# Hardware

This chapter describes fabric card, line card, and CPT 50 panel.

# Introduction to Carrier Packet Transport Cards

This topic describes the Carrier Packet Transport (CPT) cards. There are two cards in the CPT system:

- Fabric Card
- Line Card

The CPT 50 panel is a standalone unit and can be connected to the CPT system. The CPT 50 panel enables the number of ports to be scaled on the CPT system.

These cards are supported on the CPT 200 and CPT 600 platforms. The CPT system complies with RoHS-6 standards.

The following system configuration is recommended on the CPT 200 shelf:

- Standalone fabric card
- Standalone TNC/TSC card
- One or more CPT 50 panels

The following system configuration is recommended on the CPT 600 shelf:

- Redundant fabric cards
- One line card
- Redundant TNC/TSC cards
- One or more CPT 50 panels

## Fabric Card

(CPT 200 and CPT 600 only)

The fabric card is a single slot card with two 10GE SFP+ ports and two 10GE XFP ports. The XFP ports on the fabric card support the Optical Transport Network (OTN) protocol. The SFP+ ports on the fabric card can serve as normal ports or InterConnect (IC) ports. When the SFP+ ports are used as IC ports, these ports are used to connect with the SFP+ ports on the CPT 50 panel.

The fabric card runs the route processor version of IOS. The fabric card manages the line card and the CPT 50 panel through the backplane GE management channel.

When fabric and line cards are installed on the shelf, a bidirectional 2 * 16G connection is set up between each fabric and line card and also between two fabric cards.

In chassis AC type, two fabric and two line cards are supported. In chassis DC type, there is no limit on the cards that are supported.

Circuit creation is possible only at XFP ports of the fabric card. Only OCHTRAIL creation is supported. Before creating the OCHTRAIL, create a provisionable patchcord (PPC) between the XFP port of the fabric card and the OCH port.

### Slot Compatibility

On the CPT 600 shelf, install the redundant fabric cards in slots 4 and 5. There can be up to 2 fabric cards on the CPT 600 shelf. The two fabric cards on the CPT 600 shelf can both be in active mode with both cards carrying the traffic.

On the CPT 200 shelf, install the fabric card in slot 2 or 3.

### Faceplate and Block Diagram

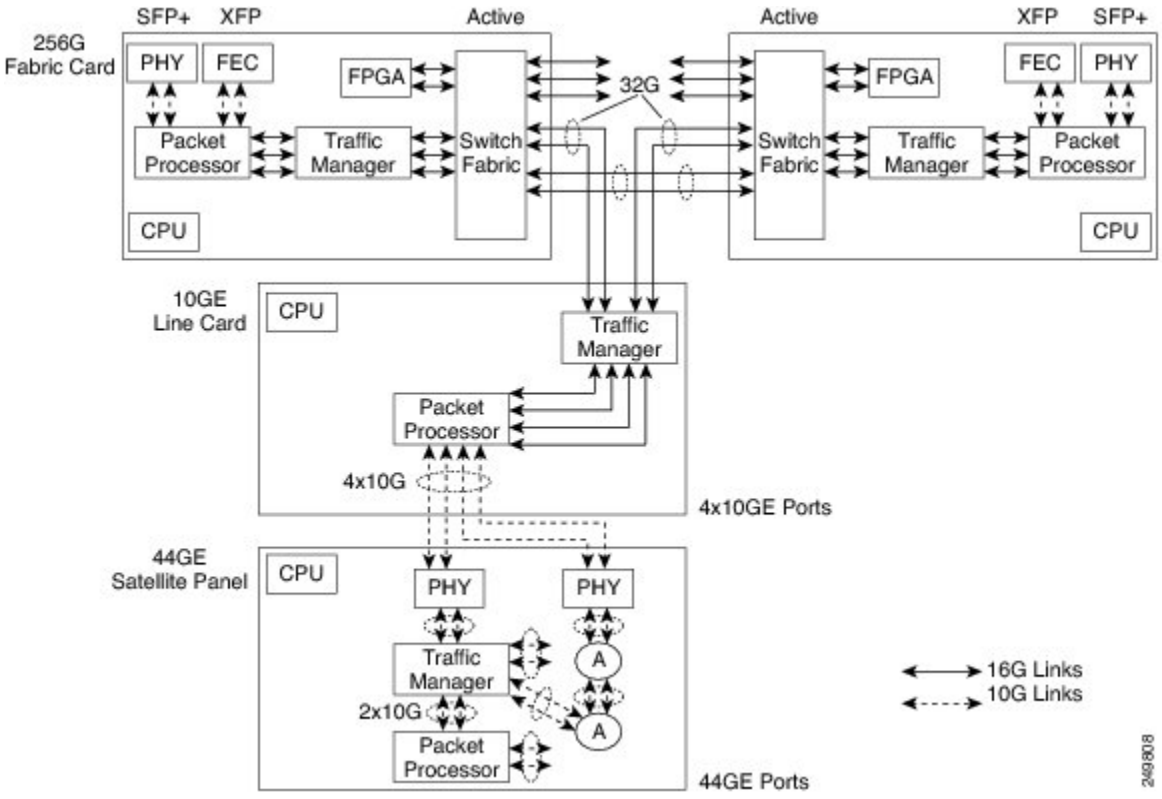
Figure 1: Fabric Card Faceplate, on page 3 illustrates the faceplate of the fabric card.

The FPGA on the fabric card processes the traffic packets. The console port on the faceplate is used for debugging.

***Figure 1: Fabric Card Faceplate***

Figure 2: CPT System Block Diagram, on page 3 illustrates the CPT system block diagram.

***Figure 2: CPT System Block Diagram***



### Card-Level Indicators

*Table 1: Card-Level Indicators*

| Card-Level LED | Description |
|---|---|
| Red FAIL LED | The red FAIL LED indicates that the processor of the card is not ready. This LED is on during the reset. The FAIL LED flashes during the boot process. Replace the card if the red FAIL LED persists. |
| Green ACT LED | If the ACT LED is green, the card is operational (one or more ports active) and ready to carry the traffic. |
| Amber SF LED | The amber SF LED indicates that a signal failure or condition such as LOS, LOF, or high BERs is present in one or more of the ports of the card. The amber SF LED is also on if the transmit and receive fibers are incorrectly connected. If the fibers are properly connected and the link is working, the light turns off. |

### Port-Level Indicators

A port status LED is provided for each SFP+ port and XFP port on the fabric card. The XFP ports on the fabric card have only Link LEDs and no ACT LEDs.

*Table 2: Port-Level Indicators*

| Port-Level LED | Description |
|---|---|
| Link LED | Green—The port is either in–service and receiving a recognized signal (that is, no signal fail), or out–of–service and maintenance (OOS,MT or locked, maintenance) in which case the signal fail and alarms are ignored.<br>Red—The port is in–service but is receiving a signal fail (LOS).<br>Amber—The port is provisioned and is in a standby state. |
| ACT LED | Indicates data reception. The LED blinks on packet flow. |

# Line Card

(CPT 200 and CPT 600 only)

The line card has four 10GE SFP+ ports. The SFP+ ports on the line card serve as normal ports or InterConnect (IC) ports. When the SFP+ ports are used as IC ports, these ports are used to connect with the SFP+ ports on the CPT 50 panel. The line card runs the line card version of IOS.

When fabric and line cards are installed on the shelf, a bidirectional 2 * 16G connection is set up between each fabric card and each line card and also between two fabric cards.

### Slot Compatibility

On the CPT 600 shelf, install the line cards in slots 2, 3, 6, and 7. There can be up to four line cards on the CPT 600 shelf. However, the line card is not required to be present on the CPT 600 shelf.

On the CPT 200 shelf, install the line card in slot 2 or 3. There can be a single line card on the CPT 200 shelf. However, the line card is not required to be present on the CPT 200 shelf.

### Line Card States

The line card could be in one of the following states:

- Empty slot
- Card pre-provisioned
- Card plugged-in
- Image downloading
- Application initialization
- Ready

### Faceplate

Figure 3: Line Card Faceplate, on page 5 illustrates the faceplate for the line card. The console port on the faceplate is used for debugging.

***Figure 3: Line Card Faceplate***

### Card-Level Indicators

Table 1: Card-Level Indicators, on page 4 provides information on card–level indicators.

### Port-Level Indicators

A port status LED is provided for each SFP+ port on the line card.

Table 2: Port-Level Indicators, on page 4 provides information on port–level indicators.

# CPT 50 Panel

(CPT 200 and CPT 600 only)

The CPT 50 panel enables the number of ports to be scaled on the CPT system. The CPT 50 panel has 4 10GE SFP+ ports and 44 GE SFP ports. The CPT 50 panel runs the line card version of IOS.

**Note** The CPT 50 panel is not placed in the CPT 200 or CPT 600 shelf.

The CPT 50 panel cannot operate independently. After connecting the CPT 50 panel to the fabric card or the line card, the CPT 50 panel is automatically discovered and registered. The discovery operation is performed using the Satellite Discovery Protocol (SDP) and the registration operation is performed using the Satellite Registration Protocol (SRP).

The four SFP+ ports on the CPT 50 panel can be connected to the SFP+ ports on the fabric card or the line card. The four SFP+ ports on the CPT 50 panel can be connected to only one card (fabric or line card) at a time.

CPT 50 shelf supports ONE-GE and FE for 1 to 44 ports. CPT 50 shelf supports TEN-GE for 45 to 48 ports. By default, the 45 to 48 ports are in IC mode and cannot be changed.

The CPT 50 panel has redundant DC feeds. The CPT 50 panel DC power supply can handle 48 V and 24 V. The 48 V power supply has both ANSI and ETSI versions.

The CPT 50 panel has a removable fan tray and a local console port for onsite access and debugging.

### Faceplate

There are four variations of the CPT 50 panel faceplate:

- CPT 50 panel with AC power. See Figure 4: CPT 50 panel with AC Power Faceplate, on page 7.
- CPT 50 panel with DC ETSI 48 V. See Figure 5: CPT 50 panel with DC ETSI 48 V Faceplate, on page 7.
- CPT 50 panel with DC ANSI 48 V. See Figure 6: CPT 50 panel with DC ANSI 48 V Faceplate, on page 7.

- CPT 50 panel with DC ANSI 24 V. See Figure 7: CPT 50 panel with DC ANSI 24 V Faceplate, on page 7.

*Figure 4: CPT 50 panel with AC Power Faceplate*

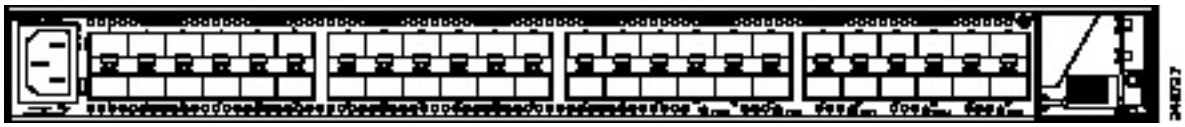


*Figure 5: CPT 50 panel with DC ETSI 48 V Faceplate*

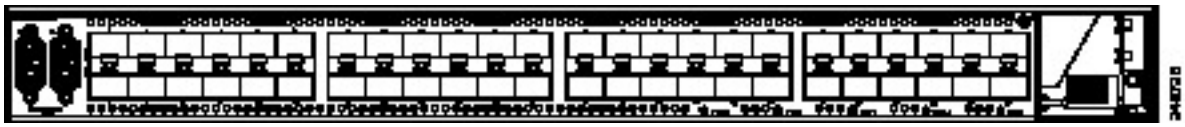


*Figure 6: CPT 50 panel with DC ANSI 48 V Faceplate*

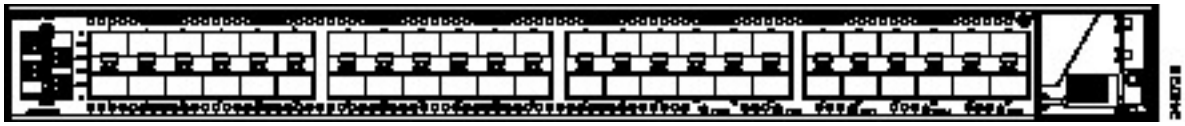
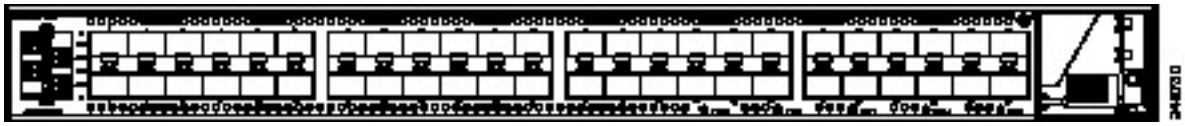


*Figure 7: CPT 50 panel with DC ANSI 24 V Faceplate*



## Card–Level Indicators

*Table 3: CPT 50 Panel Card–Level Indicators*

| Card-Level LED | Description |
|---|---|
| PWR | Indicates the status of the power to the card. If there is a power failure, this LED turns red. |
| FAN | Indicates the status of the fan to the card. If there is a fan failure, this LED turns red. |
| CRIT | Indicates the critical alarms in the network at the local terminal. |
| MAJ | Indicates the major alarms in the network at the local terminal. |
| MIN | Indicates the minor alarms in the network at the local terminal. |

### Supported CPT 50 Panels on the CPT System

- The CPT system supports up to 20 CPT 50 panels or 880 GE ports on the CPT 600 shelf.
- The CPT system supports up to 6 CPT 50 panels or 264 GE ports on the CPT 200 shelf.

The limit on the number of ports is not enforced by CTC.

### CPT 50 Panel States

The following states are defined for a CPT 50 panel that is configured in the CPT system:

- Pre–provisioned—When the 10GE ports on the fabric or the line card are configured as IC ports and when these IC ports are associated with a Fan-Out-Group (FOG).
- Loading—When the CPT 50 panel has booted up with the IOS image and when the line card version of IOS is being downloaded from the fabric card.
- Active—When the CPT 50 panel boots up with the line card image and the application initialization is completed.

### CPT 50 Panel Connectivity to the Fabric or Line Card

If the CPT 50 shelf loses connectivity to the fabric or line card due to interconnect (IC) link down events, the CPT 50 shelf reloads after the last IC link in the FOG (Fan-Out-Group) fails. This reload occurs after the configured carrier time delay. If there is a connection loss due to remote failures, the CPT 50 shelf reloads after detecting the failure time-out period (5 seconds) for the last link that was active. When the reload is complete, the CPT 50 shelf tries to reestablish the connection to the fabric or line card by performing the discovery operation. If the discovery operation is not successful within 5 minutes, the CPT 50 shelf reloads again. This cycle is repeated thrice with a reduction in the time-out period (30 seconds), until the discovery operation is successful. In the event of successful discovery, the CPT 50 shelf reestablishes the connection to the fabric or line card, else the CPT 50 shelf transits to the idle state and then attempts to connect to the fabric or line card.

### Interlink Protection

If one of the links in the FOG is down, the traffic sent on that link is switched and distributed to the remaining active links in the FOG.

### Software Restrictions

The following software restrictions apply to the CPT 50 panel:

- The CPT system supports up to 880 GE ports on the CPT 600 shelf and these ports are distributed among 1 to 20 CPT 50 panels.
- The CPT system supports up to 264 GE ports on the CPT 200 shelf and these ports are distributed among 1 to 6 CPT 50 panels.

  The limit on the number of ports is not enforced by CTC.
- Each CPT 50 panel can be connected to only one fabric or line card at a time.
- Only one FOG can be created for each CPT 50 panel.

### Pre-provisioning

The following can be pre-provisioned through CTC:

- Fabric card
- Line card
- FOG
- TEN-GE PPMs
- Port states
- OTN parameters

The ONE-GE and FE PPMs are not pre-provisioned by default.

# NTP-J19 Install the Fabric and Line Cards

| | |
|---|---|
| **Purpose** | (CPT 200 and CPT 600 only) This procedure installs the fabric and line cards on the CPT 200 and CPT 600 shelves.<br>On the CPT 600 shelf, install the redundant fabric cards in slots 4 and 5. On the CPT 200 shelf, install the fabric card in slots 2 or 3.<br>On the CPT 600 shelf, install the line cards in slots 2, 3, 6, and 7. On the CPT 200 shelf, install the line card in slots 2 or 3. |
| **Tools/Equipment** | Fabric and line cards. |
| **Prerequisite Procedures** | DLP–G604 Install the TNC or TSC Card in *Cisco ONS 15454 DWDM Configuration Guide* |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself. Statement 94

**Warning** Class 1 laser product. Statement 1008

**Warning** Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Statement 1056

**Warning** Class 1 laser product. Statement 1008

**Caution** Always use the supplied ESD wristband when working with a CPT 200 and CPT 600 shelf. For detailed instructions on how to wear the ESD wristband, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.

**Note** If protective clips are installed on the backplane connectors of the cards, remove the clips before installing the cards.

**Note** If you install a card incorrectly, the FAIL LED flashes continuously.

## Procedure

**Step 1** Navigate to the Cisco Transport Planner shelf layout for the node where you will install the fabric or line card.

**Step 2** Remove the card from its packaging, then remove the protective clips from the backplane connectors.

**Step 3** Open the card ejectors.

**Step 4** Hold the card firmly and align it to the guard rails and slide it inside the slot until the card plugs into the receptacle at the back of the slot designated by the Cisco Transport Planner shelf layout.

**Step 5** Verify that the card is inserted correctly and simultaneously close the ejectors on the card.

**Note** It is possible to close ejectors when the card is not completely plugged into the backplane. Ensure that you cannot insert the card any further.

**Note** If you install the card in the wrong slot, CTC will raise a MEA (EQPT) alarm. To clear this alarm, open the ejectors, slide the card out, then insert it in the correct slot.

After you install the card, the FAIL, ACT, and SF LEDs will go through a sequence of activities. They will turn on, turn off, and blink at different points. After approximately 2 to 3 minutes, the ACT or ACT/STBY LED turns on. The SF LED might persist until all card ports connect to their far-end counterparts and a signal is present.

**Note** Until a card is provisioned, the card is in the standby condition and the ACT/STBY LED remains amber in color.

**Step 6** If the card does not boot up properly or the LEDs do not progress through the activities described in step 5, check the following:

- When a physical card type does not match the type of card provisioned for that slot in CTC, the card might not boot and CTC will show a MEA (EQPT) alarm. If the card does not boot, open CTC and ensure that the slot is not provisioned for a different card type before assuming that the card is faulty.

- If the red FAIL LED does not turn on, check the power.
- If you insert a card into a slot provisioned for a different card, all LEDs turn off.
- If the red FAIL LED is on continuously or the LEDs behave erratically, the card is not installed properly.

If any of these conditions are present, remove the card and repeat steps 3 to 5. If the card does not boot up properly the second time, contact your next level of support.

**Note** Until a card is provisioned, the card is in the standby condition and the ACT/STBY LED remains amber in color.

**Stop. You have completed this procedure.**

# NTP-J72 Create a Fan–Out–Group Using CTC

| | |
|---|---|
| **Purpose** | This procedure creates a Fan–Out–Group (FOG) using CTC. |
| **Tools/Equipment** | None |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | As needed |
| **Onsite/Remote** | Onsite or remote |
| **Security Level** | Provisioning or higher |

By default, the SFP+ ports on the fabric or line cards are configured as 10GE ports. These ports need to be configured as IC ports and associated to a FOG to connect these ports to the CPT 50 panel. FOG is a logical channel that consists of a bundle of 10GE IC ports.

The CPT 50 panel can be connected to the fabric card using two IC ports. The CPT 50 panel can be connected to the line card using four IC ports.

The 4 SFP+ ports that are displayed as 1+ 2+ 3+ 4+ on the faceplate of the CPT 50 panel are displayed as 45, 46, 47, 48 in CTC. This includes the display in Alarms and Performance Monitoring.

**Note** You can create only one FOG for each CPT 50 panel.

### Procedure

**Step 1** Complete the NTP-J22 Log into CTC procedure at a node where you want to configure the SFP+ ports as IC ports.

**Step 2** From the View menu, choose **Go to Home View**.

**Step 3** Right-click the fabric or line card and choose **Open Packet Transport System View**. The Packet Transport System View dialog box appears.

**Step 4** Click the **Fan-Out Groups** tab.

**Step 5** Click **Create**. The Create/Edit Fan-Out Group dialog box appears.

**Step 6** From the Fan-Out Group ID drop-down list, choose a FOG ID. FOG ID is the virtual slot ID of the CPT 50 panel and takes values from FOG 36 to FOG 55.

**Step 7** From the Card Slot drop-down list, choose a slot.

**Step 8** From the Available Fan–Out Ports area, choose the required ports that you want to configure as IC ports and move these ports to the Available Fan–Out Group Member Ports area.

**Step 9** Click **Apply** to create a FOG that consists of the selected ports.

**Note** The CPT 50 panel comes up only when the SFP+ port of the card from where it is connected is not in OOS,DSBLD administrative state.

**Stop. You have completed this procedure.**

# Preparing to Install the CPT 50 Shelf

This chapter explains how to prepare for the CPT 50 shelf installation.

### Important Safety Recommendations

**Warning** This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the Regulatory Compliance and Safety Information document for the appropriate Cisco chassis. Statement 274

**Warning** Installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning** This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

**Warning** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017

**Warning** Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

**Warning** A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022

**Note** In this chapter, “shelf” refers to the steel enclosure that holds cards and connects power, and “node” refers to the entire hardware and software system.

**Note** Unless otherwise specified, CPT 50 shelf refers to both ANSI and ETSI environments.

**Note** The CPT 50 shelf is suitable for installation in network telecommunication facilities where the National Electric Code (NEC) applies.

### Required Tools and Equipment

The following sections describe the tools and equipment you need to install and test the CPT 50 shelf.

### Cisco Supplied Materials

The following materials are required and are shipped with the CPT 50 shelf (wrapped in plastic). The number in parentheses gives the quantity of the item included in the package.

- (Only ANSI) Pair of 19-inch mounting brackets (2)
- (Only ANSI) Pair of 23-inch mounting brackets (2)
- (Only ETSI) Pair of 21-inch mounting brackets (2)
- Cable guides (2)
- Rubber bumpers (4)
- M4 screws to fix brackets (8)
- M4 screws to fix ground lug (2)
- Ground lug (1)
- Power cable (1). A DC power cable is present in the kit if the customers have ordered for it.

**Attention** Always use M4 screws to install a ground lug on a CPT 50 shelf. The Cisco part number for this screw is 48-0468-01. The recommended maximum length is 6 millimeters (mm). If you use a screw longer than 6 mm, it can lead to a short circuit in the CPT 50 shelf.

**Note** If the customers have ordered a CPT-50-44GE-48E= or CPT-50-48E-LIC= shelf, a DC power cable is present in the accessory kit. If the customers have ordered a CPT-50-44GE-AC= or CPT-50-AC-LIC shelf, an AC power cable is present in the accessory kit.

**Caution** Use only the power cables that are designed to be used with the CPT 50 shelf. These are sold separately.

### User Supplied Materials

The following materials, tools, and equipment are required but are not supplied with the CPT 50 shelf.

- Equipment rack
- M4 Phillips screw driver
- Fuse panel
- Wire cutters
- Wire wrapper
- Voltmeter
- Ground cable #8 AWG stranded, specified for up to 90° Celsius (194° Fahrenheit)
- M3 Phillips screw driver only for CPT-50-44GE-48E= and CPT-50-48E-LIC= shelves to secure the DC power cable to the shelf.

**Caution** Use only the power cables that are designed to be used with the CPT 50 shelf. These are sold separately.

# NTP-J53 Unpack and Inspect the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This procedure explains how to unpack the CPT 50 shelf and verify its contents. |
| **Tools/Equipment** | None |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |

| | |
|---|---|
| **Security Level** | None |

### Procedure

**Step 1** Complete the DLP-J171 Unpack and Verify the CPT 50 Shelf, on page 15.

**Step 2** Complete the DLP-J172 Inspect the CPT 50 Shelf, on page 15.
**Stop. You have completed this procedure.**

# DLP-J171 Unpack and Verify the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This task describes how to remove the shelf from the package and verify the items. |
| **Tools/Equipment** | None |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** When you receive the CPT 50 shelf equipment at the installation site, open the top of the box. The Cisco Systems logo indicates the top of the box.

**Step 2** Remove the foam inserts from the box. The box contains the CPT 50 shelf (wrapped in plastic) and other items needed for installation.

**Step 3** To remove the shelf, grasp both rings of the shelf removal strap and slowly lift the shelf out of the box.

**Step 4** Verify that you have all items listed in the Required Tools and Equipment, on page 13.

**Step 5** Return to your originating procedure (NTP).

# DLP-J172 Inspect the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This task explains how to verify that all parts of the shelf assembly are in good condition. |
| **Tools/Equipment** | None |

| | |
|---|---|
| **Prerequisite Procedures** | DLP-J171 Unpack and Verify the CPT 50 Shelf, on page 15 |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** Verify the following:

- The CPT 50 shelf is not damaged.
- The cable connectors, EOBC, timing connectors, and power connectors on the front panel of CPT 50 shelf are not damaged.
- The SFP cages on the front panel of the CPT 50 shelf are not damaged.

**Step 2** If there is any damage, call your Cisco sales engineer for a replacement.

**Step 3** Return to your originating procedure (NTP).

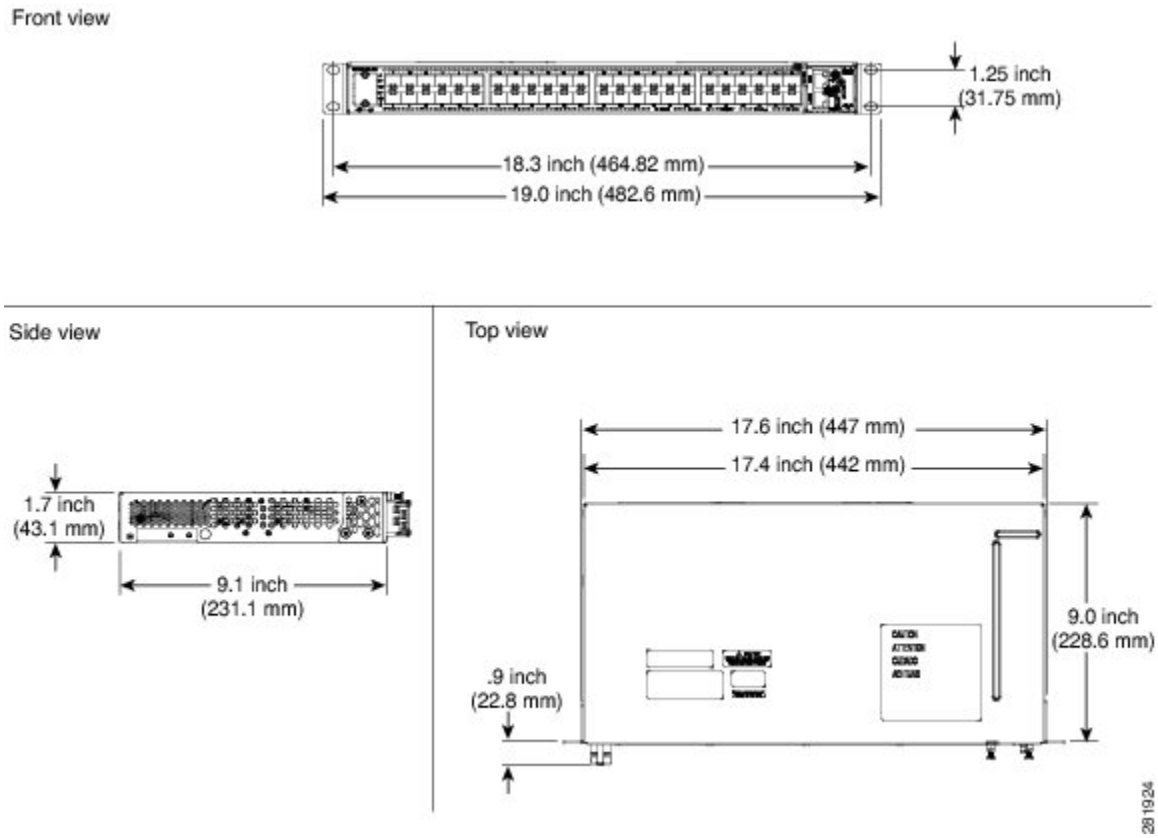
# ANSI Rack Installation

The CPT 50 shelf is mounted on a 19-inch (482.6-mm) or 23-inch (584.2-mm) equipment rack. If the shelf is mounted in the front position, then it projects 0.9 inches (22.86 mm) from the front of the rack. If the shelf assembly is mounted in the middle position, then it projects 4.3 inches (109.22 mm) from the front of the rack. The shelf mounts in both Electronic Industries Alliance (EIA) standard and Telcordia-standard racks. The shelf assembly is a total of 17.4 inches (442.4 mm) wide with no mounting ears attached. Ring runs are not provided by Cisco and might hinder side-by-side installation of shelves where space is limited.

The CPT 50 shelf measures 1.7 inches (43.1 mm) high, 19 or 23 inches (482.6 or 584.2 mm) wide (depending on which way the mounting ears are attached), and 9.1 inches (231.1 mm) deep.

The following figure shows the dimensions of the CPT 50 shelf in a 19-inch ANSI rack configuration with brackets mounted in the front position.

***Figure 8: CPT 50 Shelf Dimensions for a 19-inch ANSI Rack Configuration***




## Mounting Brackets

**Caution** Use only the fastening hardware provided with the CPT 50 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

**Caution** When mounting the CPT 50 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the CPT 50 shelf shipping kit, or remove the coating from the threads to ensure electrical continuity.

The mounting brackets (19-inch or 23-inch) are used to mount the shelf on a 19-inch (482.6 mm) rack or a 23-inch (584.2 mm) rack.

## Mounting a Single Node

Mounting the CPT 50 shelf on a rack requires a minimum of 1.75 inches (44.44 mm) of vertical rack space. To ensure the mounting is secure, use two #12-24 mounting screws for each side of the shelf assembly. For an ANSI rack, the brackets can be mounted in the front or middle position.

# ETSI Rack Installation

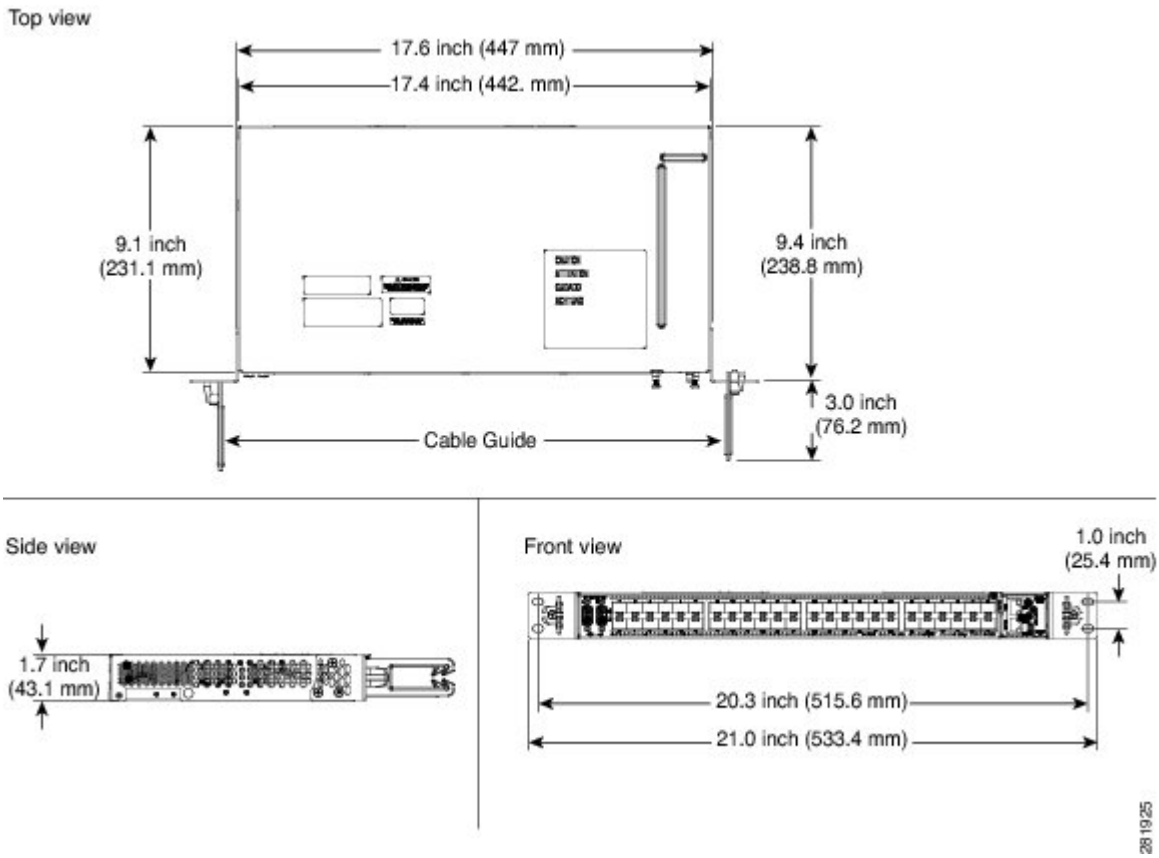
The CPT 50 shelf is mounted on a 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) ETSI standard equipment rack. The shelf assembly is a total of 442 mm (17.4 inches) wide with no mounting ears attached. Cisco does not provide ring runs, which might hinder side-by-side installation of shelves where space is limited.

The CPT 50 shelf measures 43.1 mm (1.7 inches) high, 533.4 mm (21 inches) wide, and 231.1 mm (9.1 inches) deep.

Figure 9: CPT 50 Shelf Dimensions for an ETSI Rack Configuration, on page 18 provides the dimensions of the CPT 50 shelf installed on a 600 x 600-mm (23.6 x 23.6-inch) ETSI standard equipment rack. In this figure, the cable guides are attached to the mounting brackets.

**Caution** When mounting a shelf in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

***Figure 9: CPT 50 Shelf Dimensions for an ETSI Rack Configuration***



### Mounting a Single Node

The CPT 50 shelf requires 1.75 inches (44.44 mm) minimum of vertical rack space. To ensure the mounting is secure, use two M6 mounting screws for each side of the shelf assembly. In an ETSI rack, the brackets can be mounted only in the front position.

# Wall Mounting and Desktop Mounting the CPT 50 Shelf

This section provides information about mounting the CPT 50 shelf on the wall and the desktop.

## Wall Mounting

The CPT 50 shelf can be mounted on the wall using the wall mount brackets. The type of screws used to mount the brackets on the wall depends on the wall-type; wall mount brackets are not provided by Cisco.

After the CPT 50 shelf is mounted on the wall, a fire protective tray is installed on the wall mount bracket to support the shelf assembly.

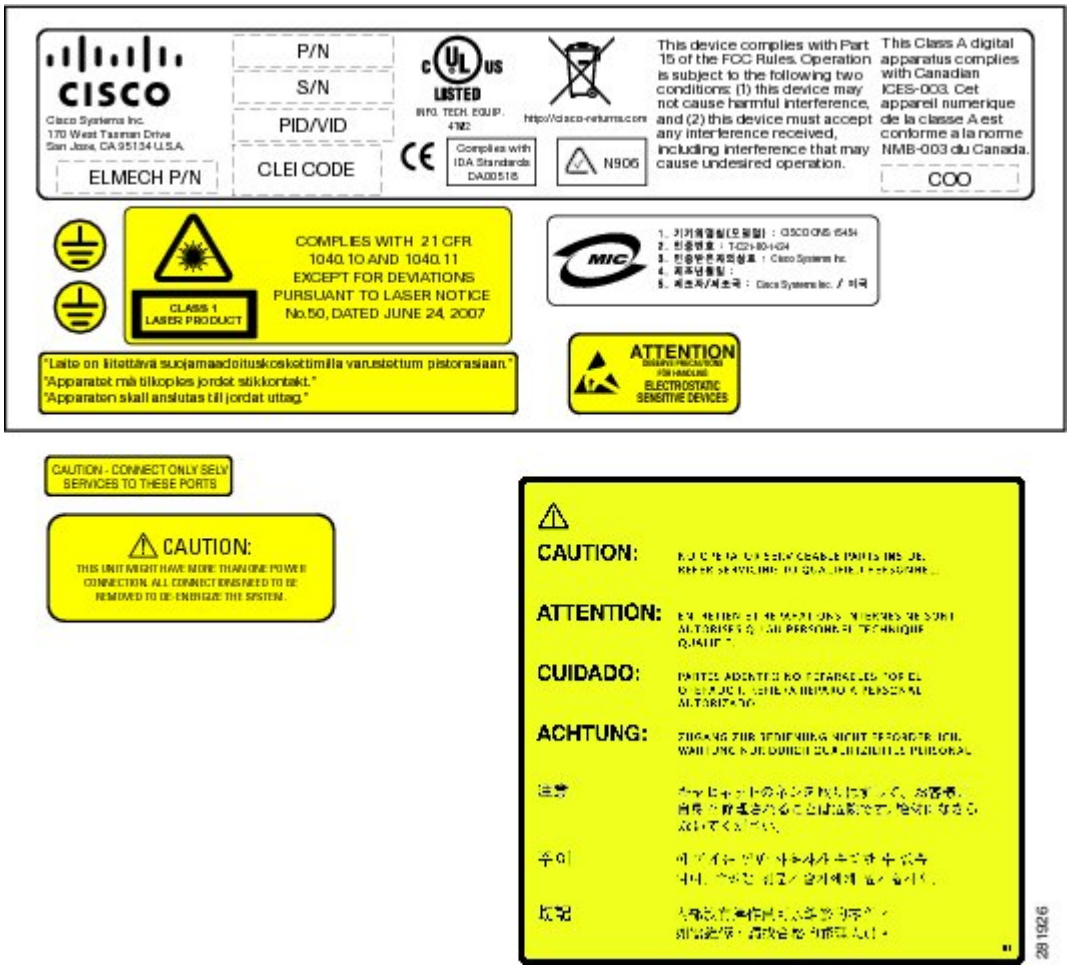
## Desktop Mounting

The CPT 50 shelf can be mounted on the desktop for easy access.

# Laser Warning

The laser warning label is placed on top of the chassis. The following figure shows the label placed on the CPT 50 shelf.

***Figure 10: CPT 50 Shelf Label***




# NTP-J54 Install the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This procedure describes how to install the shelf. |

| | |
|---|---|
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver<br>• Screws |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Note** In a CO (Central Office) or CPE (Customer Premises Equipment) installation, if the CPT 600 and CPT 50 units are connected through copper SFP+, place the units less than 6 meters apart in the same lineup.

**Warning** The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring. Statement 7005

**Warning** Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over. Statement 1048

**Warning** This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

**Warning** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A for CPT 50 shelf with 48 VDC power supply; 15A for CPT 50 shelf with 24 VDC power supply. Statement 1005

**Warning** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-15A, 100-240VAC~. Statement 1005

**Warning** To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 131°F (55°C) for CPT 50 shelf with AC power module and 149°F (65°C) for CPT 50 shelf with DC power module. Statement 1047

**Warning** Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

**Warning** To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

**Warning** To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 1 inch (25.4 mm). Statement 1076

**Warning** To pass Electrical Fast Transient/Burst (EFT/B) for GR-1089, the Westek UL C(UL) E171740 Type CM 24AWG 75degC EIA/TIA 568-B.2 STP CAT5e dual bantam to RJ45 shielded cable or an equivalent must be used with the DS1 pluggable 30-1462-01. The cable must have a grounded wire that is connected to the RJ45 shell as well as a shield of an aluminum foil.

**Note** The CPT 50 installations are suitable for Network Telecommunication facilities and locations where NEC applies.

## Procedure

**Step 1** Complete the necessary task as applicable:

- DLP-J173 Mounting the 19-inch Brackets on the CPT 50 Shelf for the ANSI Rack Configuration, on page 23
- DLP-J174 Mounting the 23-inch Brackets on the CPT 50 Shelf for the ANSI Rack Configuration, on page 24
- DLP-J175 Mounting the Brackets on the CPT 50 Shelf for the ETSI Rack Configuration, on page 26

**Step 2** Complete the necessary mounting task as applicable:

- DLP-J176 Mount the CPT 50 Shelf on a Rack (One Person), on page 28
- DLP-J178 Mount the CPT 50 Shelf on the Desktop, on page 33
- DLP-J177 Mount the CPT 50 Shelf on the Wall, on page 30

**Step 3** Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.
**Stop. You have completed this procedure.**

# DLP-J173 Mounting the 19-inch Brackets on the CPT 50 Shelf for the ANSI Rack Configuration

| | |
|---|---|
| **Purpose** | This task describes how to install the 19-inch mounting brackets on the CPT 50 shelf for the ANSI rack configuration. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Caution** Use only the fastening hardware provided with the CPT 50 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

**Caution** When mounting the CPT 50 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the CPT 50 ship kit, or remove the coating from the threads to ensure electrical continuity.

**Note** The mounting brackets can be installed in the front or the middle position of the chassis.

### Procedure

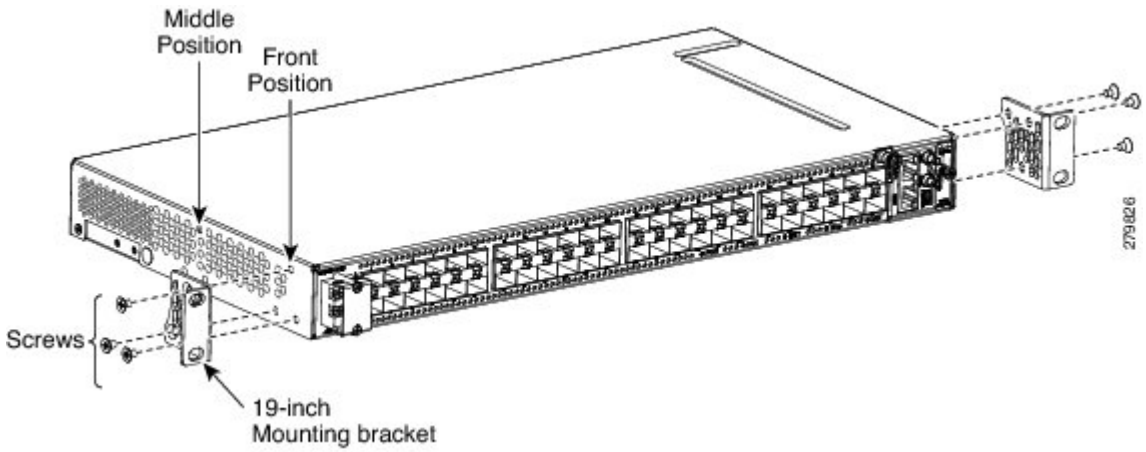
**Step 1** Place the wider side of the 19-inch mounting bracket flush against the CPT 50 shelf, as shown in Figure 11: Mounting the Brackets on the CPT 50 Shelf for ANSI Rack Configuration, on page 24. The narrow side of the mounting bracket should be towards the front of the shelf.

**Step 2** Align the mounting bracket screw holes against the shelf assembly screw holes.

**Step 3** Insert the M4 flat screws and tighten them to a torque value of 11.5 in-lbs (1.3 N-m).

**Step 4** Repeat Step 1 to Step 3 to mount the bracket on the opposite side.

***Figure 11: Mounting the Brackets on the CPT 50 Shelf for ANSI Rack Configuration***




**Step 5** Return to your originating procedure (NTP).

# DLP-J174 Mounting the 23-inch Brackets on the CPT 50 Shelf for the ANSI Rack Configuration

| | |
|---|---|
| **Purpose** | This task describes how to install the 23-inch mounting brackets on the CPT 50 shelf for the ANSI rack configuration. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |

| | |
|---|---|
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Caution** Use only the fastening hardware provided with the CPT 50 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

**Caution** When mounting the CPT 50 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the CPT 50 ship kit, or remove the coating from the threads to ensure electrical continuity.

**Note** The mounting brackets can be installed in the front or the middle position of the chassis.

## Procedure

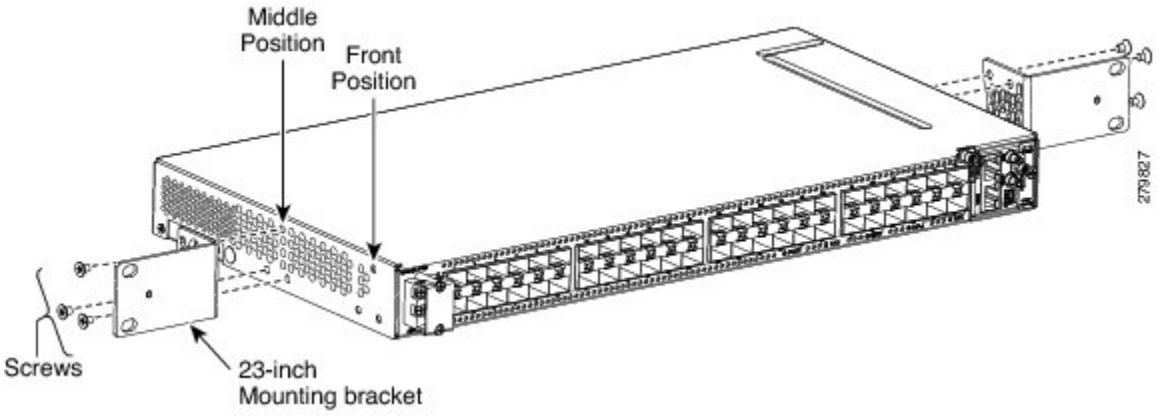
**Step 1** Place the narrow side of the 23-inch mounting bracket flush against the CPT 50 shelf, as shown in Figure 12: Mounting the Brackets on the CPT 50 shelf for a 23-inch (584.2-mm) ANSI Configuration, on page 25. The wider side of the mounting bracket should be towards the front of the shelf.

**Step 2** Align the mounting bracket screw holes against the shelf assembly screw holes.

**Step 3** Insert the M4 flat screws and tighten them to a torque value of 11.5 in-lbs (1.3 N-m).

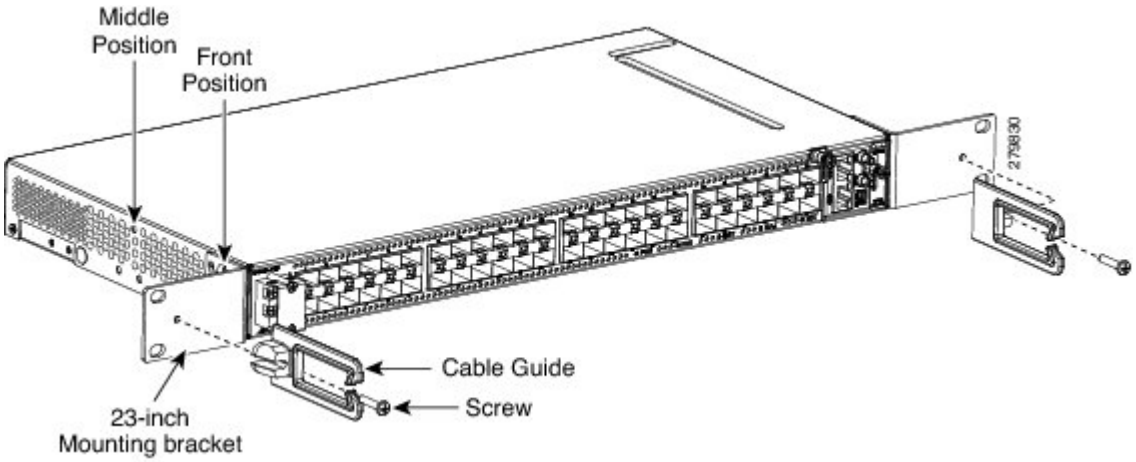
**Step 4** Repeat Step 1 to Step 3 to mount the bracket on the opposite side.

***Figure 12: Mounting the Brackets on the CPT 50 shelf for a 23-inch (584.2-mm) ANSI Configuration***



**Step 5** Align the cable guide screw hole against the mount bracket screw hole, as shown in this figure.

***Figure 13: Mounting the Cable Guide on the Bracket***




**Step 6** Insert the M4 screw and tighten it to a torque value of 6.5 in-lbs (0.75 N-m) .

**Note** The cable guide is made of plastic. Therefore a lower torque value should be applied to tighten the cable guide screws to avoid breakage.

**Step 7** Repeat Step 5 and Step 6 to install the cable guide on the opposite side.

**Step 8** Return to your originating procedure (NTP).

# DLP-J175 Mounting the Brackets on the CPT 50 Shelf for the ETSI Rack Configuration

| | |
|---|---|
| **Purpose** | This task describes how to install the mounting brackets on the CPT 50 shelf for the ETSI rack configuration. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Caution** Use only the fastening hardware provided with the CPT 50 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

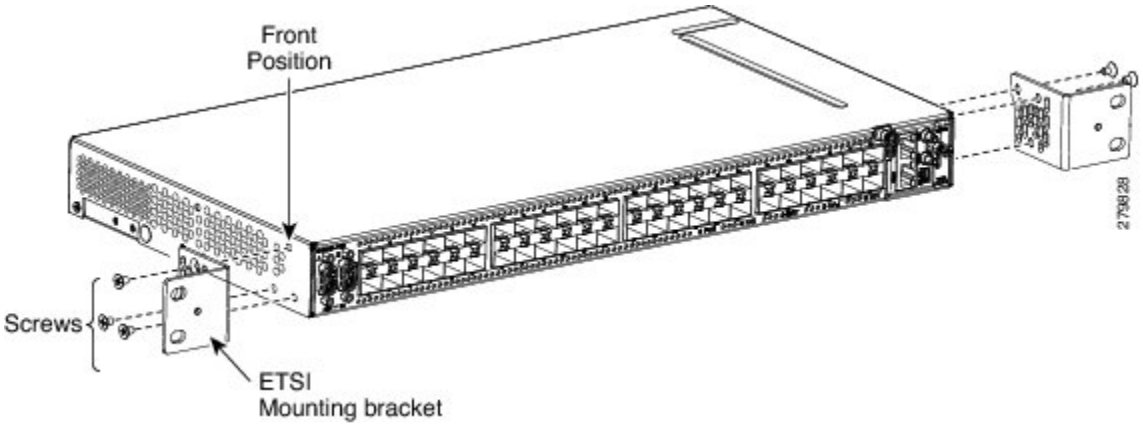
**Caution** When mounting the CPT 50 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the CPT-50 ship kit, or remove the coating from the threads to ensure electrical continuity.

**Note** The mounting brackets can be installed in the front or the middle position of the chassis.

## Procedure

**Step 1** Place the mounting bracket flush against the CPT 50 shelf, as shown in this figure.

***Figure 14: Mounting the Brackets on the CPT 50 Shelf for the ETSI Rack Configuration***



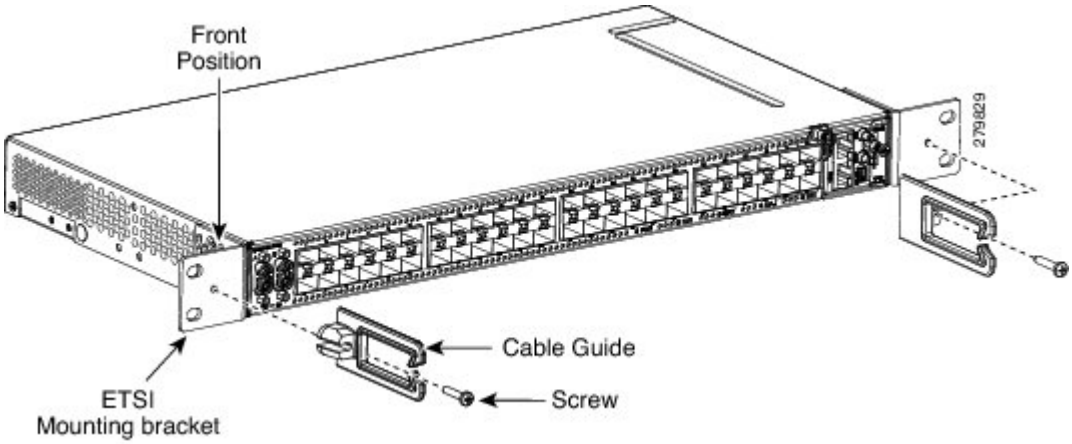

**Step 2** Align the mounting bracket screw holes against the CPT 50 shelf screw holes.

**Step 3** Insert the M4 flat screws and tighten them to a torque value of 11.5 in-lbs (1.3 N-m).

**Step 4** Repeat Step 1 to Step 3 to mount the bracket on the opposite side.

**Step 5** Align the cable guide screw hole against the mount bracket screw hole, as shown in this figure.

*Figure 15: Mounting the Cable Guide on the Bracket*




**Step 6** Insert the M4 screw and tighten it to a torque value of 6.5 in-lbs (0.75 N-m) .

**Note** The cable guide is made of plastic. Therefore a lower torque value should be applied to tighten the cable guide screws to avoid breakage.

**Step 7** Repeat Step 5 and Step 6 to install the cable guide on the opposite side.

**Step 8** Return to your originating procedure (NTP).

# DLP-J176 Mount the CPT 50 Shelf on a Rack (One Person)

| | |
|---|---|
| **Purpose** | This task explains how one person can mount the shelf assembly in a rack. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Four pan-head Phillips mounting screws |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Note** The CPT 50 shelf requires a minimum of 1.75 inches (44.44 mm) of vertical rack space. To ensure that the mounting is secure, use two M6 mounting screws on each side of the shelf for ETSI rack installation, and two 12-24 x 3/4 pan-head Phillips mounting screws on each side of the shelf for ANSI rack installation. A shelf assembly should be mounted at the bottom of the rack if it is the only unit in the rack.

**Note** In an ANSI rack, the chassis can be installed in the front or the middle position. In an ETSI rack, the chassis can be installed only in the front position.

### Procedure

**Step 1** Verify that the proper fuse panel has been installed in the top mounting space. If a fuse panel is not present, you must install one according to manufacturer instructions:

- For a 48 V DC power supply, the fuse rating must not exceed 10 A.
- For a 24 V DC power supply, the fuse rating must not exceed 15 A.
- For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes.

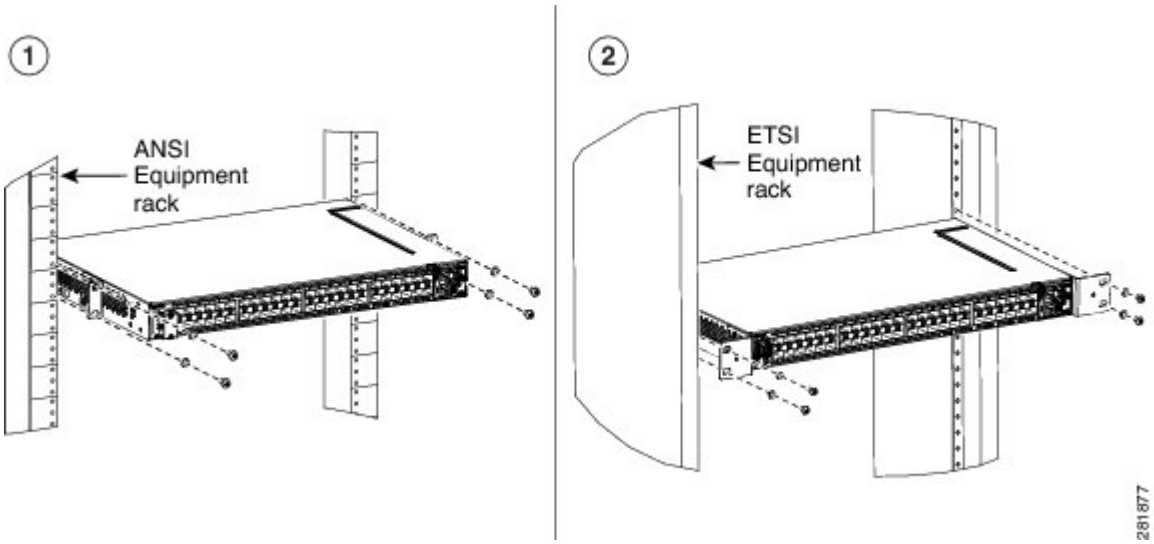
**Step 2** Ensure that the shelf assembly is mounted on the appropriate rack equipment:

- 23 inches (584.2 mm) or 19 inches (482.6 mm) for ANSI racks
- 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) for ETSI racks.
- For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes.

  Diagram 1 of Figure 16: Mounting an CPT 50 Shelf in a Rack, on page 30 shows the CPT 50 shelf mounted on an ANSI rack in the middle position using 19-inch mounting brackets.

  Diagram 2 of Figure 16: Mounting an CPT 50 Shelf in a Rack, on page 30 shows the CPT 50 shelf mounted on an ETSI rack in the front position using mounting brackets.

*Figure 16: Mounting an CPT 50 Shelf in a Rack*




**Step 3** Lift the shelf to the desired position in the rack.

**Step 4** Align the screw holes on the mounting brackets with the mounting holes in the rack.

**Step 5** Using the Phillips Dynamometric screwdriver, install one mounting screw in each side of the assembly:

- For an ANSI rack, use 12-24 x 3/4 pan-head Phillips mounting screws and tighten it to a torque value of 22 in-lbs (2.5 Nm)
- For an ETSI rack, use M6 mounting screws and tighten it to a torque value of 22 in-lbs (2.5 Nm)

**Step 6** When the shelf assembly is secured to the rack, install the remaining two mounting screws on either sides of the shelf assembly.

**Step 7** Return to your originating procedure (NTP).

# DLP-J177 Mount the CPT 50 Shelf on the Wall

| | |
|---|---|
| **Purpose** | This task explains how to mount the CPT 50 shelf on the wall. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver |
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Note** The CPT 50 shelf requires a minimum of 23.65 inches (600-mm) vertical length and a minimum of 15.75 inches (400-mm) horizontal width on the wall. Wall mount brackets are used to mount the CPT 50 shelf on the wall. The type of screws used to mount the brackets on the wall depends on the wall-type; wall mount brackets are not provided by Cisco. The screws used must be able to sustain an overall weight of at least 10 kg (22 lb).

### Procedure

**Step 1** Verify that the proper fuse panel has been installed in the top mounting space. If a fuse panel is not present, you must install one according to manufacturer instructions:

- For a 48 V DC power supply, the fuse rating must not exceed 10 A.
- For a 24 V DC power supply, the fuse rating must not exceed 15 A.
- For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes.

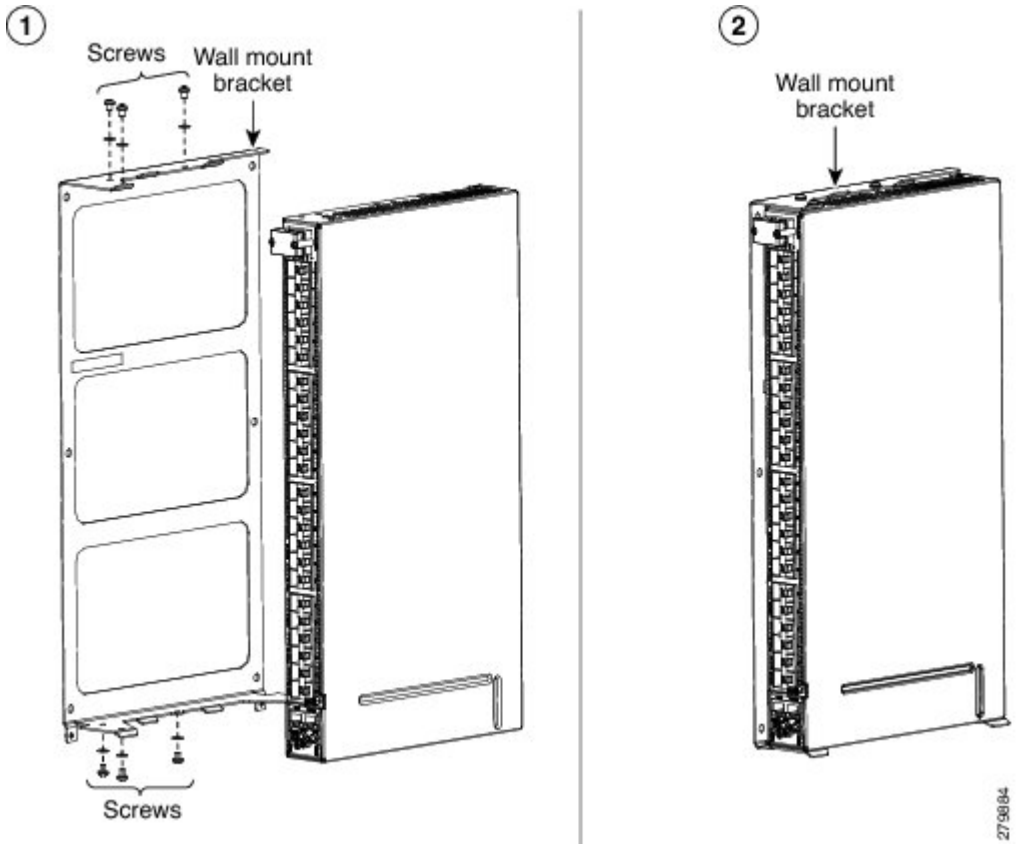
**Step 2** Mount the bracket on the wall, as shown in Figure 17: Wall Mounting of the CPT 50 Shelf, on page 32. To mount the bracket on a non-concrete wall, choose the bracket holes based on the wall structure. At least four

screws must be used to mount the bracket on the wall. Based on the wall material, apply the torque value provided by the screw vendor.

**Step 3** Align the mounting bracket screw holes against the shelf screw holes, as shown in diagram 1 of Figure 17: Wall Mounting of the CPT 50 Shelf, on page 32.

**Step 4** Insert six M4 pan-head screws and tighten them to a torque value of 11.5 in-lbs (1.3 N-m), as shown in diagram 2 of Figure 17: Wall Mounting of the CPT 50 Shelf, on page 32.

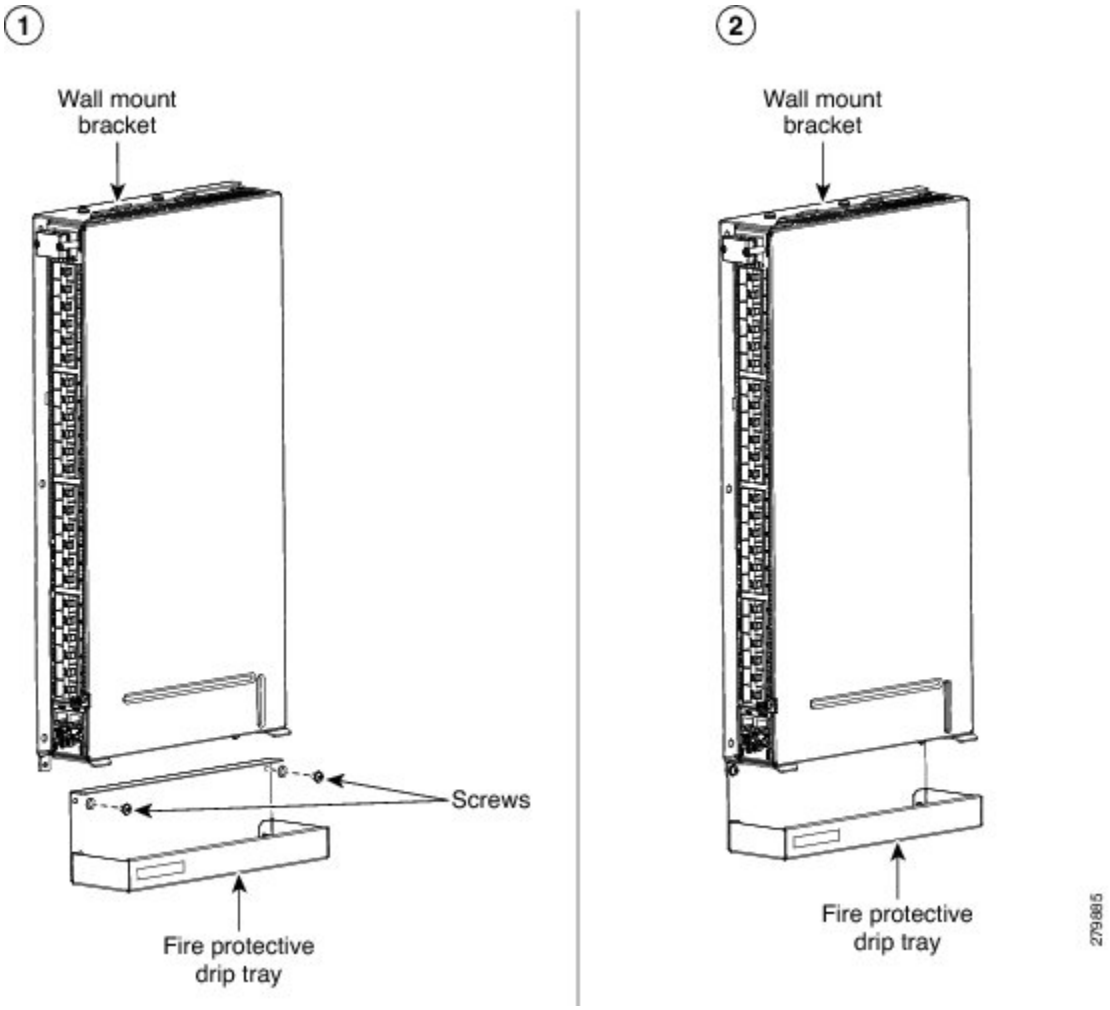
***Figure 17: Wall Mounting of the CPT 50 Shelf***




**Step 5** Align the fire protective drip tray screw holes against the wall mounting bracket screw holes, as shown in diagram 1 of Figure 18: Mounting the Fire Protective Cover, on page 33. The fire protective drip tray is present in the wall mount accessory kit provided by Cisco.
The part number of the fire protective drip tray is Cisco PN 700-31762-XX. The product identifier (PID) of the wall mount accessory kit is CPT-50-BRKTWM= and the part number is Cisco PN 53-3513-XX.

**Step 6** Insert two M4 pan-head screws and tighten them to a torque value of 11.5 in-lbs (1.3 N-m), as shown in diagram 2 of Figure 18: Mounting the Fire Protective Cover, on page 33.

***Figure 18: Mounting the Fire Protective Cover***




**Step 7** Return to your originating procedure (NTP).

# DLP-J178 Mount the CPT 50 Shelf on the Desktop

| | |
|---|---|
| **Purpose** | This task explains how to mount the shelf on the desktop. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver |

| | |
|---|---|
| **Prerequisite Procedures** | NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 |
| **Required/As Needed** | As Needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

## Procedure

**Step 1** Verify that the proper fuse panel has been installed in the top mounting space. If a fuse panel is not present, you must install one according to manufacturer instructions:

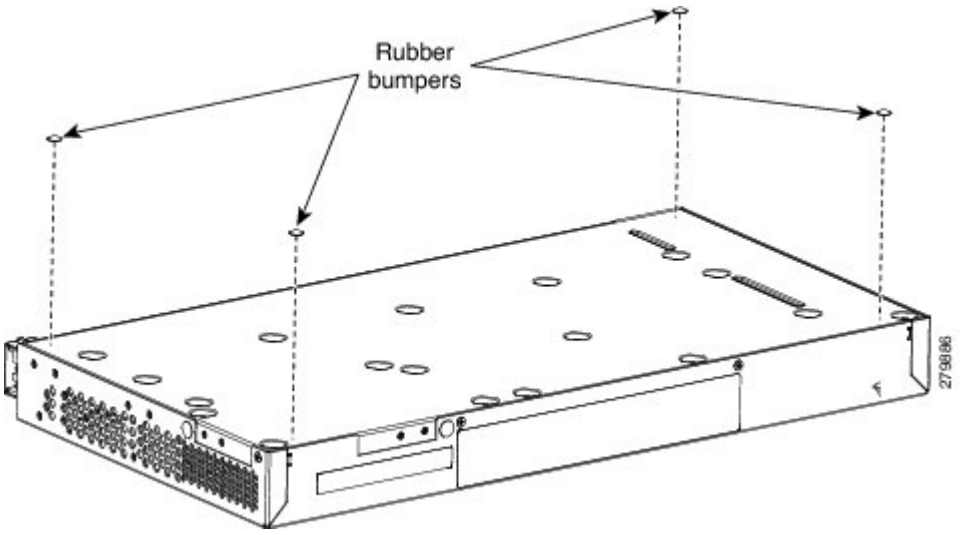
- For a 48 V DC power supply, the fuse rating must not exceed 10 A.
- For a 24 V DC power supply, the fuse rating must not exceed 15 A.
- For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes.

**Step 2** Locate the rubber bumpers provided in the accessory tool kit.

**Step 3** Place the CPT 50 shelf upside down on a smooth, flat surface.

**Step 4** Peel off the rubber bumpers from the adhesive strip and place it adhesive-side down onto all the four corners of the surface, as shown in this figure.

***Figure 19: Desktop Mounting of the CPT 50 shelf***




**Step 5** Place the CPT 50 shelf on a desktop, or other flat and secure surface.

**Step 6** Return to your originating procedure (NTP).

# Power Module

The CPT 50 shelf is available in four variations based on the power module :

- CPT 50 shelf with an AC power module for ANSI and ETSI standards
- CPT 50 shelf with a DC power module (48 V) for ANSI standard
- CPT 50 shelf with a DC power module (48 V) for ETSI standard
- CPT 50 shelf with a DC power module (24 V) for ANSI standard

**Note** Do not remove the top cover of the CPT 50 shelf.

### CPT 50 Shelf with an AC Power Module

The AC power module converts the AC input current to DC output current. The AC power module has one AC single phase with 3- pole ( line L, Neutral N, and Protective Earth PE) input connector.

### CPT 50 Shelf with a DC Power Module

The CPT 50 shelf with a DC power module can be powered by redundant DC power lines, however a single power line can power the entire CPT 50 shelf.

The CPT 50 shelf with DC power module for ETSI standard has two input battery connectors (two poles)—–48V, RET for power terminals A and B.

The CPT 50 shelf with DC power module for ANSI standard has single terminal block with four poles—–48V, RET for power terminals A and B.

# Fan-Tray Assembly

The fan-tray assembly is preinstalled on the right side of the CPT 50 shelf. The fan-tray assembly is removable and holds fans and fan-control circuitry for the CPT 50 shelf. The fan-tray assembly should be accessed only if a fan failure occurs.

The fan-tray assembly has the following ports:

- EOBC (Ethernet Out-of-Band Channel)—An RJ-45 port that supports high bandwidth external connectivity. If the CPT-50 shelf fails to boot up, the EOBC port also called as the disaster recovery port is used to log in to the CPT-50 shelf for troubleshooting.

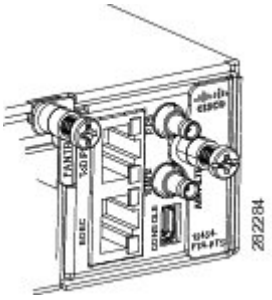
  **Note** The EOBC port is meant only for TAC (Technical Assistance Center) usage.

- PPS (Pulse Per Second)—A mini BNC output port that provides timing signals to an external equipment from the CPT 50 shelf .

- 10MH—A mini BNC output port that provides timing signals at a frequency of 10 MHz to an external equipment from the CPT 50 shelf and RET for power terminals A and B.
- ToD/PPS (Time of Day/Pulse Per Second)—An RJ-45 serial output port that provides time and day information and timing signals to an external equipment from the CPT 50 shelf.
- CONSOLE—A USB port that is used to connect a console terminal. The console terminal can be one of the following:
  - An ASCII terminal or a PC running terminal emulation software
  - A modem

The following figure shows the ports on the fan-tray assembly:

***Figure 20: Ports on the Fan-Tray Assembly***




**Note** The timing signals are compliant with the IEEE 1588 standard.

The console port provides access to the CPT 50 shelf either locally (using a console terminal), or remotely (using a modem). Console connections transmit at slower speeds than modems; therefore, the console connection is suited for use with console terminals.

**Note** An RJ-45 serial port is used for TOD/PPS functionality. The two RJ-45 pins 7 and 8 is used for TOD (Time Of Day) functionality and the other two RJ-45 pins 1 and 2 are used for PPS functionality. Even though an RJ-45 cable is used for TOD/PPS connection, a serial link is established. Two mini coax connectors with RG316 1.0/2.3 M/M cables (50 ohm) are used for PPS (Pulse Per Second) and for 10MHz sinusoidal signal. Cable for TOD/PPS and 10MHz shall be shielded.

**Note** For rules about provisioning timing references, see Telcordia SR-NWT-002224.

### Fan Speed

Fan speed is controlled by the microprocessor present in the CPT 50 shelf. The sensors measure the critical component temperature of the CPT 50 shelf. Fan speed options are low, medium, and high.

### Fan Failure

If one or more fans fail on the fan-tray assembly, replace the entire assembly. You cannot replace individual fans. The red Fan Fail LED on the front of the CPT 50 shelf illuminates when one or more fans fail. The red Fan Fail LED clears after you install a working fan-tray.

# NTP-J55 Replace the Fan-Tray Assembly in the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This procedure describes how to replace the fan-tray assembly in the CPT 50 shelf. |
| **Tools/Equipment** | #2 Phillips Dynamometric screwdriver |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Caution** Do not operate an CPT 50 shelf without an air filter.

**Note** The estimated time for a skilled technician to replace an equipment fan or fan tray is 2 minutes.

**Note** The fan or the cooling unit can be replaced without service interruption.

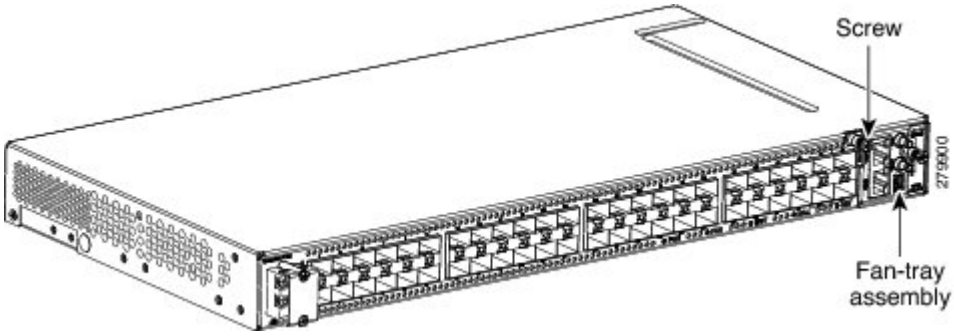
**Caution** Do not force a fan-tray module into place. Doing so can damage either the connectors on the fan tray or the connectors on the back panel of the shelf assembly, or both.

**Note** Error messages appear on the TNC or TSC card, the fan-tray LED, and in Cisco Transport Controller (CTC) when the fan-tray module is removed from the shelf or when one fan is not working.

### Procedure

**Step 1** Loosen the screw on the fan-tray assembly, as shown in this figure.

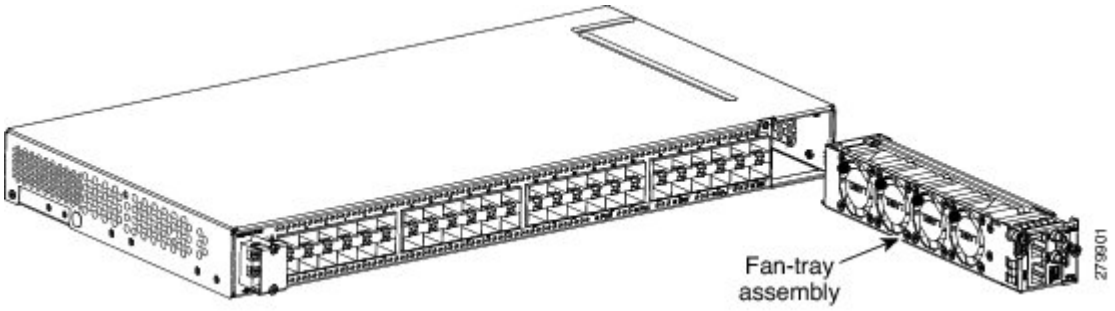
*Figure 21: Fan-Tray Assembly in the CPT-50 Shelf*




**Step 2** Extract the fan-tray assembly partially ( not more than 1 inch) to disconnect the backplane connector and wait until the fan stops.

**Step 3** When the fans have stopped, pull the fan-tray assembly completely out of the shelf, as shown this figure.

*Figure 22: Fan-Tray Extracted*




**Step 4** Slide the new fan-tray assembly into the shelf until the electrical plug at the rear of the tray plugs into the corresponding receptacle on the backplane.

**Step 5** Tighten the M3 screw to a torque value of 4 in-lbs (0.45 N-m) on the fan-tray assembly.
**Stop. You have completed this procedure.**

# NTP-J56 Replace the Air Filter in the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This procedure explains how to replace the air filter of the CPT 50 shelf. |
| **Tools/Equipment** | #2 Phillips Dynamometric screwdriver |

| | |
|---|---|
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

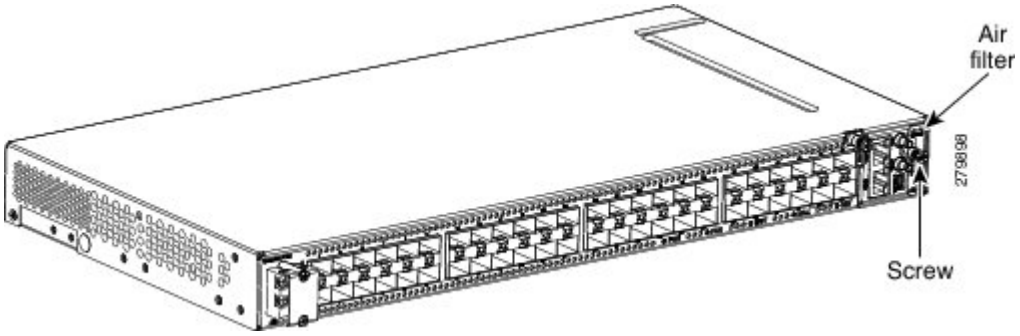
**Caution** Do not operate a CPT 50 shelf without an air filter.

**Note** Replacement or cleaning of an air filter is recommended every 60 days. Air filters are replaceable or reusable.

## Procedure

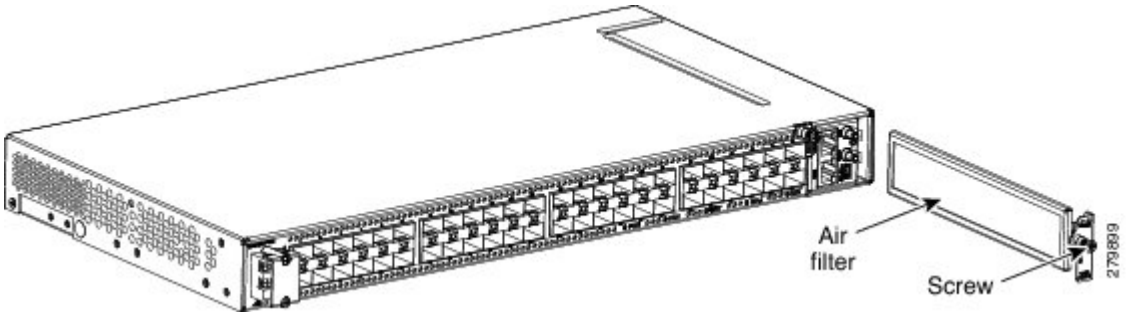
**Step 1** Loosen the screw on the air filter faceplate, as shown in this figure.

***Figure 23: Removing the Air Filter***



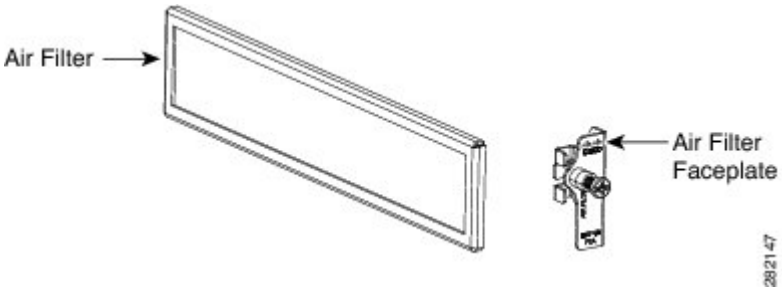

**Step 2** Extract the air filter from the shelf, as shown in this figure.

***Figure 24: Replacing the Air Filter***




**Step 3** Remove the air filter faceplate from the air filter frame, as shown in this figure.

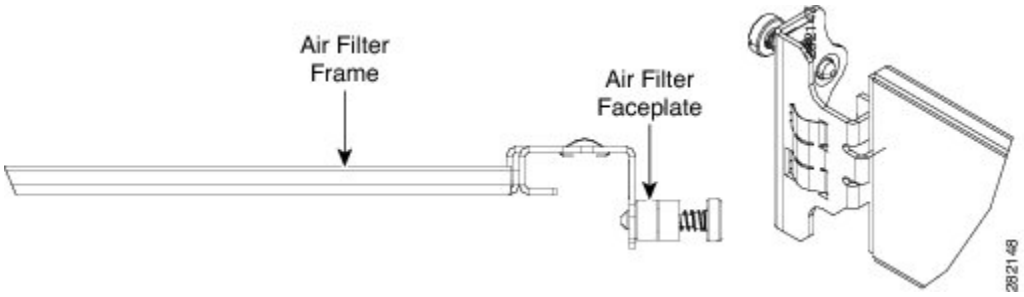
***Figure 25: Removing Air filter from the Face Plate***



**Step 4** Clean or replace the air filter.

**Step 5** Insert the air filter faceplate engaging the air filter frame, as shown in this figure.

***Figure 26: Attach the Air Filter Faceplate to the Air Filter Frame***




**Step 6** Insert the air filter into the shelf.

**Step 7** Tighten the M3 screw to a torque value of 4.0 in-lbs (0.45 N-m) on the air-filter.
**Stop. You have completed this procedure.**

# Power and Ground Description

Ground the equipment according to Telcordia standards or local practices. The following sections describe how to power and ground the CPT 50 shelf.

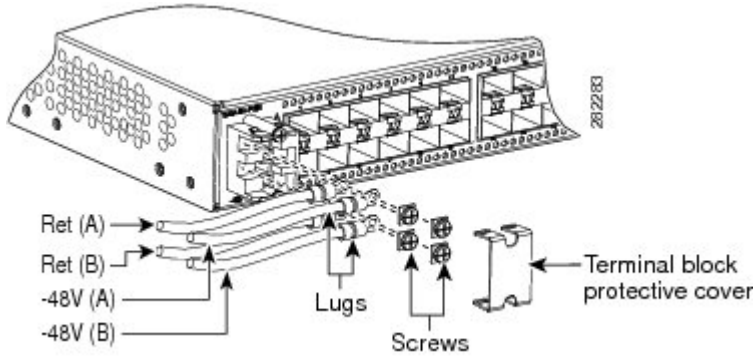
**Note** For detailed instructions on grounding the CPT 50 shelf, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.

### ANSI Power and Ground

For AC power feed, use the power cable shipped with the CPT 50 shelf. For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

The CPT 50 shelf for 48 VDC power supply has redundant –48 VDC #14 single-hole lug power terminals. The terminals are labeled RET(A), RET(B), -48V(A), and -48V(B) on the power module. See the figure below:

***Figure 27: CPT 50 Shelf for 48 VDC Power Supply***




The CPT 50 shelf for 24 VDC power supply has redundant –24 VDC #14 single-hole lug power terminals. The terminals are labeled RET(A), RET(B), -24V(A), and -24V(B) on the power module.

To install redundant DC power feeds, use four power cables and one ground cable. For a single power feed, only two power cables (#14 AWG or larger, copper conductor, 194 degrees Fahrenheit [90 degrees Celsius] minimum) and one ground cable (#8 AWG or larger) are required. Use a conductor with low impedance to ensure circuit overcurrent protection. However, the conductor must have the capability to safely conduct any faulty current that might be imposed.

For a 24 VDC power supply, the fuse rating must not exceed 15 A. The voltages –20 VDC and –28.3 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -24 VDC.

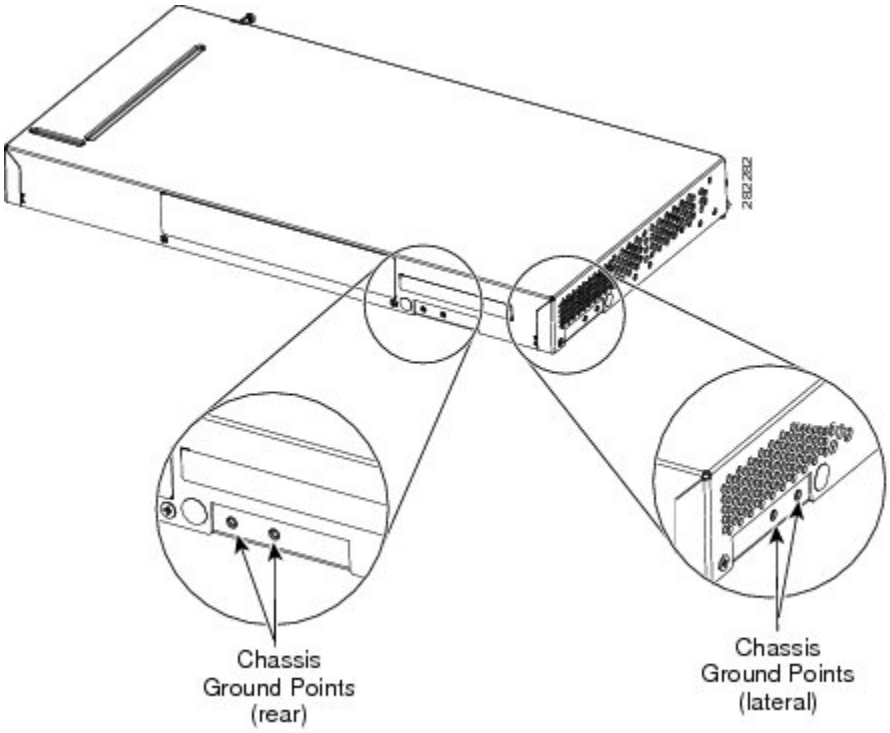
For a 48 VDC power supply, the fuse rating must not exceed 10 A. The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. Functionality is guaranteed at -40 VDC input voltage, according to GR-1089. The nominal steady state voltage is -48 VDC.

We recommend the following wiring conventions, but customer conventions prevail:

- Red wire for battery connections (–48 VDC or -24 VDC).
- Black wire for battery return connections (RET).
- The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE.

The ground lug must be a dual-hole type, UL Listed, CSA certified, and rated to accept the #8 AWG cable. Two ground threaded holes with M4 screws are provided on the CPT 50 shelf to accommodate the dual-hole lug. See the figure below:

***Figure 28: Ground Points on the CPT 50 Shelf***




### ETSI Power and Ground

The CPT 50 shelf for ETSI has redundant –48 VDC power connectors (DSUB for DC power module) on the DC power module. To install redundant power feeds, use the two power cables shipped with the CPT 50 shelf and one ground cable. For a DC power supply, the fuse rating must not exceed 10 A. The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC.

For AC power feed, use the power cable shipped with the CPT 50 shelf. For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

⚠

**Caution** Use only the power cables shipped with the CPT 50 shelf. The part number of the cables is Cisco PN 72-4974-XX and the PID is CPT-DC-CBL-E=.

# NTP-J57 Install the Power Feeds and Ground to the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This procedure explains how to install power feeds and ground the CPT 50 shelf. |
| **Tools/Equipment** | ANSI and ETSI:<br>• #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver<br>• Screws<br>• Ground cable 8.37-mm² (#8 AWG) stranded<br>• Listed pressure dual-holes lugs suitable for #14 AWG or larger copper conductors<br>• Wire cutters<br>• Wire strippers<br>• Crimp tool<br>• Fuse panel<br>• ETSI only:<br>◦ Power cable (from the fuse panel to the power modules), shipped with the CPT 50 shelf<br>◦ Two-hole grounding lug, shipped with the CPT 50 shelf<br>• ANSI only:<br>◦ Power cable (from the fuse panel to the assembly), #14 AWG or larger copper conductors, 194°F [90°C]) |
| **Prerequisite Procedures** | Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024



**Warning** To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module. Statement 390



**Warning** When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor. Statement 1002



**Warning** Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



**Warning** Before working on a chassis or working near power supplies, unplug the power cord on AC units. Statement 246



**Warning** This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. Statement 39



**Warning** Use copper conductors only. Statement 1025



**Warning** Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-1 based safety standards. Statement 1033



**Warning** This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045



**Warning** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A for CPT 50 shelf with 48 VDC power supply; 15A for CPT 50 shelf with 24 VDC power supply. Statement 1005

**Warning** This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-15A, 100-240VAC~. Statement 1005

**Warning** A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022

**Warning** This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

**Caution** Always use the supplied ESD wristband when working with a powered CPT 50 shelf. For detailed instructions on how to wear the ESD wristband, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.

## Procedure

**Step 1** Verify that the correct fuse panel is installed in the top mounting space:

- For a 48 VDC power supply, the fuse rating must not exceed 10 A.
- For a 24 VDC power supply, the fuse rating must not exceed 15 A.
- For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries. The overcurrent and short circuit protection must be in accordance with local and national electrical codes.

**Step 2** Depending on the shelf and the power module installed, complete the necessary task:

- DLP-J179 Connect Office Power (AC) to the CPT 50 Shelf, on page 47.
- DLP-J180 Connect Office Power (DC) to the CPT 50 Shelf (ANSI Only), on page 50.
- DLP-J181 Connect Office Power (DC) to the CPT 50 Shelf (ETSI Only), on page 54.

**Step 3** Connect the office ground to the CPT 50 shelf. For detailed instructions on grounding, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.

**Step 4** Complete the DLP-J182 Turn On and Verify AC Office Power on the CPT 50 Shelf, on page 57 or DLP-J183 Turn On and Verify DC Office Power on the CPT 50 Shelf, on page 58 as necessary.
**Stop. You have completed this procedure.**

# DLP-J179 Connect Office Power (AC) to the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This task explains how to connect AC power to the CPT 50 shelf. |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver<br>• Wire wrapper<br>• Wire cutters<br>• Wire strippers<br>• Crimp tool<br>• Fuse panel<br>• Ground cable 8.37-mm² (#8 AWG) stranded |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Note** This product is intended for use on the TN and TT power systems.

**Warning** When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

**Warning** This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC). Statement 7012

**Caution** The CPT 50 shelf relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

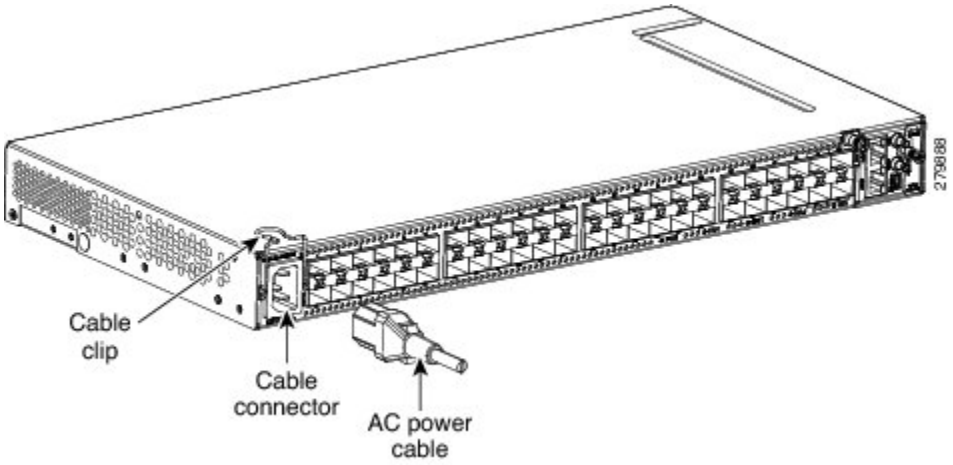
**Caution** When terminating the frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick connect connectors, or other friction-fit connectors.

**Note** If the CPT-50 shelf loses its connection to the line or fabric card, the CPT-50 shelf resets until the connection to the line or fabric card is re-established.

## Procedure

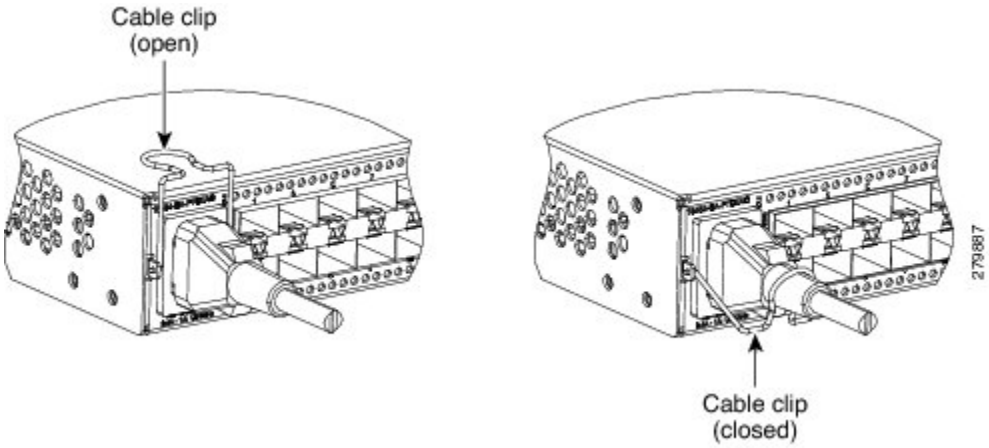
**Step 1** Attach the AC power cable to the cable connector in the AC power module, as shown in this figure.

***Figure 29: Connecting Office Power—AC Power***




**Step 2** Close the cable clip to secure the power cable, as shown in this figure.

***Figure 30: Cable Clip to Secure the Power Cable***




**Step 3** Connect the power cable to the fuse panel or power source.

**Note** The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries.

**Step 4** Return to your originating procedure (NTP).

# DLP-J180 Connect Office Power (DC) to the CPT 50 Shelf (ANSI Only)

| | |
|---|---|
| **Purpose** | This task explains how to connect the DC power to the CPT 50 shelf (ANSI Only). |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver<br>• Wire cutters<br>• Wire strippers<br>• Crimp tool<br>• Fuse panel<br>• Ground cable 8.37-mm² (#8 AWG) stranded<br>• Power cable (from fuse panel to assembly), #14 AWG or larger copper conductors, 194°F [90°C])<br>• Listed pressure dual-holes lugs suitable for #14 AWG or larger copper conductors |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

**Warning** Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. Statement 1075

**Caution** The CPT 50 shelf relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

**Note** The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE.

**Note** If the CPT-50 shelf loses its connection to the line or fabric card, the CPT-50 shelf resets until the connection to the line or fabric card is re-established.

## Procedure

**Step 1** Connect the return cables of the power supply to the Earth ground located at the power supply side.

**Step 2** Connect the office power according to the fuse panel engineering specifications.

**Step 3** Measure and cut the cables as needed to reach the CPT 50 shelf from the fuse panel.

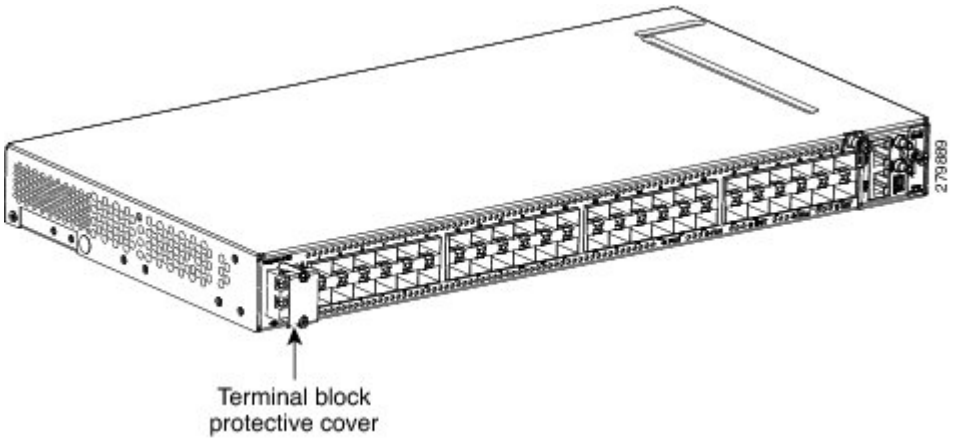
**Step 4** Dress the power according to local site practice.

**Step 5** Strip 1/2 inch (12.7 mm) of insulation from all power cables that you will use.

**Step 6** Crimp the lugs onto the ends of all the power leads.

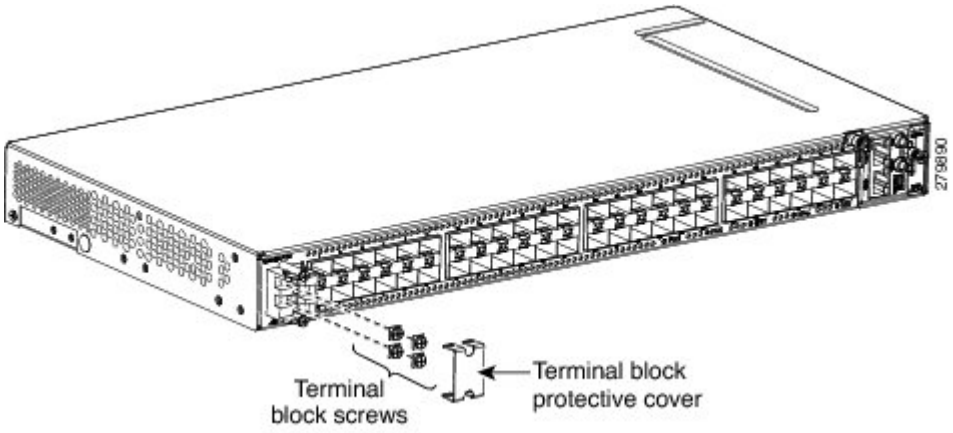
**Step 7** Remove the terminal block protective cover, as shown in this figure.

***Figure 31: Removing the Terminal Block Protective Cover***



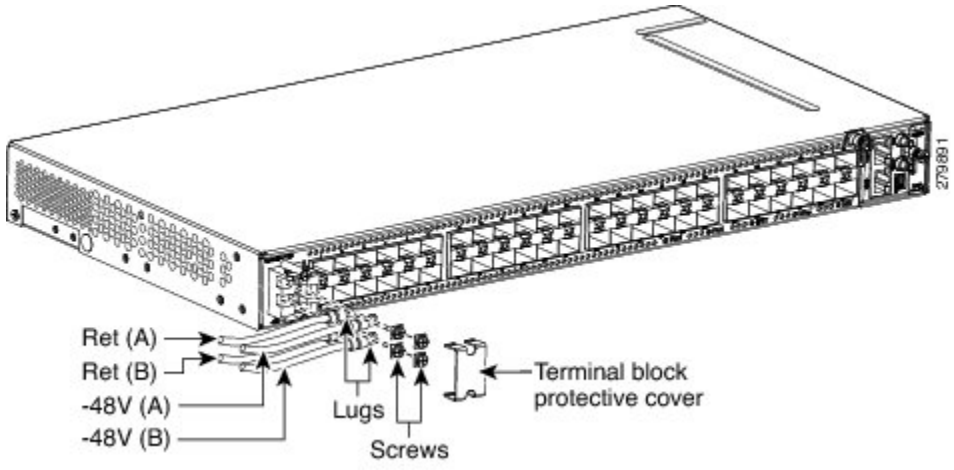

**Step 8** Untighten the terminal block screws, as shown in this figure.

***Figure 32: Loosening the Terminal Block Screws***




**Step 9** Insert the lugs, as shown in this figure.

***Figure 33: Inserting the Lugs***



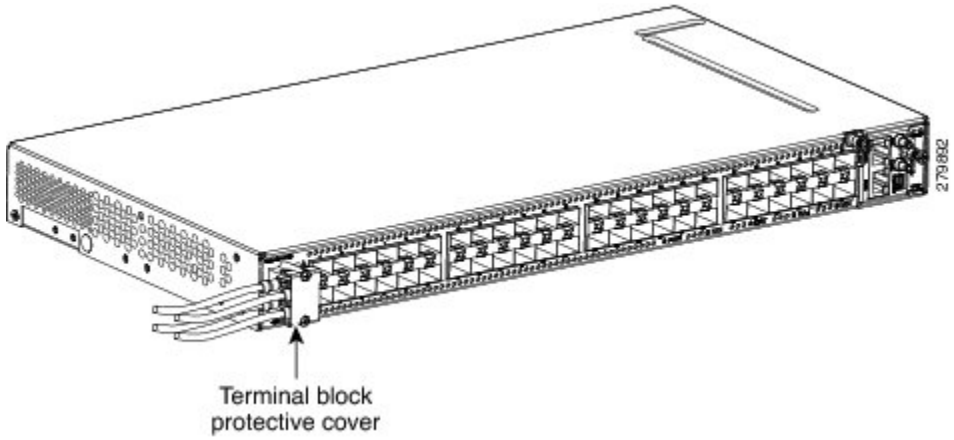

**Note** There are two DC power terminals—A and B. Each power terminal is connected with two cables—one for RET and the other for -48V.

**Step 10** Tighten the M3.5 screws to a torque value of 7 in-lbs (0.79 N-m) to lock the lugs.

**Step 11** Mount the terminal block protective cover on the CPT 50 shelf (see the following figure, "Connecting Office Power—DC Power Modules (ANSI Only)").

**Note** Use only pressure terminal connectors, such as ring and fork types, when terminating the battery, battery return, and frame ground conductors.

***Figure 34: Replacing the Terminal Block Protective Cover***




**Caution** Before you make any crimp connections, coat all bare conductors (battery, battery return, and frame ground) with an appropriate antioxidant compound. Bring all unplated connectors, braided strap, and bus bars to a bright finish, then coat with an antioxidant before you connect them. You do not need to prepare tinned, solder-plated, or silver-plated connectors and other plated connection surfaces, but always keep them clean and free of contaminants.

**Caution** When terminating the power, return (RET), and frame ground, do not use soldering lug, screwless (push-in) connectors, quick-connect, or other friction-fit connectors.

**Step 12** Return to your originating procedure (NTP).

# DLP-J181 Connect Office Power (DC) to the CPT 50 Shelf (ETSI Only)

| | |
|---|---|
| **Purpose** | This task explains how to connect the DC power to the CPT 50 shelf (ETSI Only). |
| **Tools/Equipment** | • #2 Phillips Dynamometric screwdriver<br>• Medium slot-head screwdriver<br>• Small slot-head screwdriver<br>• Wire wrapper<br>• Wire cutters<br>• Wire strippers<br>• Crimp tool<br>• Fuse panel<br>• Ground cable 8.37-mm² (#8 AWG) stranded |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

**Warning** Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. Statement 1075

**Note** The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE.

**Caution** The CPT 50 shelf relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

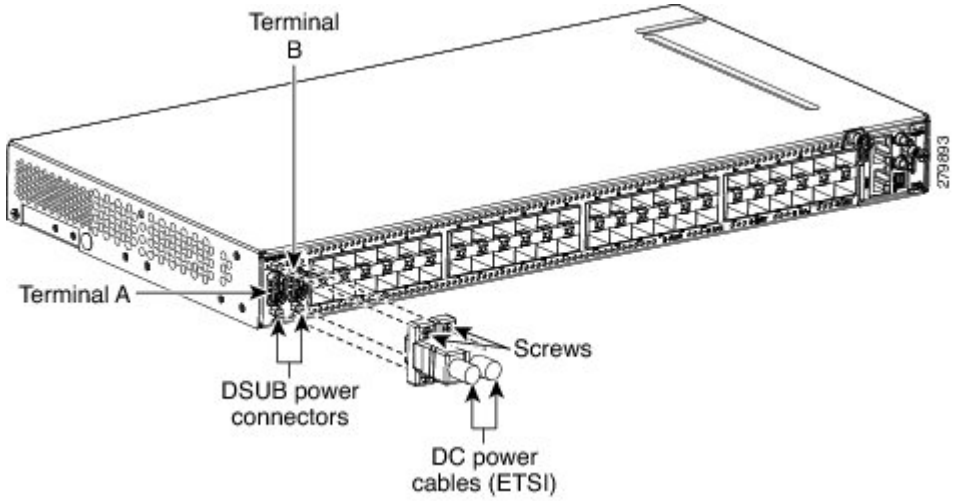
**Note** If the CPT 50 shelf loses its connection to the line or fabric card, the CPT 50 shelf resets until the connection to the line or fabric card is re-established.

## Procedure

**Step 1** Connect the return cables of the power supply to the Earth ground located at the power supply side.

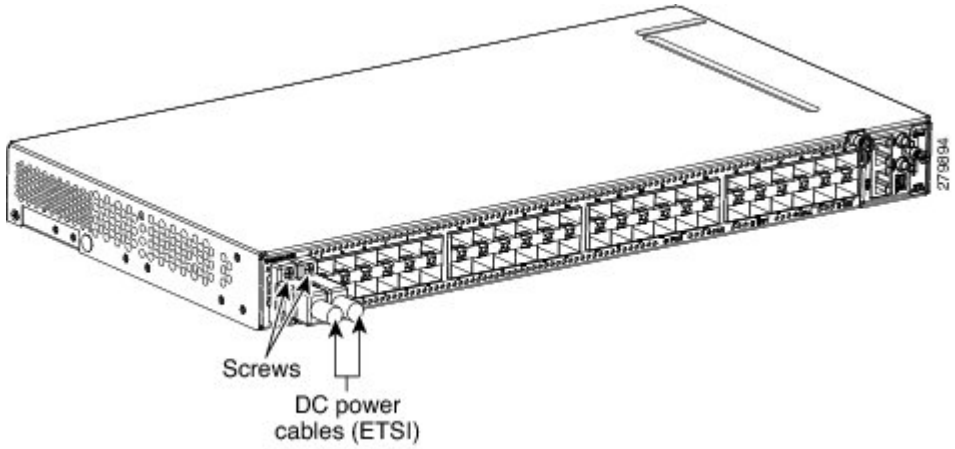
**Step 2** Attach the DC ETSI power cables to the DSUB power connectors of the DC power module, as shown in this figure.

***Figure 35: Connecting DC ETSI Power Cables to the DSUB Power Connectors***




**Step 3** Tighten the M3 pan-head screws to a torque value of 4 in-lbs ( 0.45 N-m) to secure the cable, as shown in this figure.

***Figure 36: Securing the DC Power Cables***




**Note** Use only pressure terminal connectors, such as ring and fork types, when terminating the battery, battery return, and frame ground conductors.

**Caution** Before you make any crimp connections, coat all bare conductors (battery, battery return, and frame ground) with an appropriate antioxidant compound. Bring all unplated connectors, braided strap, and bus bars to a bright finish, then coat with an antioxidant before you connect them. You do not need to prepare tinned, solder-plated, or silver-plated connectors and other plated connection surfaces, but always keep them clean and free of contaminants.

**Caution** When terminating power, return, and frame ground, do not use soldering lug, screwless (push-in) connectors, quick-connect, or other friction-fit connectors.

**Step 4** Return to your originating procedure (NTP).

# DLP-J182 Turn On and Verify AC Office Power on the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This task explains how to measure the power to verify correct power and returns for the CPT 50 shelf. |
| **Tools/Equipment** | Voltmeter |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.<br>• DLP-J179 Connect Office Power (AC) to the CPT 50 Shelf, on page 47 |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module. Statement 390

**Caution** Do not apply power to the shelf assembly until you complete all the installation steps.

### Procedure

**Step 1** To power up the node, insert the fuse into the fuse position according to site practice. For an AC power supply, the fuse rating must not exceed 10 A or 15 A, depending on the standards in various countries.

**Step 2** If the CPT 50 shelf does not power up, check the voltage at the power source using a voltmeter. The voltage should be 100 VAC to 240 VAC +/-10 percent.

**Step 3** Return to your originating procedure (NTP).

# DLP-J183 Turn On and Verify DC Office Power on the CPT 50 Shelf

| | |
|---|---|
| **Purpose** | This task explains how to measure the power to verify correct power and returns for the CPT 50 shelf. |
| **Tools/Equipment** | Voltmeter |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.<br>• DLP-J180 Connect Office Power (DC) to the CPT 50 Shelf (ANSI Only), on page 50<br>(or)<br>• DLP-J181 Connect Office Power (DC) to the CPT 50 Shelf (ETSI Only), on page 54 |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module. Statement 390

**Caution** Do not apply power to the shelf assembly until you complete all the installation steps.

## Procedure

**Step 1** Using a voltmeter, verify the office battery and ground at the following points on the fuse panel:

a) To verify the power, place the black test lead of the voltmeter to the return (RET). Place the red test lead on the BAT-A connection and verify that:

- For a 24 VDC power supply, the voltage is between –20 VDC and –28.3 VDC. Place the red test lead on the BAT-B connection and verify that it is between –20 VDC and –28.3 VDC.

  **Note** The voltages –20 VDC and –28.3 VDC are, respectively, the minimum and maximum voltages required to power the CPT 50 shelf that has 24V DC power supply. The nominal steady state voltage is -24 VDC.

- For a 48 VDC power supply, the voltage is between –40.5 VDC and –57.6 VDC. Place the red test lead on the BAT-B connection and verify that it is between –40.5 VDC and –57.6 VDC.

  **Note** The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the CPT 50 shelf that has 48V DC power supply. The nominal steady state voltage is -48 VDC.

b) To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the BAT-A return ground and verify that no voltage is present, that is, meter reading must be 0 VDC. Place the red test lead on the BAT-B return ground and verify that no voltage is present, that is, meter reading must be 0 VDC.

**Step 2** To power up the node, insert the fuse into the fuse position according to site practice. For a 24 VDC power supply, the fuse rating must not exceed 15 A. For a 48V DC power supply, the fuse rating must not exceed 10 A.

**Step 3** Using a voltmeter, verify the CPT 50 shelf for –48 VDC or –24 VDC battery and return:

a) To verify the BAT-A of the shelf, place the black lead of the voltmeter to the return. Place the red test lead to the –48V or –24V (BAT-A battery connection) red cable. For a 48 VDC power supply, verify that it reads between –40.5 VDC and –57.6 VDC. For a 24 VDC power supply, verify that the voltage reads between –20 VDC and –28.3 VDC. Then place the red test lead of the voltmeter to the RET1 (BAT-A return ground) black cable and verify that no voltage is present, that is, meter reading must be 0 VDC.

**Note** For a CPT 50 shelf that has 24 VDC power supply, the voltages –20 VDC and –28.3 VDC are, respectively, the minimum and maximum voltages required to power the CPT 50 shelf. The nominal steady state voltage is –24 VDC. To prevent damage to the CPT 50 shelf, the voltage must not exceed -30 VDC.

**Note** For a CPT 50 shelf that has 48 VDC power supply, the voltages –40.5 VDC and –57.6 VDC. are, respectively, the minimum and maximum voltages required to power the CPT 50 shelf. The nominal steady state voltage is –48 VDC.

b) To verify the BAT-B of the shelf, place the black test lead of the voltmeter to the return. Place the red test lead to the –48 V or –24 V (BAT-B battery connection) red cable. For a 48 VDC power supply, verify that it reads between –40.5 VDC and –57.6 VDC. For a 24 VDC power supply, verify that the voltage reads between –20 VDC and –28.3 VDC. Then place the red test lead of the voltmeter to the RET2 (BAT-B return ground) black cable and verify that no voltage is present, that is, meter reading must be 0 VDC.

c) To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the BAT-A return ground and verify that no voltage is present, that is, meter reading must be 0 VDC.

Place the red test lead on the BAT-B return ground and verify that no voltage is present, that is, meter reading must be 0 VDC.

**Step 4** Return to your originating procedure (NTP).

# NTP-J58 Connecting Cables to the EOBC, Timing, and Console Ports

| | |
|---|---|
| **Purpose** | This procedure describes how to connect cables to the EOBC, timing, and console ports in the CPT 50 shelf. |
| **Tools/Equipment** | • Mini-BNC cables (Cisco PN 72-5118-XX)<br>• USB cable<br>• CAT-5 Ethernet cable |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | As needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Caution** Always use the supplied Electrostatic Discharge (ESD) wristband when working with a powered CPT 50 shelf. For detailed instructions on how to wear the ESD wristband, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*.

### Procedure

**Step 1** Complete the DLP-J184 Connect the Timing Cables to the PPS, 10MHz, and ToD/PPS Ports, on page 61 to connect timing to an external equipment.

**Step 2** Complete the DLP-J185 Install Cables to the EOBC or Console Port, on page 62 to install the cables to the EOBC or console port.

**Stop. You have completed this procedure.**

# DLP-J184 Connect the Timing Cables to the PPS, 10MHz, and ToD/PPS Ports

| | |
|---|---|
| **Purpose** | This procedure describes how to connect the timing cables to the PPS, 10 MHz, and ToD/PPS ports on the CPT 50 shelf. |
| **Tools/Equipment** | • Mini-BNC cables (Cisco PN 72-5118-XX)<br>• CAT-5 Ethernet cable |
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | As needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring. **Statement 7005**

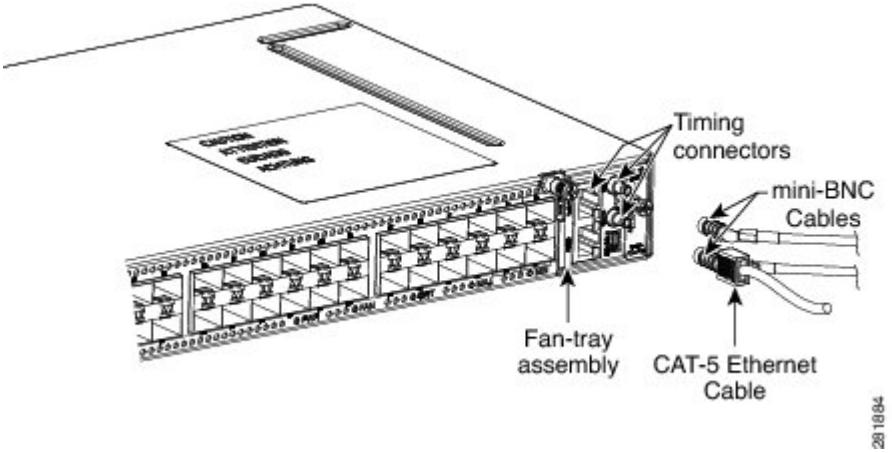
**Note** For rules about provisioning timing references, see ITU-T G.813.

**Note** To unplug the RJ-45 cables connected to the ToD/PPS and EOBC ports on the fan-tray, use small pliers or a screwdriver.

### Procedure

**Step 1** Locate the timing connectors (PPS, 10 MHz, or ToD/PPS) on the fan-tray assembly of the CPT 50 shelf, as shown in this figure.

***Figure 37: Timing Connectors (PPS, 10 MHz, or ToD/PPS) on the Fan-Tray Assembly***




**Step 2** To connect the PPS or 10 MHz port:

a) Connect one end of the mini-BNC cable to the PPS or 10 MHz mini-BNC output port.
b) Connect the other end of the mini-BNC cable to an external equipment to provide timing signals.

**Step 3** To connect the ToD/PPS RJ-45 output port:

a) Connect one end of a standard CAT-5 Ethernet cable to the ToD/PPS RJ-45 output port.
b) Connect the other end of the CAT-5 Ethernet cable to an external equipment to provide timing signals.

**Step 4** Return to your originating procedure (NTP).

# DLP-J185 Install Cables to the EOBC or Console Port

| | |
|---|---|
| **Purpose** | This procedure explains how to connect cables to the EOBC or console port on the CPT 50 shelf. |
| **Tools/Equipment** | • USB cable<br>• CAT-5 Ethernet cable |

| | |
|---|---|
| **Prerequisite Procedures** | • NTP-J54 Install the CPT 50 Shelf, on page 20<br>• Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms*. |
| **Required/As Needed** | As needed |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** The intra-building ports of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring. **Statement 7005**.

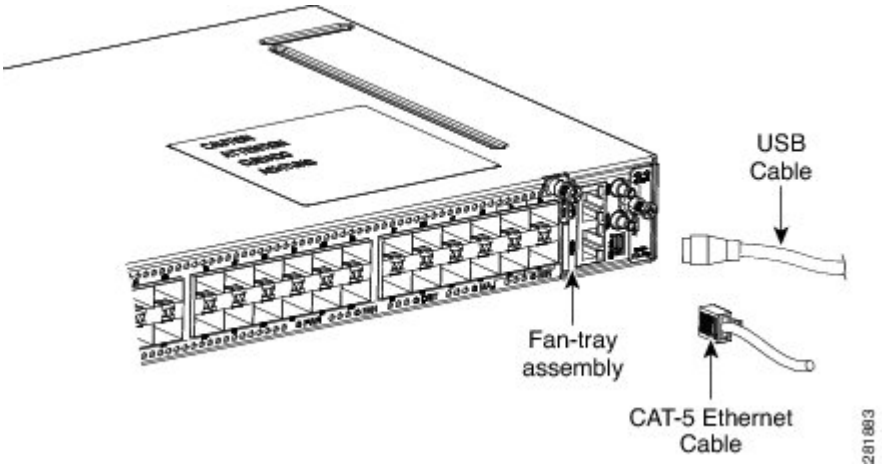
**Note** The console port is used for the setup and maintenance of the CPT 50 shelf and the EOBC port is used for disaster recovery, that is, to log in to the CPT 50 shelf for troubleshooting when the connection between the CPT 50 shelf and CPT 600 shelf is lost.

**Note** To unplug the RJ-45 cables connected to the ToD/PPS and EOBC ports on the fan-tray, use small pliers or a screwdriver.

### Procedure

**Step 1** Locate the EOBC port or the console port on the fan tray assembly of the CPT 50 shelf, as shown in this figure.

***Figure 38: EOBC or Console Port on the Fan-Tray Assembly***




**Step 2** To connect the EOBC port:

a) Connect one end of a standard CAT-5 Ethernet cable to the EOBC port.
b) Connect the other end of the CAT-5 Ethernet cable to establish external connectivity.

**Step 3** To connect the console port:

a) Connect one end of the USB cable to the console port.
b) Connect the other end of the USB cable to the console terminal or a modem that connects to the console terminal.

**Step 4** Return to your originating procedure (NTP).

# NTP-J59 Install and Route Fiber-Optic Cables

| | |
|---|---|
| **Purpose** | This task describes how to install and route fiber-optic cables. |
| **Tools/Equipment** | • Cables<br>• Tie-wrap |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |

| | |
|---|---|
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

**Caution** When connecting an optical fiber patch cord between the CPT 50 shelf and the optical card ports in the Cisco ONS 15454 M6 or Cisco ONS 15454 M2, use the electrostatic discharge wristband supplied with the Cisco ONS 15454 M6 or M2.

**Note** Always clean all the fiber connectors thoroughly before making the connection with the mating adapter. Very small particles can permanently damage the end of the mating fiber inside the CPT 50 shelf, which makes regular cleaning imperative. For cleaning instructions, see NTP-J60 Clean Fiber Connectors, on page 67.

**Note** The CPT 50 shelf features LC/UPC bulkhead adapters. Always use fiber-optic cables equipped with the corresponding (LC/UPC) connector type. Using any other type of connector results in damage to the connector or adapter, or both.

### Procedure

**Step 1** Place the LC/UPC cable connector in front of the corresponding bulkhead adapter on the front panel of the CPT 50 shelf.

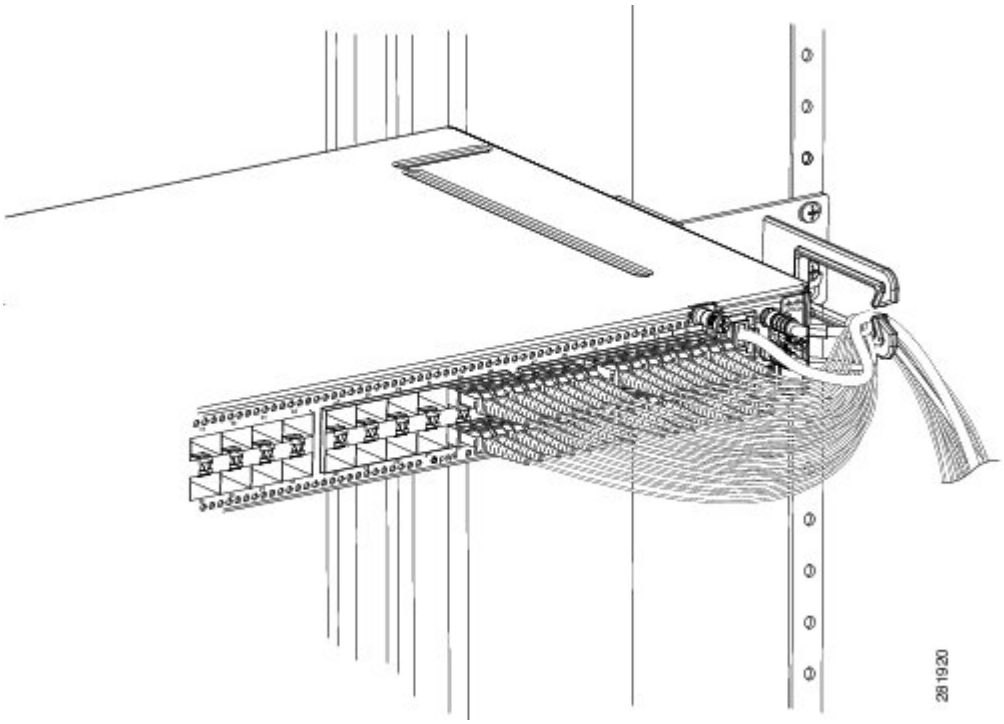
**Step 2** Align the keyed ridge of the cable connector with the slot in the receiving adapter.

**Step 3** Gently push the cable connector into the adapter until you hear a click, which indicates that the latching system is engaged.

**Step 4** Route the fiber cables through the cable guide (left and right side). A tie-wrap is tied around the fiber and cables through the cable guide.

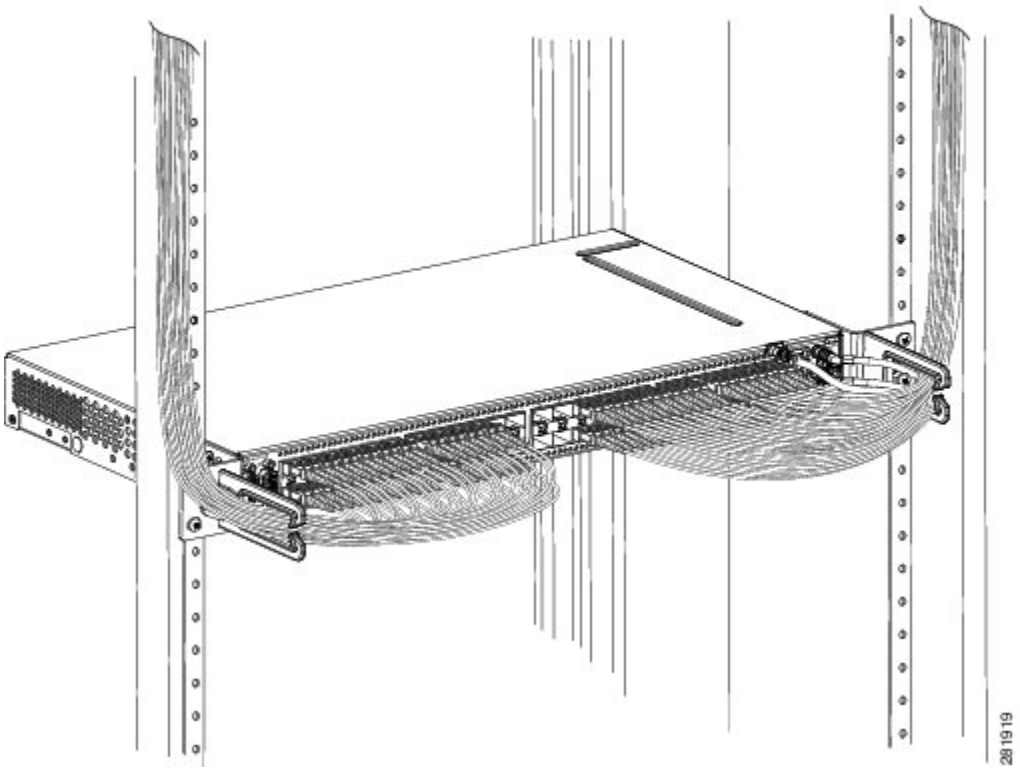
The cables are routed through the cable guide in an ANSI (23-inch) rack configuration, as shown in this figure.

***Figure 39: Cable Management in an ANSI Rack Configuration***




The cables are routed through the cable guide in an ETSI rack configuration, as shown in this figure.

*Figure 40: Cable Management in an ETSI Rack Configuration*




**Note** If no cable guide is installed, bind the cables and fibers using the tie-wrap.

# NTP-J60 Clean Fiber Connectors

| | |
|---|---|
| **Purpose** | This procedure explains how to clean the fiber connectors. |
| **Tools/Equipment** | • Type A Fiber-Optic Connector Cleaner (CLETOP reel)<br>• Inspection microscope<br>• Optical swab<br>• Optical receiver cleaning stick |
| **Prerequisite Procedures** | None |

| | |
|---|---|
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** Using an inspection microscope, inspect each fiber connector for dirt, cracks, or scratches.

**Step 2** Replace any damaged fiber connectors.

**Note** Replace all dust caps whenever the equipment is unused for 30 minutes or more.

**Step 3** Complete the DLP-J186 Clean Fiber Connectors with CLETOP, on page 68 as necessary.

**Step 4** Complete the DLP-J187 Clean the Fiber Adapters, on page 69 as necessary.

**Step 5** Stop. You have completed this procedure.

# DLP-J186 Clean Fiber Connectors with CLETOP

| | |
|---|---|
| **Purpose** | This task explains how to clean the fiber connectors with CLETOP. |
| **Tools/Equipment** | • Type A Fiber-Optic Connector Cleaner (CLETOP reel)<br>• Optical receiver cleaning stick |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** Remove the dust cap from the fiber connector.

**Step 2** Press the lever up to open the shutter door. Each time you press the lever, you expose a clean wiping surface.

**Step 3** Insert the connector into the CLETOP cleaning cassette slot, rotate one quarter turn, and gently swipe downwards.

**Step 4** Use an inspection microscope to inspect each fiber connector for dirt, cracks, or scratches. If the connector is not clean, repeat Step 1 to Step 3.

**Step 5** Insert the fiber connector into the applicable adapter or attach a dust cap to the fiber connector.

**Step 6** Return to your originating procedure (NTP).

# DLP-J187 Clean the Fiber Adapters

| | |
|---|---|
| **Purpose** | This task explains how to clean the fiber adapters. |
| **Tools/Equipment** | CLETOP stick swab |
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** Remove the dust plug from the fiber adapter.

**Step 2** Insert a CLETOP stick swab (14100400) into the adapter opening and rotate the swab.

**Step 3** Place dust plugs on the fiber adapters when not in use.

**Step 4** Return to your originating procedure (NTP).

# NTP-J61 Perform the CPT 50 Shelf Installation Acceptance Test

| | |
|---|---|
| **Purpose** | This procedure describes how to perform a shelf installation acceptance test for the CPT 50 shelf. |
| **Tools/Equipment** | Voltmeter |
| **Prerequisite Procedures** | Applicable procedures in this chapter |

| | |
|---|---|
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** If you installed a CPT 50 shelf, verify that each applicable procedure listed in the below table was completed.

***Table 4: CPT 50 Shelf Installation Task Summary***

| Description | Completed |
|---|---|
| NTP-J53 Unpack and Inspect the CPT 50 Shelf, on page 14 | |
| NTP-J54 Install the CPT 50 Shelf, on page 20 | |
| Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the *Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.* | |
| NTP-J57 Install the Power Feeds and Ground to the CPT 50 Shelf, on page 44 | |
| NTP-J58 Connecting Cables to the EOBC, Timing, and Console Ports, on page 60 | |
| NTP-J59 Install and Route Fiber-Optic Cables, on page 64 | |

**Step 2** DLP-J188 Inspect the CPT 50 Shelf Installation and Connections , on page 70.

**Step 3** DLP-J189 Measure DC Voltage on the CPT 50 shelf, on page 71.

**Step 4** Continue with NTP-J21 Set Up the Computer for CTC and NTP-J22 Log into CTC.
**Stop. You have completed this procedure.**

# DLP-J188 Inspect the CPT 50 Shelf Installation and Connections

| | |
|---|---|
| **Purpose** | This task describes how to inspect the shelf installation and connections and verify that everything is installed and connected properly. |
| **Tools/Equipment** | None |

| | |
|---|---|
| **Prerequisite Procedures** | None |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

### Procedure

**Step 1** Make sure that all external wiring connections (that is, power, ground, alarms, and so on) are secure. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.

**Step 2** Return to your originating procedure (NTP).

# DLP-J189 Measure DC Voltage on the CPT 50 shelf

| | |
|---|---|
| **Purpose** | This task describes how to measure the power to verify correct power and returns. |
| **Tools/Equipment** | Voltmeter |
| **Prerequisite Procedures** | Before installing the DC power, check the voltage |
| **Required/As Needed** | Required |
| **Onsite/Remote** | Onsite |
| **Security Level** | None |

**Warning** To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module. Statement 390

**Caution** Do not apply power to the shelf assembly until you complete all the installation steps.

### Procedure

**Step 1** Using a voltmeter, verify the office ground and power:

a) Place the black lead (positive) on the return (RET). Hold it there while completing Step b.

b) Place the red lead (negative) on the fuse power points on the third-party power distribution panel to verify that they read between:

- –40.5 VDC and –57.6 VDC (power) and 0 (return ground) for a 48 V power source.
- –20 VDC and –28.3 VDC (power) and 0 (return ground) for a 24 V power source

**Step 2** Using a voltmeter, verify the shelf ground and power wiring:
Place the black lead (positive) on the RET1(A) and the red lead on the -48 V (A) or -24 V (A) point.

- For the CPT 50 shelf with 48 V power supply, verify a reading between –40.5 VDC and –57.6 VDC.
- For the CPT 50 shelf with 24 V power supply, verify a reading between –20 VDC and –28.3 VDC.

If there is no voltage, check the following and correct if necessary:

- Battery and ground are reversed to the shelf.
- Battery is open or missing.
- Return is open or missing.

**Step 3** Repeat Step 1 and Step 2 for the RET2 (B) and -48 V (B) or -24 V (B) of the redundant power supply input.

**Step 4** Return to your originating procedure (NTP).

# Hardware Specifications

This chapter contains product names and hardware specifications for CPT 50 shelf, fabric card, and line card.

### Product Names

The product names for the CPT 50 shelf, fabric, and line cards are listed in this table.

| Card / Shelf | Product Name |
|---|---|
| Fabric Card | CPT-PTF256-10GX4= |
| Line Card | CPT-PTM-10GX4= |
| CPT 50 Shelf with 48 V AC power module | CPT-50-44GE-AC= |
| CPT 50 Shelf with 48 V DC power module for ANSI standard | CPT-50-44GE-48A |
| CPT 50 Shelf with 48 V DC power module for ETSI standard | CPT-50-44GE-48E= |
| CPT 50 Shelf with 24 DC power module for ANSI standard | CPT-50-44GE-24A= |

**Caution** In order to ensure system reliability, the CPT 600 or CPT 200 shelf must have all their slots equipped with either cards or fillers.

**Note** The fabric and line cards are inserted in a CPT 600 or CPT 200 shelf. The line card filler (15454-M-FILLER) must be installed in unused and empty slots to ensure proper air flow and electromagnetic interference (EMI) requirements during the CPT 200 or CPT 600 operation. In the CPT 200 shelf, the line card filler can be installed in Slot 2 and Slot 3. In the CPT 600 shelf, the line card filler can be installed in slots 2, 3, 4, 5, 6, and 7. The line card fillers have no card-level LED indicators. CTC does not detect filler cards. This support may be added in later releases.

### CPT Specifications

This section provides the specifications for timing, power, and environmental specifications, card and shelf dimensions.

#### GPS (Global Positioning System) Interface (1PPS and 10Mhz) of CPT 50 Shelf

| | 10 MHz Specification | 1 PPS Specification |
|---|---|---|
| Waveform | Sine wave | Pulse |
| Frequency | 10 MHz | 1 PPS |
| Amplitude | >1 V LVTTL Compatible | >1 V LVTTL Compatible |
| Impedance | 50 Ω | 50 Ω |

#### TOD/1PPS RS422 Interface— RJ45 Pinout of CPT 50

The pinout of the TOD (Time of Day) RJ45 port is listed in this table.

| Pin | Signal Name | Description |
|---|---|---|
| 1 | 1PPS_N | 1PPS RS422 output signal |
| 2 | 1PPS_P | 1PPS RS422 output signal |
| 3 | NC | No Connect |
| 4 | GND | — |
| 5 | GND | — |
| 6 | NC | No Connect |
| 7 | TOD_P | Time of Day RS422 output |
| 8 | TOD_N | Time of Day RS422 output |

#### System Power for CPT 50 Shelf

The power specifications for the CPT 50 shelf is listed in this table.

| Shelf | Input Voltage | Power Consumption | Power Terminals | Fuse Rating |
|---|---|---|---|---|
| CPT 50 shelf with AC power module for ANSI and ETSI standards | 100V - 240V AC depending on the standards in various countries | 100 VAC 2.4 A ; 240 VAC 1A | One AC single phase with 3-pole ( line L, Neutral N, and Protective Earth PE) input connector. | Must not exceed 10 A or 15 A, depending on the standards in various countries. |
| CPT 50 shelf with 48 V DC power module for ANSI standard | Voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC. Functionality is guaranteed at -40 VDC input voltage, according to GR-1089. | 48 V DC 5 A | Single terminal block with four poles— –48V, RET for power terminals A and B. | Must not exceed 10 A |
| CPT 50 shelf with 48 V DC power module for ETSI standard | Voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC. | 48 VDC 5 A | DSUB 2 poles | Must not exceed 10 A |
| CPT 50 shelf with 24 V DC power module for ANSI standard | Voltages –20 VDC and –28.3 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -24 VDC. | 24VDC 10 A | Single terminal block with four poles— –24V, RET for power terminals A and B. | Must not exceed 15 A. |

### Fan Tray

The following table lists power requirements for the fan-tray assembly.

*Table 5: Fan-Tray Power Requirements*

| Fan Tray | Watts | Amps |
|---|---|---|
| 12 V supplied by CPT 50 shelf | 36 | 3 |

### Fabric Card and Line Card Power Specifications

This section provides power specifications for fabric and line cards.

| Card | Maximum Power in Watts | Typical Power in Watts | Amperes at -48 V (Maximum) |
|---|---|---|---|
| Fabric Card | 200 | 150 | 4.1 |
| Line Card | 150 | 100 | 2.1 |

### CPT 50 Shelf, Fabric, and Line Card Dimensions

| Card / Shelf | Physical Dimensions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Measurement in inches | | | | Measurement in mm | | | |
| | Height | Width | Depth | Weight in Kg | Height | Width | Depth | Weight in Kg |
| Fabric and Line Card (Single Slot) | 12.650 | 0.921 | 9.000 | • Fabric—12<br>• Line—1.04 | 321.3 | 23.4 | 228.6 | • Fabric—1.22<br>• Line—1.04 |

| Card / Shelf | Physical Dimensions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Measurement in inches | | | | Measurement in mm | | | |
| CPT 50 Shelf | 1.7 | • 19 or 23 inches with mounting ears attached for ANSI rack configuration<br>• 21 inches with mounting ears attached for ETSI rack configuration | 9.1 | • CPT with AC power module— 4.06 kg<br>• CPT with DC power module— 4.22 kg | 43.1 | • 482.6 or 584.2 with mounting ears attached for ANSI rack configuration<br>• 533.4 mm with mounting ears attached for ETSI rack configuration | 231.1 | • CPT with AC power module— 4.06 kg<br>• CPT with DC power module— 4.22 kg |

### CPT 50 Shelf, Fabric, and Line Card Environmental Specifications

The operating temperature and humidity for CPT 50 shelf, fabric, and line cards are as follows:

- Operating Temperature— 32 to 131 degrees Fahrenheit, 0 to +55 degrees Celsius)
- Operating Humidity— 5 to 85%, noncondensing; functionality is guaranteed up to 5 to 95%, noncondensing.

### Other Specifications

| Card / Shelf | Interface | Switching Capacity |
|---|---|---|
| Fabric Card | • Two 10GE XFP ports (OTN enabled)<br>• Two 10GE SFP+ ports<br>• Mini USB port (local craft access RS232 for CTC software | 256 G |

| Card / Shelf | Interface | Switching Capacity |
|---|---|---|
| Line Card | • Four 10GE SFP+ ports<br>• Mini USB port (local craft access RS232 for CTC software | 40 G |
| CPT 50 Shelf | • 44 GE 10/100/1000Mbps SFP ports<br>• Four 10GE SFP+ ports | 44 G |

# SFP, SFP+, and XFP Modules

SFP, SFP+, and 10-Gbps SFP (XFP) modules are integrated fiber optic transceivers that provide high-speed serial links from a port or slot to the network. For more information on SFP/SFP+/XFP modules and for a list of SFP/SFP+/XFP modules supported by the CPT, see Installing the SFP, SFP+, and XFP Modules in Cisco CPT. In CTC, SFP, SFP+, and XFP modules are called pluggable port modules (PPMs).