatory requirements and thermal specifications.

To maintain an IEC 950 safety classification, you must protect the power feeds to a dc power supply with external circuit breakers or fuses. Doing so is critical to the safe operation of a Passport switch. In -48 V dc installations (typically North American), power feeds into the system require a 60 V dc rated circuit breaker or fuse. In -60 V dc installations (typically European), power feeds into the system require an 80 V dc rated circuit breaker or fuse. In all cases the circuit breaker or fuse must be rated for 20 A dc and have appropriate regulatory approvals.

The power source must be connected to a reliably grounded dc source obtained from an isolation transformer. The dc power source must be within the range of -39 to -72 V dc and capable of providing 625 W per unit, rated at 16 A dc for -39 V dc, and 9 A dc for -72 V dc.

5-slot Passport switch dc power input and wiring requirements

You must supply your own 10 AWG dc power wiring. Wiring must be

- approved for use in the country of installation

- rated for 20 A dc

- protected with a 20 A circuit breaker or fuse

The nominal input voltage can be -48/-60 V with an input operational range of -39 to -72 V. The maximum output power for each dc supply is 625 W.

Input voltage under minimum battery operating conditions must supply a minimum of -39.5 V to the power supply. For example, if the minimum battery specification for your site is -42 V, then the voltage can drop only 2.5 V. The maximum dc wire length for a voltage drop of 1 V using 10 AWG wire is 10 m (32 ft).

> *Note:* A length of 10 m is the distance from the power source to the unit. Total loop length (battery and battery return) is double this length.

Dc power wiring is connected to a two-position, barrier-type terminal strip on the rear of the power supply. The strip has a protective plastic cover.

North American installations must use #8, 10 AWG, 90˚ crimp ring lugs to connect to the power supply terminal strip. European installations must use #8, 10 AWG, 90˚ double crimp ring lugs approved for European requirements. The screws are 164-32 (#8).

The following text appears in German to comply with VDE requirements.

Das Geraet muss mindestens mit einer 6 mm^2 starken Leitung angeschlossen werden (Strombelastung 20 Amp dc).

Die Leitung muss mit einer Sicherung (CB) abgesichert werden.

Die Drahtlaenge darf 10 Meter nicht uebersteigen (fuer hin- und rueckfuehrung).

Die Gleichspannung wird an eine zweipolige Klemme angeschlossen, die sich unter einer Plastikabdeckung befindet.

Es muessen Schrauboese verwendet werden, die mindestens 6 mm Drahtdurchmesser aufnehmen koennen.

You must relieve strain on the wire connected to the terminal strip. To relieve any strain, use the clamp beneath the terminal strip on the rear housing of the switch. You must replace the protective cover of the strip after you finish wiring the switch.

5-slot Passport switch grounding requirements

Passport is grounded to protect both personnel and equipment.

The grounding pin of the power cord's ac plug provides the ground for a 5-slot Passport switch.

For dc grounding, a 5-slot Passport switch contains a separate ground stud located near the top of the rear housing.

The shelf assembly contains an electrostatic discharge (ESD) jack. Plug the antistatic wrist strap into the ESD jack and wear the strap whenever you handle processor cards or other hardware that is sensitive to electrostatic discharge.

For further information see the section on grounding in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

5-slot Passport switch cabling requirements

If you have a fully-configured switch with 13" rear-mounted termination panels, you will get the best cable routing between the lower cable organizer and the cable-support guide if

- cable diameters do not exceed 0.8 cm (5/16 inch)

- cable flexibility allows for a bend radius of 2.5 cm (1 inch)

If you will install a rear cover, the maximum height of the connector body and cable-bend radius is 7.6 cm (3 inches). See the figure "Cable recommendation for a 5-slot Passport switch" (page 111)

On the back of a 5-slot Passport switch there are three D-type connectors:

- DB-9 for operator port 0

- DB-9 for operator port 4

- DB-15 for an external alarm connection

Any connections to the rear of the 5-slot Passport switch must be made with shielded cables to meet electromagnetic interference (EMI) regulatory requirements.

Figure 35
Cable recommendation for a 5-slot Passport switch

3 in. max.

PPT 0916 001 AA
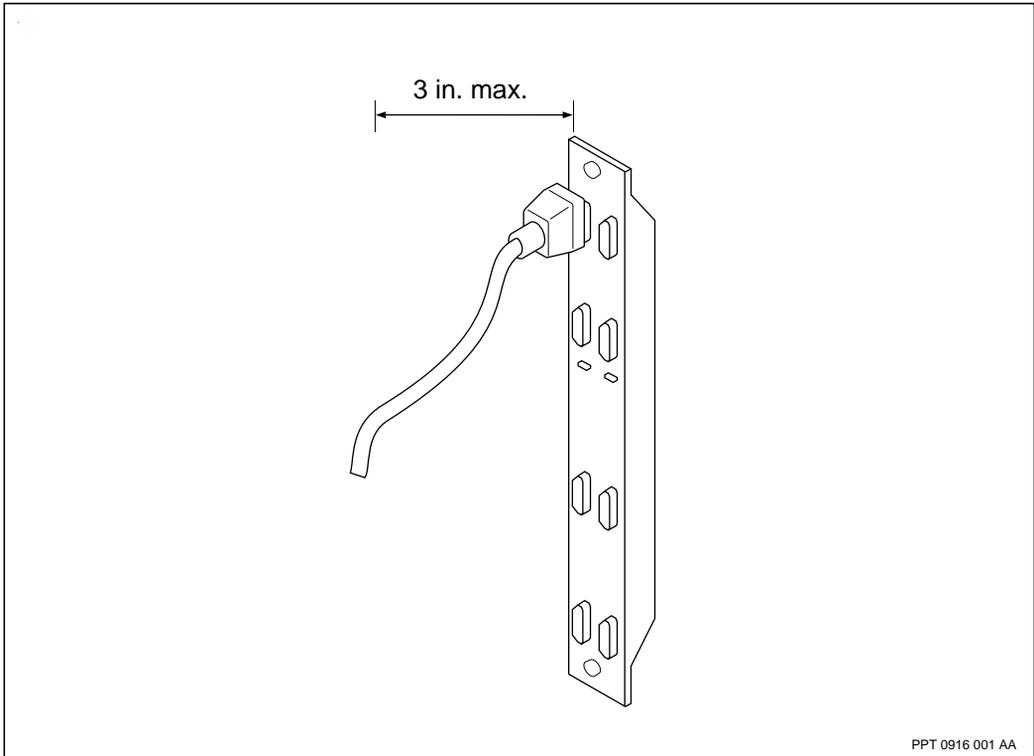
5-slot Passport switch alarms

Hardware alarms on the 5-slot Passport switch are displayed on LEDs located on the front of the switch. Red indicates a major alarm has been generated; yellow indicates a minor alarm. A green LED indicates that there is power to the shelf.

The status of most of the hardware equipment on a Passport 7400 can also be checked in software. 241-5701-520 *Passport 7400, 15000, 20000 Troubleshooting and Testing* describes the procedures for verifying hardware status.

A major alarm would be activated if a FP or control processor (CP) fails.

A minor alarm is activated if one of the following occurs:

- a power supply fails

- a fan in the cooling unit fails

- the cooling unit becomes disconnected from the shelf assembly

The 5-slot Passport switch does not generate an alarm if you remove a power supply from the shelf.

If your installation has external alarms, the switch also generates an external alarm.

For information on alarm cabling and external alarm installation see "Alarm hardware installation" in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

External alarms

Refer to "External alarms" (page 144)

Compliance to electrical and safety standards

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> To meet electromagnetic interference (EMI) regulatory requirements and thermal specifications, all blank slots must be fitted with a blank FP faceplate. Additionally, empty power supply bays require power supply blanks to meet both EMI and thermal specifications.

Passport switches comply with both North American and international regulatory safety requirements.

5-slot Passport switch standards compliances

The 5-slot Passport switch complies with the following standards:

- UL Listed. UL1950 Data processing equipment

- CSA certified per CSA C22.2 No. 950-M89 Information Technology Equipment

- Nortel Networks corporate safety standards 9001

- European Norm EN60950 (VDE)

- FCC Part 15B Class A system

- EN 55022 Class A

- CISPR 22 Class A

- EN50082-1

- ICES-003 issue

- AS/NZ 3548

- VCCI Class 1

- GR-1089-CORE

- GR-63-CORE, Issue 1, October 1993 NEBS

- FCC Part 68

- Industry Canada CS-03

- GR-78-CORE

The dc power supply of the 5-slot Passport switch complies with the appropriate sections of these documents:

- In North America, UL and CSA specifications apply to an absolute minimum input voltage of -60 V dc, wherein battery return (BR) and Logic Return (LR) are properly grounded. The BR and LR are grounded at the system ground window according to Nortel Networks corporate grounding standard CS 1422.

- In the international market, specifications apply to an absolute maximum input voltage of -72 V dc, wherein BR and LR are properly grounded. The BR and LR are grounded at the system ground window according to Nortel Networks corporate grounding standard CS 4122.

- UL 1950; March, 1989; Safety of Information Technology Equipment

- CSA C22.2 950; October, 1989; Information Technology Equipment

- EN 60950; 1988; Information Technology Equipment

Chapter 6
16-slot Passport switch hardware

See the following sections for information about the 16-slot Passport switch:

16-slot Passport switch shelf assembly

A 16-slot Passport switch contains the equipment shown in the following figure. Nortel recommends operating a 16-slot shelf with a spare control processor (CP). A spare CP provides the maximum robustness and redundancy; however, it is not required. For specific dimensions and weights, see "16-slot Passport switch dimensions and weights" (page 117).

To see the ac and dc shelf assemblies, see "16-slot Passport switch ac and dc shelf assemblies" (page 118). Both versions have replaceable power supplies.

Figure 36
16-slot Passport switch shelf assembly
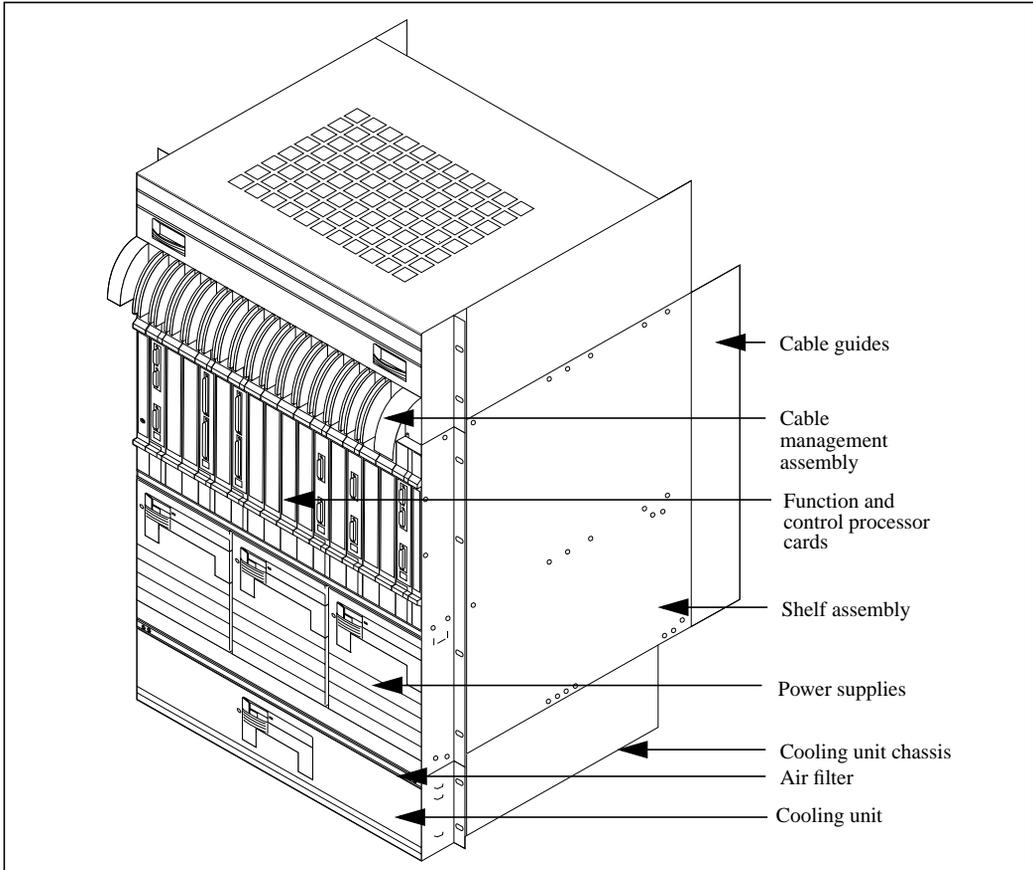
16-slot Passport switch dimensions and weights

This table summarizes the approximate dimensions and weights of the hardware you may be handling.

Table 17
16-slot Passport switch equipment dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
Shelf assembly with cooling unit, air filter assembly, cable management unit, 3 power supplies, 2 CPs, 14 FPs	84.5 cm x 44.5 cm x 50 cm (33.25 in. x 17.5 in. x 19.75 in.)	80.6 kg (177 lb)
Empty shelf assembly *Note:* This set of dimensions does not include the cable management unit or the cooling unit. The depth measurement includes cable guides.	53.5 cm x 44.5 cm x 50 cm (21 in. x 17.5 in. x 19.75 in.)	20.9 kg (46 lb)
Cable management unit	18 cm x 44.5 cm x 48 cm (7 in. x 17.5 in. x 18.75 in.)	5.5 kg (12 lb)
Cooling unit shelf, including air filter assembly	13.5 cm x 44.5 cm x 37.5 cm (5.25 in. x 17.5 in. x 14.75 in.)	9.1 kg (20 lb)
Power supply (ac) *Note:* The depth measurement includes the connector on the back.	19 cm x 15 cm x 41 cm (7.5 in. x 5.75 in. x 16 in.)	6.6 kg (14.5 lb)
Power supply (dc) *Note:* The depth measurement includes the connector on the back.	19 cm x 15 cm x 41 cm (7.5 in. x 5.75 in. x 16 in.)	6.2 kg (13.7 lb)
Power supply (blank)	17.0 cm x 14.4 cm x 36.7 cm (6.7 in. x 5.7 in. x 14.0 in.)	1.0kg (2.2lb)

16-slot Passport switch ac and dc shelf assemblies

There are two types of shelf assemblies: one for ac installations and one for dc installations.

Figure 37
16-slot Passport switch ac and dc shelf assemblies
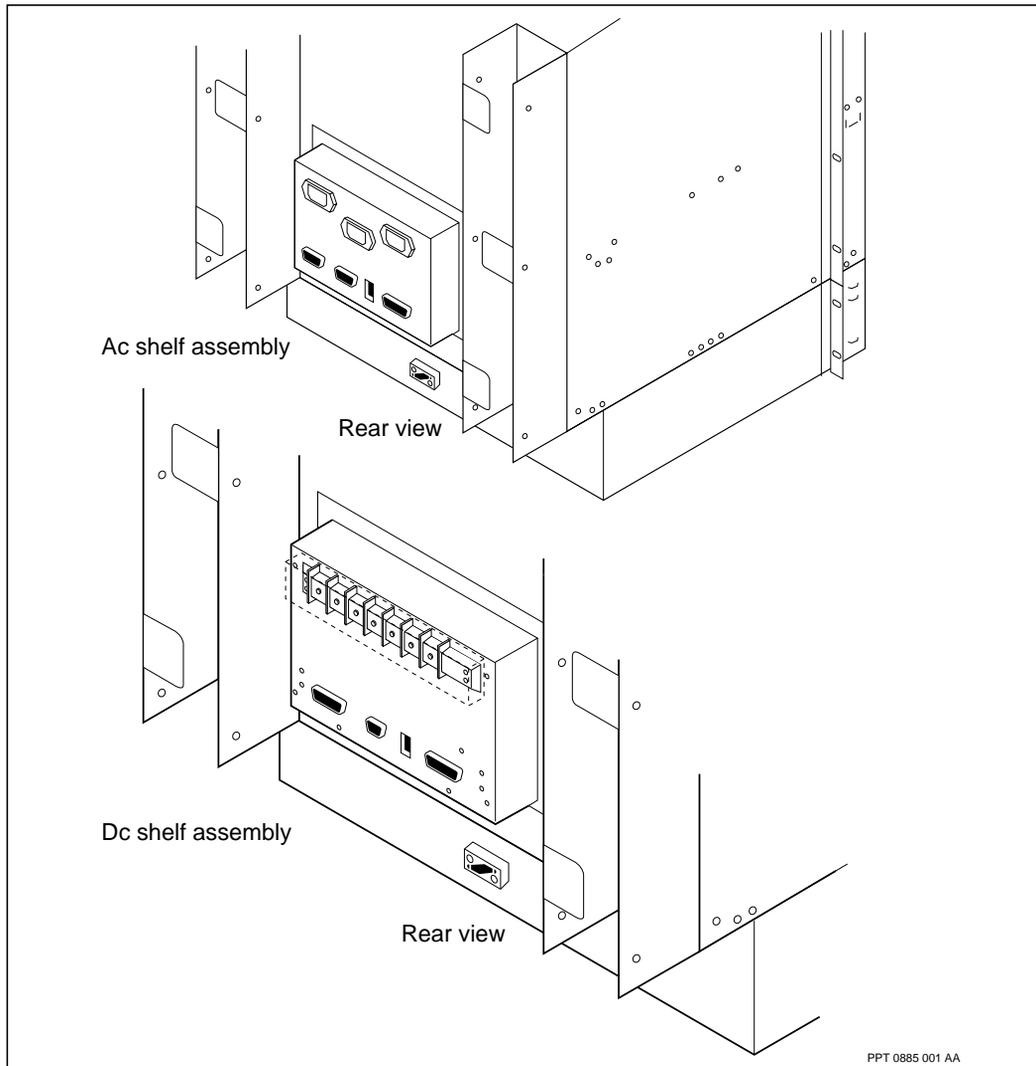
PPT 0885 001 AA

16-slot Passport switch hardware configurations

Passport hardware provides maximum configuration flexibility. Your installation may include configurations similar to these:

- "Passport cabinet containing one switch" (page 120)

- "Passport cabinet containing two switches" (page 121)

- "Standard 19-inch rack with two switches" (page 122)

See "16-slot Passport switch termination panels" (page 123) for more hardware configurations.

Figure 38
Passport cabinet containing one switch

DCP70054
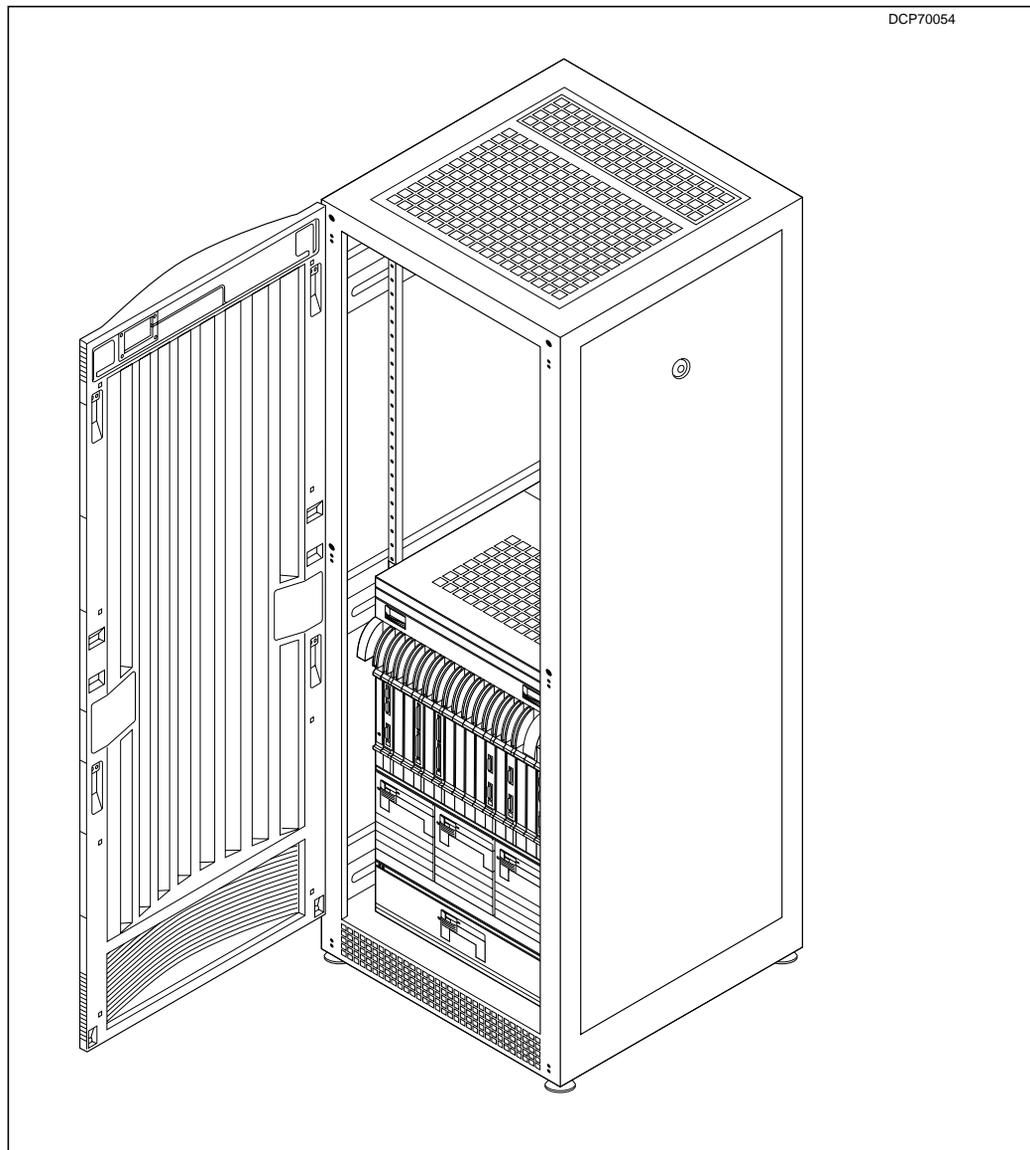
Figure 39
Passport cabinet containing two switches

Cable management unit

Node shelf assembly

Cooling unit assembly
(Cooling unit chassis,
cooling unit, and
air filter)

PPT 0890 001 AA
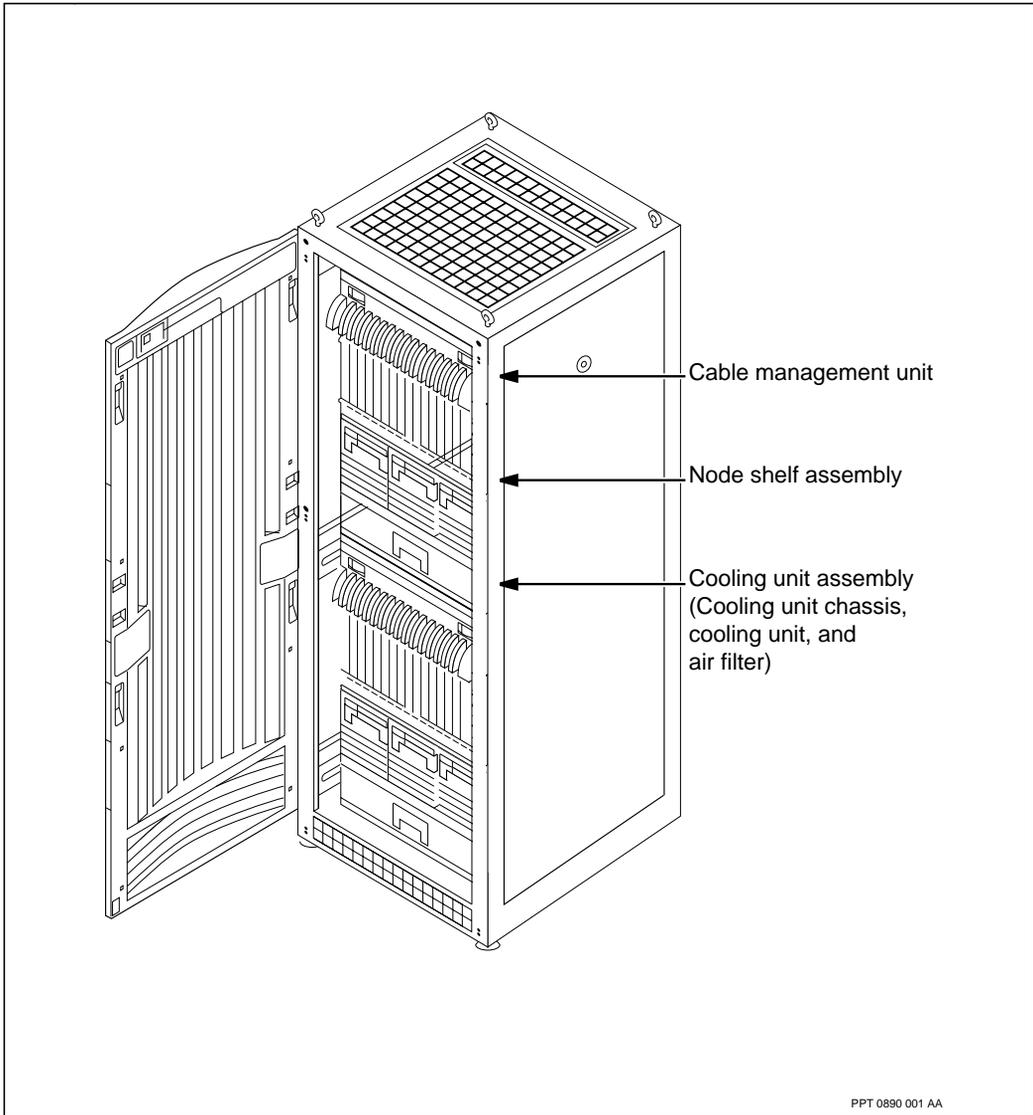
Figure 40
Standard 19-inch rack with two switches

Cable management unit

Node shelf assembly

Cooling unit assembly
(Cooling unit Chassis,
cooling unit and air filter)

PPT 0889 001 AA
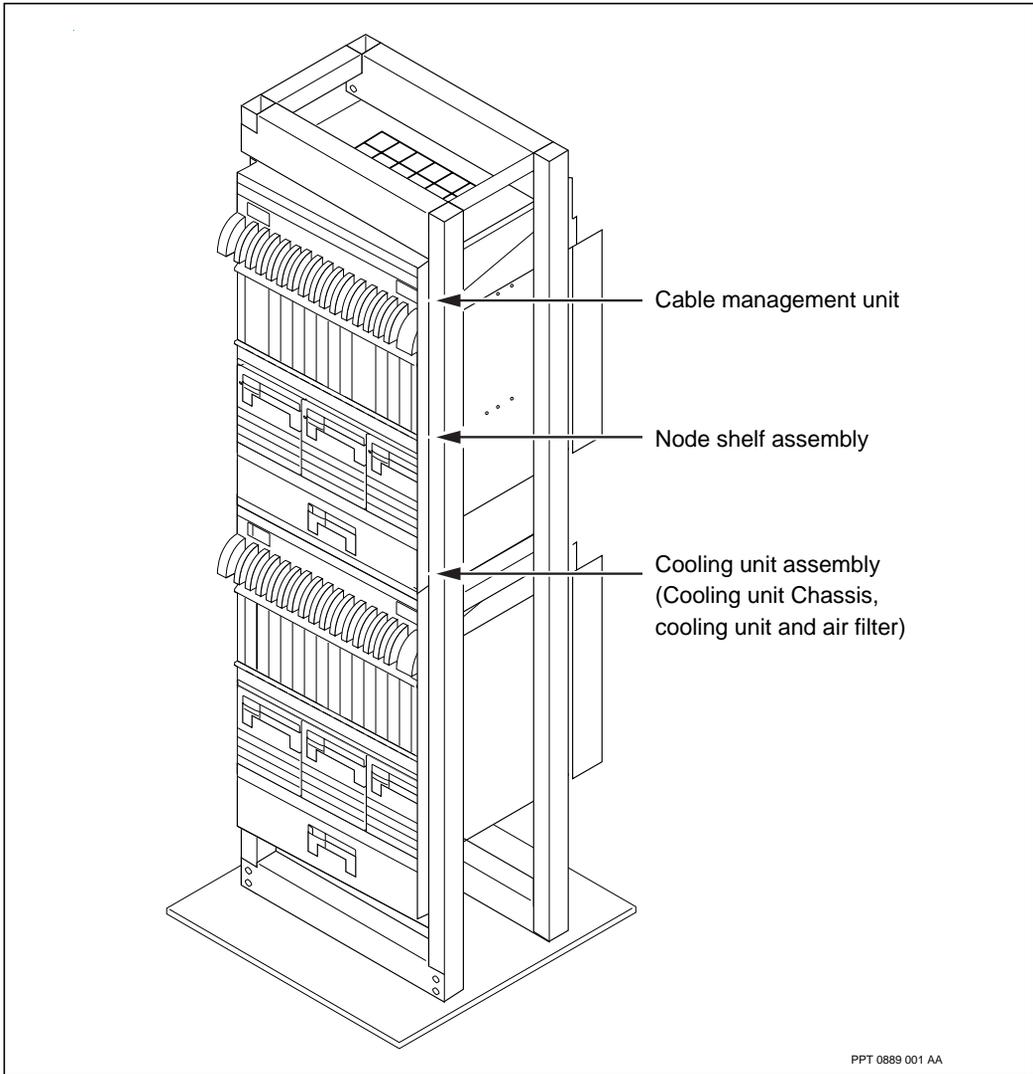
16-slot Passport switch termination panels

A 16-slot Passport switch uses 19" termination panels. A Passport cabinet equipped with one switch accommodates 14 termination panels in that cabinet. You can install seven panels in the upper front portion of the cabinet and seven panels in the upper rear portion of the cabinet.

If you install a second switch in a cabinet, you may need to move your termination panels to a separate cabinet or rack.

If you install termination panels in a separate 19-inch cabinet, leave at least 76 cm (30 in.) of space around the cabinet for access.

The following illustrations show some of the possible termination panel configurations for the 16-slot Passport switch:

Figure 41
Passport cabinet with one switch and termination panels

Front view

Rear view

PPT 0898 001 AA
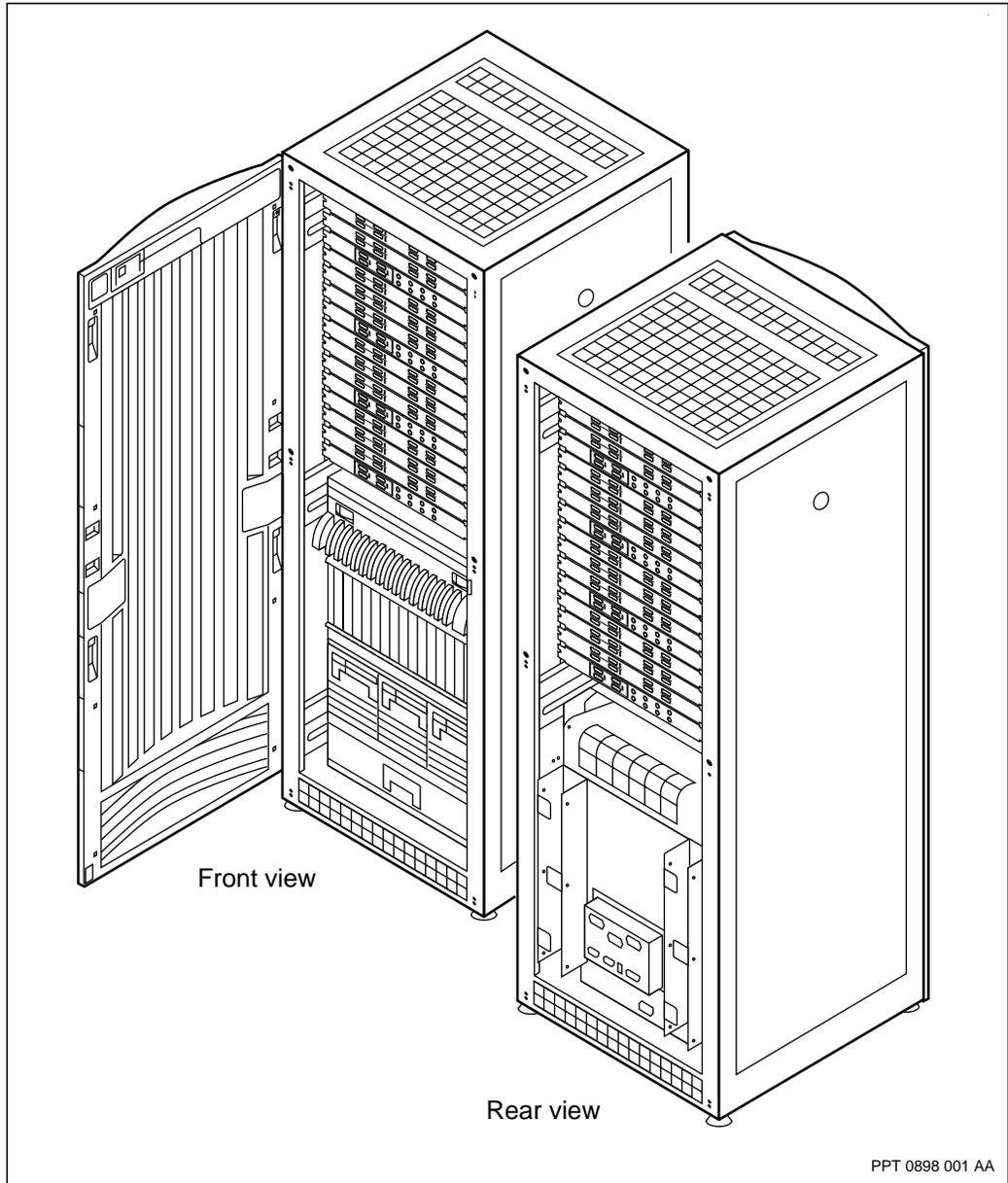
Figure 42
Standard 19-inch rack with termination panels
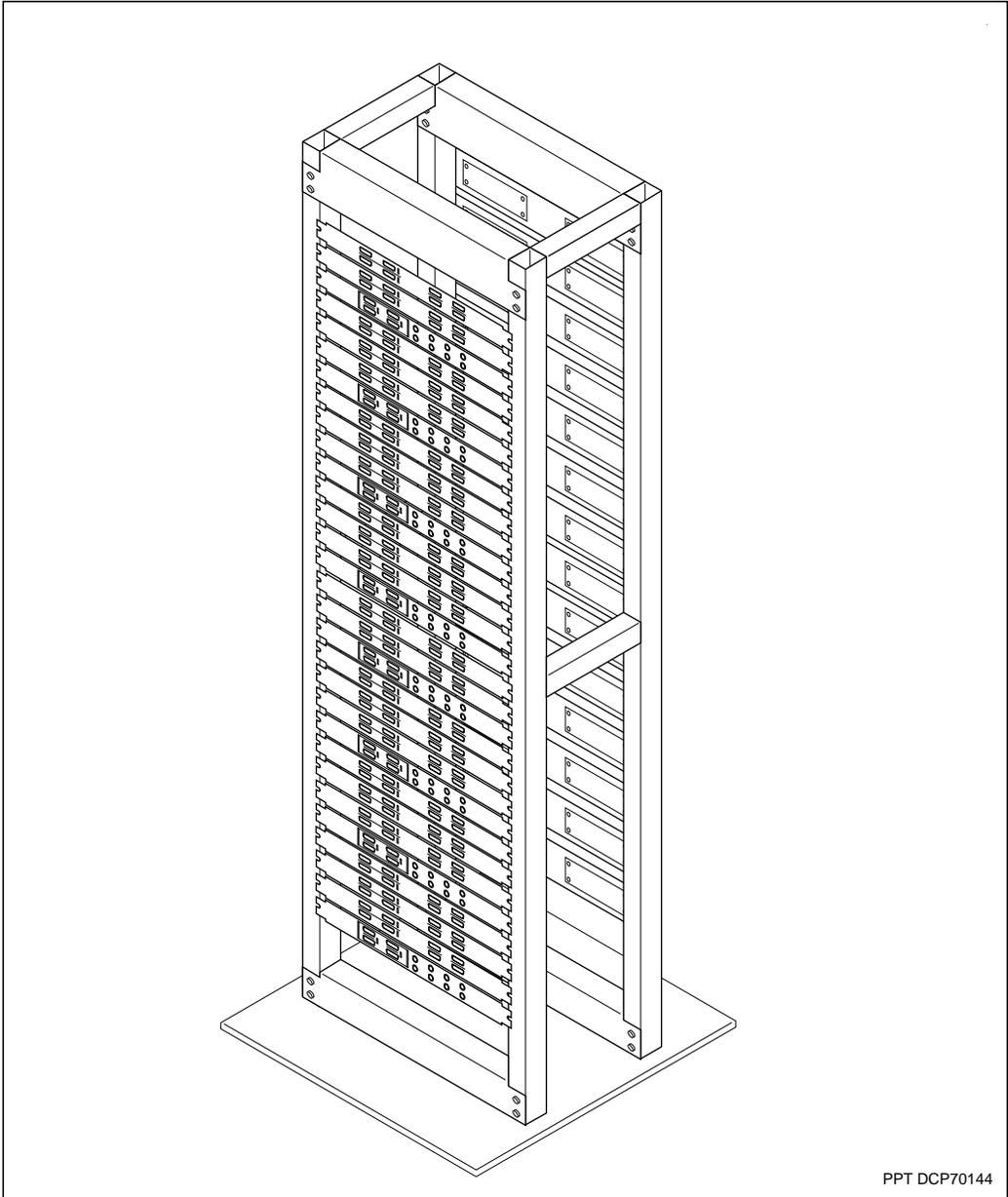
PPT DCP70144

Figure 43
Standard 19-inch rack with one switch and termination panels
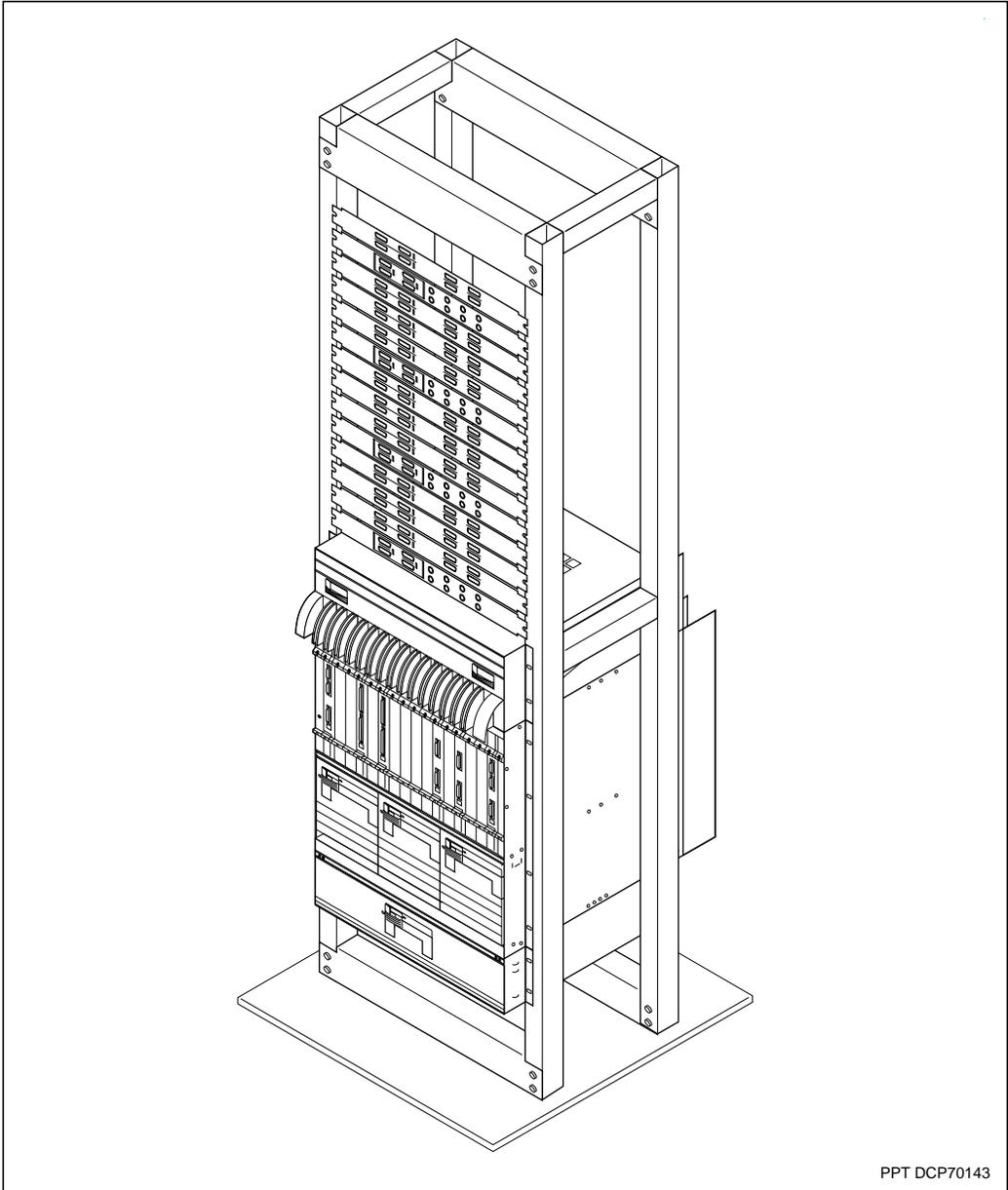
PPT DCP70143

Figure 44
Switch in a Passport cabinet and termination panels in a standard 19-inch rack

Card cables

Customer equipment cables

Cable tray

9 meters
(29 feet)
maximum
for data
cables

Cable
guides

0.5 meters
(1.6 feet)
maximum
for power
cables

Front view

Standard 19-in. rack

PPT 0902 001 AA
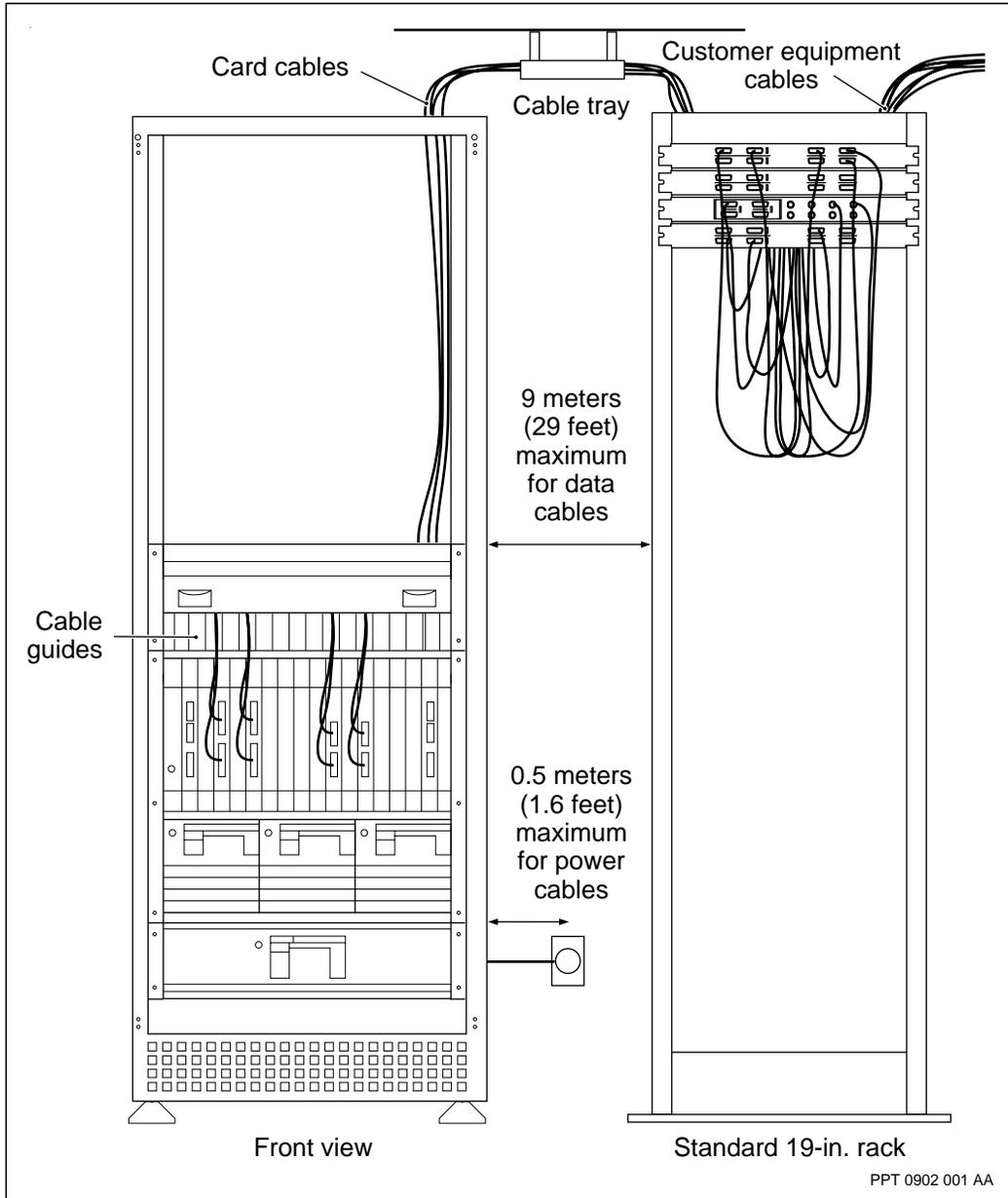
16-slot Passport switch environmental requirements

⚠	**WARNING** **Damage to equipment; electromagnetic interference** To meet EMI regulatory requirements and thermal specifications, all blank slots must be fitted with a blank FP faceplate. Additionally, empty power supply bays require power supply blanks to meet both EMI and thermal specifications.

The recommended environmental conditions for Passport hardware are given in this table.

Table 18
Environmental requirements

Environmental factor	Mode	Specification
Temperature	Operating	10˚C to 40˚C (one 16-slot Passport switch installed in a cabinet with doors)
		10˚C to 30˚C (two Passport 7400 16-slot Passport switches or one 16-slot Passport switch and one 5-slot Passport switch installed in a cabinet with doors)
		10˚C to 35˚C (two Passport 7400 16-slot Passport switches or one 16-slot Passport switch and one 5-slot Passport switch installed in a cabinet without doors)
	Rate of Change	<10˚C/hr
	Storage	-40˚C to +70˚C
	Rate of Change	<100˚C/hr
Relative Humidity	Operating	10% to 80% non-condensing (5.2 kPa pressure maximum)
	Storage	10% to 80% non-condensing (5.2 kPa pressure maximum)
(Sheet 1 of 2)		

Table 18 (continued)
Environmental requirements

Environmental factor	Mode	Specification
Altitude	Operating	61 m (200 ft) below sea level to 2000 m (6600 ft) above sea level
Particulate atmosphere		Class 100,000 (Fed. Std. No. 209B)
(Sheet 2 of 2)		

16-slot Passport switch ventilation and access clearances

A fully configured dual-shelf system generates about 3540 W, 1770 W from each shelf assembly. It needs specific clearances for ventilation and access.

Figure 45
16-slot Passport switch shelf assembly clearances

Minimum air intake area is 324 sq. cm (50 sq. in.)

Minimum air intake area is 526 sq. cm (80 sq. in.)

Minimum clearances between shelf assembly and cabinet		
	Area	Clearance
A	Fan drawer to base of cabinet	3.81 cm (1.500 in.)
B	Cable management unit to cabinet front drawer	0.64 cm (0.250 in.)
C	Cable channel to cabinet rear door	0.96 cm (0.375 in.)
D	Shelf side panels to cabinet side panels	3.5 cm (1.375 in.)
E	Cable management unit to top of cabinet	0.0 cm (0.0 in.)

PPT 0886 001 AA

Airflow velocity for a 16-slot shelf

A fully functional fan tray in a Passport 16-slot shelf generates 0.75 m/s of air flow. The amount of air flow is reduced to 0.55 m/s when a single fan unit fails.

Noise levels

The noise level for a 16-slot Passport switch is within the limits specified in the Telcordia GR-63-CORE standard.

The specific measurement for a front-facing switch in a seismic cabinet with the door closed is 56.34 dBA.

16-slot Passport switch thermal engineering guidelines

In addition to the ventilation and access requirements for a Passport switch, both the system configuration and the placement of processor cards on a shelf have an impact on the operating temperature of the processor cards and the switch. Air inlet and outlet temperatures can also have an impact on the long term reliability of hardware components.

In general, it is prudent to keep switch operating temperatures as low as possible. Therefore, when planning your system configuration, ensure that you are familiar with the information in the following sections:

- "Temperature impact of slot position in a 16-slot Passport switch" (page 131)

- "Temperature considerations for PVG configurations" (page 132)

- "Temperature impact of system configurations" (page 133)

- "Air inlet and outlet temperatures" (page 133)

Temperature impact of slot position in a 16-slot Passport switch

Using slot number eight as a base, the table "Temperature impact of slot position on processor cards" (page 132) shows the temperature increase for processor cards for each slot on the shelf. All temperature increases are stated in degrees Celsius.

Table 19
Temperature impact of slot position on processor cards

Slot number	Temperature delta with respect to slot eight
0	1
1	0.6
2	0.3
3	1.4
4	3.4
5	3.4
6	0.7
7	0.7
8	0
9	1.4
10	4.5
11	2.6
12	0.8
13	1.1
14	0.8
15	10.5

Temperature considerations for PVG configurations

Special considerations must be made for voice services processors (VSPs) when they are installed as part of a dual shelf configuration in a Passport or seismic cabinet. Slot choices for VSPs are restricted for elevations greater than 400 m (437.4 yds.) above sea level. The VSP should not be installed in slots 4, 5, 10, or 11 because of the their reduced cooling ability. In a redundant configuration this will not reduce shelf capacity.

Temperature impact of system configurations

Using a base system of a single 16-slot Passport switch installed in an open frame at sea level, the table "Temperature impact of system configurations" (page 133) shows the impact of various system configurations on the shelf operating temperature. All temperatures are stated in degrees Celsius.

Table 20
Temperature impact of system configurations

Configuration	Both fans running	Single fan failed
One shelf in a cabinet with doors	0	0
Two shelves in an open frame	2	4
Two shelves in a cabinet with doors	10	32
One shelf in an open frame, 2000 m (2187.2 yds.) above sea level	5	10
Two shelves in an open frame, 2000 m (2187.2 yds.) above sea level	8	15

Air inlet and outlet temperatures

When operating Passport switches, it is prudent to keep temperatures as low as possible. Conventional theory suggests that the mean time between failures (MTBF) can halve for every 5 Celsius (41 Fahrenheit) rise in temperature.

For long term reliability, do not allow the air inlet temperature for a Passport shelf to exceed 40 C (104 Fahrenheit). The maximum air inlet temperature for short term functionality (as defined in Telcordia GR-63-CORE, no more than a total of 96 hours for not more than 15 days in a year) is 55 C (131 Fahrenheit).

For long term reliability, the air outlet temperature for a Passport shelf should not exceed 60 C (140 Fahrenheit). The maximum air outlet temperature for short term functionality is 75 C (167 Fahrenheit).

16-slot Passport switch processor card requirements

The minimum processor card requirements for a 16-slot Passport switch are one of the following:

- one CP in slot 0, plus three FPs

- one CP in slot 0 and one CP in slot 15 (standby), plus one FP in any other slot

16-slot Passport switch ac power source requirements

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> Empty power supply bays must be fitted with power supply blanks in order to meet EMI regulatory requirements and thermal specifications.

For ac installations, the power supply must be within 3 m (10 ft) of an individually-fused wall outlet. The wall outlet must accept a 3-prong plug.

Each ac power supply must come from a separate disconnect device at the ac distribution panel. Each ac outlet must be wired separately to the ac distribution panel. The protection circuit current rating must be:

- 15 A (120 V ac) for North America

- 6.3 A (240 V ac) for Europe

Ac power supplies are self-adjusting to the ac primary voltage input in the ranges of:

- 100 to 120 V ac for North America

- 200 to 240 V ac for Europe

16-slot Passport switch ac power input requirements

For ac installations, the power source can be either 120 or 220 V ac single phase.

Table 21
16-slot Passport switch ac power requirements

Parameter	220 V ac Input	120 V ac Input
Nominal input voltage	200 to 240 V ac with input operational range of 180 to 250 V ac	100 to 120 V ac with input operational range of 92 to 132 V ac
Current	5 A max	10 A max
Frequency	47 to 63 Hz	47 to 63 Hz
Output power	600 W	600 W

To prevent interruption of service, the power for each supply of a fully
equipped switch should be supplied from an uninterruptable power supply
rated at 2000 W. This rating accounts for inefficiencies in the uninterruptable
supply itself, and ensures that the Passport power requirements are met under
all circumstances.

16-slot Passport switch ac power cords

Power cords are not shipped with Passport ac shelves but you can order them
from Nortel Networks or use your own. Ac power cords from Nortel
Networks are regulatory-approved for use with Passport and are 3 m (9.8 ft)
long. Do not use extension cords.

Power cords should meet safety standards for the country of installation and
should be marked with the appropriate certification marks. For details on
common certification marks, approved organizations, and harmonization
markings, see the *Power Cord Selection Guide* delivered with your Passport
equipment.

If you are installing a switch in North America, see "North American power
cord specifications" (page 136).

If you are installing a switch in Europe, see "European power cord
specifications" (page 136).

North American power cord specifications

Your power cords must meet these specifications:

- Plug: grounding plug (North American) NEMA 5-15P

- Rating: 13A, 125 V ac

- Conductor size: type SJT, 16 AWG (1.0 mm2)

- Receptacle/Termination: grounding receptacle IEC 320/CEE22 Type 1B

European power cord specifications

Your power cords must meet these specifications:

- Plug: continental European set plug

- Rating: 10A, 250 V ac

- Conductor size: HAR flexible cord, 16 AWG (1.0 mm2)

- Receptacle/Termination: grounding receptacle IEC 320/CEE22 type 1B

16-slot Passport switch dc power source requirements

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> Empty power supply bays must be fitted with power supply blanks in order to meet EMI regulatory requirements and thermal specifications.

To maintain an IEC 950 safety classification, you must protect the power feeds to a dc power supply with external circuit breakers or fuses. Doing so is critical to the safe operation of a Passport switch. In -48 V dc installations (typically North American), power feeds into the system require a 60 V dc rated circuit breaker or fuse. In -60 V dc installations (typically European), power feeds into the system require an 80 V dc rated circuit breaker or fuse. In all cases the circuit breaker or fuse must be rated for 30 A dc per unit or 60 A dc per switch and have appropriate regulatory approvals.

The power source must be connected to a reliably grounded dc source obtained from an isolation transformer. The dc power source must be within the range of -39 to -72 V dc and capable of providing 1000 W per unit, rated at 25 A dc for -39 V dc, and 14 A dc for -72 V dc, or 2000 W per switch, rated at 50 A dc for -39 V dc, and 28 A dc for -72 V dc.

16-slot Passport switch dc power input and wiring requirements

You must supply your own dc power cords. Cables must be able to carry 30 A dc and must be protected with a 30-Amp circuit breaker or fuse.

The nominal input voltage can be -48/-60 V with an operational range for input power of -40 to -72 V dc. The output power cannot exceed 600 W.

Input voltage under minimum battery operating conditions must supply a minimum of 39.5 V to the power supply. For example, if the minimum battery specification for your site is 42 V, then the voltage can drop only 2.5 V.

The maximum length for different wire gauges for a voltage drop of 1 V are

- 10 gauge (2.58 mm): 6.6 m (20 ft)

- 8 gauge (3.26 mm): 10 m (30 ft)

- 6 gauge (4.12 mm): 16.6 m (50 ft)

These lengths are the maximum distances from the power source. Total loop length (battery and battery return) is double the length.

Dc power cables are connected to a seven-position barrier-type terminal strip. The connector is a ring lug #10 stud size. The screws are 190-32 (#10).

In all cases, the -48/-60 V dc power feeds into the system must be protected with an external circuit breaker or fuse, with appropriate voltage ratings and regulatory approvals.The disconnect device must be external to the Passport 7400 cabinet and reside in the same room as the cabinet. It must be at least as fast as the maximum allowable trip times indicated below. A fast-acting protection device can be used since the inrush current into the system is controlled to be less than 25 A peak. The protection device must be capable of supporting 23 A dc indefinitely. It must have a voltage rating of 48/60 V dc

nominal and a current rating of 30 A nominal for each power supply. An AIRPAX 30 A circuit breaker from the IEG family with a voltage rating of 80 V dc and with a delay type 52 meets these requirements.

Table 22
Allowable trip times for 16-slot Passport switch power feed protection devices

Current (amps)	30	37.5	45	60	120	180	240	300
Maximum trip time (seconds)	-	60	30	10	2	1	0.5	0.1

16-slot Passport switch grounding requirements

To protect both personnel and equipment, you must connect ac grounds from all equipment (including Passport cabinets, termination panel cabinets, local operator terminal, and external dc grounds) to a single ac distribution panel ground point. You must also connect all equipment frames and the external dc power supply returns to this common grounding scheme.

Nortel Networks provides the grounding straps that connect cabinets to a termination panel and the grounding plates that ground termination panels together. You must provide enough 6 gauge (4.12 mm) wire to connect each cabinet and all other equipment to the ac distribution panel ground.

The shelf assembly contains an electrostatic discharge (ESD) jack. Plug an antistatic wrist strap into this jack. You must wear an antistatic wrist strap whenever you handle hardware, such as the FPs and CPs, that is sensitive to electrostatic discharge.

The ac power supply's ac ground pin is part of the ac connector and is located at the rear of the unit as shown in "Ac power supply ground pin" (page 139).

Figure 46
Ac power supply ground pin
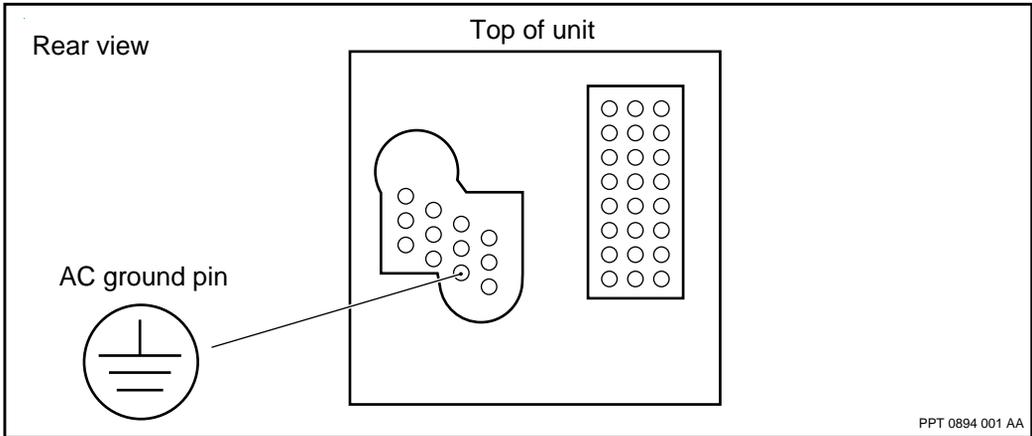
16-slot Passport switch ac grounding scheme

Grounding for the ac configuration is based on a single-point ground concept where each Passport switch is a separate entity. The ground is taken through the ac plug to the ground window by way of a fuse panel. You must also connect all equipment frames to the grounding point.

Figure 47
Ac grounding scheme

Passport

Ground lead provided
Power Supply AC input receptacles

Shelf ground stud

ACEGs within power cords

Shelf

Modem C (differential interface)

LR

Power Supply

Customer-provided 19-inch termination panel rack

All shields and faceplate are connected

Ground studs on rear of cabinet

Shelf

Shield

logic grd

Shield

logic grd

AC earth ground (ACEG)

Modem A (single-ended interface)

LR

Power Supply

#6 AWG wire (see note)

Ground lead provided

#6 AWG wire provided by customer to term. panel rack

#6 AWG wire provided by customer to ground AC outlets on separate floors to the same ground window

ACEG

AC coupled modem link

Modem B

Power Supply

Note: 1) Single point grounding system, ie: all grounds in same fuse panel
2) If termination panels are properly installed in a Passport cabinet, the grounding wire between termination panels and the node is not required.
3) #6 AWG wire provided by customer to cabinet frame.

ACEG

PPT 3080 002 AA

16-slot Passport switch dc grounding scheme

Grounding for the dc configuration is based on separate signal and frame grounds. These are separately connected directly to the ground window. External dc power supply returns must also be connected to the common grounding point.

Figure 48
Dc grounding scheme

PPT 3080 001 AA
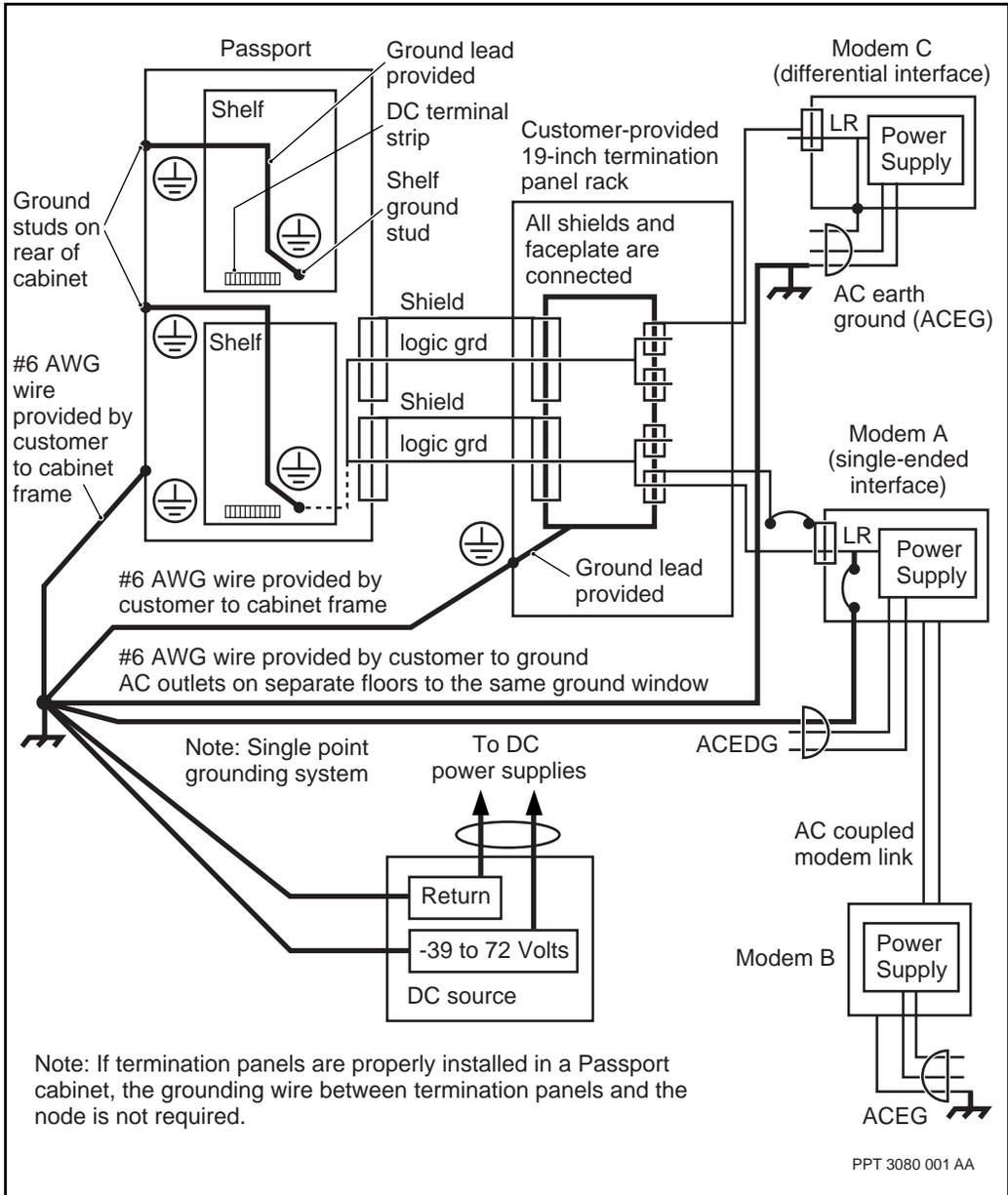
16-slot Passport switch alarms

You must install either a rack-mounted alarm panel or a Passport door alarm cable to monitor alarms on site. If you want to display alarms at a remote location, the 5-slot and 16-slot switches provide a remote external alarm connection.

Hardware alarms for the 16-port Passport switch are displayed on LEDs on the cabinet or on a rack-mounted alarm panel. Red indicates a major alarm has been generated; yellow indicates a minor alarm. A green LED indicates that there is power to the shelf.

The status of most of the hardware equipment on a Passport 7400 can also be checked in software. 241-5701-520 *Passport 7400, 15000, 20000 Troubleshooting and Testing* describes the procedures for verifying hardware status.

A major alarm would be activated if a FP or control processor (CP) fails.

A minor alarm is activated if one of the following occurs:

- a power supply fails

- a fan in the cooling unit fails

- the cooling unit becomes disconnected from the shelf assembly

A Passport switch does not generate an alarm if you:

- remove a power supply from the shelf

- move the switch on the faceplate of the power supply to the standby position

If your installation has external alarms, the switch also generates an external alarm. See "External alarms" (page 144)

To reset a minor alarm, correct the fault. After you correct the fault, the switch reopens the minor alarm contacts. After you clear a major alarm, you can reset the alarm hardware to clear the alarm.

For information on alarm cabling and external alarm installation see "Alarm hardware installation" in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

External alarms

Connecting the external alarm cabling is optional. If you do, the procedure is the same for the 5-slot and 16-slot models.

Shielded cables are required for the external alarm connections. For pinouts see "Pinout information for alarm connectors" (page 145)

The external alarm cable connects to the cabinet via a D-type, 15-pin connector, labelled "Alarm 1" or "ALM 1. The Passport switch provides dry relay contacts that close when the switch generates an alarm." There are three sets of major alarm contacts and three sets of minor alarm contacts. You can use each set to generate alarms at a different location. The figure "Example of a major alarm connection" (page 144) shows an external alarms system that lights a bulb when the shelf generates a major alarm.

Figure 49
Example of a major alarm connection
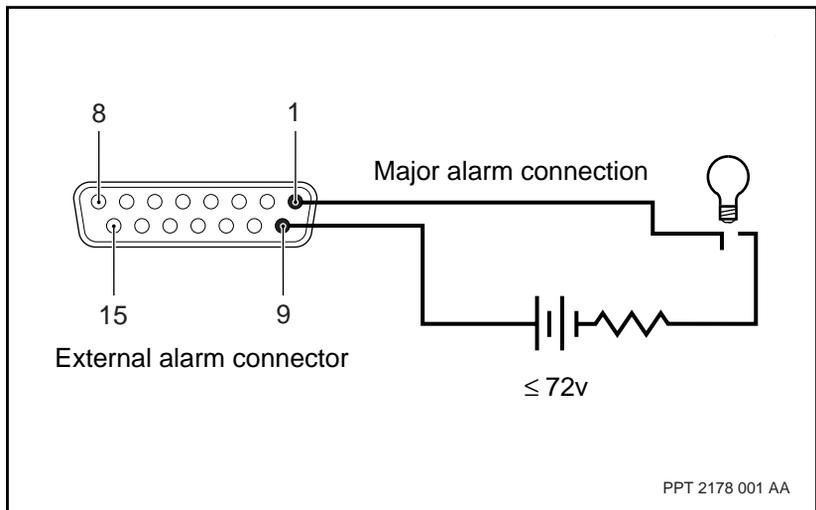
Each set of contacts is rated at 72 V DC, 1 A DC. Your alarm system must provide its own power.

You can insert a switch between the alarm cable and your alarm system to allow you to isolate your alarm system from the Passport 7400 alarm circuit (relay contacts) during repairs. Remember to set the switch to the ON position after any repair.

Pinout information for alarm connectors

This section provides the pinout information for the alarm connectors. The tables are as follows:

- "External alarm connector pinouts" (page 145)

- "Pinout of 16-slot Passport switch Alarm 2 shelf connector" (page 146)

- "Pinout of a 16-slot Passport switch door alarm connector" (page 146)

- "Pinout of a 16-slot Passport switch cooling unit connector" (page 147)

Table 23
External alarm connector pinouts

Pin number	Contact
1	major alarm connection for location 1
2	major alarm connection for location 2
3	major alarm connection for location 3
4	no connection
5	minor alarm connection for location 1
6	minor alarm connection for location 2
7	minor alarm connection for location 3
8	no connection
9	major alarm connection for location 1
10	major alarm connection for location 2
11	major alarm connection for location 3
12	no connection
13	minor alarm connection for location 1
14	minor alarm connection for location 2
(Sheet 1 of 2)	

Table 23 (continued)
External alarm connector pinouts

Pin number	Contact
15	minor alarm connection for location 3
Note: All relay contacts are normally open.	
(Sheet 2 of 2)	

Table 24
Pinout of 16-slot Passport switch Alarm 2 shelf connector

Pin number	Signal name
1	major alarm
2	no connection
3	minor alarm
4	no connection
5	12VDOOR
6	ALCOFN
7	ground
8	no connection
9	no connection

Table 25
Pinout of a 16-slot Passport switch door alarm connector

Pin number	Signal name
1	ALCONF
2	12VDOOR
3	major alarm
4	ground
(Sheet 1 of 2)	

Table 25 (continued)
Pinout of a 16-slot Passport switch door alarm connector

Pin number	Signal name
5	minor alarm
6	FGND
(Sheet 2 of 2)	

Table 26
Pinout of a 16-slot Passport switch cooling unit connector

Pin number	Signal name
1	24RETFAN1
2	24RETFAN1
3	24RETFAN2
4	ground
5	12VFAN2
6	12VFAN2
7	no connection
8	5V
9	FANFAILN
10	24RETFAN2
11	ground
12	12VFAN1
13	12VFAN1
14	FGND
15	5V N/U

16-slot Passport switch shelf interconnect cable

If you install two switches in a Passport cabinet or rack, you can use the shelf interconnect cable. The shelf interconnect cable connects the Alarm 2 connectors of both shelves. This connection provides a single source of alarms for the door alarm and the external alarms connector, Alarm 1. The interconnect cable is available separately from Nortel Networks.

Compliance to electrical and safety standards

> **WARNING**
> **Damage to equipment by electromagnetic interference**
> To meet electromagnetic interference (EMI) regulatory requirements and thermal specifications, all blank slots must be fitted with a blank processor card (NTBP23). Additionally, empty power supply bays require power supply blanks to meet both EMI and thermal specifications.

Passport switches comply with both North American and international regulatory safety requirements.

16-slot Passport switch standards compliances

The 16-slot Passport switch complies with the following regulatory standards:

- UL Listed. UL1950 Data processing equipment

- CSA certified per CSA C22.2 No. 950-M89 Information Technology Equipment

- Nortel Networks corporate safety standards 9001

- European Norm EN60950 (VDE)

- FCC Part 15B Class A system

- EN 55022 Class A

- CISPR 22 Class A

- EN50082-1

- ICES-003 issue

- AS/NZ 3548

- VCCI Class 1

- GR-1089-CORE

- GR-63-CORE

- FCC Part 68

- Industry Canada CS-03

- GR-78-CORE

The dc power supply of the 16-slot Passport switch complies with the appropriate sections of these documents:

- In North America, UL and CSA specifications apply to an absolute minimum input voltage of -60 V dc, wherein battery return (BR) and Logic Return (LR) are properly grounded. The BR and LR are grounded at the system ground window according to Nortel Networks corporate grounding standard CS 1422.

- In the international market, specifications apply to an absolute maximum input voltage of -72 V dc, wherein BR and LR are properly grounded. The BR and LR are grounded at the system ground window according to Nortel Networks corporate grounding standard CS 4122.

- UL 1950; March, 1989; Safety of Information Technology Equipment

- CSA C22.2 950; October, 1989; Information Technology Equipment

- EN 60950; 1988; Information Technology Equipment

Chapter 7
Passport cabinet

This chapter contains a description of Passport cabinets. It includes:

*   "Locks on Passport cabinets" (page 151)

*   "Passport cabinet dimensions and weights" (page 152)

*   "Passport cabinet alarm connectors" (page 153)

*   "Passport cabinet environmental requirements" (page 156)

Locks on Passport cabinets

Passport cabinets have locking doors. The two keys that come with the cabinet fit both front and rear doors. Only service personnel should have these keys.

	WARNING **Risk of injury by electric shock** Only service personnel should have keys to the cabinet.

	WARNUNG **Verletzungsgefahr durch Elektroschock** Der Zugang zum Gerät mit dem Service-Schlüssel ist nur dem Service-Personal gestattet.

Note: The above warning appears in German to comply with VDE regulatory requirements.

Passport cabinet dimensions and weights

This table summarizes the approximate dimensions and weights of the hardware. Generally, ensure that loading doors, corridors, doorways and elevators leading to the installation room have clearances of at least 2.5 m (8.25 ft) in height and 0.9 m (3 ft) in width.

Table 27
Passport cabinet equipment dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
Passport cabinet, as shipped, and loaded on a hand-truck (including the pallet that is shipped with the cabinet)	230 m x 120 m (90 in. x 48 in.)	136 kg (300 lb)
Fully-configured cabinet with doors, 1 shelf assembly, cooling unit, air filter assembly, cable management unit, 3 power supplies, 2 CPs, 14 FPs, and 14 termination panels (excluding cables)	197 cm x 60 cm x 70 cm (78 in. x 24 in. x 28 in.)	200.5 kg 441 lb)
Fully-configured cabinet with doors, 2 shelf assemblies, 2 cooling units, 2 air filter assemblies, 2 cable management units, 6 power supplies, 4 CPs, 28 FPs, and 28 termination panels (excluding cables)	197 cm x 60 cm x 70 cm (78 in. x 24 in. x 28 in.)	313.3 kg (689 lb)
Cabinet with doors (empty)	197 cm x 60 cm x 70 cm (78 in. x 24 in. x 28 in.)	87.7 kg (193 lb)

The figure "Dimensions of a Passport cabinet" (page 153) shows the basic size of the cabinet.

Figure 50
Dimensions of a Passport cabinet

DCP70123

2.3 m
(7.5 ft)

1.2 m
(4 ft)

Weight: 35.5 kg (78 lb)
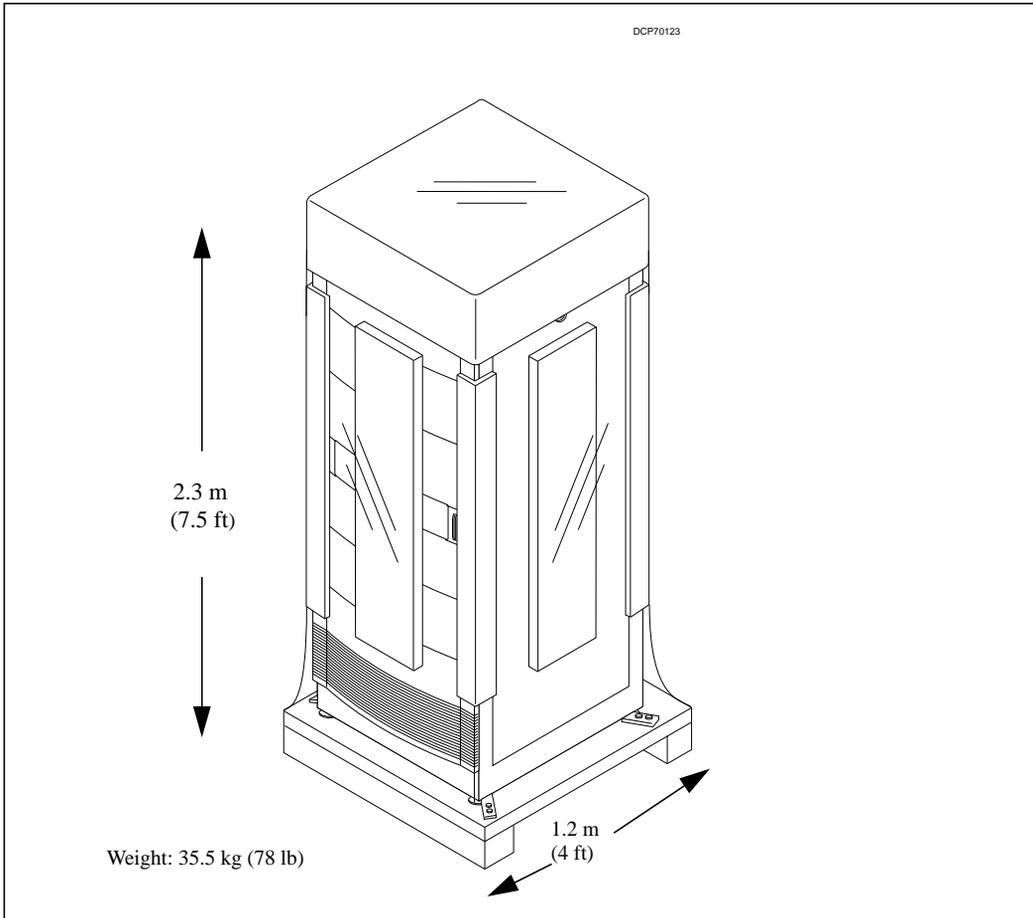
Passport cabinet alarm connectors

The front doors of Passport cabinets and the rear of the 5-slot and 16-slot switches contain alarm connectors. Connect the door alarm cable between these connectors if you want the LEDs on the cabinet door to light when your switch generates a minor or major hardware alarm.

> **CAUTION**
>
> Do not use door alarm connectors for telephones.
>
> Fuer den Ausgang "Door Alarm"! nicht fuer
> TNV-Anschluss geeighet.

Note: The above warning appears in German to comply with VDE
requirements.

The figure "Passport cabinet alarm connectors" (page 155) shows where the
connectors are located.

Figure 51
Passport cabinet alarm connectors

Do not use door alarm connectors for telephones.

Front door

PPT 0884 001 AA
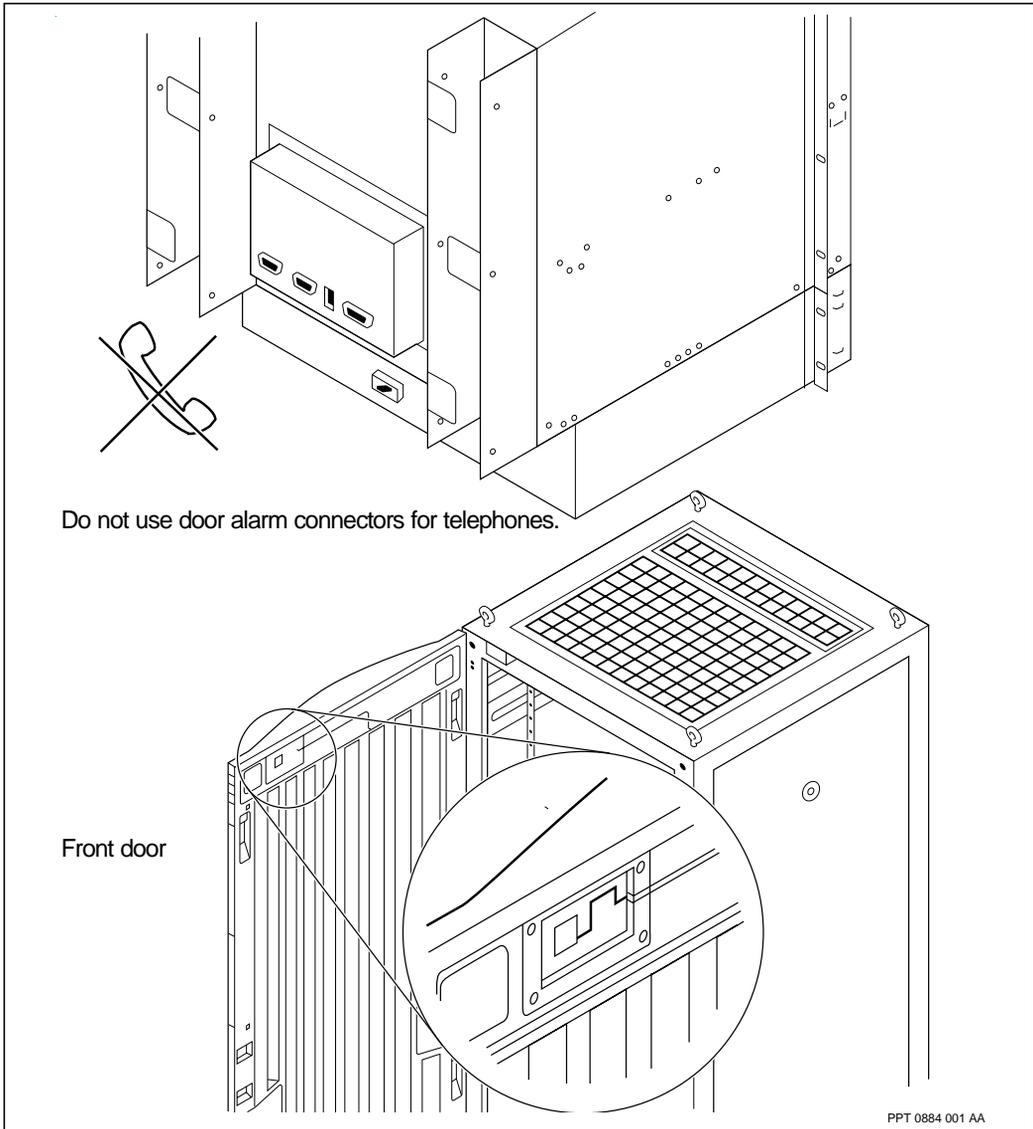
Passport cabinet environmental requirements

The recommended environmental conditions for Passport hardware are given in "Environmental requirements" (page 128). If you want to install two Passport switches in a cabinet with doors, ensure that the you are familiar with "16-slot Passport switch thermal engineering guidelines" (page 131).

Chapter 8
Seismic cabinet

See the following sections for a description of the seismic cabinet:

- "Seismic cabinet dimensions and weights" (page 157)

- "Termination panels in a seismic cabinet" (page 160)

- "3-slot Passport switch heat dissipation in a seismic cabinet" (page 161)

- "5-slot Passport switch heat dissipation in a seismic cabinet" (page 161)

- "16-slot Passport switch heat dissipation in a seismic cabinet" (page 161)

- "Grounding requirements for a seismic cabinet" (page 162)

- "Network equipment building standards (NEBS) compliances" (page 162)

Seismic cabinet dimensions and weights

This table summarizes the dimensions and weights of the seismic cabinet.

Table 28
Seismic cabinet dimensions and weights

Equipment	Outside dimensions (height x width x depth)	Weight
Seismic cabinet, as shipped, and loaded on a hand-truck (including the pallet that is shipped with the cabinet)	210 cm x 90 cm (84 in. x 36 in.)	107 kg (244 lb).
Fully-configured cabinet with doors, 1 shelf assembly, cooling unit, air filter assembly, cable management unit, 3 power supplies, 2 CPs, 14 FPs, and 14 termination panels (excluding cables)	197 cm x 60 cm x 79 cm (78 in. x 24 in. x 31 in.)	239.1 kg (526 lb)
Fully-configured cabinet with doors, 2 shelf assemblies, 2 cooling units, 2 air filter assemblies, 2 cable management units, 6 power supplies, 4 CPs, 28 FPs, and 28 termination panels (excluding cables)	197 cm x 60 cm x 79 cm (78 in. x 24 in. x 31 in.)	313.3 kg (689 lb)
Empty cabinet with doors	197 cm x 60 cm x 79 cm (78 in. x 24 in. x 31 in.)	87.7 kg (193 lb)

For information about the basic size of the seismic cabinet, see the figure "Seismic cabinet dimensions" (page 159).

Figure 52
Seismic cabinet dimensions

4 in.
(10 cm)

20 in.
(50 cm)

removable screen
for cable routing
from top of cabinet

31 in.
(79 cm)

76 1/2 in.
(195 cm)

24 in.
(61 cm)
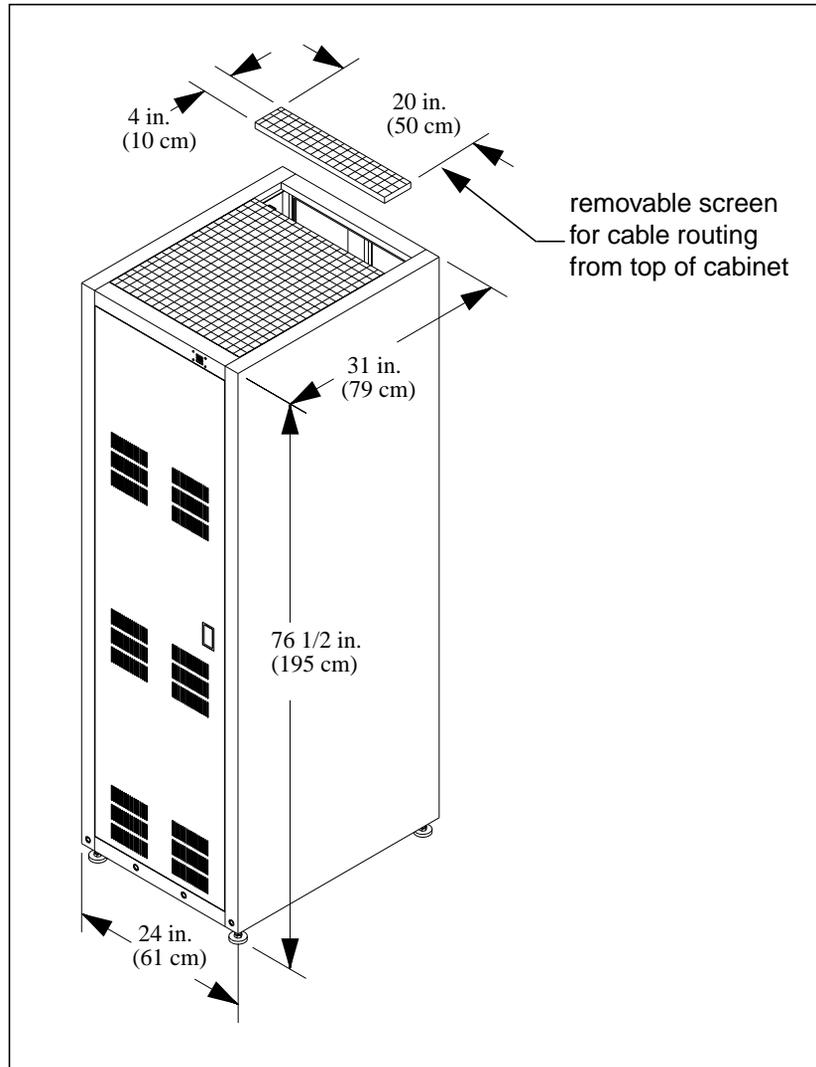
Configured cabinet weight

The weight of a seismic cabinet depends on the type and the total number of switches installed.

Table 29
Cabinet physical specifications

Switch	Maximum weight	Maximum number of switches per cabinet1	Maximum weight	Gross weight of cabinet
16-slot Passport switch	81 kg (177 lb)	2	161 kg (354 lb)	256 kg (564 lb)
5-slot Passport switch	39 kg (85.4 lb)	6	232.5 kg (512.4 lb)	328 kg (722.4 lb)
3-slot Passport switch	17 kg (37.4 lb)	10 (limited by weight of entire cabinet)	170 kg (374 lb)	265 kg (584 lb)
Note: Mounting holes on cabinet rails are spaced in the following repeating pattern: 5/8 in., 5/8 in., and 1/2 in. to comply with standard EIA-310-D dated September 1992.				

Termination panels in a seismic cabinet

A seismic cabinet configured with two fully populated Passport shelves can house all of the termination panels needed for the function processors (FPs) in that cabinet, except for:

•   the eight-port DS1 FP, which uses two termination panels per pack. If a full shelf of eight-port DS1 FPs is supported, some termination panels have to be moved to another cabinet.

•   the DS1 MSA32 or E1 MSA32 FPs using RJ45 termination panels. A maximum of three DS1 or E1 RJ45 termination panels for each Passport shelf can be mounted in the seismic cabinet. Other termination panels have to be moved to another cabinet.

•   the DS1 MSA32 or E1 MSA32 FPs using 1 port/DB15 termination panels. A maximum of four DS1 or E1 1 port/DB15 termination panels for each Passport shelf can be mounted in the seismic cabinet. Other termination panels have to be moved to another cabinet.

•   the DS1 MSA32 or E1 MSA32 FPs using 2 port/DB15 termination panels. A maximum of five DS1 or E1 2 port/DB15 termination panels for each Passport shelf can be mounted in the seismic cabinet. Other termination panels have to be moved to another cabinet.

- the E1 MSA32 FPs using unbalanced termination panels. A maximum of three DS1 or E1 unbalanced termination panels for each Passport shelf can be mounted in the seismic cabinet. Other termination panels have to be moved to another cabinet.

In all cases when installing termination panels in a seismic cabinet with working Passport shelves, the cable exit and air exhaust area of the Passport shelves must be kept clear.

If you are housing termination panels in a separate seismic cabinet or 19-inch rack, leave at least 36 in. of space at the front and back of the cabinet for access.

3-slot Passport switch heat dissipation in a seismic cabinet

The heat dissipation for a seismic cabinet configured with a 3-slot Passport switch is:

- per switch: 1,307 BTUs/h
- maximum per cabinet: 13,070 BTUs/h

5-slot Passport switch heat dissipation in a seismic cabinet

The heat dissipation for a seismic cabinet configured with a 5-slot Passport switch is:

- per switch: 1,802 BTUs/h
- maximum per cabinet: 12,812 BTUs/h

16-slot Passport switch heat dissipation in a seismic cabinet

The heat dissipation for a seismic cabinet configured with a 16-slot Passport switch is:

- per switch: 6,018 BTUs/h
- maximum per cabinet: 12,036 BTUs/h

Grounding requirements for a seismic cabinet

A seismic cabinet has grounding straps that you must attach to the mounting rails inside the cabinet. You must then connect these straps to a common grounding point at the base of the cabinet.

Network equipment building standards (NEBS) compliances

Passport seismic cabinets meet the Zone 4 seismic requirements of Telcordia NEBS GR-63-CORE.

Chapter 9
Control processors

See these sections for information on control processors (CPs):

Control processor features

A control processor (CP):

- can be one of two types: CP (NTNQ01) or CP-with-BITS (NTNQ03)

- sequences function processor (FP) start-up

- downloads new software onto FPs

- performs memory-intensive tasks for services delivered by FPs

- provides system timing for all other processors connected to the back plane, ensuring synchronous bus operation

- manages and monitors the status of FPs, the bus, and other Passport hardware in the switch

- monitors and processes alarms and the performance of real-time clocking

- interfaces with a network management system, a text interface device, or a modem which is used for network operator access, network monitoring, provisioning, and maintenance.

  A text interface device or modem connects directly to a port on the faceplate of a CP.

  Note: Connecting a modem requires a specific setup, as described in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

- provides Preside Multiservice Data Manager connectivity through a 10BASE-T Ethernet port, or alternatively, a V.24 DCE port.

- provides local access to the switch through the V.24 DCE port (port 1). You can connect a VT100 terminal or any device that emulates a VT100 terminal to the CP and use this terminal to configure the switch.

- provides sparing ability. When you install two CPs in a shelf, one is active and the other is on standby. If the active CP fails, the standby CP becomes active.

  Before setting up sparing between CPs, make sure all eight digits of the product equipment codes (PECs) for both CPs match. This ensures that both CPs have the same amount of memory and disk space.

  Note: See "Passport part numbers" (page 417) for equivalent PECs. Except where noted, processor cards with equivalent PECs can be used as spares for each other.

Control processor components

The control processor (CP) consists of a processor module, an interface module, and a disk drive.

The processor module connects the CP to the Passport backplane, providing an interface with the bus. It performs activities associated with bus and routing data through the switch.

The CP shelf manager supports the following functions:

- disk interface

- stratum clock

- real-time clock

- shelf alarm circuitry

- V.24 DCE port providing Preside Multiservice Data Manager connectivity or local operator access (including through a modem)

- OAM 10BASE-T Ethernet port providing Preside Multiservice Data Manager connectivity

- On the CP-with-BITS, a port providing interface for two external timing sources over E1s and DS1s

The CP hard disk drive stores Passport software, configuration data, and spooled information.

Control processor faceplates

These figures show the faceplates for the control processor (CP) and CP-with-BITS.

Figure 53
Control processor faceplate

Ejector latch

Locking latch

V.24 DCE port

LED status indicator
for Ethernet port

10Base-T Ethernet port
RJ45 connector

LED status
indicator

Ejector latch

9

5

6

1

V.24 DCE 9-pin
D-type connector

**Pin Numbering
Scheme**

1 2 3 4 5 6 7 8

PPT 0982 002 AB
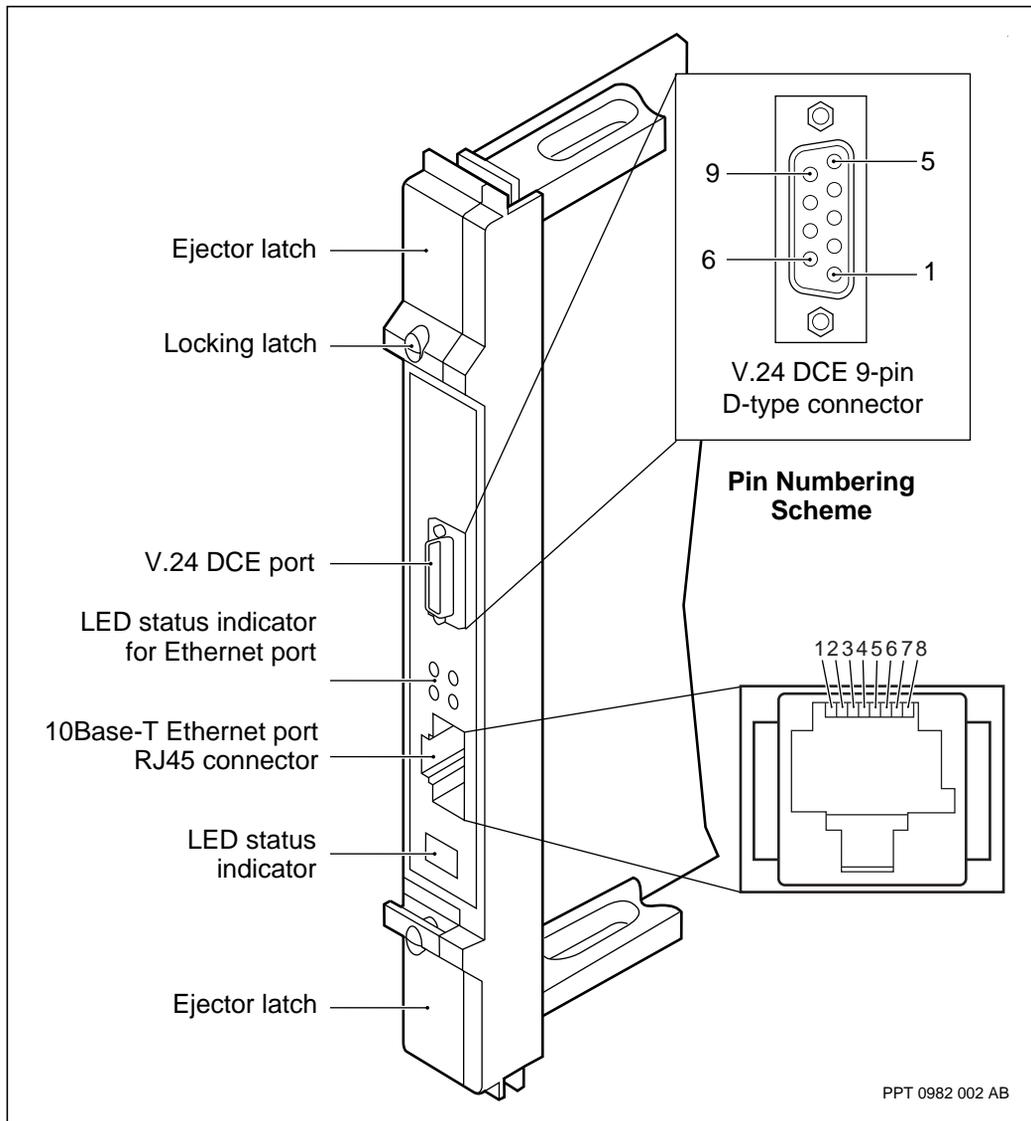
Figure 54
Control processor with BITS faceplate

Ejector latch

Locking latch

DS1/E1 ports
BITS 0 and BITS 1
Port 1

V.24 DCE port
Port 2

LED status indicators
for Ethernet port

10Base-T Ethernet port
RJ45 connector
Port 3

LED status
indicator

Ejector latch

15

9

8

1

15-pin
D-type connector

**Pin Numbering
Scheme**

PPT 3304 001 AA
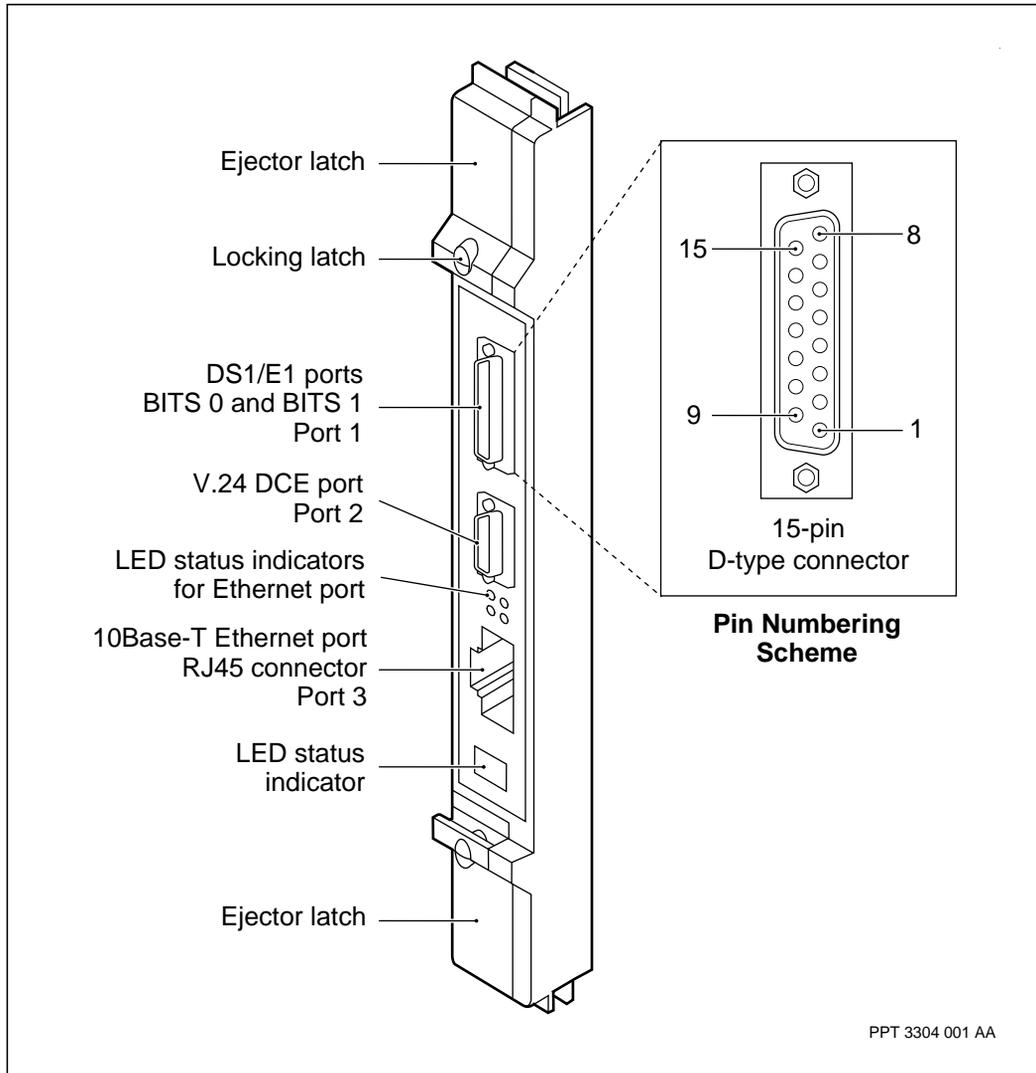
BITS Termination panels

The BITS termination panels (NTPS13) work together with the CP-with-BITS (NTNQ03) and BITS termination panel cables (NTPS18) to provide external timing functionality.

For more information see the section "BITS termination panel" (page 69)

Ethernet 10BASE-T connector pinouts

This table lists the connector pinouts for the control processor (CP) 10BASE-T Ethernet port.

Table 30
Ethernet 10BASE-T connector pinouts

Pin number	Signal name
1	Tx+
2	Tx-
3	Rx+
4	Not Used
5	Not Used
6	Rx-
7	Not Used
8	Not Used

V.24 connector pinouts

This table identifies the pinouts and signal names for the V.24 connector.

Table 31
V.24 connector pinout and signal names

Pin number	RS-232-C pin numbers	V.24 signal	ITU-T signal number	Direction on DCE port
1	15	TSET	114	OUTPUT
2	2	TXD	103	INPUT
3	3	RXD	104	OUTPUT
4	20	DTR	108	INPUT
5	7	GND	102	N/A
6	8	DCD(RSLD)	109	OUTPUT
7	4	RTS	105	INPUT
8	5	CTS(RFS)	106	OUTPUT
9	17	RSET	115	OUTPUT

DS1 or E1 BITS connector pinouts

Table 32
BITS interface connector pinout and signal names

Pin number	Signal name
7	BIT A Receive +
14	BIT A Receive -
2	BIT B Receive +
10	BIT B Receive -
11	Signal ground
4	+3.3V
5	Signal ground
12	Frame ground

Line rate

The control processor's line rate supports asynchronous data transfer at 9.6 kbit/s.

See the section "Line rate, port configuration, and clocking" (page 39) for more information.

Compliance with standards

Each V.24 port supports a subset of CCITT V.24 standards and can accommodate most interface devices.

Ethernet compliance with standards

The Ethernet function processor complies with these standards and conventions:

- IEEE 802.3

- Digital/Intel/Xerox (DIX)

Chapter 10
DS1 function processors

Voice services are support by the following DS1 function processors (FPs):

ATM services are supported by the following Passport E1 FPs:

Frame-based services are supported by the following Passport E1 FPs:

Multi-services access is supported by the following Passport E1 FPs:

1-port DS1 MVP-E function processor

See these sections for information about the DS1 Multipurpose Voice Platform enhanced echo cancellation (MVP-E) function processor (FP):

1-port DS1 MVP-E faceplate

This figure shows a 1-port DS1 MVP-E faceplate.

Figure 55
1-port DS1 MVP-E faceplate
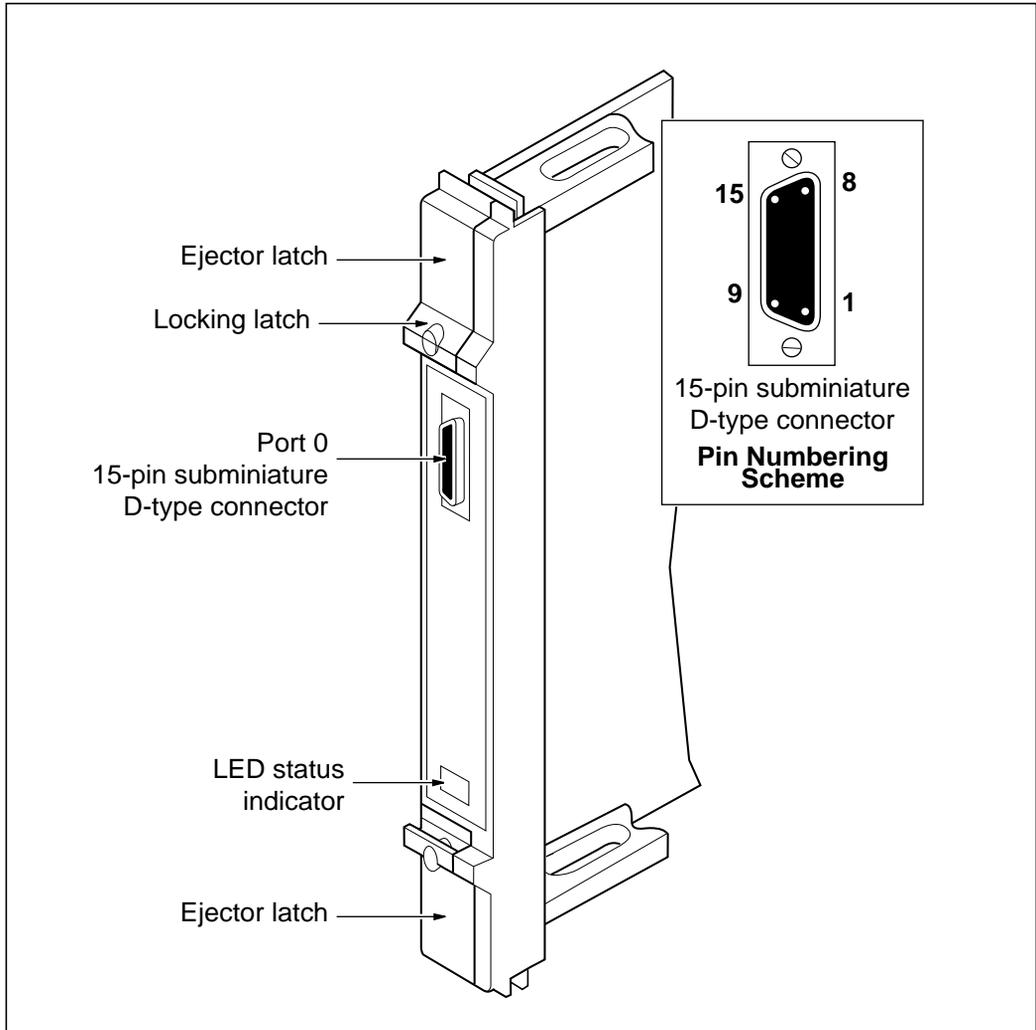
1-port DS1 MVP-E termination panels

The 1-port DS1 MVP-E FPs use the DS1 or E1 termination panels. These panels provide a break-out for customer-equipment connections so that each port has its own termination point and access. These termination panels also support sparing.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

1-port DS1 MVP-E cable assembly

The maximum cable length for balanced DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 33
1-port DS1 MVP-E cable assembly parts

Qty	Item	Description
	Belden 8106	Cable, 100 ohm, 6 twisted pairs, 24 gauge strand
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
26	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge wire
2	NT A0361050	AMP 747099-3 Straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" Pan Head Machine Screw
4	NT P0387666	0.115" Spring Washer

For more information, see "Cables" (page 77).

1-port DS1 MVP-E pinouts

See these sections for information about specific connectors:

- "1-port DS1 MVP-E connector P0 pinout and signal names" (page 174)

- "DS1 termination panel pinouts and signal names" (page 176)

Table 34
1-port DS1 MVP-E connector P0 pinout and signal names

Pin number	Signal name
7	Receive +
8	Transmit +
(Sheet 1 of 2)	

Table 34 (continued)
1-port DS1 MVP-E connector P0 pinout and signal names

Pin number	Signal name
14	Receive -
15	Transmit -
1	Protection switch register bit 0
9	Protection switch register bit 1
2	Protection switch register bit 2
10	Protection switch register bit 3
3	No connection
5	Signal ground
4	+12 V dc
11	Signal ground
12	Frame ground
6	Protection switch load
13	Protection switch status
(Sheet 2 of 2)	

Figure 56
DS1 termination panel pinouts and signal names
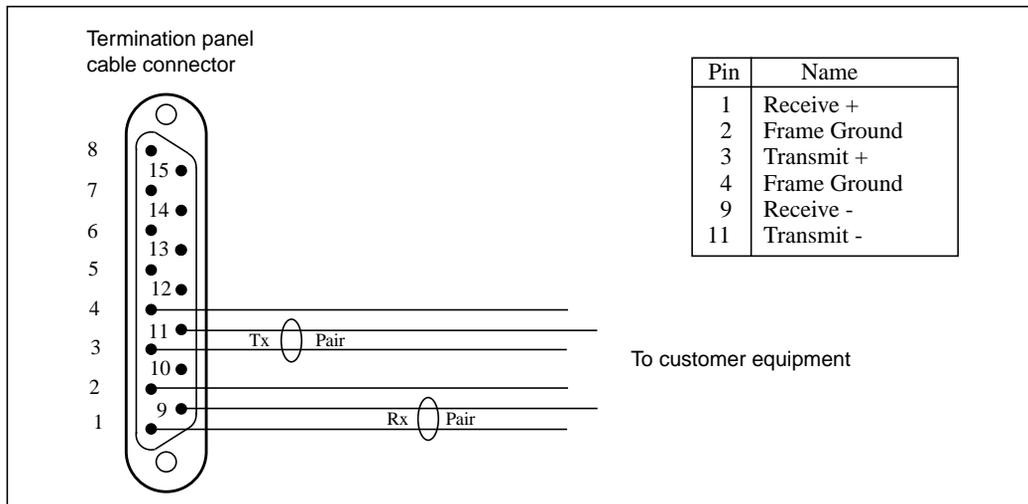
4-port DS1 MVP-E

See these sections for information about the 4-port DS1 Multipurpose Voice Platform with enhanced echo cancellation (MVP-E) function processor (FP):

- "4-port DS1 MVP-E faceplate" (page 176)
- "4-port DS1 MVP-E termination panels" (page 177)
- "4-port DS1 MVP-E cable assembly" (page 178)
- "4-port DS1 MVP-E pinouts" (page 178)

4-port DS1 MVP-E faceplate

You can use the monitor ports (MON 0 and MON 1) to connect to test equipment and test the card while it is in service. It carries a -26dB tap of the transmit (Tx) connector signal. The 9-pin subminiature D-type connector provides one-for-one sparing capability.

This figure shows the faceplate for the 4-port DS1 MVP-E FP.

Figure 57
4-port DS1 MVP-E faceplate
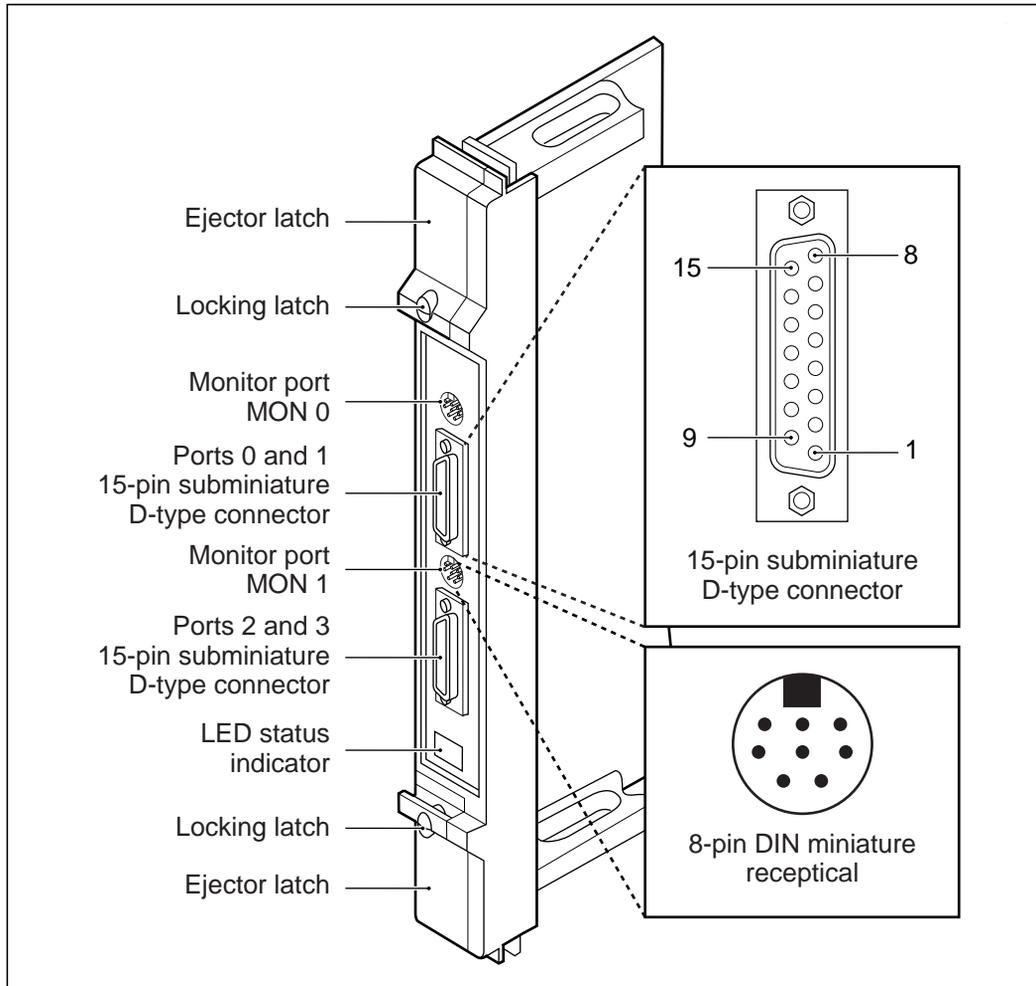
4-port DS1 MVP-E termination panels

The 4-port DS1 MVP-E FPs use the DS1 or E1 termination panels. This panel provides a break-out for customer-equipment connections so that each port has its own termination point and access. The termination panels supports sparing.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

4-port DS1 MVP-E cable assembly

The maximum cable length for balanced DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 35
4-port DS1 MVP-E cable assembly parts

Qty	Item	Description
	Belden 8106	Cable, 100 ohm, 6 twisted pairs, 24 gauge strand
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
26	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge wire
2	NT A0361050	AMP 747099-3 Straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" Pan Head Machine Screw
4	NT P0387666	0.115" Spring Washer

For more information, see "Cables" on page 77.

4-port DS1 MVP-E pinouts

See the following for information about specific connectors:

- "4-port DS1 connector P0 pinout and signal names" (page 179)

- "4-port DS1 connector P1 pinout and signal names" on page 179

- "4-port DS1 MVP-E faceplate monitor pinout and signal names" (page 180)

- "DS1 termination panel pinouts and signal names" (page 176)

Table 36
4-port DS1 connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal Ground
4	+12 V dc
5	Signal ground
12	No connection

Table 37
4-port DS1 connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
(Sheet 1 of 2)	

Table 37 (continued)
4-port DS1 connector P1 pinout and signal names

Pin number	Signal name
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	No connections
(Sheet 2 of 2)	

Figure 58
4-port DS1 MVP-E faceplate monitor pinout and signal names

Pin	Name
1	Port n: Transmit +
2	Port n: Transmit -
3	Port n: Receive +
4	Port n: Receive -
5	Port n+1: Trasmit +
6	Port n+1: Transmit -
7	Port n+1: Receive +
8	Port n+1: Receive -

Monitor port connector

PPT 3068 001 AA
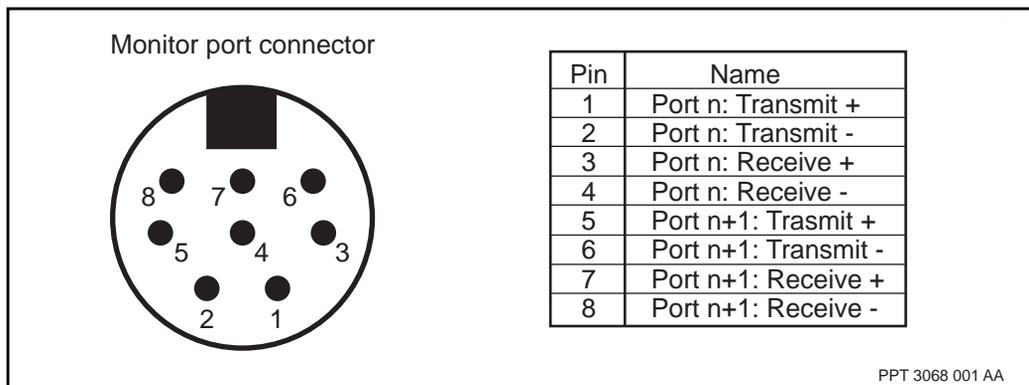
Figure 59
DS1 termination panel pinouts and signal names

Pin	Name
1	Receive +
2	Frame Ground
3	Transmit +
4	Frame Ground
9	Receive -
11	Transmit -
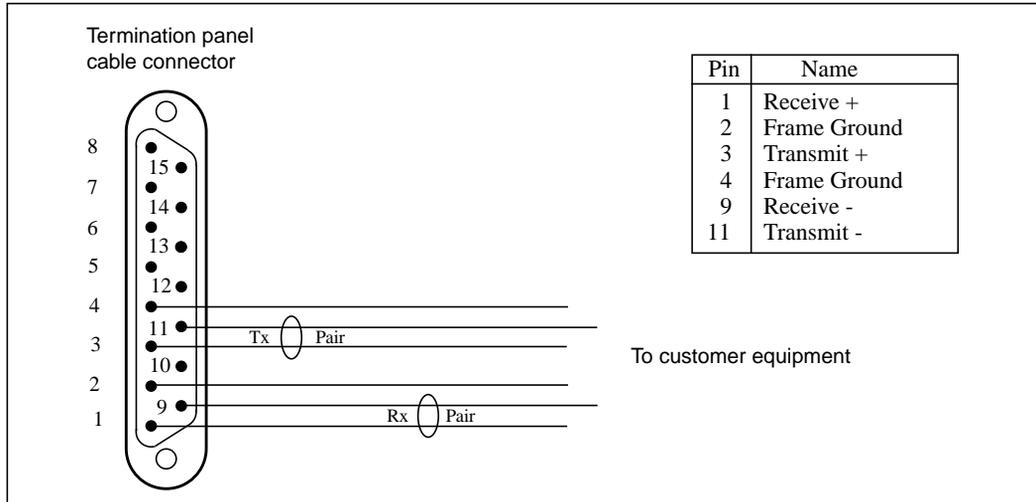
3-port DS1 ATM function processor

See these sections for information about the 3-port DS1 ATM function processor (FP):

- "3-port DS1 ATM faceplate" (page 181)

- "3-port DS1 ATM termination panels" (page 182)

- "3-port DS1 ATM cable assembly" (page 183)

- "3-port DS1 ATM pinouts" (page 183)

3-port DS1 ATM faceplate

This figure shows the faceplate for the 3-port DS1 ATM FP.

Figure 60
3-port DS1 ATM faceplate
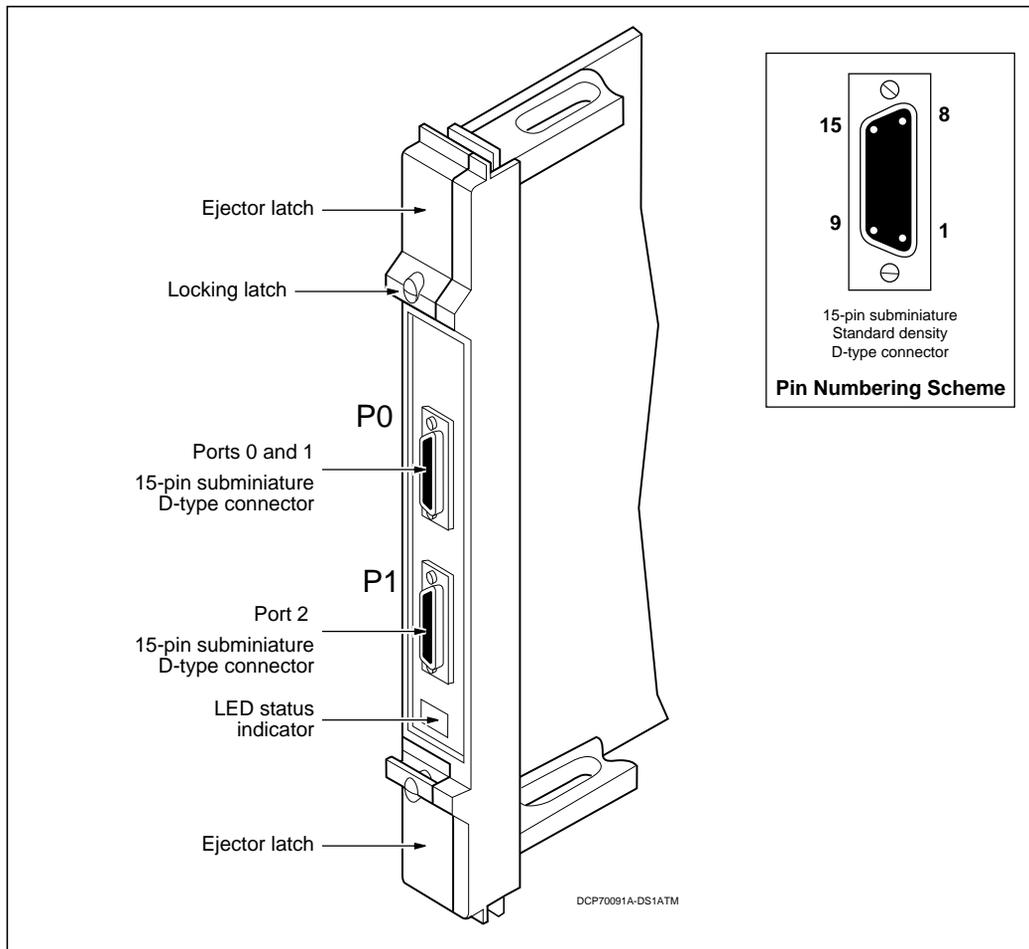
3-port DS1 ATM termination panels

The 3-port DS1 ATM FP uses the DS1 or E1 termination panel. This panel provides a break-out for customer-equipment connections so that each DS1 ATM port has its own termination point and access. The DS1 or E1 termination panel supports sparing.

Before setting up sparing, check the seventh and eighth digits of the product codes of the main and spare FPs. If the digits are CA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and BB) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

3-port DS1 ATM cable assembly

The maximum cable length for DS1 ATM lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 38
3-port DS1 cable assembly parts

Qty	Item	Description
	Belden 8107	shielded cable, 100 Ω, 7 twisted pairs, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing,15-pin D-sub, male, tin plated, with grounding indents
12	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

3-port DS1 ATM pinouts

See these sections for information about specific connectors:

- "3-port DS1 ATM connector P0 pinout and signal names" (page 184)

- "3-port DS1 ATM connector P1 pinout and signal names" (page 184)

- "DS1 termination panel pinouts and signal names" (page 185)

Table 39
3-port DS1 ATM connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 40
3-port DS1 ATM connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	No connection
(Sheet 1 of 2)	

Table 40 (continued)
3-port DS1 ATM connector P1 pinout and signal names

Pin number	Signal name
9	No connection
2	No connection
10	No connection
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 61
DS1 termination panel pinouts and signal names
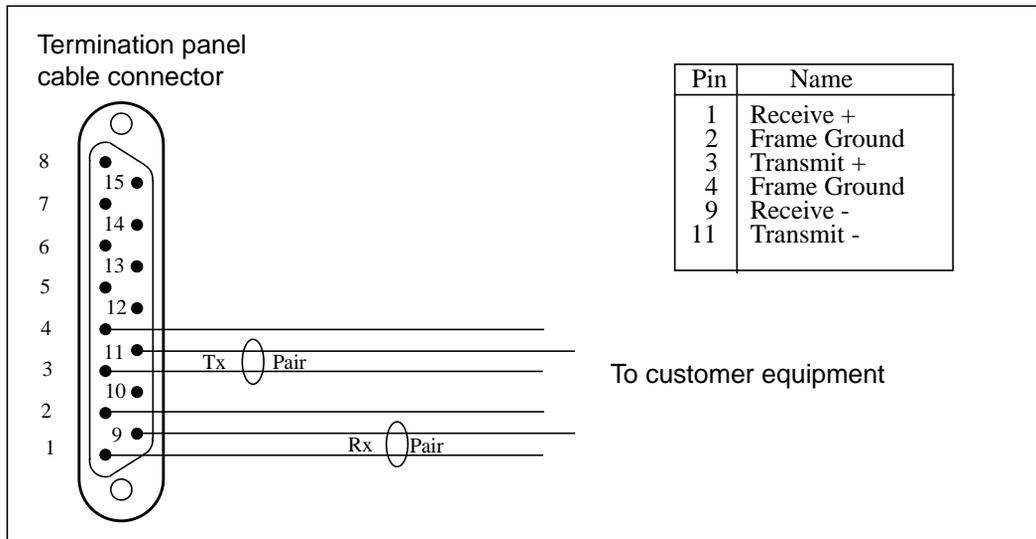
4-port DS1 AAL1 function processor

See these sections for information about the DS1 AAL1 function processor (FP):

- "4-port DS1 AAL1 faceplate" (page 186)

- "4-port DS1 AAL1 termination panels" (page 188)

- "4-port DS1 AAL1 cable assembly" (page 188)

- "4-port DS1 AAL1 pinouts" (page 189)

4-port DS1 AAL1 faceplate

This figure shows the faceplate for the 4-port DS1 AAL1 FP.

Figure 62
4-port DS1 AAL1 faceplate and connectors

15-pin
D-type connector

**Pin Numbering
Scheme**

Ejector latch

Locking latch

P0
Ports 0 and 1
15-pin subminiature
D-type connector

P1
Ports 2 and 3
15-pin subminiature
D-type connector

LED status
indicator

Ejector latch

PPT 0959 001 AB
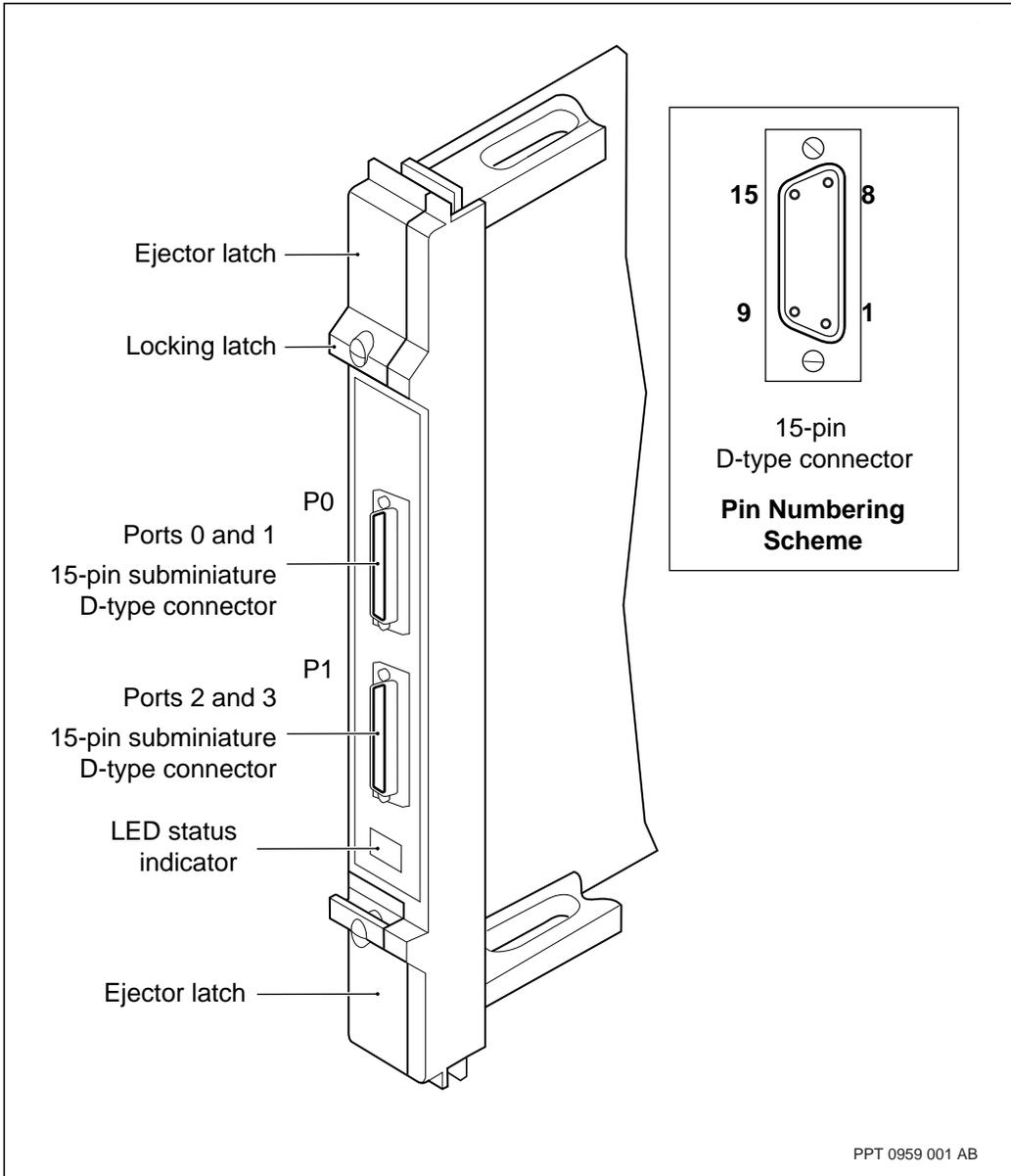
4-port DS1 AAL1 termination panels

The 4-port DS1 AAL1 FP uses the DS1 or E1 termination panels. These termination panels provide a break-out for customer-equipment connections so that each DS1 AAL1 port has its own termination point and access. The DS1 or E1 termination panel supports one-for-one sparing.

Before setting up sparing, check the seventh and eighth digits of the product equipment codes (PECs) of the main and spare FPs. If the digits are BA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and AC) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information about termination panels, see "DS1 or E1 termination panels" (page 55).

4-port DS1 AAL1 cable assembly

The maximum cable length for DS1 AAL1 lines to customer equipment is 340 m (1,100 ft). This length applies to multi-pair 24 gauge (0.51 mm) cable containing an overall outer shield. The distance between the FP and the termination panel is part of the total length.

Table 41
Recommended cable assembly parts for DS1 AAL1 lines

Quantity	Item	Description
	Belden 8107	Shielded cable, 100 ohm, 7 twisted pairs, 24 gauge (0.51 mm) strand
1	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
6	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
1	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
2	NT P0180927	0.112-40 x 0.5 in. pan head machine screw
2	NT P0387666	0.115 in. spring washer

For more information about cables, see "Cables" (page 77).

4-port DS1 AAL1 pinouts

See these sections for information about specific connectors:

*   "4-port DS1 AAL1 FP connector P0 pinout and signal names" (page 189)

*   "4-port DS1 AAL1 FP connector P1 pinout and signal names" (page 190)

*   "DS1 AAL1 termination panel connector pinout and signal names" (page 191)

Table 42
4-port DS1 AAL1 FP connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 43
4-port DS1 AAL1 FP connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3 Transmit +
9	Port 3 Transmit -
2	Port 3 Receive +
10	Port 3 Receive -
6	Protection Switch Load
13	Protection Switch Status
5	Signal ground
3	+5V dc
11	Signal ground
4	+12 V dc
12	Frame ground

Figure 63
DS1 AAL1 termination panel connector pinout and signal names
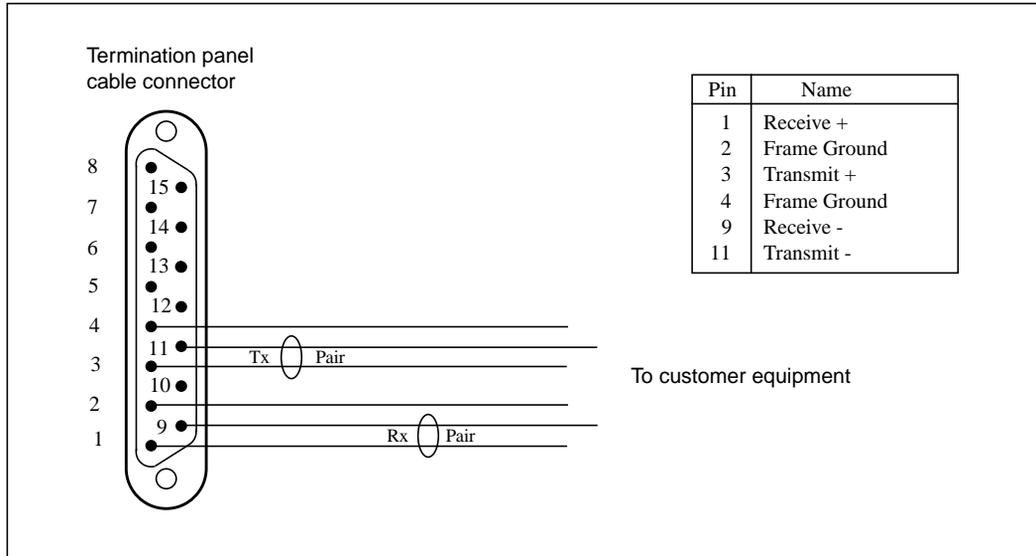
8-port DS1 ATM function processor

See these sections for information about the 8-port DS1 ATM function processor (FP):

- "8-port DS1 ATM faceplate" (page 191)

- "8-port DS1 ATM termination panels" (page 193)

- "8-port DS1 ATM cable assembly" (page 193)

- "8-port DS1 ATM pinouts" (page 194)

8-port DS1 ATM faceplate

The following figure shows the 8-port DS1 ATM faceplate and connectors.

Figure 64
8-port DS1 ATM faceplate and connectors
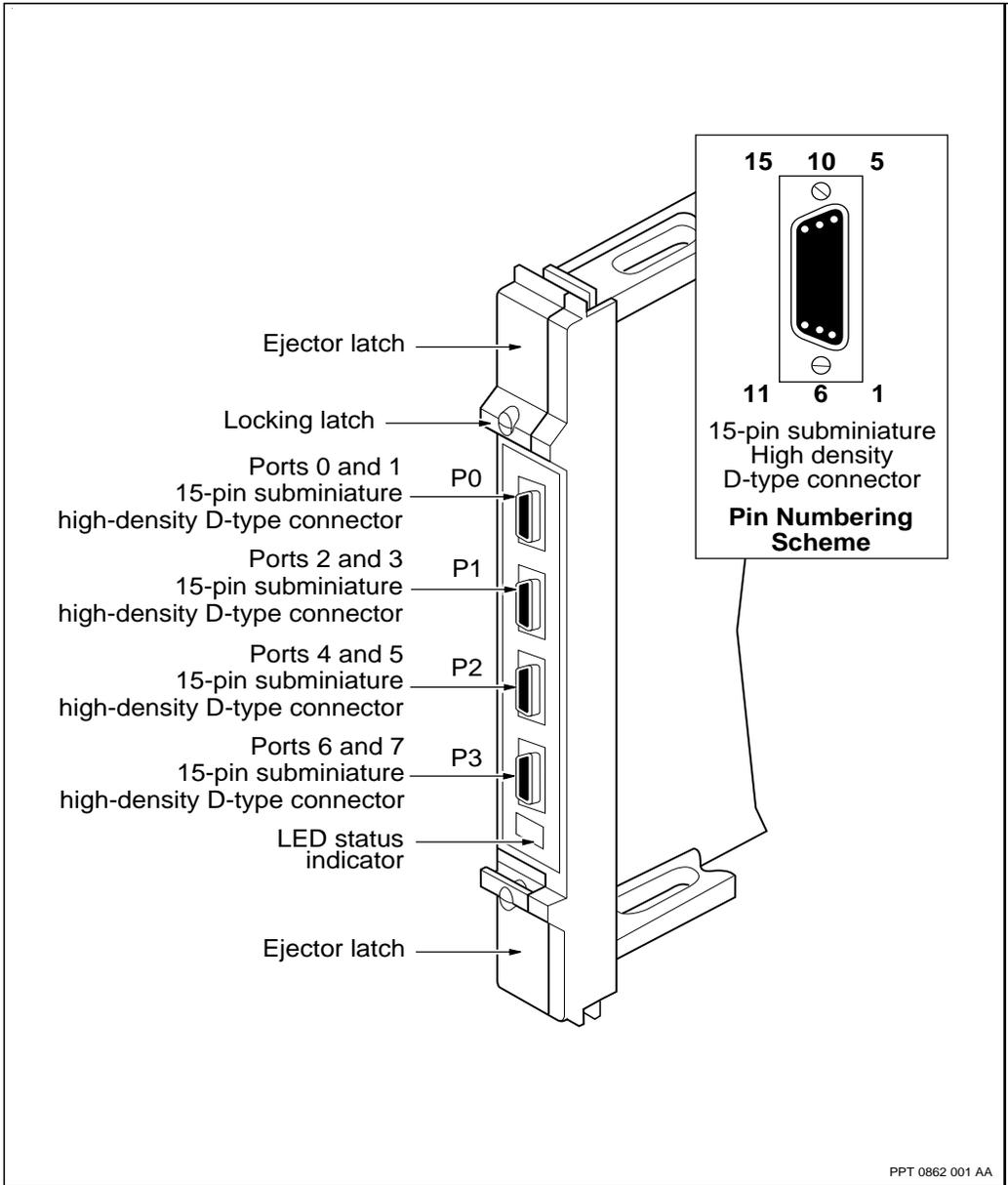
8-port DS1 ATM termination panels

The 8-port DS1 ATM FP uses one or two DS1 or E1 termination panels. These panels provide a break-out for customer-equipment connections so that each DS1 ATM port has its own termination point and access. The DS1 or E1 termination panels support sparing.

One termination panel provides one-for-one sparing for up to four ports. You can spare ports 0–3, and 4–7. For example, a sparing configuration with three ports can use ports 0, 2, and 3, but not ports 0, 2, and 7. Only provision ports that you are going to use. To spare more than four ports, use two DS1 termination panels.

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are CA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and BB) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

8-port DS1 ATM cable assembly

The maximum cable length for DS1 ATM lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 44
8-port DS1 ATM cable assembly parts

Qty	Item	Description
	Belden 8107	shielded cable, 100 Ω, 7 twisted pairs, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing,15-pin D-sub, male, tin plated, with grounding indents
12	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.82 to 0.51) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

8-port DS1 ATM pinouts

See these sections for information about specific connectors:

- "8-port DS1 ATM connector P0 pinout and signal names" (page 194)

- "8-port DS1 ATM connector P1 pinout and signal names" (page 195)

- "8-port DS1 ATM connector P2 pinout and signal names" (page 195)

- "8-port DS1 ATM connector P3 pinout and signal names" (page 196)

- "DS1 termination panel pinouts and signal names" (page 197)

Table 45
8-port DS1 ATM connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 46
8-port DS1 ATM connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground

Table 47
8-port DS1 ATM connector P2 pinout and signal names

Pin number	Signal name
8	Port 4, Transmit +
15	Port 4, Transmit -
7	Port 4, Receive +
14	Port 4, Receive -
1	Port 5, Transmit +
(Sheet 1 of 2)	

Table 47 (continued)
8-port DS1 ATM connector P2 pinout and signal names

Pin number	Signal name
9	Port 5, Transmit -
2	Port 5, Receive +
10	Port 5, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
Shield	Frame ground
(Sheet 2 of 2)	

Table 48
8-port DS1 ATM connector P3 pinout and signal names

Pin number	Signal name
8	Port 6, Transmit +
15	Port 6, Transmit -
7	Port 6, Receive +
14	Port 6, Receive -
1	Port 7, Transmit +
9	Port 7, Transmit -
2	Port 7, Receive +
10	Port 7, Receive -
6	Protection Switch Load
13	Protection Switch Status
(Sheet 1 of 2)	

Table 48 (continued)
8-port DS1 ATM connector P3 pinout and signal names

Pin number	Signal name
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
Shield	Frame ground
(Sheet 2 of 2)	

Figure 65
DS1 termination panel pinouts and signal names
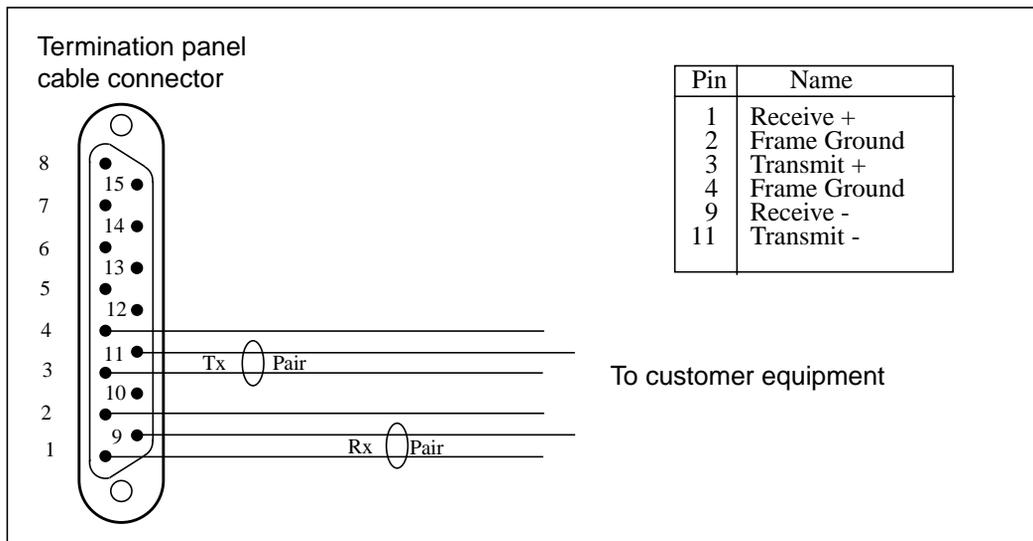
4-port DS1 frame relay function processor

See these sections for information about the 4-port DS1 function processor (FP):

- "4-port DS1 frame relay faceplate" (page 198)

- "4-port DS1 frame relay termination panels" (page 200)

- "4-port DS1 frame relay cable assembly" (page 200)

- "4-port DS1 frame relay pinouts" (page 201)

4-port DS1 frame relay faceplate

This figure shows the faceplate for the 4-port DS1 frame relay FP.

Figure 66
4-port DS1 frame relay faceplate

Ejector latch

Locking latch

Ports 0 and 1
15-pin subminiature
D-type connector   **P0**

Ports 2 and 3
15-pin subminiature
D-type connector   **P1**

LED status
indicator

Locking latch

Ejector latch

15-pin subminiature
D-type connector

**Pin Numbering
Scheme**

15   8

9   1
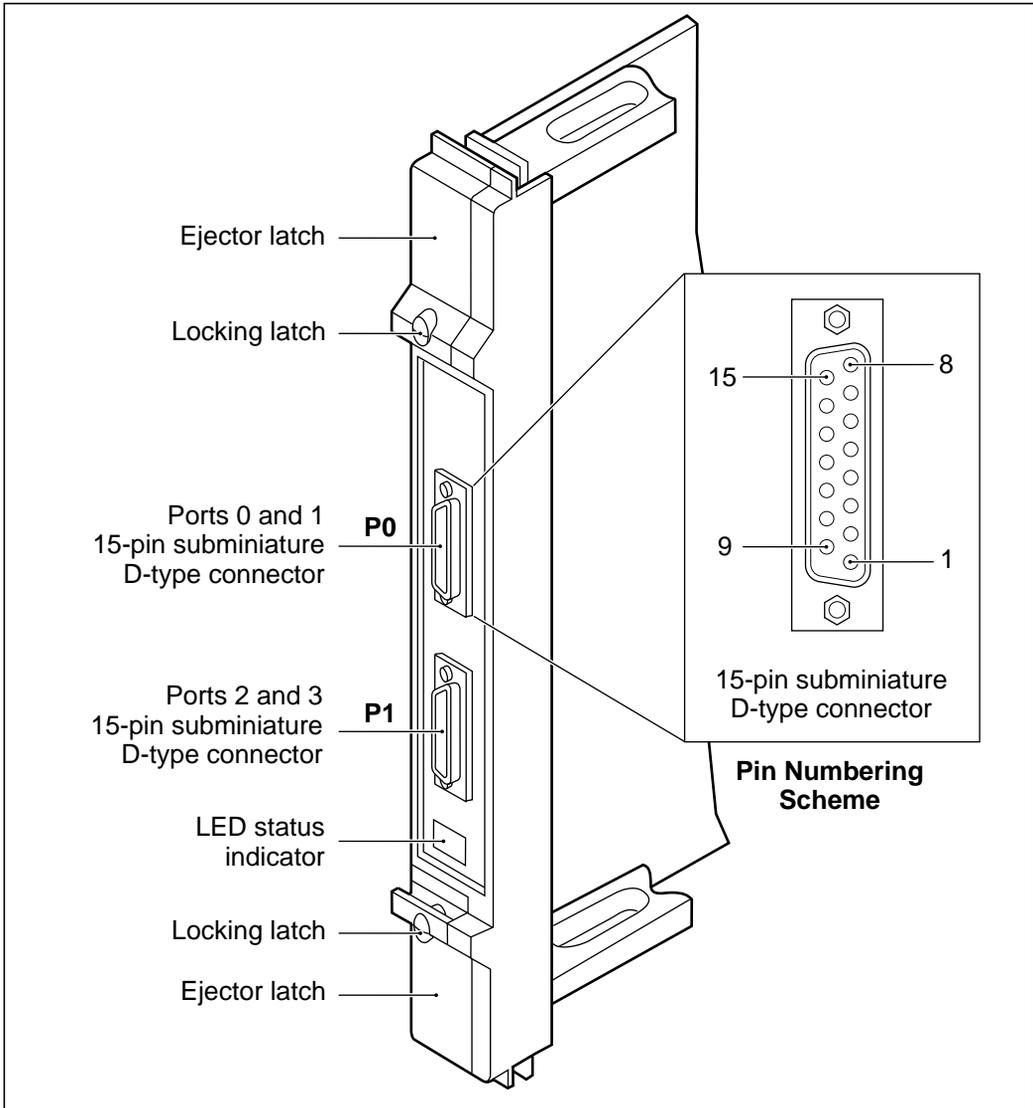
4-port DS1 frame relay termination panels

The 4-port DS1 FP uses the DS1 or E1 termination panel. This panel provides a break-out for customer equipment connections so that each DS1 port has its own termination point and access. The DS1 or E1 termination panels support sparing.

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

4-port DS1 frame relay cable assembly

The maximum cable length for DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 49
4-port DS1 cable assembly parts

Qty	Item	Description
	Belden 8107	shielded cable, 100 Ω, 7 twisted pair, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
12	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information about cables, see "Cables" (page 77)

4-port DS1 frame relay pinouts

See these sections for information on specific connectors:

- "4-port DS1 connector P0 pinout and signal names" (page 201)
- "4-port DS1 connector P1 pinout and signal names" (page 202)
- "DS1 termination panel pinout and signal names" (page 203)

Table 50
4-port DS1 connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 51
4-port DS1 connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground

Figure 67
DS1 termination panel pinout and signal names

Pin	Name
1	Receive +
2	Frame Ground
3	Transmit +
4	Frame Ground
9	Receive -
11	Transmit -

Termination panel cable connector

To customer equipment

Tx Pair

Rx Pair
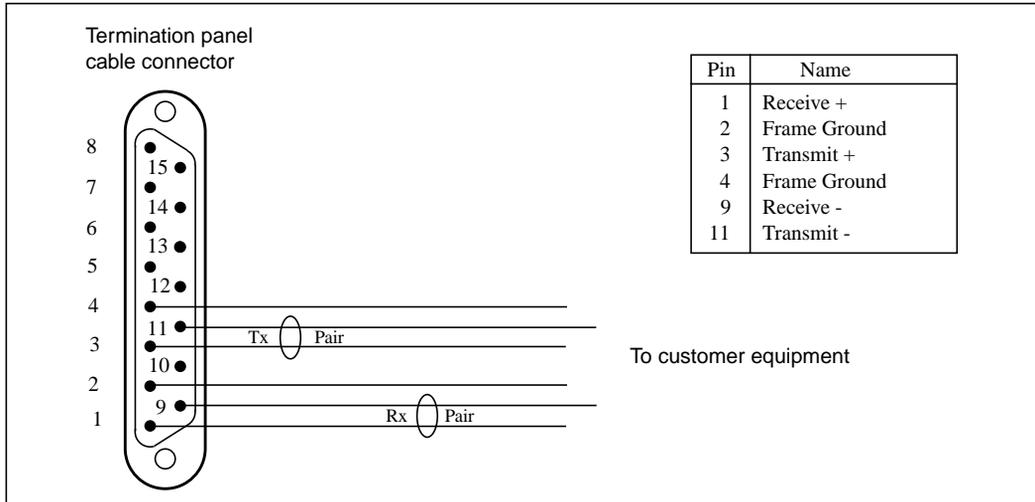
4-port DS1C function processor

See these sections for information about the 4-port DS1C function processor (FP):

- "4-port DS1C faceplate" (page 204)

- "4-port DS1C termination panels" (page 206)

- "4-port DS1C cable assembly" (page 206)

- "4-port DS1C pinouts" (page 206)

4-port DS1C faceplate

This figure shows the faceplate for the 4-port DS1C FP.

Figure 68
4-port DS1C faceplate

Ejector latch

Locking latch

Ports 0 and 1
15-pin subminiature
D-type connector

C0

Ports 2 and 3
15-pin subminiature
D-type connector

C1

LED status
indicator

Locking latch

Ejector latch

15
8
9
1

15-pin subminiature
D-type connector

**Pin Numbering
Scheme**

PPT 1000 001 AA
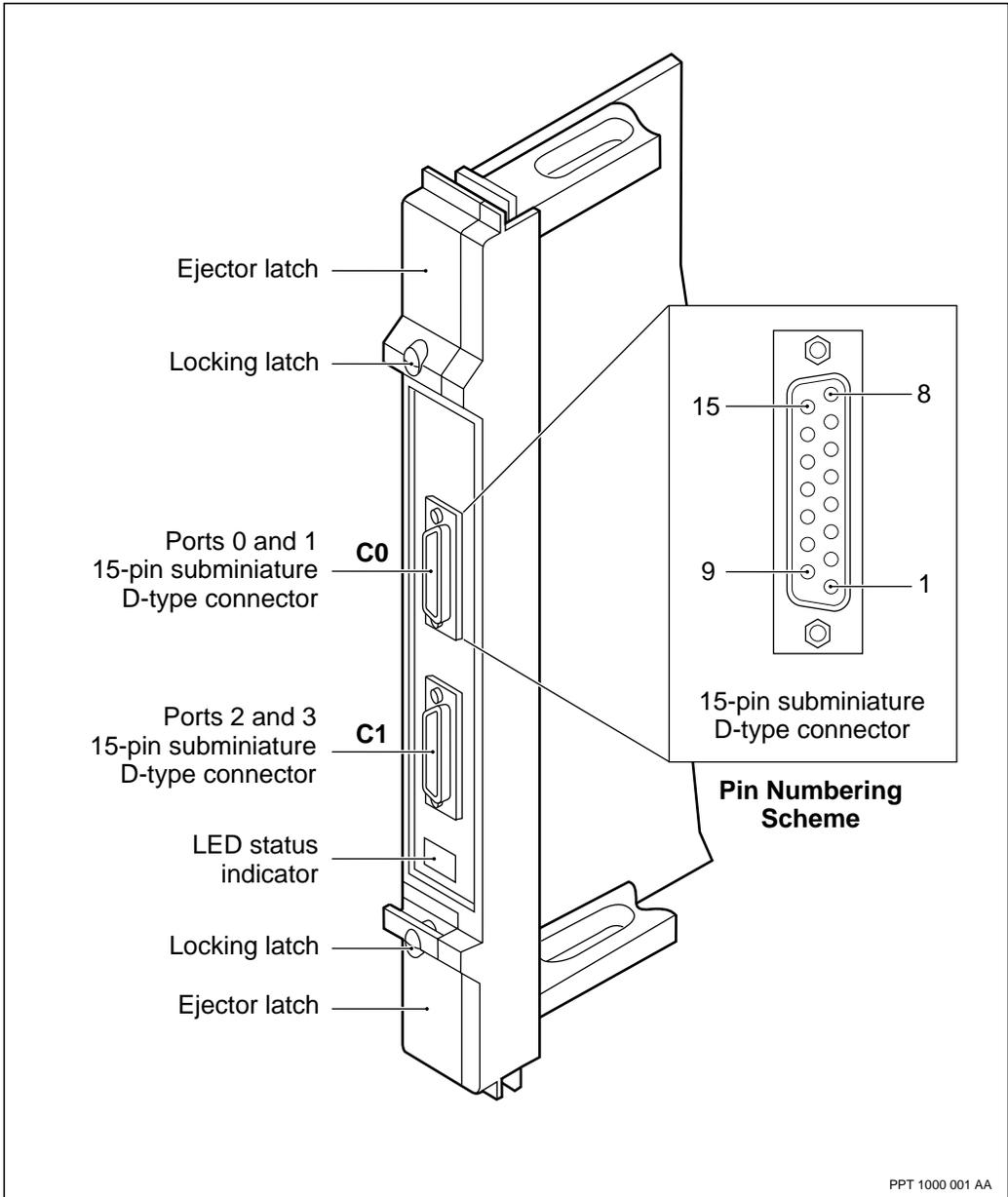
4-port DS1C termination panels

The 4-port DS1C FP uses the DS1 or E1 termination panels. These panels provide a break-out for customer-equipment connections so that each DS1C port has its own termination point and access. The DS1 or E1 termination panels support sparing.

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

For more information about the DS1 or E1 termination panels, see "DS1 or E1 termination panels" (page 55).

4-port DS1C cable assembly

The maximum cable length for DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 52
4-port DS1C cable assembly parts

Qty	Item	Description
	Belden 8107	Shielded cable, 100 Ω,7 twisted pairs, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing,15-pin D-sub, male, tin plated, grounding indents
12	NT A0291226	AMP 66506-3, pins for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

4-port DS1C pinouts

See these sections for information about specific connectors:

- "4-port DS1C connector C0 pinout and signal names" (page 207)

Table 53
4-port DS1C connector C0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 54
4-port DS1C connector C1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
(Sheet 1 of 2)	

Table 54 (continued)
4-port DS1C connector C1 pinout and signal names

Pin number	Signal name
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 69
DS1 termination panel pinouts and signal names

Pin	Name
1	Receive +
2	Frame Ground
3	Transmit +
4	Frame Ground
9	Receive -
11	Transmit -
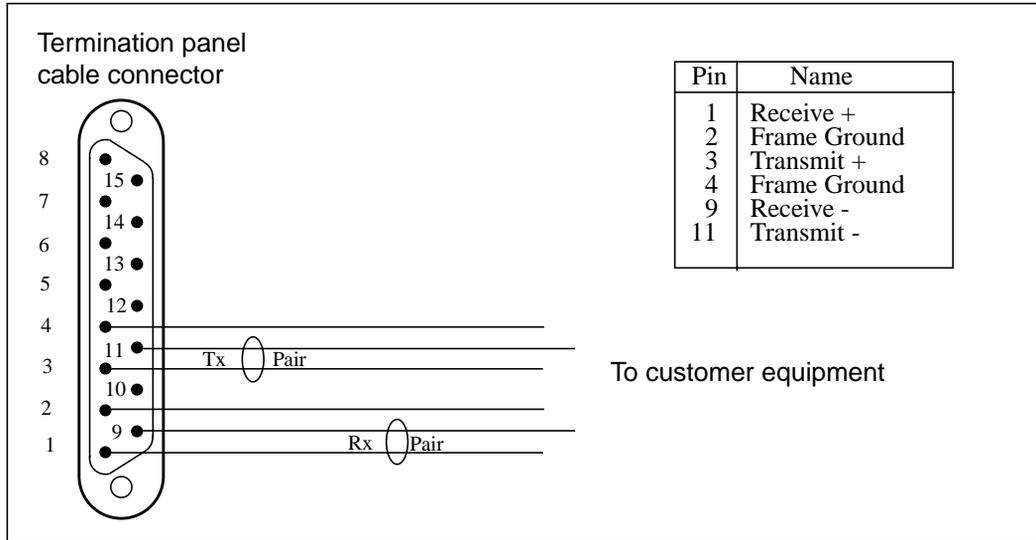
8-port DS1 function processor

See these sections for information about the 8-port DS1 function processor (FP):

- "8-port DS1 faceplate" (page 209)

- "-8-port DS1 termination panel" (page 211)

- "8-port DS1 cable assembly" (page 211)

- "8-port DS1 pinouts" (page 211)

8-port DS1 faceplate

This figure shows the faceplate for the 8-port DS1 FP.

Figure 70
8-port DS1 faceplate

15

10

5

15-pin subminiature
High density
D-type connector

**Pin Numbering
Scheme**

11

6

1

Ejector latch

Locking latch

Ports 0 and 1
15-pin subminiature
high-density D-type connector

P0

Ports 2 and 3
15-pin subminiature
high-density D-type connector

P1

Ports 4 and 5
15-pin subminiature
high-density D-type connector

P2

Ports 6 and 7
15-pin subminiature
high-density D-type connector

P3

LED status
indicator

Ejector latch

PPT 0862 001 AA

-8-port DS1 termination panel

The 8-port DS1 FP uses the DS/E1 termination panels. These termination panels provide a break-out for customer equipment connections so that each DS1 port has its own termination point and access. The DS1 or E1 termination panels support sparing.

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

For more information about termination panels, see "DS1 or E1 termination panels" (page 55).

8-port DS1 cable assembly

The maximum cable length for DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length.

Table 55
8-port DS1 cable assembly parts

Qty	Item	Description
	Belden 8107	Shielded cable, 100 Ω, 7 twisted pairs, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing,15-pin D-sub, male, tin plated, with grounding indents
12	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information on cables, see "Cables" (page 77).

8-port DS1 pinouts

See these sections for information about specific connectors:

- "8-port DS1 connector P0 pinout and signal names" (page 212)

Table 56
8-port DS1 connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 57
8-port DS1 connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground

Table 58
8-port DS1 connector P2 pinout and signal names

Pin number	Signal name
8	Port 4, Transmit +
15	Port 4, Transmit -
7	Port 4, Receive +
14	Port 4, Receive -
1	Port 5, Transmit +
(Sheet 1 of 2)	

Table 58 (continued)
8-port DS1 connector P2 pinout and signal names

Pin number	Signal name
9	Port 5, Transmit -
2	Port 5, Receive +
10	Port 5, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Table 59
8-port DS1 connector P3 pinout and signal names

Pin number	Signal name
8	Port 6, Transmit +
15	Port 6, Transmit -
7	Port 6, Receive +
14	Port 6, Receive -
1	Port 7, Transmit +
9	Port 7, Transmit -
2	Port 7, Receive +
10	Port 7, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
(Sheet 1 of 2)	

Table 59 (continued)
8-port DS1 connector P3 pinout and signal names

Pin number	Signal name
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
Shield	
(Sheet 2 of 2)	

Figure 71
DS1 termination panel pinouts and signal names
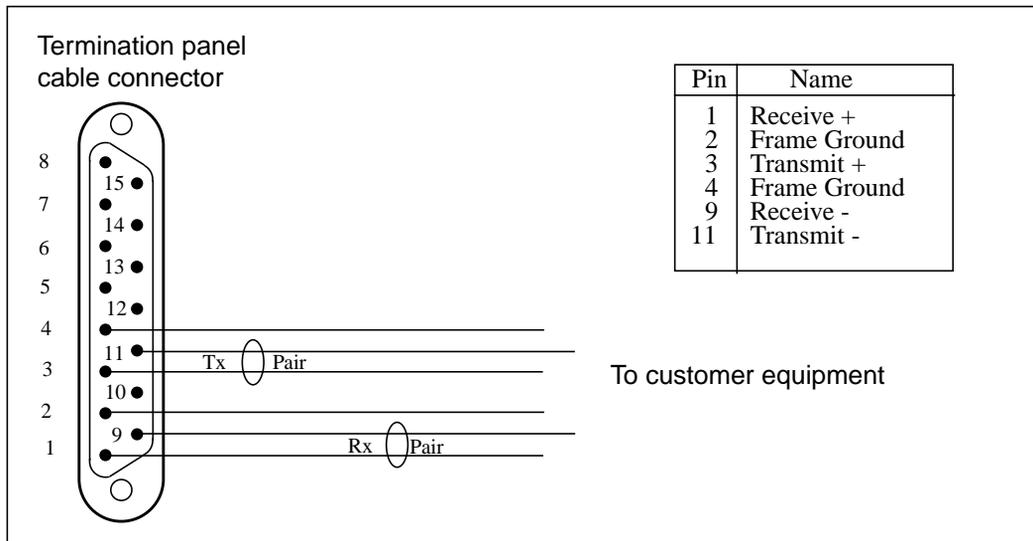
32-port DS1 MSA function processor

See these sections for information about the 32-port DS1 for multi-service access (MSA) function processors (FP). Unless otherwise specified, the information applies to an MSA32 FP with or without the optional optical ports.

For a list of the product engineering codes (PECs) of available MSA32 FPs with or without the OC-3 optical interfaces, see "Passport processor card part numbers" (page 421).

- "32-port DS1 MSA faceplate" (page 216)
- "32-port DS1 MSA termination panels" (page 218)
- "32-port DS1 MSA pinouts" (page 218)
- "32-port DS1 MSA cable assemblies for electrical ports" (page 229)
- "OC-3 cable assembly for optical ports on a 32-port DS1 MSA FP" (page 231)
- "OC-3 line automatic protection switching on a 32-port DS1 MSA FP" (page 232)
- "OC-3 interface characteristics on a 32-port DS1 MSA FP" (page 232)
- "Connecting to OC-3 ports on a 32-port DS1 MSA FP" (page 234)

32-port DS1 MSA faceplate

A 32-port DS1 MSA FP (FP) occupies two adjacent slots in a shelf. (The software uses only the first slot number and ignores the second one.) See the figure "32-port DS1 MSA faceplate with optional OC-3 ports" (page 217) for the DS1 MSA32 FP.

The transmit (TX) connection is located at the top half of the OC-3 port, while the receive (RX) connection is at the bottom.

Figure 72
32-port DS1 MSA faceplate with optional OC-3 ports

Ejector latch
Locking latch
Ports 0-7
(P0)
P0
OC3 ports
Ports 8-15
(P1)
P1
Ports 16-23
(P2)
Maintenance port
Ports 24-31
(P3)

44 30 15

31 16 1
44-pin
High density
D-type connector
Pin Numbering
Scheme

PPT 2844 001 AB
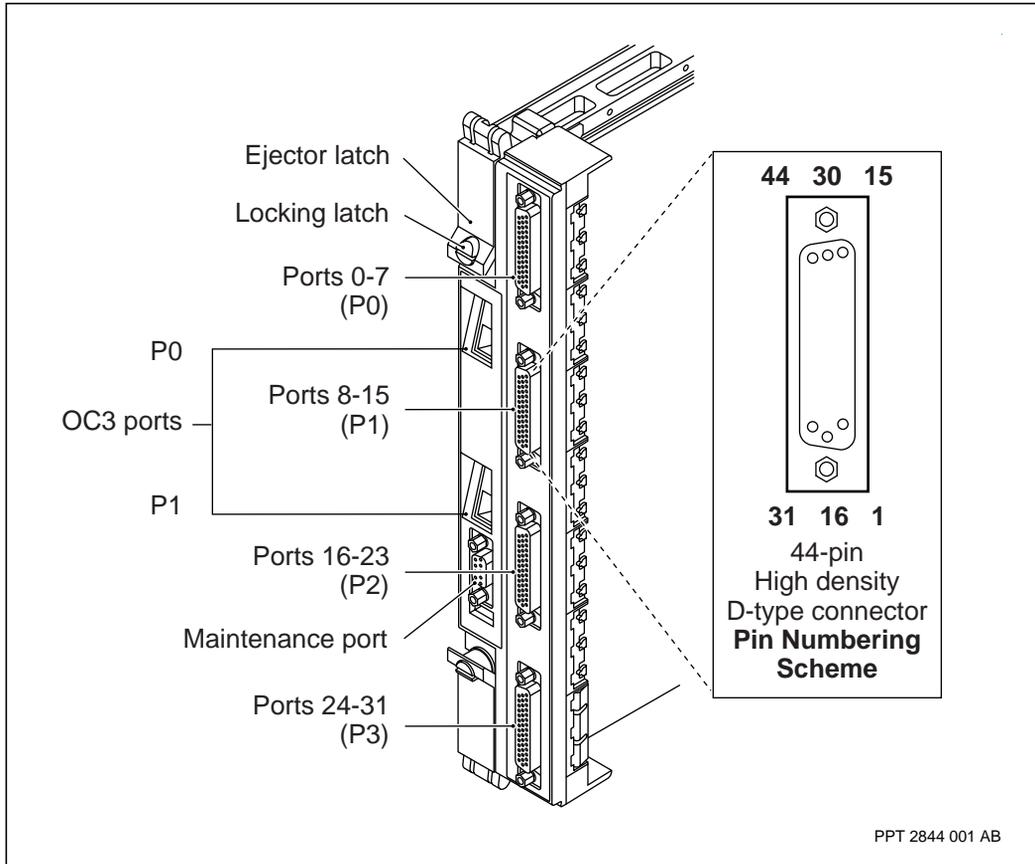
CAUTION
Risk of service loss
Two power supplies must be installed before inserting a 32-port MSA FP. There is a risk of a shelf reset when installing a 32-port MSA FP in a shelf with only a single power supply unit.

This risk does not apply when the 32-port MSA FP is already installed and one of two power supplies fail.

32-port DS1 MSA termination panels

The 32-port DS1 MSA use the MSA32 DS1 or E1 termination panels. These panels provide a breakout for customer equipment connections, so that each DS1 port has its own termination point and access. The MSA32 DS1 or E1 termination panels support 1-for-n sparing for the electrical ports on the MSA32 FPs.

These termination panels support one-for-n sparing for up to six panels.

For more information about the MSA32 DS1 or E1 termination panels, see "MSA32 DS1 or E1 termination panels" (page 63).

32-port DS1 MSA pinouts

When connecting directly from the 32-port DS1 MSA FP to CPE, in effect bypassing the MSA32 termination panels, the CPE cabling must be adapted to the 32-port DS1 MSA cabling pinouts.

See these tables and figures for information on specific connectors:

- "32-port DS1 MSA connector P0 pinout and signal names" (page 219)

- "32-port DS1 MSA connector P1 pinout and signal names" (page 221)

- "32-port DS1 MSA connector P2 pinout and signal names" (page 223)

- "32-port DS1 MSA connector P3 pinout and signal names" (page 224)

- "32-port DS1 MSA termination panel pinouts and signal names: 1-port/DB15" (page 227)

- "32-port DS1 MSA termination panel pinouts and signal names: 2-port/DB15" (page 228)

- "32-port DS1 MSA termination panel pinouts and signal names: RJ45" (page 229)

Table 60
32-port DS1 MSA connector P0 pinout and signal names

Pin number	Signal name
9	Port 0, Transmit -
39	Port 0, Transmit +
10	Port 0, Receive -
25	Port 0, Receive +
27	Port 1, Transmit -
41	Port 1, Transmit +
11	Port 1, Receive -
26	Port 1, Receive +
28	Port 2, Transmit -
42	Port 2, Transmit +
13	Port 2, Receive +
43	Port 2, Receive -
15	Port 3, Transmit -
30	Port 3, Transmit +
14	Port 3, Receive +
44	Port 3, Receive -
18	Port 4, Transmit -
32	Port 4, Transmit +
3	Port 4, Receive -
33	Port 4, Receive +
5	Port 5, Transmit -
20	Port 5, Transmit +
4	Port 5, Receive -
34	Port 5, Receive +
6	Port 6, Transmit -
(Sheet 1 of 2)	

Table 60 (continued)
32-port DS1 MSA connector P0 pinout and signal names

Pin number	Signal name
21	Port 6, Transmit +
22	Port 6, Receive -
36	Port 6, Receive +
8	Port 7, Transmit -
38	Port 7, Transmit +
23	Port 7, Receive -
37	Port 7, Receive +
1	Signal ground
16	Signal ground
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 2 of 2)	

Table 61
32-port DS1 MSA connector P1 pinout and signal names

Pin number	Signal name
9	Port 8, Transmit -
39	Port 8, Transmit +
10	Port 8, Receive -
25	Port 8, Receive +
27	Port 9, Transmit -
41	Port 9, Transmit +
11	Port 9, Receive -
26	Port 9, Receive +
28	Port 10, Transmit -
42	Port 10, Transmit +
13	Port 10, Receive +
43	Port 10, Receive -
15	Port 11, Transmit -
30	Port 11, Transmit +
14	Port 11, Receive +
44	Port 11, Receive -
18	Port 12, Transmit -
32	Port 12, Transmit +
3	Port 12, Receive -
33	Port 12, Receive +
5	Port 13, Transmit -
20	Port 13, Transmit +
4	Port 13, Receive -
34	Port 13, Receive +
6	Port 14, Transmit -
(Sheet 1 of 2)	

Table 61 (continued)
32-port DS1 MSA connector P1 pinout and signal names

Pin number	Signal name
21	Port 14, Transmit +
22	Port 14, Receive -
36	Port 14, Receive +
8	Port 15, Transmit -
38	Port 15, Transmit +
23	Port 15, Receive -
37	Port 15, Receive +
1	Signal ground
16	Signal ground
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 2 of 2)	

Table 62
32-port DS1 MSA connector P2 pinout and signal names

Pin number	Signal name
9	Port 16, Transmit -
39	Port 16, Transmit +
10	Port 16, Receive -
25	Port 16, Receive +
27	Port 17, Transmit -
41	Port 17, Transmit +
11	Port 17, Receive -
26	Port 17, Receive +
28	Port 18, Transmit -
42	Port 18, Transmit +
13	Port 18, Receive +
43	Port 18, Receive -
15	Port 19, Transmit -
30	Port 19, Transmit +
14	Port 19, Receive +
44	Port 19, Receive -
18	Port 20, Transmit -
32	Port 20, Transmit +
3	Port 20, Receive -
33	Port 20, Receive +
5	Port 21, Transmit -
20	Port 21, Transmit +
4	Port 21, Receive -
34	Port 21, Receive +
6	Port 22, Transmit -
(Sheet 1 of 2)	

Table 62 (continued)
32-port DS1 MSA connector P2 pinout and signal names

Pin number	Signal name
21	Port 22, Transmit +
22	Port 22, Receive -
36	Port 22, Receive +
8	Port 23, Transmit -
38	Port 23, Transmit +
23	Port 23, Receive -
37	Port 23, Receive +
1	Signal ground
16	Signal ground
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
(Sheet 2 of 2)	

Table 63
32-port DS1 MSA connector P3 pinout and signal names

Pin number	Signal name
9	Port 24, Transmit -
39	Port 24, Transmit +
(Sheet 1 of 3)	

Table 63 (continued)
32-port DS1 MSA connector P3 pinout and signal names

Pin number	Signal name
10	Port 24, Receive -
25	Port 24, Receive +
27	Port 25, Transmit -
41	Port 25, Transmit +
11	Port 25, Receive -
26	Port 25, Receive +
28	Port 26, Transmit -
42	Port 26, Transmit +
13	Port 26, Receive +
43	Port 26, Receive -
15	Port 27, Transmit -
30	Port 27, Transmit +
14	Port 27, Receive +
44	Port 27, Receive -
18	Port 28, Transmit -
32	Port 28, Transmit +
3	Port 28, Receive -
33	Port 28, Receive +
5	Port 29, Transmit -
20	Port 29, Transmit +
4	Port 29, Receive -
34	Port 29, Receive +
6	Port 30, Transmit -
21	Port 30, Transmit +
22	Port 30, Receive -
(Sheet 2 of 3)	

Table 63 (continued)
32-port DS1 MSA connector P3 pinout and signal names

Pin number	Signal name
36	Port 30, Receive +
8	Port 31, Transmit -
38	Port 31, Transmit +
23	Port 31, Receive -
37	Port 31, Receive +
1	Sparing control
16	12 V feed to sparing panel
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
2	Sparing control
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 3 of 3)	

Figure 73
32-port DS1 MSA termination panel pinouts and signal names: 1-port/DB15

Pin	Name
1	Receive +
2	Frame Ground
3	Transmit +
4	Frame Ground
9	Receive -
11	Transmit -
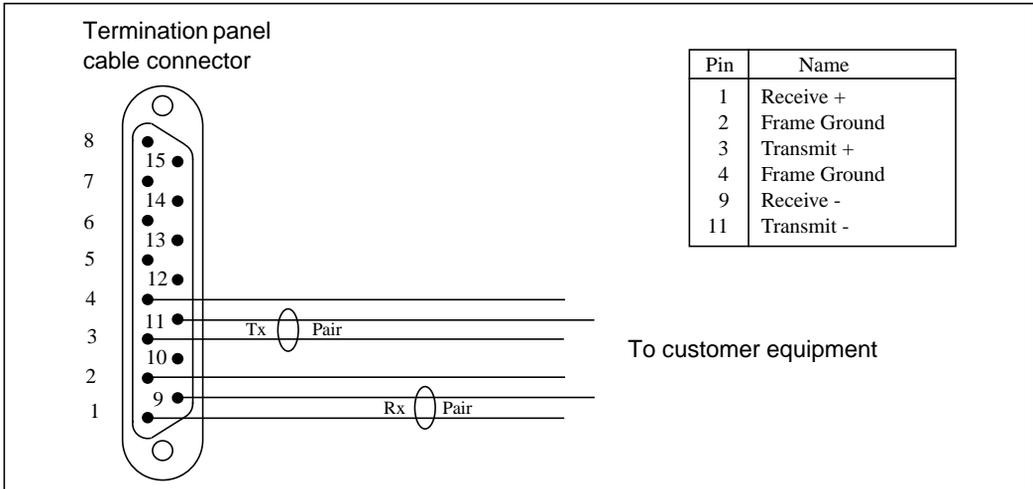
Note: Pinouts for each of the 32 ports follow the pattern shown in the above figure.

Figure 74
32-port DS1 MSA termination panel pinouts and signal names: 2-port/DB15

Pin	Name
1	Port 1 transmit +
2	Port 1 receive +
5	Signal ground
7	Port 0, receive +
8	Port 0, transmit +
9	Port 1, transmit -
10	Port 1, receive -
12	Frame ground
14	Port 0, receive -
15	Port 0, transmit -

PPT 2862 001 AB
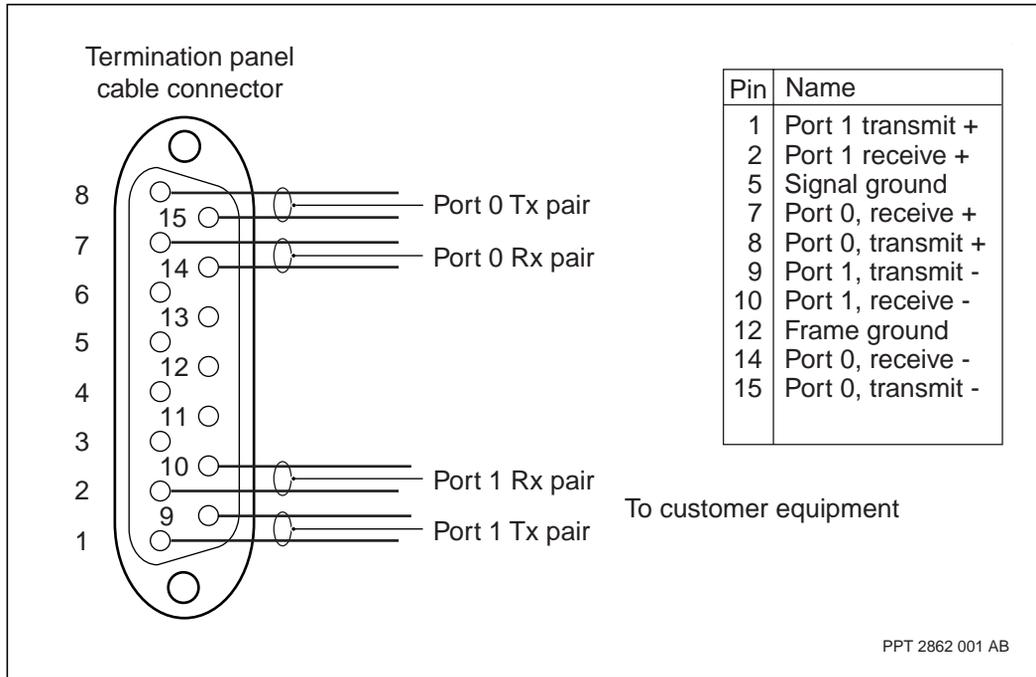
Note: Pinouts for each of the 32 ports follow the pattern shown in the above figure. All odd-numbered ports (1,3,5,...,31) have identical pinouts, as do all even-numbered ports (0,2,4,...,30).

Figure 75
32-port DS1 MSA termination panel pinouts and signal names: RJ45

RJ-45 connector

1 2 3 4 5 6 7 8

Pin	Signal
1	Rx-
2	Rx+
3	Not used
4	Tx-
5	Tx+
6	Not used
7	Not used
8	Not used

PPT 2898 001 AA
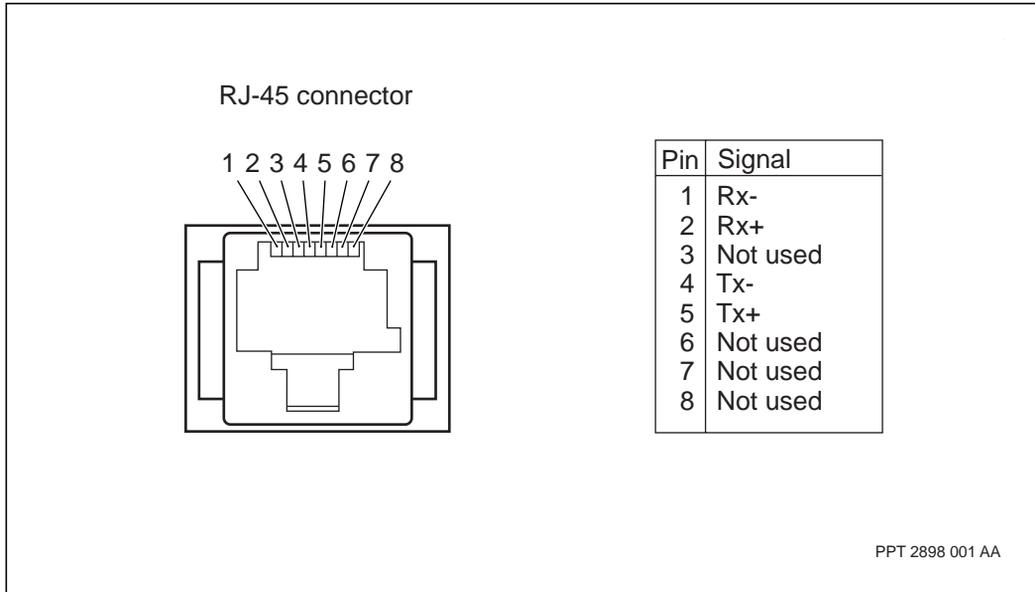
Note: Pinouts for each of the 32 ports follow the pattern shown in the above figure.

32-port DS1 MSA cable assemblies for electrical ports

The cable assemblies for one or more MSA32 sparing panels are used for:

- interfacing between the sparing panel and its FPs, both the mains and the spare

- inter-panel connections in a one-for-n (1:n) sparing configuration that is not one-for-one (1:1) for MSA32

- interfacing between the sparing panel and intra-office equipment such as CSUs or DSXs

The FP interface and inter-panel cables are manufactured by Nortel Networks in fixed lengths with the appropriate connectors.

Inter-panel connections for one-for-n sparing configurations require flexi-cables for linking the panels together. The product engineering codes (PECs) for the flexi-cables are:

Table 64
PECs of the MSA32 DS1flexi-cables between sparing panels

PEC	Type of sparing panel
NTJS99	RJ45
NTY199AA	BNC, DB15 1-port, DB15 2-port
NTY199AB	BNC, DB15 1-port, DB15 2-port with shorter flexi-cables and optionally used with a cable cover NTPS07

The DS1 MSA32 sparing panels with BNC or DB15 connectors can have an optional cable cover installed over the inter-panel flexi-cables of a one-for-n configuration. The cover is identified by PEC NTPS07. The flexi-cable assembly must be the shorter version identified by NTY199AB or later.

The available MSA32 FP interface cables are listed in the table "PECs of the MSA32 DS1 interface cables from FP to sparing panel" (page 230). In addition to providing connectivity for eight DS1 ports, each MSA32 FP interface cable also integrates sparing panel control lines.

Table 65
PECs of the MSA32 DS1 interface cables from FP to sparing panel

PEC	Type of FP	Length
NTPS03	DS1	3 m (9.8 ft)
NTPS04	DS1	15 m (49.2 ft)

The maximum cable length for DS1 lines to customer equipment is 340 m (1100 ft). The distance between the FP and the termination panel is part of the total length. This length applies to 28 gauge (.32 mm), 100 ohm cables. The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz. Insertion loss is proportional to cable length and varies among types of cables.

Table 66
Balanced DS1 cable assembly parts

Qty	Item	Description
	MTR R0119074	cable, 25 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0360941	high density D-sub connector
88	NT A0360941	high density D-sub connector contact, 22 - 28 AU crimp
1	NT A0311933	Accessory D-sub connector, joining latching
1	NT A0800332	D-sub hood connector, D-25 array
1	NT A0800333	D-sub hood connector, D-25 array
2	NT A0740362	cable clamp (standard) for D-sub metal hood
1	NT P0633705	cable tie, tie marker

For general information on cables, see "Cables" (page 77).

OC-3 cable assembly for optical ports on a 32-port DS1 MSA FP

When a 32-port DS1 MSA FP has the optional optical ports, it requires optical cabling. The fiber mode type must be the same as the FP mode type. Use single-mode fiber cable with single-mode FPs and multi-mode fiber cable with multi-mode FPs.

Multi-mode fiber (MMF) cable must conform to ANSI/EIA/TIA-568. The MMF has a core diameter of 62.5 microns and cladding diameter of 125 microns. The modal bandwidth is at least 500 MHz-km and the attenuation is less than 1.0 dB/Km at 1300 nm.

The single-mode fiber (SMF) cable has a core diameter of 9 microns and cladding diameter of 125 microns. The attenuation is less than 0.5 dB/Km at 1300 nm.

Connectors should be industry standard duplex SC connectors.

The sum of cable splice losses and connector losses from the FP to customer equipment must not exceed 10 dB for multi-mode and 12 dB for single-mode. The losses in a transmission path determines the distance the FP can send a signal. The maximum distance from the FP to customer equipment is 2 km for multimode and 15 to 20 km for single-mode, depending on the losses due to splices and connectors.

You can purchase cables with attached connectors that meet the above specifications from any supplier of fiber optic cables.

For more information, see "Cables" (page 77).

OC-3 line automatic protection switching on a 32-port DS1 MSA FP

SONET line automatic protection switching (line APS), or line protection, is a standards-defined feature enabling a form of line sparing on optical cards.

For more information on line APS, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide* and 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

OC-3 interface characteristics on a 32-port DS1 MSA FP

When a DS1 MSA32 FP has the optional optical ports, the OC-3 ATM portion of the 2-slot FP has the following characteristics as defined in ANSI T1E1.2 95-003.

Table 67
OC-3 ATM general interface characteristics on a DS1 FP

General Optical Interface Characteristics	
Connector	Dual SC
Bit Rate	155.520 Mbit/s
Line Code	Binary Non-Return-To-Zero (NRZ)

Table 68
OC-3 single mode intermediate reach interface characteristics on a DS1 FP

Single-mode Intermediate Reach Optical Interface Characteristics	
Emission Wavelength	1261 nm to 1360 nm
Attenuation Range	0 - 28 dB
Spectral Width: Maximum RMS Width	4 nm
Mean Transmission Power	-5 to 0 dBm
Minimum Extinction Ratio	10.0 dB
Eye Pattern Mask	As per ITU G.957 Fig 2, ANSI T1E1.2/94-002R1-Fig 10, TA-253 Issue 8 Fig 4-2
Maximum receive power (average)	0 dBm
Minimum receive power (average)	-34 dBm
Optical Path Power Penalty	1 dB

Table 69
OC-3 multi-mode interface characteristics on a DS1 FP

Multimode Optical Interface Characteristics	
Center Wavelength	1270 nm to 1380 nm
Attenuation Range	0 - 12.5 dB
Maximum Spectral Width:	200 nm
Mean Transmission Power	-19 to -14 dBm
Minimum Extinction Ratio	10 dB
Rise time, 20-80% Fall time, 20-80%	2.5 nanoseconds 2.5 nanoseconds
(Sheet 1 of 2)	

Table 69 (continued)
OC-3 multi-mode interface characteristics on a DS1 FP

Multimode Optical Interface Characteristics	
Overshoot%	10
Rx sensitivity (dBm)	-32.5 to -14 dBm
(Sheet 2 of 2)	

Connecting to OC-3 ports on a 32-port DS1 MSA FP

The OC-3 ATM IP sends out a signal stronger than the OC-3 ATM FP can handle. In the case that these cards are used together within a network, a 10 dB attenuator is required for the Tx port of the OC-3 ATM IP. The attenuator will lower the strength of the signal to a maximum -10 dB, an acceptable signal for the OC-3 ATM FP.

Chapter 11
DS3 function processors

Frame-based services are supported by the following Passport DS3 function processors (FPs):

- "1-port DS3 function processor" (page 236)

- "1-port DS3C function processor" (page 239)

ATM services are supported by the following Passport DS3 FPs:

- "2-port DS3C TDM function processor" (page 243)

- "3-port DS3 ATM function processor" (page 246)

- "3-port DS3 ATM IP function processor" (page 248)

1-port DS3 function processor

See these sections for information about the 1-port DS3 function processor (FP):

- "1-port DS3 faceplate" (page 236)

- "1-port DS3 termination panels" (page 238)

- "1-port DS3 cable assembly" (page 238)

- "1-port DS3 pinouts" (page 238)

1-port DS3 faceplate

The Monitor (Tx monitor) connector can be used to connect to test equipment and test the card while it is in service. It carries a -26dB tap of the transmit (Tx) connector signal. The subminiature 9-pin D-type connector provides a one-for-one sparing capability.

Figure 76
1-port DS3 faceplate

Ejector latch

Locking latch

9-pin subminiature
D-type connector

Coaxial cable
connectors
Receive
(Rx)

Transmit
(Tx)

Monitor
(Tx monitor)

LED status
indicator

Locking latch

Ejector latch

9
5

6
1

9-pin subminiature
D-type connector

**Pin Numbering
Scheme**

PPT 1062 001 AA

1-port DS3 termination panels

The 1-port DS3 FP uses the DS3/E3 termination panels. These panels provide a break-out for customer-equipment connections and support sparing. You can connect customer equipment to the port of a DS3 FP through the coaxial cable connectors on the faceplate.

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

For more information about the DS3/E3 termination panels, see "DS3 or E3 termination panels" (page 56).

1-port DS3 cable assembly

The maximum cable length for DS3 lines to customer equipment is 325 m (1000 ft). The distance between the FP and the termination panel is part of the total length.

To meet EMC requirements, ensure that any cables you connect from a DS3 FP or termination panel to customer equipment are of type NT734.

Table 70
1-port DS3 cable assembly parts

Quantity	Item	Description
1	NT-734 or comparable cable with double shielded construction	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information, see "Cables" (page 77).

1-port DS3 pinouts

This table identifies the pinouts and signal names for the DS3 D-type connector.

Table 71
1-port DS3 card D-type connector pinouts and signal names

Pin number	Signal name
1	Logic ground
2	PSSTATUS
3	PSLOAD
4	PSREG0
5	PSREG1
6	Frame ground
7	PSREG2
8	PSREG3
9	Fused +12V

Trunk facility requirements

Within the Passport subnet, the end-to-end DS3 trunk facility must meet all of the following conditions:

- full, single clear-channel DS3

- structured or framed DS3

- used for non-subrate applications

For DS3 trunk facilities, C-bit parity is a provisionable option.

1-port DS3C function processor

See these sections for information about the 1-port DS3C function processor (FP):

- "1-port DS3C faceplate" (page 240)

- "1-port DS3C termination panels" (page 242)

- "1-port DS3C termination panels" (page 242)

- "1-port DS3C cable assembly" (page 242)

- "1-port DS3C pinouts" (page 243)

1-port DS3C faceplate

You can use the monitor port (Tx monitor) to connect to test equipment and test the card while it is in service. It carries a -26dB tap of the transmit (Tx) connector signal. The 9-pin subminiature D-type connector provides one-for-one sparing capability.

Figure 77
1-port DS3C faceplate
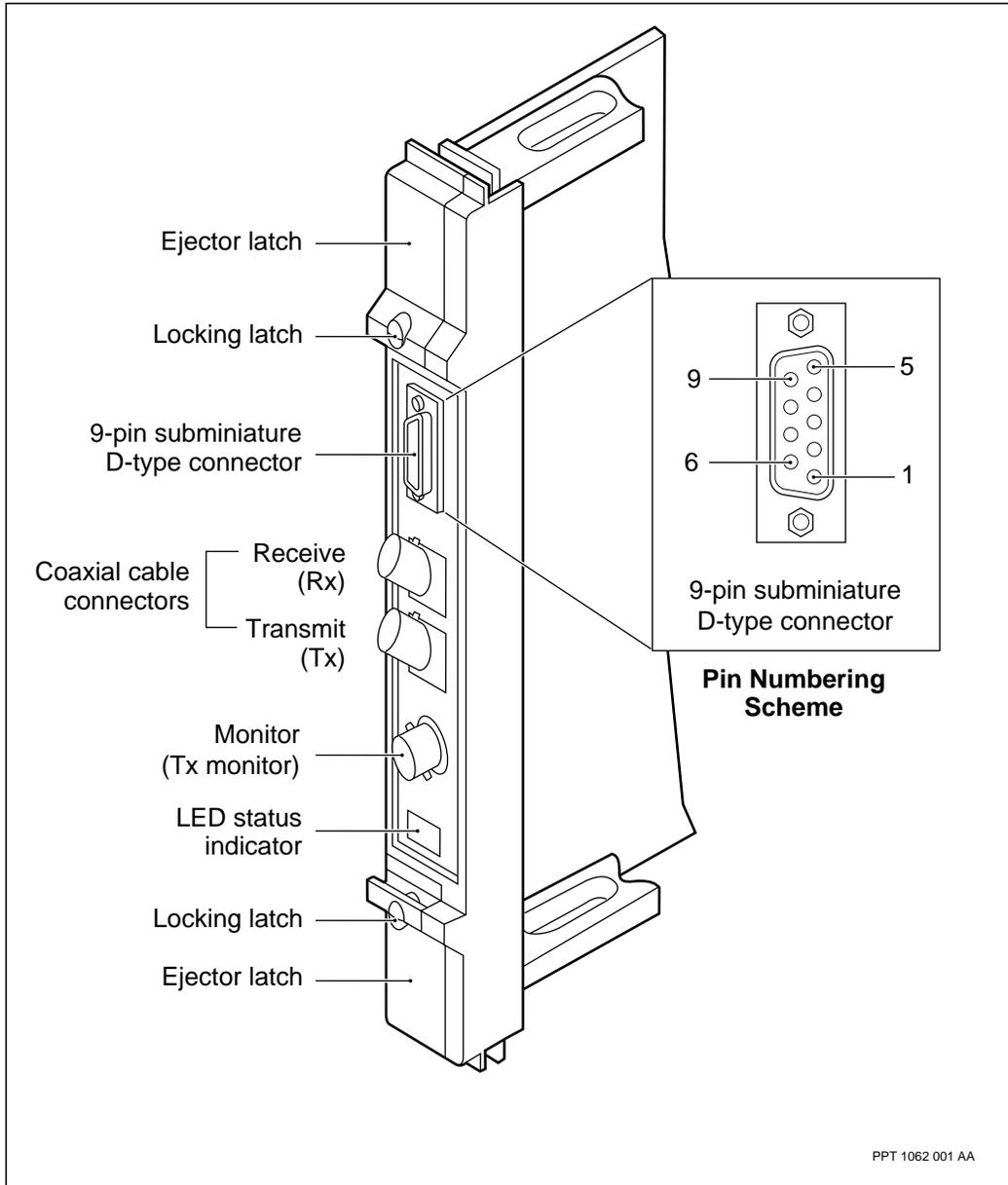
1-port DS3C termination panels

You can connect customer equipment to a 1-port DS3C FP using the DS3/E3 termination panels. These panels provide a break-out for customer-equipment connections and support sparing.

The 1-port DS3C FP supports both one-for-one and one-for-*n* sparing where *n* is one to four. If you want to use one-for-one sparing, you can connect the spare FP using either a termination panel or a sparing panel. To protect multiple FPs with a single spare, use the DS3C one-for-n (1:n) sparing panel.

Before setting up sparing, check the PECs on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

⚠	**CAUTION** **Service interruption** Sparing requires all ports on the spare FP be connected to the termination or sparing panel sparing connectors, whether they are provisioned or not. Failure to do so will result in the termination or sparing panel dropping all ports on the spare FP.

For more information about the DS3 or E3 termination panels, see "DS3 or E3 termination panels" (page 56).

1-port DS3C cable assembly

The maximum cable length for DS3 lines to customer equipment is 325 m (1,000 ft). The distance between the FP and the termination panel is part of the total length.

Table 72
1-port DS3 cable assembly parts

Quantity	Item	Description
1	NT-734 or comparable cable with double shielded construction	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information, see "Cables" (page 77).

1-port DS3C pinouts

This table identifies the pinouts and signal names for the D-type connector.

Table 73
DS3C FP connector pinouts and signal names

Pin number	Signal name
1	Logic ground
2	PSSTATUS
3	PSLOAD
4	PSREG0
5	PSREG1
6	Frame ground
7	PSREG2
8	PSREG3
9	Fused +12V

2-port DS3C TDM function processor

See these sections for information about the 2-port DS3C TDM function processor (FP):

• "2-port DS3C TDM faceplate" (page 244)

- • "2-port DS3C TDM termination panels" (page 246)

- • "2-port DS3C TDM cable assembly" (page 246)

2-port DS3C TDM faceplate

"2-port DS3C TDM faceplate" (page 245) shows the faceplate for the DS3C TDM FP. A small connector is available for one-for-one sparing capability.

Figure 78
2-port DS3C TDM faceplate

Ejector latch

Locking latch

Monitor 1

Monitor 0

Receive (Rx)

Port 1

Transmit (Tx)

Receive (Rx)

Port 0

Transmit (Tx)

Sparing control

LED status indicator

Locking latch

Ejector latch

PPT 2172 001 AA
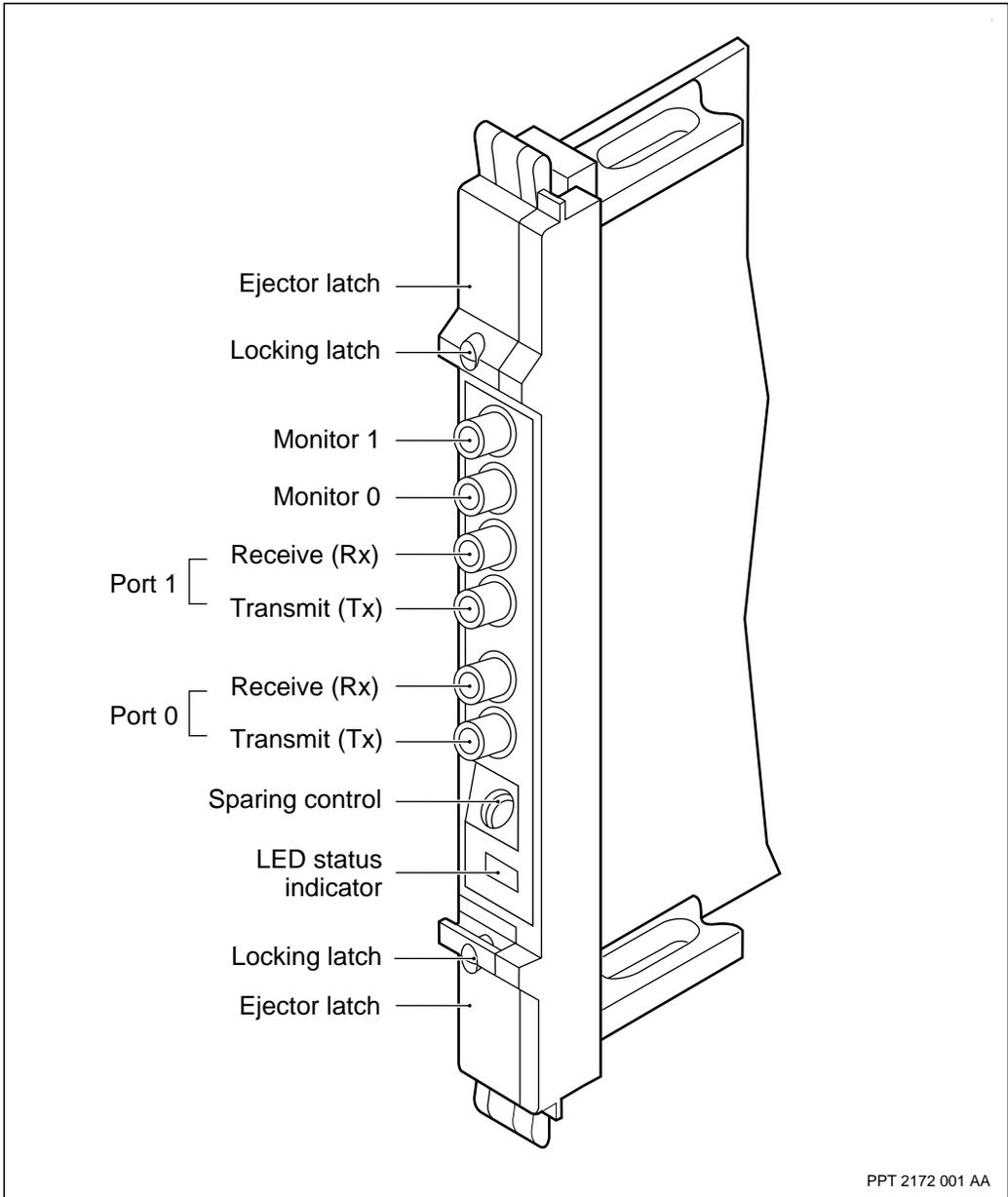
2-port DS3C TDM termination panels

You can connect customer equipment directly to the 2-port DS3C TDM FP or to its termination panel. The 2-port DS3C TDM FP uses the 19" DS3/E3/JT2 ATM termination panel. This termination panel supports one-for-one sparing.

Note: The 2-port DS3C TDM FP does not use the 13" DS3/E3/JT2 ATM termination panel.

For more information about the DS2/E3/JT2 termination panel, see "DS3, E3, or JT2 ATM termination panels" (page 58).

2-port DS3C TDM cable assembly

The maximum cable length for DS3C lines to customer equipment is 325 m (1000 ft). The distance between the FP and the termination panel is part of the total length.

Table 74
2-port DS3C TDM cable assembly parts

Qty	Item	Description
2	NT-734 or comparable cable with double shielded construction	75-Ω coaxial cable
4	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug

For more information, see "Cables" (page 77).

3-port DS3 ATM function processor

See these sections for information about the 3-port DS3 ATM function processor (FP):

• "3-port DS3 ATM faceplate" (page 246)

• "3-port DS3 ATM termination panels" (page 248)

• "3-port DS3 ATM cable assembly" (page 248)

3-port DS3 ATM faceplate

A small DIN connector is available for one-for-one sparing capability.

Figure 79
3-port DS3 ATM faceplate
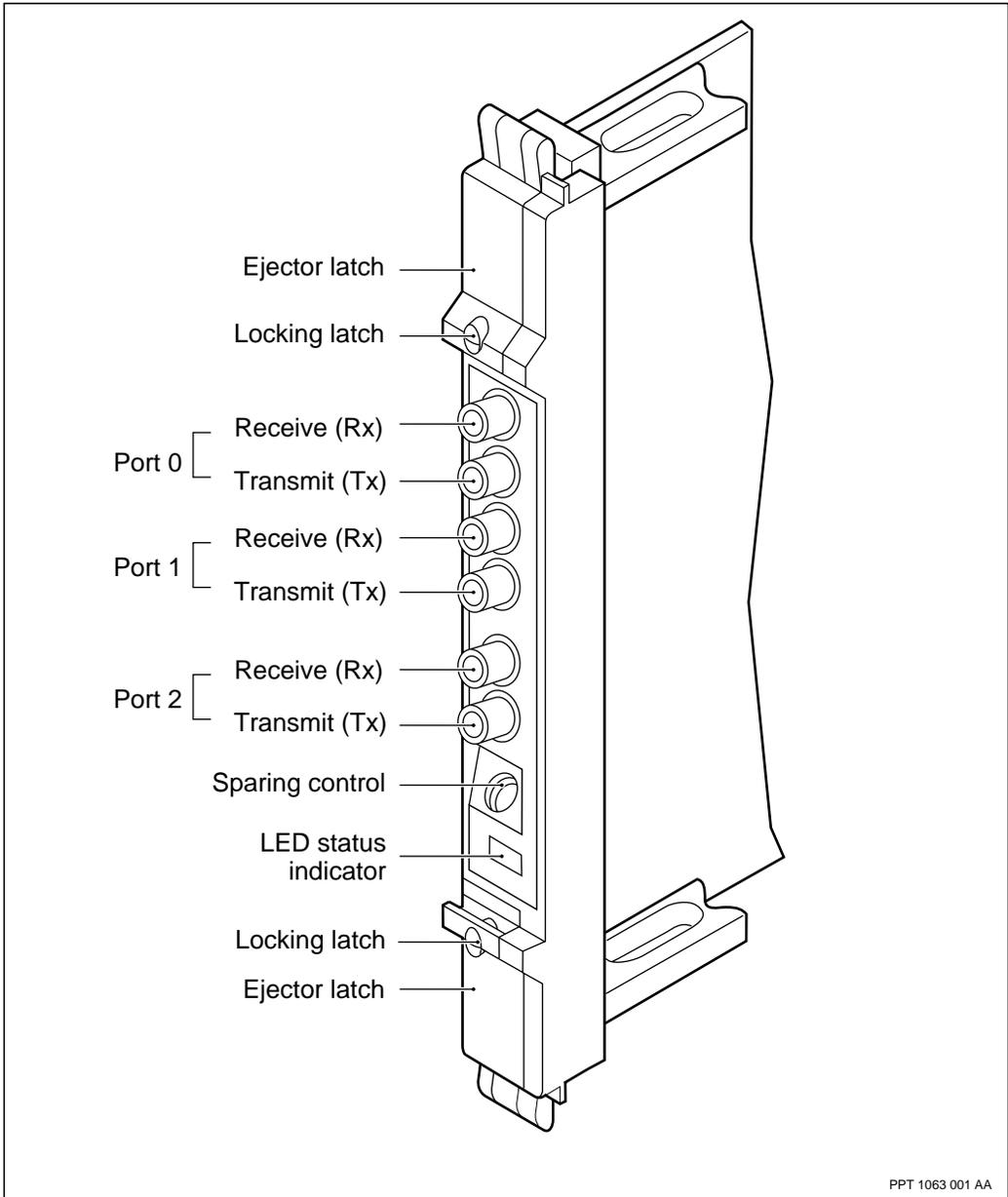
Ejector latch

Locking latch

Port 0
  Receive (Rx)
  Transmit (Tx)

Port 1
  Receive (Rx)
  Transmit (Tx)

Port 2
  Receive (Rx)
  Transmit (Tx)

Sparing control

LED status indicator

Locking latch

Ejector latch

PPT 1063 001 AA

3-port DS3 ATM termination panels

You can connect customer equipment directly to the 3-port DS3 ATM FP or to its termination panel. The DS3 ATM FP uses the DS3/E3/JT3 ATM termination panels. These termination panels support sparing.

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are EA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, BA and DA) can be spared with each other. The PEC is located on the faceplate of the FP.

The three ports on the right side of this termination panel are used for monitoring transmit output. This allows you to connect third-party equipment for testing and monitoring purposes.

For more information about termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

3-port DS3 ATM cable assembly

The maximum cable length for DS3 lines to customer equipment is 325 m (1000 ft). The distance between the FP and the termination panel is part of the total length.

Table 75
3-port DS3 ATM cable assembly parts

Qty	Item	Description
2	NT-734 or comparable cable with double shielded construction	75-Ω coaxial cable
4	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug

For more information, see "Cables" (page 77).

3-port DS3 ATM IP function processor

See these sections for information about the 3-port DS3 ATM IP function processor (FP):

• "3-port DS3 ATM IP faceplate" (page 249)

- "3-port DS3 ATM IP termination panels" (page 251)

- "3-port DS3 ATM cable assembly" (page 248)

3-port DS3 ATM IP faceplate

A small DIN connector is available for one-for-one sparing capability.

Figure 80
3-port DS3 ATM IP faceplate
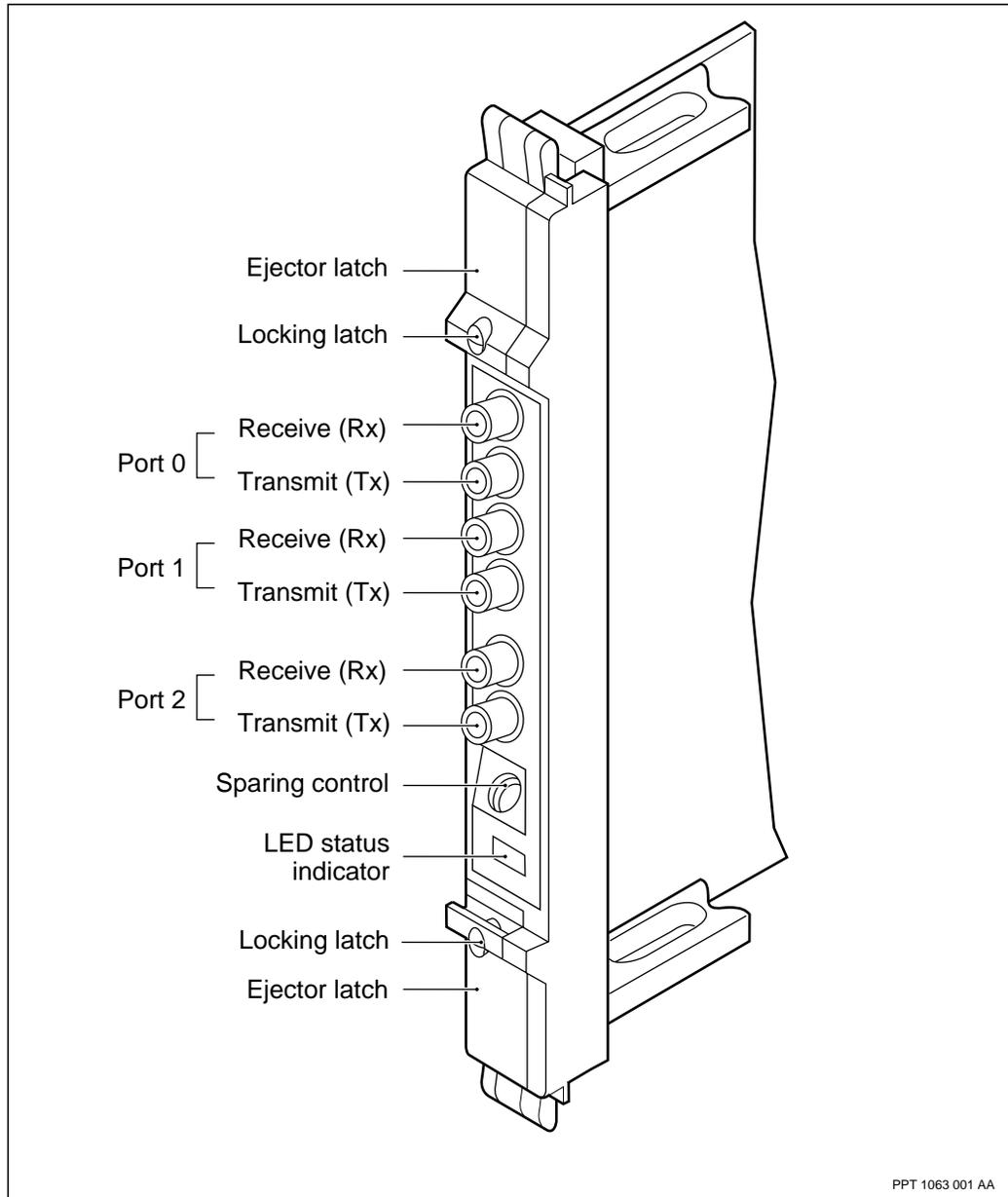
3-port DS3 ATM IP termination panels

You can connect customer equipment directly to the 3-port DS3 ATM IP or to its termination panel. The DS3 ATM IP FP uses the DS3/E3/JT3 ATM termination panels. These termination panels support sparing.

Before setting up sparing, ensure all eight digits of the product equipment codes (PECs) of the main and spare FPs match.

For more information about the DS3/E3/JT3 ATM termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

3-port DS3 ATM IP cable assembly

The maximum cable length for DS3 ATM IP lines to customer equipment is 325 m (1000 ft). The distance between the FP and the termination panel is part of the total length.

Table 76
3-port DS3 ATM IP cable assembly parts

Qty	Item	Description	Maximum length
2	NT-734 or comparable cable with double-shielded construction	75-Ω coaxial cable	325 m (1000 ft)
4	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug	

For more information, see "Cables" (page 77).

Chapter 12
E1 function processors

Voice services are supported by the following Passport E1 function processors (FPs):

- "1-port E1 MVP-E function processor" (page 254)

- "4-port E1 MVP-E function processor" (page 258)

Frame-based services are supported by the following Passport E1 FPs:

- "4-port E1 function processor" (page 264)

- "4-port E1C function processor" (page 269)

ATM services are supported by the following Passport E1 FPs:

- "3-port E1 ATM function processor" (page 274)

- "4-port E1 AAL1 function processor" (page 279)

- "8-port E1 ATM function processor" (page 285)

- "32-port E1 TDM function processor" (page 292)

Multiple services are supported by the following Passport E1 FPs:

- "32-port E1 MSA function processor" (page 299)

1-port E1 MVP-E function processor

See these sections for information about the 1-port E1 Multipurpose Voice Platform with enhanced echo cancellation (MVP-E) function processor (FP):

- "1-port E1 MVP-E faceplate" (page 254)
- "1-port E1 MVP-E termination panels" (page 256)
- "1-port E1 MVP-E balanced cable assembly" (page 256)
- "1-port E1 MVP-E unbalanced cable assembly" (page 256)
- "1-port E1 MVP-E pinouts" (page 257)

1-port E1 MVP-E faceplate

This figure shows an E1 MVP-E faceplate.

Figure 81
1-port E1 MVP-E faceplate
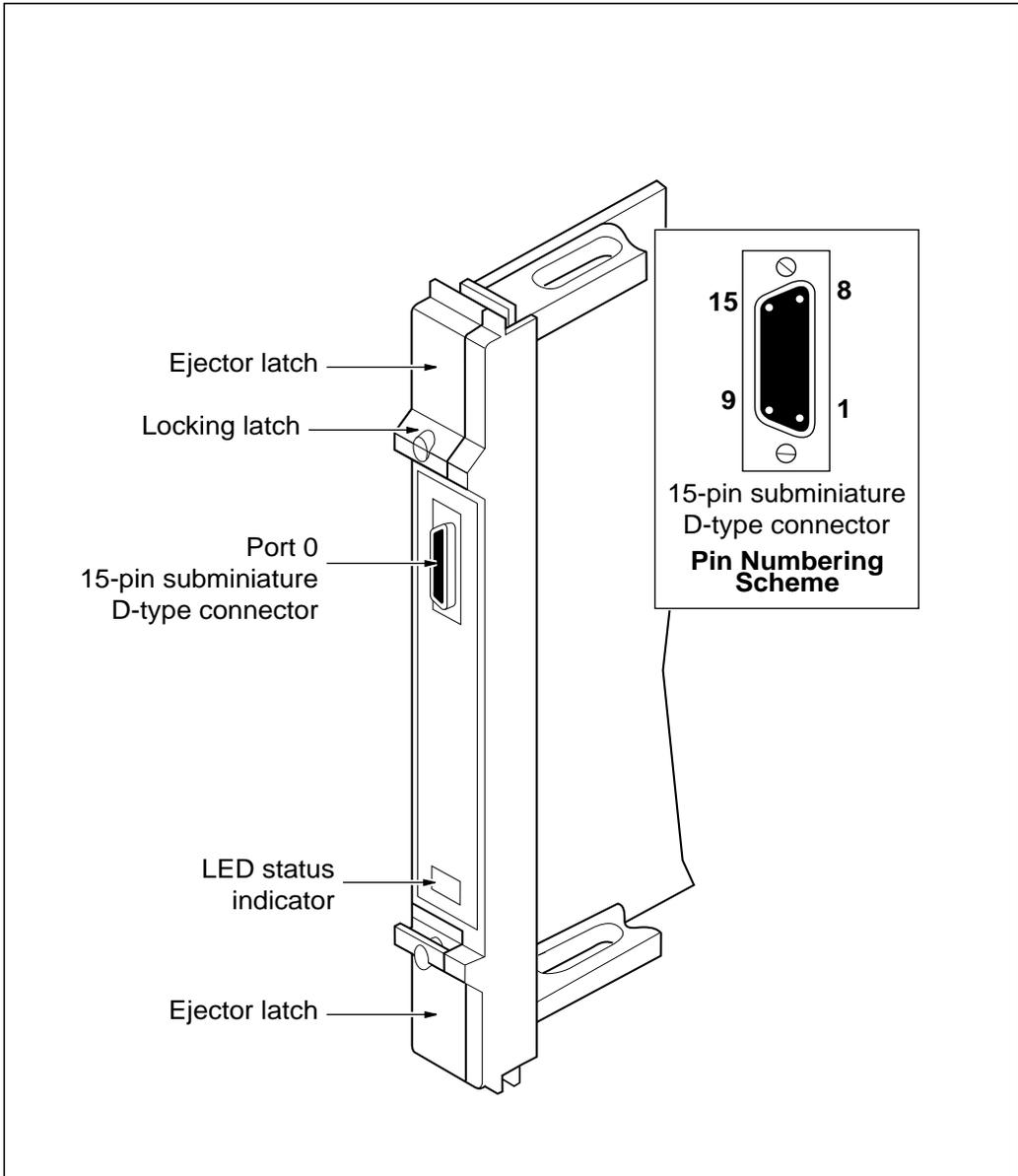
1-port E1 MVP-E termination panels

The 1-port E1 MVP-E FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

1-port E1 MVP-E balanced cable assembly

The maximum cable length for balanced lines to customer equipment is 230 m (750 ft). The distance between the FP and the termination panel is part of the total length.

Table 77
1-port E1 MVP-E cable assembly parts

Qty	Item	Description
	Belden 8138	Cable, 120 ohm, 8 twisted pairs, 28 gauge strand
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
6	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge wire
2	NT A0361050	AMP 747099-3 Straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" Pan Head Machine Screw
4	NT P0387666	0.115" Spring Washer

For more information, see "Cables" (page 77).

1-port E1 MVP-E unbalanced cable assembly

The maximum cable length for unbalanced lines to customer equipment is 750 m (2400 ft). The distance between the FP and the termination panel is part of the total length.

Table 78
1-port E1 MVP-E cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75 ohm coaxial cable
1	Specialty Connector Company 28P387-1	75 ohm straight BNC plug

For more information, see "Cables" (page 77).

1-port E1 MVP-E pinouts

Table 79
1-port E1 MVP-E connector P0 pinout and signal names

Pin number	Signal name
7	Receive +
8	Transmit +
14	Receive -
15	Transmit -
1	Protection switch register bit 0
9	Protection switch register bit 1
2	Protection switch register bit 2
10	Protection switch register bit 3
3	No connection
5	Signal ground
4	+12 V dc
11	Signal ground
12	Frame ground
6	Protection switch load
13	Protection switch status

Figure 82
E1 termination panel pinouts and signal names
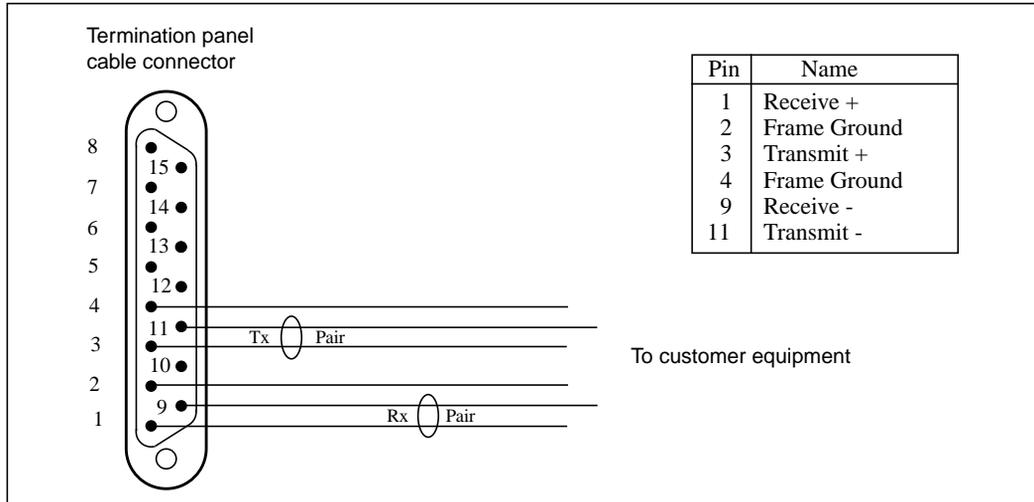
4-port E1 MVP-E function processor

See these sections for information about the 4-port E1 Multipurpose Voice Platform with enhanced echo cancellation (MVP-E) function processor (FP):

• "4-port E1 MVP-E faceplate" (page 258)

• "4-port E1 MVP-E termination panels" (page 260)

• "4-port E1 MVP-E balanced cable assembly" (page 260)

• "4-port E1 MVP-E pinouts" (page 261)

4-port E1 MVP-E faceplate

You can use the monitor ports (MON 0 and MON 1) to connect to test equipment and test the card while it is in service. It carries a -26dB tap of the transmit (Tx) connector signal. The 9-pin subminiature D-type connector provides one-for-one sparing capability.

Figure 83
4-port E1 MVP-E faceplate

Ejector latch

Locking latch

Monitor port
MON 0

Ports 0 and 1
15-pin subminiature
D-type connector

Monitor port
MON 1

Ports 2 and 3
15-pin subminiature
D-type connector

LED status
indicator

Locking latch

Ejector latch

15
8
9
1

15-pin subminiature
D-type connector

8-pin DIN miniature
receptical

PPT 3068 002 AA
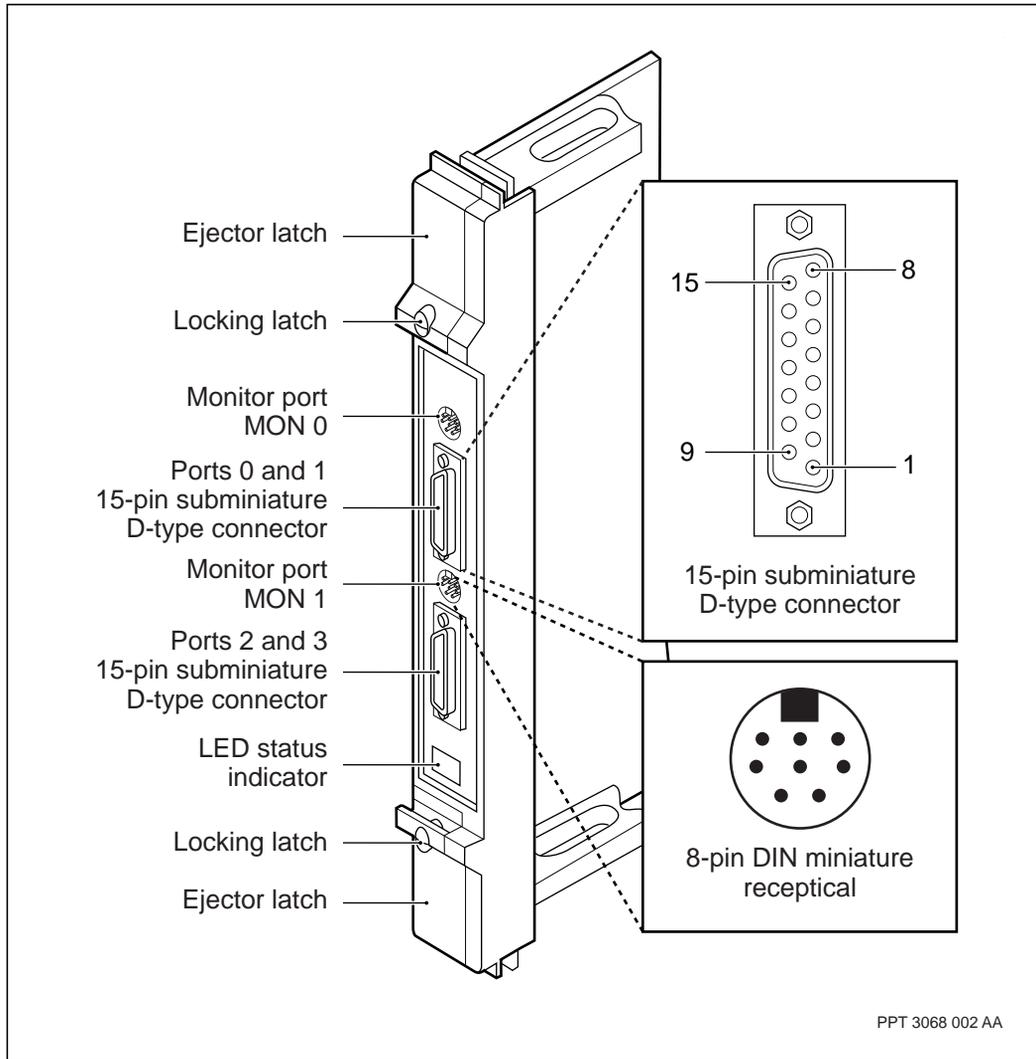
4-port E1 MVP-E termination panels

The 4-port E1 MVP-E FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

4-port E1 MVP-E balanced cable assembly

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft.). The distance between the FP and the termination panel is part of the total length.

Table 80
Balanced 4-port E1 MVP-E cable assembly parts

Qty	Item	Description
	Belden 8138	cable, 120 ohm, 8 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
12	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" on page 77.

4-port E1 MVP-E unbalanced cable assembly

The maximum cable length for unbalanced E1 lines to customer equipment is 750m (2400 ft.). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

Table 81
Unbalanced 4-port E1 MVP-E cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information about cables, see "Cables" (page 77).

4-port E1 MVP-E pinouts

See the following for information on specific connectors:

- "4-port E1 MVP-E connector P0 pinout and signal names" (page 261)

- "4-port E1 MVP-E connector P1 pinout and signal names" (page 262)

- "4-port E1 MVP-E faceplate monitor pinout and signal names" (page 263)

- "E1 termination panel pinout and signal names" (page 264)

Table 82
4-port E1 MVP-E connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
(Sheet 1 of 2)	

Table 82 (continued)
4-port E1 MVP-E connector P0 pinout and signal names

Pin number	Signal name
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal Ground
4	+12 V dc
5	Signal ground
12	No connection
(Sheet 2 of 2)	

Table 83
4-port E1 MVP-E connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
(Sheet 1 of 2)	

Table 83 (continued)
4-port E1 MVP-E connector P1 pinout and signal names

Pin number	Signal name
11	Signal ground
4	+12 V dc
5	Signal ground
12	No connection
(Sheet 2 of 2)	

Figure 84
4-port E1 MVP-E faceplate monitor pinout and signal names

Monitor port connector

Pin	Name
1	Port n: Transmit +
2	Port n: Transmit -
3	Port n: Receive +
4	Port n: Receive -
5	Port n+1: Trasmit +
6	Port n+1: Transmit -
7	Port n+1: Receive +
8	Port n+1: Receive -

PPT 3068 001 AA
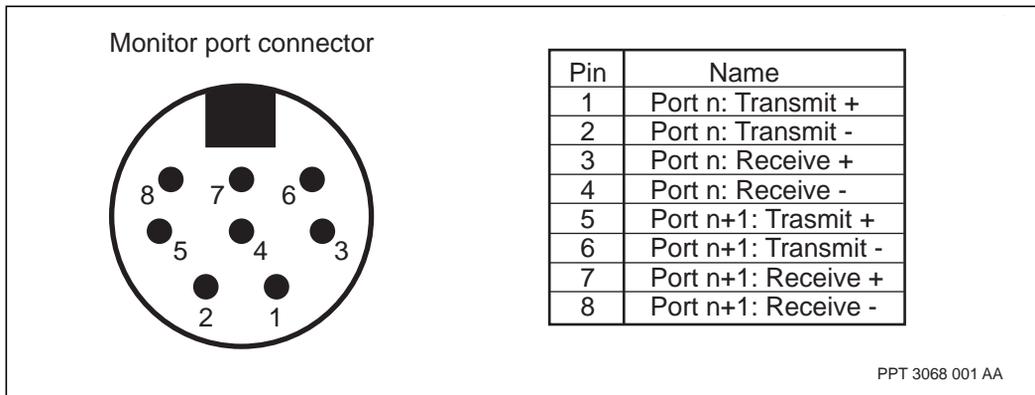
Figure 85
E1 termination panel pinout and signal names

Termination panel
cable connector

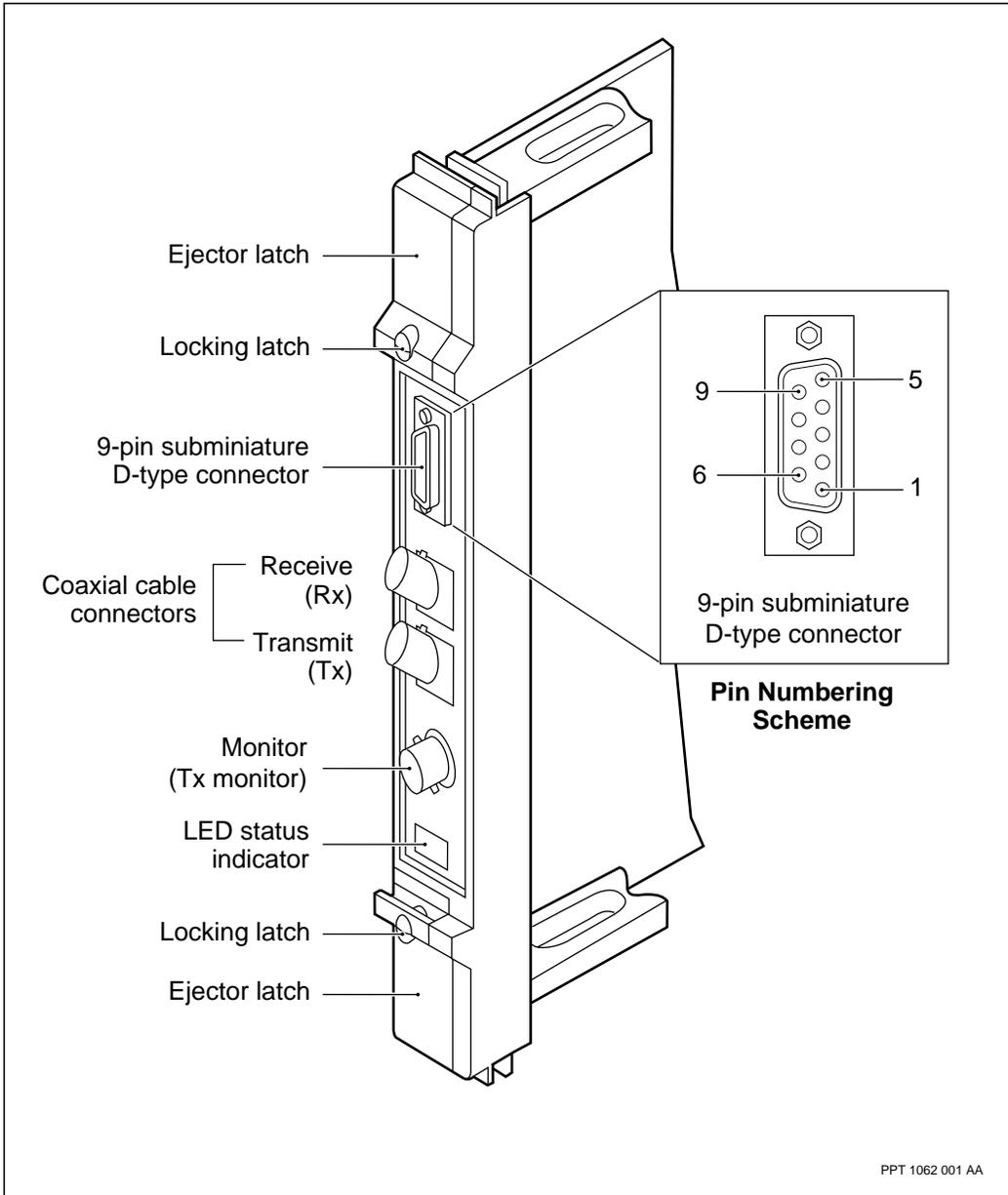| Pin	Name
1	Receive +
2	Frame Ground
3	Transmit +
4	Frame Ground
9	Receive -
11	Transmit -

To customer equipment
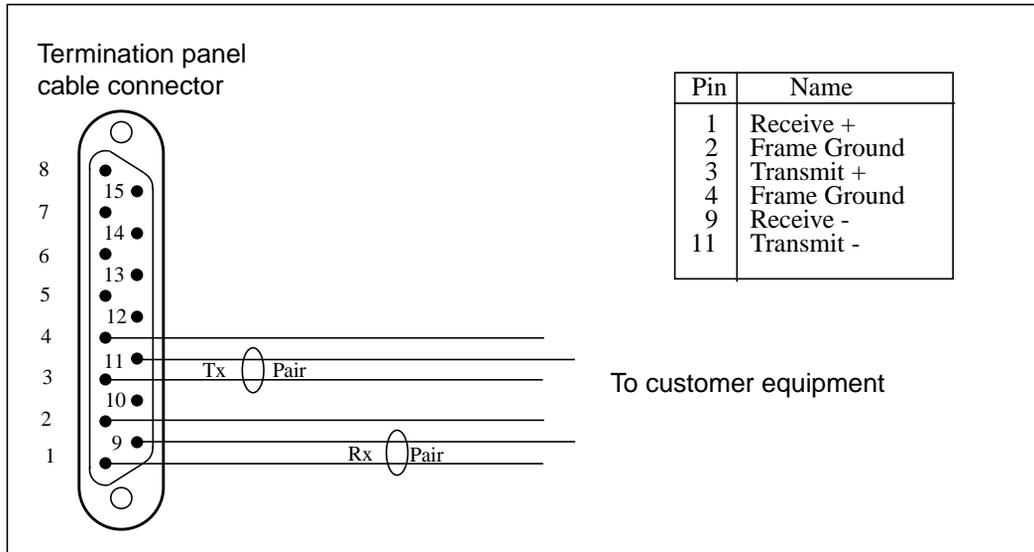
4-port E1 function processor

See these sections for information about the 4-port E1 function processor
(FP):

- "4-port E1 faceplate" (page 265)

- "4-port E1 termination panels" (page 266)

- "4-port E1 balanced cable assembly" (page 266)

- "4-port E1 unbalanced cable assembly" (page 267)

- "4-port E1 pinouts" (page 267)

4-port E1 faceplate

Figure 86
4-port E1 faceplate

Ejector latch

Locking latch

Ports 0 and 1 **P0**
15-pin subminiature
D-type connector

Ports 2 and 3 **P1**
15-pin subminiature
D-type connector

LED status
indicator

Ejector latch

15   **8**

9   **1**

15-pin
D-type connector

**Pin Numbering
Scheme**

PPT 0959 001 AB
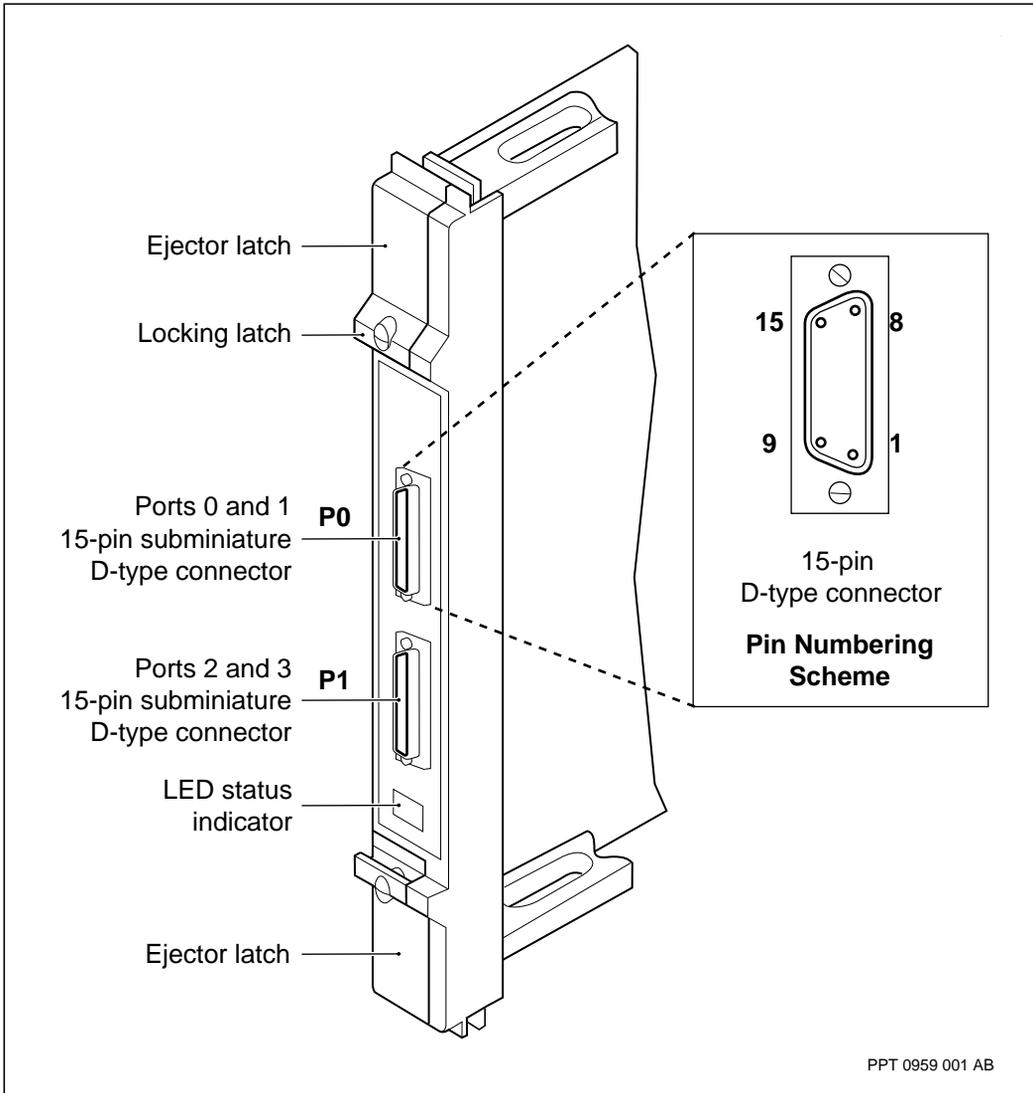
4-port E1 termination panels

The 4-port E1 FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

4-port E1 balanced cable assembly

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft). The distance between the FP and the termination panel is part of the total length.

Table 84
Balanced 4-port E1 cable assembly parts

Qty	Item	Description
	Belden 8138	cable, 120 ohm, 8 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
12	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

4-port E1 unbalanced cable assembly

The maximum cable length for unbalanced E1 lines to customer equipment is 750 m (2400 ft). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

Table 85
Unbalanced 4-port E1 cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information about cables, see "Cables" (page 77).

4-port E1 pinouts

See these sections for information on specific connectors:

Table 86
4-port E1 connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
(Sheet 1 of 2)	

Table 86 (continued)
4-port E1 connector P0 pinout and signal names

Pin number	Signal name
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Table 87
4-port E1 connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
(Sheet 1 of 2)	

Table 87 (continued)
4-port E1 connector P1 pinout and signal names

Pin number	Signal name
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 87
E1 termination panel pinout and signal names
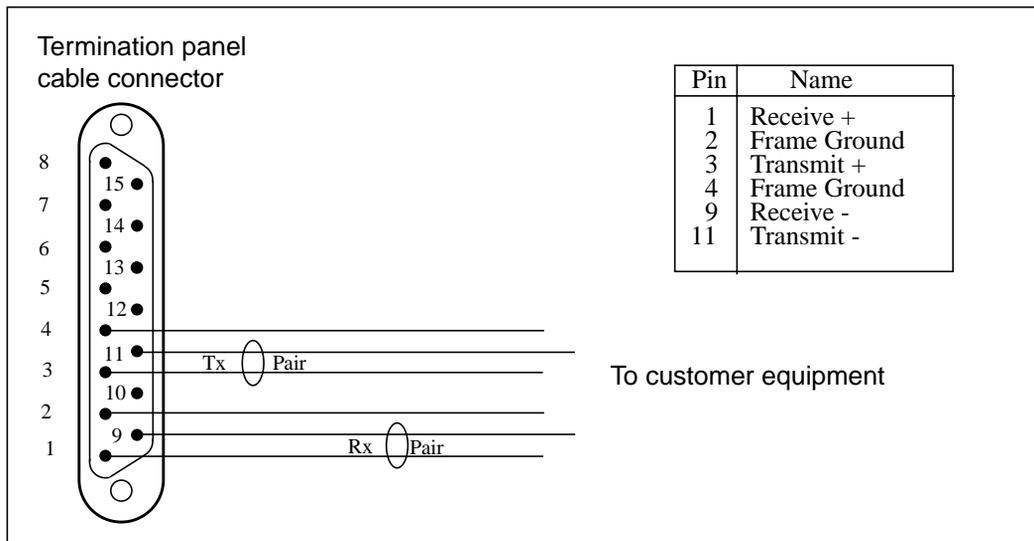
4-port E1C function processor

See the following sections for information about the 4-port E1C function processor (FP):

- "4-port E1C faceplate" (page 270)

- "4-port E1C termination panels" (page 271)

- "4-port E1C balanced cable assembly" (page 271)

- "4-port E1C unbalanced cable assembly" (page 272)

- "4-port E1C pinouts" (page 272)

4-port E1C faceplate

Figure 88
4-port E1C faceplate

Ejector latch

Locking latch

Ports 0 and 1
15-pin subminiature
D-type connector **C0**

Ports 2 and 3
15-pin subminiature
D-type connector **C1**

LED status
indicator

Locking latch

Ejector latch

15
8
9
1

15-pin subminiature
D-type connector

**Pin Numbering
Scheme**

PPT 1000 001 AA
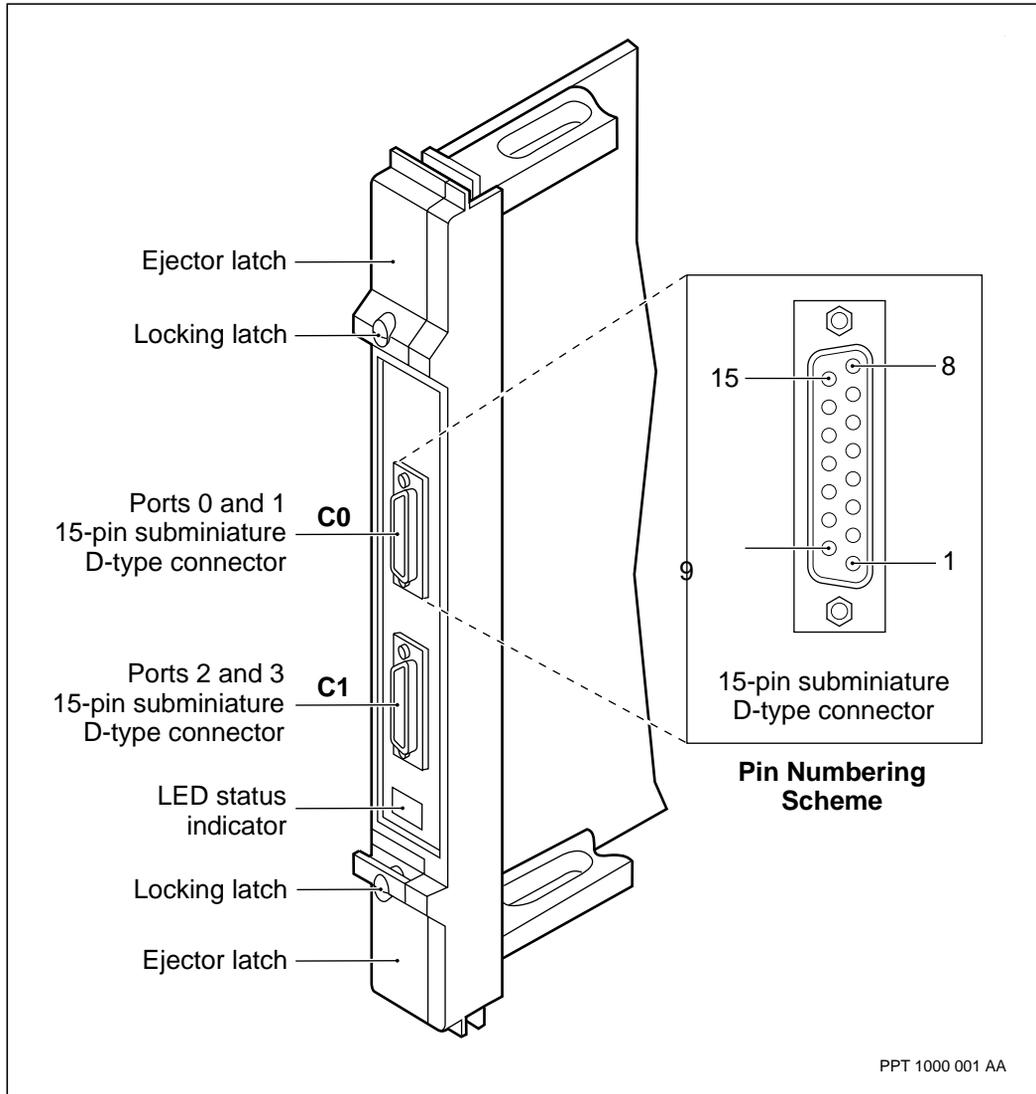
4-port E1C termination panels

The 4-port E1C FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

Before setting up sparing, check the product equipment codes (PECs) on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

4-port E1C balanced cable assembly

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft). The distance between the FP and the termination panel is part of the total length.

Table 88
Balanced 4-port E1C cable assembly parts

Qty	Item	Description
	Belden 8138	Cable, 120 Ω, 8 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
12	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

4-port E1C unbalanced cable assembly

The maximum cable length for unbalanced E1 lines to customer equipment is 750 m (2400 ft). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

Table 89
Unbalanced 4-port E1C cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information, see "Cables" (page 77).

4-port E1C pinouts

See these sections for information on specific connectors:

- "4-port E1C connector C0 pinout and signal names" (page 272)

- "4-port E1C connector C1 pinout and signal names" (page 273)

- "E1 termination panel pinouts and signal names" (page 274)

Table 90
4-port E1C connector C0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
(Sheet 1 of 2)	

Table 90 (continued)
4-port E1C connector C0 pinout and signal names

Pin number	Signal name
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Table 91
4-port E1C connector C1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
(Sheet 1 of 2)	

Table 91 (continued)
4-port E1C connector C1 pinout and signal names

Pin number	Signal name
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 89
E1 termination panel pinouts and signal names
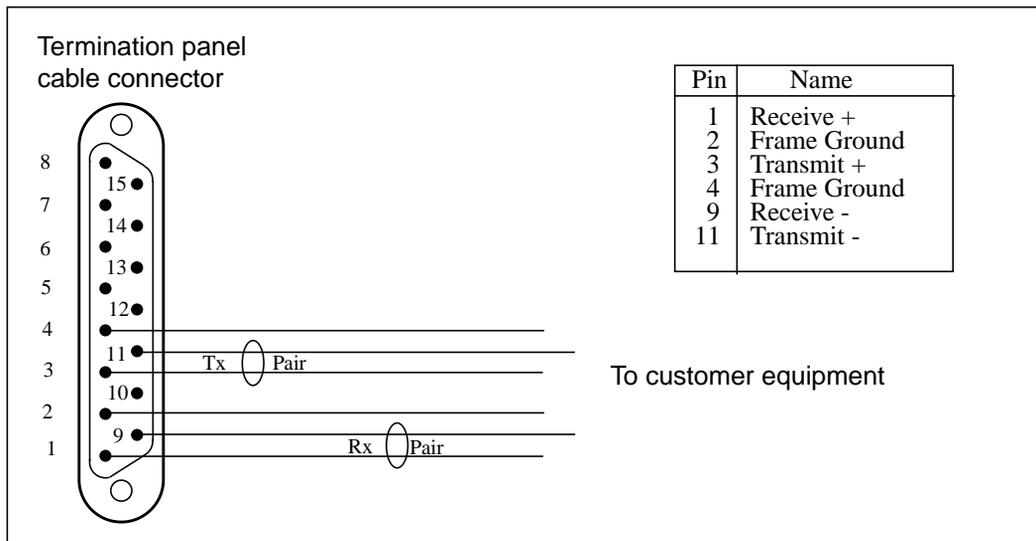
3-port E1 ATM function processor

See these sections for information about the 3-port E1 ATM function processor (FP):

- "3-port E1 ATM faceplate" (page 275)

- "3-port E1 ATM termination panels" (page 276)

- "3-port E1 ATM balanced cable assembly" (page 276)

- "3-port E1 ATM unbalanced cable assembly" (page 277)

- "3-port E1 ATM pinouts" (page 277)

3-port E1 ATM faceplate

This figure shows the faceplate for the 3-port E1 ATM FP.

Figure 90
3-port E1 ATM faceplate
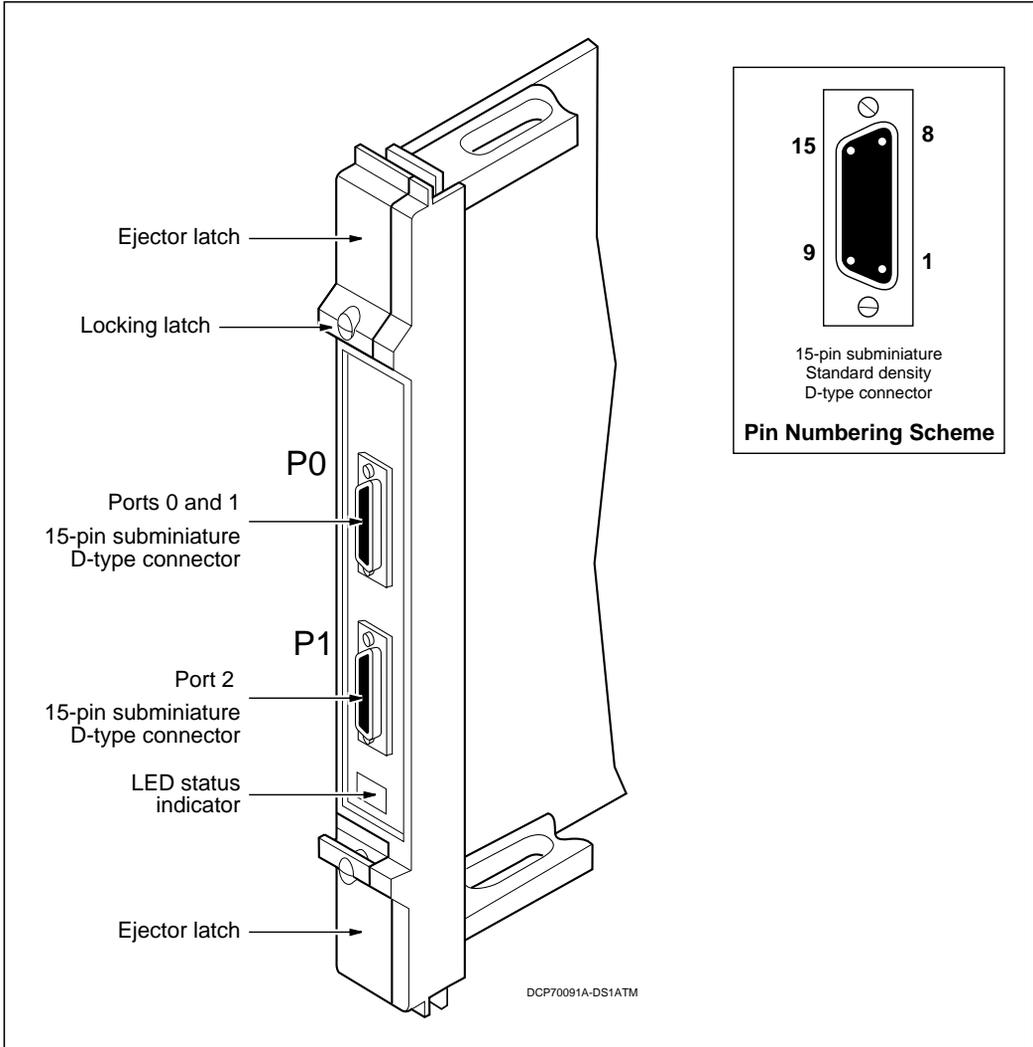
3-port E1 ATM termination panels

The 3-port E1 ATM FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are CA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and BB) can be spared with each other. The PEC is located on the faceplate of the FP.

3-port E1 ATM balanced cable assembly

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft). The distance between the FP and the termination panel is part of the total length.

Table 92
3-port E1 ATM balanced cable assembly parts

Qty	Item	Description
	Belden 8138	cable, 120 ohm, 8 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
12	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

3-port E1 ATM unbalanced cable assembly

The maximum cable length for unbalanced E1 lines to customer equipment is 750 m (2400 ft). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

Table 93
3-port E1 ATM unbalanced cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75-Ω coaxial cable
2	Specialty Connector Company 28P387-1	75-Ω straight BNC plug

For more information, see "Cables" (page 77).

3-port E1 ATM pinouts

See these sections for information about specific connectors:

- "3-port E1 ATM connector P0 pinout and signal names" (page 277)
- "3-port E1 ATM connector P1 pinout and signal names" (page 278)
- "E1 termination panel pinouts and signal names" (page 279)

Table 94
3-port E1 ATM connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
(Sheet 1 of 2)	

Table 94 (continued)
3-port E1 ATM connector P0 pinout and signal names

Pin number	Signal name
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Table 95
3-port E1 ATM connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	No connection
9	No connection
2	No connection
10	No connection
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
(Sheet 1 of 2)	

Table 95   (continued)
3-port E1 ATM connector P1 pinout and signal names

Pin number	Signal name
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 91
E1 termination panel pinouts and signal names
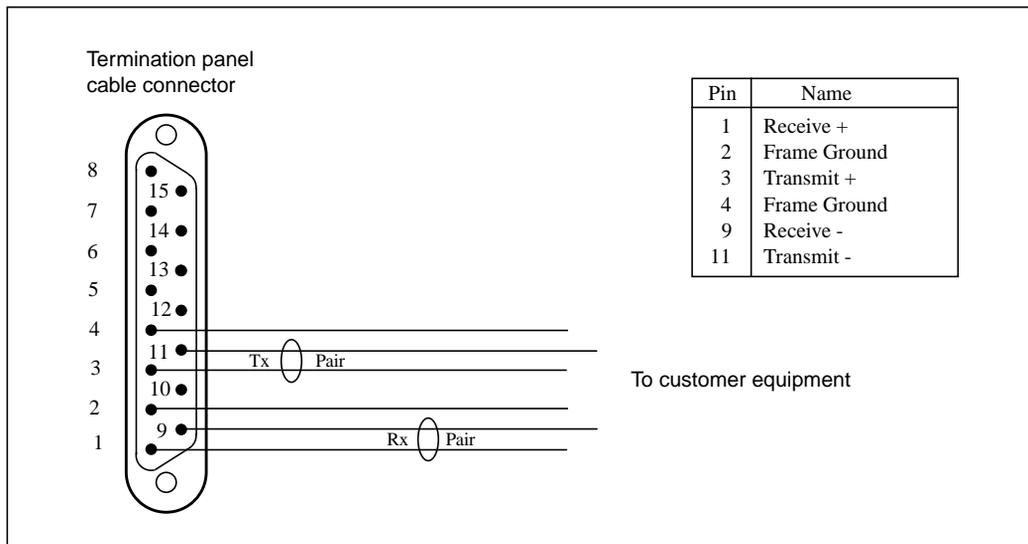
4-port E1 AAL1 function processor

See these sections for information about the 4-port E1 AAL1 function
processor (FP):

- "4-port E1 AAL1 faceplate" (page 280)

- "4-port E1 AAL1 termination panels" (page 281)

- "4-port E1 AAL1 balanced cable assembly" (page 281)

- "4-port E1 AAL1 unbalanced cable assembly" (page 282)

- "4-port E1 AAL1 pinouts" (page 282)

4-port E1 AAL1 faceplate

Figure 92
4-port E1 AAL1 faceplate and connectors

Ejector latch

Locking latch

P0
Ports 0 and 1
15-pin subminiature
D-type connector

P1
Ports 2 and 3
15-pin subminiature
D-type connector

LED status
indicator

Ejector latch

15
8
9
1

15-pin
D-type connector

**Pin Numbering
Scheme**

PPT 0959 001 AB
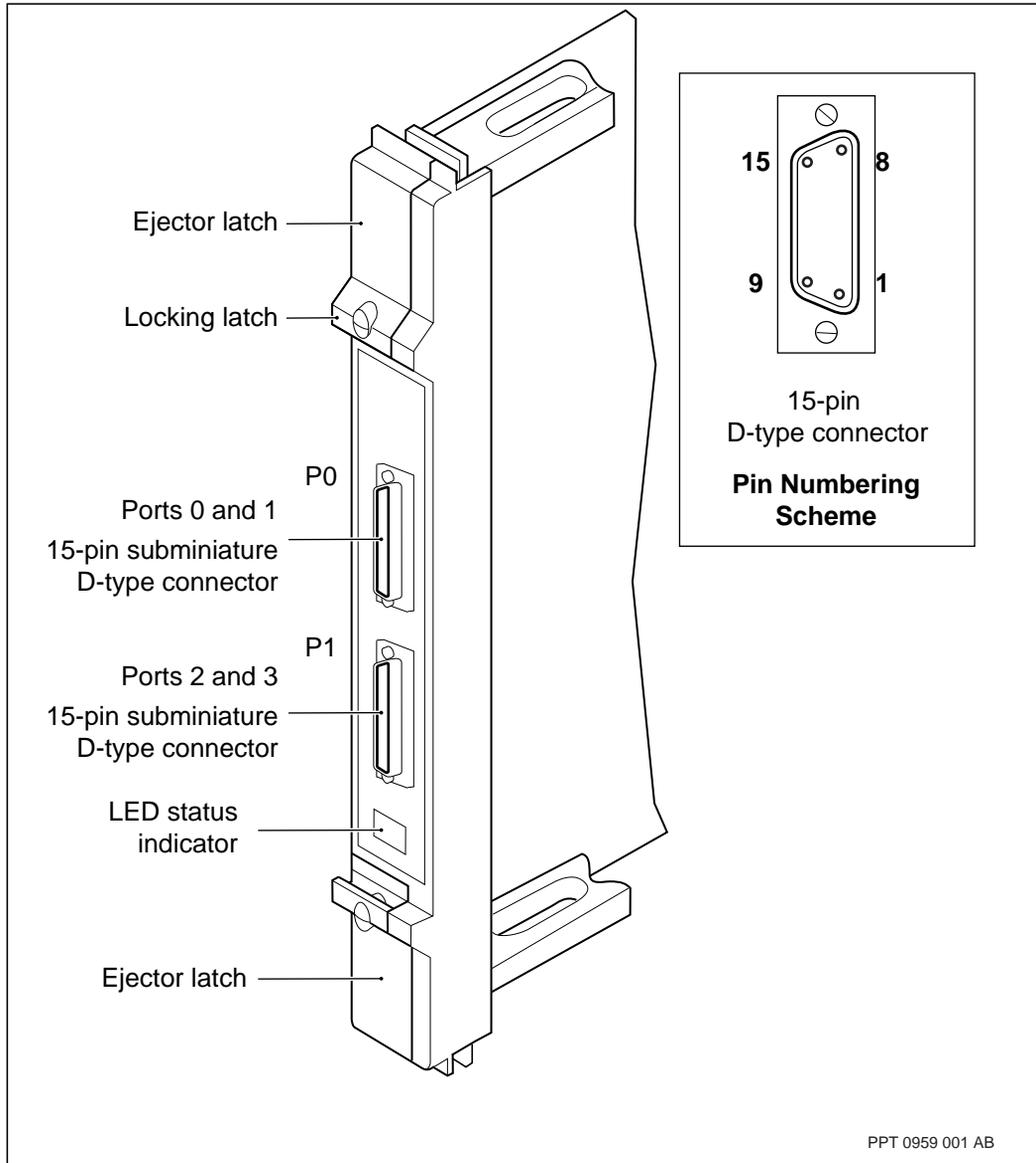
4-port E1 AAL1 termination panels

The 4-port E1 AAL1 FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

Before setting up sparing, check the seventh and eighth digits of the product equipment codes (PECs) of the main and spare FPs. If the digits are BA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and AC) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

4-port E1 AAL1 balanced cable assembly

The maximum cable length for E1 AAL1 lines to customer equipment is 230 m (750 ft). This length applies to 28 gauge (0.32 mm), 120 ohm cables. The insertion loss of each pair must not exceed 6dB measured at 1024 kHz. Insertion loss is proportional to cable length and varies among types of cables. The distance between the FP and the termination panel is part of the total length.

Table 96
Recommended cable assembly for balanced 4-port E1 AAL1 lines

Quantity	Item	Description
	Belden 8138	Cable, 120 ohm, 8 twisted pairs, 28 gauge (0.32 mm) strand
1	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
5	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32 mm) wire
1	NT A0361050	AMP 747099-3 Straight hood kit, 15 pin D-sub
(Sheet 1 of 2)		

Table 96 (continued)
Recommended cable assembly for balanced 4-port E1 AAL1 lines

Quantity	Item	Description
2	NT P0180927	0.112-40 x 0.5" Pan Head Machine Screw
2	NT P0387666	0.115" Spring Washer
(Sheet 2 of 2)		

4-port E1 AAL1 unbalanced cable assembly

The maximum cable length for unbalanced 4-port E1 AAL1 lines to customer equipment is 750 m (2400 ft). This length applies to NT-734 or equivalent cables. The insertion loss of each pair must not exceed 6dB measured at 1024 kHz. Insertion loss is proportional to cable length and varies among types of cables. The distance between the FP and the termination panel is part of the total length.

Table 97
Recommended cable assembly parts for unbalanced 4-port E1 AAL1 lines

Quantity	Item	Description
	NT-734	75–Ω coaxial cable with bounded shield
1	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

4-port E1 AAL1 pinouts

See these sections for information about specific connectors:

- "4-port E1 AAL1 FP connector P0 pinout and signal names" (page 283)

- "4-port E1 AAL1 FP connector P1 pinout and signal names" (page 283)

- "Balanced E1 AAL1 termination panel connector pinout and signal names" (page 284)

Table 98
4-port E1 AAL1 FP connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 99
4-port E1 AAL1 FP connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3 Transmit +
(Sheet 1 of 2)	

Table 99 (continued)
4-port E1 AAL1 FP connector P1 pinout and signal names

Pin number	Signal name
9	Port 3 Transmit -
2	Port 3 Receive +
10	Port 3 Receive -
6	Protection Switch Load
13	Protection Switch Status
3	+5V dc
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Figure 93
Balanced E1 AAL1 termination panel connector pinout and signal names
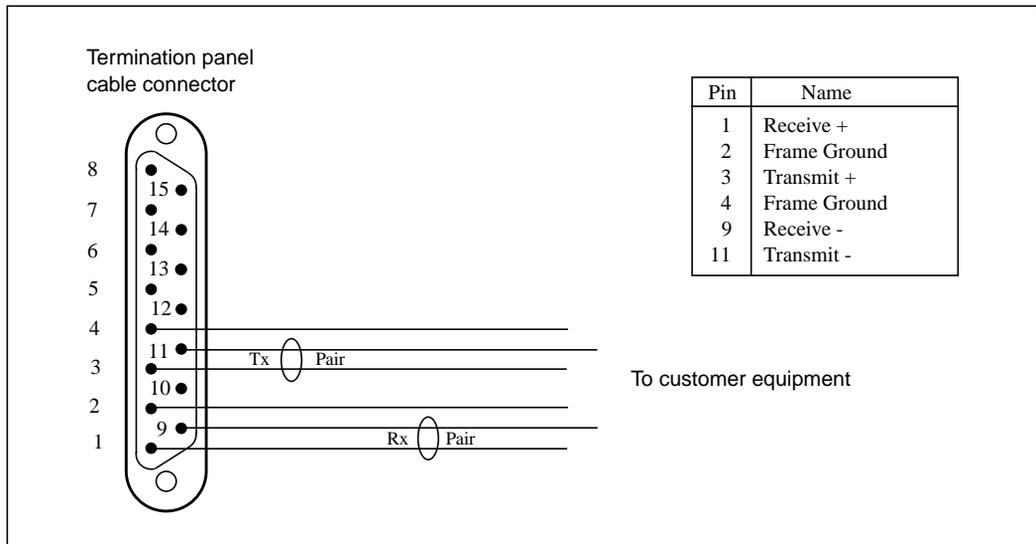
8-port E1 ATM function processor

See these sections for information about the 8-port E1 function processor
(FP):

- "8-port E1 ATM faceplate" (page 286)

- "8-port E1 ATM termination panels" (page 287)

- "8-port E1 ATM balanced cable assembly" (page 287)

- "8-port E1 ATM unbalanced cable assembly" (page 288)

- "8-port E1 ATM pinouts" (page 288)

8-port E1 ATM faceplate

Figure 94
8-port E1 ATM faceplate and connectors
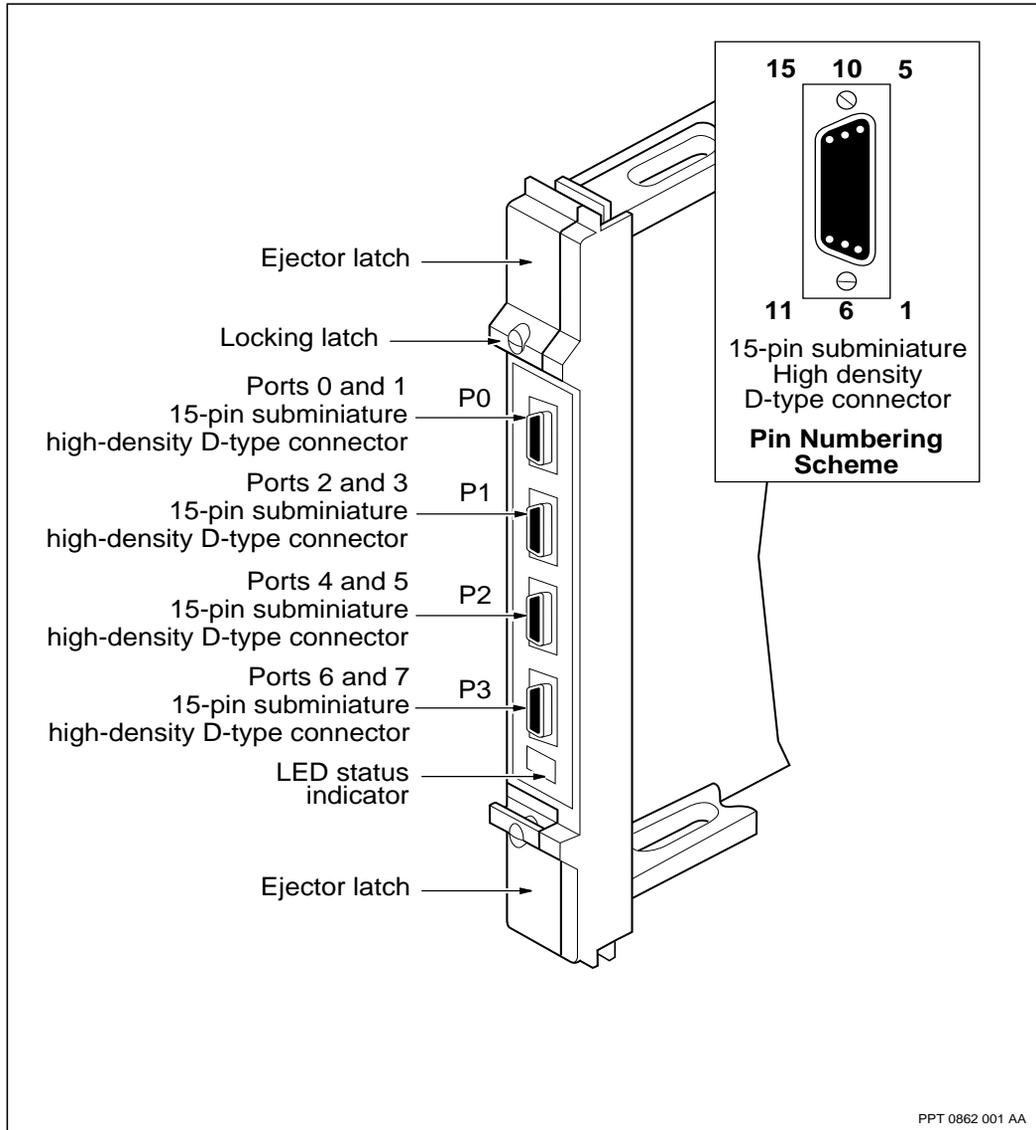
8-port E1 ATM termination panels

The 8-port E1 ATM FP uses the DS1/E1 (balanced) and the E1 unbalanced termination panels. These panels provide a break-out for customer-equipment connections so that each E1 port has its own termination point and access. The DS1/E1 (balanced) and the E1 unbalanced termination panels support sparing.

The 8-port E1 ATM FP uses one or two termination panels. One termination panel provides one-for-one sparing for up to four ports. You can spare ports 0–3, and 4–7. For example, a sparing configuration with three ports can use ports 0, 2, and 3, but not ports 0, 2, and 7. Only provision ports that you are going to use. To spare more than four ports, use two E1 termination panels.

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are CA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and BB) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information on the DS1/E1 termination panels, see "DS1 or E1 termination panels" (page 55). For more information about the E1 unbalanced termination panels, see "E1 unbalanced termination panels" (page 61).

8-port E1 ATM balanced cable assembly

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft). The distance between the FP and the termination panel is part of the total length.

Table 100
8-port E1 ATM balanced cable assembly parts

Qty	Item	Description
	Belden 8138	Cable, 120 Ω, 8 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
12	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge (0.51 to 0.32) wire
(Sheet 1 of 2)		

Table 100 (continued)
8-port E1 ATM balanced cable assembly parts

Qty	Item	Description
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer
(Sheet 2 of 2)		

For more information, see "Cables" (page 77).

8-port E1 ATM unbalanced cable assembly

The maximum cable length for unbalanced E1 lines to customer equipment is 750 m (2400 ft). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

Table 101
8-port E1 ATM unbalanced cable assembly parts

Qty	Item	Description
	NT-734 or equivalent	75–Ω coaxial cable
2	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information, see "Cables" (page 77).

8-port E1 ATM pinouts

See these sections for information about specific connectors:

- "8-port E1 ATM connector P0 pinout and signal names" (page 289)

- "8-port E1 ATM connector P1 pinout and signal names" (page 289)

- "8-port E1 ATM connector P2 pinout and signal names" (page 290)

- "8-port E1 ATM connector P3 pinout and signal names" (page 291)

- "E1 termination panel pinouts and signal names" (page 292)

Table 102
8-port E1 ATM connector P0 pinout and signal names

Pin number	Signal name
8	Port 0, Transmit +
15	Port 0, Transmit -
7	Port 0, Receive +
14	Port 0, Receive -
1	Port 1, Transmit +
9	Port 1, Transmit -
2	Port 1, Receive +
10	Port 1, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground

Table 103
8-port E1 ATM connector P1 pinout and signal names

Pin number	Signal name
8	Port 2, Transmit +
15	Port 2, Transmit -
7	Port 2, Receive +
14	Port 2, Receive -
1	Port 3, Transmit +
(Sheet 1 of 2)	

Table 103 (continued)
8-port E1 ATM connector P1 pinout and signal names

Pin number	Signal name
9	Port 3, Transmit -
2	Port 3, Receive +
10	Port 3, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
(Sheet 2 of 2)	

Table 104
8-port E1 ATM connector P2 pinout and signal names

Pin number	Signal name
8	Port 4, Transmit +
15	Port 4, Transmit -
7	Port 4, Receive +
14	Port 4, Receive -
1	Port 5, Transmit +
9	Port 5, Transmit -
2	Port 5, Receive +
10	Port 5, Receive -
6	Protection Switch Register Bit 0
13	Protection Switch Register Bit 1
3	Protection Switch Register Bit 2
(Sheet 1 of 2)	

Table 104
8-port E1 ATM connector P2 pinout and signal names

Pin number	Signal name
11	Protection Switch Register Bit 3
4	No connection
5	Signal ground
12	Frame ground
Shield	Frame ground
(Sheet 2 of 2)	

Table 105
8-port E1 ATM connector P3 pinout and signal names

Pin number	Signal name
8	Port 6, Transmit +
15	Port 6, Transmit -
7	Port 6, Receive +
14	Port 6, Receive -
1	Port 7, Transmit +
9	Port 7, Transmit -
2	Port 7, Receive +
10	Port 7, Receive -
6	Protection Switch Load
13	Protection Switch Status
3	No connection
11	Signal ground
4	+12 V dc
5	Signal ground
12	Frame ground
Shield	Frame ground

Figure 95
E1 termination panel pinouts and signal names
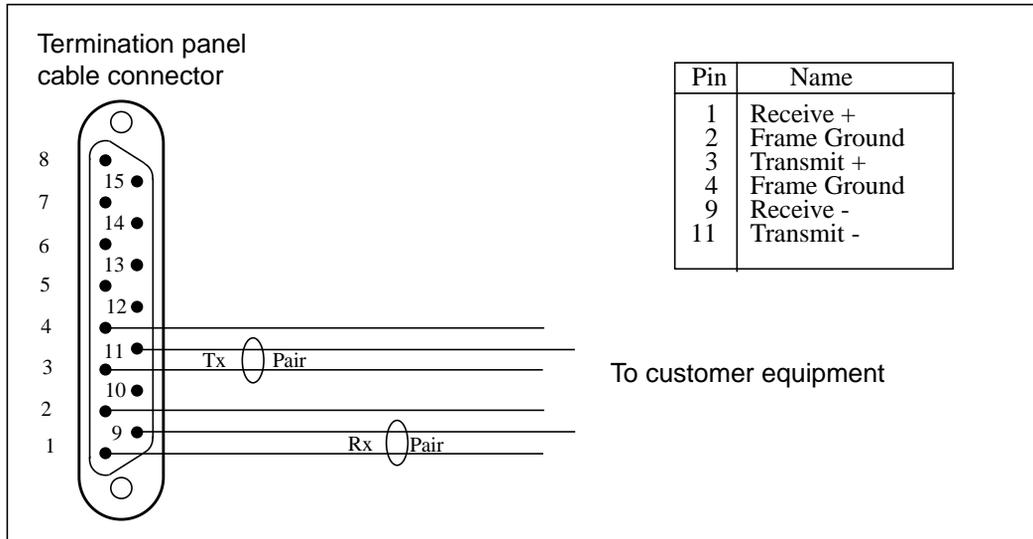
32-port E1 TDM function processor

See these sections for information about the 32-port E1 TDM function processor (FP):

- "32-port E1 TDM faceplate" (page 292)

- "32-port E1 TDM termination panels" (page 294)

- "32-port E1 TDM multiport aggregate device" (page 294)

- "32-port E1 TDM cable assembly" (page 299)

32-port E1 TDM faceplate

"32-port E1 TDM faceplate" (page 293) shows the faceplate for the 32-port E1 TDM FP. A small connector is available for one-for-one sparing capability.

Figure 96
32-port E1 TDM faceplate

Ejector latch

Locking latch

Monitor 17-32

Monitor 1-16

Ports 17-32

Receive (Rx)

Transmit (Tx)

Ports 1-16

Receive (Rx)

Transmit (Tx)

Sparing control

LED status
indicator

Locking latch

Ejector latch

PPT 2172 001 AA
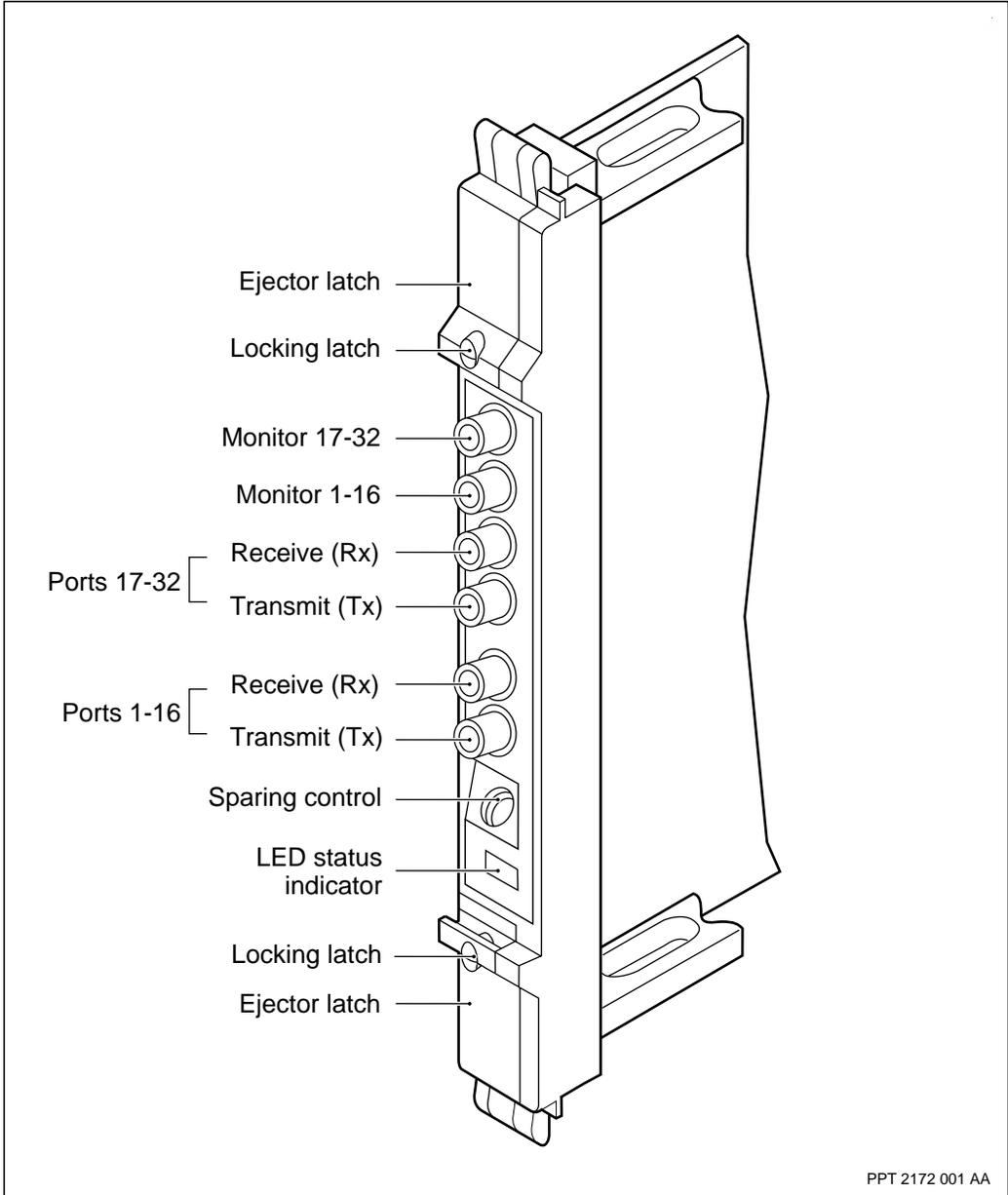
32-port E1 TDM termination panels

The 32-port E1 TDM uses the 19" DS3/E3/JT2 ATM termination panel. This termination panel support one-for-one sparing.

Note: The 32-port E1 TDM FP does not use the 13" DS3/E3/JT2 ATM termination panel.

For more information about the DS3/E3/JT2 ATM termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

32-port E1 TDM multiport aggregate device

The 32-port E1 TDM FP uses a multiport aggregate device to break out the ports of the FP. Each multiport aggregate device provides individual access for 16 E1 ports. To break out all of the ports of a 32-port E1 TDM FP, you need two multiport aggregate devices.

The multiport aggregate device is 1-unit high and fits in a Passport or seismic cabinet, or a standard 19" rack. Dimensions for height, width, and depth are 4.4 cm x 43.2 cm x 26.8 cm (1.7 in. x 17.0 in. x 10.5 in.). The device weighs 2 kg (4.4 lb). See the figure "Balanced multiport aggregate device" (page 295) or "Unbalanced multiport aggregate device" (page 296).

For more information about the multiport aggregate device, see the following sections:

- "Multiport aggregate device connections and cabling" (page 296)

- "Multiport aggregate device power and grounding requirements" (page 297)

- "Multiport aggregate device LEDs" (page 298)

- "Multiport aggregate device alarms" (page 298)

- "Multiport aggregate device compliance" (page 298)

Figure 97
Balanced multiport aggregate device
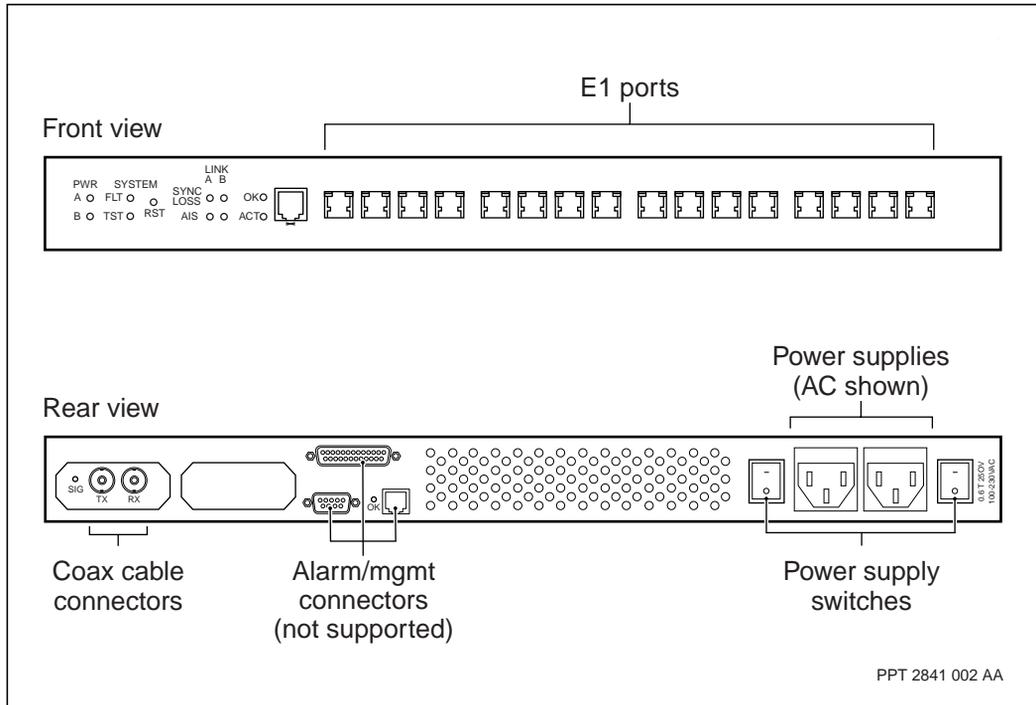
Figure 98
Unbalanced multiport aggregate device

PPT 2990 001 AA
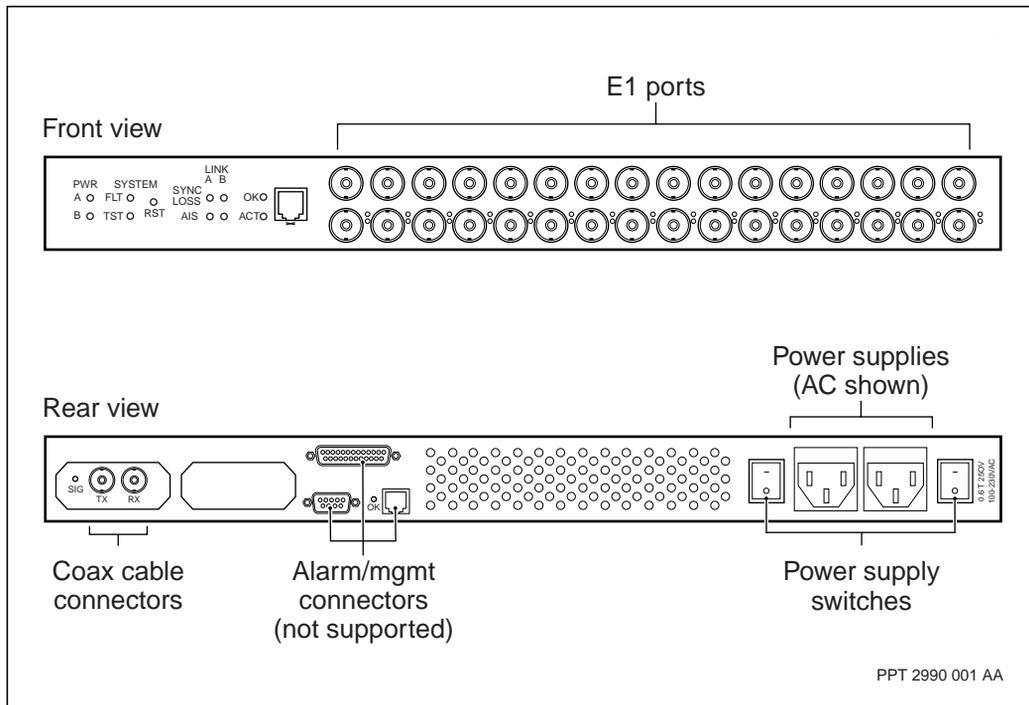
Multiport aggregate device connections and cabling

The multiport aggregate device provides coaxial (unbalanced) connections between the device and the FP or termination panel and RJ45 (120 ohm) connections or coaxial connections for each of the E1 ports. See the table "E1 RJ45 connector pinouts" (page 297).

The maximum cable length for balanced E1 lines to customer equipment is 230 m (750 ft).

The maximum cable length for unbalanced E1 lines to customer equipment is 750 m (2400 ft). The E1 balanced and unbalanced interface connections comply with ITU-T Recommendation G.703

Table 106
E1 RJ45 connector pinouts

Pin number	Signal name
1	Receive (tip)
2	Receive (ring)
3	Frame ground
4	Transmit (ring)
5	Transmit (tip)
6	Frame Ground
7	Not connected
8	Not connected

Multiport aggregate device power and grounding requirements

The multiport aggregate device contains two ac or dc power supplies. When both power supplies are operational, they share power consumption for the device. If one of the power supplies fails, the remaining power supply provides power for the device.

The dc power source must be within the range of -36 to -72 V dc. Maximum power consumption is 20 Watts. The dc power feeds into the system must be protected with an external circuit breaker or fuse, with appropriate voltage ratings and regulatory approvals.The disconnect device must be external to the cabinet or rack and reside in the same room.

You must supply your own power cables. Power cables must be properly grounded.

WARNING
Risk of injury by electricity
Failure to properly ground a multiport aggregate device can expose personnel to electrical shock hazards and cause damage to equipment.

> **WARNUNG**
> **Verletzungsgefahr durch Stromschlag**
> Wird ein Multiport-Aggregat nicht korrekt geerdet,
> besteht Verletzungsgefahr für das Bedienpersonal und
> das Risiko der Beschädigung des Geräts durch
> Stromschlag.

Multiport aggregate device LEDs

The SYNC LOSS LED for link A indicates a loss of frame (LOF) or loss of signal (LOS) condition on the link between the device and the FP. The SIG LED on the rear of the device is lit when the device is receiving a signal from the FP. You can use the SIG LED for link A in conjunction with the SYNC LOSS LED to distinguish between LOS and LOF. The AIS LED for link A indicates that alarm indication signal is being received from the Passport switch.

A pair of LEDs for each E1 port indicate loss of signal (LOS) and alarm indication signal (AIS) conditions.

Multiport aggregate device alarms

If a power supply for the multiport aggregate device fails, it reports the condition to Passport and Passport raises an alarm. E1 alarms from customer equipment are reported to the Passport switch through the E1 signal. E1 alarm conditions include AIS, LOF and remote alarm indication (RAI) conditions.

In the event of an E1 LOS condition, the Passport switch sets LOF, RAI, and AIS alarm conditions on the affected ports. There is no distinction between LOS and LOF.

If the link between the FP and the multiport aggregate device fails, Passport raises alarms on the 16 E1 ports affected.

Multiport aggregate device compliance

The multiport aggregate device complies with the following standards:

- ITU-T G.703

- ITU-T G.753

- ITU-T G.823

- ITU-T G.824

- EN 55022, 1994

- EN 50082-1, 1992

- EN 60950/A4, 1996

32-port E1 TDM cable assembly

The maximum cable length for lines between the FP and the multiport aggregate device is 750 m (2400 ft). The distance between the FP and the termination panel is part of the total length.

The insertion loss of a cable must not exceed 6 dB measured at 1024 kHz. The table "32-port E1 TDM cable assembly parts" (page 299) specifies the cables required to connect to the faceplate of the FP.

Table 107
32-port E1 TDM cable assembly parts

Qty	Item	Description
2	NT-734 or comparable cable with double shielded construction	75-Ω coaxial cable
4	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug

For more information, see "Cables" (page 77).

32-port E1 MSA function processor

See these sections for information about the 32-port E1 for multi-service access (MSA) function processors (FP). Unless otherwise specified, the information applies to a 32-port E1 MSA FP with or without the optional optical ports.

For a list of the product engineering codes (PECs) of available 32-port E1 MSA FPs with or without the STM-1 optical interfaces, see "Passport processor card part numbers" (page 421).

- "32-port E1 MSA faceplate" (page 300)

- "32-port E1 MSA termination panels" (page 302)

32-port E1 MSA faceplate

A 32-port E1 MSA FP (FP) occupies two adjacent slots in a shelf. (The software uses only the first slot number and ignores the second one.) See the figure "32-port E1 MSA faceplate with optional STM-1 (OC-3) ports" (page 301) for the E1 MSA32 FP (FP).

The transmit (TX) connection is located at the top half of the STM-1 port, while the receive (RX) connection is at the bottom.

Figure 99
32-port E1 MSA faceplate with optional STM-1 (OC-3) ports

PPT 2844 001 AB

	CAUTION
⚠	**Risk of service loss**
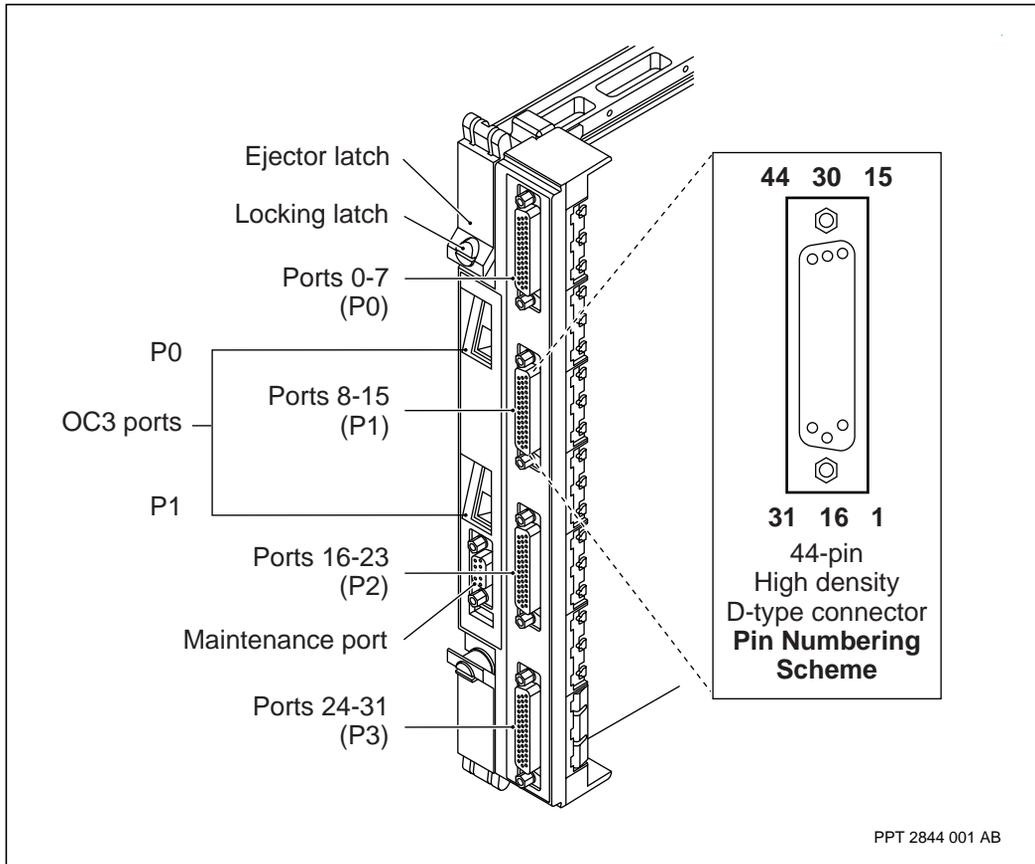
CAUTION
Risk of service loss
Two power supplies must be installed before inserting an MSA32 FP. There is a risk of a shelf reset when installing an MSA32 FP in a shelf with only a single power supply unit.

This risk does not apply when the MSA32 is already installed and one of two power supplies fail.

32-port E1 MSA termination panels

The 32-port E1 MSA uses the MSA32 DS1/E1 termination panels and the MSA32 E1 unbalanced BNC termination panel. These termination panels provide a breakout for customer equipment connections, so that each E1 port has its own termination point and access. The termination panels support 1-for-n sparing for the electrical ports on the MSA32 FPs.

These termination panels support one-for-n sparing for up to six panels.

For more information about the MSA32 DS1/E1 termination panels, see "MSA32 DS1 or E1 termination panels" (page 63). For more information about the MSA32 E1 unbalanced BNC termination panel, see "MSA32 E1 unbalanced BNC termination panel" (page 62).

32-port E1 MSA cable assemblies for electrical ports

The cable assemblies of one or more MSA32 sparing panels are used for:

- interfacing between the sparing panel and its FPs, both the mains and the spare

- inter-panel connections in a one-for-n (1:n) sparing configuration that is not one-for-one (1:1) for MSA32

- interfacing between the sparing panel and intra-office equipment such as CSUs or DSXs

When connecting directly from the E1 MSA32 FP to CPE, in effect bypassing the MSA32 termination panels, the CPE cabling must be adapted to the E1 MSA32 cabling pinouts.

The FP interface and inter-panel cables are manufactured by Nortel Networks in fixed lengths with the appropriate connectors.

Inter-panel connections for one-for-n sparing configurations require flexi-cables for linking the panels together. The product engineering codes (PECs) for the flexi-cables are:

Table 108
PECs of the 32-port E1 MSA flexi-cables between sparing panels

PEC	Type of sparing panel
NTJS99	RJ45
NTY199AA	BNC, DB15 1-port, DB15 2-port
NTY199AB	BNC, DB15 1-port, DB15 2-port with shorter flexi-cables and optionally used with a cable cover NTPS07

The E1 MSA32 sparing panels with BNC or DB15 connectors can have an optional cable cover installed over the inter-panel flexi-cables of a one-for-n configuration. The cover is identified by PEC NTPS07. The flexi-cable assembly must be the shorter version identified by NTY199AB or later.

The maximum cable length for balanced E1 MSA32 lines to customer equipment is 230 m (750 ft). This length applies to 28 gauge (0.32 mm), 120 ohm cables. The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz. Insertion loss is proportional to cable length and varies among types of cables. The distance between the FP and the termination panel is part of the total length.

Table 109
Balanced E1 cable assembly parts

Qty	Item	Description
	MTR R0119440	cable, 18 twisted pairs, 28 gauge (0.32 mm) strand
2	NT A0360941	high density D-sub connector
72	NT A0360941	contact D-sub connector, high density 22 - 28 AU crimp
1	NT A0311933	Accessory D-sub connector, joining latching
1	NT A0800332	D-sub hood connector, D-25 array
1	NT A0800333	D-sub hood connector, D-25 array
(Sheet 1 of 2)		

Table 109 (continued)
Balanced E1 cable assembly parts

Qty	Item	Description
2	NT A0740362	cable clamp (standard) for D-sub metal hood
1	NT P0633705	cable tie, tie marker
(Sheet 2 of 2)		

The maximum cable length for unbalanced E1 MSA32 lines to customer equipment is 750 m (2400 ft). The insertion loss of each pair must not exceed 6 dB measured at 1024 kHz for E1. Insertion loss is proportional to cable length and varies from one type of cable to another.

For general information, see "Cables" (page 77).

STM-1 cable assembly for optical ports on a 32-port E1 MSA FP

When a 32-port E1 MSA FP has the optional optical ports, it requires optical cabling. The fiber mode type must be the same as the FP mode type. Use single-mode fiber cable with single-mode FPs and multi-mode fiber cable with multi-mode FPs.

Multi-mode fiber (MMF) cable must conform to ANSI/EIA/TIA-568. The MMF has a core diameter of 62.5 microns and cladding diameter of 125 microns. The modal bandwidth is at least 500 MHz-km and the attenuation is less than 1.0 dB/Km at 1300 nm.

The single-mode fiber (SMF) cable has a core diameter of 9 microns and cladding diameter of 125 microns. The attenuation is less than 0.5 dB/Km at 1300 nm.

Connectors should be industry standard duplex SC connectors.

The sum of cable splice losses and connector losses from the FP to customer equipment must not exceed 10 dB for multi-mode and 12 dB for single-mode. The losses in a transmission path determines the distance the FP can send a signal. The maximum distance from the FP to customer equipment is 2 km for multi-mode and 15 to 20 km for single-mode, depending on the losses due to splices and connectors.

You can purchase cables with attached connectors that meet the above specifications from any supplier of fiber optic cables.

For more information, see "Cables" (page 77).

32-port E1 MSA pinouts

See these sections for information on specific connectors:

Table 110
32-port E1 MSA connector P0 pinout and signal names

Pin number	Signal name
9	Port 0, Transmit -
39	Port 0, Transmit +
10	Port 0, Receive -
25	Port 0, Receive +
27	Port 1, Transmit -
41	Port 1, Transmit +
11	Port 1, Receive -
26	Port 1, Receive +
28	Port 2, Transmit -
(Sheet 1 of 3)	

Table 110 (continued)
32-port E1 MSA connector P0 pinout and signal names

Pin number	Signal name
42	Port 2, Transmit +
13	Port 2, Receive +
43	Port 2, Receive -
15	Port 3, Transmit -
30	Port 3, Transmit +
14	Port 3, Receive +
44	Port 3, Receive -
18	Port 4, Transmit -
32	Port 4, Transmit +
3	Port 4, Receive -
33	Port 4, Receive +
5	Port 5, Transmit -
20	Port 5, Transmit +
4	Port 5, Receive -
34	Port 5, Receive +
6	Port 6, Transmit -
21	Port 6, Transmit +
22	Port 6, Receive -
36	Port 6, Receive +
8	Port 7, Transmit -
38	Port 7, Transmit +
23	Port 7, Receive -
37	Port 7, Receive +
1	Signal ground
16	Signal ground
(Sheet 2 of 3)	

Table 110 (continued)
32-port E1 MSA connector P0 pinout and signal names

Pin number	Signal name
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 3 of 3)	

Table 111
32-port E1 MSA connector P1 pinout and signal names

Pin number	Signal name
9	Port 8, Transmit -
39	Port 8, Transmit +
10	Port 8, Receive -
25	Port 8, Receive +
27	Port 9, Transmit -
41	Port 9, Transmit +
11	Port 9, Receive -
26	Port 9, Receive +
28	Port 10, Transmit -
42	Port 10, Transmit +
(Sheet 1 of 3)	

Table 111 (continued)
32-port E1 MSA connector P1 pinout and signal names

Pin number	Signal name
13	Port 10, Receive +
43	Port 10, Receive -
15	Port 11, Transmit -
30	Port 11, Transmit +
14	Port 11, Receive +
44	Port 11, Receive -
18	Port 12, Transmit -
32	Port 12, Transmit +
3	Port 12, Receive -
33	Port 12, Receive +
5	Port 13, Transmit -
20	Port 13, Transmit +
4	Port 13, Receive -
34	Port 13, Receive +
6	Port 14, Transmit -
21	Port 14, Transmit +
22	Port 14, Receive -
36	Port 14, Receive +
8	Port 15, Transmit -
38	Port 15, Transmit +
23	Port 15, Receive -
37	Port 15, Receive +
1	Signal ground
16	Signal ground
17	Signal ground
(Sheet 2 of 3)	

Table 111 (continued)
32-port E1 MSA connector P1 pinout and signal names

Pin number	Signal name
24	Signal ground
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 3 of 3)	

Table 112
32-port E1 MSA connector P2 pinout and signal names

Pin number	Signal name
9	Port 16, Transmit -
39	Port 16, Transmit +
10	Port 16, Receive -
25	Port 16, Receive +
27	Port 17, Transmit -
41	Port 17, Transmit +
11	Port 17, Receive -
26	Port 17, Receive +
28	Port 18, Transmit -
42	Port 18, Transmit +
13	Port 18, Receive +
(Sheet 1 of 3)	

Table 112 (continued)
32-port E1 MSA connector P2 pinout and signal names

Pin number	Signal name
43	Port 18, Receive -
15	Port 19, Transmit -
30	Port 19, Transmit +
14	Port 19, Receive +
44	Port 19, Receive -
18	Port 20, Transmit -
32	Port 20, Transmit +
3	Port 20, Receive -
33	Port 20, Receive +
5	Port 21, Transmit -
20	Port 21, Transmit +
4	Port 21, Receive -
34	Port 21, Receive +
6	Port 22, Transmit -
21	Port 22, Transmit +
22	Port 22, Receive -
36	Port 22, Receive +
8	Port 23, Transmit -
38	Port 23, Transmit +
23	Port 23, Receive -
37	Port 23, Receive +
1	Signal ground
16	Signal ground
17	Signal ground
24	Signal ground
(Sheet 2 of 3)	

Table 112 (continued)
32-port E1 MSA connector P2 pinout and signal names

Pin number	Signal name
31	Signal ground
35	Signal ground
2	Signal ground
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
(Sheet 3 of 3)	

Table 113
32-port E1 MSA connector P3 pinout and signal names

Pin number	Signal name
9	Port 24, Transmit -
39	Port 24, Transmit +
10	Port 24, Receive -
25	Port 24, Receive +
27	Port 25, Transmit -
41	Port 25, Transmit +
11	Port 25, Receive -
26	Port 25, Receive +
28	Port 26, Transmit -
42	Port 26, Transmit +
13	Port 26, Receive +
43	Port 26, Receive -
15	Port 27, Transmit -
(Sheet 1 of 3)	

Table 113 (continued)
32-port E1 MSA connector P3 pinout and signal names

Pin number	Signal name
30	Port 27, Transmit +
14	Port 27, Receive +
44	Port 27, Receive -
18	Port 28, Transmit -
32	Port 28, Transmit +
3	Port 28, Receive -
33	Port 28, Receive +
5	Port 29, Transmit -
20	Port 29, Transmit +
4	Port 29, Receive -
34	Port 29, Receive +
6	Port 30, Transmit -
21	Port 30, Transmit +
22	Port 30, Receive -
36	Port 30, Receive +
8	Port 31, Transmit -
38	Port 31, Transmit +
23	Port 31, Receive -
37	Port 31, Receive +
1	Sparing control
16	12V feed to sparing panel
17	Signal ground
24	Signal ground
31	Signal ground
35	Signal ground
(Sheet 2 of 3)	

Table 113 (continued)
32-port E1 MSA connector P3 pinout and signal names

Pin number	Signal name
2	Sparing control
7	Signal ground
12	Signal ground
19	Signal ground
29	Signal ground
40	Signal ground
shield	Frame ground
(Sheet 3 of 3)	

Figure 100
32-port E1 MSA termination panel pinout and signal names: 1-port/DB15
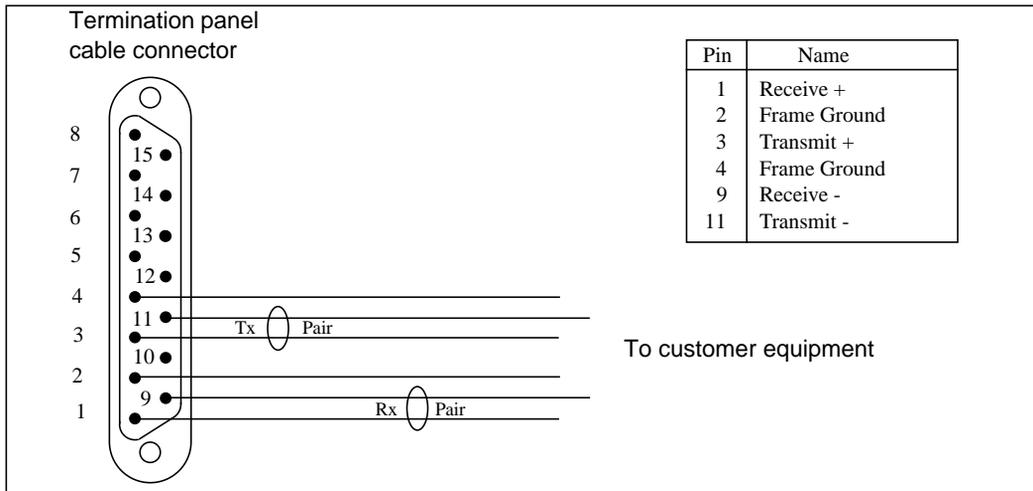
Figure 101
32-port E1 MSA termination panel pinout and signal names: 2-ports/DB15

Termination panel
cable connector

Pin	Name
1	Port 1 transmit +
2	Port 1 receive +
5	Signal ground
7	Port 0, receive +
8	Port 0, transmit +
9	Port 1, transmit -
10	Port 1, receive -
12	Frame ground
14	Port 0, receive -
15	Port 0, transmit -

Port 0 Tx pair

Port 0 Rx pair

Port 1 Rx pair

Port 1 Tx pair

To customer equipment

PPT 2862 001 AB
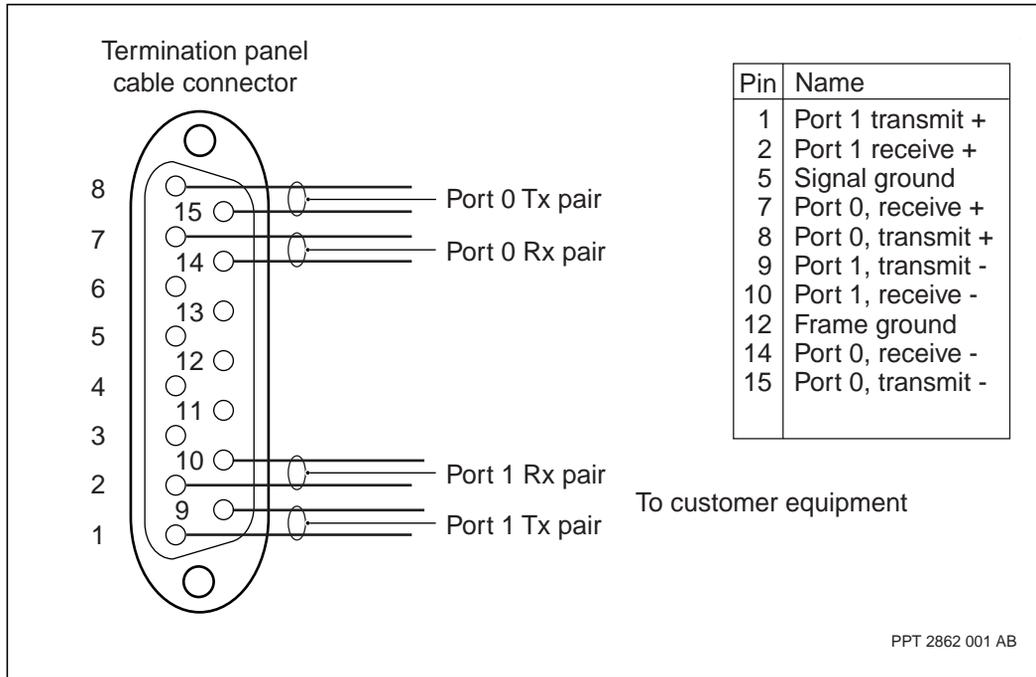
Figure 102
32-port E1 MSA termination panel pinouts and signal names: RJ45

RJ-45 connector

1 2 3 4 5 6 7 8

Pin	Signal
1	Rx-
2	Rx+
3	Not used
4	Tx-
5	Tx+
6	Not used
7	Not used
8	Not used

PPT 2898 001 AA
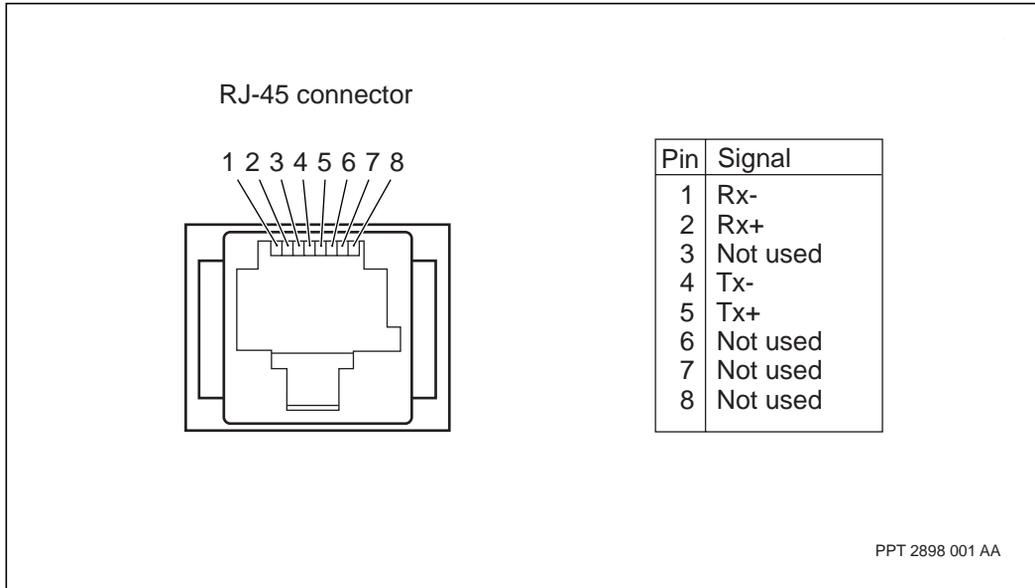
STM-1 line automatic protection switching on a 32-port E1 MSA FP

SDH line automatic protection switching (line APS), or line protection, is a standards-defined feature enabling a form of line sparing on optical cards.

Line APS is fully described in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

To provision line APS, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide* and 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

STM-1 interface characteristics on a 32-port E1 MSA FP

When a 32-port E1 MSA FP has the optional optical ports, the OC-3 ATM portion of the 2-slot FP has the following characteristics as defined in ANSI T1E1.2 95-003.

Table 114
STM-1 ATM general interface characteristics on a 32-port E1 MSA FP

General Optical Interface Characteristics	
Connector	Dual SC
Bit Rate	155.520 Mbit/s
Line Code	Binary Non-Return-To-Zero (NRZ)

Table 115
STM-1 single-mode intermediate reach interface characteristics on a 32-port E1 MSA FP

Single-mode Intermediate Reach Optical Interface Characteristics	
Emission Wavelength	1261 nm to 1360 nm
Attenuation Range	0 - 28 dB
Spectral Width: Maximum RMS Width	4 nm
Mean Transmission Power	-5 to 0 dBm
Minimum Extinction Ratio	10.0 dB
Eye Pattern Mask	As per ITU G.957 Fig 2, ANSI T1E1.2/94-002R1-Fig 10, TA-253 Issue 8 Fig 4-2
Maximum receive power (average)	0 dBm
Minimum receive power (average)	-34 dBm
Optical Path Power Penalty	1 dB

Table 116
STM-1 multi-mode interface characteristics on a 32-port E1 MSA FP

Multi-mode Optical Interface Characteristics	
Center Wavelength	1270 nm to 1380 nm
Attenuation Range	0 - 12.5 dB
Maximum Spectral Width	200 nm
Mean Transmission Power	-19 to -14 dBm
Minimum Extinction Ratio	10 dB
Rise time, 20-80% Fall time, 20-80%	2.5 nanoseconds 2.5 nanoseconds
Overshoot%	10
Rx sensitivity (dBm)	-32.5 to -14 dBm

Connecting to STM-1 ports on a 32-port E1 MSA FP

The STM-1 ATM IP sends out a signal stronger than the STM-1 ATM FP can handle. In the case that these cards are used together within a network, a 10 dB attenuator is required for the Tx port of the STM-1 ATM IP. The attenuator will lower the strength of the signal to a maximum -10 dB, an acceptable signal for the STM-1 ATM FP.

Chapter 13
E3 function processors

Frame-based services are supported by the following Passport E3 function processors (FPs):

- "1-port E3 function processor" (page 319)

ATM services are supported by the following Passport E1 FPs:

- "3-port E3 ATM function processor" (page 322)

- "3-port E3 ATM IP function processor" (page 324)

1-port E3 function processor

See these sections for information about the E3 function processor (FP):

- "1-port E3 faceplate" (page 319)

- "1-port E3 termination panels" (page 321)

- "1-port E3 cable assembly" (page 321)

- "1-port E3 pinouts" (page 322)

1-port E3 faceplate

You can connect the Monitor (Tx monitor) port to test equipment and test the card while it is in service. This port carries a -26 dB tap of the transmit (Tx) connector signal. The E3 FP's subminiature 9-pin D-type connector provides one-for-one sparing.

Figure 103
1-port E3 faceplate

Pin Numbering Scheme

PPT 1062 001 AA
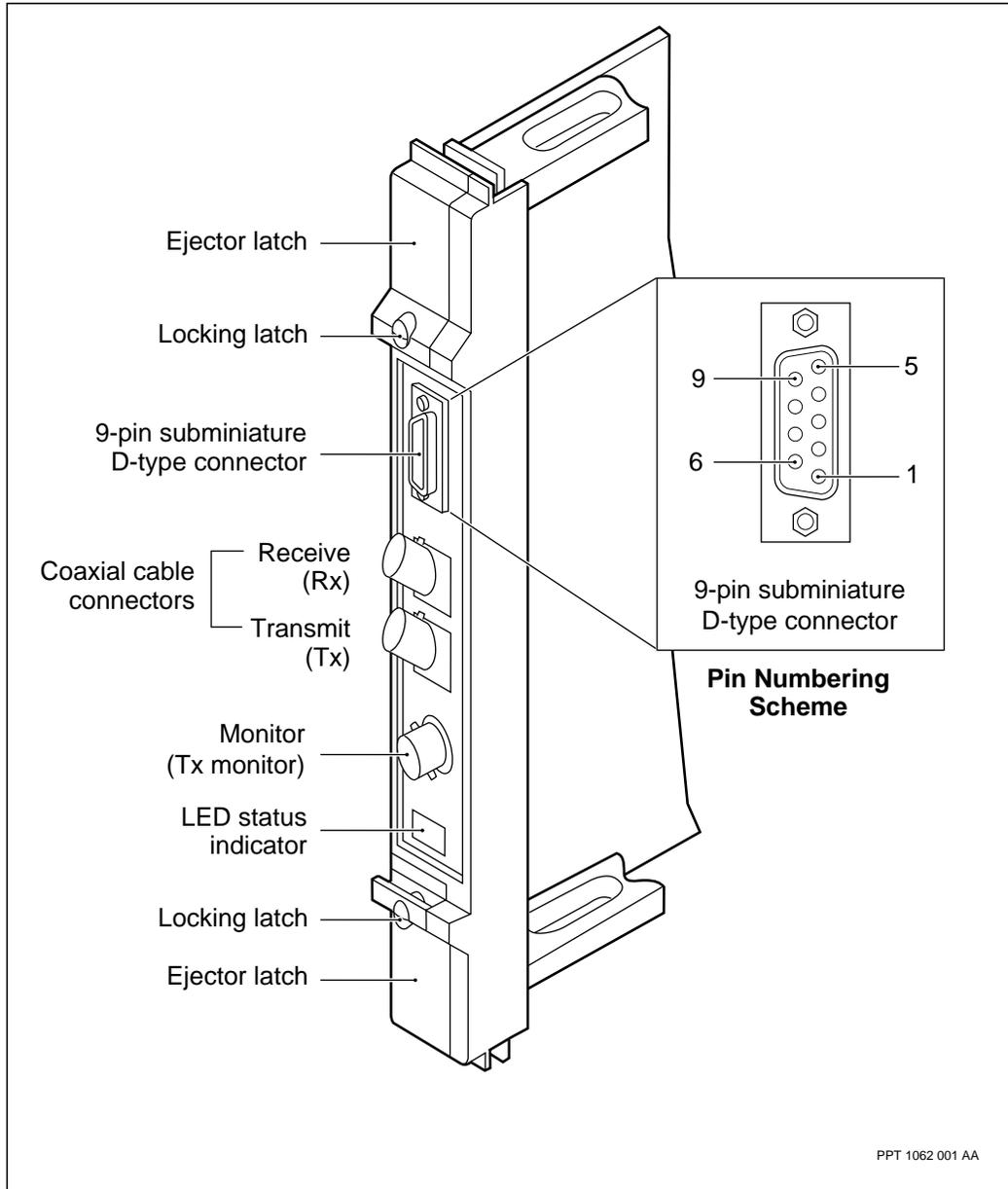
1-port E3 termination panels

The 1-port E3 FP uses the DS3/E3 termination panels. These panels provide a break-out for customer-equipment connections and support sparing.

Before setting up sparing, check the PECs on the faceplates of both the active and spare FPs. The first six digits (four letters and two numbers) of the PECs must match.

For more information about the DS3/E3 termination panels, see "DS3 or E3 termination panels" (page 56).

1-port E3 cable assembly

The maximum cable length for E3 lines to customer equipment is 375 m (1220 ft).

The insertion loss of a cable must not exceed 12 dB measured at 17184 kHz. Insertion loss is proportional to cable length and varies from one type of cable to another. For example, for NT-734 cable, an insertion loss of 12 dB at 17184 kH is about 375 m of cable.

To meet EMC requirements, any cables connected from the Receive port of the E3 FP or termination panel to customer equipment must be of type NT734 and include two ferrite beads.

Table 117
1-port E3 cable assembly parts

Quantity	Item	Description
2	NT-734	75–Ω coaxial cable
2	Ferrite kit NTFP54AA	2 ferrites to attach to the cable ends of E3 cables
4	Specialty Connector Company 28P387-1	75–Ω straight BNC plug

For more information, see "Cables" (page 77).

1-port E3 pinouts

This table identifies the pinouts and signal names for the E3 D-type connectors of the sparing control cable.

Table 118
E3 D-type connector pinouts and signal names

Pin number	Signal name
1	Logic ground
2	PSSTATUS
3	PSLOAD
4	PSREG0
5	PSREG1
6	Frame ground
7	PSREG2
8	PSREG3
9	Fused +12V

3-port E3 ATM function processor

See these sections for information about the 3-port E3 ATM function processor (FP):

- "3-port E3 ATM faceplate" (page 322)

- "3-port E3 ATM termination panels" (page 324)

- "3-port E3 ATM cable assembly" (page 324)

3-port E3 ATM faceplate

A small DIN connector is available for one-for-one sparing capability.

Figure 104
3-port E3 ATM faceplate
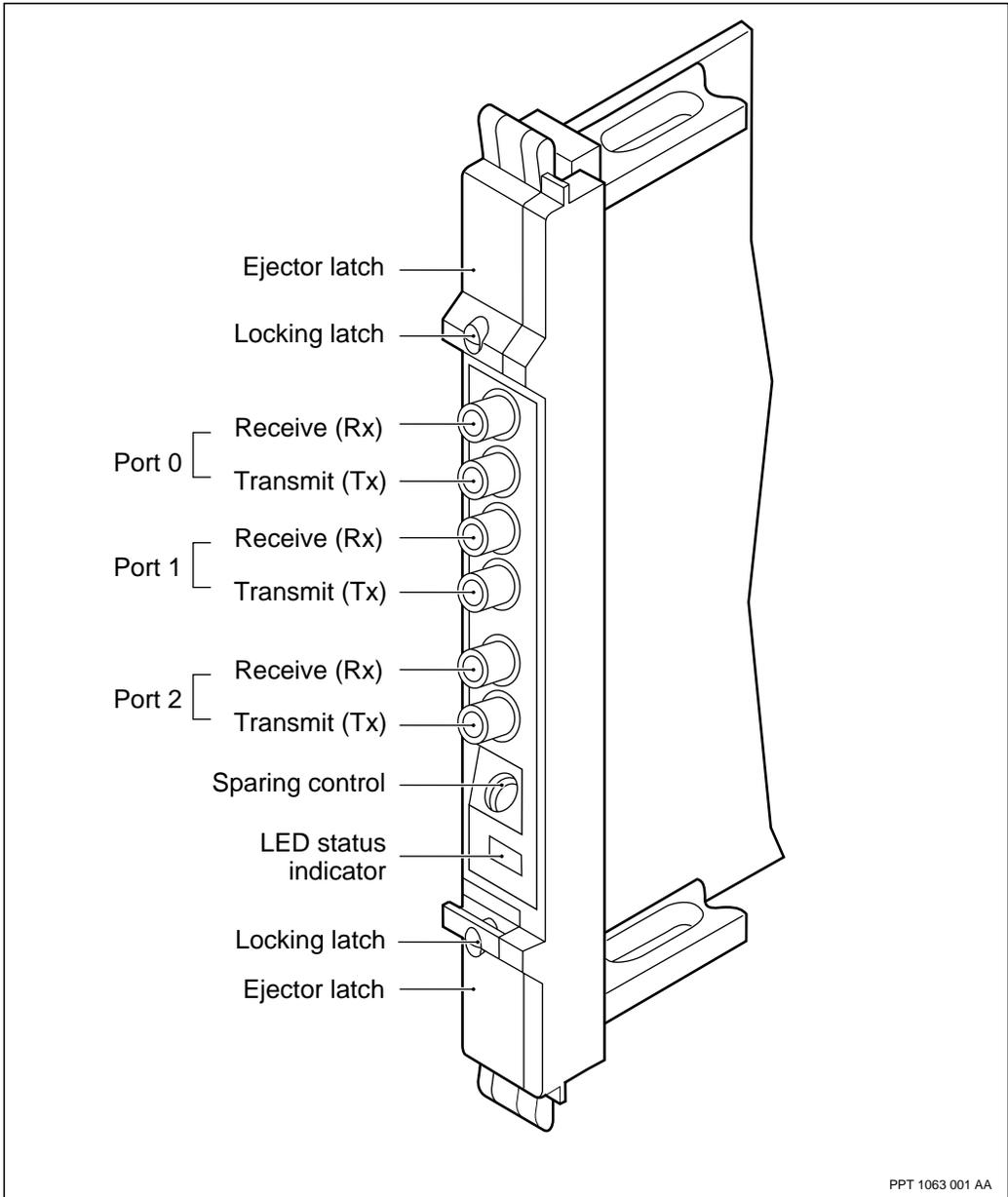
Ejector latch

Locking latch

Port 0
— Receive (Rx)
— Transmit (Tx)

Port 1
— Receive (Rx)
— Transmit (Tx)

Port 2
— Receive (Rx)
— Transmit (Tx)

Sparing control

LED status indicator

Locking latch

Ejector latch

PPT 1063 001 AA

3-port E3 ATM termination panels

You can connect customer equipment directly to the 3-port E3 ATM FP or to its termination panel. The 3-port E3 ATM FP uses the DS3/E3/JT2 ATM termination panels. These termination panels support sparing.

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are EA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, BA and DA) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information about termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

3-port E3 ATM cable assembly

The maximum cable length for unbalanced E3 ATM lines to customer equipment is 375 m (1220 ft). The distance between the FP and the termination panel is part of the total length.

The insertion loss of a cable must not exceed 12 dB measured at 17184 kHz. For example, for NT-734 cable an insertion loss of 12 dB at 17184 kHz is about 375 m of cable.

Table 119
3-port E3 ATM cable assembly parts

Qty	Item	Description	Maximum length
1	NT-734	75-Ω coaxial cable	375 m (1220 ft)
2	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug	

For more information, see "Cables" (page 77).

3-port E3 ATM IP function processor

See these sections for information about the E3 ATM IP function processor (FP):

• "3-port E3 ATM IP faceplate" (page 326)

- "3-port E3 ATM IP termination panels" (page 327)
- "3-port E3 ATM IP cable assembly" (page 327)

3-port E3 ATM IP faceplate

Figure 105
3-port E3 ATM IP faceplate
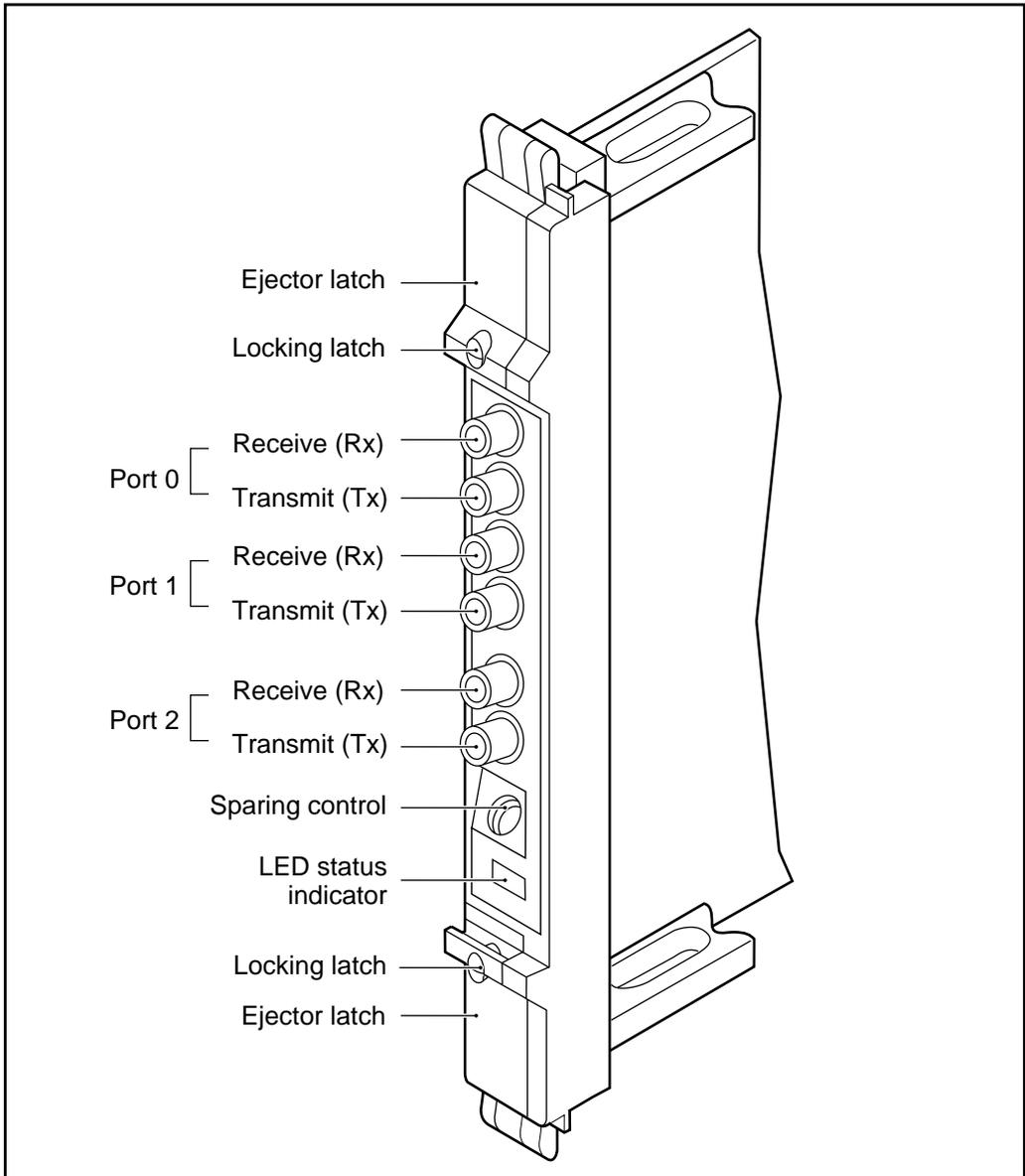
3-port E3 ATM IP termination panels

You can connect customer equipment directly to the 3-port E3 ATM IP or to its termination panel. The 3-port E3 ATM IP FP uses the DS3/E3/JT2 ATM termination panels. These termination panels support sparing.

For more information about the DS3/E3/JT2 ATM termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

3-port E3 ATM IP cable assembly

The maximum cable length for unbalanced E3 ATM IP lines to customer equipment is 375 m (1220 ft). The distance between the FP and the termination panel is part of the total length.

The insertion loss of a cable must not exceed 12 dB measured at 17184 kHz. For example, for NT-734 cable an insertion loss of 12 dB at 17184 kHz is about 375 m (1220 ft) of cable.

Table 120
3-port E3 ATM IP cable assembly parts

Qty	Item	Description	Maximum length
1	NT-734	75-Ω coaxial cable	375 m (1220 ft)
2	Specialty Connector Company 28P387-1 or comparable BNC connector	75-Ω straight BNC plug	

For more information, see "Cables" (page 77).

Chapter 14
OC-3 function processors

ATM services are provided by the following OC-3 function processors (FPs):

*   "3-port OC-3 ATM function processor" (page 329)

*   "2-port OC-3 ATM IP function processor" (page 333)

3-port OC-3 ATM function processor

See these sections for information about the OC-3 ATM function processor (FP):

*   "3-port OC-3 ATM faceplate" (page 329)

*   "3-port OC-3 ATM cable assembly" (page 330)

*   "3-port OC-3 ATM interface characteristics" (page 331)

Note: To connect a single-mode OC-3 FP to a multi-mode OC-3 FP, you must use a fiber optic mode converter. See the documentation supplied with your converter.

3-port OC-3 ATM faceplate

This figure shows the faceplate for the OC-3 ATM FP.

Figure 106
OC-3 ATM faceplate
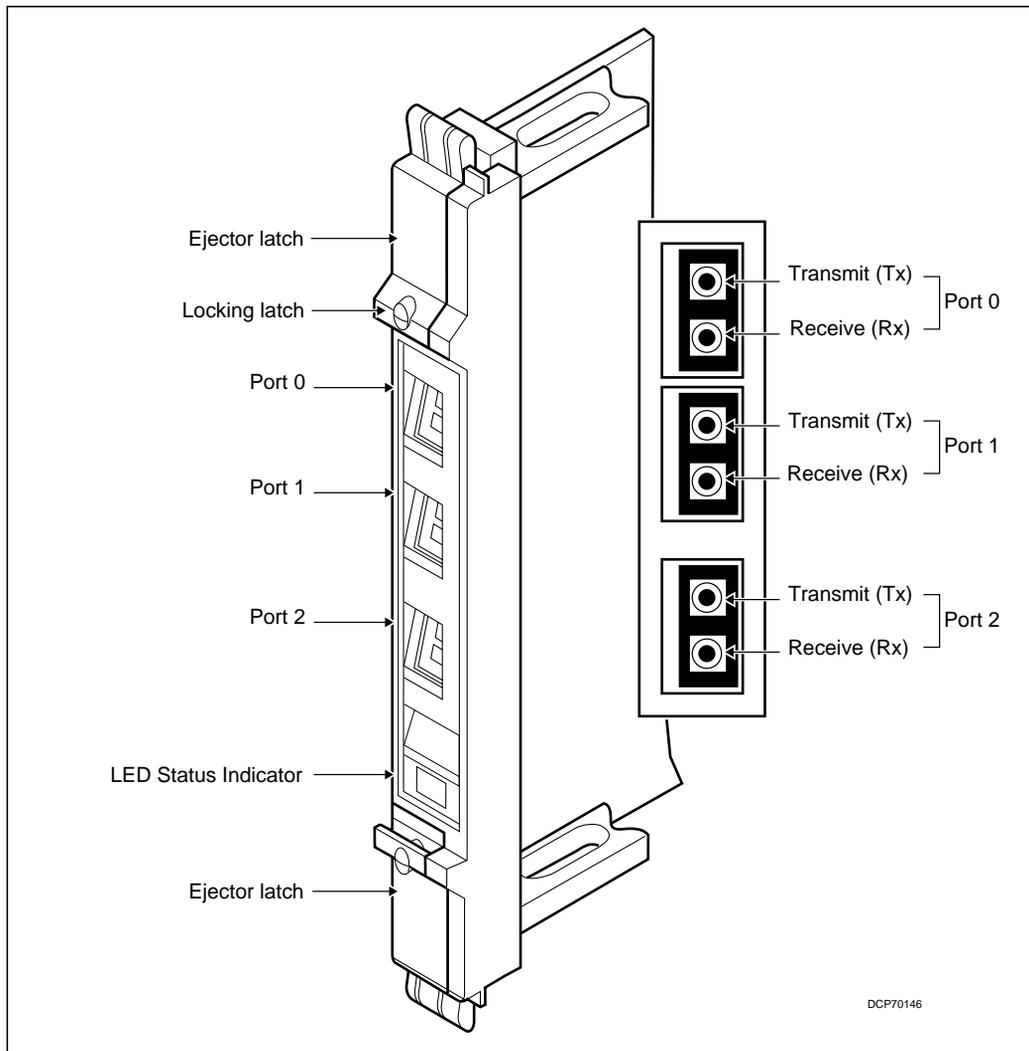
3-port OC-3 ATM cable assembly

The fiber mode type must be the same as the FP (FP) mode type. Use single-mode fiber cable with single-mode FPs and multi-mode fiber cable with multi-mode FPs.

Multi-mode fiber (MMF) cable must conform to ANSI/EIA/TIA-568. The MMF has a core diameter of 62.5 microns and cladding diameter of 125 microns. The modal bandwidth is at least 500 MHz-km and the attenuation is less than 1.0 dB/km at 1300 nm.

The single-mode fiber (SMF) cable has a core diameter of 9 microns and cladding diameter of 125 microns. The attenuation is less than 0.5 dB/Km at 1300 nm.

Connectors should be industry standard duplex SC connectors.

The sum of cable splice losses and connector losses from the FP to customer equipment must not exceed 10 dB for multi-mode and 12 dB for single-mode. The losses in a transmission path determines the distance the FP can send a signal. The maximum distance from the FP to customer equipment is 2 km for multi-mode and 15 to 20 km for single-mode, depending on the losses due to splices and connectors.

You can purchase cables with attached connectors that meeting the above specifications from any supplier of fiber optic cables.

For more information, see "Cables" (page 77).

3-port OC-3 ATM interface characteristics

The 3-port OC-3 ATM FPs have the following characteristics as defined in ANSI T1E1.2 95-003.

Table 121
3-port OC-3 ATM general interface characteristics

General Optical Interface Characteristics	
Connector	Dual SC
Bit Rate	155.52 Mbps
Line Code	Binary Non-Return-To-Zero (NRZ)

Table 122
3-port OC-3 ATM single mode intermediate reach interface characteristics

Single Mode Intermediate Reach Optical Interface Characteristics	
Emission Wavelength	1261 nm to 1360 nm
Attenuation	0 - 12 dB
Maximum Dispersion	96 ps/nm
Spectral Width: Maximum RMS Width	7.7 nm
Mean Transmission Power	-15 to -8 dBm
Minimum Extinction Ratio	8.2 dB
Eye Pattern Mask	As per ITU G.957 Fig 2, ANSI T1E1.2/94-002R1-Fig 10, TA-253 Issue 8 Fig 4-2
Maximum receive power (avg)	-8 dBm
Minimum receive power (avg)	-28 dBm
Optical Path Power Penalty	1 dB

Table 123
3-port OC-3 ATM multimode interface characteristics

Multimode Optical Interface Characteristics	
Center Wavelength	1270 nm to 1380 nm
Attenuation	0 - 10 dB
Maximum Spectral Width:	200 nm
Mean Transmission Power	-20 to -14 dBm
Minimum Extinction Ratio	10 dB
(Sheet 1 of 2)	

Table 123 (continued)
3-port OC-3 ATM multimode interface characteristics

Multimode Optical Interface Characteristics	
Rise (fall) time, 10-90% (ns)	5
Overshoot%	25
Rx sensitivity (dBm)	-30 to -14
(Sheet 2 of 2)	

2-port OC-3 ATM IP function processor

See these sections for information about the 2-port OC-3 ATM IP function processor (FP):

- "2-port OC-3 ATM IP faceplate" (page 334)

- "2-port OC-3 ATM IP cable assembly" (page 335)

- "2-port OC-3 ATM IP line automatic protection switching" (page 335)

- "2-port OC-3 ATM IP interface characteristics" (page 336)

- "Connecting to OC-3 ATM FPs" (page 337)

Note: To connect a single-mode OC-3 ATM IP to a multi-mode OC-3 ATM IP, you must use a fiber optic mode converter. See the documentation supplied with your converter.

2-port OC-3 ATM IP faceplate

Figure 107
2-port OC-3 ATM IP faceplate
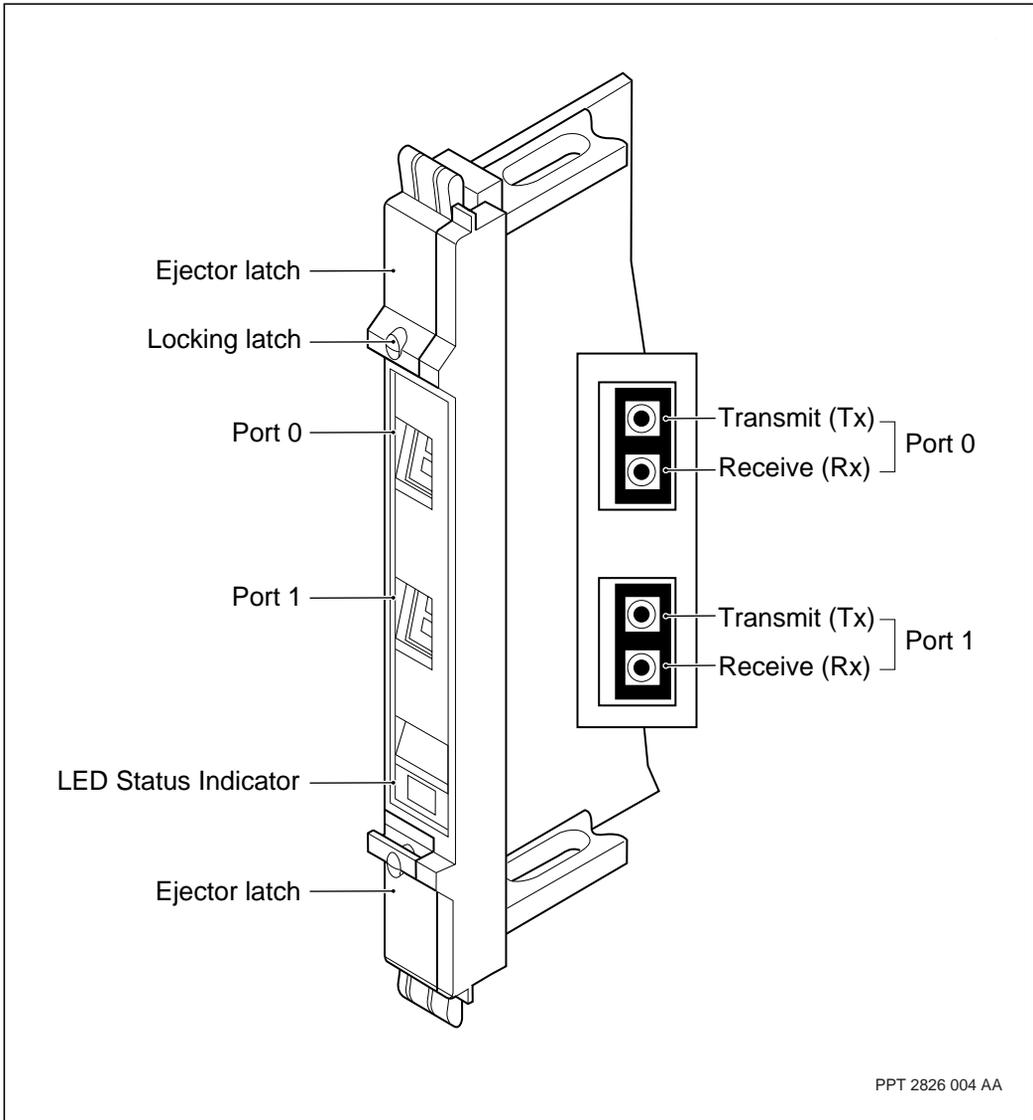
PPT 2826 004 AA

2-port OC-3 ATM IP cable assembly

The fiber mode type must be the same as the FP mode type. Use single-mode fiber cable with single-mode FPs and multi-mode fiber cable with multi-mode FPs.

Multi-mode fiber (MMF) cable must conform to ANSI/EIA/TIA-568. The MMF has a core diameter of 62.5 microns and cladding diameter of 125 microns. The modal bandwidth is at least 500 MHz-km and the attenuation is less than 1.0 dB/km at 1300 nm.

The single-mode fiber (SMF) cable has a core diameter of 9 microns and cladding diameter of 125 microns. The attenuation is less than 0.5 dB/km at 1300 nm.

Connectors should be industry standard duplex SC connectors.

The sum of cable splice losses and connector losses from the function processor to customer equipment must not exceed 7 dB for multi-mode and 28 dB for single-mode. The losses in a transmission path determines the distance the FP can send a signal. The maximum distance from the FP to customer equipment is 2 km for multi-mode and 40 km for single-mode, depending on the losses due to splices and connectors.

You can purchase cables with attached connectors that meeting the above specifications from any supplier of fiber optic cables.

For more information, see "Cables" (page 77).

2-port OC-3 ATM IP line automatic protection switching

SONET line automatic protection switching (line APS), or line protection, is a standards-defined feature enabling a form of line sparing on optical cards.

Line APS is fully described in 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

To provision line APS, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide* and 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

2-port OC-3 ATM IP interface characteristics

The 2-port OC-3 ATM IP FPs have the following characteristics as defined in ANSI T1E1.2 95-003.

Table 124
2-port OC-3 ATM IP general interface characteristics

General Optical Interface Characteristics	
Connector	Dual SC
Bit Rate	155.520 Mbps
Line Code	Binary Non-Return-To-Zero (NRZ)

Table 125
2-port OC-3 ATM IP single mode long reach interface characteristics

Single Mode Long Reach Optical Interface Characteristics	
Emission Wavelength	1261 nm to 1360 nm
Attenuation Range	0 - 28 dB
Spectral Width: Maximum RMS Width	4 nm
Mean Transmission Power	-5 to 0 dBm
Minimum Extinction Ratio	10.0 dB
Eye Pattern Mask	As per ITU G.957 Fig 2, ANSI T1E1.2/94-002R1-Fig 10, TA-253 Issue 8 Fig 4-2
Maximum receive power (avg)	0 dBm
Minimum receive power (avg)	-34 dBm
Optical Path Power Penalty	1 dB

Table 126
2-port OC-3 ATM IP multimode interface characteristics

Multimode Optical Interface Characteristics	
Center Wavelength	1270 nm to 1380 nm
Attenuation Range	0 - 12.5 dB
Maximum Spectral Width:	200 nm
Mean Transmission Power	-19 to -14 dBm
Minimum Extinction Ratio	10 dB
Rise time, 20-80% Fall time, 20-80%	2.5 nanoseconds 2.5 nanoseconds
Overshoot%	10
Rx sensitivity (dBm)	-32.5 to -14 dBm

Connecting to OC-3 ATM FPs

The OC-3 ATM IP sends out a signal stronger than the OC-3 ATM FP can handle. In the case that these cards are used together within a network, a 10dB attenuator is required for the Tx port of the OC-3 ATM IP. The attenuator will lower the strength of the signal to a maximum -10dB, an acceptable signal for the OC-3 ATM FP.

Chapter 15
Ethernet function processors

IP services are supported on the following Passport Ethernet function processors (FPs):

6-port Ethernet 10BaseT function processor

See these sections for information about the Ethernet function processor (FP):

6-port Ethernet faceplate

Figure 108
6-port Ethernet 10BaseT faceplate
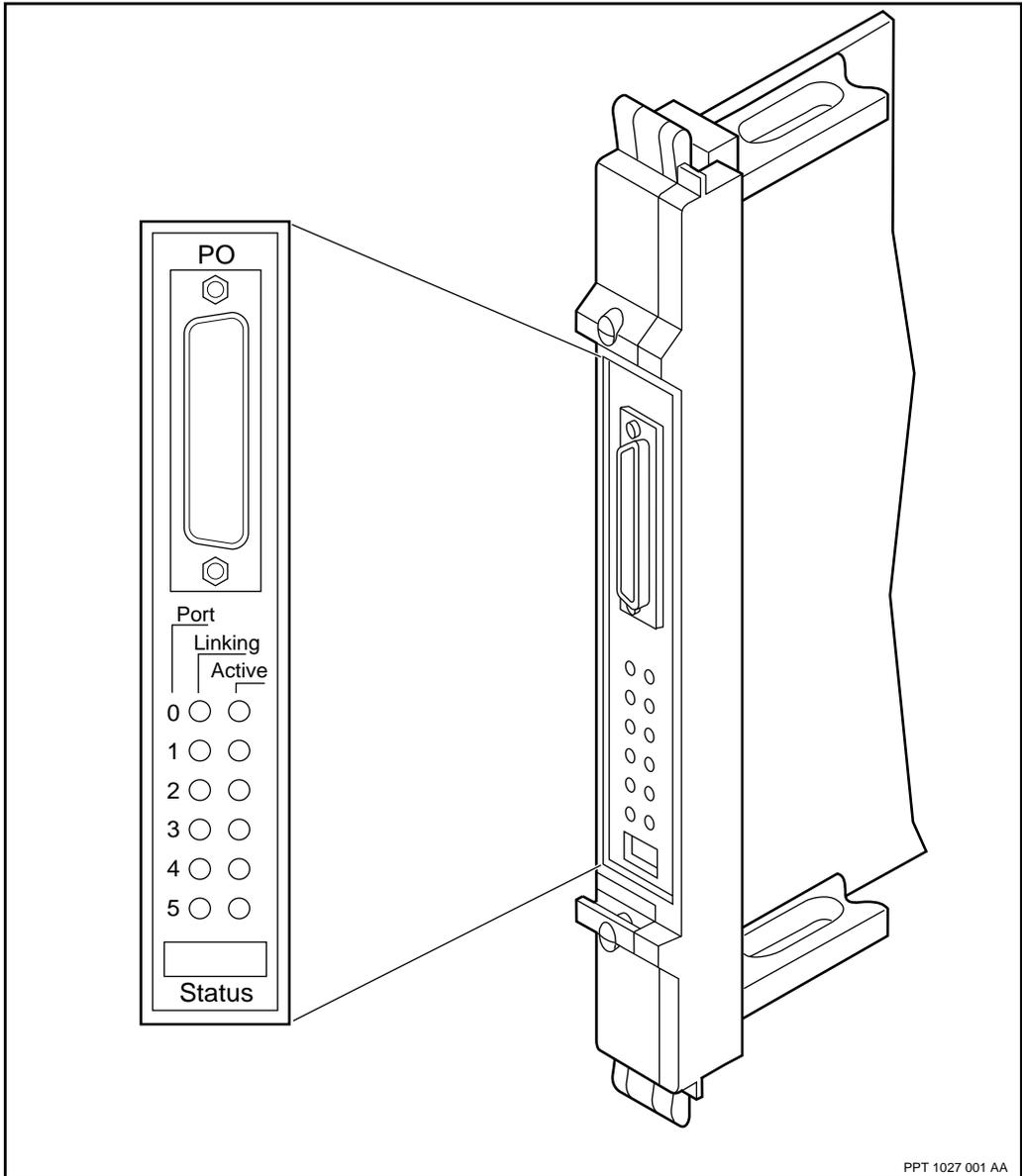
PPT 1027 001 AA

6-port Ethernet 10BaseT termination panels

The 6-port Ethernet 10BaseT uses the Ethernet termination panels. These panels provide a break-out for customer equipment connections and provide each port with its own access.

Each termination panel has six standard 10BaseT Ethernet connectors for routing signals to external equipment. Any standard 8-pin 10BaseT Ethernet cable connector (customer-supplied) can be attached to these connectors.

For more information about the Ethernet termination panels, see "Ethernet termination panels" (page 49).

6-port Ethernet 10BaseT cable assembly

The 10BaseT configuration for the Ethernet FP uses

- unshielded twisted-pair (UTP) customer-equipment cabling configured in a star

- a wiring hub with a maximum distance of 100 m (328 ft) between Ethernet switches. The maximum distance can be less, based on cabling characteristics.

The maximum cable length for Ethernet lines to customer equipment is detailed in the IEEE 802.3 specification.The distance between the FP and the termination panel is part of the total length.

Using unshielded cable for the Ethernet FP cable can void compliance with EMI or RFI regulations.

For more information, see "Cables" (page 77).

6-port Ethernet 10BaseT pinouts

See the following sections for information about Ethernet pinouts:

- "6-port Ethernet 10BaseT faceplate and termination panel pinouts" (page 342)

- "6-port Ethernet 10BaseT faceplate connector pin scheme" (page 344)

- "6-port Ethernet 10BaseT termination panel connector pinouts" (page 344)

Table 127
6-port Ethernet 10BaseT faceplate and termination panel pinouts

Front panel connector pin	Termination panel connector pin	Cable color code	Signal
23	26	white/blue stripe	P0Tx+ (Port 0 transmit positive)
38	1	blue/white stripe	P0Tx- (Port 0 transmit negative)
6	27	white/orange	P0Rx+ (Port 0 receive positive)
22	2	orange/white stripe	P0Rx- (Port 0 receive negative)
25	28	white/green	P1Tx+
40	3	green/white stripe	P1Tx-
8	29	white/brown	P1Rx+
24	4	brown/white stripe	P1Rx-
27	30	white/slate stripe	P2Tx+
42	5	slate/white stripe	P2Tx-
10	31	red/blue stripe	P2Rx+
26	6	blue/red stripe	P2Rx-
20	32	red/orange stripe	P3Tx+
35	7	orange/red stripe	P3Tx-
5	33	red/green stripe	P3Rx+
21	8	green/red stripe	P3Rx-
18	34	red/brown stripe	P4Tx+
33	9	brown/red stripe	P4Tx-
3	35	red/slate stripe	P4Rx+
19	10	slate/red stripe	P4Rx-
16	36	black/blue stripe	P5Tx+
31	11	blue/black stripe	P5Tx-
1	37	black/orange stripe	P5Rx+
(Sheet 1 of 2)			

Table 127 (continued)
6-port Ethernet 10BaseT faceplate and termination panel pinouts

Front panel connector pin	Termination panel connector pin	Cable color code	Signal
17	12	orange/black stripe	P5Rx-
Note: You do not need to connect the following pin on the front panel connector: 2, 4, 7, 9, 11, 12, 13, 14, 15, 28, 29, 30, 32, 34, 36, 37, 39, 41, 43, 44. The connector housing supplies the frame ground.			
(Sheet 2 of 2)			

Figure 109
6-port Ethernet 10BaseT faceplate connector pin scheme
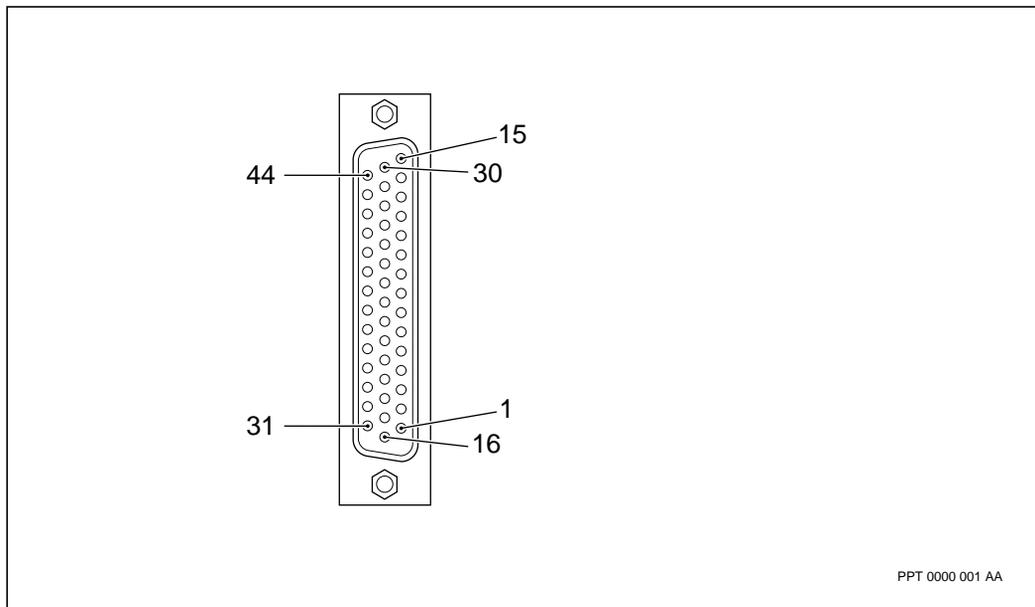
PPT 0000 001 AA

Table 128
6-port Ethernet 10BaseT termination panel connector pinouts

Pin number	Signal name
1	Tx+
2	Tx-
3	Rx+
4	Not Used
5	Not Used
6	Rx-
7	Not Used
8	Not Used

Figure 110
6-port Ethernet 10BaseT connector pin scheme
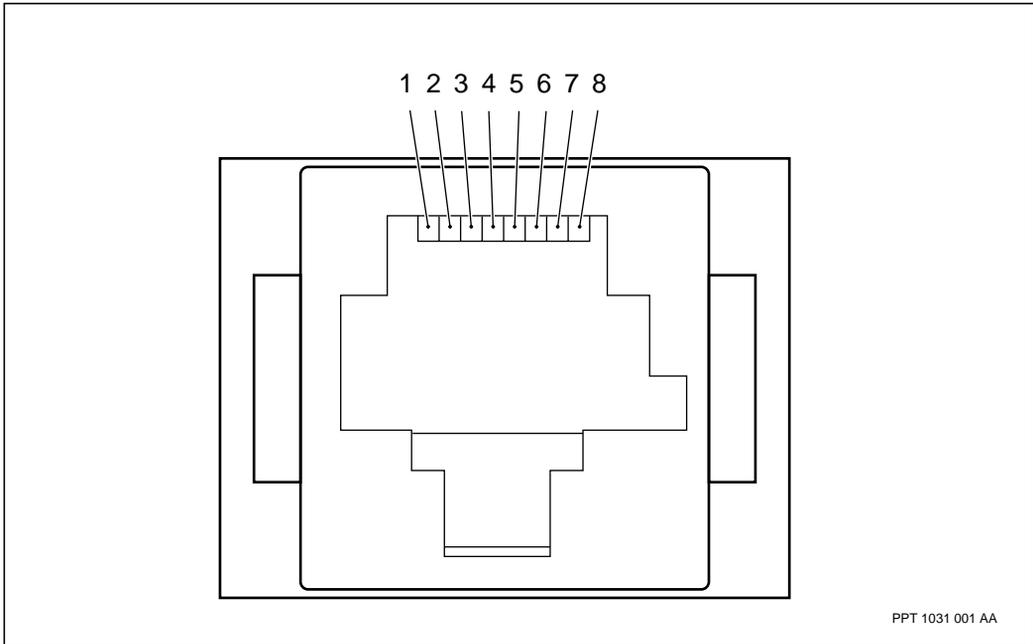
PPT 1031 001 AA

2-port Ethernet 100BaseT function processor

See these sections for information about the 2-port Ethernet 100BaseT function processor (FP):

- "2-port Ethernet 100BaseT faceplate" (page 346)

- "2-port Ethernet 100BaseT cable assembly" (page 347)

- "2-port Ethernet 100BaseT pinouts" (page 347)

2-port Ethernet 100BaseT faceplate

Figure 111
2-port Ethernet 100BaseT faceplate

Ejector latch

Locking latch

Port 1
LED status indicator

Port 1
RJ45 connector

Port 0
LED status indicator

Port 0
RJ45 connector

LED status
indicator

Ejector latch

PPT 0982 003 AA
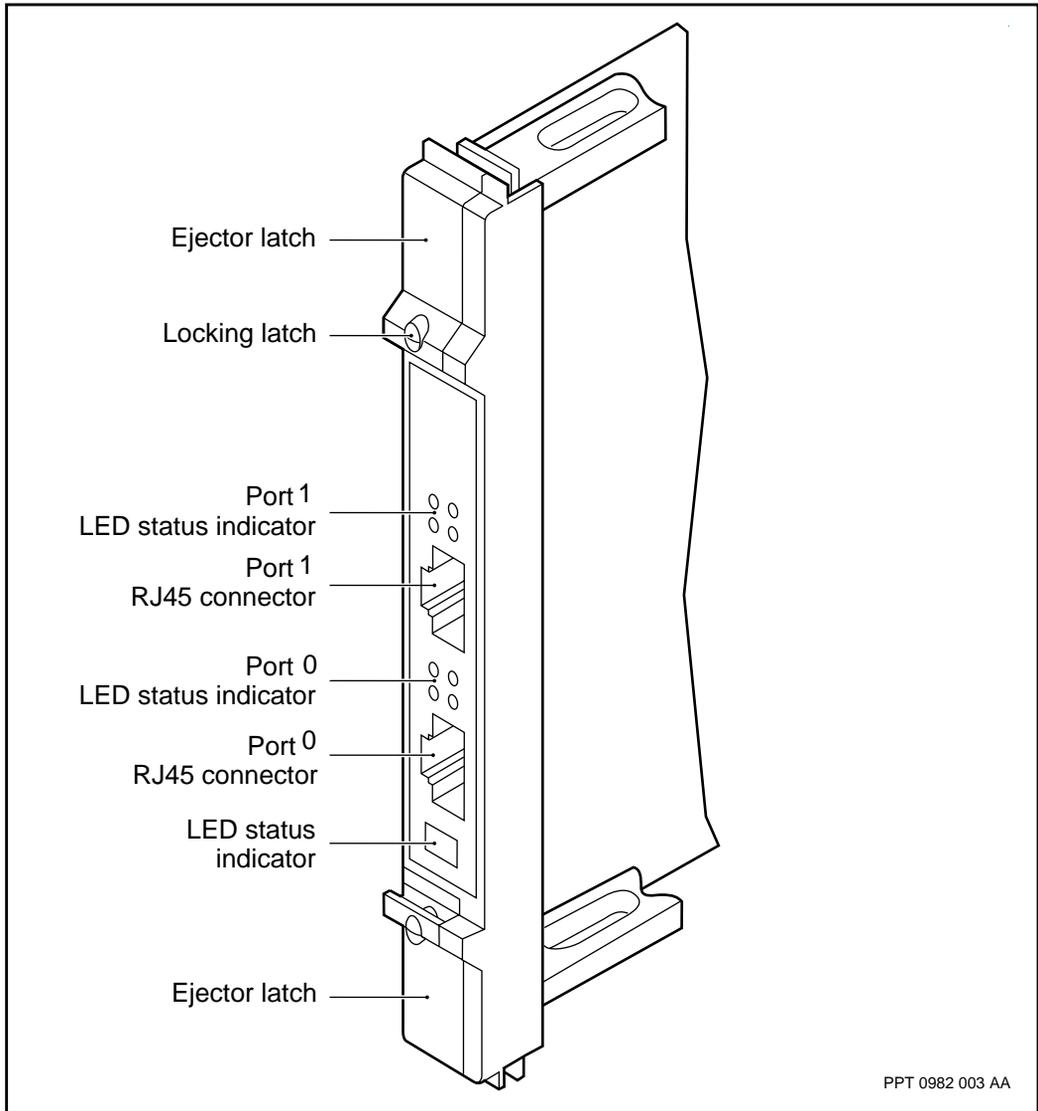
2-port Ethernet 100BaseT cable assembly

The minimum grade of cable required to run a 2-port Ethernet 100BaseT FP, is category 5 unshielded twisted pair (UTP). Certain installations may require a higher grade cable (Enhanced Category 5 cable) to overcome cross-talk, immunity and other noise problems.

The maximum cable length between Ethernet switches is 100 m (328 ft). However, cabling characteristics can reduce the maximum distance. The maximum cable length for Ethernet lines to customer equipment is detailed in the IEEE 802.3 specification.

For information about cables, see "Cables" (page 77).

2-port Ethernet 100BaseT pinouts

This figure and table show the pin assignments for the RJ45 connectors on the faceplate of the 2-port Ethernet 100BaseT FP.

Figure 112
2-port Ethernet 100BaseT connector pin scheme

PPT 1031 001 AA
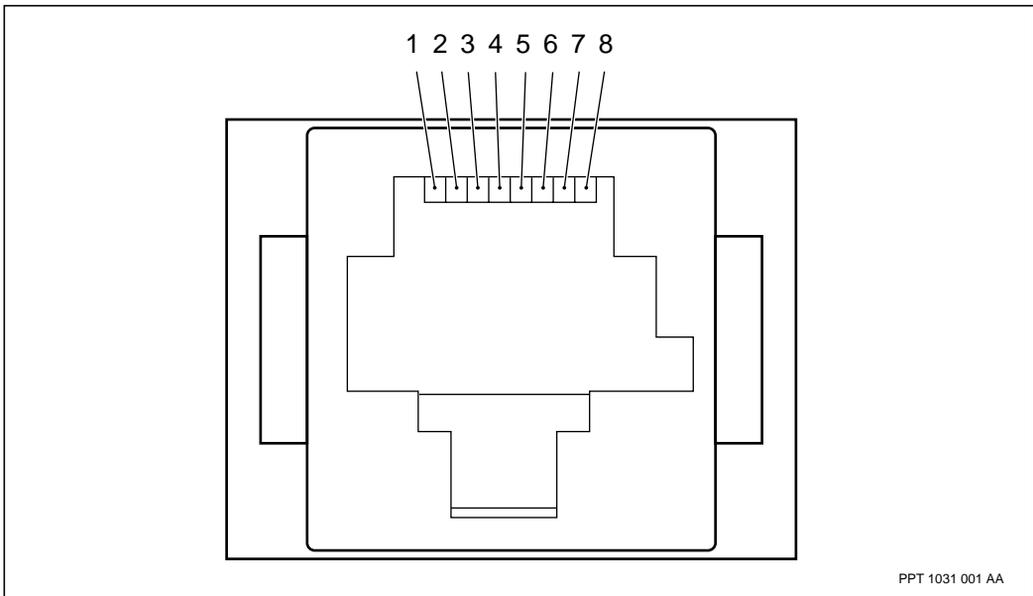
Table 129
RJ45 connector pinouts

RJ45 pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	-
5	-
6	Receive -
7	-
8	-

Chapter 16
2-port STM-1 electrical function processors

See these sections for information about the 2-port STM-1 electrical ATM function processor (FP):

- "2-port STM-1 electrical ATM FP faceplate" (page 350)

- "2-port STM-1 electrical channelized CES/ATM/IMA faceplate" (page 352)

- "2-port STM-1 electrical termination panel" (page 353)

- "2-port STM-1 electrical cable assemblies" (page 354)

2-port STM-1 electrical ATM FP faceplate

You can use the monitor ports (TXM0 and TXM1) to connect to test equipment and test the card while it is in service. It carries a -26 dB tap of the transmit (Tx) connector signal. The 9-pin subminiature D-type connector provides one-for-one sparing capability. The monitor ports are also 75-ohm BNC connectors.

Figure 113
Faceplate of a 2-port STM-1 electrical ATM FP

Port 0 — Receive (Rx), Transmit (Tx)
Port 1 — Receive (Rx), Transmit (Tx)
Monitor ports — Transmit (TXM0), Transmit (TXM1)
Sparing control
LED status indicator

9-pin subminiature D-type connector

Pin Numbering Scheme

PPT 3161 003 AA
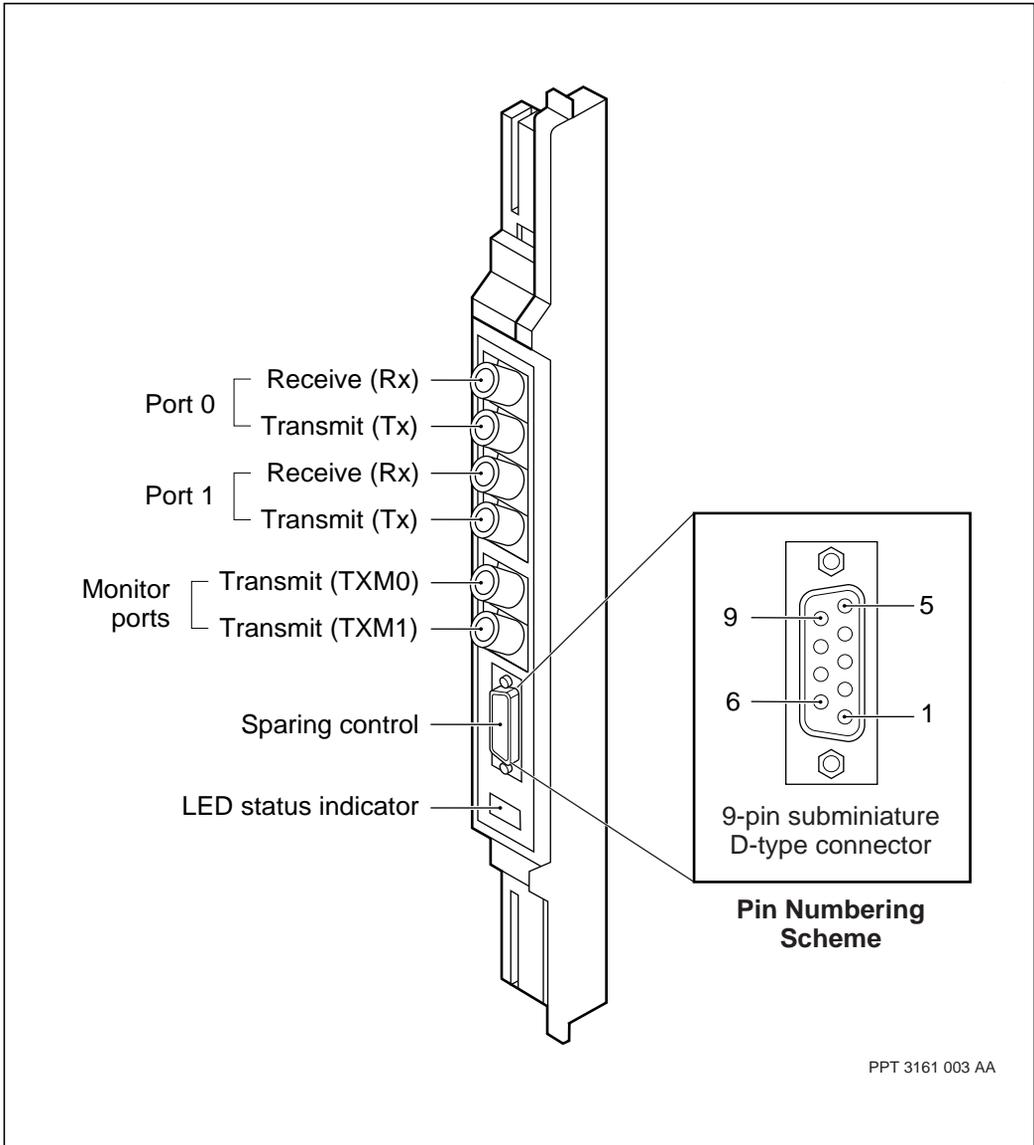
2-port STM-1 electrical channelized CES/ATM/IMA faceplate

The 2pSTM1eCh is a dual slot function processor (FP). You can use the monitor ports (TXM0 and TXM1) to connect to test equipment and test the card while it is in service. It carries a -26dB tap of the transmit (Tx) connector signal. The 9-pin subminiature D-type connector provides one-for-one sparing capability. The monitor ports are also 75-ohm BNC connectors.

Figure 114
Faceplate of a 2-port STM-1 electrical channelized CES/ATM/IMA FP
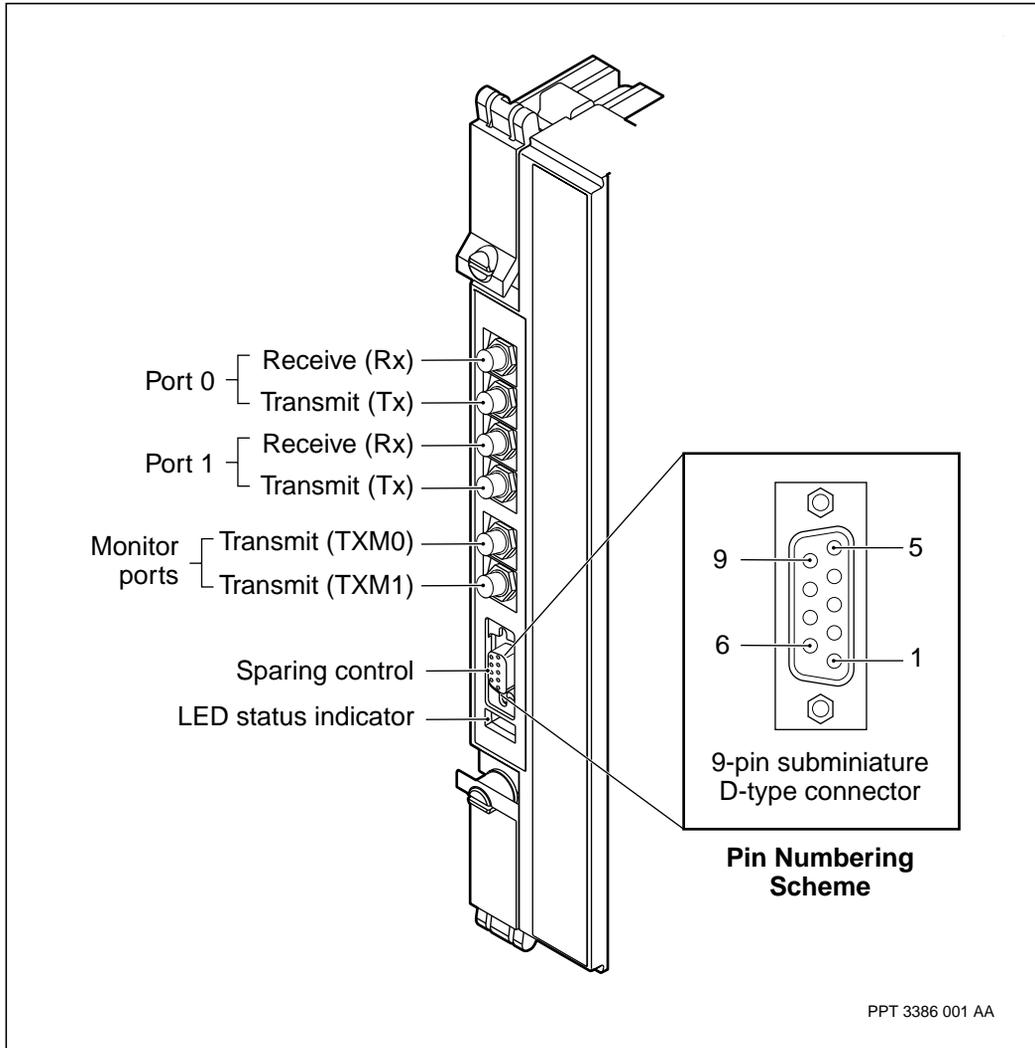
Port 0 — Receive (Rx)
Port 0 — Transmit (Tx)
Port 1 — Receive (Rx)
Port 1 — Transmit (Tx)
Monitor ports — Transmit (TXM0)
Monitor ports — Transmit (TXM1)
Sparing control
LED status indicator

9
5
6
1

9-pin subminiature
D-type connector

**Pin Numbering
Scheme**

PPT 3386 001 AA

2-port STM-1 electrical termination panel

The 2-port STM-1 electrical (STM-1e) termination panel provides
one-for-one (1:1) sparing between two 2-port STM-1 electrical non-
channelized or channelized FPs.

For more information about the STM-1e termination panel, see "2-port STM-1 electrical termination panel" (page 66).

2-port STM-1 electrical cable assemblies

The cable assemblies from the 2-port STM-1 electrical FP faceplate to the NTPS92 sparing panel faceplate include a control cable from each FP and a signal cable from the transmit (Tx) and receive (Rx) ports for both the main and spare connections (shown in the figure "2-port STM-1e termination panel - PEC NTPS92" (page 68)). The control cable (pins 3 and 4) enables the CP to have the sparing panel relays switch over so that the back-up FP can take over the traffic.

The cable assemblies can be prefabricated from Nortel Networks or custom made by yourself.

When measuring the exact path from the FP to the far end, the sparing panel is not considered to be the far end. It is only part of the total length.

Prefabricated 2-port STM-1e cable assemblies

The optional prefabricated cable assemblies can be used to connect the FP to the sparing panel or other equipment with the SMB BT43 receptacles. These cables do not require ferrite beads for EMI shielding. See the table "Prefabricated cable assemblies for the 2-port STM-1e sparing panel or FP" (page 354). Otherwise, you must use your own cables as described in "Custom-made 2-port STM-1e cable assemblies" (page 356).

Table 130
Prefabricated cable assemblies for the 2-port STM-1e sparing panel or FP

PEC	Length	Type of cable assembly
NTPS11AA	1.5 m (4.9 ft)	control with standard DB9 D-sub connector
NTPS11AB	3.0 m (9.8 ft)	control with standard DB9 D-sub connector
NTPS11AC	15 m (49.2 ft)	control with standard DB9 D-sub connector
NTPS12AA	1.5 m (4.9 ft)	signal with the SMB BT43 (or SMZ) connector
(Sheet 1 of 2)		

Table 130 (continued)
Prefabricated cable assemblies for the 2-port STM-1e sparing panel or FP

PEC	Length	Type of cable assembly
NTPS12AB	3.0 m (9.8 ft)	signal with the SMB BT43 (or SMZ) connector
NTPS12AC	15 m (49.2 ft)	signal with the SMB BT43 (or SMZ) connector
(Sheet 2 of 2)		

Figure 115
Prefabricated cable assembly NTPS12 used between the FP and the sparing panel

PPT 3163 005 AA
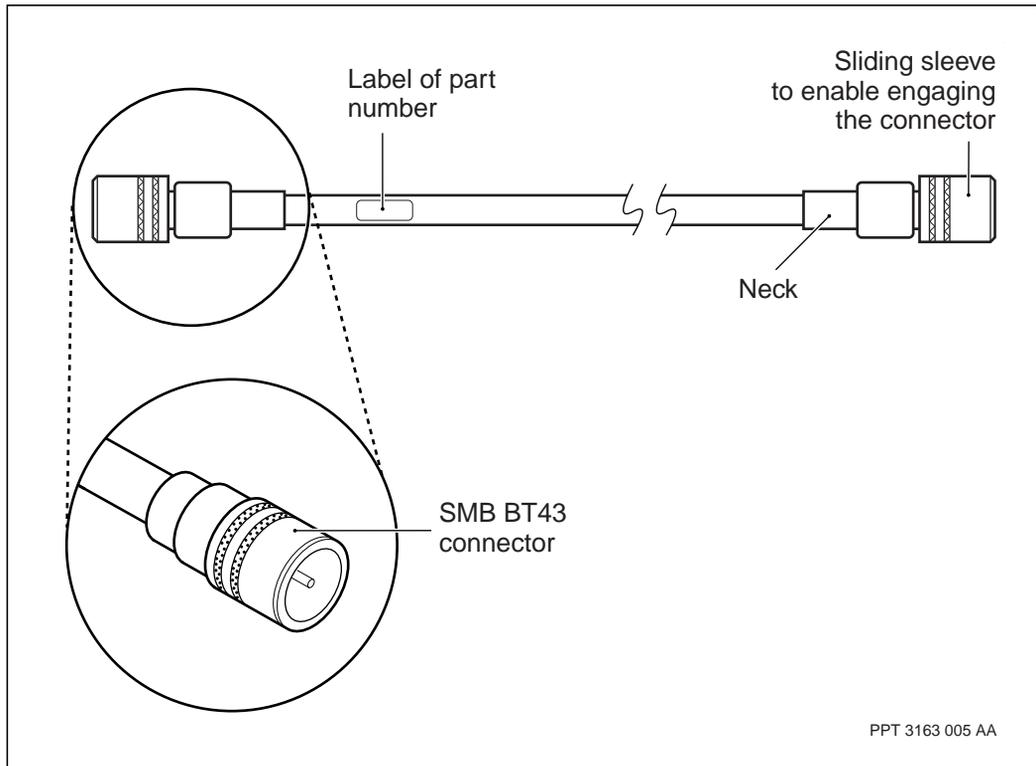
Custom-made 2-port STM-1e cable assemblies

The maximum cable length for STM-1e lines to customer equipment is 100 m (328 ft). The length of cable between the FP and sparing panel must be considered part of the length. The insertion loss of each cable must not exceed 12.7 dB measured at 78 MHz. Insertion loss is proportional to cable length and varies from one type of cable to another.

To make your own custom-length signal cable assembly, use the parts identified in the table "2-port STM-1 electrical coax cable assembly parts" (page 356). Otherwise, you can use a signal cable from "Prefabricated 2-port STM-1e cable assemblies" (page 354).

Table 131
2-port STM-1 electrical coax cable assembly parts

Qty	Item	Description
	R0120262	Type RA7001 75–Ω coaxial cable (double braided + foil shielding)
2	A0877822	BT43 (SMB 75–Ω straight plug coax connector)

To make your own custom-length control cable assembly, use a standard female DB9 D-sub connector at each end of No. 26 AWG (0.128 mm^2) wire. The wire cluster must be wrapped in braided shield, and the braided shield must be properly attached to the D-sub shell (or casing). Solder the wires to the DB9 connectors according to the table "Pinout of a control cable for the 2-port STM-1e FP or sparing panel" (page 357). For the procedure to make a braided shield, refer to the section on making customer equipment cables in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

Table 132
Pinout of a control cable for the 2-port STM-1e FP or sparing panel

Pin	Description
1	no connection
2	no connection
3	protection request line
4	protection status line
5	ground
6	+12 volts
7	no connection
8	no connection
9	no connection
Note: Pins 3 and 6 are for the first twisted pair. Pins 4 and 5 are for the second twisted pair.	

The connectors of the signaling cables for the 2-port STM-1e FP and sparing panel are SMB BT43 (SMZ). The installation of these connectors is described in the sections on installing card cables and installing customer equipment cabling in 241-7401-240 *Passport 7400 Hardware Installation, Maintenance and Upgrade*.

Chapter 17
V.11 function processor

See the following sections for information about the 8-port V.11 function processor (FP):

- "8-port V.11 faceplate" (page 360)

- "8-port V.11 termination panels" (page 361)

- "8-port V.11 cable assembly" (page 361)

- "8-port V.11 pinouts" (page 362)

Note 1: Nortel ships V.11 FPs with all termination DIP switches set to *on*. A terminated line has a load connected to the input. An unterminated line has no load. Generally, line rates above 200 kbit/s should be terminated. For more information about when to use an unterminated line, see CCITT V.11 Recommendations, Annex A, section A2.

Note 2: If you want to run multiple services on a single FP, see your Nortel Networks representative.

8-port V.11 faceplate

Figure 116
8-port V.11 faceplate

Ejector latch

Locking latch

Ports 0 to 3
68-pin high-density
D-type connector

P0

Ports 4 to 7
68-pin high-density
D-type connector

P1

LED status
indicator

Locking latch

Ejector latch

68
34
35
1

68-pin high density
D-type connector

**Pin Numbering
Scheme**

PPT 1060 001 AA
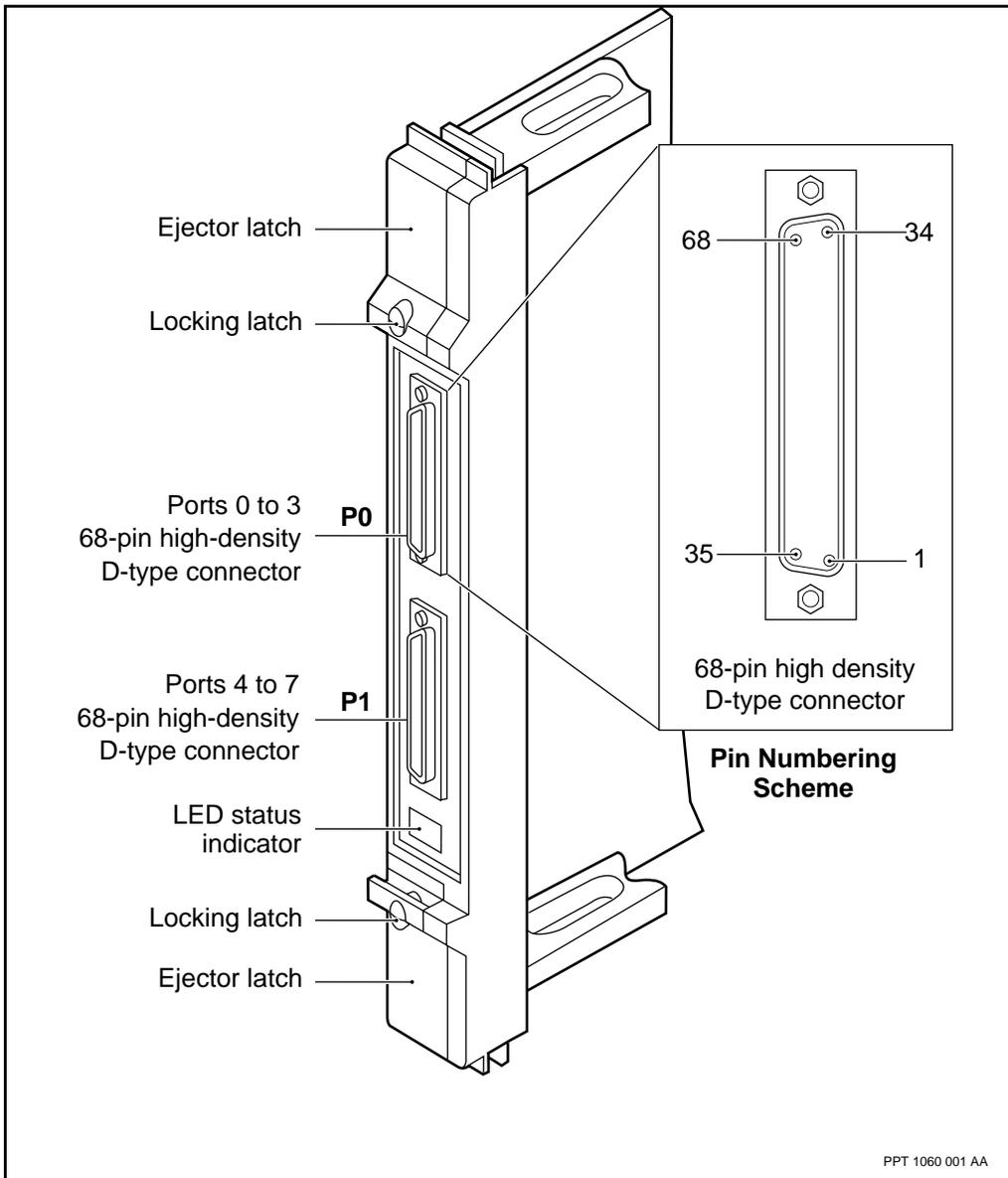
8-port V.11 termination panels

The V.11 FP uses V.11 termination panels. These panels provide a break-out for customer-equipment connections so that each V.11 port has its own termination point and access. These termination panels also determine the type of connection (DCE or DTE) depending on which connector is used. The V.11 termination panels do not support sparing.

For more information about the V.11 termination panels, see "V.11 termination panels" (page 53).

8-port V.11 cable assembly

The 8-port V.11 function processor (FP) supports the cable lengths specified in Appendix I.2 of the ITU-T Recommendation V.11. The table "Maximum V.11 cable lengths" (page 361) provides some of these cable lengths from Appendix I.2 as a quick reference.

The maximum allowable cable length from the Passport to the external customer equipment depends on the clock speed of the V.11 line.

Note: The maximum length always includes the length of the card cable connecting the V.11 FP to its termination panel. Therefore, the customer-equipment cable needs to be shorter than the maximum length indicated in the table.

For clock speeds up to 100 Kbit/s, the maximum V.11 cable length allowed by the ITU-T Recommendation V.11 is 1000 m.

Table 133
Maximum V.11 cable lengths

Clock speed (Mbit/s)	Maximum cable length * (meters)
0.5	200
1	100
2	50
4	25
6	15
(Sheet 1 of 2)	

Table 133 (continued)
Maximum V.11 cable lengths

Clock speed (Mbit/s)	Maximum cable length * (meters)
8	12.5
* includes the cable that connects the FP to its termination panel	
(Sheet 2 of 2)	

> *Note:* V.11 line termination needs to be switched ON for a V.11 port that is clocked above 200 Kbit/s.

For more information about V.11 cable assembly, see "8-port V.11 cable assembly parts" (page 362).

8-port V.11 cable assembly parts

This table lists the items you need to assemble V.11 cables.

Table 134
8-port V.11 cable assembly parts

Qty	Item	Description
5 meters (16 ft.)	Belden 8107	Shielded cable, 100 ohm, 7 twisted pairs, 24 gauge (0.51 mm) strand
2	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
30	NT A0291226	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub

For more information about cables, see "Cables" (page 77).

8-port V.11 pinouts

See these sections for information about specific connectors:

- "8-port V.11 connector P0 pinouts and signal names for ports 0 and 1" (page 363)

- "8-port V.11 connector P0 pinout and signal names for ports 2 and 3" (page 364)

- "8-port V.11 connector P1 pinout and signal names for ports 4 and 5" (page 366)

- "8-port V.11 connector P1 pinout and signal names for ports 6 and 7" (page 367)

- "8-port V.11 connector pinout and signal names for DCE-to-DTE or DTE-to-DCE connection" (page 370)

Table 135
8-port V.11 connector P0 pinouts and signal names for ports 0 and 1

Pin No.	V.11 DTE	V.11 DCE	Name
1	T0A	R0A	
35	T0B	R0B	
2	R0A	T0A	
36	R0B	T0B	
3	X0B	S0B	
37	X0A	S0A	
4	S0B	X0B	
38	S0A	X0A	
5	C0A	I0A	
39	C0B	I0B	
6	I0A	C0A	
40	I0B	C0B	
7			
41			
8			EQPTID03
42			+5V
9			SIGRET0
(Sheet 1 of 2)			

Table 135 (continued)
8-port V.11 connector P0 pinouts and signal names for ports 0 and 1

Pin No.	V.11 DTE	V.11 DCE	Name
10	T1A	R1A	
44	T1B	R1B	
11	R1A	T1A	
45	R1B	T1B	
12	X1B	S1B	
46	X1A	S1A	
13	S1B	X1B	
47	S1A	X1A	
14	C1A	I1A	
48	C1B	I1B	
15	I1A	C1A	
49	I1B	C1B	
16			
50			
17			PSREG0
51			PSREG1
43			SIGRET1
(Sheet 2 of 2)			

Table 136
8-port V.11 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.11 DTE	V.11 DCE	Name
18	T2A	R2A	
52	T2B	R2B	
19	R2A	T2A	
(Sheet 1 of 3)			

Table 136 (continued)
8-port V.11 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.11 DTE	V.11 DCE	Name
53	R2B	T2B	
20	X2B	S2B	
54	X2A	S2A	
21	S2B	X2B	
55	S2A	X2A	
22	C2A	I2A	
56	C2B	I2B	
23	I2A	C2A	
57	I2B	C2B	
24			
58			
25			PSREG2
59			PSREG3
26			SIGRET2
27	T3A	R3A	
61	T3B	R3B	
28	R3A	T3A	
62	R3B	T3B	
29	X3B	S3B	
63	X3A	S3A	
30	S3B	X3B	
64	S3A	X3A	
31	C3A	I3A	
65	C3B	I3B	
32	I3A	C3A	
(Sheet 2 of 3)			

Table 136 (continued)
8-port V.11 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.11 DTE	V.11 DCE	Name
66	I3B	C3B	
33			
67			
34			+5V
68			+5V
60			SIGRET3
(Sheet 3 of 3)			

Table 137
8-port V.11 connector P1 pinout and signal names for ports 4 and 5

Pin No.	V.11 DTE	V.11 DCE	Name
1	T4A	R4A	
35	T4B	R4B	
2	R4A	T4A	
36	R4B	T4B	
3	X4B	S4B	
37	X4A	S4A	
4	S4B	X4B	
38	S4A	X4A	
5	C4A	I4A	
39	C4B	I4B	
6	I4A	C4A	
40	I4B	C4B	
7			
41			
8			EQPTID47
(Sheet 1 of 2)			

Table 137 (continued)
8-port V.11 connector P1 pinout and signal names for ports 4 and 5

Pin No.	V.11 DTE	V.11 DCE	Name
42			+5V
9			SIGRET4
10	T5A	R5A	
44	T5B	R5B	
11	R5A	T5A	
45	R5B	T5B	
12	X5B	S5B	
46	X5A	S5A	
13	S5B	X5B	
47	S5A	X5A	
14	C5A	I5A	
48	C5B	I5B	
15	I5A	C5A	
49	I5B	C5B	
16			
50			
17			PSLOAD
51			PSSTATUS
43			SIGRET5
(Sheet 2 of 2)			

Table 138
8-port V.11 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.11 DTE	V.11 DCE	Name
18	T6A	R6A	
52	T6B	R6B	
(Sheet 1 of 3)			

Table 138 (continued)
8-port V.11 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.11 DTE	V.11 DCE	Name
19	R6A	T6A	
53	R6B	T6B	
20	X6B	S6B	
54	X6A	C6A	
21	S6B	C6B	
55	S6A		
22	C6A		
56	C6B		
23	I6A		
57	I6B		
24			
58		R7A	
25		R7B	+5V
59		T7A	+5V
26		T7B	SIGRET6
		S7B	
27	T7A	S7A	
61	T7B	X7B	
28	R7A	X7A	
62	R7B	I7A	
29	X7B	I7B	
63	X7A	C7A	
30	S7B	C7B	
64	S7A		
31	C7A		
(Sheet 2 of 3)			

Table 138 (continued)
8-port V.11 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.11 DTE	V.11 DCE	Name
65	C7B		
32	I7A		
66	I7B		
33		S6A	
67		X6B	
34		X6A	+5V
68		I6A	+5V
60		I6B	SIGRET7
(Sheet 3 of 3)			

Figure 117
8-port V.11 connector pinout and signal names for DCE-to-DTE or DTE-to-DCE connection
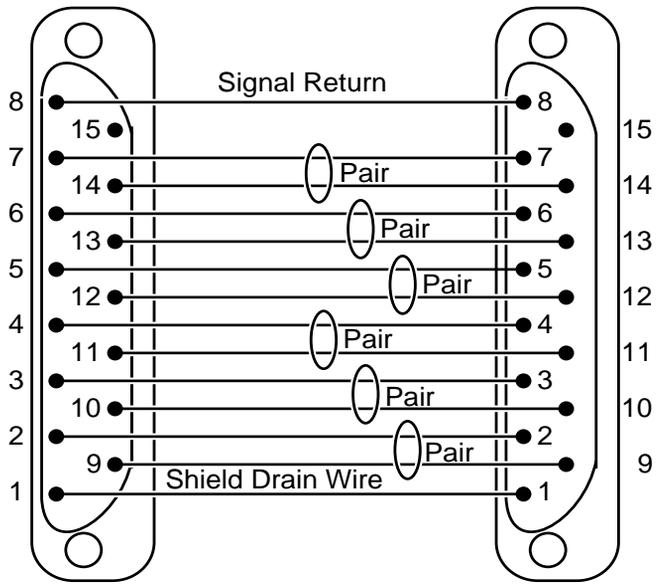
Pin	Name
1	shield drain
2	TA
3	CA
4	RA
5	IA
6	SA
7	XA
8	GND
9	TB
10	CB
11	RB
12	IB
13	SB
14	XB
15	No connections

Note 1:
The connection pairs \(circled above as Pairs\) should be connected to twisted pairs in the cables. Failure to do so may result in data errors, particularly for long cables and/or high data rates.

PPT 0873 001 AB

Chapter 18
V.35 function processor

See these sections for information about the 8-port V.35 function processor (FP):

- "8-port V.35 faceplate" (page 372)

- "8-port V.35 termination panels" (page 373)

- "8-port V.35 cable assembly" (page 373)

- "8-port V.35 pinouts" (page 374)

8-port V.35 faceplate

Figure 118
8-port V.35 faceplate

Ejector latch

Locking latch

Ports 0 to 3
68-pin high-density
D-type connector **P0**

Ports 4 to 7
68-pin high-density
D-type connector **P1**

LED status
indicator

Locking latch

Ejector latch

68

34

35

1

68-pin high density
D-type connector

**Pin Numbering
Scheme**

PPT 1060 001 AA
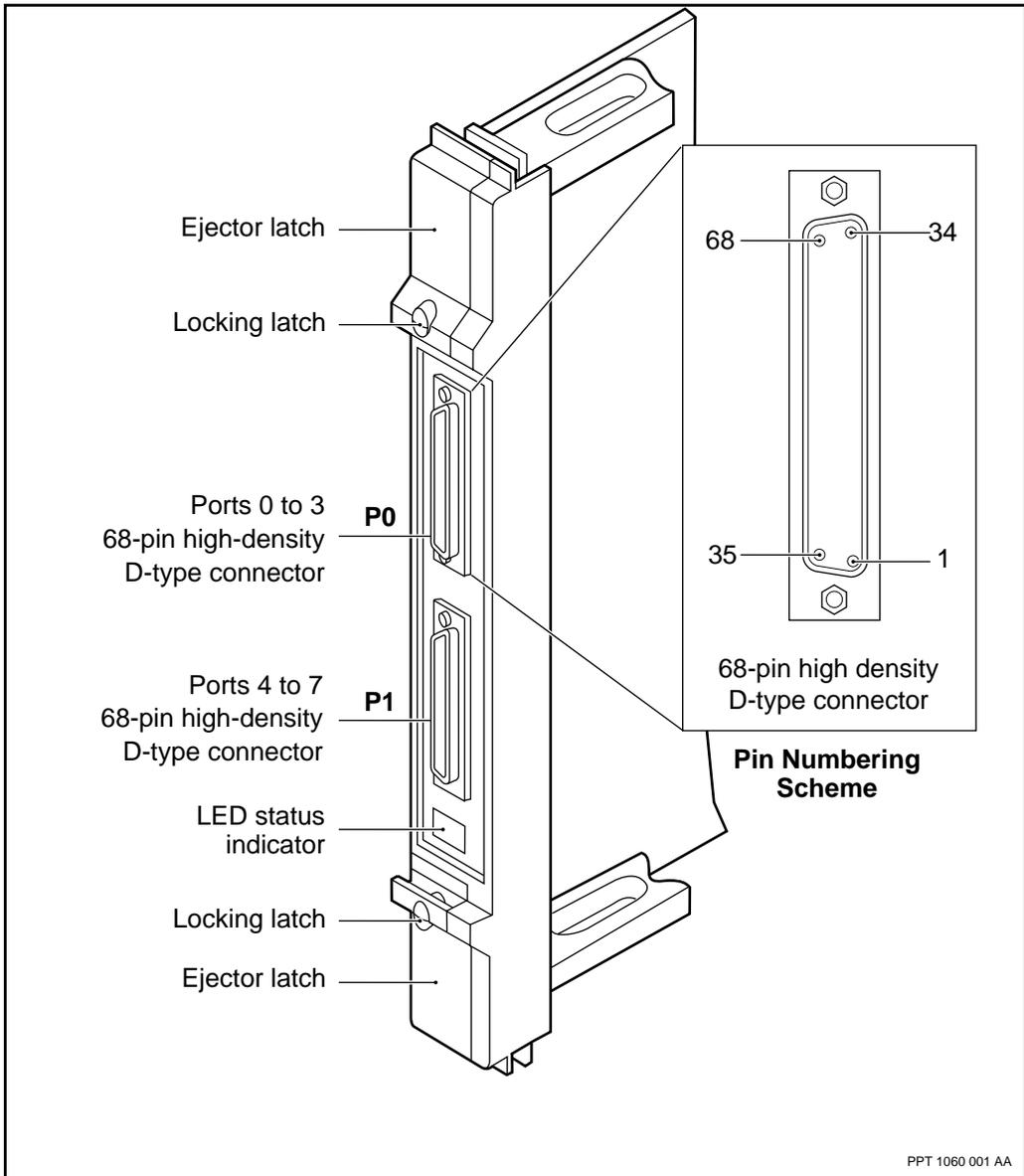
8-port V.35 termination panels

The V.35 FP uses the V.35 termination panels. The V.35 termination panels provide a break-out for customer-equipment connections so that each V.35 port has its own termination point and access. These termination panels also determine the type of connection (DCE or DTE) depending on which connector is used. The V.35 termination panels do not provide sparing.

For more information about the V.35 termination panels, see "V.35 termination panels" (page 54).

8-port V.35 cable assembly

The maximum cable length to customer equipment depends on the speed of data required. The maximum cable length is the total path from the FP to the equipment at the other end of the connection, through one or more termination panels. To prevent signal distortion, Nortel Networks recommends the following.

- For data rates up to 144 kbit/s, the maximum cable length is 90 m (292 ft).

- For data rates up to 192 kbit/s, the maximum cable length is 75 m (192 ft).

- For data rates up to 3.68 Mbit/s, the maximum cable length is 15 m (49 ft).

- For data rates above 3.68 Mbit/s and up to 4 Mbit/s, the maximum cable length is 3 m (9.8 ft).

See "8-port V.35 cable assembly parts" (page 373) for more information.

8-port V.35 cable assembly parts

This table lists the items you need to assemble V.35 cables.

Table 139
8-port V.35 cable assembly parts

Qty	Item	Description
5 meters (16 ft.)	NT R0113716	Belden 8108 shielded cable, 100 Ω, 8 twisted pair, 24 gauge (0.51 mm) strand
1	NT A0380877	AMP 205206-3, connector housing, 15-pin D-sub, male, tin plated, with grounding indents
15	NT A029126	AMP 66506-3 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
1	NT A0361050	AMP 747099-3 straight hood kit, 15-pin D-sub
1	NT A0296895	AMP 201357-1 connector housing, 34-pin positions
17	NT A0296894	AMP 201611-1 pin for above, 20 to 24 gauge (0.81 to 0.51 mm) wire
1	NT A0296893	AMP 200517-2 connector hood, 34-pin positions
1	NT A0298542	AMP 201414-1 jackscrew female for above connector
1	NT A0298543	AMP 201413-1 jackscrew female for above connector
4	NT P0180927	0.112-40 x 0.5-inch pan head machine screw
4	NT P0387666	0.115-inch spring washer

For more information about cables, see "Cables" (page 77).

8-port V.35 pinouts

See these sections for information on specific connectors:

- "8-port V.35 connector pinout and signal names for crossover cable for DCE-to-DCE connection" (page 383). Make this cable when the V.35 interface originates the clock and you are connecting it to a DCE interface such as a modem. An example of this type of application is the bit transparent data service (BTDS).

Table 140
8-port V.35 connector P0 pinout and signal names for ports 0 and 1

Pin No.	V.35 DTE	V35 DCE	Name
1	TXD0A	RXD0A	
35	TXD0B	RXD0B	
2	RXD0A	TXD0A	
36	RXD0B	TXD0B	
3	TSET0B	RSET0B	
37	TSET0A	RSET0A	
4	TSETDTE0B	TSET0B	
38	TSETDTE0A	TSET0A	
5	RSET0B	TSETDTE0B	
39	RSET0A	TSETDTE0A	
6	RTS0	RFS0	
40	RFS0	RTS0	
7	DSR0	DCD0	
41	DCD0	DSR0	
8			EQPTID03
42			+5V
9			SIGRET0
10	TXD1A	RXD1A	
44	TXD1B	RXD1B	
(Sheet 1 of 2)			

Table 140 (continued)
8-port V.35 connector P0 pinout and signal names for ports 0 and 1

Pin No.	V.35 DTE	V35 DCE	Name
11	RXD1A	TXD1A	
45	RXD1B	TXD1B	
12	TSET1B	RSET1B	
46	TSET1A	RSET1A	
13	TSETDTE1B	TSET1B	
47	TSETDTE1A	TSET1A	
14	RSET1B	TSETDTE1B	
48	RSET1A	TSETDTE1A	
15	RTS1	RFS1	
49	RFS1	RTS1	
16	DSR1	DCD1	
50	DCD1	DSR1	
17			PSREG0
51			PSREG1
43			SIGRET1
(Sheet 2 of 2)			

Table 141
8-port V.35 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.35 DTE	V35 DCE	Name
18	TXD2A	RXD2A	
52	TXD2B	RXD2B	
19	RXD2A	TXD2A	
53	RXD2B	TXD2B	
20	TSET2B	RSET2B	
54	TSET2A	RSET2A	
(Sheet 1 of 3)			

Table 141 (continued)
8-port V.35 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.35 DTE	V35 DCE	Name
21	TSETDTE2B	TSET2B	
55	TSETDTE2A	TSET2A	
22	RSET2B	TSETDTE2B	
56	RSET2A	TSETDTE2A	
23	RTS2	RFS2	
57	RFS2	RTS2	
24	DSR2	DCD2	
58	DCD2	DSR2	
25			PSREG2
59			PSREG3
26			SIGRET2
27	TXD3A	RXD3A	
61	TXD3B	RXD3B	
28	RXD3A	TXD3A	
62	RXD3B	TXD3B	
29	TSET3B	RSET3B	
63	TSET3A	RSET3A	
30	TSETDTE3B	TSET3B	
64	TSETDTE3A	TSET3A	
31	RSET3B	TSETDTE3B	
65	RSET3A	TSETDTE3A	
32	RTS3	RFS3	
66	RFS3	RTS3	
33	DSR3	DCD3	
67	DCD3	DSR3	
(Sheet 2 of 3)			

Table 141 (continued)
8-port V.35 connector P0 pinout and signal names for ports 2 and 3

Pin No.	V.35 DTE	V35 DCE	Name
34			+5V
68			+5V
60			SIGRET3
(Sheet 3 of 3)			

Table 142
8-port V.35 connector P1 pinout and signal names for ports 4 and 5

Pin No.	V.35 DTE	V35 DCE	Name
1	TXD4A	RXD4A	
35	TXD4B	RXD4B	
2	RXD4A	TXD4A	
36	RXD4B	TXD4B	
3	TSET4B	RSET4B	
37	TSET4A	RSET4A	
4	TSETDTE4B	TSET4B	
38	TSETDTE4A	TSET4A	
5	RSET4B	TSETDTE4B	
39	RSET4A	TSETDTE4A	
6	RTS4	RFS4	
40	RFS4	RTS4	
7	DSR4	DCD4	
41	DCD4	DSR4	
8			EQPTID47
42			+5V
9			SIGRET4
10	TXD5A	RXD5A	
(Sheet 1 of 2)			

Table 142 (continued)
8-port V.35 connector P1 pinout and signal names for ports 4 and 5

Pin No.	V.35 DTE	V35 DCE	Name
44	TXD5B	RXD5B	
11	RXD5A	TXD5A	
45	RXD5B	TXD5B	
12	TSET5B	RSET5B	
46	TSET5A	RSET5A	
13	TSETDTE5B	TSET5B	
47	TSETDTE5A	TSET5A	
14	RSET5B	TSETDTE5B	
48	RSET5A	TSETDTE5A	
15	RTS5	RFS5	
49	RFS5	RTS5	
16	DSR5	DCD5	
50	DCD5	DSR5	
17			PSLOAD
51			PSSTATUS
43			SIGRET5
(Sheet 2 of 2)			

Table 143
8-port V.35 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.35 DTE	V35 DCE	Name
18	TXD6A	RXD6A	
52	TXD6B	RXD6B	
19	RXD6A	TXD6A	
53	RXD6B	TXD6B	
20	TSET6B	RSET6B	
(Sheet 1 of 3)			

Table 143 (continued)
8-port V.35 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.35 DTE	V35 DCE	Name
54	TSET6A	RSET6A	
21	TSETDTE6B	TSET6B	
55	TSETDTE6A	TSET6A	
22	RSET6B	TSETDTE6B	
56	RSET6A	TSETDTE6A	
23	RTS6	RFS6	
57	RFS6	RTS6	
24	DSR6	DCD6	
58	DCD6	DSR6	
25			+5V
59			+5V
26			SIGRET6
27	TXD7A	RXD7A	
61	TXD7B	RXD7B	
28	RXD7A	TXD7A	
62	RXD7B	TXD7B	
29	TSET7B	RSET7B	
63	TSET7A	RSET7A	
30	TSETDTE7B	TSET7B	
64	TSETDTE7A	TSET7A	
31	RSET7B	TSETDTE7B	
65	RSET7A	TSETDTE7A	
32	RTS7	RFS7	
66	RFS7	RTS7	
33	DSR7	DCD7	
(Sheet 2 of 3)			

Table 143 (continued)
8-port V.35 connector P1 pinout and signal names for ports 6 and 7

Pin No.	V.35 DTE	V35 DCE	Name
67	DCD7	DSR7	
34			+5V
68			+5V
60			SIGRET7
(Sheet 3 of 3)			

Figure 119
8-port V.35 connector pinout and signal names for DCE-to-DTE or DTE-to-DCE connection

Pin	Name
1	DSR
2	TXDA
3	RSETB
4	RXDA
5	RTS
6	TSET (DTE) B
7	TSETB
8	RETURN
9	TXDB
10	RSETA
11	RXDB
12	RFS
13	TSET (DTE) A
14	TSETA
15	DCD

Note 1:
When the V.35 port is in DTE mode, the jumper between pins C (RTS) and H (DTR) is usually required. When the V.35 port is in DCE mode and the same 34 pin external cable is being used, the jumper may need to be removed. This will depend on the characteristics of the external DTE equipment.

Note 2:
The connection pairs (circled above as pairs) must be connected to twisted pairs in the cables. Failure to do so can result in data errors, particularly for long cables and/or high data rates.

PPT 0871 001 AB

Figure 120
8-port V.35 connector pinout and signal names for crossover cable for DCE-to-DCE connection

Pin	Name
1	DSR
2	TXDA
3	RSETB
4	RXDA
5	RTS
6	TSET (DTE) B
7	TSETB
8	RETURN
9	TXDB
10	RSETA
11	RXDB
12	RFS
13	TSET (DTE) A
14	TSETA
15	DCD

15 pin connector to termination panel in DCE model

34 pin connector to user equipment (V.35 modem in DCE mode, set for external clock and correct clock rate)

Shield Drain Wire

Note:
It is important that the connection pairs (circled above as Pairs) be connected to twisted pairs in the cables. Failure to do so may result in data errors, particularly for long cables and/or high data rates.

PPT 0872 001 AA

Chapter 19
HSSI function processor

See these sections for information about the 1-port high-speed serial interface (HSSI) function processor (FP):

- "1-port HSSI faceplate" (page 386)

- "1-port HSSI cable assembly" (page 387)

- "1-port HSSI pinouts" (page 387)

Note: The 1-port HSSI FP can be configured for DCE or DTE. The default setting for the DIP switch is DCE.

1-port HSSI faceplate

Figure 121
1-port HSSI faceplate

DCE/DTE DIP switch
Right = DCE
Left = DTE

DIP switch
should be
towards faceplate
(CONVERT position)
for DTE operation

Note:
The DIP switch is
a seven pole switch.
Ensure the switch is
completely set in
DTE or DCE position
before inserting card.

PPT 0986 001 AA
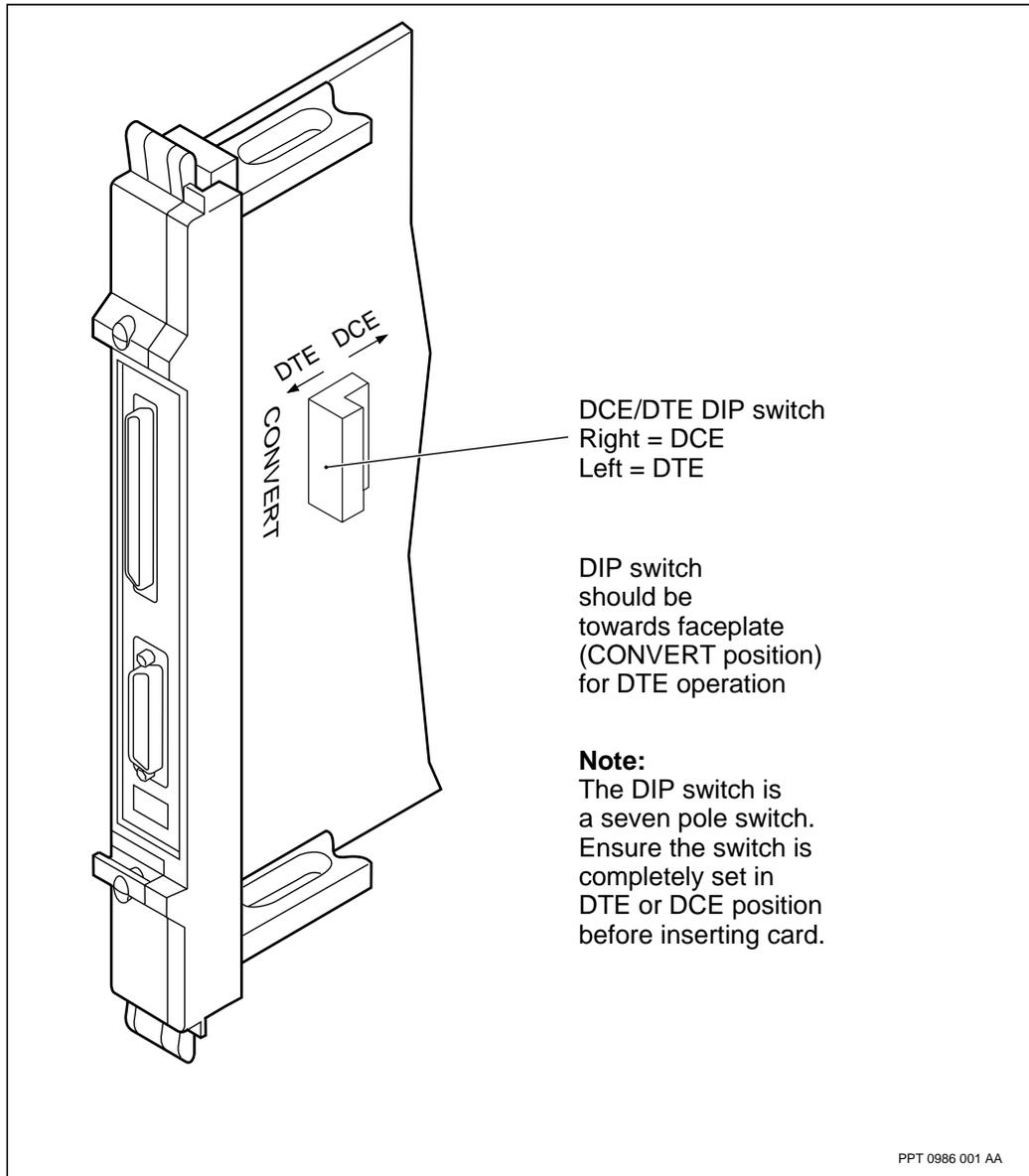
1-port HSSI cable assembly

The 1-port HSSI FP requires one cable to connect the FP to customer equipment. The type of cable required depends on whether you use the FP in DCE or DTE mode. The one-to-one DCE to DTE cable and the special null modem DTE to DCE cable are each available in 3 m (10 ft) and 15 m (50 ft) lengths. If you make your own cable, the maximum length is 15 m (50 ft).

If you set the dip switch to DTE mode, you must use a Nortel Networks null modem cable or equivalent; otherwise, the switch generates an alarm.

Table 144
1-port HSSI cable assembly parts

Qty	Item	Description
50 feet (15 m) maximum length	NT R0116875	25 pair cable Madison 50SDK00026
2	NT A0601096	AMP 749 193-2, connector hood SCSI, 2x25 array
2	NT A0378247	AMP 749621-5, connector plug 50 position, IDC .05"

For more information, see "Cables" (page 77).

1-port HSSI pinouts

See these sections for information about specific connectors. Wire colors are for cable described in "1-port HSSI cable assembly" (page 387).

- "1-port HSSI pinouts for DCE mode or DTE mode operation" (page 388)

- "1-port HSSI pinouts for cable from DCE mode connector P0 to DTE equipment" (page 389)

- "1-port HSSI pinouts for null modem cable from DTE mode connector P0 to DCE equipment" (page 390)

- "1-port HSSI pinout locations" (page 392)

Table 145
1-port HSSI pinouts for DCE mode or DTE mode operation

Pin #	FP in DCE mode One-to-one cable used		FP in DTE mode (Note 1) Null modem cable used	
	Pinout of HSSI connector P0 at faceplate	Pinout of cable connector at far (DTE) end of cable	Pinout of HSSI connector P0 at faceplate	Pinout of cable connector at far (DCE) end of cable
1, 26	Ground	Ground	Ground	Ground
2, 27	TT (out)	TT (out)	RT (out)	TT (in)
3, 28	CA (out)	CA (out)	TA (out)	CA (in)
4, 29	RD (out)	RD (out)	SD (out)	RD (in)
5, 30	No connection (Note 1)	No connection	LA (out)	No connection
6, 31	ST (out)	ST (out)	Not used	ST (in)
7, 32	Ground	Ground	Ground	Ground
8, 33	TA (in)	TA (in)	CA (in)	TA (out)
9, 34	RT (in)	RT (in)	TT (in)	RT (out)
10, 35	LA (in)	LA (in)	Not used	LA (out)
11, 36	SD (in)	SD (in)	RD (in)	SD (out)
12, 37	LB (in)	LB (in)	TM (in)	LB (out)
13, 38	Ground	Ground	Ground	Ground
18, 43	No connection	No connection	Cable ID (in) (Note 3)	No connection
19, 44	Ground	Ground	Ground	Ground
20, 45	No connection	No connection	ST (in)	No connection

Note 1: All no connection pins are open wire. Pins 14, 39, 15, 40, 16, 41, 17, 42, 22, 47, 23, 48 are no connection.

Note 2: High impedance pull up voltage provided by HSSI FP for null modem cable identification on pin 46.

Note 3: For DTE, pin 46 connected to pin 43 with short jumper wire within cable connector at HSSI FP end.

(Sheet 1 of 2)

Table 145 (continued)
1-port HSSI pinouts for DCE mode or DTE mode operation

Pin #	FP in DCE mode One-to-one cable used		FP in DTE mode (Note 1) Null modem cable used	
	Pinout of HSSI connector P0 at faceplate	Pinout of cable connector at far (DTE) end of cable	Pinout of HSSI connector P0 at faceplate	Pinout of cable connector at far (DCE) end of cable
21, 46	No connection (Note 2)	No connection	Pin 46 to pin 43 (Note 2)	No connection
24, 49	TM (out)	TM (out)	LB (out)	TM (in)
25, 50	Ground	Ground	Ground	Ground

Note 1: All no connection pins are open wire. Pins 14, 39, 15, 40, 16, 41, 17, 42, 22, 47, 23, 48 are no connection.

Note 2: High impedance pull up voltage provided by HSSI FP for null modem cable identification on pin 46.

Note 3: For DTE, pin 46 connected to pin 43 with short jumper wire within cable connector at HSSI FP end.

(Sheet 2 of 2)

Table 146
1-port HSSI pinouts for cable from DCE mode connector P0 to DTE equipment

From	To	Color	From	To	Color
Con1-1	Con2-1	tan/white	Con1-26	Con2-26	white/tan
Con1-2	Con2-2	brown/white	Con1-27	Con2-27	white/brown
Con1-3	Con2-3	pink/white	Con1-28	Con2-28	white/pink
Con1-4	Con2-4	orange/white	Con1-29	Con2-29	white/orange
Con1-5	Con2-5	yellow/white	Con1-30	Con2-30	white/yellow
Con1-6	Con2-6	green white	Con1-31	Con2-31	white/green
Con1-7	Con2-7	blue/white	Con1-32	Con2-32	white/blue
Con1-8	Con2-8	violet/white	Con1-33	Con2-33	white/violet
Con1-9	Con2-9	gray/white	Con1-34	Con2-34	white/gray

(Sheet 1 of 2)

Table 146 (continued)
1-port HSSI pinouts for cable from DCE mode connector P0 to DTE equipment

From	To	Color	From	To	Color
Con1-10	Con2-10	brown/tan	Con1-35	Con2-35	tan/brown
Con1-11	Con2-11	pink/tan	Con1-36	Con2-36	tan/pink
Con1-12	Con2-12	orange/tan	Con1-37	Con2-37	tan/orange
Con1-13	Con2-13	yellow/tan	Con1-38	Con2-38	tan/yellow
Con1-14	Con2-14	green/tan	Con1-39	Con2-39	tan/green
Con1-15	Con2-15	blue/tan	Con1-40	Con2-40	tan/blue
Con1-16	Con2-16	violet/tan	Con1-41	Con2-41	tan/violet
Con1-17	Con2-17	gray/tan	Con1-42	Con2-42	tan/gray
Con1-18	Con2-18	pink/brown	Con1-43	Con2-43	brown/pink
Con1-19	Con2-19	orange/brown	Con1-44	Con2-44	brown/orange
Con1-20	Con2-20	yellow/brown	Con1-45	Con2-45	brown/yellow
Con1-21	Con2-21	green/brown	Con1-46	n.c.	
Con1-22	Con2-22	blue/brown	Con1-47	Con2-47	brown/blue
Con1-23	Con2-23	violet/brown	Con1-48	Con2-48	brown/violet
Con1-24	Con2-24	gray/brown	Con1-49	Con2-49	brown/gray
Con1-25	Con2-25	orange/pink	Con1-50	Con2-50	pink/orange
(Sheet 2 of 2)					

Table 147
1-port HSSI pinouts for null modem cable from DTE mode connector P0 to DCE equipment

From	To	Color	From	To	Color
Con1-1	Con2-1	tan/white	Con1-26	Con2-26	white/tan
Con1-2	Con2-9	brown/white	Con1-27	Con2-34	white/brown
Con1-3	Con2-8	pink/white	Con1-28	Con2-33	white/pink
Con1-4	Con2-11	orange/white	Con1-29	Con2-36	white/orange
Con1-5	Con2-10	yellow/white	Con1-30	Con2-35	white/yellow
(Sheet 1 of 2)					

Table 147 (continued)
1-port HSSI pinouts for null modem cable from DTE mode connector P0 to DCE equipment

From	To	Color	From	To	Color
Con1-6	n.c.		Con1-31	n.c.	
Con1-7	Con2-7	blue/white	Con1-32	Con2-32	white/blue
Con1-8	Con2-3	violet/white	Con1-33	Con2-28	white/violet
Con1-9	Con2-2	gray/white	Con1-34	Con2-27	white/gray
Con1-10	n.c.		Con1-35	n.c.	
Con1-11	Con2-4	pink/tan	Con1-36	Con2-29	tan/pink
Con1-12	Con2-24	orange/tan	Con1-37	Con2-49	tan/orange
Con1-13	Con2-13	yellow/tan	Con1-38	Con2-38	tan/yellow
Con1-14	n.c.		Con1-39	n.c.	
Con1-15	n.c.		Con1-40	n.c.	
Con1-16	n.c.		Con1-41	n.c.	
Con1-17	n.c.		Con1-42	n.c.	
Con1-18	n.c.		Con1-43	Con1-46	short wire
Con1-19	Con2-19	orange/brown	Con1-44	Con2-44	brown/orange
Con1-20	Con2-6	yellow/brown	Con1-45	Con2-31	brown/yellow
Con1-21	n.c.		Con1-46	Con1-43	short wire
Con1-22	n.c.		Con1-47	n.c.	
Con1-23	n.c.		Con1-48	n.c.	
Con1-24	Con2-12	gray/brown	Con1-49	Con2-37	brown/gray
Con1-25	Con2-25	orange/pink	Con1-50	Con2-50	pink/orange
(Sheet 2 of 2)					

Figure 122
1-port HSSI pinout locations

PPT 3001 001 AA
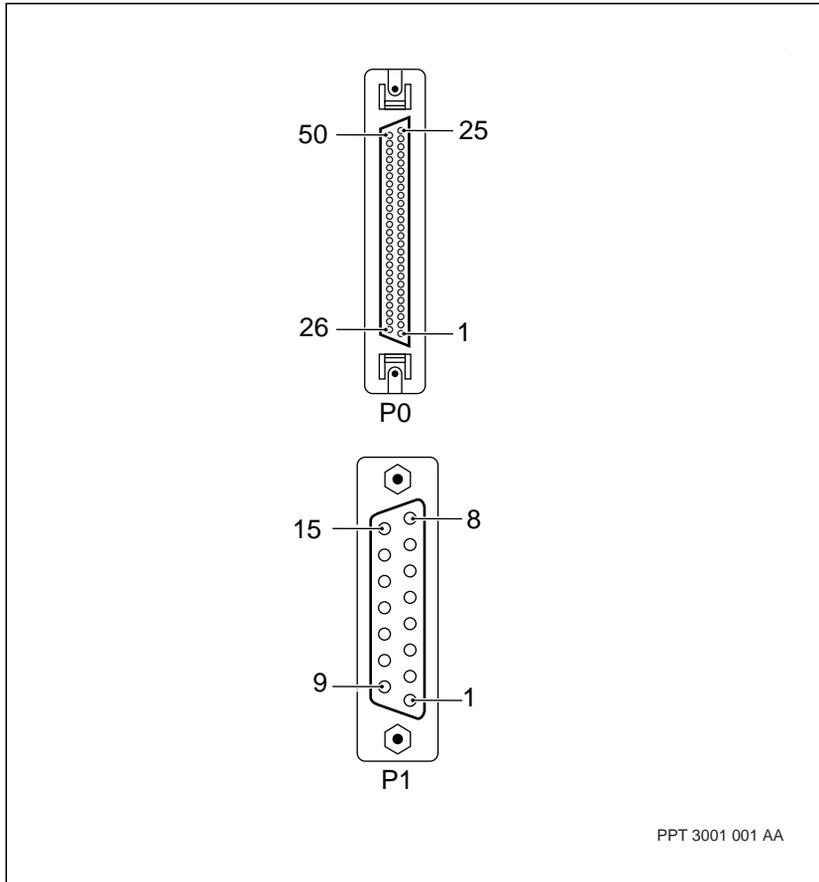
Chapter 20
JT2 ATM function processor

See these sections for information about the JT2 ATM function processor (FP):

- "2-port JT2 ATM faceplate" (page 394)

- "2-port JT2 ATM termination panels" (page 395)

- "2-port JT2 ATM cable assembly" (page 395)

2-port JT2 ATM faceplate

Figure 123
2-port JT2 ATM faceplate

Ejector latch

Locking latch

Port 0
- Receive (Rx)
- Transmit (Tx)

Port 1
- Receive (Rx)
- Transmit (Tx)

Sparing control

LED status indicator

Ejector latch

PPT 0865 001 AB
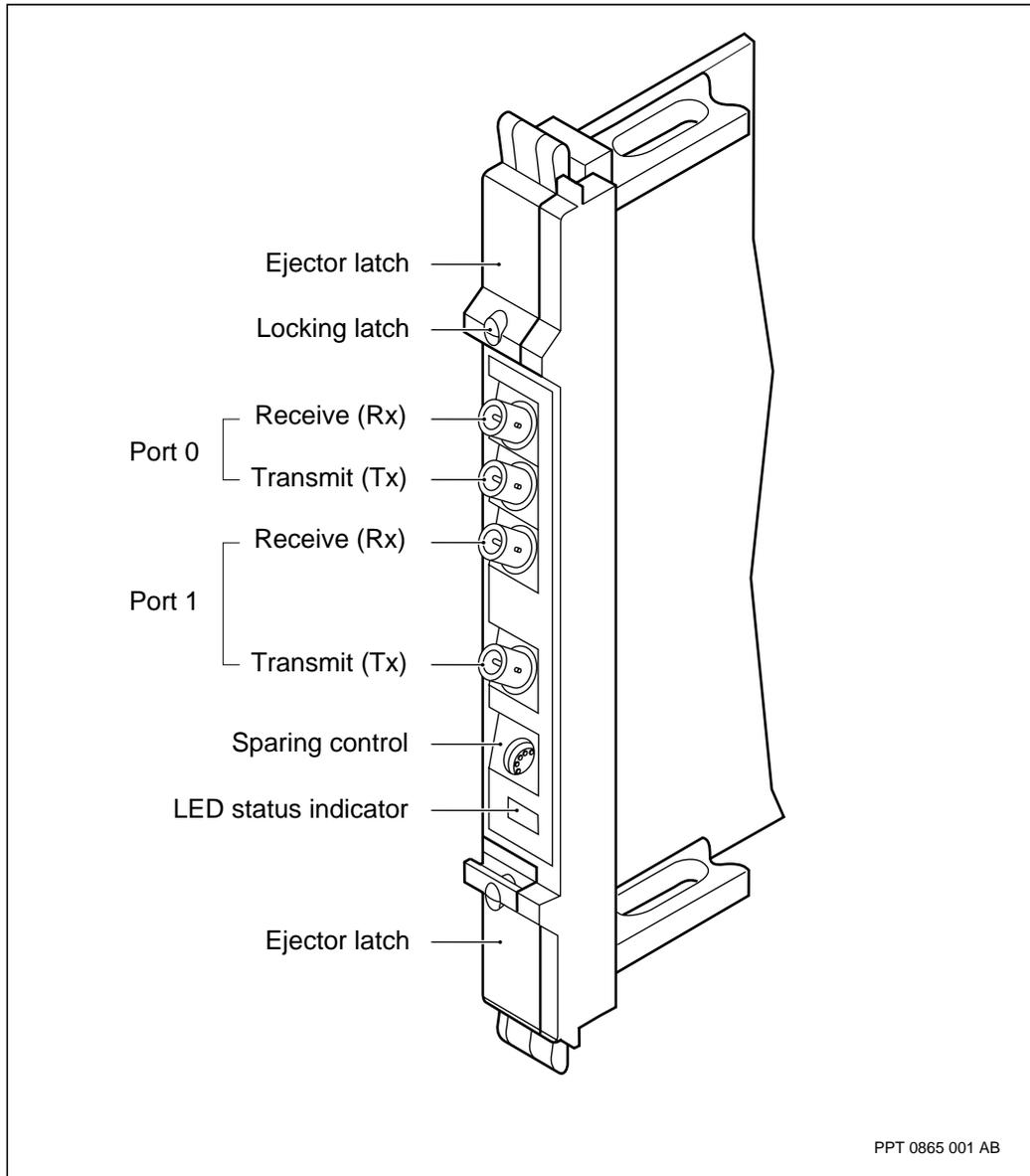
2-port JT2 ATM termination panels

The 2-port JT2 ATM FP uses the DS3/E3/JT2 ATM termination panels. You can connect customer equipment directly to the FP or to its termination panel. These termination panels support sparing.

Before setting up sparing, check the seventh and eighth digits of the PECs of the main and spare FPs. If the digits are CA, you can only spare that FP with FPs of the same or later vintage. Earlier vintages (for example, AA and BB) can be spared with each other. The PEC is located on the faceplate of the FP.

For more information about termination panels, see "DS3, E3, or JT2 ATM termination panels" (page 58).

2-port JT2 ATM cable assembly

The maximum cable length for JT2 ATM lines to customer equipment is 183 m (600 ft). The distance between the FP and the termination panel is part of the total length.

The insertion loss of a cable must not exceed 6 dB measured at 3156 kHz. For example, for NT-734 cable an insertion loss of 6 dB at 3156 kHz is about 135 m of cable.

Table 148
2-port JT2 ATM cable assembly parts

Qty	Item	Description
2	NT-734 or comparable cable with double shielded construction	75-Ω coaxial cable
4	Amphenol 31-320	50-Ω straight BNC plug

For more information, see "Cables" (page 77).

Chapter 21
TTC2M MVP-E function processor

See the following sections for information about the TTC2M Multipurpose Voice Platform with enhanced echo cancellation (MVP-E) function processor (FP):

TTC2M MVP-E faceplate

Figure 124
TTC2M MVP-E faceplate

Ejector latch

Locking latch

Port 0
15-pin subminiature
D-type connector

LED status
indicator

Ejector latch

15
8

9
1

15-pin subminiature
D-type connector
**Pin Numbering
Scheme**

PPT 0867 001 AA
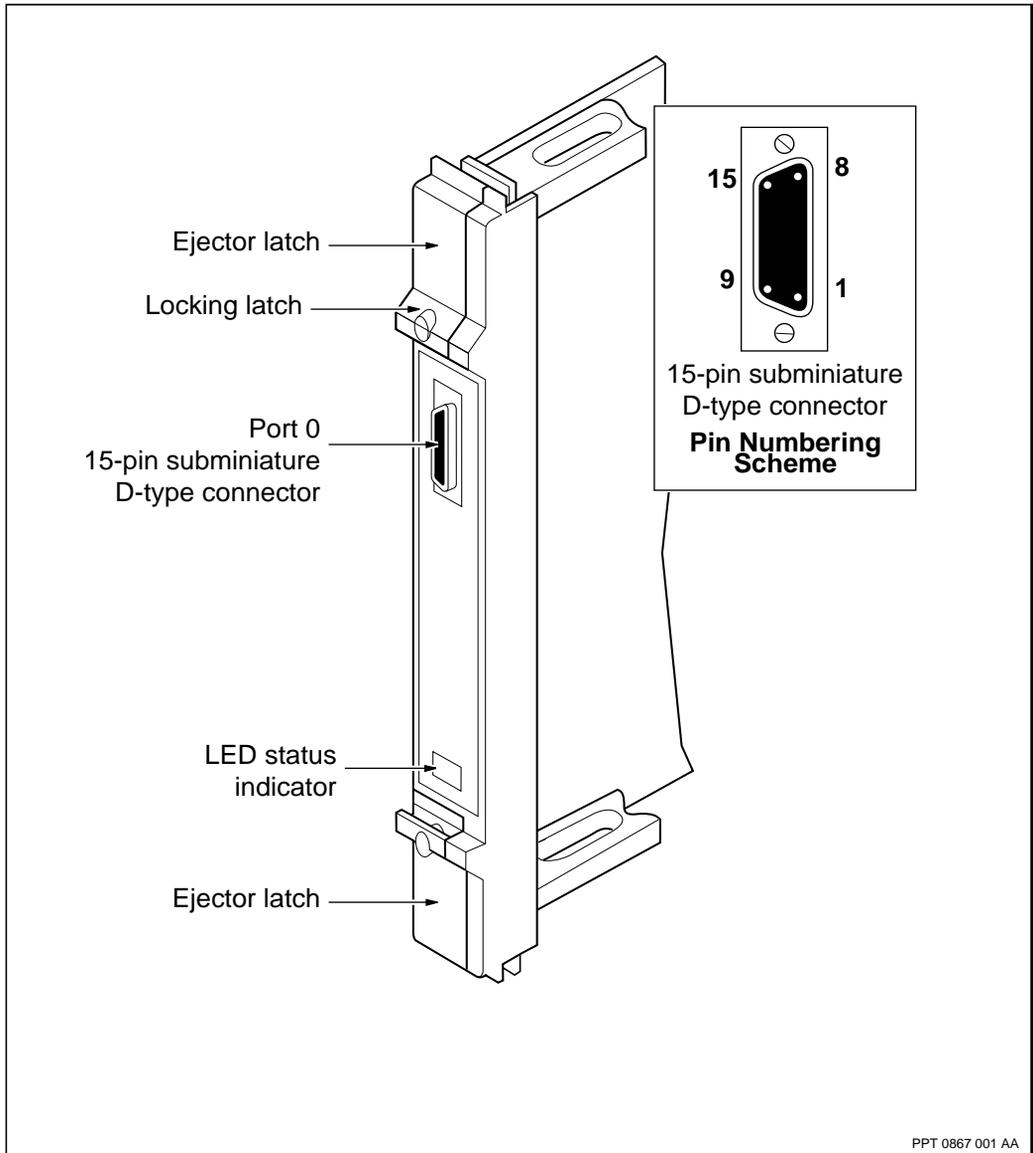
TTC2M MVP-E cable assembly

The maximum cable length for TTC2M MVP-E lines to customer equipment is 183 m (600 ft). This table gives details of the parts needed for cables.

Table 149
TTC2M MVP-E cable assembly parts

Qty	Item	Description
		cable, 0.4 ø multipair, shielded, twisted-pair
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
10	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

Table 150
TTC2M MVP-E cable assembly parts

Qty	Item	Description
		cable, 0.4 ø multipair, shielded, twisted-pair
2	NT A0380877	AMP 205206-3, connector housing, 15 pin D-sub, male, tin plated, with grounding indents
10	NT A0279330	AMP 66507-9 pin for above, 24 to 28 gauge wire
2	NT A0361050	AMP 747099-3 straight hood kit, 15 pin D-sub
4	NT P0180927	0.112-40 x 0.5" pan head machine screw
4	NT P0387666	0.115" spring washer

For more information, see "Cables" (page 77).

TTC2M MVP-E pinouts

This table identifies the pinouts and signal names for connector P0.

Table 151
TTC2M MVP-E connector P0 pinout and signal names

Pin number	Signal name	Signal direction
2	Receive +	from PBX to Passport
4	Transmit +	to PBX from Passport
9	Receive -	from PBX to Passport
11	Transmit -	to PBX from Passport
1	Ground	

Chapter 22
ILS Forwarder function processor

See these sections for information about the ILS Forwarder function processor (FP):

- "ILS Forwarder features" (page 401)

- "ILS Forwarder faceplate" (page 402)

- "ILS Forwarder sparing" (page 402)

ILS Forwarder features

The ILS Forwarder function processor (FP)

- does not require external cabling, and therefore has no ports on the faceplate

- supports ATM applications for IP such as ATM Multiprotocol Encapsulation (ATM MPE). The ILS Forwarder FP is a Nortel-proprietary FP and increases the performance of IP services over ATM.

- provides important information for the proper operation of ATM MPE service. The ILS Forwarder FP provides its state; it is either enabled or disabled. (If the *ilsForwarder* component is locked, the ILS Forwarder FP is disabled; otherwise, it is enabled.)

- supports the following states: When the ILS Forwarder FP is enabled, the service forwarding code on the ATM FP can forward packets to the ILS Forwarder FP. When the ILS Forwarder FP is disabled, the ATM FP does not forward packets to the ILS Forwarder FP.

For a list of the services and applications this FP supports, see your 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference* representative.

For more information about FPs, see "Processor cards" (page 37).

ILS Forwarder faceplate

"ILS Forwarder faceplate" (page 403) shows the faceplate for the ILS Forwarder FP. A LED shows the operational status of the FP.

ILS Forwarder sparing

A standby ILS Forwarder FP option supports one-for-one sparing. All traffic goes through the active FP. The standby FP is idle but ready to assume traffic should the active FP fail. This FP requires no cabling, therefore, you must provision sparing. For more information, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Figure 125
ILS Forwarder faceplate
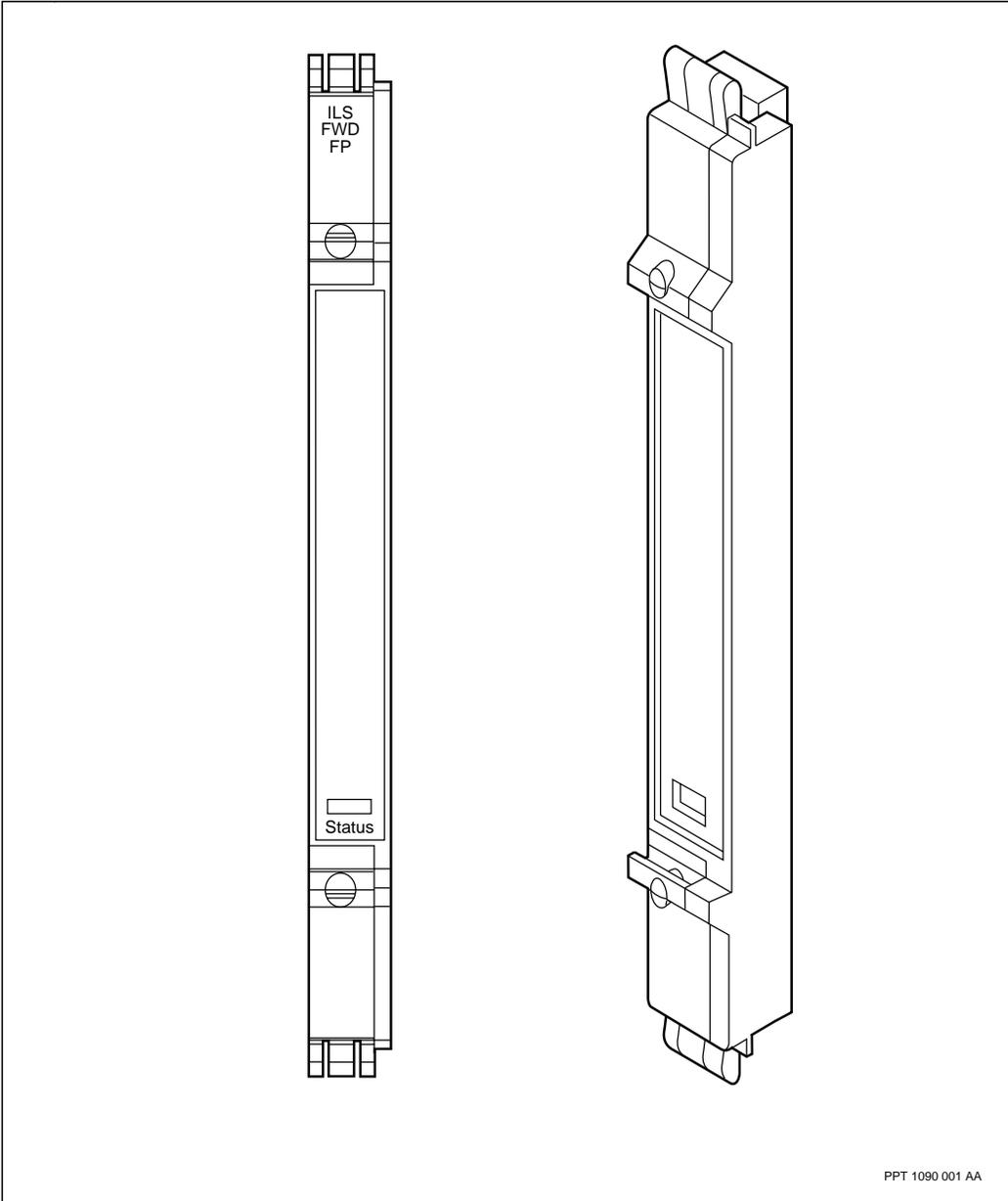
PPT 1090 001 AA

Chapter 23
VPN extender card

See these sections for more information on the VPN extender card:

VPN extender card features

The VPN extender card (VpnXc) is a processor card for IP services. IP services use the VpnXc to provide enhanced IP-VPN scalability without impacting the multi-service performance of Passport 7400. The VPN extender card is used to host all the virtual routers (VRs) that support IP-VPN services. The VPN extender card allows IP-VPN services to scale well beyond the capabilities of a control processor (CP) only scenario.

The product engineering code (PEC) of the VPN extender card for Passport 7400 is NTNQ80.

VpnXc faceplate

Figure 126
Faceplate of a VPN extender card

Status
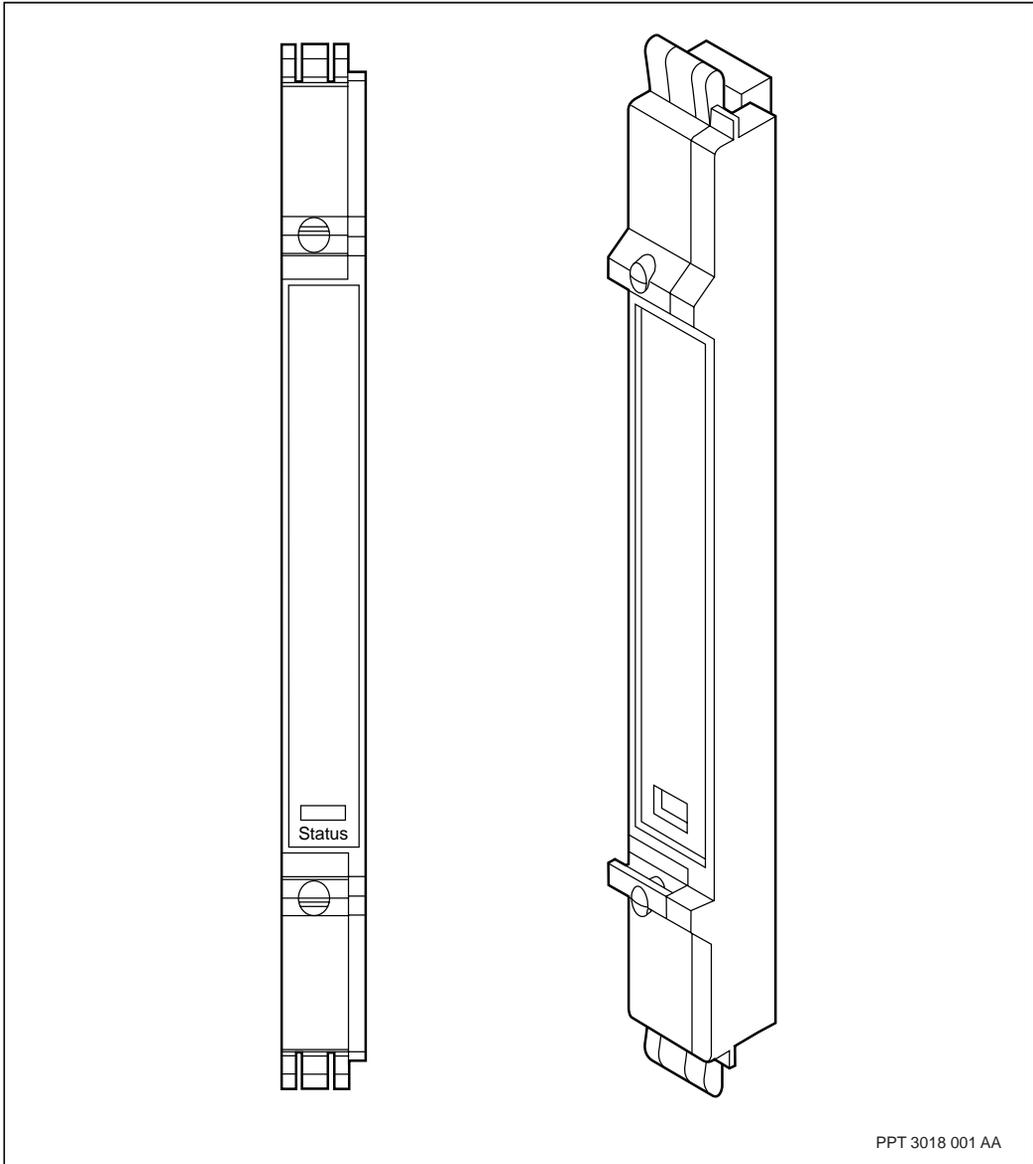
PPT 3018 001 AA

VpnXc components

The VPN extender card consists of a motherboard and a packet data accelerator (PDA) daughter card.

Note: The (PDA) on the VpnXc is for future use and is not supported.

The VpnXc connects to the shelf backplane.

The VpnXc interface supports these functions

- 8 Mbyte FLASH memory

- 256 Mbyte SDRAM memory

VpnXc configuration

The VPN extender card has no external connections or ports that require configuration. The card type value <cardtype> is *VpnExtender* or *VpnXc* for the VPN extender card. For more information on configuring Passport 7400 FPs, see 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*.

VpnXc sparing

The VPN extender card supports cold one-for-one sparing. The standby FP is idle but ready to provide service should the active FP fail. This FP requires no cabling, therefore, you must provision sparing. The redundant pair of VPN extender cards do not need to be installed in adjacent slots.

For more information, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Chapter 24
Voice services function processors

Passport Voice Gateway (PVG) services is supported on the following Passport VSP function processors (FPs):

- "VSP function processor" (page 409)

- "VSP2 function processor" (page 411)

VSP function processor

See these sections for information about the voice services function processor (FP):

- "Voice services faceplate" (page 410)

Voice services faceplate

Figure 127
Voice services faceplate
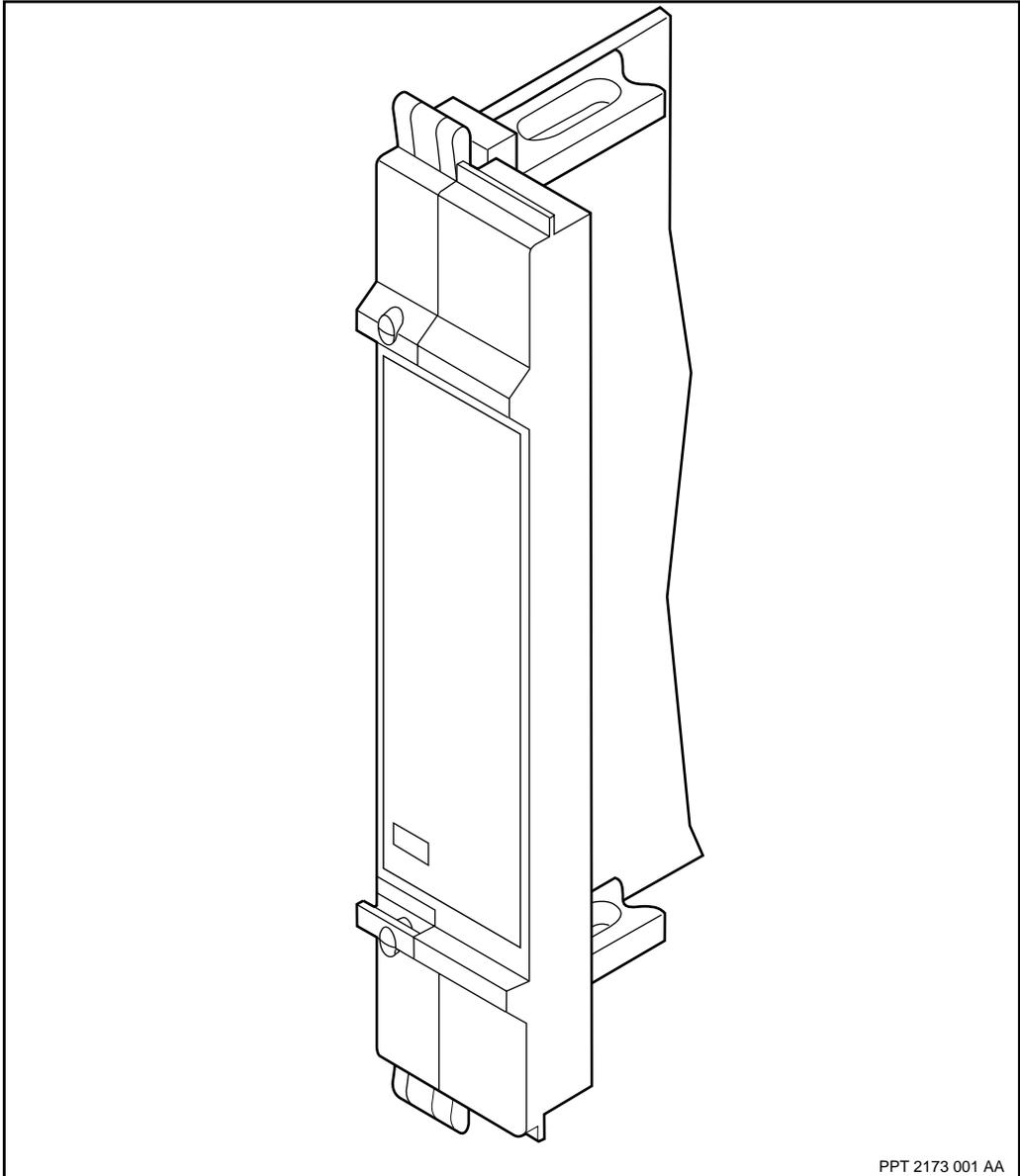
PPT 2173 001 AA

VSP2 function processor

See these sections for information about the voice services function processor 2 (VSP2):

*   "Voice services faceplate" (page 410)

VSP2 faceplate

Figure 128
VSP2 faceplate
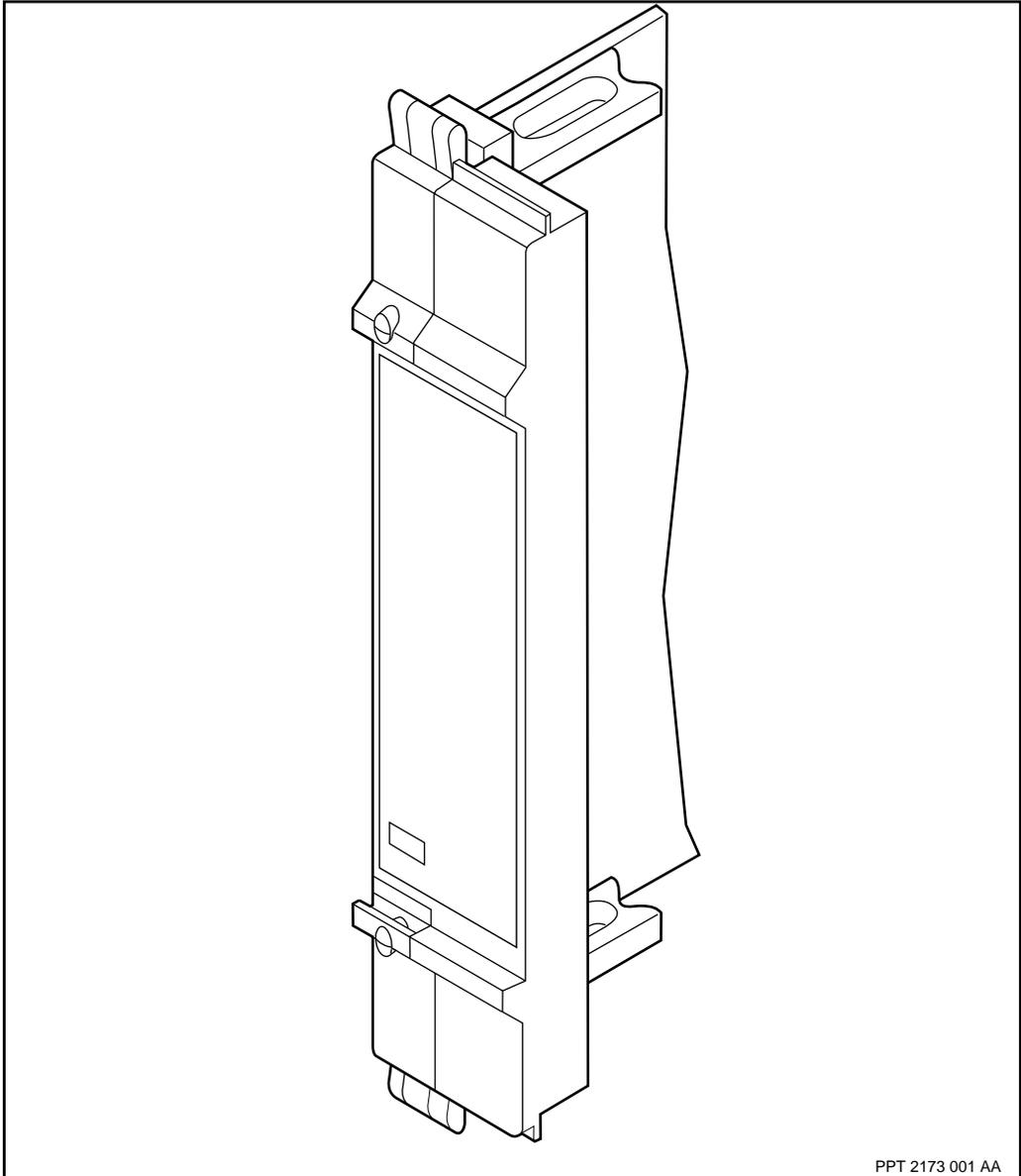
PPT 2173 001 AA

Chapter 25
Wireless packet data server

See these sections for information about the wireless packet data server (WPDS):

- "WPDS features" (page 413)

- "WPDS faceplate" (page 414)

- "WPDS sparing" (page 415)

- "WPDS configuration" (page 415)

WPDS features

The wireless packet data server

- has product engineering code (PEC) NTNQ64

- does not require external cabling, and therefore has no ports on the faceplate

- supports wireless applications. The WPDS is a Nortel-proprietary FP and increases the performance of wireless services.

- provides its state; it is either enabled or disabled. (If the *wpds* component is locked, the WPDS is disabled; otherwise, it is enabled.)

- provides data encryption and authentication.

For a list of the services this function processor (FP) supports, see the 241-5701-615 *Passport 7400, 15000, 20000 FP Configuration Reference*. For more information about FPs, see "Processor cards" (page 37).

WPDS faceplate

Figure 129
WPDS faceplate

Status
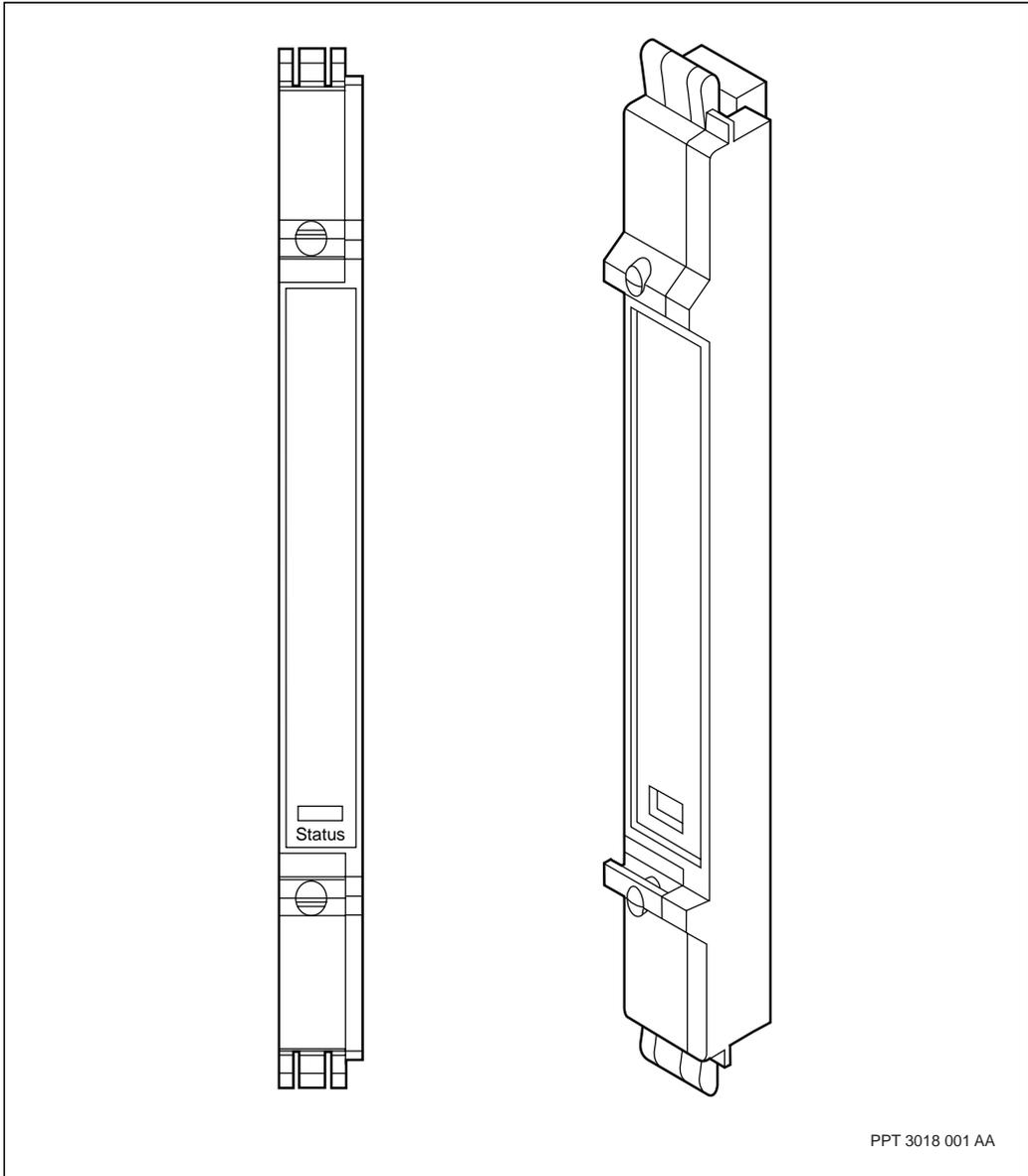
PPT 3018 001 AA

WPDS configuration

The WPDS has no external connections or ports that require configuration. The card type value <cardtype> is *wpds* for the wireless packet data server. For more information on configuring Passport 7400 FPs, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

WPDS sparing

A standby WPDS option supports one-for-one sparing. All traffic goes through the active FP. The standby FP is idle but ready to assume traffic should the active FP fail. This FP requires no cabling, therefore, you must provision sparing. For more information, see 241-5701-600 *Passport 7400, 15000, 20000 Configuration Guide*.

Appendix
Passport part numbers

The following tables contain the part numbers for Passport items:

- "16-slot Passport switch part numbers" (page 417)

- "5-slot Passport switch part numbers" (page 418)

- "3-slot Passport switch part numbers" (page 419)

- "Passport cabinet and seismic cabinet part numbers" (page 419)

- "Passport power cord part numbers" (page 420)

- "Passport processor card part numbers" (page 421)

    Note: The difference between the next generation and premium next generation function processors (FPs) is their capacity for connections. The premium is the 32 MB version of the standard 16 MB card.

- "Passport termination panel part numbers" (page 423)

- "Passport cable part numbers" (page 424)

- "Passport miscellaneous items part numbers" (page 427)

Table 152
16-slot Passport switch part numbers

Description	Order code
Passport 7480 ac shelf	NTJS62
Passport 7480 dc shelf	NTJS63
(Sheet 1 of 2)	

Table 152 (continued)
16-slot Passport switch part numbers

Description	Order code
16-slot cable management unit	NTJS59
16-slot ac power supply	NTBP09
16-slot dc power supply	NTBP52
16-slot blank power supply faceplate	NTBP51
16-slot cooling unit drawer	NTBP0701
16-slot external alarm board	NTBP69
16-slot cooling unit	NTBP07AA
16-slot cable management unit	NTBP08
16-slot air filter	NTBP0702
16-slot air filter pad	A0383866
Door/rack-mount alarm cable	NTBP42
Rack-mount alarm panel assembly	NTJS74AA
Shelf alarm interconnect cable	NTBP73
(Sheet 2 of 2)	

Table 153
5-slot Passport switch part numbers

Description	Order code
Passport 7440 shelf	NTWP66
5-slot front/rear cover kit	NTEP65
5-slot ac power supply	NTEP26
5-slot dc power supply	NTEP27
5-slot blank power supply faceplate	NTEP41
5-slot stand-alone mounting kit	NTEP40
5-slot rack mounting kit	NTEP17
5-slot cooling unit door assembly	NTEP13
(Sheet 1 of 2)	

Table 153 (continued)
5-slot Passport switch part numbers

Description	Order code
5-slot cooling unit assembly (for shelves NTEP39GA or NTEP63)	NTEP14BA
5-slot cooling unit assembly (for shelves NTEP39, versions AA to FA)	NTEP14AA
5-slot air filter replacement pad	A0626924
5-slot front/rear cover kit	NTEP65
5-slot ac power supply	NTEP26
(Sheet 2 of 2)	

Table 154
3-slot Passport switch part numbers

Description	Order code
Passport 7420 shelf	NTHQ19
3-slot standalone (desk-mount) kit	NTHQ05
3-slot rack mount kit	NTHQ04
3-slot seismic rack mount kit	NTHQ20
3-slot vertical mount kit	NTHQ08
3-slot rear-mount termination panel kit	NTHQ09
3-slot cable management kit	NTHQ10

Table 155
Passport cabinet and seismic cabinet part numbers

Description	Order code
Passport cabinet with side panels	NTBP85
Passport cabinet with doors and side panels	NTJS52
Passport cabinet side panel kit	NTBP04
(Sheet 1 of 2)	

Table 155 (continued)
Passport cabinet and seismic cabinet part numbers

Description	Order code
Passport cabinet door kit	NTJS56
Passport cabinet anchoring kit	QMY709A
Seismic shelf mounting collar kit	NTFN38
Seismic cabinet mounting rail kit	NTFN36
Seismic cabinet anchoring kit (outside mount)	NTFN37
Seismic cabinet anchoring kit (inside mount)	NTFN98
Seismic cabinet	NTJS53
(Sheet 2 of 2)	

Table 156
Passport power cord part numbers

Description	Order code
Brazil, Canada, Costa Rica, Curacao (also NTFP86), Dominican Republic, Jamaica, Korea, Mexico, Saudi Arabia, Taiwan, Thailand, United States, Venezuela	NTFP83
Japan (2.4 m)	NTFP84
Hong Kong, Mauritius, Oman, United Kingdom (13 A fuse)	NTFP85
Austria, Belgium, Curacao (also NTFP83), Czech Republic, Slovak Republic, United Arab Emirates, Finland, France, Germany, Indonesia, Morocco, Netherlands, Norway, Portugal, Russia, Spain, Sweden, Turkey	NTFP86
Argentina, Australia, China, New Zealand	NTFP87
Switzerland	NTFP88
Denmark	NTEP56
Italy	NTEP57
India	NTEP58
Israel	NTEP59

Table 157
Passport processor card part numbers

Description	Order code
Control processor	NTNQ01
Control processor with BITS	NTNQ03
V.35 (next generation)	NTNQ10
V.35 (premium next generation)	NTNQ11
V.11 (next generation)	NTNQ12
V.11 (premium next generation)	NTNQ13
4-port DS1 (next generation)	NTNQ14
4-port E1 (next generation)	NTNQ15
8-port DS1 (next generation)	NTNQ16
DS1C (next generation)	NTNQ17
DS1C (premium next generation)	NTNQ18
DS1C (64 Mbyte)	NTNQ19
E1C (next generation)	NTNQ20
E1C (premium next generation)	NTNQ21
E1C (64 Mbyte)	NTNQ22
DS3 (next generation)	NTNQ23
DS3 (premium next generation)	NTNQ24
E3 (next generation)	NTNQ25
DS3C	NTNQ26
HSSI (next generation)	NTNQ27
3-port DS1 ATM	NTNQ45
3-port E1 ATM	NTNQ46
DS1 AAL1	NTNQ47
E1 AAL1	NTNQ48
8-port DS1 ATM	NTNQ49
(Sheet 1 of 3)	

Table 157 (continued)
Passport processor card part numbers

Description	Order code
8-port E1 ATM	NTNQ50
DS3 ATM	NTNQ51
E3 ATM	NTNQ52
JT2 ATM	NTNQ53
OC3 ATM (multi-mode)	NTNQ54
OC3 ATM (single-mode)	NTNQ55
Ethernet (next generation)	NTNQ36
Ethernet (100BaseT)	NTNQ37
ILS Forwarder	NTNQ38
VPN extender card	NTNQ80
1-port DS1 MVP Enhanced	NTNQ85
4-port DS1 MVP Enhanced (MVP-E)	NTNQ89
1-port E1 MVP Enhanced	NTNQ86
4-port E1 MVP Enhanced (MVP-E)	NTNQ88
1-port TTC2M MVP Enhanced	NTNQ87
2-port OC3 ATM IP multi-mode	NTNQ65
2-port OC3 ATM IP single-mode	NTNQ66
3-port E3 ATM single-mode	NTNQ67
3-port DS3 ATM single-mode	NTNQ68
Wireless packet data server	NTNQ64
2-port STM-1 Electrical ATM	NTNQ90
2-port STM-1 Electrical channelized CES/ATM/IMA	NTNQ91
32-port DS1 MSA	NTY180
32-port DS1 MSA with 2-port (protected) OC-3/STM-1 multi-mode	NTY182
(Sheet 2 of 3)	

Table 157 (continued)
Passport processor card part numbers

Description	Order code
32-port DS1 MSA with 2-port (protected) OC-3/STM-1 single-mode	NTY184
32-port E1 MSA	NTJS80
32-port E1 MSA with 2-port (protected) OC-3/STM-1 multi-mode	NTJS82
32-port E1 MSA with 2-port (protected) OC-3/STM-1 single-mode	NTJS84
VSP AAL1	NTFN87
Voice services processor 2 (VSP2)	NTSY91
2-port DS3C AAL	NTFN91
32-port E1 AAL	NT0461
(Sheet 3 of 3)	

Table 158
Passport termination panel part numbers

Description	Order code
19" DS1/E1 balanced BITS termination panel	NTPS13AB
19" E1 unbalanced BITS termination panel	NTPS13BB
19" V.35 termination panel (1 unit high)	NTFP08
19" V.11 termination panel (1 unit high)	NTFP09
19" DS1/E1 balanced termination panel (1 unit high)	NTFP10
19" E1 unbalanced termination panel (1 unit high)	NTFP11
19" DS3/E3 termination panel (1 unit high)	NTBP99
19" DS3/E3/JT2 ATM termination panel (2 units high)	NTFP99
19" DS1/E1 MSA32 1-port/DB15 termination panel	NTY197
19" DS1/E1 MSA32 2-port/DB15 termination panel	NTY195
19" DS1/E1 MSA32 RJ45 termination panel	NTJS95
(Sheet 1 of 2)	

Table 158 (continued)
Passport termination panel part numbers

Description	Order code
19" E1 MSA32 unbalanced BNC termination panel	NTY196
19" Ethernet termination panel	NTFP23
19" STM-1 electrical 2-port one-for-one sparing panel	NTPS92
13" DS1/E1 balanced BITS termination panel	NTPS13AA
13" E1 unbalanced BITS termination panel	NTPS13BA
13" V.35 termination panel	NTEP21
13" V.11 termination panel	NTEP22
13" DS1/E1 balanced termination panel	NTEP23
13" E1 unbalanced termination panel	NTEP24
13" DS3/E3 termination panel	NTEP37
13" DS3/E3/JT2 ATM termination panel	NTEP53
13" Ethernet termination panel	NTEP42
13" termination panel	NTEP46
multiport aggregate device (dc powered)	NT0486AA
multiport aggregate device (ac powered)	NT0420AA
(Sheet 2 of 2)	

Table 159
Passport cable part numbers

Description	Order Code
DCE V.24 operator cable (Note: This cable is not to be used for connecting a modem.)	NTBP25AA
BITS termination panel cable (81.3cm or 32 in) use with 13" termination panels	NTPS18AA
BITS termination panel cable (3m or 9.8 ft) use with 19" rack-mounted termination panels	NTPS18BA
V.11 to V.35 termination panel cable (3 m or 9.8 ft)	NTBP29DA
(Sheet 1 of 4)	

Table 159 (continued)
Passport cable part numbers

Description	Order Code
V.11 to V.35 termination panel cable (3 m or 9.8 ft)	NTBP29DB
V.11 to V.35 termination panel cable (15 m or 49.2 ft)	NTBP29DC
V.11 to V.35 13" termination panel cable (use with NTEP21)	NTEP03CA
DS1 or E1 MSA32 BNC or DB15 sparing panel inter-panel flexi-cable	NTY199AA
DS1 or E1 MSA32 BNC or DB15 sparing panel inter-panel flexi-cable, shorter version; also compatible with cable cover NTPS07	NTY199AB
DS1 or E1 MSA32 RJ45 sparing panel inter-panel flexi-cable	NTJS99AB
DS1 MSA32 sparing panel cable (3 m or 9.8 ft)	NTPS03AA
DS1 MSA32 sparing panel cable (15 m or 49.2 ft)	NTPS04AA
DS1 termination panel cable (3 m or 9.8 ft)	NTBP27AA
DS1 termination panel cable (15 m or 49.2 ft)	NTBP27AB
DS1/E1 termination panel cable (1 m or 3.3 ft)	NTEP02BA
DS1 13" termination panel cable (32 inches)	NTEP01AA
8-port DS1 termination panel cable (3 m or 9.8 ft)	NTFP69AA
8-port DS1 termination panel cable (15 m or 49.2 ft)	NTFP69AB
8-port DS1 termination panel cable (30 inches)	NTFP70AA
8-port DS1 termination panel cable (36 inches)	NTFP70AB
E1 MSA32 sparing panel cable (3 m or 9.8 ft)	NTPS01
E1 MSA32 sparing panel cable (15 m or 49.2 ft)	NTPS02
E1 termination panel cable (3 m or 9.8 ft)	NTBP28AA
E1 termination panel cable (15 m or 49.2 ft)	NTBP28AB
E1 13" termination panel cable (32 inches)	NTEP02AA
DS3/E3 termination panel cable (3 m or 9.8 ft)	NTFP19AA
DS3/E3 termination panel cable (15 m or 49.2 ft)	NTFP19AB
(Sheet 2 of 4)	

Table 159 (continued)
Passport cable part numbers

Description	Order Code
DS3/E3 termination panel cable (1 m or 3.3 ft)	NTFP19AC
DS3/E3/JT2 termination panel cable (3 m or 9.8 ft)	NTFP19AD
DS3/E3/JT2 termination panel cable (15 m or 49.2 ft)	NTFP19AE
DS3/E3/JT2 termination panel cable (1 m or 3.3 ft)	NTFP19AF
DS3/E3/JT2 ATM control cable (3 m or 9.8 ft)	NTFP52AB
DS3/E3/JT2 ATM control cable (15 m or 49.2 ft)	NTFP52AC
DS3/E3/JT2 ATM control cable (1 m or 3.3 ft)	NTFP52AA
HSSI null modem cable for DTE (3 m or 9.8 ft)	NTFP94AA
HSSI null modem cable for DTE (15 m or 49.2 ft)	NTFP95AA
HSSI one-to-one cable for DCE (3 m or 9.8 ft)	NTFP96AA
HSSI one-to-one cable for DCE (15 m or 49.2 ft)	NTFP97AA
E1 ATM termination panel cable (3 m or 9.8 ft)	NTHP02AA
E1 ATM termination panel cable (15 m or 49.2 ft)	NTHP03AA
E1 ATM termination panel cable (31 inches)	NTHP04AA
E1 ATM termination panel cable (34 inches)	NTHP05AA
E1 ATM termination panel cable, Class B (3 m or 9.8 ft)	NTPS09AC
E1 ATM termination panel cable (15 m or 49.2 ft) Class B	NTPS09AD
E1 ATM termination panel cable (31 inches) Class B	NTPS09AA
E1 ATM termination panel cable (34 inches) Class B	NTPS09AB
DS3/E3 control cable (3 m or 9.8 ft)	NTFP20AA
DS3/E3 control cable (15 m or 49.2 ft)	NTFP20AB
DS3/E3 control cable (0.8 m)	NTFP20AC
DS3/E3 control cable (3 m or 9.8 ft) Class B	NTPS08AB
DS3/E3 control cable (15 m or 49.2 ft) Class B	NTPS08AC
DS3/E3 control cable (0.8 m) Class B	NTPS08AA
(Sheet 3 of 4)	

Table 159 (continued)
Passport cable part numbers

Description	Order Code
Ethernet cable for a 5-slot Passport switch	NTFN02AB
Ethernet cable for a 16-slot Passport switch (3 m or 9.8 ft)	NTFN03AB
Ethernet cable for a 16-slot Passport switch (15 m or 49.2 ft)	NTFN04AB
STM-1 electrical sparing panel control cable (1.5 m or 4.9 ft)	NTPS11AA
STM-1 electrical sparing panel control cable (3.0 m or 9.8 ft)	NTPS11AB
STM-1 electrical sparing panel control cable (15 m or 49.2 ft)	NTPS11AC
STM-1 electrical sparing panel signal cable (1.5 m or 4.9 ft)	NTPS12AA
STM-1 electrical sparing panel signal cable (3.0 m or 9.8 ft)	NTPS12AB
STM-1 electrical sparing panel signal cable (15 m or 49.2 ft)	NTPS12AC
(Sheet 4 of 4)	

Table 160
Passport miscellaneous items part numbers

Description	Order code
Antistatic wrist strap	A0378999
Blank processor card	NTBP23
Cover for inter-panel flexi-cable connections between one-for-n MSA32 sparing panels with BNC or DB15 connectors	NTPS07
16-slot Passport switch blank power supply faceplate	NTBP51
5-slot Passport switch blank power supply faceplate	NTEP41
Ferrite kit (originally for 1-port E3 FP)	NTFP54
Ferrite kit (clip-on ferrite beads for dc power input cables)	NTJS6381

Passport 7400
Hardware Description

Release 5.2

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