Port Concentrator Shelf Installation

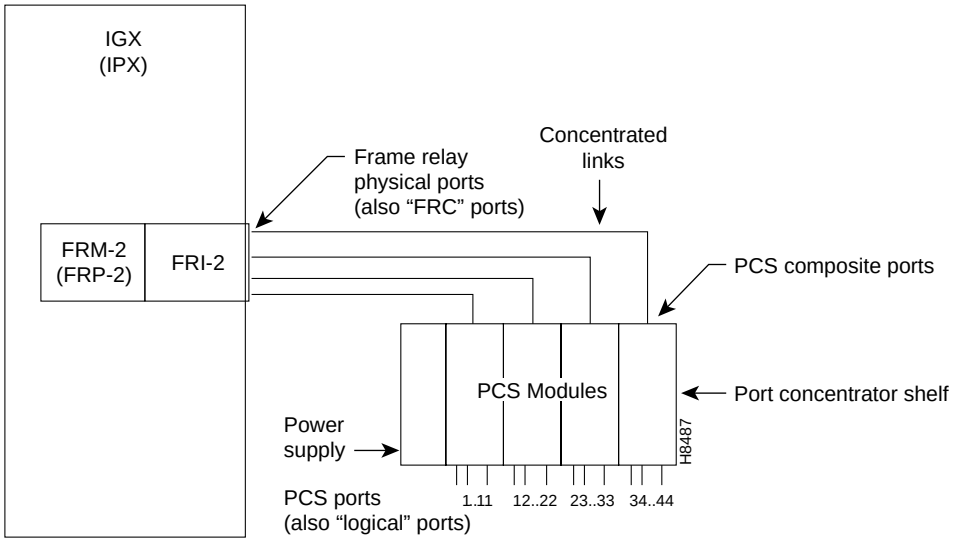
Installation Preparation

This chapter includes the information required for correct installation and operation of the Port Concentrator Shelf (PCS). (See Figure 1-1.)

The PCS expands the capacity of an IGX FRM-2 or an IPX FRP-2 Frame Relay card to 44 low-speed ports (ranging from 9.6K bps to 384K bps). This ability to increase the port density of an IGX or IPX switch affords better economies for the common switch equipment.

The PCS is connected to the FRM-2 or FRP-2 by one or more X.21 links (referred to as "concentrated links"). In a full configuration, each concentrated link services one of four 11-port modules in the PCS, for a total of 44 ports per Frame Relay card.

Figure 1-1 Port Concentrator Shelf Components



Terminology

The following terms are used to identify PCS components:

- "FRC" (Frame Relay Concentrator) ports—FRM-2 or FRI-2-X.21 ports connected to the PCS. Used in commands such as *dspfrcport.* These are also known as PCS "physical" ports.
- Frame Relay "Logical" ports—Each of the 44 PCS ports, from the perspective of the IGX/IPX interface, is considered a logical port to distinguish it from IGX/IPX "physical" Frame Relay ports.

Host System Requirements

The PCS is compatible *only* with:

- IPX/IGX System Software Version 8.1.26 or later
- FRM-2 (IGX) or FRP-2 (IPX) front card coupled with FRI-2 back card

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Note Compatibility between PCS and FRM-2/FRP-2 is bidirectional; the PCS will not work with any other model of this card, and only a PCS may be connected to the FRM-2 or FRP-2. If less than four PCS modules are used, connection of unused Frame Relay ports to something other than the PCS is not allowed.

Location

The PCS should be operated in a clean, dry environment that does not exceed the following specifications:

- Operating temperature: 32 to 104˚F (0 to 40˚C)
- Humidity: up to 95 percent noncondensing

In addition, do not place the PCS near any surface that generates heat. The environment should be free from dust and extreme fluctuations in temperature and humidity. Place the PCS a minimum of six feet from any potential sources of electromagnetic interference (EMI).

Power Requirements

An AC-powered PCS must be plugged into a grounded, three-prong commercial power source (either 115 VAC or 220 VAC as appropriate) that is located no more than 6 feet (1.8 meters) from the PCS chassis.

A DC-powered PCS must be connected to a -48 volt DC source that complies with the SELV Requirements of EN 60950 / IEC 950 / UL 1950 / CSA 950. The source must be capable of supplying up to 6A continuously. An easily accessible disconnect device should be installed as part of the supply wiring.

Overcurrent Protection

An AC-powered PCS should be connected to a branch circuit with overcurrent protection rated no more than 20A.

A DC-powered PCS should have a maximum 15A branch circuit overcurrent protector installed at the power source.

In North America, the overcurrent protection should conform to the National Electrical Code (ANSI/NFPA 70) and the Canadian Electrical Code (C22.1, Part 1) for protection against excess currents, short circuits and earth faults.

FCC Considerations

For safety, and for minimal radio frequency interference (RFI), all electrical connections should be made using shielded cables. To comply with FCC requirements, each cable must have a shield that covers all conductors and must connect to the metal shell of the mating connector.

When correctly installed with front cover attached, the PCS meets FCC requirements for a Class A digital device, pursuant to part 15 of the FCC Rules.

Electrostatic Precautions

Precautions should be taken to prevent electrostatic discharge (ESD) damage to PCS modules. When inserting a module into or removing a module from the PCS chassis, always wear a grounded wrist strap. The wrist strap should touch the skin and be grounded through approximately one megohm resistor to a suitable ground such as an equipment rack.

If a module is removed from the chassis, it should always be stored in a static-shielded bag.

Unpacking and Inspecting

Inspect the equipment thoroughly when you unpack it. Report any damage to the shipping agency and notify StrataCom. Check the contents against the packing slip to ensure that no contents are missing.

The PCS is shipped in a custom container that should be saved in case the PCS must be returned to StrataCom for any reason. Returning a unit in other than the original container may result in damage and void the warranty.

Hot Swapping of Modules

Once a unit is operating, modules may be inserted or removed without first having to power down the chassis. During initial installation, however, all modules should be inserted before you apply power.

Installing PCS Hardware

Note Installation of the PCS should be performed only by a qualified technician.

Installing the PCS consists of the following tasks:

1. Setting jumpers and interface type (DTE or DCE) on each of the port interface cards.
2. Inserting PCS modules into the chassis.
3. Installing the PCS chassis in the equipment rack (if desired).
4. Attaching front cover to the rack.
5. Connecting the chassis to a power source and applying power.
6. Making port (to external device) and line (to the FRM-2 or FRP-2 Card) connections with the appropriate cables.

Tools Required

The following tools are required to install the PCS:

- Blade screwdriver
- Phillips screwdriver

A Hex Key (Allen wrench) is supplied in the shipping container for attaching the front cover.

Placing or Mounting the PCS Chassis

The PCS chassis can be placed on any flat non-heat-generating surface or mounted in a standard 19-inch equipment rack.

The PCS requires 8.75 inches of vertical rack space. A minimum of two inches above and below the unit should be left open for cooling.

See the section “Installing the Shelf in a Rack and Attaching the Front Cover” later in this chapter.

Setting Clocking Jumpers and Interface Type

Concentrated Link Port

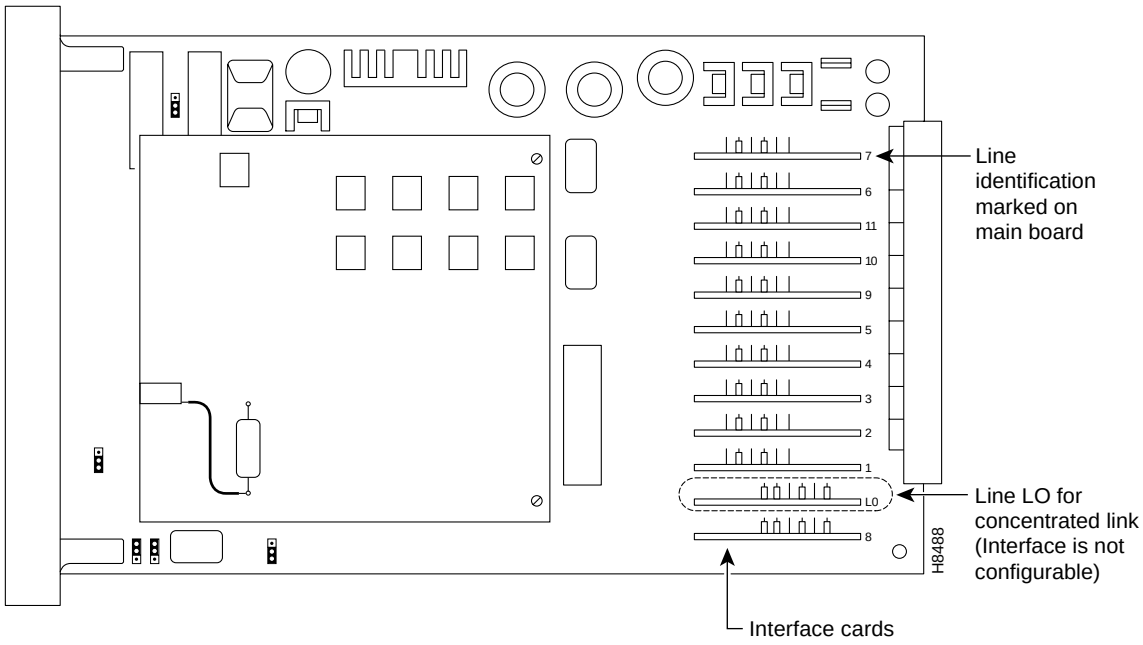
The concentrated link connection to the FRM-2 or FRP-2 must always have a DTE V.11 interface with clocking as set at the factory (see Figure 1-7).

Line L0 (see Figure 1-2) on each module connects to the FRM-2 or FRP-2.

Frame Relay Ports

Port interfaces are defined by a separate hardware interface card inserted into the main board for each port (see Figure 1-2).

Figure 1-2 Interface Card Locations



For each line, you must set or verify the following:

- Interface type: interface type (DCE or DTE) is selected by position of the interface card (see Figure 1-3).
- Interface clocking: clocking for the interface is set by jumpers on the interface cards (see the sections “V.28 Interface Jumpers” and “V.11 Interface Jumpers” later in this chapter).

At the time of your order, V.11 (X.21), V.28, or V.35 interfaces are specified for Frame Relay ports. Any mix of interfaces and type can be used.

Interface Type

The PCS ships with all lines set to DTE interface. If you require a DCE interface on a Frame Relay port, you must take the following steps:

1. Find the interface card associated with the line you want to change to a DCE interface (see Figure 1-2 and the following section, “Identifying Lines”).
2. Remove the interface card, rotate it 180 degrees and reinsert it with “DCE” on the top edge (see Figure 1-3).

Identifying Lines

For each module, each interface card is in a slot that is labeled L0 through L11:

- L0 is the concentrated link for each module that is connected to the FRC card.
- L1 through L11 correspond to Frame Relay ports for each module.

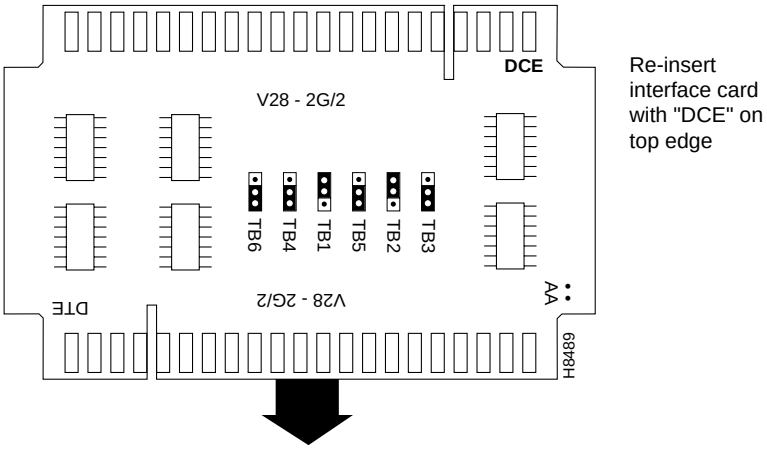
- Module 1 is associated with ports 1-11 on the rear panel. Module 2, Module 3, and Module 4 are each associated with a different group of 11 ports on the rear panel:

  Module 1: Ports 1–11
  Module 2: Ports 12–22
  Module 3: Ports 23–33
  Module 4: Ports 34–44

  Each of these ports is then identified in the IPX user interface in the format *slot.port*, where *slot* is the slot in which the FRM-2 or FRP-2 is installed in the IGX or IPX, and *port* is in the range of 1–44 on the connected PCS.

- Lines 0–11 on each module are *not* in order.

Figure 1-3 Selecting DCE Interface



V.28 Interface Jumpers

Interface clocking and other functions for the V.28 interface are selected by the six jumpers in the center of the interface card. (See Figure 1-4 and Figure 1-5.)

Figure 1-4 V.28 Interface Clocking Selection Jumper Locations

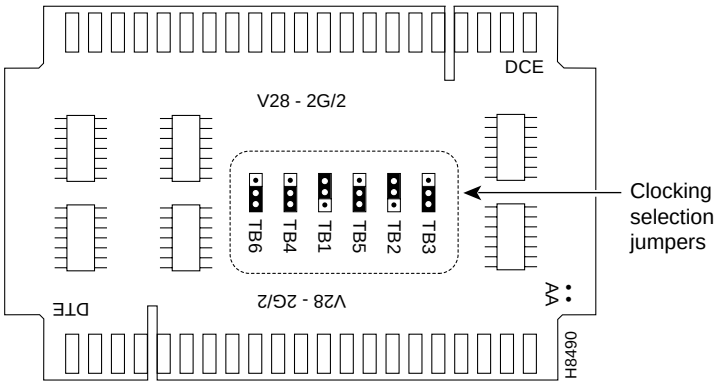
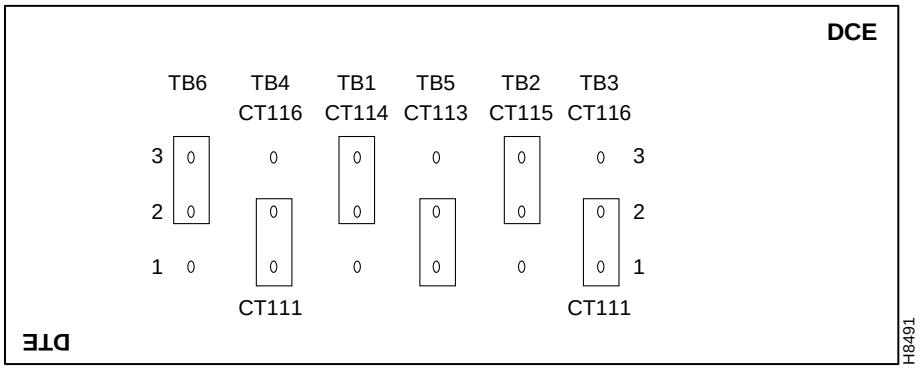


Figure 1-5 V.28 Interface Jumper Positions



Conventions

A strap between pins two and three is shown as <2-3>.

A strap between pins one and two is shown as <1-2>.

Jumper TB1

This jumper connects or disconnects the Transmit Clock (CT114). Position <2-3> allows the device to operate in synchronous mode. Position <1-2> disconnects the signal, putting the interface into asynchronous mode. Since the PCS does not support asynchronous mode, this jumper should be left in position <2-3>.

For DCE mode, Transmit Clock is supplied by position <2-3>. For DTE mode, Transmit Clock is accepted by position <2-3>.

Jumper TB2

This jumper connects or disconnects the Receive Clock (CT115). Position <2-3> allows the device to operate in synchronous mode. Position <1-2> disconnects the signal, putting the interface into asynchronous mode. Since the PCS does not support asynchronous mode, this jumper should be left in position <2-3>.

For DCE mode, Receive Clock is supplied by position <2-3>. For DTE mode, Receive Clock is accepted by position <2-3>.

Jumpers TB3, TB4, and TB5

Jumpers TB3, TB4, and TB5 are not used. Each jumper should always be in position <1-2>.

Jumper TB6

This jumper enables or disables local Receive Clock based on the state of the Carrier Detect signal. Generally, a DCE device supplies a Receive Clock signal to a DTE device.

For DCE mode, the PCS port supplies a clock in all cases to the connected device. The position of this jumper has no effect.

For DTE mode, refer to Table 1-1.

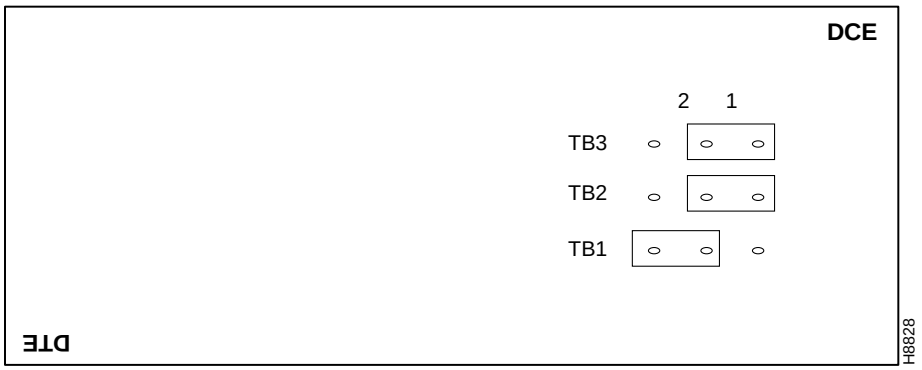
Table 1-1 V.28 Interface Jumper TB6 Usage

	Position <1-2>	Position <2-3>
Carrier Detect ON	Receive Clock accepted from DCE	Receive Clock accepted from DCE
Carrier Detect OFF	Internal Receive Clock generated	Receive Clock accepted from DCE

V.11 Interface Jumpers

See Figure 1-6 for the V.11 interface jumper positions.

Figure 1-6 V.11 Interface Jumper Positions



Jumper TB1

Jumper TB1 should always be in position 2.

Jumpers TB2 and TB3

These jumpers are used in conjunction for four possible combinations for DTE interface mode clocking.

In DCE mode, the PCS port always provides Transmit and Receive Clock signals to the attached device, so the position of these jumpers has no effect. (See Table 1-2.)

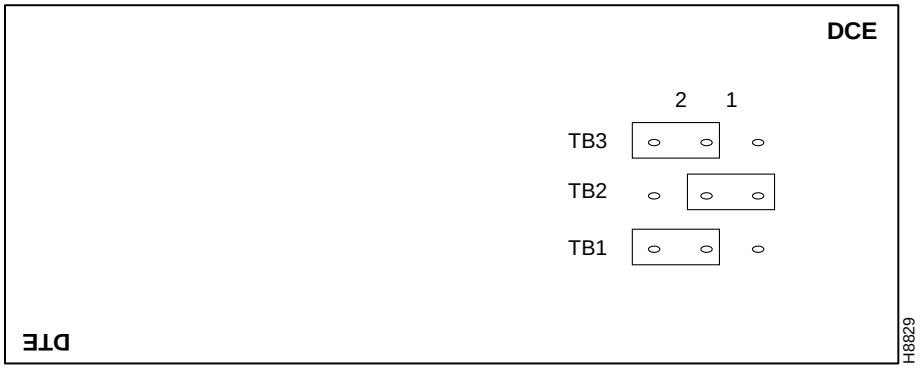
Table 1-2 Jumper Positions

TB2 Position 2	
TB3 Position 2	Both Transmit and Receive Clocks are taken from the attached device.
TB2 Position 2	
TB3 Position 1	When Carrier Detect (CT109) is present, the Receive Clock is taken from the attached device. When Carrier Detect is not present, the PCS port uses an internally generated Receive Clock.
TB2 Position 1	
TB3 Position 2	Enables reception of external X.24 clock signals (CT114 A/B).
TB2 Position 1	
TB3 Position 1	When Indication (IA/IB) are present, the Receive Clock is taken from the attached device. If not present, the PCS port uses an internally generated Receive Clock.

Concentrated Link Port Interface (Line L0)

As shown in Figure 1-2, L0 houses the interface card for the concentrated link port. This must always be a V.11 interface card in DTE mode, with the jumpers in the positions indicated in Figure 1-7.

Figure 1-7 Concentrated Link Interface Card Jumper Positions



Note The concentrated link interface card must always be installed with DTE in the top position.

V.35 Interface

There are two types of V.35 interface cards, designated V.35-1G and V.35-2G.

V.35-1G Card

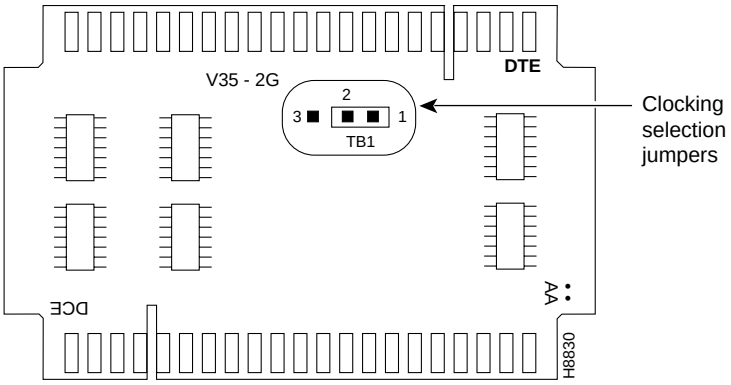
The V.35-1G is the older generation of the V.35 interface card, and is not generally recommended for use with the PCS. Because of heat generation, a maximum of two V.35-1G cards may be used per PCS module.

The V.35-1G interface card has no jumpers. Clocking and other signals adhere to the V.35 specification. (See Table 1-4.)

V.35-2G Card

The V.35-2G has one jumper used to select clocking operation. (See Figure 1-8.)

Figure 1-8 V.35-2G Interface Card



Jumper TB1

When this interface is DTE mode, jumper TB1 enables local Receive Clock generation. Generally, a DCE device such as a modem or CSU/DSU supplies a Receive Clock signal to a DTE device. When the interface is in DCE mode, this jumper has no effect because the interface will supply the clock in all cases to the attached DTE.

When in DTE mode, this interface can either accept the Receive Clock from the DCE at all times or only when a Carrier Detect signal (CT109) is present. When jumper TB1 is in the position <1-2>, the interface generates its own Receive Clock when Carrier Detect (CT109) is absent. When Carrier Detect is present from the DCE, the interface accepts the Receive Clock from the DCE.

When the jumper is in position <2-3>, the interface accepts the clock from the attached DCE at all times. (See Table 1-3.)

Table 1-3 V.35 Interface Jumper TB1 Usage

	Position <1-2>	Position <2-3>
Carrier Detect ON	Receive Clock accepted from DCE	Receive Clock accepted from DCE
Carrier Detect OFF	Internal Receive Clock generated	Receive Clock accepted from DCE

Reinserting Interface Cards

If the interface card is removed to change either interface type or clocking, reinsert it firmly, making sure that it comes into complete contact with the main board of the PCS module.

Installing the Shelf in a Rack and Attaching the Front Cover

The front cover must be attached during operation to prevent EMI. Both the empty shelf and brackets for the cover are attached to the rack with the same screws. The front cover bracket with door clasp is attached to the right side, the bracket with hinge tabs is attached to the left.

Take the following steps to install the rack and attach the front cover (see Figure 1-9):

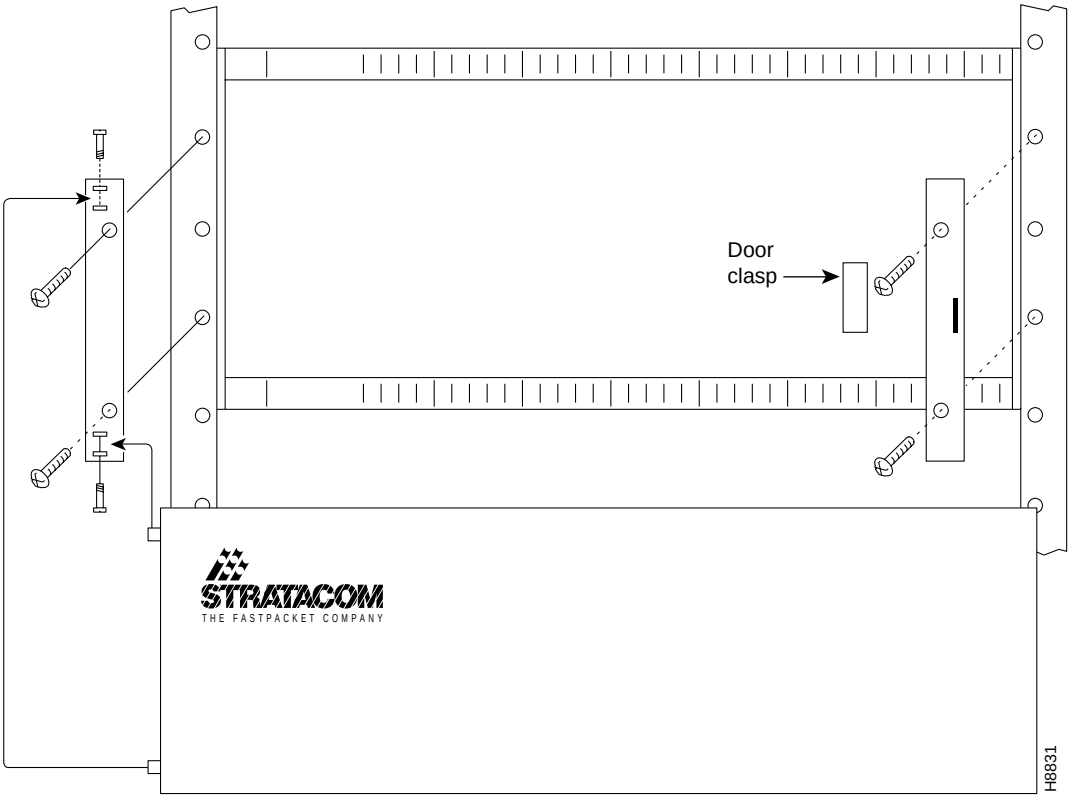
Step 1 Loosely attach the chassis to the rack with the mounting screws.

Step 2 Slide the door bracket with door clasp under the screws on the right side, and the door assembly with the hinge bracket under the screws on the left side.

Step 3 Check the alignment of the door clasp and the plastic clutch on the inside of the door and make any necessary adjustments.

Step 4 Tighten the screws attaching the chassis to the rack.

Figure 1-9 Installing the Rack in a Shelf and Attaching the Front Cover

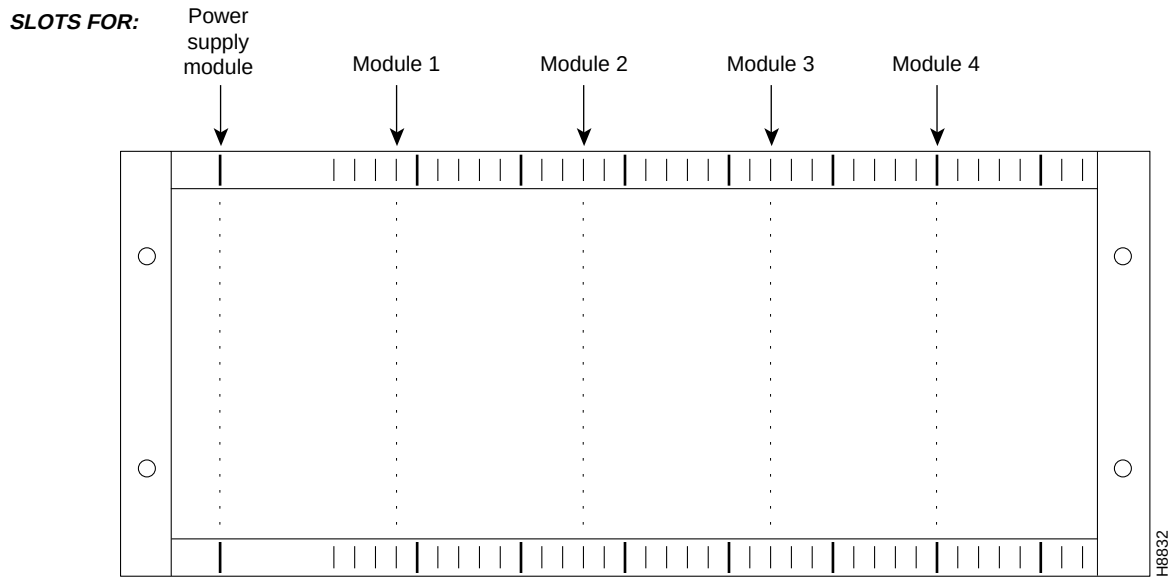


Inserting Modules into the PCS Chassis

There are five slots in the chassis that permit modules to snap into the chassis backplane. If you do not line up the module into the proper slot, it will not snap into the backplane.

The power supply can only be inserted into one slot. The four additional slots house modules for ports 1–44. (See Figure 1-10.)

Figure 1-10 Chassis Slots for PCS Modules



When you insert modules into the chassis shelf, ensure that they snap into the backplane.

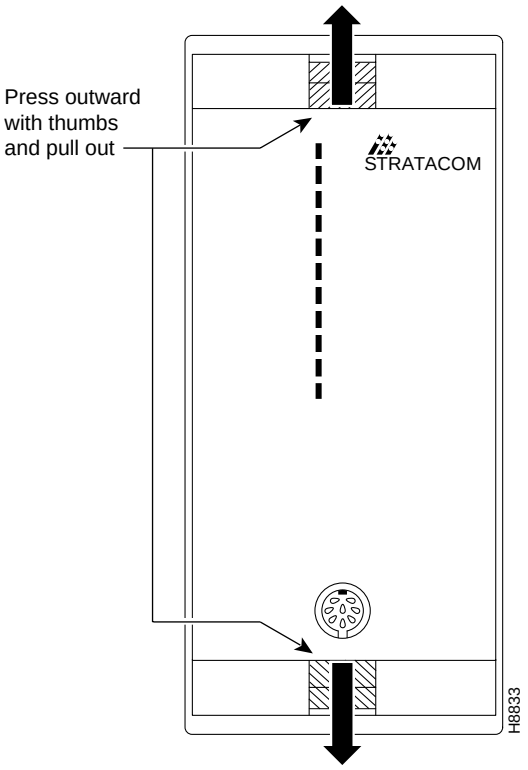
Inserting the Power Supply

Only one slot can accommodate the power supply (see Figure 1-10). The power supply must be secured into place by the two screws that are attached to the front of the power supply module.

Removing Modules from the Chassis

To remove a module from the chassis, press outward on the two catches with your thumbs and pull firmly outward (see Figure 1-11.)

Figure 1-11 Removing a Module from the Chassis



Connecting Power

Connecting AC Powered Units

When all modules are installed in the chassis, and the chassis has been properly rack-mounted, connect the female end of the power supply cord to the power connector on the rear panel of the PCS. Connect the plug of the power supply cord to the appropriate electrical outlet (115V or 230V).

Connecting DC Powered Units

Connect DC power to the PCS only after all modules are installed in the chassis and the chassis has been properly rack-mounted. Make sure the DC power source is off before connecting the DC power cable.

The cable from the DC-power source must have three insulated #14 AWG (1.5 mm2) conductors (stranded) and the cable must be terminated with closed-loop ring terminals at the PCS. The safety earthing conductor has insulation that is green with one or more yellow stripes.

Take the following steps to connect DC power:

Step 1 Connect the safety earthing conductor to the PCS, then connect the +48V conductor, then connect the –48 V conductor.

Step 2 Check that the screws securing the conductors to the PCS terminal block are tight.

Step 3 Check that the power switch on the front panel of the PCS is in the OFF position.

Step 4 Close the disconnect device at the 48V power source.

Step 5 Close the power switch on the front panel of the PCS.

Successful Power-Up Indication

When successfully completed, the uppermost LED on each module should be green. If the LED is red, this indicates a power-up test failure and you must contact the Cisco Technical Assistance Center.

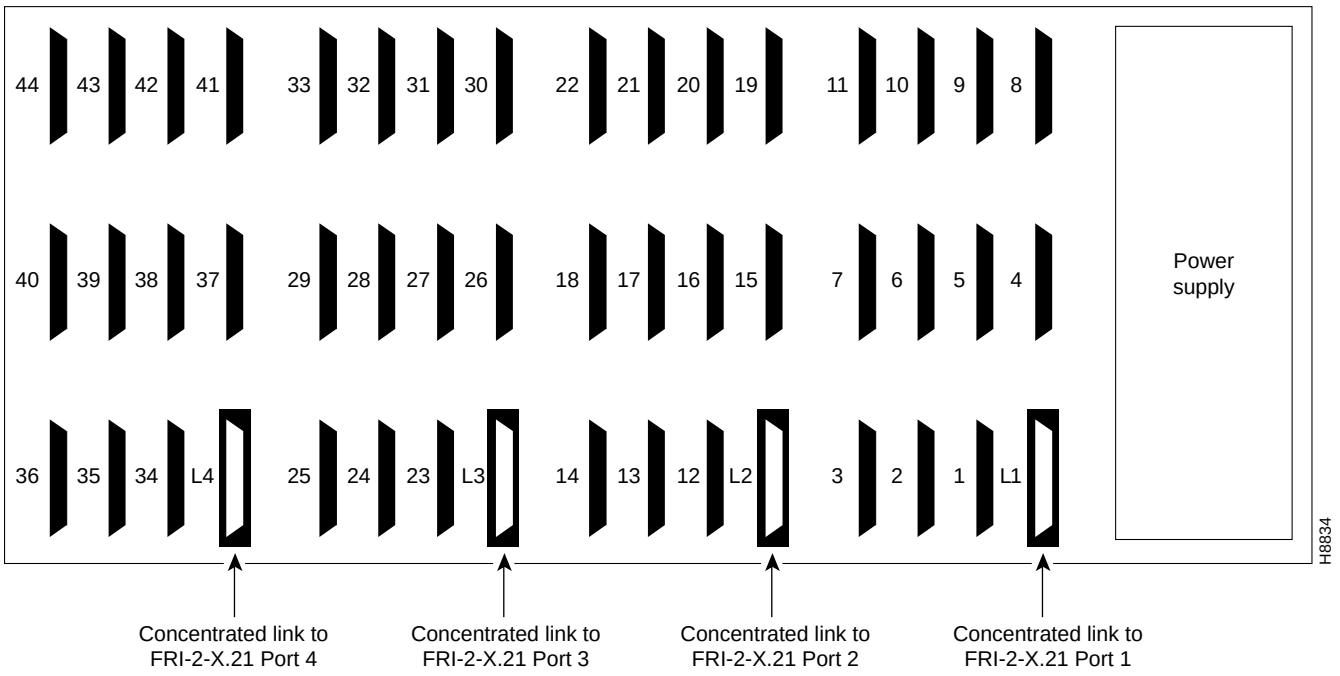
Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Connecting Cables

Concentrated Link Connections to the FRM-2 or FRP-2

On the rear panel, the ports through which each module is connected to the FRM-2 or FRP-2 are labeled L1, L2, L3, and L4 (see Figure 1-12).

Figure 1-12 PCS Rear Panel



Connect these ports to the FRM-2 or FRP-2 ports with the cable (provided by Cisco) labeled Concentrated Link.

PCS Ports

On the rear panel, ports through which external devices are connected to the PCS are labeled 1–44. These are the port numbers used in the IPX or IGX configuration commands.

Cables to connect PCS lines to external devices can be purchased from StrataCom. The pinouts for X.21*bis* (V.10/V.11), V.28, and V.35 interfaces are shown in Table 1-4, Table 1-5, and Table 1-6.

Cables for use with PCS ports are described in the appendix "PCS Cables."

Table 1-4 X.21bis V.10/V.11 (RS-449) Interface Pinouts

CCITT Circuit	Function	Pin	X.21 Function
Shield	Cable Screening	1	
CT102A	Signal Ground	7	
CT102B	Common Return	10	
CT103A	Transmitted Data	2	T
CT103B	Transmitted Data	14	T
CT104A	Received Data	3	R
CT104B	Received Data	16	R
CT105A	Control	4	
CT105B	Control	23	
CT106	Ready to Send	5	
CT107	Data Set Ready	6	
CT108	Data Terminal Ready	20	
CT109A	Carrier Detected	8	I
CT109B	Carrier Detected	9	I
CT114A	Transmit Element Timing	15	Clock
CT114B	Transmit Element Timing	13	Clock
CT115A	Receive Element Timing	17	
CT115B	Receive Element Timing	12	
CT140	Remote Loopback (Loop 2)	21	
CT141	Remote Loopback (Loop 3)	18	
CT142	Test Indicator	25	

Table 1-5 V.28 Interface Pinouts

CCITT Circuit	Function	Pin
Shield	Cable Screening	1
CT102A	Signal Ground	7
CT103A	Transmitted Data	2
CT104A	Received Data	3
CT105A	Request to Send	4
CT106	Ready to Send	5
CT107	Data Set Ready	6
CT108	Data Terminal Ready	20
CT109A	Carrier Detected	8
CT111	Data Signal Rate	23
CT116	Selector (DTE)	9
CT114A	Transmit Element Timing	15
CT115A	Receive Element Timing	17
CT117	Standby Indicator	10
CT140	Remote Loopback (Loop 2)	21
CT141	Remote Loopback (Loop 3)	18
CT142	Test Indicator	25
CT125		22

Table 1-6 V.35 Interface Pinouts

CCITT Circuit	Function	Pin
Shield	Cable Screening	1
CT102A	Signal Ground	7
CT103A	Transmitted Data	2
CT103B	Transmitted Data	14
CT104A	Received Data	3
CT104B	Received Data	16
CT105A	Request to Send	4
CT106	Ready to Send	5
CT107	Data Set Ready	6
CT108	Data Terminal Ready	20
CT109A	Carrier Detected	8
CT114A	Transmit Element Timing	15
CT114B	Transmit Element Timing	13
CT115A	Receive Element Timing	17
CT115B	Receive Element Timing	12