Installing and Maintaining the E1200i System

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FORCE10 ™

➡ **Note:** The country-specific warnings and statements of compliance have been moved to "Agency Compliance" on page 94 in the appendix "System Specifications" on page 91.

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Chapter 1   About This Guide

This guide provides site preparation recommendations, step-by-step procedures to rack mount the Force10 Networks E1200i chassis, as well as instructions to install fan trays, power supplies, route processor modules (RPMs), switch fabric modules (SFMs), and line cards.

This guide also includes instructions for removing and installing field-replaceable parts, including power supplies for both the AC and DC models. The E1200i system is packaged with components necessary for optimal performance, including blank panels for RPM, SFM, and line card slots. Blanks are required in empty slots to ensure adequate system cooling and for EMI containment during operation.

After you complete the hardware installation process and power up the system, refer to the *FTOS Configuration Guide* for preliminary software configuration information. E1200i systems run Force10 OS (FTOS™) software. The *FTOS Command Reference for the E-Series* provides detailed CLI information, and the *FTOS Configuration Guide for the E-Series* includes FTOS configuration information.

Information Symbols and Warnings

Table 1 defines the information symbols used throughout this guide.

Table 1   Information Symbols

Symbol	Warning	Description
	Danger:	This symbol warns that improper handling and installation could result in bodily injury. Before you begin work on this equipment, be aware of hazards involving electrical circuitry, networking environments, and instigate accident prevention procedures.
	Caution:	This symbol informs you that improper handling and installation could result in equipment damage or loss of data.
	Warning:	This symbol informs you that improper handling may reduce your component or system performance.
	Note:	This symbol informs you of important operational information.

Danger: The installation of this equipment shall be performed by trained and qualified personnel only. Read this guide before installing and powering up this equipment. This equipment contains two power cords. Disconnect both power cords before servicing.

Danger: This equipment contains optical transceivers, which comply with the limits of Class 1 laser radiation.

CLASS 1
LASER PRODUCT

Visible and invisible laser radiation may be emitted from the aperture of the optical transceiver ports when no cable is connected. Avoid exposure to laser radiation and do not stare into open apertures.

Caution: Wear grounding wrist straps when handling this equipment to avoid ESD damage.

Danger: Leakage Current (High Touch Current) in AC-powered systems: AC power cords are secured to the power inlet using the provided brackets. The power cord plugs must be secured to the building outlets by the qualified chassis installer or a qualified electrician.

See Chapter 3, Site Preparation for more cautions.

Related Publications

For more information about the E1200i system, refer to the following documents:

- *FTOS Configuration Guide for the E-Series*
- *FTOS Command Reference for the E-Series*
- *E-Series Network Operations Guide*
- *Release Notes for the E-Series and FTOS*

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Chapter 2 — The E1200i System

The Force10 Networks E1200i system is a carrier-class, high-capacity aggregation router. The 16-slot modular system provides two slots dedicated for Route Processor Modules (RPMs) and 14 slots for line cards with Layer 2 switching and Layer 3 and routing capabilities.

Operating Overview

The E1200i system requires a Route Processor Module (RPM), at least one line card, and at least eight Switch Fabric Modules (SFMs) for packet processing. The RPM is the core for routing and control operations; all traffic destined to the E1200i terminates on the RPM. Routing table entries are built on the RPM and directed to the forwarding information tables on the line cards.

Software processes, such as Telnet, SNMP, CLI, Layer 2, and Layer 3 functions, are divided among three CPUs for redundancy and speed. Independent software images run on each CPU. Each CPU has its own memory, which isolates processes from each other, increasing reliability. Operating the E1200i system with redundant RPMs enables automatic fail-over redundancy.

Line cards perform all data forwarding operations. Each line card has Force10 Networks proprietary ASICs — the flexible packet classification (FPC) ASIC and the Buffer and Traffic Manager (BTM) ASIC. The FPC accepts packets, feeds packets to input/output ports, handles packet classification (access lists, and Layer 2 and Layer 3 lookups), and packet-marking (Diffserv or 802.1p). The BTM is responsible for all queuing operations.

The internal flash memory device shipped with the RPM contains the boot ROM and runtime images. Each RPM accommodates an external flash memory card that can be used to copy and store system boot, software images, and configuration files. For information about using a flash card, refer to Appendix A, on page 75.

Figure 1   E1200i AC Chassis Front View

Cable Management System

Line Card Slots

Line Card Slots

RPM 1

Switch Fabric
Module (SFM)

Blank (BLNK)

Air Filter

Air Vents

AC Power Supply

AC Power Plug
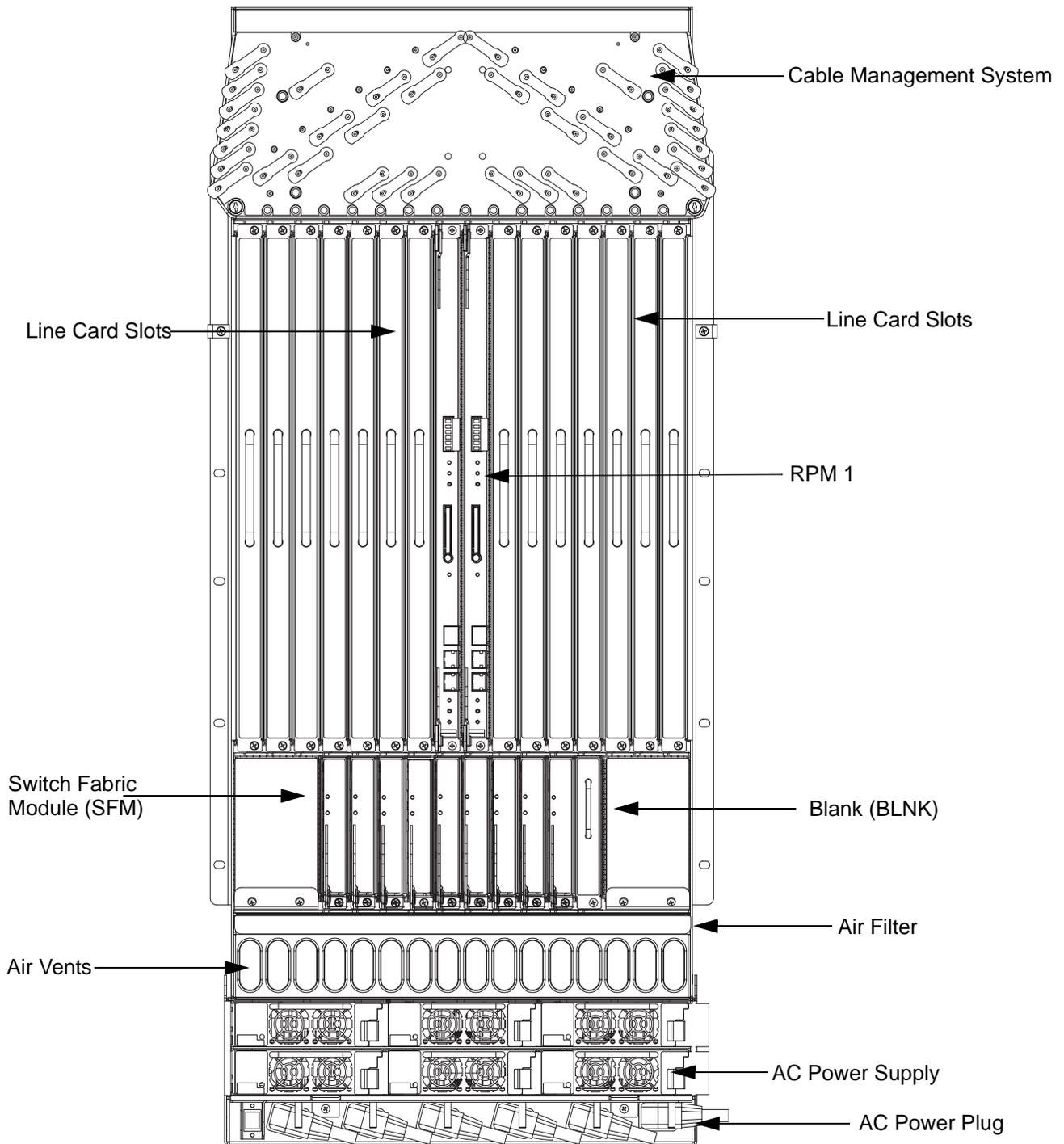
Figure 2 E1200i AC Chassis Rear View

Installed Fan Tray

locking screw

Empty Fan Tray with
Self-closing Door

Ground Connection

Ground Connection
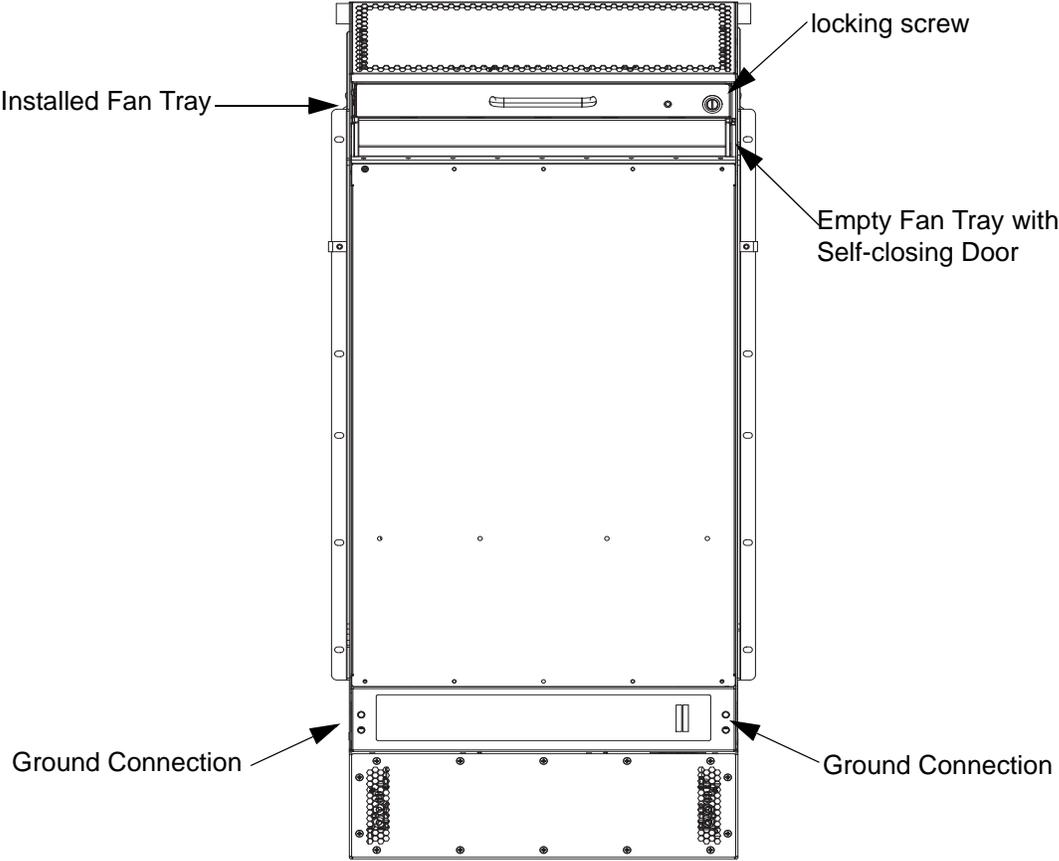
Figure 3   E1200i DC Chassis Front View

Cable Management System

Line Card Slots

Line Card Slots

RPM 1

Switch Fabric
Module (SFM)

Blank (BLNK)

DC Power Supply

DC Power Supply

Air Filter

Air Vents
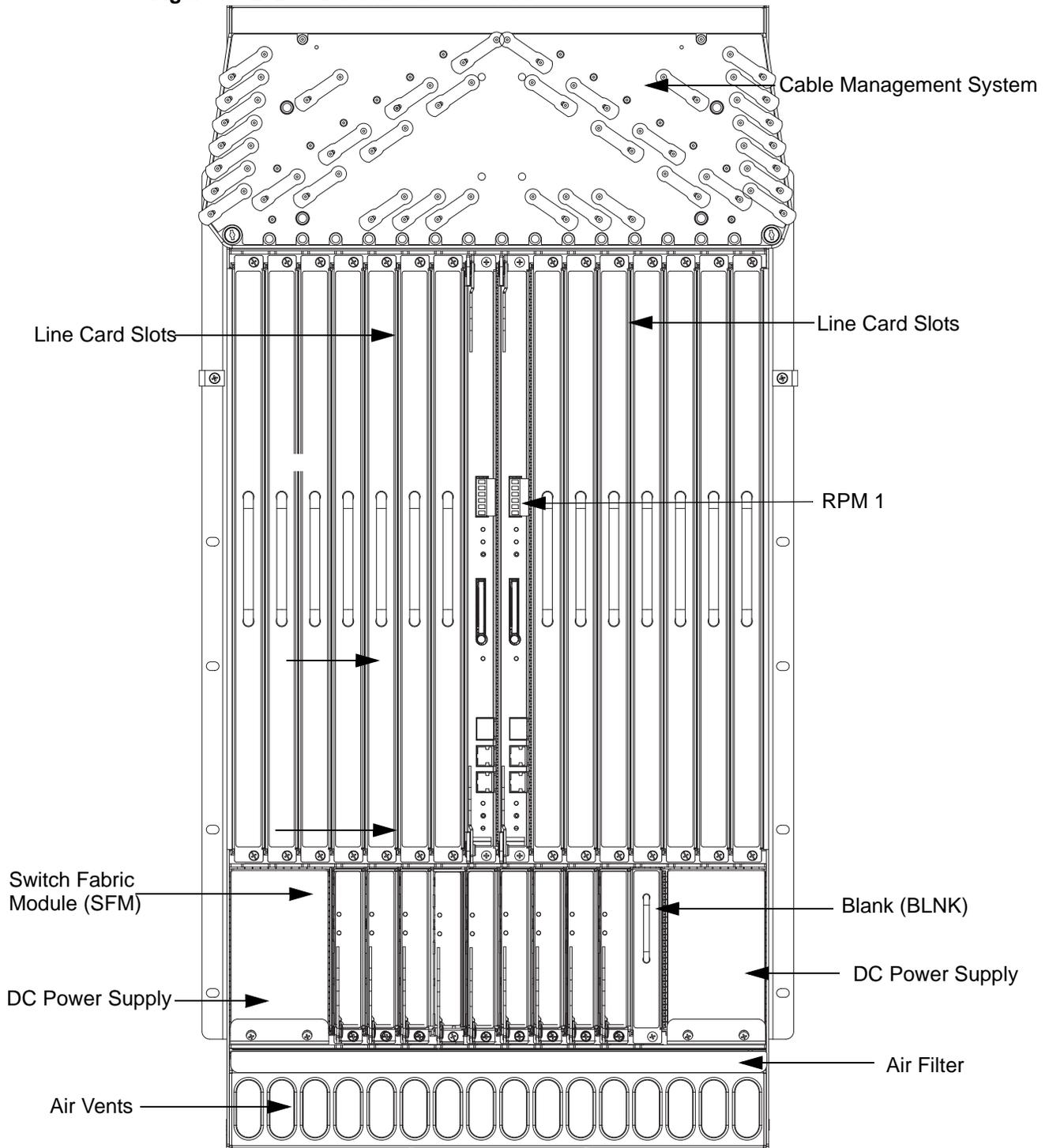
Figure 4 E1200i DC Chassis Rear View

Locking screw

Installed Fan Tray

Empty Fan Tray with
Self-closing Door

Ground Connection

Ground Connection
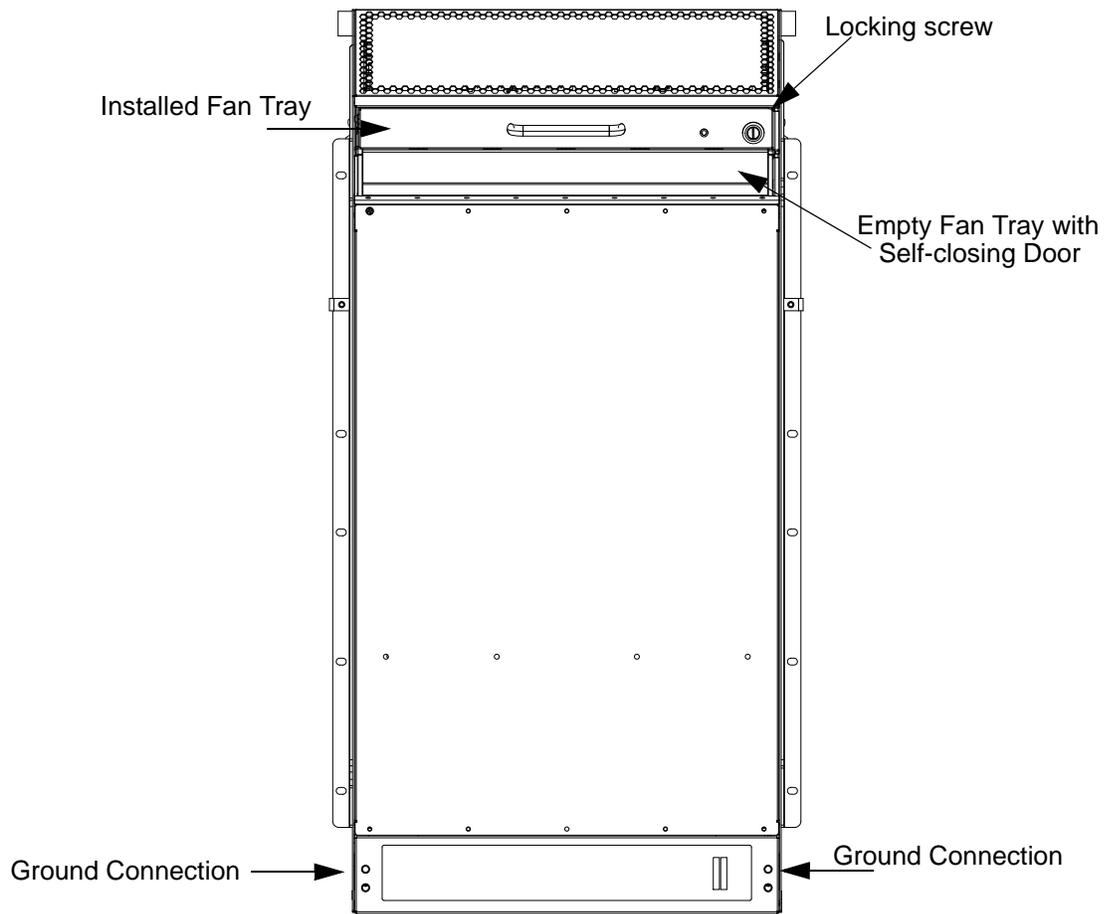
Table 2 E1200i Hardware Component Operating Requirements Summary

Component	Minimum	Maximum	Field-Replaceable
Backplane (factory installed)	1	1	N
Air filter (factory installed)	1	1	Y
Fan trays	2	2	Y
RPMs	1	2	Y
Line cards	1	14	Y
SFMs	8	9	Y
AC Power Supply	2	6	Y
DC Power Supply	1	2	Y
Cable management system	0	1	Y
Cable management system cover	0	1	Y

To install the E1200i system, Force10 Networks recommends that you perform the installation procedures in the following order:

Step	Task	Section
1.	Prepare the site	Site Preparation on page 19
2.	Unpack the AC chassis and components *or* Unpack the DC chassis and components	Unpacking the E1200i AC System on page 23 Unpacking the E1200i DC System on page 27
3.	Mount the AC chassis *or* Mount the DC chassis	Standard Front Chassis Mounting on page 24 Installing the Chassis into an Equipment Cabinet on page 25 Standard Front Chassis Mounting on page 28 Installing the Chassis into an Equipment Cabinet on page 29
4.	Install the cable management system	See the instructions that come with the cable management system.
5.	Install components: • Fan trays • Power Supplies (including power and grounding cables)	 Installing Fan Trays on page 31 Installing AC Power Supplies on page 35 Installing DC Power Supplies on page 41
6.	Verify power supply and fan tray operability	AC Power Supply and Fan Operability Test on page 37 DC Power Supply and Fan Operability Test on page 47
7.	Install card components: • RPM(s) and line cards • SFMs	 Installing Line Cards and RPMs on page 50 Installing Switch Fabric Modules (SFMs) on page 54
8.	Connect network cable	RPM Ports and Cables on page 57
9.	Supply power to the chassis	Supplying Power - AC on page 62 Supplying Power - DC on page 62
10.	Initial boot	The initial boot operation automatically brings up the system to the runtime CLI. To interrupt the automatic boot process, issue a break key sequence (**Ctrl^**) if you experience boot problems. The console monitor will display the default BOOT_USER # prompt. Refer to Appendix B, on page 79 for instructions to continue the boot process.

Chapter 3   # Site Preparation

This chapter describes factors to consider before installing your E1200i system. The following topics are discussed:

For complete E1200i System Specifications, refer to Appendix D, on page 91.

Site Selection Criteria

Before you begin the installation process, make sure that the area where you intend to install your E1200i meets the following safety requirements.

Select a site:

- In a restricted access area.
- In a dry, clean, well-ventilated and temperature-controlled room, away from nearby heat sources such as hot air vents or direct sunlight.
- Away from sources of severe electromagnetic noise.
- Near an adequate power source. Connect the E1200i to the appropriate branch circuit protection as defined by local electrical codes.
- Means of power disconnect must be located near the equipment
- Position in a rack with adequate space in the front and rear, and sides of the unit for proper ventilation, access to cables, and maintenance access. Allow *at least* 18 inches in the front and 20 inches in the rear of the rack for ventilation. If placing the chassis in a cabinet, ensure that there is enough clearance between the closed cabinet door and the cables in the cable management system on the chassis.

> **Caution:** Lift the E1200i chassis *either* from the bottom or by the handles provided with the front shipping cover. Lifting by the chassis shelves or fan tray openings will cause chassis damage. Do not remove the protective front shipping cover until the chassis is secured in the equipment rack.

Rack Mounting

When you prepare your equipment rack, make sure the rack is bolted to the floor and/or braced to a wall or ceiling.

When you install the chassis:

- Make sure that the rack is grounded to the grounding electrode. Each DC PEM must be grounded to the rack or building ground bus. The equipment rack must be grounded to the same grounding electrode used by the power service in your area. The ground path must be permanent.
- Install the E1200i chassis in the rack before you install internal components or make network and power connections.
- In an empty rack, place the chassis in the lower half of the rack to ensure rack stability.

Cabinet Placement

The cabinet must meet the following criteria:

- Minimum cabinet size is 30 inches deep and 24 inches wide.
- Minimum air flow is 750 cubic feet per minute (CFM).
- Minimum of 3 inches between the closed doors and the front of the cable management panel, and a minimum of 3 inches between the chassis rear and the rear of the cabinet with the cabinet door closed. With the rear doors of the cabinet open, you will need a clearance of at least 20 inches from the rear to access the chassis fan trays.
- Minimum of 20 inches clearance at the chassis front to access the air filter, power supplies, and cards.

Power

At a minimum, the E1200i requires either 2 AC Power Supplies or 1 DC PEM to operate.

Caution: You cannot power the system with both types of power supply module installed. The system must contain only one type of power module, either AC or DC.

Caution: The E1200i AC Chassis is shipped with blank inserts covering the DC PEM openings. DO NOT REMOVE THEM. The blank inserts must remain installed for proper system cooling and for EMI containments during system operation.

Danger:
- Make your chassis ground connections first (see Figure 2). If the chassis is not correctly grounded, excessive electromagnet emission may result.
- Disconnect all power to the equipment rack or cabinet before chassis installation.
- Never operate the E1200i system with empty RPM, SFM, or line card slots. Always replace empty slots with blank panels.

Each E1200i system requires *at least two* AC Power Supplies or *at least one* DC Power Supply to operate.

Three AC units are required for power supply redundancy, four AC units are required for full facility redundancy, and six AC units provide 3+3 redundancy

Two DC units are required for power supply and full facility redundancy.

Danger: Leakage Current (High Touch Current): The AC power cords are secured to the power inlet using the provided bracket. The AC power cord plugs must be secured to the building outlets by the chassis installer or a qualified electrician.

Refer to Appendix D, on page 91 for specifications on thermal output and other power related numbers.

Fans and Airflow

Your E1200i chassis contains two field-replaceable fan trays. Air flows through the system from a filtered-intake vent located in the lower part of the chassis. Air circulates from the bottom front (and sides) to the back and exhausts through a top rear vent. The variable fan speed is reduced at normal operating temperatures and increases to full speed as operating temperatures increase, up to 104° F (40° C).

For fan tray access, maintenance and proper ventilation, position the chassis and equipment rack or cabinet *so that*:

- At least three inches clearance is around the front and side intake and exhaust vents for free air flow
- Provide 20 inches in the rear to access the fan tray.
- Operate the E1200i system with two fan trays.

For instructions on replacing a fan tray, refer to Removing and Replacing Fan Trays on page 65.

Storing Components

Caution: Do not transport a chassis with components (line cards, power supplies, RPMs, Fan Trays, Power Supply, or SFMs) installed in the chassis. Place the modules in their original ESD-preventative packaging and attach the Front Shipping Cover on the front of the chassis prior to placing the chassis in its original shipping crate. Shipping the chassis with components installed may damage the components and the chassis backplane.

If you do not install your E1200i system and components right away, Force10 Networks recommends that you properly store components and all extra field-replaceable components (spares) until you are ready to install them. Keep all components in the original packaging during storage.

Follow these *indoor* storage guidelines:

- Storage temperature should remain constant ranging from -40° to 158°F (-40° to 70°C).
- Non-condensing relative humidity should be maintained within 5 to 95 percent.
- Store on a dry floor, away from direct sunlight, heat, and air conditioning ducts.
- Store in a dust-free environment.

Chapter 4   Installing the AC Chassis

This chapter provides instructions to rack mount your E1200i AC system into a standard 19-inch or 23-inch equipment rack. It contains the following sections:

- Unpacking the E1200i AC System
- Installing the Equipment Rack Shelf Bar
- Standard Front Chassis Mounting
- Installing the Chassis into an Equipment Cabinet

Unpacking the E1200i AC System

The E1200i AC system and components are shipped on a wooden pallet with Front Shipping cover. Remove the chassis from the shipping packaging and move the chassis with a hand cart, pallet jack, or fork lift to its rack. Do not unpack the power supplies, fan trays, air filter, or cards until the chassis is installed.

> ⚠ **Warning:** The E1200i AC shipping containers each weigh up to 400 pounds. The unpacked chassis and pallet weigh approximately 200 pounds. Do not attempt to lift or move the chassis without the use of a hand cart, pallet jack, or forklift.

> ⛔ **Caution:** Lift the E1200i AC chassis *only* with the handles provided or from the bottom. Lifting by the chassis shelves will cause chassis damage. Do not remove the shipping cover during the installation process. The cover prevents damage to the internal framework and EMI seals.

> ⚠ **Warning:** Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventative wrist or foot-heal ground strap when handling RPMs, SFMs, or line cards. After you remove the original packaging, place RPMs, SFMs, and line cards directly into the chassis, or on an antistatic surface.

> ⚠ **Warning:** Complete the chassis installation into the rack before you install any other component (fan trays, power supplies, line cards, RPMs, SFMs, cables).

Installing the Equipment Rack Shelf Bar

The rack shelf bar (Figure 5) enables you to easily position the chassis into the rack and provides the unit additional stability. The E1200i AC system must be mounted in a rack that is permanently secured to the floor.

Figure 5 Rack Shelf Bar

To install a equipment rack shelf bar:

Step	Task
1.	Determine the chassis mounting location in the equipment rack.
2.	Orient the bar with the arrows pointing upward. The smooth side of the bar should face outward.
3.	Attach the bar to the equipment rack brackets using the mounting screws provided by the manufacturer.

Standard Front Chassis Mounting

Note: Force10 Networks recommends that you install and operate the E1200i AC system in a standard 19-inch or 23-inch equipment rack.

Install the E1200i AC system after you secure the equipment rack shelf bar. Load the chassis in the lower half of an empty rack to avoid a top-heavy rack (Figure 6).

Warning: Do not remove the Front shipping Cover during the initial installation process. The cover provides front handles to assist in lifting and prevents damage to the internal framework and EMI seals.

Figure 6   Rack Mounting the Chassis
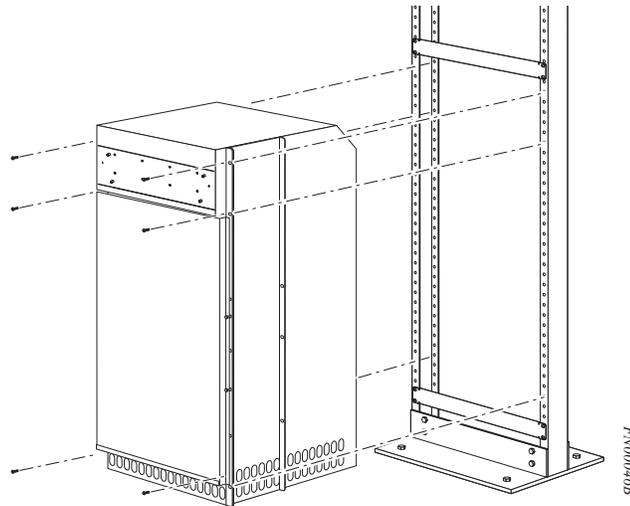
To install the chassis into a prepared rack:

Step	Task
1.	If you are center or rear-mounting the chassis in a 19-inch rack, adjust the chassis rack mounting brackets to the desired position.
2.	If you are mounting the chassis in a 23-inch rack, install the 23-inch adapter brackets.
3.	Using a hand cart, pallet jack, or forklift, align the rack-mount holes with the equipment rack holes, situating the chassis on top of the equipment rack shelf bar.
4.	Insert rack mounting screws in the holes that are not obscured by the metal chassis shipping cover. Tighten the screws. See Figure 6.
5.	Loosen and remove the screws that secure the chassis Front Shipping Cover and remove the cover.
6.	Insert the remaining rack mounting screws and tighten to secure the chassis in the rack.

Installing the Chassis into an Equipment Cabinet

Install the E1200i AC system after you secure the rack shelf bar. Load the chassis in the lower half of the cabinet to avoid it becoming top-heavy. Make sure the cabinet is positioned with adequate space in the front, rear, and sides of the unit for proper ventilation, access to cables, and access for maintenance.

Refer to Chapter 3, Site Preparation for complete requirements.

To install the chassis into an equipment cabinet:

Step	Task
1.	Install the equipment rack shelf bar.

Step	Task
2.	Adjust the chassis mounting brackets to the desired front-rear position and add a 23-inch adapter brackets as required.
3.	Using a hand cart, pallet jack, or forklift, align the rack-mount holes with the cabinet holes.
4.	Insert rack mounting screws in the holes that are not obscured by the metal chassis shipping cover. Tighten the screws.
5.	Loosen and remove the screws attaching the chassis shipping cover. Remove the shipping cover.
6.	Insert the remaining mounting screws and tighten to secure the chassis in the cabinet.

Chapter 5   **Installing the DC Chassis**

This chapter provides instructions to rack mount your E1200i DC system into a standard 19-inch or 23-inch equipment rack. It contains the following sections:

Unpacking the E1200i DC System

The E1200i DC system and components are shipped on a wooden pallet with Front Shipping cover. Remove the chassis from the shipping packaging and move the chassis with a hand cart, pallet jack, or fork lift to its rack. Do not unpack the power supplies, fan trays, air filter, or cards until the chassis is installed.

> ⚠ **Warning:** The E1200i DC shipping containers each weigh up to 400 pounds. The unpacked chassis and pallet weigh approximately 200 pounds. Do not attempt to lift or move the chassis without the use of a hand cart, pallet jack, or forklift.

> ⊖ **Caution:** Lift the E1200i DC chassis *only* with the handles provided or from the bottom. Lifting by the chassis shelves will cause chassis damage. Do not remove the shipping cover during the installation process. The cover prevents damage to the internal framework and EMI seals.

> ⚠ **Warning:** Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventative wrist or foot-heal ground strap when handling RPMs, SFMs, or line cards. After you remove the original packaging, place RPMs, SFMs, and line cards directly into the chassis or on an antistatic surface.

> ⚠ **Warning:** Complete the chassis installation into the rack before you install any other component (fan trays, power supplies, line cards, RPMs, SFMs, cables).

Installing the Equipment Rack Shelf Bar

The rack shelf bar (Figure 7) enables you to easily position the chassis into the rack and provides the unit additional stability. The E1200i DC system must be mounted in a rack that is permanently secured to the floor.

Figure 7 Rack Shelf Bar

To install a equipment rack shelf bar:

Step	Task
1.	Determine the chassis mounting location in the equipment rack.
2.	Orient the bar with the arrows pointing upward. The smooth side of the bar should face outward.
3.	Attach the bar to the equipment rack brackets using the mounting screws provided by the manufacturer.

Standard Front Chassis Mounting

Note: Force10 Networks recommends that you install and operate the E1200i DC system in a standard 19-inch or 23-inch equipment rack.

Install the E1200i DC system after you secure the equipment rack shelf bar. Load the chassis in the lower half of an empty rack to avoid a top-heavy rack (Figure 8).

Warning: Do not remove the Front shipping Cover during the initial installation process. The cover provides front handles to assist in lifting and prevents damage to the internal framework and EMI seals.

Figure 8   Rack-Mounting the Chassis
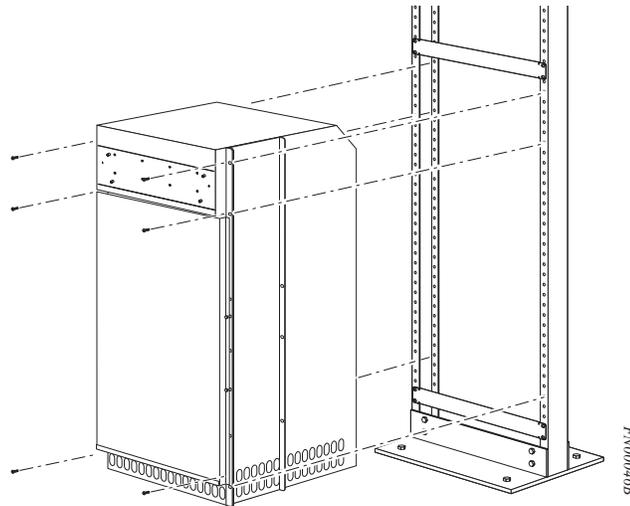
To install the chassis into a prepared rack:

Step	Task
1.	If you center- or rear-mount the chassis in a 19-inch rack, adjust the chassis rack-mounting brackets to the desired position.
2.	If you mount the chassis in a 23-inch rack, install the 23-inch adapter brackets.
3.	Use a hand cart, pallet jack, or forklift to align the rack-mount holes with the equipment rack holes, situating the chassis on top of the equipment rack shelf bar.
4.	Insert rack-mounting screws in the holes that are not obscured by the metal chassis shipping cover. Tighten the screws. See Figure 8.
5.	Loosen and remove the screws that secure the chassis Front Shipping Cover and remove the cover.
6.	Insert the remaining rack-mounting screws and tighten to secure the chassis in the rack.

Installing the Chassis into an Equipment Cabinet

Install the E1200i DC system after you secure the rack shelf bar. Load the chassis in the lower half of the cabinet to avoid it becoming top-heavy. Make sure the cabinet is positioned with adequate space in the front, rear, and sides of the unit for proper ventilation, access to cables, and access for maintenance.

Refer to Chapter 3, Site Preparation for complete requirements.

To install the chassis into an equipment cabinet:

Step	Task
1.	Install the equipment rack shelf bar.

Step	Task
2.	Adjust the chassis mounting brackets to the desired front-rear position and add a 23-inch adapter brackets as required.
3.	Using a hand cart, pallet jack, or forklift, align the rack-mount holes with the cabinet holes.
4.	Insert rack-mounting screws in the holes that are not obscured by the metal chassis shipping cover. Tighten the screws.
5.	Loosen and remove the screws attaching the chassis shipping cover. Remove the shipping cover.
6.	Insert the remaining mounting screws and tighten to secure the chassis in the cabinet.

Chapter 6　　　　　　　# Installing Fan Trays

Access the fan tray slots from the rear of the chassis (Figure 9). Two fan trays are required in the chassis. When a fan tray is not installed in the lower slot, a self-closing door will seal the slot. Panel blanks are not required. However, to ensure fail-safe chassis operation, do not operate the chassis with only one fan tray for more than 30 minutes.

> ⚠ **Warning:** Install the fan trays before you supply power to the system.

> ⚠ **Warning:** Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventative wrist or foot-heal ground strap when handling chassis components. After you remove the original packaging, place chassis components on an antistatic surface.

Figure 9   Installing Fan Tray

Figure 10   Fan Tray

screw latch ———————→
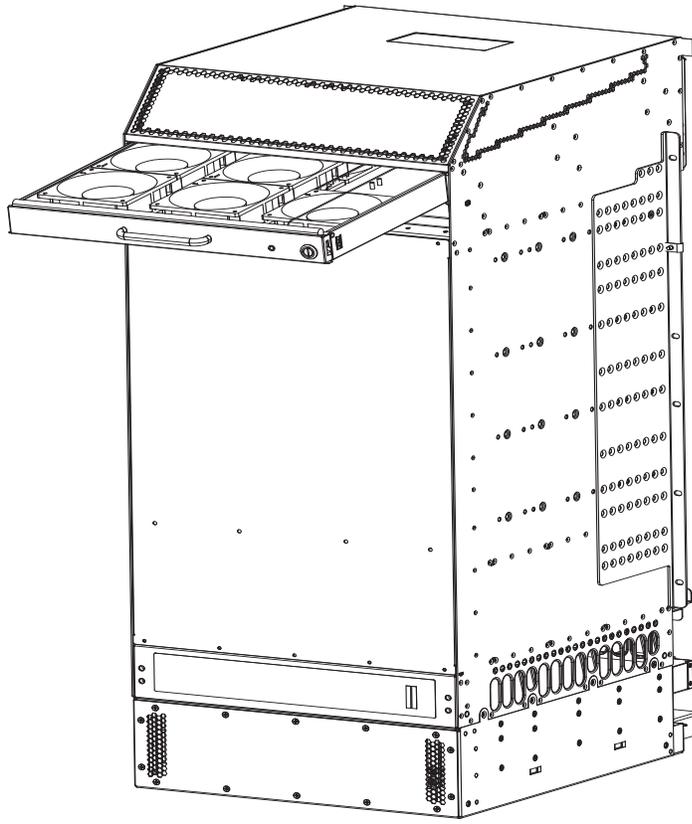
Installing Fan Trays
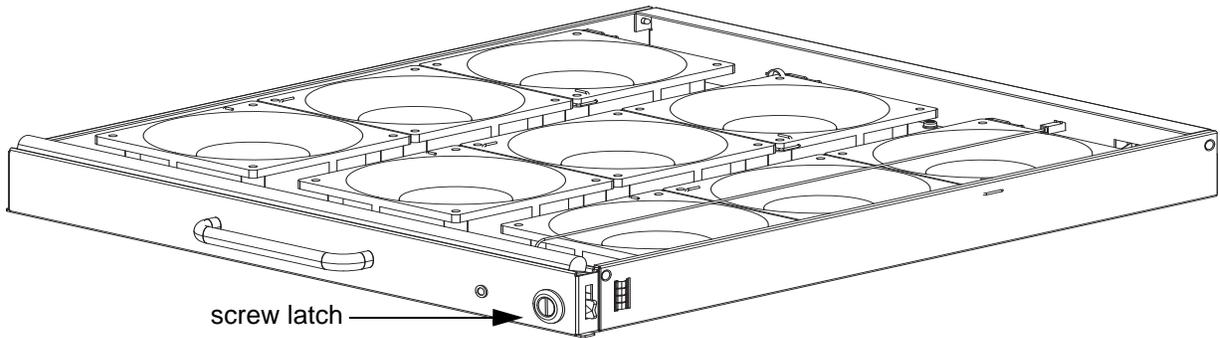
To install fan trays:

Step	Task
1.	Unpack the fan tray.
2.	Prior to inserting a fan tray, fully turn its screw latch counter-clockwise (with flathead screwdriver) until the fan tray latching mechanism fully retracts into the fan tray (see Figure 10).
3.	Grip the fan tray handle. Slide the connector end of each fan tray into the slot until it stops and the handle end is flush with the chassis rear.
4.	Secure the fan trays into place by turning the screw latch clockwise.

Table 3 is an illustration of the fan tray safety labels:

Table 3   Fan Tray Safety Labels

Label	Location
⚠ **CAUTION** Verify fan blades have stopped rotating before removing fan tray *FN00051A*	Fan tray faceplate

Chapter 7   Installing AC Power Supplies

The E1200i AC system requires a minimum of two AC power supplies to operate, three for power redundancy, four for facility redundancy (2+2), and 6 for 3+3 redundancy. To comply with safety agency and EMI regulations, you *must* install the AC-cord retainer over all power cords. The E1200i AC chassis contains six AC power supply slots, as shown in Figure 11.

> **Note:** If you are installing only two power supplies, they must be installed in the same row. FTOS will generate an error message if the two power supplies are not in the same row.

> **Note:** If you are installing power supplies for redundancy:
> • For 2+2 redundancy, two power supplies must reside in each row. That is, two in the top row and two in the bottom row.
> • For redundant operation with only three power supplies, install all three power supplies in the same row.

> **Note:** The On/Standby switch disconnects power to the rest of the chassis from *all* 6 AC power supplies.
> • When the AC cord is attached, power supply fans will spin and the LEDs will indicate status while the On/Standby switch is in Standby.

Figure 11   E1200i AC Power Supply Shelf

Power Supplies

AC Power Plugs

WARNING -
HIGH LEAKAGE CURRENT. EARTH CONNECTION
ESSENTIAL BEFORE CONNECTING SUPPLY.
COURANT DE FUITE ELEVE. RACCORDEMENT
À LA TERRE INDISPENSABLE AVANT LE
RACCORDEMENT AU RESEAU.

This retainer must be in place during normal operation.
Do not remove except for servicing

On/Standby
Switch

AC-Cord Retainer
Safety Cover
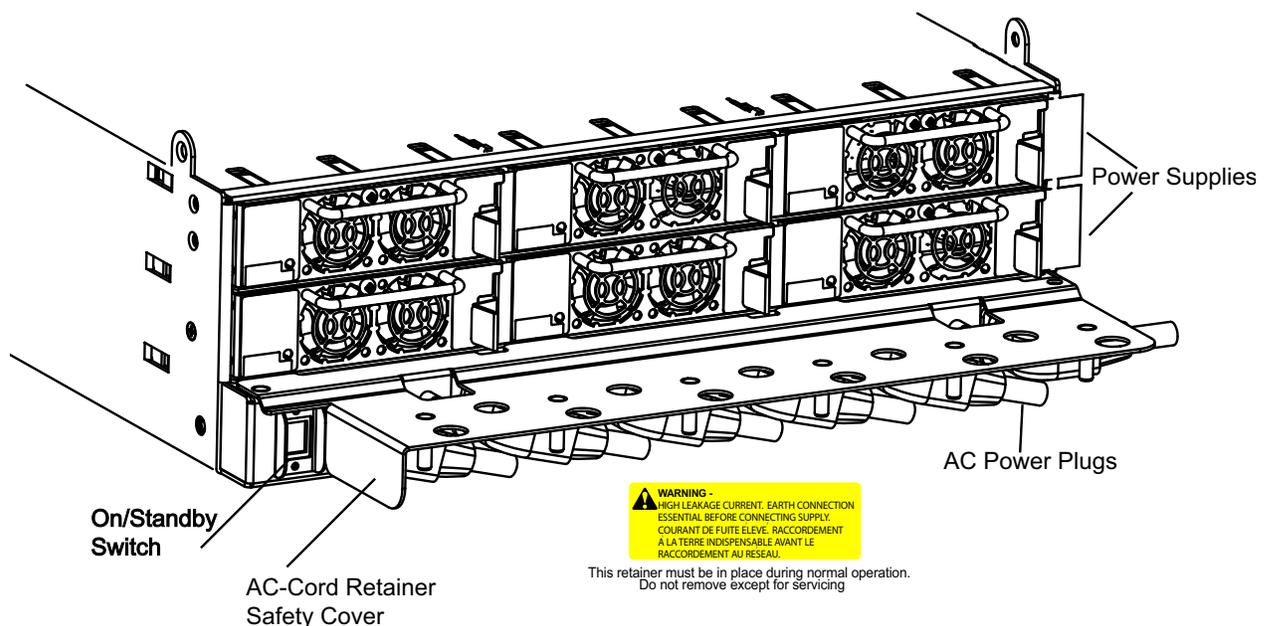
Secure your chassis ground first and then install each power supply.

Securing the Chassis Ground

Step	Task
1.	Locate the chassis ground connector nuts on the chassis rear (see Figure 2 on page 15).
2.	Install the grounding cables to the ground nuts. The grounding cable must comply with your local electrical codes in size and color (typically the color is green or green with yellow stripe). **Note:** Grounding cables must be terminated only with a UL-listed 2-hole lug with 1/4-inch holes on 3/4-inch spacing (see Figure 12). a Use ANSI UNC 1/4-20 x 1/2 bolt. b Tighten the bolt (torque should not exceed 25inch/lbs). c Connect the opposite end of the grounding cable to the nearest appropriate facility grounding post. **Figure 12** Cable Connector Required for E1200i AC
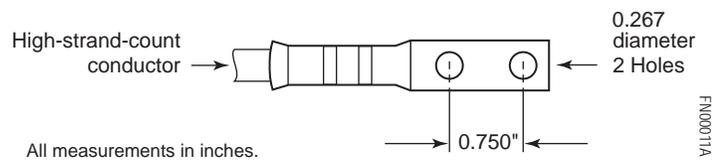
Installing Power Supplies

Caution: An E1200i AC power supply still has power after extraction, and has completely powered off when the fans have stopped rotating. When replacing a power supply, to avoid arcing and discoloration of the supply and the chassis pins, please wait for the fans to stop rotating before reinserting the supply

Step	Task
1.	Make sure that the On/Standby switch, located on the left side of plug AC-0, is in the **Standby** (up) position (Figure 11).
2.	Loosen the cord retainers locking screws (if needed) and tilt the AC-cord retainer up approximately 15º and gently slide the cover away from the chassis.

Step	Task (continued)

3. Slide the power supplies into their slots until the module front is flush with the shelf front.

Figure 13   Insert power supply
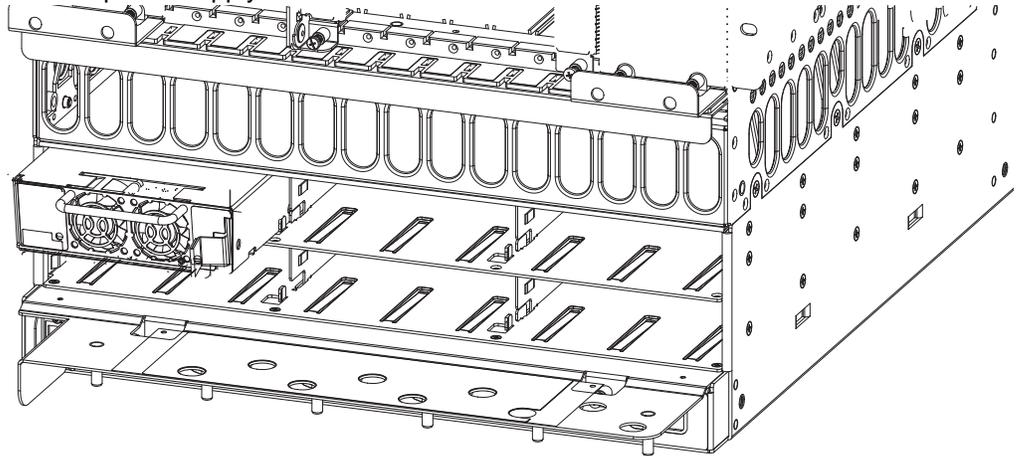
4. Connect the Power Supply cord to the designated socket (Figure 11).

5. Re-install the AC-cord Retainer by tilting approximately 15° and gently sliding in the long edge just above the AC cords.

6. Secure the retainer by tighten the locking screws on either side of the retainer.

⚡ **Danger:** Leakage Current (High Touch Current) in AC-powered systems: AC power cords are secured to the power inlet using the provided brackets. The power cord plugs must be secured to the building outlets by the qualified chassis installer or a qualified electrician.

AC Power Supply and Fan Operability Test

Once your power supplies and fan trays are installed, verify their operability by supplying power to the chassis and verifying the status LEDs.

Before you begin this power test, inspect your equipment rack and chassis. Verify that:

- Each Power Supply is properly installed and plugged into the assigned slot.
- The AC-cord Retainer is secured over the plugs.

⚡ **Danger:** Prevent exposure and contact with hazardous voltages. Do not attempt to operate this system without the AC-cord Retainer.

- Your power cables connect to an appropriate AC power supply in a manner that complies with your local electrical codes. For AC systems, a Main Disconnect must be provided for each AC cord.

- Two fan trays are installed.

To test the power supplies and fan trays:

Step	Task
1.	With the fan trays and power supplies installed, power on the system. • Flip the On/Standby switch located next to plug AC-0 to the **ON** position (down).
2.	Power Supply Status LEDs should be green. If an LED is not lit or is blinking amber: • check that the units are properly installed and are plugged into the correct slot. • Verify the power source • If the LED remains unlit or blinking amber at power up, replace the power supply.
3.	Both fan tray LEDs should be green (online). A blinking green fan tray LED indicates booting. Verify that air is flowing through the chassis. If a fan tray is not operating properly or air is not flowing through the chassis: • power off the chassis at the remote power source. • Ensure that all fan trays are properly installed. • Verify the remote power source. • If a fan tray LED remains unlit, replace the fan tray.
4.	After you have verified the power and fan operability, power off the chassis to continue the installation process.
5.	De-energize the Main Disconnect and flip the On-Off switch to the **OFF** position.
6.	Verify that the LEDs are not lit.

Power Supply and Fan Tray LEDs

Table 4   Power Supply LEDs

Status	LED is ...
No AC power	Unlit: No connection
Operational (On/Standby switch may be set to Standby)	Lit: GREEN
Power Supply Failure	Lit: AMBER

Table 5   Fan Tray LEDs

Status	LED is ...
Booting	Blinking: GREEN
Fault Detected	Lit: YELLOW
Communication Failure	Blinking: YELLOW

Table 5 Fan Tray LEDs

Status	LED is ...
Operational	Lit: GREEN
Loss of Power	Unlit

Chapter 8   Installing DC Power Supplies

The E1200i DC system requires a minimum of one DC Power Entry Module (PEM) to operate, but two are recommended for redundancy. To comply with safety agency and EMI regulations, you *must* install covers on all power supply slots not containing a PEM. Connect the PEMs to the appropriate branch circuit protection as defined by local electrical codes.

For full redundancy, each PEM must be attached to an independent power source with a dedicated circuit breaker. For example, the PEM in slot 0 connects to circuit breaker A and the PEM in slot 1 connects to circuit breaker B.

The E1200i DC chassis contains two DC PEM slots, as shown in Figure 14.

Figure 14   PEM 0 and PEM 1 Chassis Locations
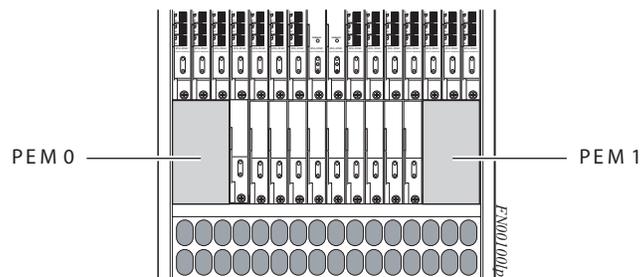
The DC PEM shown in Figure 15 is used in both the E1200 and E1200i DC chassis.

Figure 15   E1200i DC PEM
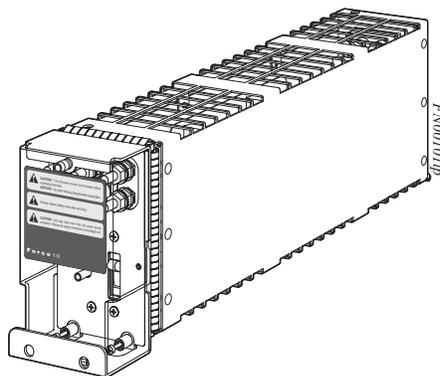
Figure 16 E1200i DC PEM Front Panel
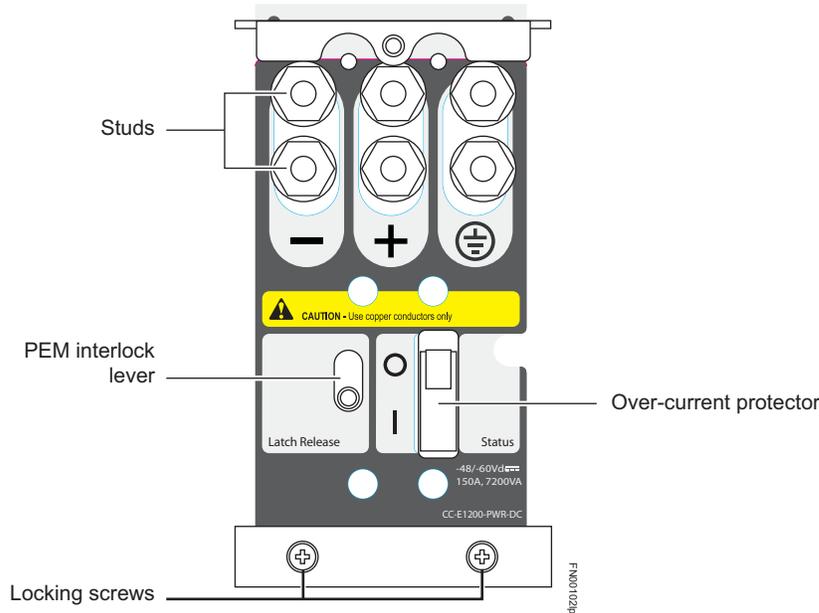
Cable and Connector Requirements

You must provide your own cables to connect to a remote power source (for example, a circuit breaker panel) in your equipment rack or office. Cables must be sized to meet the following criteria:

- rated for at least 150A service to allow for a fully loaded E1200i DC system at low input voltage per your local electrical codes
- limits voltage drop across the cable length to 0.5V or less

Before you make the cable connections, apply a coat of antioxidant paste to un-plated metal contact surfaces. File un-plated connectors, braided straps, and bus bars to a shiny finish. It is not necessary to file and coat tinned connectors or other plated connection surfaces, such as on the E1200i DC PEM studs.

Installing DC PEMs

Each E1200i DC system requires *at least one* load-sharing DC PEM to operate. Two units are recommended for full facility redundancy.

Parameter	Specifications
Maximum DC PEM Input Current	150A
Maximum Power Dissipation	6850W (21,598 BTU/hour)
Input Voltage	-48 to -60 Vdc

Use the following steps to install a DC PEM:

Step	Task
1.	Make sure that the remote power source (the circuit breaker panel) is in the **OFF** position.
2.	Make sure that the over-current protector (located on the PEM front panel) is in the **OFF** position.
3.	Loosen the retaining screw and remove the PEM safety cover .
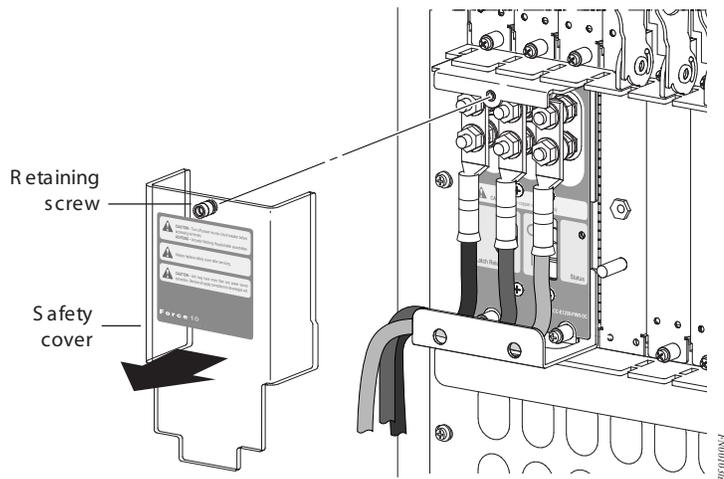
4. Slide the PEM into the 0 or 1 slot (Figure b):

   a Lift up and hold the PEM interlock lever and carefully push the unit inward to fully seat it to the backplane. When the PEM is fully inserted, the interlock lever will drop to hold the PEM in position.

   b Tighten the two locking screws with a #2 Phillips screw driver to secure the PEM. Do not exceed 5 inch/lbs torque.

Over current protector

PEM interlock lever

Locking screws
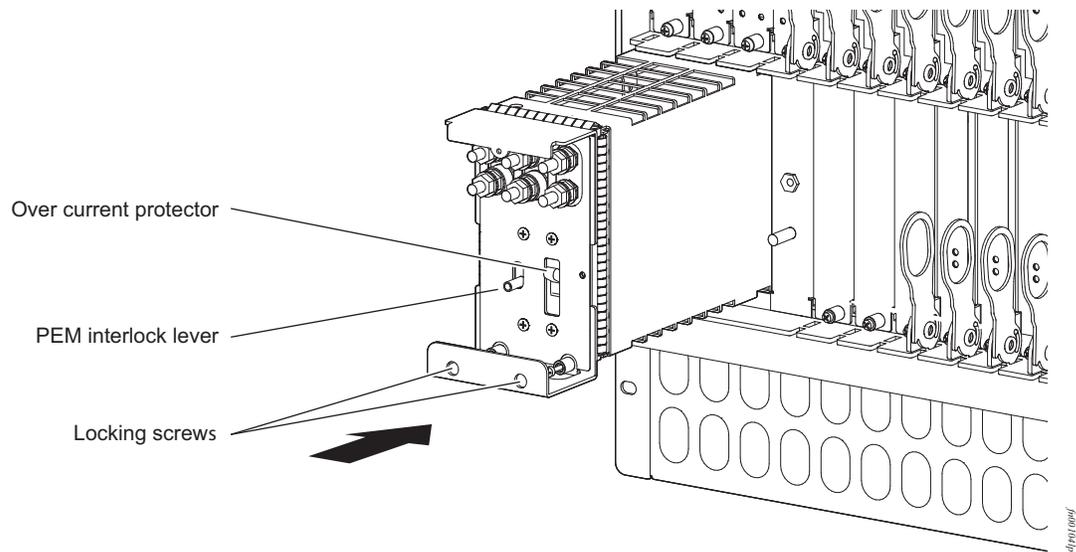
5. Secure the chassis ground connection first:

    a Remove one outer nut and one washer from each of the six studs. One nut should remain, tight on the stud. If the inner nut is loose, re-tighten it to 25 inch/lbs. maximum.

    b Locate the chassis ground connector studs on the PEM front panel (see Figure 16). **The two rightmost studs are the ground connection.**

    c Install the grounding cable onto the ground studs. The grounding cable must comply with your local electrical codes in size and color (typically the color is green or green with yellow stripe).

    NOTE: Grounding cables must be terminated only with a UL-listed 2-hole lug with 1/4-inch holes on 3/4-inch spacing (see Figure 17).

    d Replace the two washers and nuts on the studs.

    e With a 7/16-inch box or socket wrench, tighten the nuts (torque should not exceed 25inch/lbs).

    f Connect the opposite end of the grounding cable to the nearest appropriate facility grounding post.

        Figure 17 Cable Connector Required for E1200i DC PEM
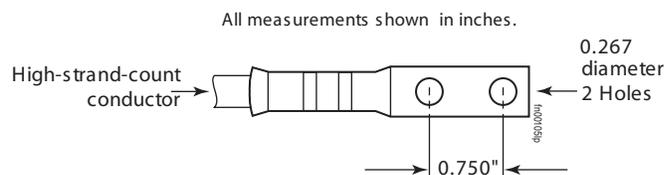
6. Connect the -48 VDC and Return cables from each PEM to the remote power sources (circuit breakers A and B).

    a Check that the remote power sources (for example, circuit breakers) are in the **OFF** position.

    b Locate the appropriate studs on the PEM front panel (Figure 16).

    c The two leftmost studs on the PEM are the -48 VDC (-) connection. **The cable attached to these studs is typically black.**

        • The two middle studs are the return (+) connection. **The cable attached to these studs is typically red.**

    d Install the -48 VDC and Return cables on the studs. The cables should be of the size and color to comply with local electrical codes.

    Note: Power cables must be terminated only with a UL-listed 2-hole lug with 1/4-inch studs with 3/4-inch spacing (Figure 19).

    e Replace the washers and nuts on the studs.

    f With a 7/16-inch box or socket wrench, tighten the nuts.

7.   Route the terminated cables down and toward the rack rail, as shown below.

Figure 18   Connecting the Ground Cable to the E1200i DC PEM
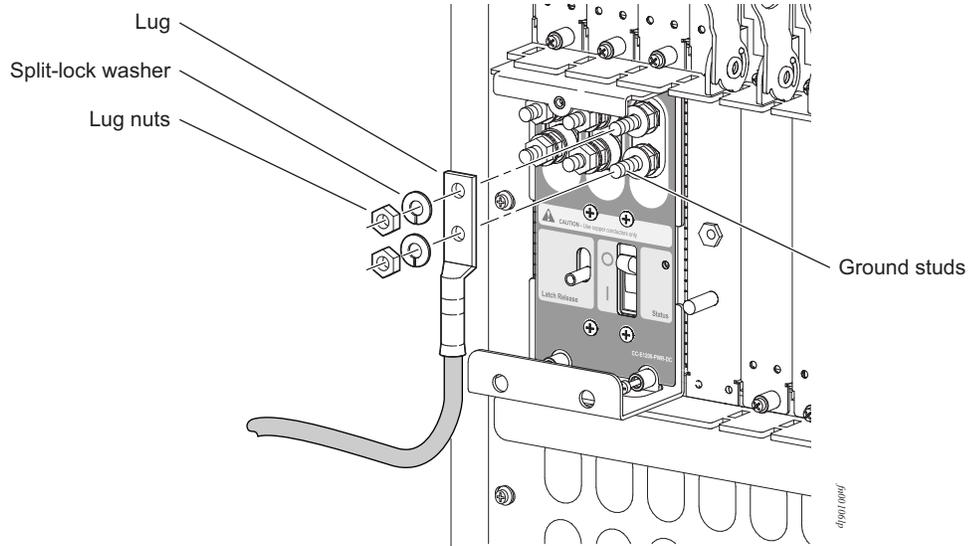
Figure 19   DC PEM with Connections in Place
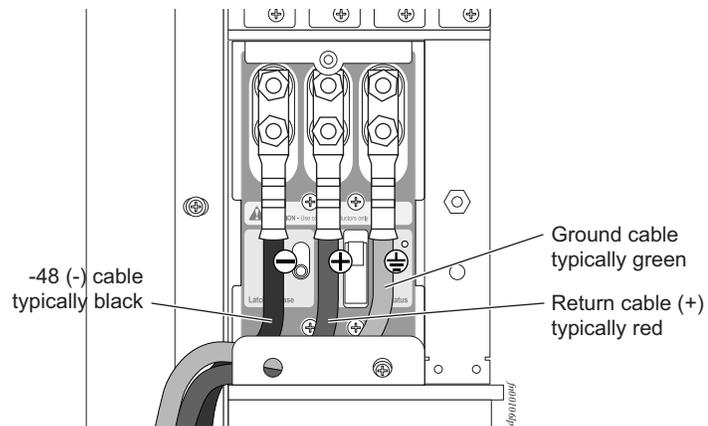
8. Replace the safety cover and tighten the captive screw with a #2 Phillips screwdriver (Figure 20).

Figure 20   Reinstalling the PEM Safety Cover
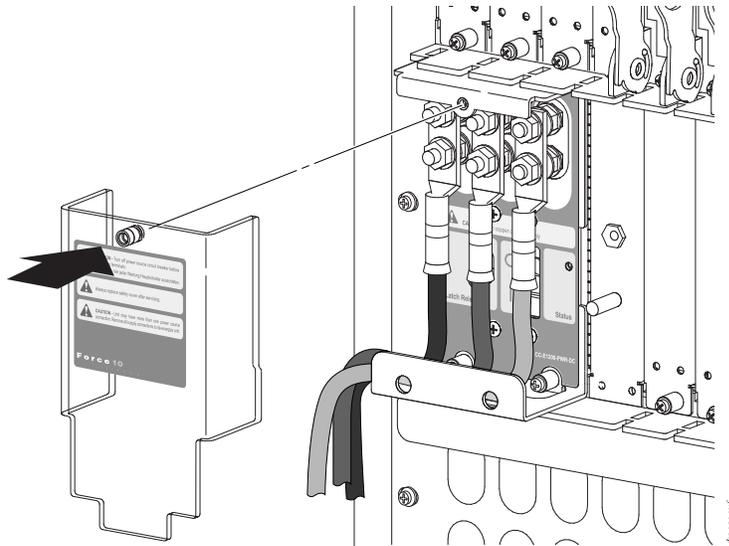
9. Check that the over-current protector (located on the PEM front panel) is in the **OFF** position.

Energize the remote power source. The Voltage LED should be green. If it is amber, the -48 VDC and Return cables are connected incorrectly or are reversed.

10. Go to DC Power Supply and Fan Operability Test, next, to complete the installation.

DC Power Supply and Fan Operability Test

After you have completed the fan tray and PEM installation, verify their operability by supplying power to the chassis and verifying the status LEDs.

→ **Note:** If there is a DC PEM failure, the entire PEM must be replaced. There are no field-serviceable parts inside the DC PEM unit.

Before you begin this power test, inspect your equipment rack and chassis. Verify that:

• Each PEM is properly installed and grounded.
• The safety covers are installed on each PEM.

⚠ **Danger:** Prevent exposure and contact with hazardous voltages. Do not attempt to operate this system without the safety cover provided with each DC PEM.

- Your power cables connect to an appropriate DC supply in a manner that complies with your local electrical codes. For DC systems, a Main Disconnect must be provided.
- On the DC PEM(s), use a voltage meter to verify power on the cables. Also verify that the Voltage LED is green.
- A power supply blank is installed in any empty slot.
- Six fan trays are installed.

To test the power supplies and fan trays:

Step	Task
1.	With the fan trays and DC PEMs installed, power on the system. • Flip the over-current protector (located on the PEM front panel) to the **ON** position.
2.	PEM Status LEDs should be green. If an LED is not lit or is amber, check that the unit is properly installed. Verify the power source. If the LED remains unlit, power off all modules and replace the unit.
3.	All six fan tray LEDs should be green (online). Verify that air is flowing through the chassis. If a fan tray is not operating properly or air is not flowing through the chassis, power off the chassis at the remote power source. Ensure that all fan trays are properly installed. Verify the remote power source. If a fan tray LED remains unlit, replace the fan tray.
4.	After you have verified the power and fan operability, power off the chassis to continue the installation process.
5.	De-energize the Main Disconnect and flip the over-current protector to the **OFF** position.
6.	Verify that the LEDs are not lit.

Chapter 9   # Installing RPMs, Line Cards, and SFMs

This chapter provides instructions for installing cards into the E1200i AC or DC chassis. It contains the following sections:

- Unpacking an RPM or Line Card
- Installing Line Cards and RPMs
- Preparing and Installing RPMs and Line Cards
- RPM Label and LEDs
- Installing Switch Fabric Modules (SFMs)
- Line Card Cable Management Systems

Unpacking an RPM or Line Card

⚠️ **Warning:**
- Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventive wrist or foot-heel ground strap when handling RPMs, SFMs, or line cards. Connect your ESD strap to the grounding plug located on the front of the chassis. See Figure 2 for ESD strap connector location. After you remove the original packaging, place RPMs, SFMs, and line cards on an antistatic surface.
- Do not supply power to your E1200i system until the power supplies and fan tray(s) are installed and verified, and RPMs, SFMs, line cards, and any blank panels are installed.

Force10 Networks recommends that you keep all components in the original packaging until you are ready to install them.

Important Points to Remember

- Do NOT remove the cards from their protective bags until you are ready to install them in a chassis.
- When you are ready to install the cards, unwrap and install one card at a time, starting with the right-most slot (Slot 13 for line cards, Slot R1 for RPMs, and Slot 9 for SFMs) ending with the left-most slot (Slot 0 for line cards, Slot R0 for RPMs, and Slot 0 for SFMs).

Installing Line Cards and RPMs

At a minimum, the E1200i requires one RPM and one line card to operate.

> **Caution:** Any slot not filled with a line card or RPM must be filled with a blank to ensure adequate cooling and EMI containment.

RPMs

The E1200i system requires the installation of at least one RPM, although two are recommended for redundancy. RPMs are designed to be installed in either the center R0 or R1 slots. Since FTOS searches for an RPM in slot 0 first, Force 10 recommends you install your RPM in slot 0 when only running with one RPM. Do not force RPMs into line card slots. RPMs are keyed differently than line cards to prevent improper installation.

You can hot-insert a second RPM into a running system without performance interruption or software intervention. A second RPM for redundant functionality provides uninterrupted operability if the system transitions from the active RPM to the standby RPM. The standby RPM constantly performs updates and receives the same configuration information received by the active RPM. The standby RPM also performs diagnostics on its subsystems. In the event of a failover, the standby RPM immediately takes over and resumes the control activities that the active RPM was performing. provides more information on the second RPM.

The RPM Major and Minor alarm LEDs are controlled by software which sets the threshold levels for triggering the different stages of alarms.

Line Cards

Your E1200i configuration requires a minimum of *one* line card. Line cards are hot-swappable. The line card ports provide external interface functions for connections to other systems (for example, a router or switch). Each line card has an onboard CPU for line card management which updates packet forwarding information, obtains statistical information, and performs synchronization tasks with the RPM, as well as Force10 Networks custom-built ASICs, which enable line-rate forwarding.

Line Card Port Numbering

There are 14 line card slots available in the E1200i chassis. A minimum of one line card is required for operation. Line cards are installed in slots 0 through 13. Ports on line cards are numbered from the top, starting from 0 (see Figure 21).

Figure 21 24 Port 1GE and 2-Port 10GE Line Card Port Numbering
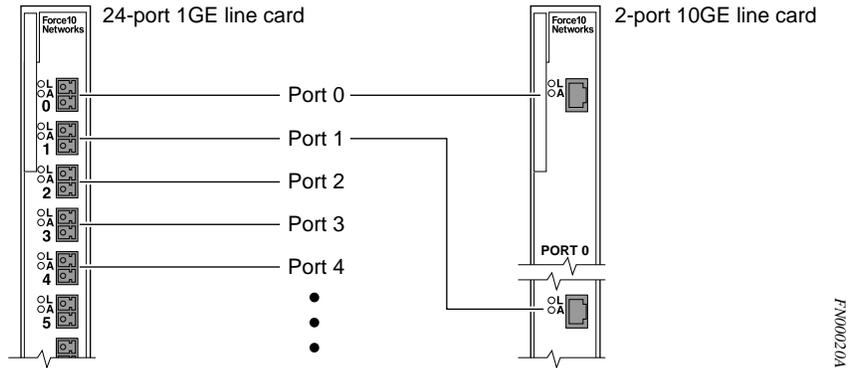
Blank Panels

Caution: To avoid a chassis over-temperature condition, install blanks for RPMs, SFMs, and line card slots not in use. Always replace cards or blanks immediately.

Blank panels for RPMs, SFMs, and line cards must be installed in empty slots to control airflow. If a slot is not filled for more than five minutes, the following message appears on the console:

```
%CHMGR-2-MINORTEMP: Minor alarm: chassis temperature high (SFM
temperature reaches or exceeds threshold of 65C)
```

Blank panels are shipped with the system to ensure that all chassis slots are installed with operational modules or blanks.

Preparing and Installing RPMs and Line Cards

To prolong the life of the EMI seals, begin installing cards in the right-most slot (slot 13), filling the slots leftward (slot 12, then slot 11, then slot 10, and so on).

Figure 22 Installing an RPM into the E1200i
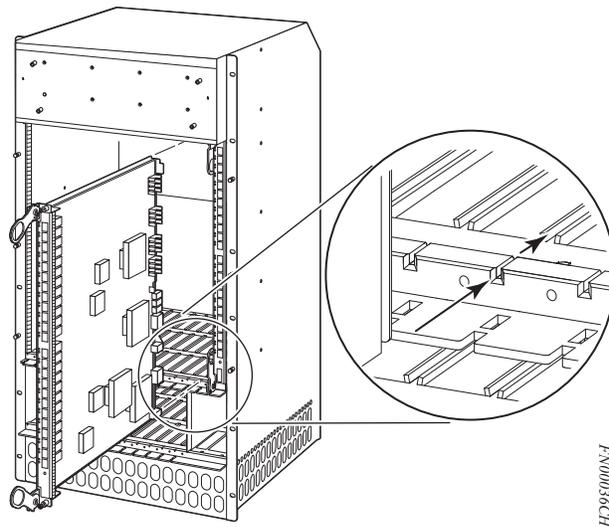
🛑 **Caution:** It is important that you retain the packaging and installation order of the cards. Load cards from **right** to **left, beginning with Slot 13.**

Figure 23 RPM and Line Card Slot Numbering Label
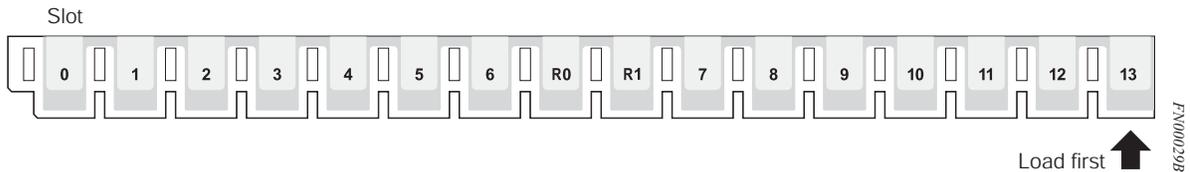
To install line cards and RPMs:

Step	Task
1.	Remove the line card from its box and carefully remove the line card from the anti-static packaging.
2.	Align the RPM with the guide and gently slide it into the slot until you feel the connectors engage with the chassis backplane. **Note:** Hold the card by the edges. Avoid touching the printed circuit board and connector pins. Extend the top and bottom card levers before you insert the card into the slot.
3.	Rotate the levers to seat the backplane connectors and line card in place.
4.	Secure card and blanks in place by tightening the top and captive screws on each card.
5.	Follow the same installation procedure for the remaining cards and slots, in the appropriate order.

➡️ **Note:** The blank panels do not have board components or connector pins. Align the blank with the guides and gently slide toward the backplane.

Installing a Second RPM

➡ **Note:** If your system contains two RPMs, both RPMs must contain the same software image.

Install a second RPM either before the system is powered on or after the Primary RPM is up and stable. After the second RPM is installed, wait several seconds until the connection between the two RPMs is established before configuring any commands. Below is an example of the messages that should appear:

```
%POLLMGR-2-ALT_RPM_STATE: Alternate RPM is present

%IRC-6-IRC_COMMUP: Link to peer RPM is up

%RAM-6-RAM_TASK: RPM1 is in Standby State.
```

Once the link between the two RPMs is established, copy the running configuration to the startup configuration.

RPM Label and LEDs

Table 6 describes the RPM LED states and the RPM front panel.

Table 6 RPM LEDs

Section	Label	Description
Management	10/100 Ethernet	L: Green: link is up
		A: Green: activity on port
Alarms	Major	Red: a critical condition exists, such as a severe over temperature condition, a fan tray failure, an overcurrent condition in a power supply, or an out-of-tolerance voltage. The RPM LEDs are controlled by software which sets the threshold levels for triggering the different stages of alarms.
		Unlit: no major conditions
	Minor	Amber: a serious condition exists, such as an over temperature condition, a single fan failure, or a line card failure. The RPM LEDs are controlled by software, which sets the threshold levels for triggering the different stages of alarms.
		Unlit: no minor alarm conditions
	ACO/LT	Allows you to test the operability of LEDs to verify that they are able to light. Press the ACO/LT button to temporarily illuminate the LEDs on the RPM.
		If you press this button when the alarm status LED is lit, the alarm relay contacts are reset until the next alarm event.
Flash	In Use	Green: flash memory card is in the process of a read or write process. Do not remove the flash card when the In Use LED is lit.
		Unlit: not in use

Table 6 RPM LEDs

	Primary	Green: primary
		Unlit: secondary (or standby)
	Status	This is a bi-color LED.
		Green: operational
		Amber: fault detected
		Flashing green: booting
		Unlit: in secondary mode or power is off

Installing Switch Fabric Modules (SFMs)

A minimum of eight SFMs are required in order for the E1200i system to operate properly. Slot 9 allows for a redundant SFM, allowing up to ten SFMs in the E1200i system.

SFMs carry user traffic between line cards or between RPMs and a line card. SFMs plug directly into the backplane, which provides high-speed access to the line cards. The switch fabric receives user data packets and redirects them to the appropriate destinations according to the routing information.

Caution: If you are not operating your system with a redundant (tenth) SFM, you must install an SFM blank to avoid overheating and ensure EMI containment.

Install SFMs from the right-most slot (9) to the left-most slot (0).

Step	Task
1.	Remove an SFM from the anti-static packaging.
2.	Align the SFM with the guide and gently slide it into the slot until you feel the connectors engage with the chassis backplane.
	Note: Hold the SFM by the edges. Avoid touching the printed circuit board and connector pins. Extend the top and bottom card levers before you insert the card into the slot.
3.	Rotate the lever to seat the backplane connectors and card in place.
4.	Secure each SFM in place by tightening the captive screw.
5.	Continue the process for the remaining SFMs.
6.	Align any blank panels with the guides and gently slide toward the backplane. Secure each blank panel by tightening the single captive screw.

Note: If you are not operating your E1200i system with redundancy, your SFM package will include blank panels. Blanks are slot covers that have no board components or connector pins.

Figure 24 Installing SFMs

Start with slot 8 or slot 9
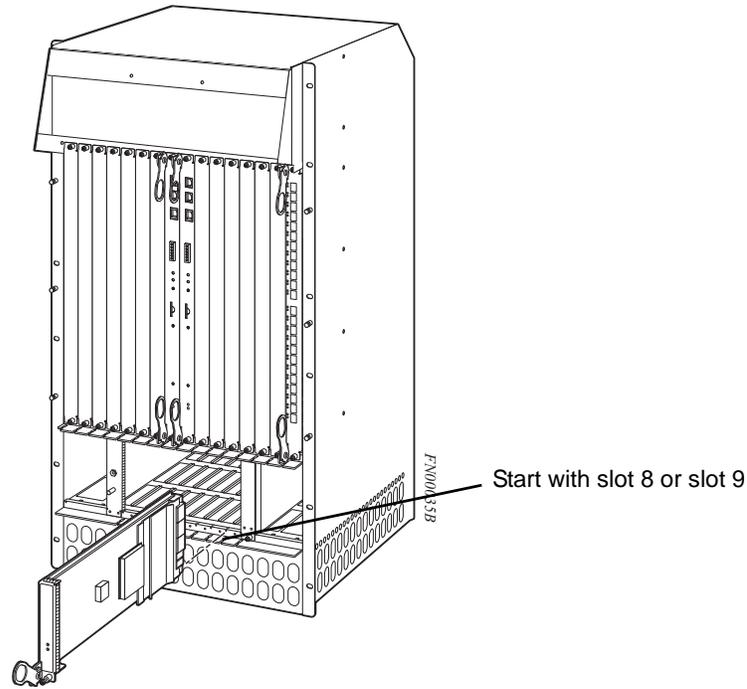
SFM Front Panel and LEDs

Table 7 illustrates the SFM front panel and LEDs.

Table 7 SFM Front Panel and LED Descriptions

	LED	Description
CC-E-SFM3 ● Active ● Status Switch Fabric Assy Serial #	Active	Green: active and passing traffic
		Unlit: in standby mode
	Status	Flashing Green: booting
		Green: operational
		Flashing Amber: communication failure
		Amber: fault detected
		Unlit: no power

Line Card Cable Management Systems

Force10 provides a variety of E1200i chassis cable management systems to manage your fiber optic and auxiliary cables connecting to line cards. For details, see the Force10 price list. For installation instructions, see the instructions that come with the specific cable management system.

Chapter 10   RPM Ports and Cables

This chapter describes standard RPM cables and adapter pin assignments for the E1200i AC and DC systems. It contains the following sections:

- RPM Ports
- Cable and Adapter Pin Assignments
- Accessing the 10/100 Ethernet Management Port

RPM Ports

There are three ports on the RPM. They are labeled and described as:

- Console. A Universal Asynchronous Receiver/Transmitter (UART) port with an RJ-45 jack, is used for system configuration and monitoring. Modem connections are not supported on this port.
- Auxiliary. A UART port with an RJ-45 jack, allows modem access to the E1200i system from a remote location.
- 10/100 Ethernet. A 10/100 Ethernet port is the Management port, which is a channel to download images and manage the system, as well as FTP and Telnet operations. You must provide a RJ-45 Ethernet cable to connect to the Ethernet receptacle.

Connecting the Console and Auxiliary Ports

Note: Attach an ESD-preventive wrist strap and connect the leash to the ESD connection on the front of the E1200i chassis. Always wear an ESD-preventive wrist or foot-heel ground strap when handling components.

The console and auxiliary ports are asynchronous serial ports. If you connect a device to these ports, it must be capable of asynchronous transmission. Your terminal or terminal emulation mode must be set to VT100 with the following settings:

- 9600 baud rate (to avoid autobaud input, the default is set to a 9600 bps baud rate)
- No parity
- 8 data bits
- 1 stop bit
- Window Terminal Emulator option set to **NO**
- 24 lines X 80 characters

- No flow control (console port only)
- Hardware flow control (RTS/CTS) (for auxiliary port only)

Cable and Adapter Pin Assignments

Use the E1200i Console port on the RPM to connect to a terminal port, PC serial port, or a terminal server to configure and monitor your system. Use the E1200i Auxiliary port on the RPM to connect to a modem.

Both the Console and Auxiliary port are RJ-45 ports. Figure 25 displays the pinouts in an RJ-45 port.

Figure 25   Pinout for an RJ-45 Connector End Adaptors

87654321
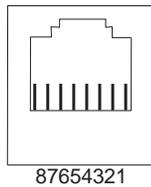
Table 8 displays the RJ-45 console port pin assignments. Table 9 displays the RJ-45 auxiliary port pin assignments.

Table 8   Console Port (RJ-45) Pin Assignments

Pin	Signal	Input/Output
1	NC (unused)	-
2	DTR	Output
3	TxD	Output
4	GND	-
5	GND	-
6	RxD	Input
7	DSR	Input
8	NC (unused)	-

Table 9   Auxiliary Port (RJ-45) Pin Assignments

Pin	Signal	Input/Output
1	RTS	Output
2	DTR	Output
3	TxD	Output
4	GND	-
5	GND	-
6	RxD	Input

Table 9 Auxiliary Port (RJ-45) Pin Assignments

Pin	Signal	Input/Output
7	DSR	Input
8	CTS	Input

Accessing the Console with a DB-9 Adapter

You can connect to the console using a RJ-45 to RJ-45 rollover cable and a RJ-45 to DB-9 female DTE adapter (labeled "TERMINAL") to a terminal server (for example, PC). lists the pin assignments.

Table 10 Pin Assignments Between the E1200i Console and a DTE Terminal Server

E1200i Console Port	RJ-45 to RJ-45 Rollover Cable		RJ-45 to DB-9 Adapter	Terminal Server Device
Signal	RJ-45 pinout	RJ-45 Pinout	DB-9 Pin	Signal
RTS	1	8	8	CTS
DTR	2	7	6	DSR
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND
RxD	6	3	3	TxD
DSR	7	2	4	DTR
CTS	8	1	7	RTS

Accessing the Console with a DB-25 Adapter

You can connect to the console using an RJ-45 to RJ-45 rollover cable and RJ-45 to DB-25 female DTE adapter. lists the pin assignments.

Table 11 Pin Assignments Between E1200i Console and DB-25 Adapter

E1200i Console Port	RJ-45 to RJ-45 Rollover Cable		RJ-45 to DB-25 Modem Adapter	Terminal Server Device
Signal	RJ-45 Pinout	RJ-45 Pinout	DB-25 Pinout	Signal
RTS	1	8	5	CTS
DTR	2	7	6	DSR
TxD	3	6	3	RxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	TxD
DSR	7	2	20	DTR
CTS	8	1		RTS

Accessing the Auxiliary Port by Modem

You can access the auxiliary port using a dial-up modem using an RJ-45 to RJ-45 rollover cable and RJ-45 to DB-25 male DCE adapter (labeled "MODEM"). Table 12 lists the pin assignments.

Table 12 RJ-45 to DB-25 Adapter Pin (Modem) Assignments

E1200i Auxiliary Port	RJ-45 to RJ-45 Rollover Cable		RJ-45 to DB-25 Modem Adapter	Modem
Signal	RJ-45 Pinout	RJ-45 Pinout	DB-45 Pinout	Signal
RTS	1	8	4	RTS
DTR	2	7	20	DTR
TxD	3	6	3	TxD
GND	4	5	7	GND
GND	5	4	7	GND
RxD	6	3	2	RxD
DSR	7	2	8	DCD
CTS	8	1	5	CTS

Accessing the 10/100 Ethernet Management Port

Configure the 10/100 Ethernet management port, labeled **10/100 Ethernet** on the primary RPM card in order to obtain network access capability, such as downloading a runtime image onto your system. You can connect this port to an Ethernet hub or FastEthernet port on a router.

Table 13 10/100 Ethernet Management Port LEDs

Label	Description
L (Link)	Lit: Link is up Unlit: No connection
A (Activity)	Lit: Activity on port Unlit: No activity

Chapter 11　　　　　　　　　# Powering Up

This chapter provides instructions for powering up your E1200i AC or DC system after you have installed all the chassis components and made your power and network connections. It covers the following topics:

- Preparation
- Supplying Power - AC
- Supplying Power - DC
- Booting to the CLI Prompt

Preparation

> **Note:** Make sure that the switch on the **remote power source** is in the **OFF** position until you are ready to supply power to the chassis.

Before you supply power to your chassis, Force10 Networks recommends that you re-inspect your equipment rack and chassis.

Verify that:

- The equipment rack is properly secured and grounded.
- The chassis is bolted and secured into your equipment rack.
- The chassis is grounded.
- Each power supply module is properly installed and secured.
- The AC-Cord Retainer is installed, if applicable (AC systems).
- The power switch is in the **OFF** position, if applicable (DC systems).
- Power cables connect to a compliant remote power source.
- Both fan trays are installed and secured.
- All line cards, RPMs, and SFMs are properly installed and secured.
- All chassis slots are filled. Blank panels and covers are installed in all empty slots.

> **Danger:** Leakage Current (High Touch Current): The AC power cords are secured to the power inlet using the provided bracket. The power cord plugs must be secured to the building outlets by the chassis installer or a qualified electrician.

Supplying Power - AC

Step	Task
1.	Flip the REMOTE power switch to the ON position.
2.	Flip the On/Standby switch to the ON position.
3.	The Status LED for each power supply should be green (online). If a power supply's LED is not lit or is amber: • ensure that the unit is properly installed. • Verify the power source. • If the power supply's LED remains unlit, power off the remote power source and replace the unit.
4.	Both fan tray LEDs should be green (online). Verify that air is flowing through the chassis. If a fan tray is not operating properly or air is not flowing through the chassis: • power off the chassis at the remote power source. • Ensure that the fan tray is properly installed. • Verify the power source. • If the fan tray LED remains unlit on power-up, replace the fan tray.

To turn the chassis power off, flip the On/Standby switch to the **Standby** position.

➡ **Note:** The AC power supplies status LEDs will remain lit and the power supply fans will continue to operate, even though DC power to the backplane has been turned off.

Supplying Power - DC

Step	Task
1.	Flip the REMOTE power switch to the ON position.
2.	The Status LED for each power supply should be green (online). If a power supply's LED is not lit or is amber: • ensure that the unit is properly installed. • Verify the power source. • If the power supply's LED remains unlit, power off the remote power source and replace the unit.
3.	Both fan tray LEDs should be green (online). Verify that air is flowing through the chassis. If a fan tray is not operating properly or air is not flowing through the chassis: • power off the chassis at the remote power source. • Ensure that the fan tray is properly installed. • Verify the power source. • If the fan tray LED remains unlit on power-up, replace the fan tray.

Booting to the CLI Prompt

After you supply power to the system, the following should occur:

- During bootup, power is removed temporarily from all line cards and SFMs. This is expected behavior.
- Both fan trays should be operating.
- The green (online) LEDs for the fan trays, Power Supplies, RPMs, SFMs, and line cards should be lit and remain lit as long as the system is receiving power and is operational.

When you supply power to the E1200i system, the system performs a series of power-on self tests. RPM, line card, and SFM LEDs blink as the diagnostic programs run. No user interaction is required at this point. Observe the process on your console monitor. When the boot process is complete, the card LEDs remain online (green) and the console monitor displays the Command Line Interface (CLI) prompt.

> **Note:** Do not press any keys or control sequences at any time during the boot process. Doing so may cause the boot process to terminate.

Refer to the *FTOS Configuration Guide*, on the technical publications CD-ROM, for initial configuration procedures and configuration instructions.

Booting from the BOOT_USER Prompt

The initial boot operation automatically brings up the system to the runtime CLI. To interrupt the automatic boot process, issue a break key sequence (CNTL^). The console monitor will display the default **BOOT_USER #** prompt. Refer to for instructions to continue the boot process.

Chapter 12 — Removing and Replacing Components

This chapter provides instructions for removing and replacing E1200i AC and DC components. It covers the following topics:

- Removing and Replacing Fan Trays
- Removing and Replacing AC Power Supplies
- Removing and Replacing DC Power Supplies
- Removing and Replacing RPMs, Line Cards, or SFMs
- Removing and Replacing the Air Filter

When a component fails, the E1200i system triggers major or minor alarm LEDs (located on the RPM), sends events to the SNMP trap and show alarms table, disables or changes component Status LEDs or triggers an audible alarm. Refer to Appendix C, on page 87 for more information on alarms.

Removing and Replacing Fan Trays

In the event of a fan tray failure, signified by an amber LED, an SNMP trap, or major alarm event, the entire fan tray must be replaced. If one or more fans within a fan tray fail, the system generates a minor alarm and an SNMP trap.

The fan trays are hot-swappable.

To remove and replace the fan tray, you must have access to the rear of the chassis and be able to pull the fan tray completely out of the slot (at least 20 inches).

To remove and replace a fan tray:

Step	Task
1.	Prior to removing a fan tray, turn the screw latch counter-clockwise (with a flathead screwdriver) one quarter of a turn to unlock the fan tray. (Figure 26).

Step	Task
2.	Grip the handle and pull the fan tray out approximately one inch from the chassis. Wait 30 seconds until the fan blades stop rotating, then remove.

⚠ **Danger**: Keep fingers clear of rotating fan blades.

Step	Task
3.	Prior to inserting a new fan tray, fully turn (with a flathead screwdriver) the screw latch counter-clockwise until the fan tray latching mechanism retracts into the fan tray.
4.	Insert the fan tray into the chassis. Guide the tray firmly into the slot until it stops and the handle end is flush with the chassis rear.
5.	To secure the fan trays into place, turn the screw latch clockwise to tighten the latching mechanism. (see Figure 26)

Figure 26   Securing the Fan Tray Screw Latch

screw latch
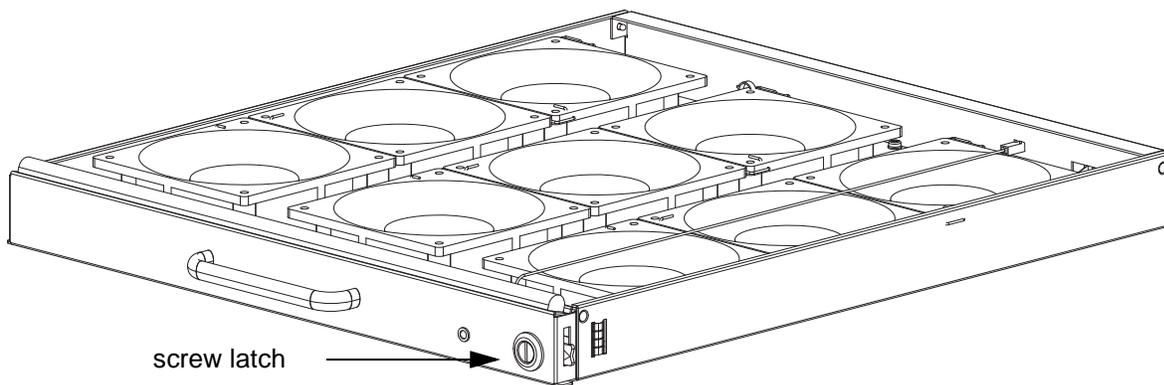
Removing and Replacing AC Power Supplies

If you are operating your E1200i AC chassis with redundant Power Supplies, you can install, remove, or replace a Power Supply without affecting system operation. If you are operating your E1200i AC system with only two Power Supplies (the minimum), you must *completely* power off the system.

➡ **Note:** If there is a Power Supply failure (Power Supply LED is not lit or major alarm LED is lit), the entire Power Supply Module must be replaced. There are no field serviceable parts inside the Power Supply unit.

⚠ **Danger: Do not** remove the AC-Cord Retainer until the power supplied by the remote power source is **OFF.**

⚠ **Danger: Do not** remove the AC-Cord Retainer until the power supplied by the remote power source is **OFF.**

Note: The On/Standby switch disconnects power to the rest of the chassis from *all* 6 AC power supplies.

- When the AC cord is attached, power supply fans will spin and the LEDs will indicate status while the On/Standby switch is in Standby.

Note: AC Power Supplies may be replaced without removing the AC-cord retainer or the AC cords.

Remove an AC Power Supply in a non-redundant installation

Step	Task
1.	Unplug the network interface cables connected to the line card or RPM.
2.	Activate the disconnect switch at the Main power source or disconnect the AC cord at the remote power source.
3.	Grip the handle and squeeze the thumb latch.
4.	Slide the Power Supply out of the slot.
5.	If you are replacing the Power Supply, go to Installing AC Power Supplies on page 35.

Remove an AC Power Supply in a redundant installation

Step	Task

Power Supplies

AC Power Plugs

On/Standby Switch

AC-Cord Retainer Safety Cover

WARNING -
HIGH LEAKAGE CURRENT. EARTH CONNECTION
ESSENTIAL BEFORE CONNECTING SUPPLY.
COURANT DE FUITE ÉLEVÉ. RACCORDEMENT
À LA TERRE INDISPENSABLE AVANT LE
RACCORDEMENT AU RESEAU.

This retainer must be in place during normal operation.
Do not remove except for servicing

1.	Tilt the AC-cord Retainer Safety cover approximately 15° and gently slide the cover away from the chassis.
2.	Grip the handle and squeeze the thumb latch.
3.	Slide the Power Supply out of the slot.
4.	If you are replacing the Power Supply, go to Installing AC Power Supplies on page 35.

Removing and Replacing DC Power Supplies

If you are operating your E1200i DC chassis with redundant Power Supplies, you can install, remove, or replace a Power Supply without affecting system operation. If you are operating your E1200i DC system with only one Power Supply (the minimum), you must completely power off the system.

Note: If there is a Power Supply failure (Power Supply LED is not lit or major alarm LED is lit), the entire Power Supply Module must be replaced. There are no field serviceable parts inside the Power Supply unit.

Remove a DC Power Supply

Step	Task
1.	Ensure that the **remote power source** is in the **OFF** position and that the PEM status light is off.
	• PEM 0 connects to remote power source 0.
	• PEM 1 connects to remote power source 1.
2.	Loosen the retaining screw and remove the PEM safety cover.
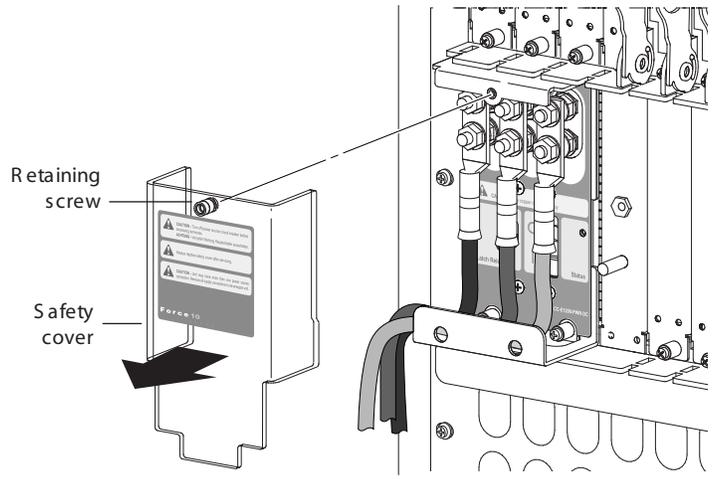
Step	Task
3.	Switch the Over Current Protector (located on the PEM front panel) to the **OFF** position.
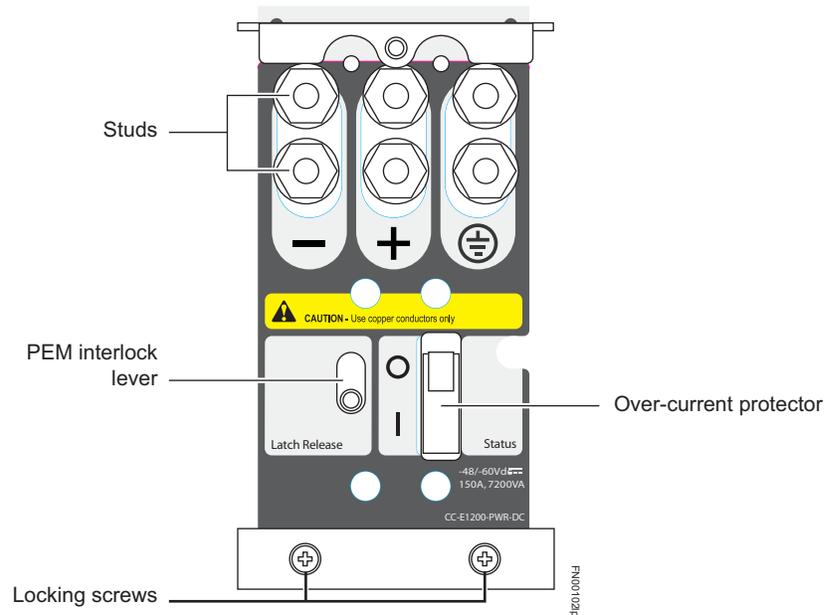
Step	Task
4.	Loosen the Locking screws.

Step	Task (continued)
5.	Lift and hold the PEM interlock lever to release the PEM
6.	While holding the interlock lever up, using the bottom handle, pull the PEM straight out of the slot.

Removing and Replacing RPMs, Line Cards, or SFMs

Warning:
- Do not remove a panel blank unless you are ready to install a line card, RPM, or SFM into that slot. If you remove a card, immediately replace the empty slot with a panel blank. Blanks are required to control airflow and electromagnetic interference.
- Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventive wrist or foot-heel ground strap when handling RPMs, SFMs, or line cards. (Connect the ESD strap to the grounding plug located on the front of the chassis.)
- After you remove the original packaging, place RPMs, SFMs, and line cards on an antistatic surface.

Note:
- If you operate your E1200i without redundant RPMs, the system enters a software-defined power-down state when you remove the only RPM for replacement.
- Your E1200i system will not function properly with fewer than eight SFMs.

You can add, replace, or remove modules without interrupting the system power or system operations. RPMs, line cards, and SFMs are hot-swappable. The E1200i system generates major alarm events for high temperatures (over 75°C) and module failures depending on the module and whether or not it is redundant. Minor alarms are generated for component temperatures over 65°C and 75°C for line cards. SNMP traps are sent for both alarm types. Refer to Appendix C, on page 87 for more details.

Removing and Replacing line cards or RPMs

To remove and replace E1200i line card or RPM modules:

Step	Task
1.	Unplug the network interface cables connected to the line card or RPM.
2.	Loosen the captive screws and pull the ejector levers simultaneously toward you to disengage the backplane connections.
3.	Slide the card out of the slot and store the cards in the original antistatic packaging.
4.	If you are immediately installing a replacement card, align the new card with the guide, and gently slide the card into the slot until you feel the connectors engage with the chassis backplane. If you are not planning to install a new card immediately, install a blank panel.

Step	Task (continued)
5.	If you are installing a line card, follow these procedures: • If you are hot-swapping (replacing the line card with the same card type), no additional configuration is required. • If you are installing a different line card type, enter, in Configuration mode, the following command: **linecard** *number card-type,* where *number* is a slot number from 0 to 13, and *card-type* is the five-character code for the card type. • If you are replacing the line card with a blank panel, delete the line card information from the configuration by entering: **no linecard**
6.	If you are *not* operating your system with redundant cards (with only one line card, one RPM, and eight SFMs) you must power off your system until the cards are replaced.

Removing and Replacing SFMs

To remove and replace an SFM:

Step	Task
1.	Loosen the captive screw and pull the ejector lever towards you to disengage the backplane connections.
2.	Slide the card out of the slot and store in the original anti-static packaging. System messages appear on the console, including the following: `%TSM-6-SFM_REMOVE: Removed SFM` **Wait 5 to 10 seconds to install a new SFM or reinsert an SFM. ***
3.	Remove the new SFM from the antistatic packaging.
4.	Align the new SFM with the guide and gently slide the card into the slot until you feel the connectors engage with the chassis backplane. **Note:** Hold the SFM by the edges. Avoid touching the printed circuit board and connector pins. Extend the card lever before you insert the card into the slot.
5.	Rotate the lever to seat the backplane connectors and SFM in place.
6.	Secure the SFM in place using the provided screw.
7.	If you are not operating your E1200i system with redundancy, replace the empty slot with a filler panel blank. Blanks do not have board components or connector pins. Align the blank with the guides and gently slide toward the backplane. Rotate the lever to secure the blank in place.

→ **Note:** If you mistakenly insert an SFM too quickly after removing it, traffic flow is interrupted. To correct the situation, remove an active SFM or the standby SFM, wait several seconds, and reinsert. System messages stating that the active interfaces' status changed and the switch fabric is up appear when an SFM is inserted correctly and traffic is flowing.

Removing and Replacing the Air Filter

A factory-installed air filter (Figure 27) is shipped with the E1200i system. The hot-swappable air filter prevents large particles, debris, and dust from entering and circulating through the system, and ensures proper air flow through the system. Filters should be inspected monthly and replaced every twelve months or as required.

⚠️ **Warning:** An improperly installed air filter will restrict air flow and will generate thermal problems throughout the chassis. Ensure the air filter is oriented correctly and seated securely in the slot.

Do not operate without a filter for any longer than 30 minutes to avoid card over-temperature conditions.

To remove and replace the air filter:

Step	Task
1.	Pull the air filter straight out of the chassis.
2.	Rotate the replacement filter so that the front handle label is right reading.
3.	Guide the filter firmly into the slot until it stops.

Figure 27 Replacing the Air Filter

Appendix A   Using a Flash Memory Card
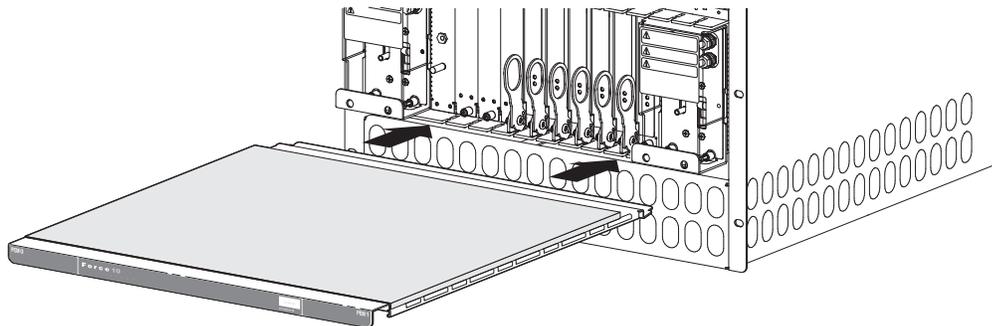
This appendix provides information about using an external flash memory card and contains the following sections:

- External Flash Memory Card Overview
- Inserting the External Flash Memory Card
- Removing the External Flash Memory Card
- Formatting an External Flash Card
- Copying Files to the External Flash
- Displaying Files Stored on the External Flash

External Flash Memory Card Overview

Each RPM card is designed with a slot to accommodate an external flash memory card (slot0:). You can use a flash card to copy the image and configuration files for storage and backup purposes. For complex configurations, use the copies for other E1200i systems in your network. Configure your boot execution process to use the images stored on a flash card as the primary (active), secondary (standby), or default boot order preference. Optional external flash memory cards are shipped blank.

Inserting the External Flash Memory Card

Note: Only insert the external flash before system boot or after the system has completed its boot and is run-time mode.

To install the flash memory card:

Step	Task
1.	Press the ejector button to ensure it is in the extended position. Hold the flash card vertically (with the manufacturer's label on the left and the barcode on the right).
2.	Gently insert the flash card into the primary RPM flash slot until the card is flush with the front panel. Do not force the flash card into the slot.
3.	The In Use LED illuminates only during read or write operations.
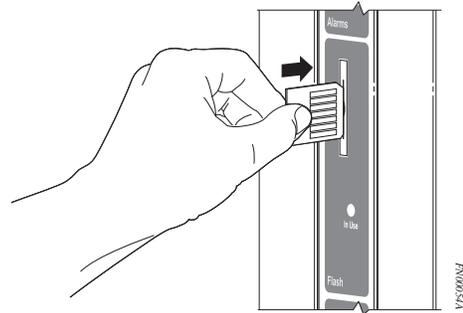
Removing the External Flash Memory Card

To remove the flash memory card:

Step	Task
1.	Gently depress the flash card in the slot. The card should partially pop out of the slot.
2.	Remove the card and place it in an antistatic bag.

Formatting an External Flash Card

New external flash cards must be formatted in the E1200i before use.

Flash cards used on systems other than the E1200i as well as cards formatted on PCs must be reformatted in the E1200i flash slot before they can be used. Similar to formatting a new diskette, formatting erases all information stored on the flash card.

To format the flash card:

Step	Task
1.	Insert the flash card into the flash slot on the *primary* RPM.
2.	In the EXEC CLI mode, enter **format slot0:**
3.	The formatted flash card is ready to use.

Copying Files to the External Flash

Copy files to the flash when you want keep a backup image. The In Use LED illuminates during a read or write operation. Do not eject the flash card from the slot while this LED is lit.

To copy files to the external flash card use the following command:

Command Syntax	Command Mode	Purpose
copy *file-url1 file-url2*	EXEC Privilege	Configure the following parameters: • *file-url1:* the file source • *file-url2:* enter **slot0://**

Displaying Files Stored on the External Flash

Flash cards can be used to copy and store system images, boot images, and configuration files. Optional flash memory cards are shipped blank.

To display files stored on a flash, use the following command:.

Command Syntax	Command Mode	Purpose
dir [*filesystem*]	EXEC Privilege	Configure the following optional parameters to view files on the flash card: • *filesystem:* enter either **flash:** for the internal flash or **slot0:** for the external flash. The default is **flash:** (the internal flash). To view the external flash, enter **dir slot0:**

Figure 28   dir Command Example

```
Force10#dir slot0:
Directory of slot0:

  1  -rwx    6478482   Sep 7 101 16:54:34  E1200i.BIN

flash: 64077824 bytes total (57454592 bytes free)
Force10#
```

FTOS supports up to a 40-character file name length, up to a 180-character local file path length, and up to a 256-character remote file path length.

Appendix B	System Boot

This appendix provides instructions to boot the E1200i AC and DC system from the BOOT_USER prompt.

The System Boot Process

When you supply power to the E1200i system, the system performs a series of power-on self-tests. RPM, and line card Status LEDs blink during initialization. No user interaction is required as long as the boot process proceeds without interruption. Observe the process on your console monitor and note the message output on the display. When the boot process is complete, the RPM and line card Status LEDs remain online (green) and the console monitor displays the command line interface (CLI) prompt, Force10>.

The RPM cards in the E1200i system contain an internal flash memory card (flash:). This is the default storage area for the boot files and the startup configuration file. Upon system power up or a system reset, the boot process uses parameters stored in non-volatile random access memory (NVRAM) to boot the system.

Each RPM card is equipped with a slot for an external flash memory card (slot0:). You can copy the image files and configuration files to the external flash device on the *primary* RPM. You can also begin your boot process by accessing a remote server containing the boot image and system image files. When you configure your system to boot, you can specify the boot preference order: primary, secondary, or default in the BOOT_USER mode and the CLI mode.

> **Note:** The E1200i system supports up to a 40-character file name length, up to a 180-character local file path length, and up to a 256-character remote file path length.

For information about the flash memory card, refer to Appendix A, on page 75.

Booting from the BOOT_USER Prompt

To get into the BOOT_USER mode, you can issue a break control sequence (CNTL^) to interrupt the automatic boot process or if you experience boot problems. This mode allows you to modify the parameters necessary to manage the boot process. Only console port access is enabled for the BOOT_USER mode.

To configure the chassis from the BOOT_USER prompt:

Step	Command	Task
1.	**help** or **?**	• The BOOT_USER # prompt appears after an autoboot interruption. This is the default boot prompt, not the CLI prompt. • Enter **help** or **?** to display a list of available commands and syntax. • Enter **syntax help** to display syntax information and variable descriptions. • On some display output, you are given the option to continue the help screen display **<cr>** or to stop **<q>**. • You can abbreviate the boot commands by entering only the first letter of a command word. A matching algorithm displays the commands starting with the letter or letters you entered. For example, **b** displays the commands starting with the letter b, **boot change** and **boot selector**. Entering **s h** displays the syntax help information. • All commands are case insensitive.

Step	Command	Task (continued)

2. Execute the following **show** commands to display important boot information:

show boot selector

This command displays the boot ROM image currently selected and the most recently booted ROM image.

```
BOOT_USER # show boot selector

ROM BOOTSTRAP SELECTOR PARMETERS:
================================
Current ROM bootstrap selector set to Bootflash partition A.

Last ROM bootstrap occurred from Bootflash partition A.

BOOT_USER #
```

3. **show bootflash**

This command displays information about the current boot ROM.

```
BOOT_USER # show bootflash

GENERAL BOOTFLASH INFO
======================
Bootflash Partition A:
    Force10 Networks System Boot
    Copyright 1999-2007 Force10 Networks, Inc.
    ROM Header Version 1.0
    Official CP_IMG_BOOT, BSP Release 2.0.0.14
    Created Fri Nov  2 18:22:47 US/Pacific 2007

Bootflash Partition B:
    Force10 Networks System Boot
    Copyright 1999-2007 Force10 Networks, Inc.
    ROM Header Version 1.0
    Official CP_IMG_BOOT, BSP Release 2.0.0.14
    Created Fri Nov  2 18:22:47 US/Pacific 2007

Boot Selector Partition:
    Force10 Networks System Boot
    Copyright 1999-2007 Force10 Networks, Inc.
    ROM Header Version 1.0
    Official CP_IMG_BOOT_SELECTOR, BSP Release 2.0.0.14
    Created Fri Nov  2 18:26:56 US/Pacific 2007
BOOT_USER #
```

Step	Command	Task (continued)

4. **show bootvar**

This command displays the current operating system boot configuration parameters.

```
BOOT_USER # show bootvar

PRIMARY OPERATING SYSTEM BOOT PARAMETERS:
=========================================
boot device                     : flash
file name                       : /E1200i-x.bin

SECONDARY OPERATING SYSTEM BOOT PARAMETERS:
=========================================
No Operating System boot parameters specified!

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:
=========================================
boot device                     : flash
file name                       : /E1200-x.bin

BOOT_USER #
```

5. **boot change {primary | secondary | default}**

If your configuration displays no preconfigured operating system boot parameters, use the **boot change** command to edit appropriate fields.

- The **primary** operating system boot parameters are used in the first attempt to boot the system.
- The **secondary** operating system boot parameters are used if the primary operating system boot selection is not available.
- The **default** operating system boot parameters are used if the secondary operating system boot parameter selection is not available. The default parameters always reside on the internal flash device (flash:).

Note: These parameters, as well as other boot parameters, can be modified in the CLI mode.

When you enter the **boot change** command, you are prompted for a response.

- Enter a new parameter or press the **ENTER** key (carriage return) to accept the default parameter.
- Enter **.** (period) to clear a field.
- Enter ‐ (dash) to edit a field above the current cursor position.

Note: When you enter a new parameter that extends beyond 80 characters, you cannot use the BACKSPACE key to correct any mistakes. If you make a mistake, you must re-enter the parameter.

Step	Command	Task (continued)

```
BOOT_USER # boot change primary

'.' = clear field;  '-' = go to previous field

boot device                : flash
file name                  : /E1200-3.x.bin

BOOT_USER # boot change default

'.' = clear field;  '-' = go to previous field

boot device                : flash
file name                  : /E1200-3.x.bin

BOOT_USER #
```

Step	Command	Task (continued)
6.	**interface management port config 100m** **interface management port config 10m** **interface management port config auto-negotiate** **interface management port config no auto-negotiate** **interface management port config full-duplex** **interface management port config half-duplex** **interface management port config show**	• (OPTIONAL) Use these commands to set the speed and duplex settings for the Management interface.The default setting is full-duplex and auto-negotiation. • Use the **interface management port config show** command to view the Management interface's physical settings.
7.	**show interface management ethernet** **interface management ethernet ip address** *ip-address ip-address-mask*	• Use the **show interface management ethernet** command to display the IP address and network mask of the management Ethernet port. • If the **show** command output does not display configured IP address information, use the **interface management ethernet ip address** *ip-address ip-address-mask* command to set the IP address of the Management Ethernet port for network (ftp/tftp) operating system boot.

Step	Command	Task (continued)

```
BOOT_USER # show interface management ethernet
No IP address set for interface management ethernet 0/0!

BOOT_USER # interface management ethernet ip address 1.2.3.4 255.255.0.0
Management ethernet 0/0 IP address: 1.2.3.4 255.255.0.0

BOOT_USER # show interface management ethernet

Management ethernet IP address: 1.2.3.4:ffffff00

BOOT_USER #
```

8.	**show default-gateway** **default-gateway** *ip-address*	(Optional) Use the **show default-gateway** command to view gateway information.
		If your server is on the same subnet, you do not need to configure a gateway parameter.
		If your server is not on the same subnet, use the **default-gateway** *ip-address* command to set the gateway IP address.

```
BOOT_USER # show default-gateway

No gateway IP address specified!

BOOT_USER # default-gateway ip 1.2.3.5
Gateway IP address 1.2.3.5
BOOT_USER # show default-gateway

Gateway IP address: 1.2.3.5

BOOT_USER #
```

9.	**dir flash:** **dir slot0:**	Use the **dir flash:** command to list files stored on the internal flash device.
		Use the **dir slot0:** command to list files stored on the external flash device.

```
BOOT_USER # dir flash:
Displaying files in flash:
  size          date       time      name
--------       ------     ------     --------
11187685    FEB-15-2002  05:37:58   e1200-.bin
11031398    FEB-23-2002  22:42:46   E1200-3.bin
 9280984    FEB-17-2002  21:02:36   E1200-2.bin
10778521    FEB-18-2002  22:53:26   E1200-3.1.bin
    1787    FEB-23-2002  22:42:46   startup-config

BOOT_USER #
```

Step	Command	Task (continued)
10.	**reload**	Reload software.
		The autoboot program initializes and displays self-test results on the console screen.
		NOTE: Do not press break control sequence at any time during the boot/reboot process. Doing so causes the boot process to terminate.
11.	Force10>	When the reboot completes, the CLI defaults to the EXEC mode.

Refer to the *FTOS Command Line Interface Reference* for CLI configuration procedures and configuration instructions.

Appendix C   Alarms

The E1200i generates major and minor alarms for the following conditions:

* fan trays status
* Power Supply status
* RPMs status
* high temperature on RPMs
* line cards status
* high temperature on line cards
* SFMs status
* high temperature on SFMs.

A major alarm is any fault that would render the E1200i non-functional.

A minor alarm is any fault that threatens the operation of the E1200i.

You can monitor alarm conditions on the E1200i system through the console, LEDs, and audible alarms. If you configure the SNMP command (**snmp-server enable traps envmon**), the FTOS also sends an SNMP trap.

In the E1200i system, alarms are logged for each occurrence, but the system may not send an event log for multiple occurrences. For example, whenever a module exceeds the shutdown threshold, the module shuts down. If more than one module exceeds the warning or high temperature thresholds within a five minute period, the system generates one event for all effected modules, but alarms are logged for each occurrence. If the modules temperature falls to 5° lower than the warning threshold temperature, the system clears the alarm and an SNMP trap.

Table 14   Alarm Events and Reporting

Module	Alarm Event	Alarm LED	Reported in event log	Status LED on Module	Audible Alarm?
Fans	Entire Fan Tray fails	major (red)	major	unlit	yes
	1 or 2 individual fans fail	minor (amber)	minor	unlit	no
Power Supply	Power Supply input power fail	major (red)	major	unlit	yes
	Power Supply power fails at boot[1]	unlit	not reported	unlit	no

Table 14   Alarm Events and Reporting

Module	Alarm Event	Alarm LED	Reported in event log	Status LED on Module	Audible Alarm?
Line Card	Hardware failure	major (red)	major	amber	no
	Exceeds high temperature limit	major (red)	major	unlit	yes
	Exceeds warning temperature limit	minor (amber)	minor	green	yes
	Individual interface fails	minor (amber)	reported	amber[2]	no
RPM (Non-redundant Configuration with 1 RPM)					
	Exceeds high temperature limit	major (red)	major	unlit	yes
	Exceeds warning temperature limit	minor (amber)	minor	green	no
	RPM fails but CP is ok	major (red)	major	amber	yes
SFMs (Redundant Configuration with 10 SFMs)					
	Exceeds high temperature limit	major (red)	major	unlit	yes
	Exceeds warning temperature limit	minor (amber)	minor	green	no
	Any card fails	minor (amber)	minor	amber	no
	Any card removed	minor (amber)	minor	unlit	no
8 SFMs (Non-Redundant Configuration)					
	Exceeds high temperature limit	major (red)	major	unlit	yes
	Exceeds warning temperature limit	minor (amber)	minor	green	no
	Any card fails	major (red)	major	amber	yes
	Any card removed	major (red)	major	unlit	yes

1   Event appears only in the show alarms command output.

2   The interface's Link LED is unlit.

Power Supplies and Alarms

If a Power Supply fails while the E1200i is operating, the software generates a major alarm and an SNMP trap, lights the major LED, and activates the audible alarm.

When a Power Supply fails, the software also records one alarm event for line cards, RPM, and SFM, though each contains its own power source. The system generates one alarm event and SNMP trap summarizing the Power Supply failure and the components affected.

SFMs and Alarms

The number of SFMs present in the system when it boots determines the level of alarms sent when a tenth (redundant) SFM is removed or fails. At boot time, if ten SFMs are present and functioning, the E1200i system issues no alarms. However, if one SFM fails or is removed, the system sends a minor alarm stating that nine SFMs are present. The system requires eight functioning SFMs to pass traffic.

At boot time, if eight SFMs are present and functioning, the E1200i system issues no alarms. The system issues no alarms if an SFM is added to the system; however, if the number of functioning SFMs changes from nine to eight, the system sends a minor alarm event. The system always triggers a major alarm when the number of working SFMs reaches seven.

Appendix D   System Specifications

This appendix contains two major sections:

E1200i AC Chassis Physical Design

Parameter	Specifications
Height	42 inches (106.68 cm)
Width	17.40 inches (44.20 cm)
Depth (without cable management system)	22.25 inches (56.51 cm)
Chassis weight with factory-installed components (backplane and air filter)	139 pounds (approx.) (63.05kg)
Weight fully loaded (backplane, air filter, 2 fan trays, 10 SFMs, RPMs, and 14 line cards)	394 pounds (approx.) (178.7 kg)
Mounting	Attached rack mount brackets are factory set for front mounting in a standard 19-inch rack. Mounting brackets are adjustable for center and rear mounting. Optional brackets are available for front or center mounting in a 23-inch rack or cabinet.
Rack clearance required	Front: 18 inches Rear: 20 inches
Thermal Output	
Maximum for fully loaded chassis	7,784W (26,578BTU/HR)
Minimum for chassis with one 48-port 1GE line card	1,450W (4,951 BTU/HR)

E1200i AC System Power Requirements

Parameter	Specifications
Maximum Power Consumption	7,784W
Input Voltage Range	200-240 VAC 50/60 Hz

Maximum Heat Dissipation	7,188W (24,541 BTU/HR)
Maximum Power Supply Input Current	16A per module

E1200i DC Chassis Physical Design

Parameter	Specifications
Height	36.75 inches (93.35 cm)
Width	17.40 inches (44.20 cm)
Depth (without cable management system)	21.25 inches (53.98 cm)
Chassis weight with factory-installed components (backplane and air filter)	97 pounds (approx.) (44.00 kg)
Weight fully loaded (backplane, air filter, 2 fan trays, 10 SFMs, RPMs, and 14 line cards)	319 pounds (approx.) (144.70 kg)
Mounting	Attached rack mount brackets are factory set for front mounting in a standard 19-inch rack.
	Mounting brackets are adjustable for center and rear mounting.
	Optional brackets are available for front or center mounting in a 23-inch rack or cabinet.
Rack clearance required	Front: 18 inches
	Rear: 20 inches
Thermal Output	
Maximum for fully loaded chassis	6850W (23,389 BTU/HR)
Minimum for chassis with one 48-port 1GE line card	1,450W (4,951 BTU/HR)

E1200i DC System Power Requirements

Parameter	Specifications
Maximum Power Consumption	6,850W
Input Voltage Range	200-240 VAC 50/60 Hz
Maximum Heat Dissipation	6,325W (21,598 BTU/HR)
Maximum Power Supply Input Current	16A per module

Environmental Specifications

Operating	Specifications
Temperature	32° to 104°F (0° to 40°C)
Maximum altitude	No performance degradation to 10,000 feet (3,048 meters)
Relative humidity	5 to 85 percent, noncondensing
Shock	Designed to meet Telcordia GR-63 CORE
Vibration	Designed to meet Telcordia GR-63 CORE
Non-operating	
Temperature	-40° to 158°F (-40° to 70°C)
Maximum altitude	15,000 feet (4,572 meters)
Relative humidity	5 to 95 percent, noncondensing
Vibration	Bellcore GR-63

Agency Compliance

The E1200i is designed to comply with the following safety and agency requirements.

USA Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designated to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance to the instructions, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures necessary to correct the interference at their own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Force10 Networks is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications in the equipment. Unauthorized changes or modification could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communication Statement

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Union EMC Directive Conformance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Force 10 Networks can not accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of this product, including the fitting of non-Force10 option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for

commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment. .

> **Attention:** This is a Class A product. In a domestic environment, this device may cause radio interference, in which case, the user may be required to take adequate measures.

European Community Contact
Force10 Networks, EMEA - Central
Dahlienweg 19
66265 Heusweiler
Germany
http://www.force10networks.com/german/
Tel: +49 172 6802630
Email: EMEA Central Sales

Japan: VCCI Compliance for Class A Equipment

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準
に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

This is Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

> **Danger:** AC Power cords are for use with Force10 Networks equipment only. Do not use Force10 Networks AC power cords with any unauthorized hardware.

本製品に同梱いたしております電源コードセットは、本製品専用です。
本電源コードセットは、本製品以外の製品ならびに他の用途でご使用い
ただくことは出来ません。製品本体には同梱された電源コードセットを
使用し、他製品の電源コードセットを使用しないで下さい。

Korea (MIC certification)

Korean Class A Warning Statement

이기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

Safety Standards and Compliance Agency Certifications

- CUS UL 60950-1, 1st Edition
- CSA 60950-1-03, 1st Edition
- EN 60950-1, 1st Edition

- EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification Requirements and User's Guide
- EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems
- FDA Regulation 21CFR 1040.10 and 1040.11
- IEC 60950-1, 1st Ed., including all National Deviations and Group Differences

Electromagnetic Emissions

- USA: FCC CFR47 Part 15, Subpart B, Class A
- Canada: ICES-003, Issue-4, Class A
- Europe: EN 55022 2006 (CISPR 22: 2007), Class A
- Japan: VCCI V3/2007.04 Class A
- Australia/ New Zealand: AS/NZS CISPR 22: 2006, Class A

Immunity

- EN61000-3-2 Harmonic Current Emissions
- EN6100-3-3 Fluctuation and Flicker
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Conducted Immunity
- EN 300 386 V1.3.3 (2005) EMC for Network Equipment
- EN 55024 1998 +A1:2001 +A2:2003

Product Recycling and Disposal

This switch must be recycled or discarded according to applicable local and national regulations. Force10 Networks encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Force10 offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products.

> *Waste Electrical and Electronic Equipment (WEEE) Directive for Recovery, Recycle and Reuse of IT and Telecommunications Products*

Force10 switches are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label, as shown in Figure 29, is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Figure 29   The European WEEE symbol

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE.

Force10 Networks products, which fall within the scope of the WEEE, are labeled with the crossed-out wheelie-bin symbol, as shown above, as required by WEEE.

For information on Force10 product recycling offerings, see the WEEE Recycling instructions on iSupport at: https://www.force10networks.com/CSPortal20/Support/WEEEandRecycling.pdf.
For more information, contact the Force10 Technical Assistance Center (TAC) (see Appendix E, Technical Support).

For California:

Perchlorate Material — Special handling may apply.
See: http://www.dtsc.ca.gov/hazardouswaste/perchlorate

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials.

Appendix E   Technical Support

This appendix contains these major sections:

The iSupport Website

iSupport provides a range of documents and tools to assist you with effectively using Force10 equipment and mitigating the impact of network outages. Through iSupport you can obtain technical information regarding Force10 products, access to software upgrades and patches, and open and manage your Technical Assistance Center (TAC) cases. Force10 iSupport provides integrated, secure access to these services.

The i-Support website (see Figure 30, below) (http://www.force10networks.com/support/) contains a publicly available interface that includes access to techtips, white papers, and user manuals. After you get an account and log in, the available documentation expands to other types, including bug lists, error message decoder, release notes. You can even track your own Force10 inventory.

Once you are logged in, the following five tabs become available:

*   **Home:** Summary of open cases, RMA management, and field notices (as shown below)
*   **Service Request**: Case management
*   **Software Center:** Software downloads, bug fixes, and bug tracking tool
*   **Documents:** User documentation, FAQs, field notices, technical tips, and white papers
*   **Support Programs:** Information on the suite of Force10 support and professional support services.

Figure 30 Support Policies section of iSupport

The screenshot above shows the Support Policies section of iSupport. The *Support Guide*, available on that page, details the types of information and services that you can access through iSupport and through various types of support contracts.

Accessing iSupport Services

The URL for iSupport is http://www.force10networks.com/support/. To access iSupport services you must have a userid and password. If you do not have one, you can request one at the website:

1. On the Force10 Networks iSupport page, click the **Account Request** link.

2. Fill out the User Account Request form, and click **Send**. You will receive your userid and password by E-mail.

3. To access iSupport services, click the **LOGIN** link, and enter your userid and password. See Contacting the Technical Assistance Center, below, for more.

Contacting the Technical Assistance Center

How to Contact Force10 TAC	Log in to iSupport at http://www.force10networks.com/support/, and select the **Service Request** tab.
Information to Submit When Opening a Support Case	• Your name, company name, phone number, and E-mail address • Preferred method of contact • Model number • Serial Number (see Requesting a Hardware Replacement on page 102) • Software version number • Symptom description • Screen shots illustrating the symptom, including any error messages. These can include: • Output from the **show tech-support** [**non-paged**] command (This report is very long, so the storage buffer in your terminal program should be set high.) • Output from the **show logging eventlog** [*unit*] command, where *unit* is the stack ID of the member unit that experienced the failure (This report is included as a section in the output of **show tech-support**.) • Console captures showing the error messages • Console captures showing the troubleshooting steps taken • Saved messages to a syslog server, if one is used
Managing Your Case	Log in to iSupport, and select the **Service Request** tab to view all open cases and RMAs.
Downloading Software Updates	Log in to iSupport, and select the **Software Center** tab.
Technical Documentation	Log in to iSupport, and select the **Documents** tab. This page can be accessed without logging in via the **Documentation** link on the iSupport page.
Contact Information	E-mail: support@force10networks.com Web: http://www.force10networks.com/support/ Telephone: US and Canada: 866.965.5800 International: 408.965.5800

Requesting a Hardware Replacement

To request replacement hardware, follow these steps:

Step	Task
1	Determine the part number and serial number of the component. To list the numbers for all components installed in the chassis, use the **show hardware** command.

2	Request a Return Materials Authorization (RMA) number from TAC by opening a support case. Open a support case by:
	
	• Using the Create Service Request form on the iSupport page (see Contacting the Technical Assistance Center on page 101).
	• Contacting Force10 directly by E-mail or by phone (see Contacting the Technical Assistance Center on page 101). Provide the following information when using E-mail or phone:
	    • Part number, description, and serial number of the component.
	    • Your name, organization name, telephone number, fax number, and e-mail address.
	    • Shipping address for the replacement component, including a contact name, phone number, and e-mail address.
	    • A description of the failure, including log messages. This generally includes:
	        • Output from the **show tech-support** [**non-paged**] command (This report is very long, so the storage buffer in your terminal program should be set high.)
	        • Output from the **show logging eventlog** [*unit*] command, where *unit* is the stack ID of the member unit that experienced the failure (This report is included as a section in the output of **show tech-support**.)
	        • Console captures showing the error messages
	        • Console captures showing the troubleshooting steps taken
	        • Saved messages to a syslog server, if one is used

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