Installing and Maintaining the C300 System

May 2007 **PN: 100-00046-02**

FORCE10™

Copyright 2007 Force10 Networks, Inc.

All rights reserved. Printed in the USA. January 2007.

Force10 Networks® reserves the right to change, modify, revise this publication without notice.

Trademarks

Force10 Networks® is a registered trademarks of Force10 Networks, Inc. Force10, the Force10 logo, and C-Series are trademarks of Force10 Networks, Inc. All other brand and product names are registered trademarks or trademarks of their respective holders.

Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, Force10 Networks reserves the right to make changes to products described in this document without notice. Force10 Networks does not assume any liability that may occur due to the use or application of the product(s) described herein.

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。

Feedback on Documentation?
Send email to techpubs@force10networks.com

Contents

List of Figures

List of Tables

Preface About this Guide

This guide provides site preparation recommendations and instructions for installing the Force10 Networks C300 chassis, fan tray, power supply units (power supplies), route processor modules (RPMs), and line cards.

The C300 system is packaged with all of the necessary components, including slot blanks for RPMs, power supplies, and line cards.

Information Symbols

Table 1 describes symbols contained in this guide.

Table 1 Information Symbols

Symbol	Warning	Description
	Danger	This symbol warns you that improper handling and installation could result in bodily injury. Before you work on this equipment, be aware of electrical hazards and take appropriate safety precautions.
	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 could reduce your component or system performance.
	Note	This symbol informs you of important operational information.

Related Documents

For more information about the C300 system, refer to the following documents:

- *C-Series FTOS Command Line Interface Reference*

Chapter 1 Overview

The C300 is a high performance switch/router. The 10-slot system contains two slots for Route Processor Modules (RPMs) and eight slots for line cards.

Figure 1 C300 Chassis (Front View)

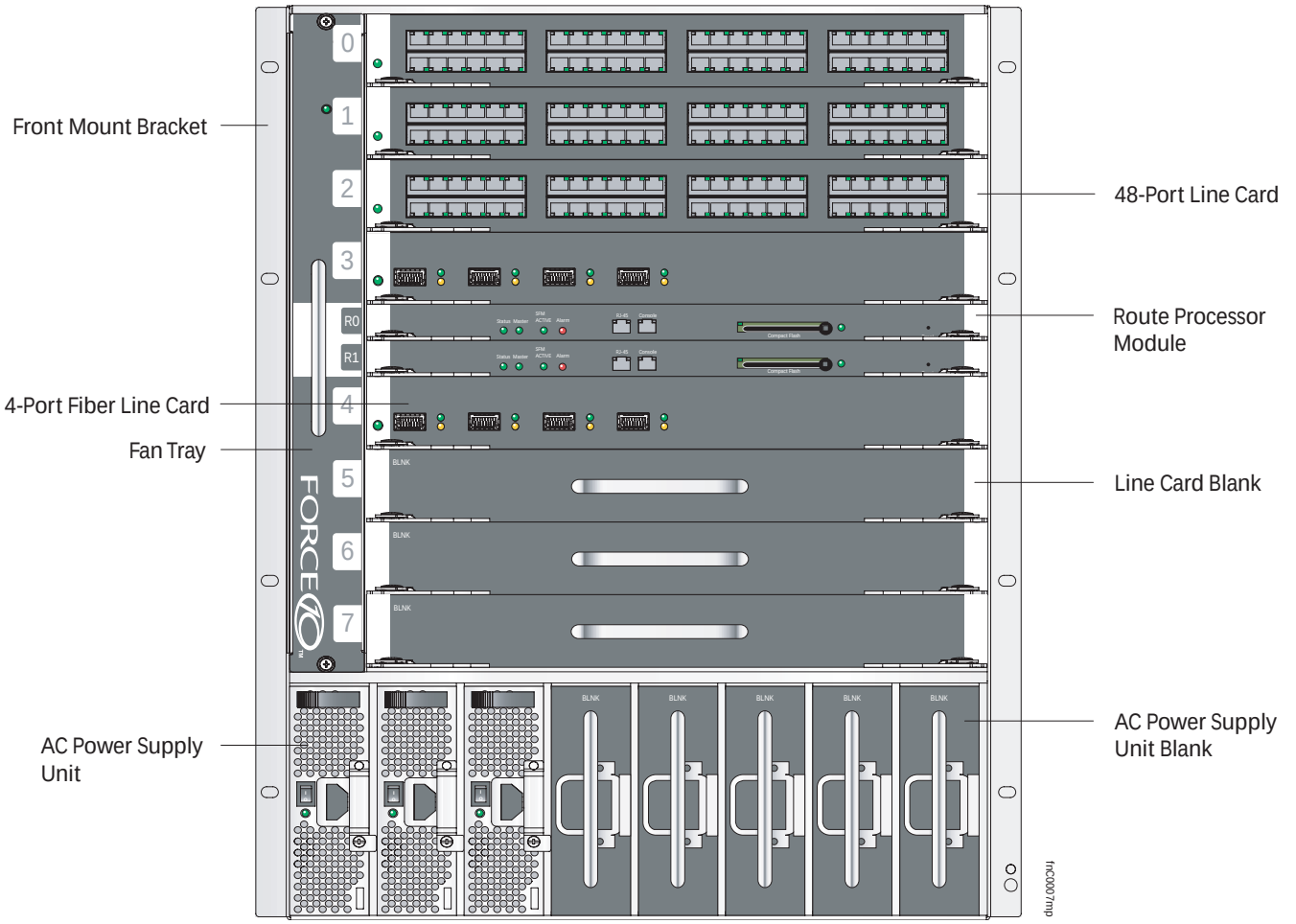


Table 2 C300 Component Requirements

Component	Minimum	Maximum	Field-Replaceable
Backplane (factory installed)	1	1	No
Fan tray	1	1	Yes
RPM	1	2	Yes
Line card	1	8	Yes
AC Power Supply	2	8	Yes

C300 System Installation Process

The Force10 Networks recommended installation process is described below.

Step	Task	Relevant Section in the Manual
1	Prepare the site.	Site Selection Criteria on page 15
2	Unpack the chassis and components.	Shipping and Storing Components on page 16
3	Install the chassis in a rack.	Installing the Chassis into an Equipment Rack on page 19
4	Install the fan tray.	Installing C300 Fan Tray on page 21
5	Install the RPMs and line cards.	Installing RPMs and Line Cards on page 23
6	Connect console and management cables.	RPM Cables on page 29
7	Install the power supplies.	Installing Power Supply Units on page 33
8	Switch on all of the power supplies.	Powering Up on page 37

Chapter 2 Preparing the Site

Site Selection Criteria

Before beginning the installation process, make sure that the area where you intend to install your C300 meets the following safety requirements:

- It is in a restricted access area.
- It is in a dry, clean, well-ventilated, temperature-controlled room, that is away from heat sources such as hot air vents or direct sunlight.
- It is away from sources of severe electromagnetic noise.
- It is near an adequate power source.
    - The power supply cord is used as the main disconnect device; ensure that the socket-outlet is located/installed near the equipment and is easily accessible.
    - Connect the C300 System to the appropriate branch circuit protection as defined by local electrical codes.
- It is positioned in a rack with adequate space in the front, rear, and sides of the unit for proper ventilation, access to cables, and maintenance access.
    - Allow *at least* six inches (16 cm) of clearance around the side intake and exhaust vents.
    - Allow *at least* 12 inches (30.5 cm) between two C300s or an C300 and another side airflow chassis.
    - Allow *at least* 18 inches in the front and 20 inches in the rear of the rack.

Note: The C-Series does not have an air filter so take special care in making sure that the installation site and the chassis itself are cleaned regularly.

Rack Mounting

When you prepare your equipment rack:

- Make sure that the rack is bolted to the floor and braced to a wall or ceiling.
- Make sure that the rack is permanently grounded to earth ground. The equipment rack must be grounded to the same ground point used by the power service in your area.
- The power cord is the primary ground.

When you install the chassis:

- Use a level to ensure the chassis is installed level.

Power Requirements

The C300 needs at least two power supplies to operate. However, Force10 recommends a two-plus-one redundancy configuration. That is, use a minimum of three AC power supplies; one is for redundancy.

The C300 power requirements are given below:

Table 3 System Power Specifications

Parameter	Specifications
Nominal Input Voltage	90 - 260 VAC 47/63 Hz
Maximum AC Power Supply Input Current (based on 1200W output for 100/120V and 200/240V lines.)	14 A @ 100 VAC per AC Power Supply
	12 A @ 120 VAC per AC Power Supply
	7 A @ 200 VAC per AC Power Supply
	6 A @ 230 VAC per AC Power Supply
Maximum System Power Input 3 AC Power Supply Operation 3 AC Power Supply Operation	9600W (1200W per PSU) 3600W @ 100V 3600W @ 200V
Maximum Thermal Output (for 100/120V and 200/240V)	4095 BTU/hour

Shipping and Storing Components

Caution: Do not transport a C300 chassis with the components (line cards, power supplies, and RPMs) installed in the chassis. Place the components in their original protective shipping packaging and original shipping position. Shipping components installed in the chassis or without their protective packaging, might damage the components or the chassis backplane.

If you do not install your C300 System and components immediately, Force10 recommends you properly store components (including all extra field-replaceable parts) until you are ready to install them.

Follow these indoor storage guidelines:

- Storage temperature should remain constant ranging from 41° to 104°F (5°C to 40°C)
- Non-condensing relative humidity should be maintained with 5 to 95%.
- Store on a dry floor, away from direct sunlight, heat, and air conditioning ducts.

- Store in a dust-free environment.

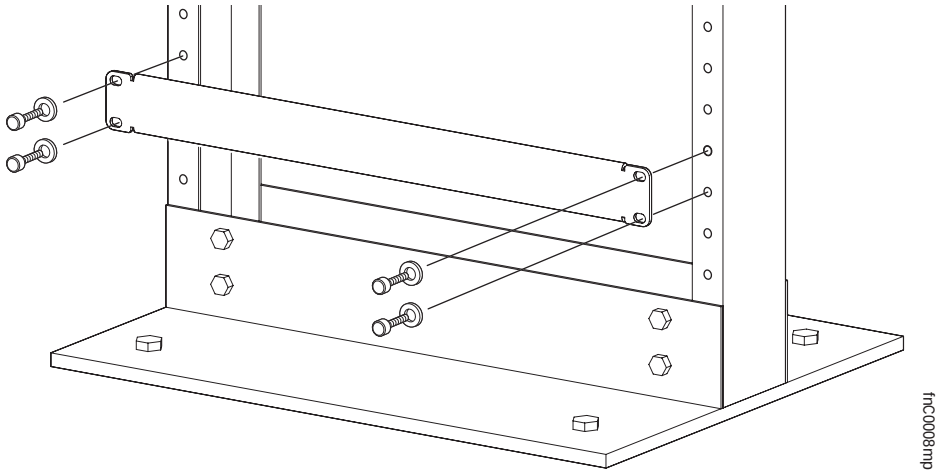
Chapter 3 Installing the Chassis

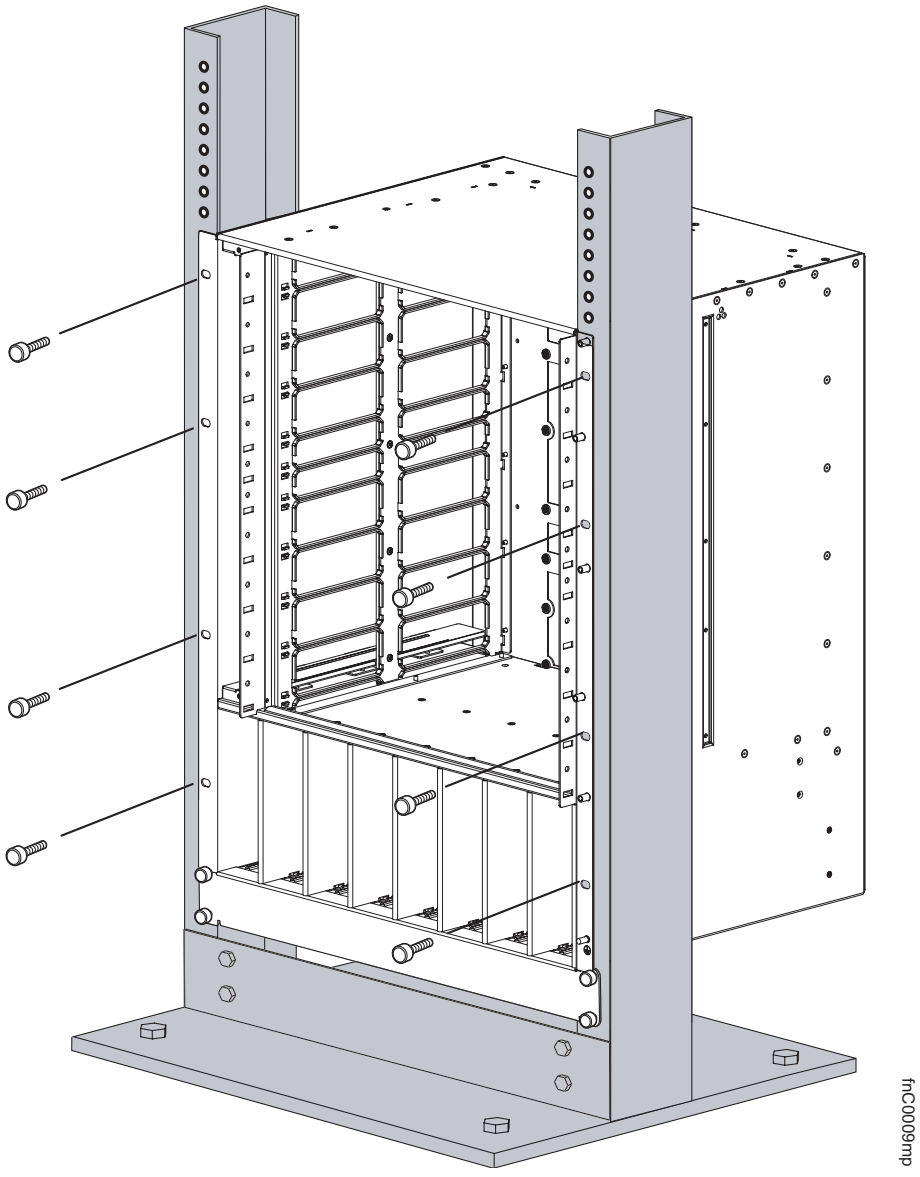
Safety Considerations

Warning: Use an equipment lift or pallet jack when lifting or moving the chassis. Install the chassis into the rack before inserting chassis components. Lift the C300 chassis *only* from the bottom. Lifting by the chassis shelves or power supply openings will damage the chassis.

Installing the Chassis into an Equipment Rack

Follow these steps to install the chassis into a 19-inch equipment rack:

Step	Task
1	Install the equipment rack bar. This bar enables you to easily position the chassis into the rack and stabilizes the chassis. • Orient the equipment rack bar at the desired location in the rack, with the arrows pointing up and the smooth side facing outward. **Figure 2** Installing the Equipment Rack Bar  fnC0008mp

Step	Task
2	Attach the bar to the rack (see Figure 2) using the mounting screws provided with your rack.
3	Use an equipment lift to align the chassis rack-mount holes with the equipment rack holes, and situate the chassis on top of the equipment rack bar.
4	Insert screws (provided with your rack) through the chassis rack-mounting bracket and into the equipment rack, and tighten them (see Figure 3). **Figure 3** Rack Mounting the Chassis 

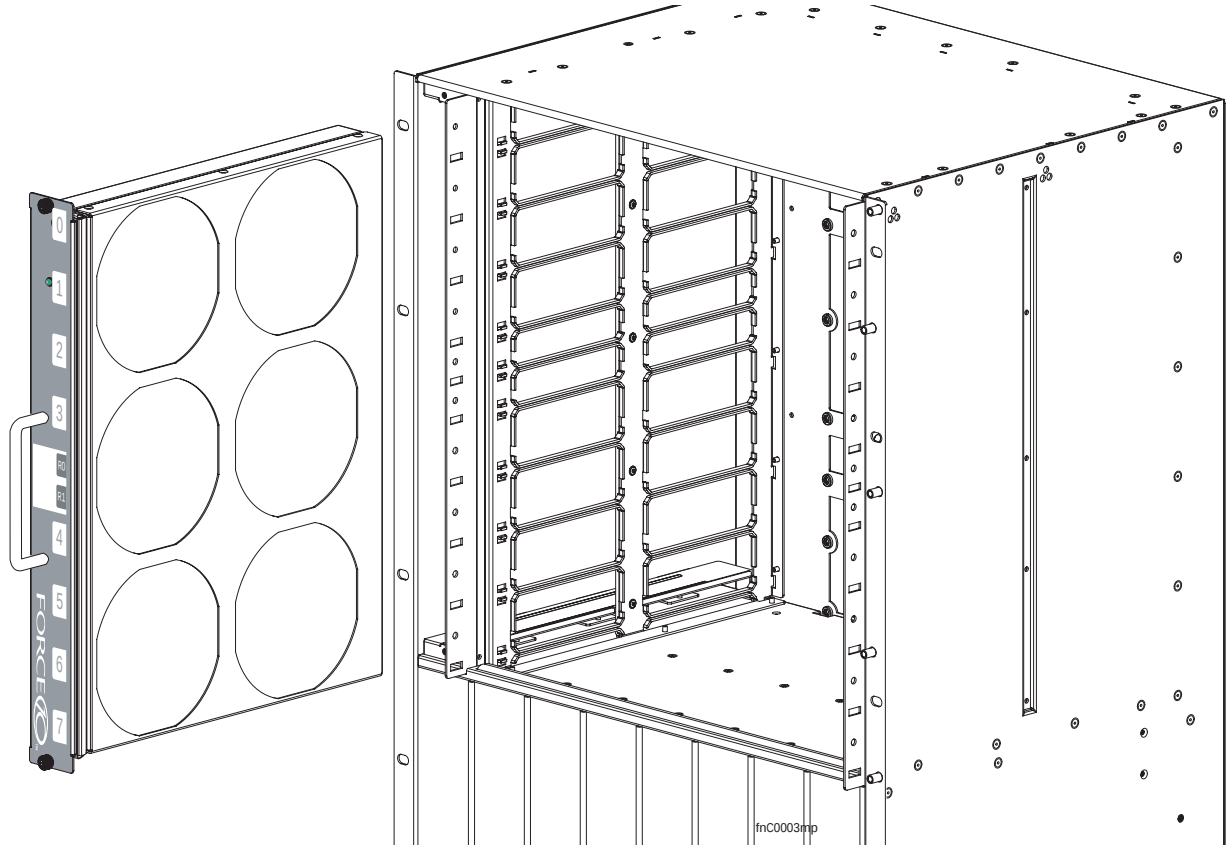
Chapter 4 Installing C300 Fan Tray

The C300 chassis has one field-replaceable fan tray that contains six fans that run at a constant speed. Air flows through the C300 system toward the fans (right to left) and is exhausted on fan-side of the chassis. The fan tray is accessible from the front of the chassis.

Warning: To ensure proper temperature and airflow control, the fan tray must always be installed and operating properly.

Note: The C300 does not have an air filter so take special care in making sure that the installation site and the chassis itself are cleaned regularly.

Figure 4 Inserting the Fan Tray



To install the fan tray:

Step	Task
1	Slide the connector end into the fan slot (see Figure 4).
2	Gently push on the front of the tray until it stops. The fan tray should be flush with the chassis.
3	Use a #2 Phillips screwdriver to secure the fan tray into place by tightening the screws at the top and bottom of the fan tray.

Note: The fan tray LED will remain lit when the chassis is powered up and the fan tray is functioning properly.

Chapter 5 Installing RPMs and Line Cards

The C300 System accommodates 8 line cards and 2 RPMs.

Route Processor Modules

The C300 system requires the installation of at least one Route Processor Module (RPM); two are recommended.

- 1 RPM provides each line card with 48 Gigabits of backplane bandwidth.
- 2 RPMs provides each line card with 96 Gigabits of backplane bandwidth.

RPMs are designed to be installed in either the R0 or R1 slot (see Figure 1 on page 13). Do not force RPMs into RPM or line cards slots. RPMs are keyed differently than line cards to prevent improper installation.

Warning: RPMs are not hot-swappable. If you want to install or remove an RPM after the chassis is booted, you must shut down the chassis, insert/remove the RPM, and then restart the chassis.

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

RPM Label and LEDs

Table 4 describes the RPM LED states and the RPM front panel.

Table 4 RPM Front Panel and LED Descriptions

Section	Label	Description
Management	Console Port	Use this RJ-45 jack for the initial system boot, as well as system configuration and monitoring. Modem connection is not supported on the Console.
	10/100/1000 Ethernet	Use this non-routable Ethernet port to download images and manage the system. FTP and telnet operations are supported. This port is an RJ-45. **Port LEDs:** L/A: Blinking Amber: 100M speed Solid Amber: 1G speed Off: 10M speed Speed: Blinking Green: Link detected/ Activity Solid Green: Link detected/ No Activity Off: No Link/ Card Offline
Alarm LED		Red: Major Alarm—a critical condition exists (such as a severe over temperature condition). See Appendix C, on page 53 for more information. Flashing red: Minor Alarm—a serious condition exists (such as a single fan failure or a line card failure). See Appendix C, on page 53 for more information. Unlit: no alarm conditions.
Flash	Slot	Use the compact flash card (external compact flash memory card) slot to store and retrieve boot and system images.
	In Use LED	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.
	Master LED	Indicates that this RPM is the Primary RPM. Green: primary Unlit: secondary/ fatal error/ booting
	Reset Button	Use this recessed reset switch to reset the RPM by inserting a small object, such as a pen tip, to depress the button.
	SFM Active	Green: Switch Fabric is active Unlit: Switch Fabric is inactive
	Status LED	Green: operational Red: card problem state Flashing green: booting/ diagnostics Unlit: in standby mode or power is off

Line Cards

Line cards are hot-swappable. Any line card can be inserted into any line card slot. Line card slots are labeled 0 to 7; these labels can be seen when the fan tray is installed.

Blank Panels

Blanks are required in empty slots to control airflow for adequate system cooling, personal safety, and EMI containment during operation.

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

Caution: All chassis slots must be installed with operational modules or blanks. Always replace cards and blank panels immediately.

Installing the RPMs and Line Cards

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 or line cards. Place RPMs and line cards on an antistatic surface when they are not installed.

Caution: Unlock the levers before inserting the line card into to chassis. Fully engage the locking mechanism once the card has been inserted; not doing so will cause damage to the card below when that card is inserted.

Note: The fan tray face panel has slot number markings for the RPMs and line cards. Insert the fan tray before the linecards to simplify RPM and linecard installation.

Step	Task
1	Extend the left and right card levers by first pressing gently down on the thumb tabs (see Figure 5) in the ejector levers and then pulling the ejector levers simultaneously until they are in the open position. See Figure 6.

Figure 5 Depress the thumb tabs

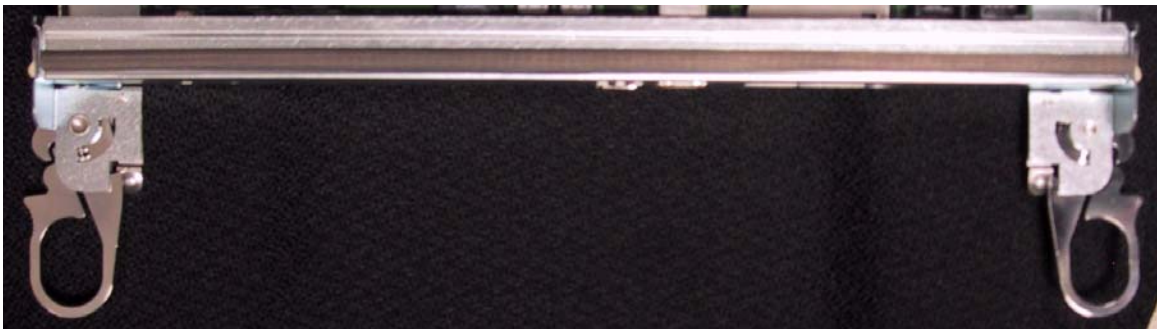


Figure 6 Extend the levers

2	Hold the card assembly by the metal carrier edges. Avoid touching the printed circuit board and connector pins.
3	Align the card with the guide, and gently slide it into any line card slot until the card is about halfway into the slot.
	Installation Note: Use the markings on the fan tray to determine which slots are for the RPMs and which are for the line cards.
4	Continue sliding the line card until you feel the connectors engage with the chassis backplane.

Step	Task
5	Rotate the levers towards the card to seat the backplane connectors and line card in place. Push on the knurled section of the levers until the thumb tabs pop up and lock the unit in place. See Figure 7 and Figure 8.

Figure 7 Close the levers

Figure 8 Press the knurled section of the lever

Caution: Installing a card without fully engaging the locking mechanism will damage the EMI seal on the card below it when that card is inserted.

6	Install a blank panel in all slots that do not have a card and secure it with the screws provided.

Installation Note: The blank panels for RPMs and line cards are different sizes (RPM blanks are smaller); be sure that blank panels are installed in the correct slots.

Figure 9 Installing a Line Card

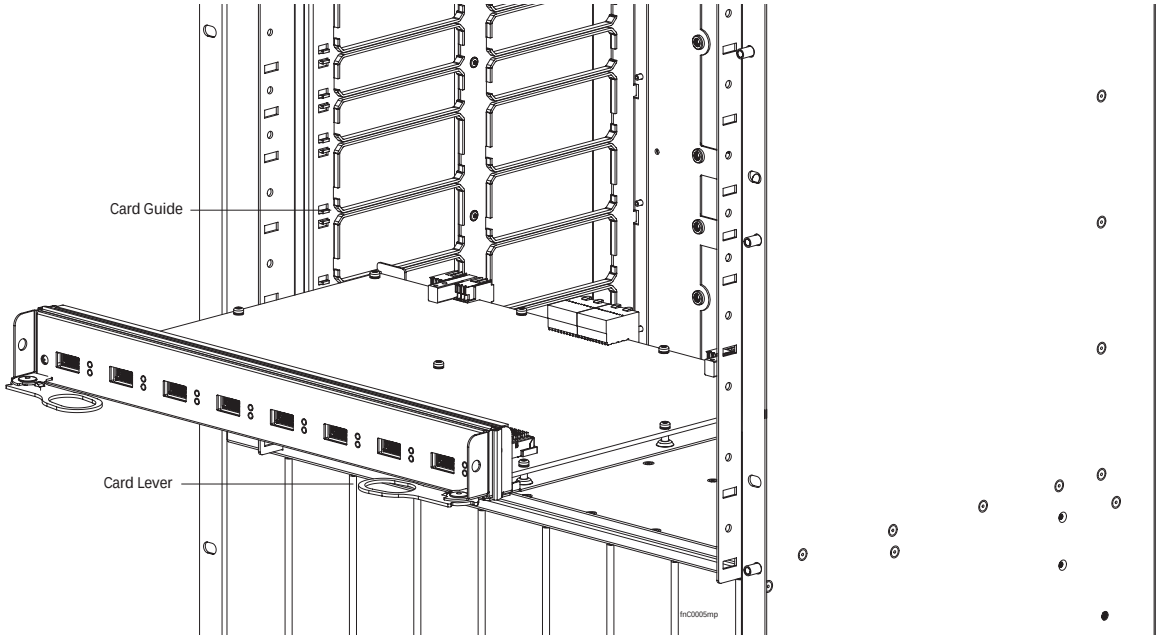
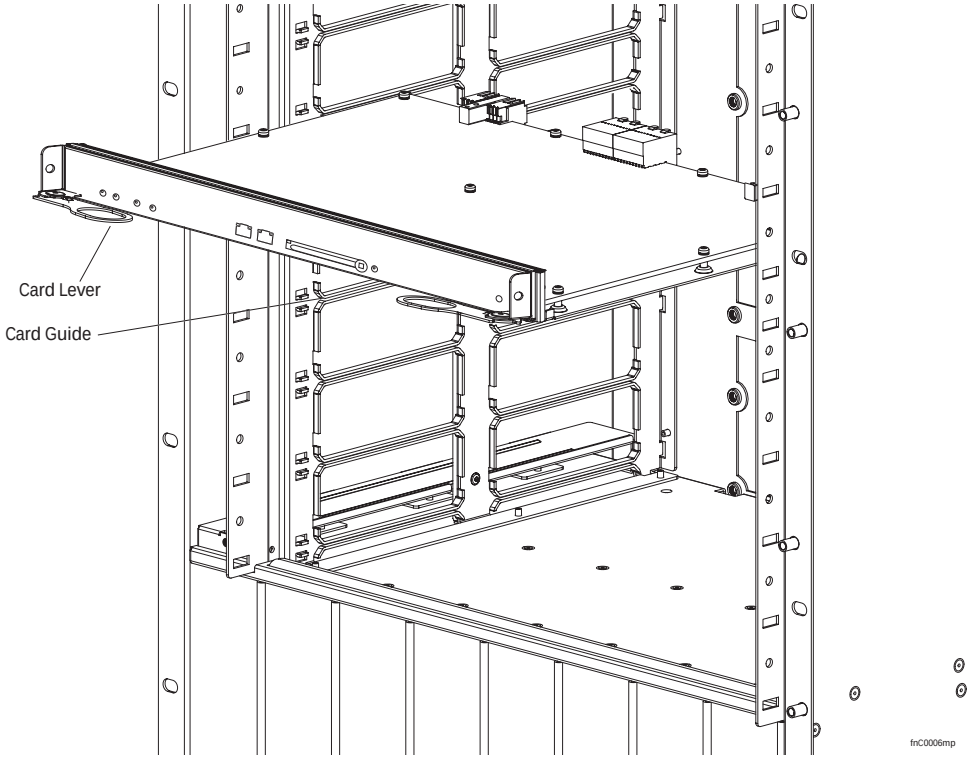


Figure 10 Installing an RPM



Chapter 6 RPM Cables

Connecting the Console Port

The console port is an asynchronous serial port. 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
- Hardware flow control (RTS/CTS)

Cable and Adapter Pin Assignments

Use the C300 System Console port on the RPM to connect to a terminal port, PC serial port, or a terminal server to configure and monitor your system. An RJ-45 Ethernet cable is required to connect to the Ethernet port.

The Console port is an RJ-45, the pinouts of which are shown in Figure 11.

Figure 11 Pinouts for an RJ-45 Connector End of Adaptors

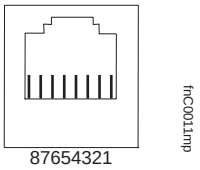


Table 5 displays the RJ-45 console port pin assignments.

Table 5 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)	-

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). Table 6 lists the pin assignments.

Table 6 Pin Assignments Between the C300 Console and a DTE Terminal Server

C300 System 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 a RJ-45 to RJ-45 rollover cable and a RJ-45 to a DB-25 female DTE adapter. Table 7 lists the pin assignments.

Table 7 Pin Assignments Between C300 Console and DB-25 Adapter

C300 System 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

Chapter 7 Installing Power Supply Units

The C300 has eight power supply slots at the front-bottom of the chassis (Figure 12).

- The C300 requires a minimum of two AC power supplies to operate, but Force10 recommends a two-plus-one redundancy configuration, so a minimum of three power supplies is recommended. Additional power supplies are required to enable Power over Ethernet (PoE). See Power Over Ethernet.
- To protect against high-voltage shock, install a power supply blank on all unused power supply slots.
- Connect the C300 AC power supply to the appropriate branch circuit protection as defined by local electrical codes.

Figure 12 Power Supply Location

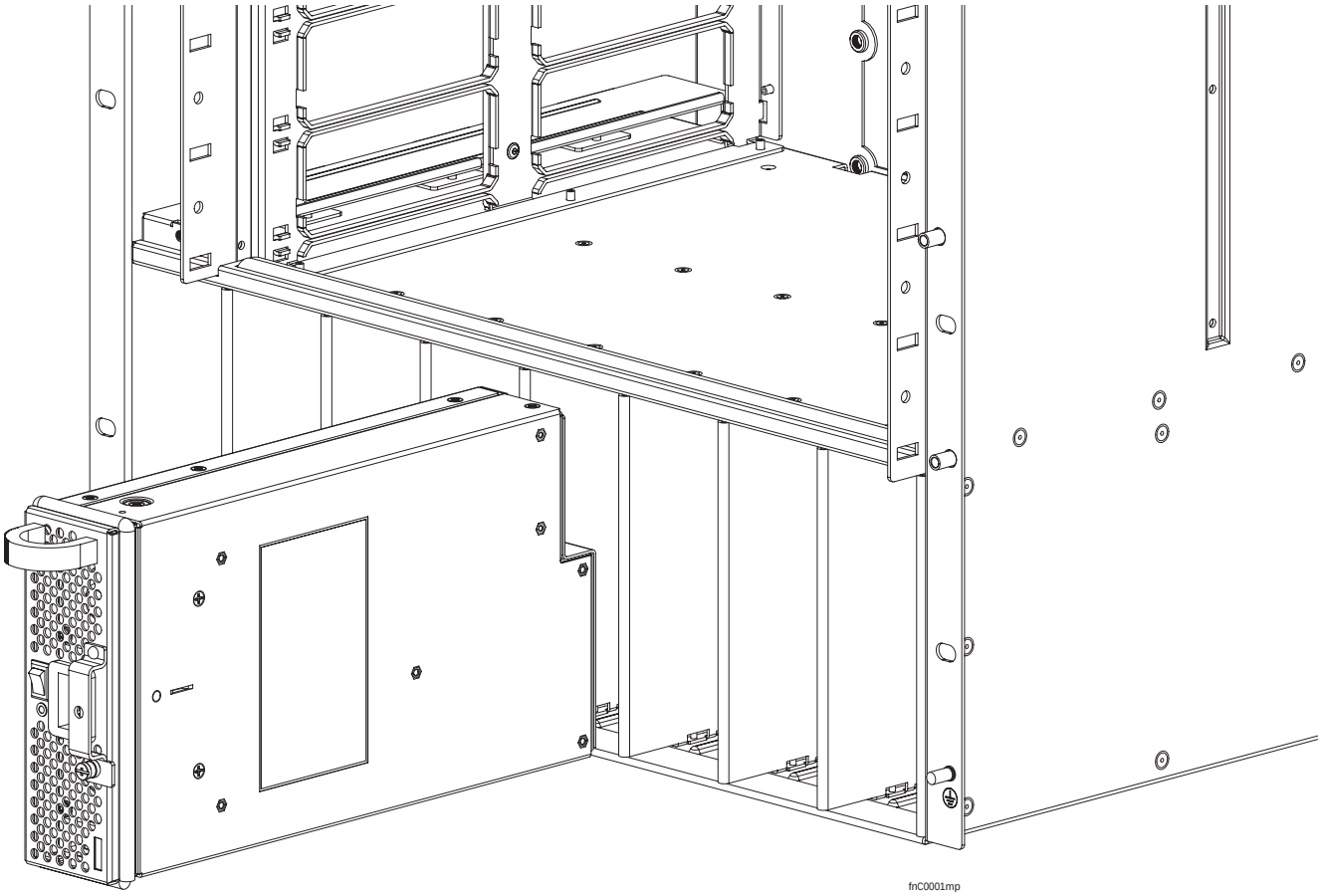
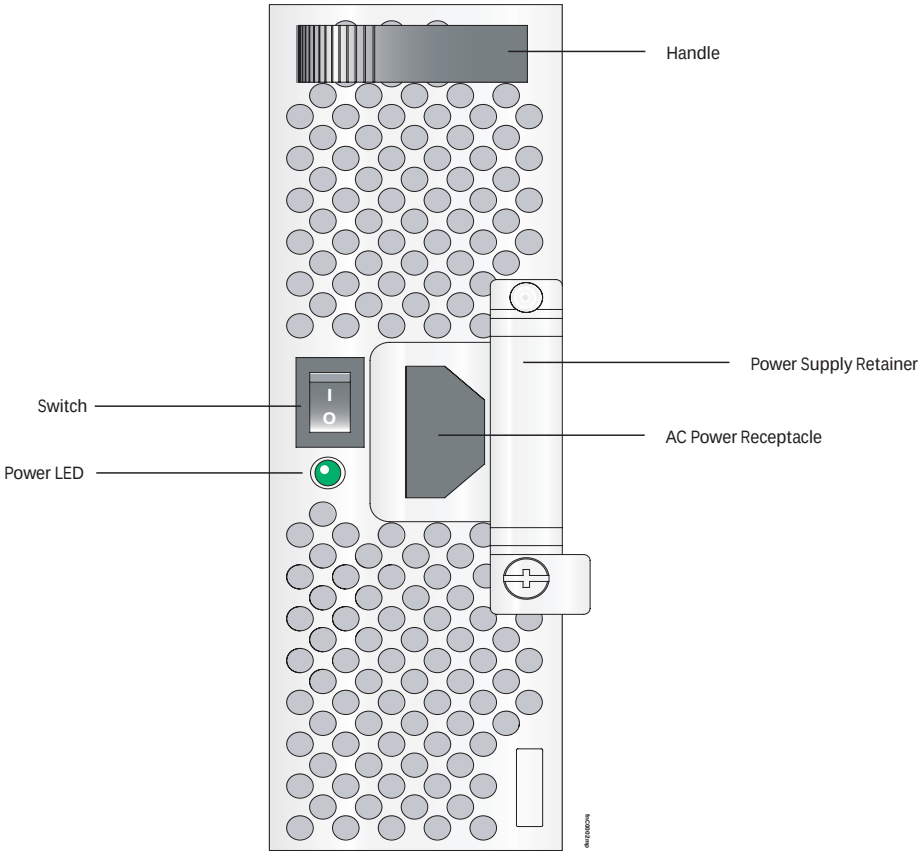


Figure 13 Power Supply



Each power supply has one LED as described in Table 8. This LED does not function unless an RPM is installed.

Table 8 Power Supply Unit LED Description

Status	Description
Off	The unit is off.
Flashing Green	Warning: the unit is beyond temperature and/or current limits.
Solid Green	The unit is functioning properly
Flashing Red	The unit has failed, possibly due to temperature or current beyond its limits.
Solid Red	The unit is switched on but either unplugged or has low input voltage. **Note:** For a unit LED to light red, there must be at least one other unit operating in the chassis.

Note: If there is a failure in the power supply, it must be replaced. Power supplies are not field serviceable.

Installing the Power Supply

Warning: Use only the power cord supplied with the power supply. Do not supply power to your C300 system until the power supplies and fan tray are installed, and RPMs and line cards have been installed.

You can install any power supply into any power supply slot. Force10 recommends installing power supplies starting from the left side of the chassis, leaving no blank slots between units.

To install an power supply:

Step	Task
1	Verify the switch is in the **OFF** (bottom) position.
2	Slide the power supply into the leftmost power supply slot. See Figure 12 for correct orientation.
3	Plug the power cord into the power receptacle in the face of the power supply. See Figure 13 for location.
4	Plug the power cord into an AC power outlet.
5	Repeat steps 1 through 4 for the remaining power supplies.

Power Over Ethernet

The C-Series can transmit power to Ethernet devices over the signal pairs of an Unsheilded Twisted Pair (UTP) cable. A maximum of 15.4 Watts (at 48 Volts) can be transmitted over a link.

The chassis transmits power to connected IEEE 802.3af-compliant devices via ports that are enabled with PoE. A minimum of four power supply units (PSU) are required to enable PoE, and 77 ports can be enabled per PSU thereafter, as described in Table 9.

Table 9 PoE Ports per Power Supply Unit

Power Supply Units	Max PoE Ports
1	—
2	—
3	—
4	77
5	154
6	231
7	308
8	384

Chapter 8 Powering Up

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

Verify that:

- The equipment rack or properly secured and grounded.
- The chassis is bolted and secured into your equipment rack.
- At least two power supply modules are installed.
- All power supply module is properly installed.
- All power supply modules are switched to the **OFF** (bottom) position.
- Power cables connect to a compliant remote power source.
- The fan tray is installed and cannot be removed by pulling on the fan tray handle.
- At least one RPM is installed.
- All line cards and RPMs are properly installed and secured.
- All chassis slots are filled. Blank panels and covers are installed in all empty slots.

Supplying Power

Danger: Never operate the C300 System without a fan tray and at least one RPM or with an open power supply, RPM, or line card slot. All slots must contain modules or filler panels.

To supply power to the C300 system:

Step	Task
1	Energize the remote power source or outlet.
2	Toggle the switch on the AC power supplies to the **ON** (top) position.

Step	Task
3	In an AC Power Supply, the LEDs should be green. If these LEDs are not lit green: • Check that the unit is properly installed. • Verify the power source. • If the power supply cannot be verified, power off all modules and replace the unit.
4	The fan tray LED should be green (online). You should be able to hear the air flowing through the chassis. If the fans are not operating properly or air is not flowing through the chassis: • Power off all power supplies. • Verify that the fan tray is properly installed. • If the fan tray LED remains unlit, power down the unit, and replace the fan tray.

To turn off the AC power supplies:

- Toggle the switch two the **OFF** position.
- Unplug the power cord from the power receptacle on the front of the power supply.
- Verify that the LEDs are unlit.

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

- The fan tray should be operating.
- The green (online) fan tray, RPM, and line card LEDs should be lit and remain lit as long as the system is receiving power and is operational.

When you supply power to the C300, the system performs a series of power-on self tests. RPM and line card 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.

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 ^ or CNTL~). The console monitor will display the default `BOOT_USER #` prompt. Refer to Appendix A, on page 47 for instructions to continue the boot process.

Chapter 9 Removing and Replacing Components

This section provides instructions for removing and replacing the following C300 components:

- Removing and Replacing the Fan Tray
- Removing and Replacing Power Supply Units
- Removing and Replacing a Line Card

When a component fails, the C300 System system triggers an alarm LED (located on the active RPM), disables or changes component Status LEDs, and sends events to the SNMP trap and show alarms table (if this feature is configured). Refer to Appendix C, on page 53 for more information on alarms.

Warning: Electrostatic discharge (ESD) damage can occur when components are mishandled. Always wear an ESD-preventive wrist or ankle strap when handling RPMs and line cards. Connect the ESD strap to the grounding plug located on the front of the chassis. Place RPMs and line cards on an antistatic surface and anti-static bags when they are not installed.

Removing and Replacing the Fan Tray

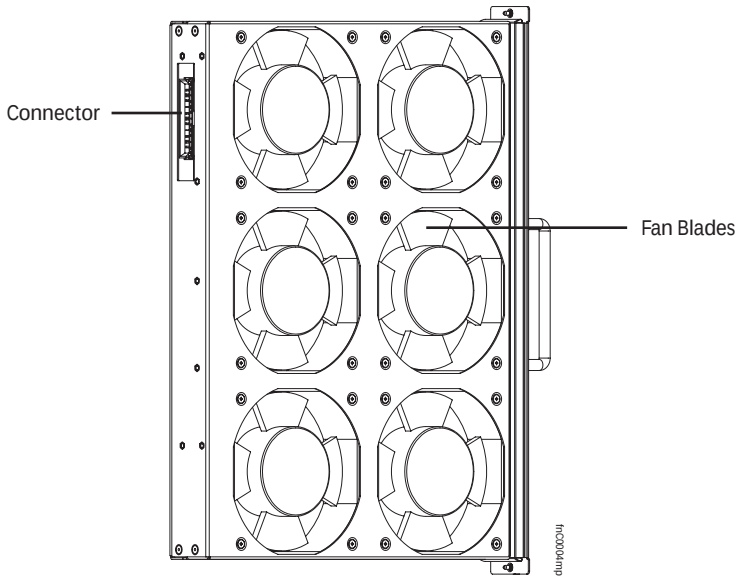
A fan tray failure or a failure of a fan within a fan tray is recognized by a red fan tray LED, a lit RPM alarm LED, and, if configured, an SNMP trap and alarm event. The failure requires a replacement of the entire fan tray. While you replace the fan tray, the C300 system will operate safely for approximately two (2) minutes at an ambient temperature of 77° F (25° C).

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

Danger: When removing the fan tray avoid contact with the moving fan blades (see Figure 14).

Warning: To ensure proper temperature and airflow control, the fan tray must always be installed.

Figure 14 Fan Tray (Left)



To remove and replace the fan tray:

Step	Task
1	Unscrew the retaining screws at the top and bottom of the fan tray.
2	Use the handle to pull the fan tray out approximately two inches from the chassis. Wait 30 seconds, until the fan blades stop rotating, then completely remove the fan tray.
3	Insert the new fan tray into the chassis. Guide the tray firmly into the slot until it stops and the handle end is flush with the chassis.
4	Secure the fan tray into place by tightening the screws at the top and bottom of the fan tray using a #2 Phillips screwdriver.

Removing and Replacing Power Supply Units

Warning: Do not remove a panel blank unless you are ready to install a power supply into that slot. After removing a power supply, immediately place a panel blank in the empty slot. Blanks are required to control airflow and electromagnetic interference.

A power supply failure is recognized by a red power LED, a lit RPM alarm LED, and, if configured, an SNMP trap. If you are operating your C300 chassis with a redundant power supply, you can install, remove, or replace a power supply without affecting system operation. If you are operating your C300 system with only two power supplies (the minimum), you must completely power off the system to replace a power supply.

Note: If a power supply fails, the entire unit must be replaced. There are no field serviceable parts inside the unit.

To remove and replace a power supply:

Step	Task
1	If you are removing one of only two installed power supplies, power down the chassis. If you are removing a redundant power supply, toggle the switch on the power supply to the **OFF** (bottom) position.
2	Disconnect the power cable from the AC power source and the front of the power supply.
3	Pull the power supply out of the slot using the handle.
4	If you are not replacing the power supply, insert a panel blank. See Figure 1 for the correct orientation.
5	Toggle the switch on the replacement power supply to the **OFF** position.
6	Slide the new power supply into the power supply slot. See Figure 12 for the correct orientation.
7	Plug the power cord into the power receptacle in the face of the power supply. See Figure 13 for the location.
8	Plug the AC power cord into an AC power outlet.
9	Toggle the switch on the power supply to the **ON** (top) position.
10	Power up the chassis if necessary.

Removing and Replacing a Line Card

Warning: Do not remove a panel blank unless you are ready to install a line card into that slot. After removing a line card, immediately place a panel blank in the empty slot. Blanks are required to control airflow and electromagnetic interference.

You can add, replace, or remove C300 line cards without interrupting the system power or system operations.

To remove and replace C300 line cards:

Step	Task
1	Unplug the network interface cables connected to the line card.
2	Extend the left and right card levers by first pressing gently down on the thumb tabs (see Figure 15) in the ejector levers and then pulling the ejector levers simultaneously until they are in the open position. See Figure 16.

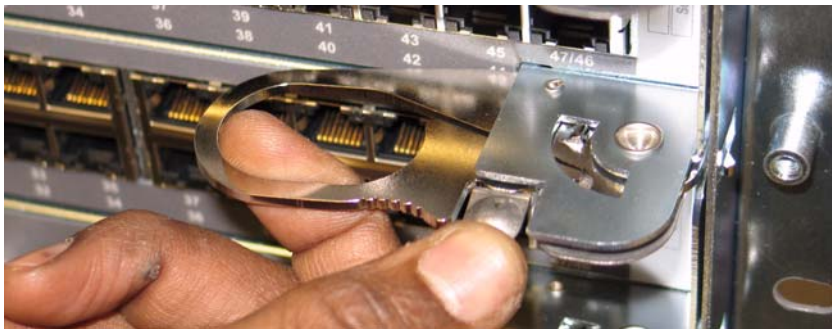


Figure 15 Depress the thumb tabs

Figure 16 Extend the levers

3	Pull the card by the card levers until it is out of the slot. Avoid touching the printed circuit board and connector pins.
4	If you are not replacing the card immediately, install a blank panel.

Step	Task (continued)
5	If you are replacing the card, follow the instructions in Installing the RPMs and Line Cards on page 25.

Removing and Replacing an RPM

Warning: After removing an RPM, place a panel blank in the empty slot before powering up the chassis. Blanks are required to control airflow and electromagnetic interference.

Note: The C300 requires at least one RPM to operate. The system enters a software-defined power-down state if you remove the only RPM.

To remove and replace a C300 RPM:

Step	Task
1	Power down the chassis.
2	Unplug any network interface cables connected to the RPM.

Step	Task (continued)
3	Extend the left and right card levers by first pressing gently down on the thumb tabs (see Figure 15) in the ejector levers and then pulling the ejector levers simultaneously until they are in the open position. See Figure 16.

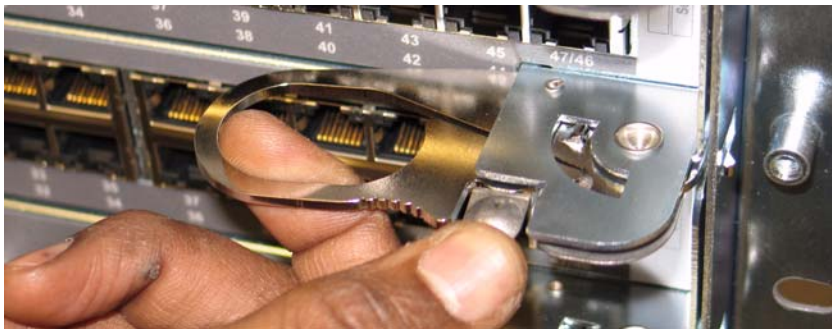


Figure 17 Depress the thumb tabs

Figure 18 Extend the levers

4	Pull the card by the card levers until it is out of the slot. Avoid touching the printed circuit board and connector pins.
5	If you are not replacing the RPM, insert an RPM blank panel.
6	If you are replacing the RPM, follow the instructions in Installing the RPMs and Line Cards on page 25.
7	Only after the replacement is installed, power up the chassis.

Appendix A System Boot

When you supply power to the C300 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. 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 C300 system use a Compact Flash card (external flash memory card) to store and retrieve boot and system images. 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.

Note: The C300 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 Compact Flash card, refer to Appendix B, on page 51.

Booting from the BOOT_USER Prompt

To get into the BOOT_USER mode, issue a break control sequence (CNTL+^) to interrupt the automatic boot process or you may enter the mode 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.

The `BOOT_USER #` prompt appears after an autoboot interruption. This is the default boot prompt, not the CLI prompt.

In some display outputs, you can continue the help screen display by pressing ENTER or can stop the output by entering **q** and then ENTER. You can abbreviate the boot commands by entering only the first letter of a command word. (In the BOOT_USER mode, you cannot press the TAB key to complete commands.) 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.

To configure the chassis from the BOOT_USER prompt use the following commands:

Command	Purpose
help or **?**	• Enter **help** or **?** to display a list of available commands and syntax. • Enter **syntax help** to display syntax information and variable descriptions.
boot change {primary | secondary | default}	If your configuration displays no pre-configured 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 run-time 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.

```
BOOT_USER # boot change primary

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

boot device                    : flash
file name                      : /FTOS-CB-1.1.x.y.bin

BOOT_USER # boot change default

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

boot device                    : flash
file name                      : /FTOS-CB-1.1.x.y.bin

BOOT_USER #
```

Command	Purpose (continued)
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                      : /FTOS-CB-1.1.x.y.bin

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

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:
=========================================
boot device                    : flash
file name                      : /FTOS-CB-1.1.x.y.bin

BOOT_USER #
```

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 1.1
  Engineering 750_64460_CP_IMG_BOOT_CS, BSP Release 1.0.0.52, Checksum 0x3a531c11
  Created Fri Jan 12 15:05:47 2007 by build on hydrogen
  Trailer Version 1.0 001deaa8
  Trailer checksum 0x3a531c11

Bootflash Partition B:
  Force10 Networks System Boot
  Copyright 1999-2007 Force10 Networks, Inc.
  ROM Header Version 1.1
  Engineering 750_64460_CP_IMG_BOOT_CS, BSP Release 1.0.0.52, Checksum 0x3a531c11
  Created Fri Jan 12 15:05:47 2007 by build on hydrogen
  Trailer Version 1.0 001deaa8
  Trailer checksum 0x3a531c11

Boot Selector Partition:
  Force10 Networks System Boot
  Copyright 1999-2007 Force10 Networks, Inc.
  ROM Header Version 1.1
  Engineering 750_64460_CP_IMG_BOOT_SELECTOR_CS, BSP Release 1.0.0.52, Checksum 0x8daf31d1
  Created Fri Jan 12 15:05:26 2007 by build on hydrogen
  Trailer Version 1.0 00003480
  Trailer checksum 0x8daf31d1

BOOT_USER #
```

Command	Purpose (continued)
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**	• 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.
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. Use CIDR block notation for the subnet mask.

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

BOOT_USER # interface management ethernet ip address 1.2.3.4/24
Management ethernet 0/0 IP address: 1.2.3.4/24

BOOT_USER # show interface management ethernet

Management ethernet IP address: 1.2.3.4/24

BOOT_USER #
```

boot zero {default | primary | secondary}	Delete the boot configuration.
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.

Refer to the *C-Series FTOS Command Line Interface Reference* for BOOT_USER mode commands and commands for run-time modes.

Appendix B The Compact Flash Card

Each RPM is designed with a slot (slot0:) to accommodate a Compact Flash Card (external compact flash memory card). You can use the Compact Flash Card to store and retrieve boot and system images. For complex configurations, you can copy your configurations onto the Compact Flash Card and then transfer the configuration to other C300 systems in your network.

Note: Use only a Force10 Compact memory card in your C300 System. Additional memory cards can be purchased from Force10.

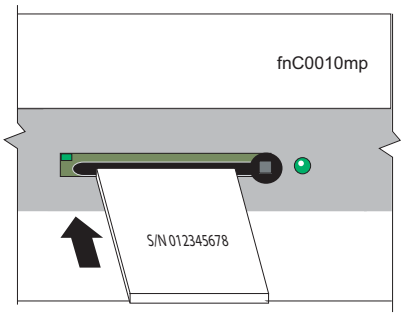
Inserting the Compact Flash Card

Note: Insert the Compact Flash Card either before system boot or after the system has completed booting and is in run-time mode.

To install the Compact Flash card:

Step	Task
1	Hold the flash card horizontally with the side with the serial number facing up (the numbers should be oriented so you can read them) See Figure 19 for the proper orientation.

Figure 19 Inserting the Compact Flash Card in RPM



Step	Task (continued)
2	Insert the flash card into the primary RPM flash slot until the card is completely seated with the connectors at the rear of the slot.
	Note: Do not force the card into the slot. The slot is designed to prevent improper installation. The In Use LED lights only during read or write operations.

Removing the Compact Flash Card

Warning: Do not remove the Compact Flash Card when the In Use LED is lit.

To remove the flash memory card:

Step	Task
1	Make sure that the In Use LED is not lit, and gently depress the flash card in the slot. The card should partially eject out of the slot.
2	Remove the card, and place it in an antistatic bag.

Formatting the Compact Flash Card

New Compact Flash cards must be formatted in the C300 before use.

Flash cards used on systems other than the C300 as well as cards formatted on PCs must be reformatted in the C300 flash slot before they can be used. Formatting erases all information stored on the flash card.

To format the Compact Flash card:

Step	Task
1	Insert the flash card into the flash slot on the primary RPM.
2	In the CLI, enter **format slot0:**

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 C Alarms

The C300 System generates alarms for the following conditions:

- fan tray status
- power supply status
- RPMs status
- high temperature on RPMs
- line cards status
- high temperature on line cards

A major alarm is any fault that would render the C300 System non-functional.

A minor alarm is any fault that threatens the operation of the C300 System.

You can monitor alarm conditions on the C300 System system through the console and LEDs. If you configure the SNMP command (**snmp-server enable traps envmon**), the FTOS also sends an SNMP trap.

In the C300 System 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 10 Alarm Events and Reporting

Module	Alarm Event	Alarm LED	Reported in event log	Status LED on Module
Fan tray	One fan within the module fails	minor (blinking red)	minor	N/A
	More than one fan within the module fails or hardware failure in the module	major (red)	major	unlit
AC Power Supplies	Hardware failure in a non-redundant power configuration (2 power supplies)	major (red)	major	unlit
	Hardware failure in a redundant power configuration (3 or more)	minor (amber)	minor	unlit
Line Card	Hardware failure	major (red)	major	amber
	Exceeds high temperature limit	major (red)	major	unlit
	Exceeds warning temperature limit	minor (amber)	minor	green
	Individual interface fails	minor (amber)	reported	amber[1]
RPM (Non-redundant Configuration with 1 RPM)				
	Exceeds high temperature limit	major (red)	major	unlit
	Exceeds warning temperature limit	minor (amber)	minor	green
	RPM fails but CP is ok	major (red)	major	amber

AC Power Supplies and Alarms

During system boot, if a redundant power supply is removed or fails, the FTOS generates a minor alarm message.

If only two power supplies are installed and one of them fails, the software generates an alarm and an SNMP trap (if configured), and lights the RPM alarm LED and power supply LED.

Appendix D System Specifications

Physical Design

Chassis Dimensions

Table 11 Chassis Dimensions

Parameter	Specifications
Height	22.7 inches (57.7 cm)
Width	17.4 inches (44.3 cm)
Depth	13.8 inches (35.2 cm)
Weight (empty)	55 lbs
Mounting	Integral rack mount strips for front mounting in a standard 19-inch rack.
Clearance required	Front: 18-inches (46 cm) Rear: 20-inches (51 cm)

Component Dimensions

Table 12 Component Dimensions

Component	Catalog Number	Length (in)	Width (in)	Depth (in)	Weight (lb)
48-port 1G Line Card	LC-CB-GE-48T	15.25	13.75	1.75	5.31
4-port 10G XFP Line Card	LC-CB-10GE-4P	15.25	13.75	1.75	5.31
8-port 10G XFP Line Card	LC-CB-10GE-8P	15.25	13.75	1.75	5.31
48-port 1G SFP Line Card	LC-CB-GE-48P	15.25	13.75	1.75	5.31
48-port 1G PoE Line Card	LC-CB-GE-48V	15.25	13.75	1.75	5.585
C300 RPM	LC-CB-RPM	15.25	13.75	1	5.275
Fan Tray	CC-C300-FAN	13	1.125	16.125	8.51
Power Supply Unit	CC-C-1200W-AC	11.75	1.875	5.625	5.065
Line Card Blank Panel	CC-C-BLNK-LC	15.25	13.75	1.75	2.94

Table 12 Component Dimensions

Component	Catalog Number	Length (in)	Width (in)	Depth (in)	Weight (lb)
RPM Blank Panel	CC-C-BLNK-RPM	15.25	13.75	1	2.75
PSU Blank Panel	CC-C-BLNK-PWR	11.25	1.875	5.625	1.08

System Power Specifications

Table 13 System Power Specifications

Parameter	Specifications
Nominal Input Voltage	90 - 260 VAC 47/63 Hz
Maximum AC Power Supply Input Current (based on 1200W output for 100/120V and 200/240V lines.)	14 A @ 100 VAC per AC Power Supply
	12 A @ 120 VAC per AC Power Supply
	7 A @ 200 VAC per AC Power Supply
	6 A @ 230 VAC per AC Power Supply
Maximum System Power Input 3 AC Power Supply Operation 3 AC Power Supply Operation	9600W (1200W per PSU) 3600W @ 100V 3600W @ 200V
Maximum Thermal Output (for 100/120V and 200/240V)	4095 BTU/hour

Component Power Requirements

Table 14 Component Power Requirements

Component	Catalog Number	Power Requirement (Watts)
48-port 1G Line Card	LC-CB-GE-48T	150W
4-port 10G XFP Line Card	LC-CB-10GE-4P	150W
8-port 10G XFP Line Card	LC-CB-10GE-8P	200W
48-port 1G SFP Line Card	LC-CB-GE-48P	—
48-port 1G PoE Line Card	LC-CB-GE-48V	150W
C300 RPM	LC-CB-RPM	165W
Fan Tray	CC-C300-FAN	90W
Power Supply Unit	CC-C-1200W-AC	1200W

Note: The power requirement for the 48-port 1G PoE line card exludes the power required for PoE.

Appendix E Technical Support

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.

Accessing iSupport Services

The URL for iSupport is 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 **Log in** link, and enter your userid and password.

Contacting the Technical Assistance Center

How to Contact Force10 TAC	Log in to iSupport at www.force10networks.com/support/, and select the **Service Request** tab.

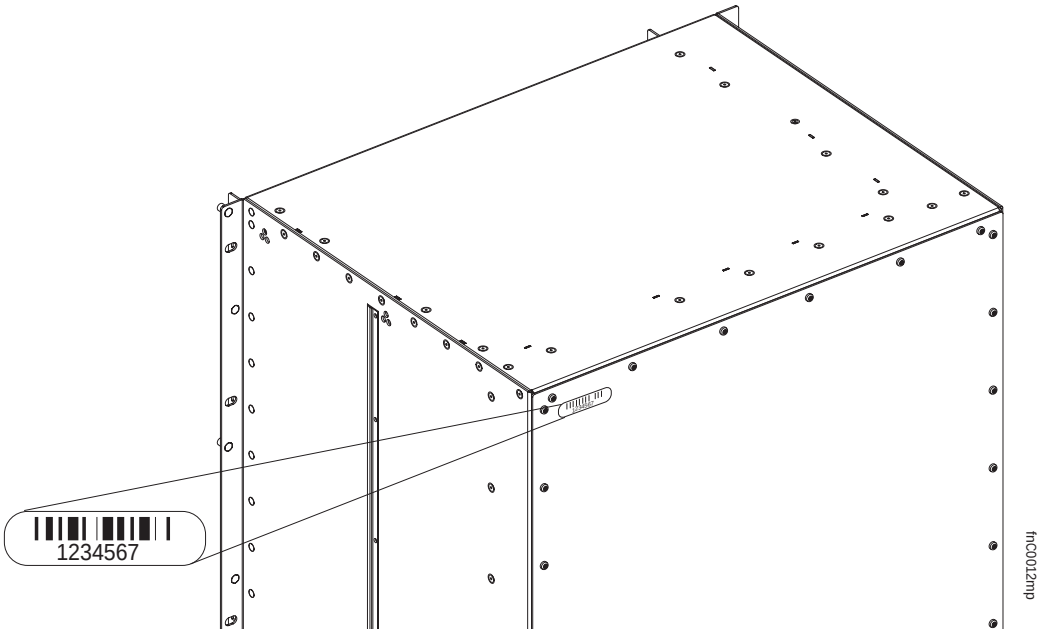
Information to Submit When Opening a Support Case	• Your name, company name, phone number, and E-mail address
	• Preferred method of contact
	• Model number
	• Serial Number (see Locating C300 Serial Numbers on page 60)
	• Software version number
	• Symptom description
	• Screen shots illustrating the symptom, including any error messages. These can include:
	  • Output from the **show tech** command or the **show tech linecard** {*number*} command.
	  • Output from the **show trace command** or the **show trace linecard** {*number*} command.
	  • 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: www.force10networks.com/support/ Telephone: US and Canada: 866.965.5800 International: 408.965.5800

Locating C300 Serial Numbers

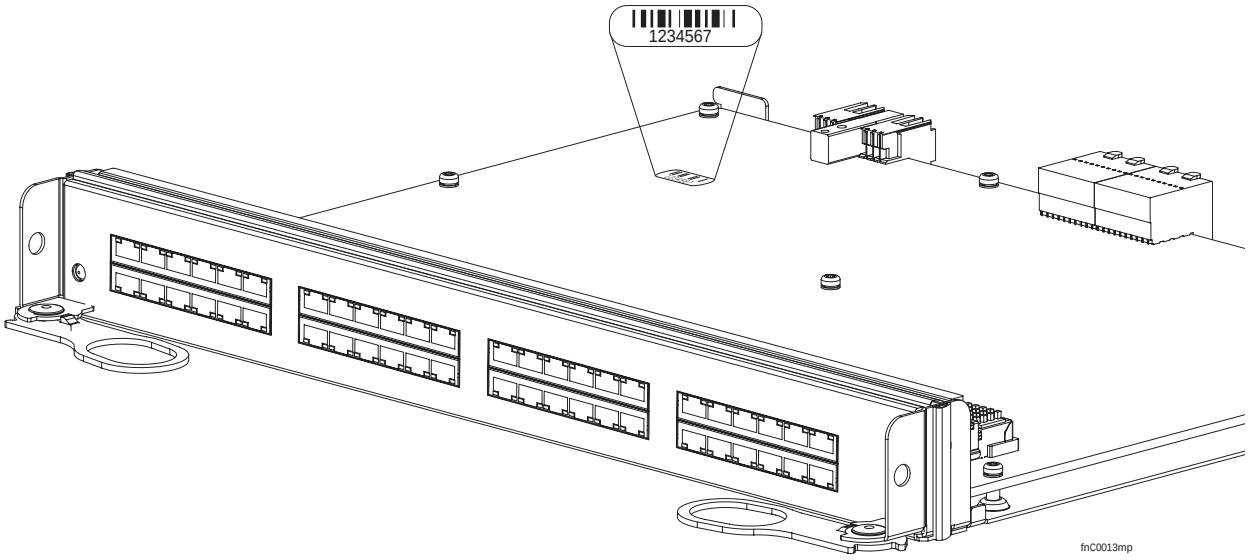
The serial number of the chassis is located on a sticker on the back of the chassis in the top-left corner. The serial number is below the bar code and has seven digits.

Figure 20 Serial Number on Back of Chassis



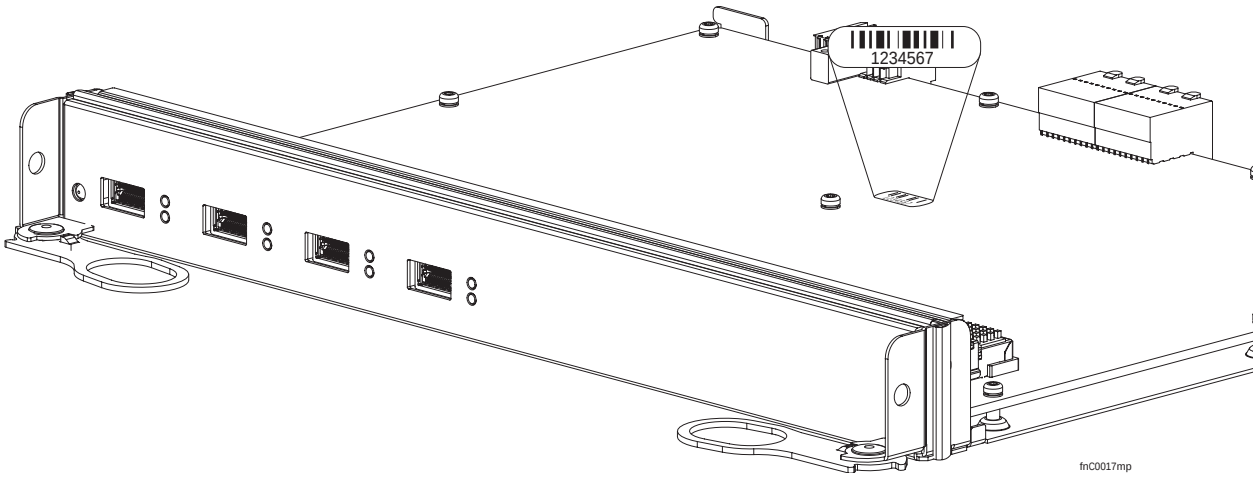
The serial number of the 48-Port 1-Gigabit Ethernet line card is located on a sticker on the top-left of the line card. The serial number is below the bar code and has seven digits.

Figure 21 Serial Number on 48-port 1-Gigabit Line Card



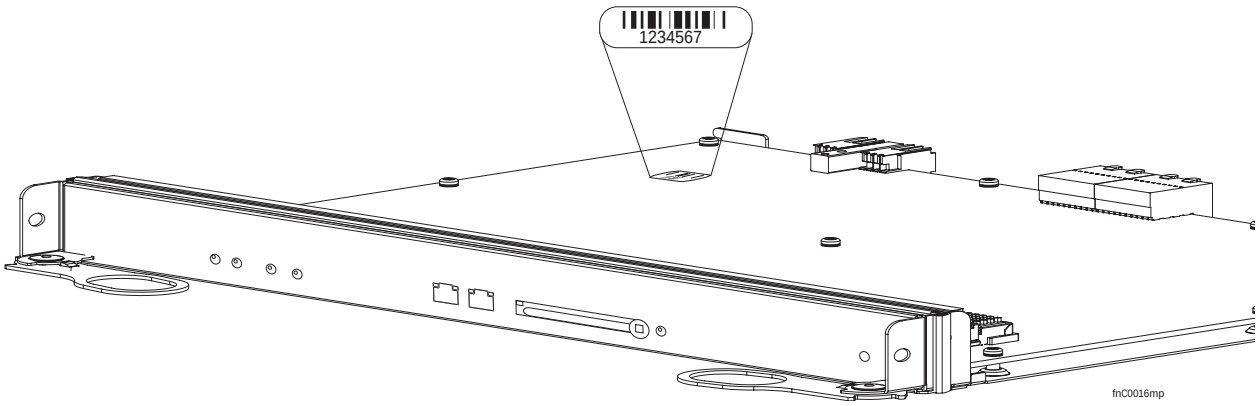
The serial number of the 4-Port 10-Gigabit Ethernet line card is located on a sticker on the top-middle of the line card. The serial number is below the bar code and has seven digits.

Figure 22 Serial Number on 4-port 10-Gigabit Line Card



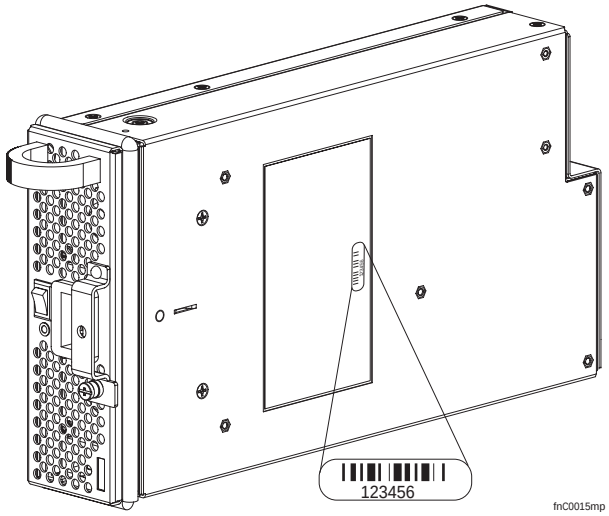
The serial number of the Route Processor Module is located on a sticker on the top-left of the line card. The serial number is below the bar code and has seven digits.

Figure 23 Serial Number on Route Processor Module



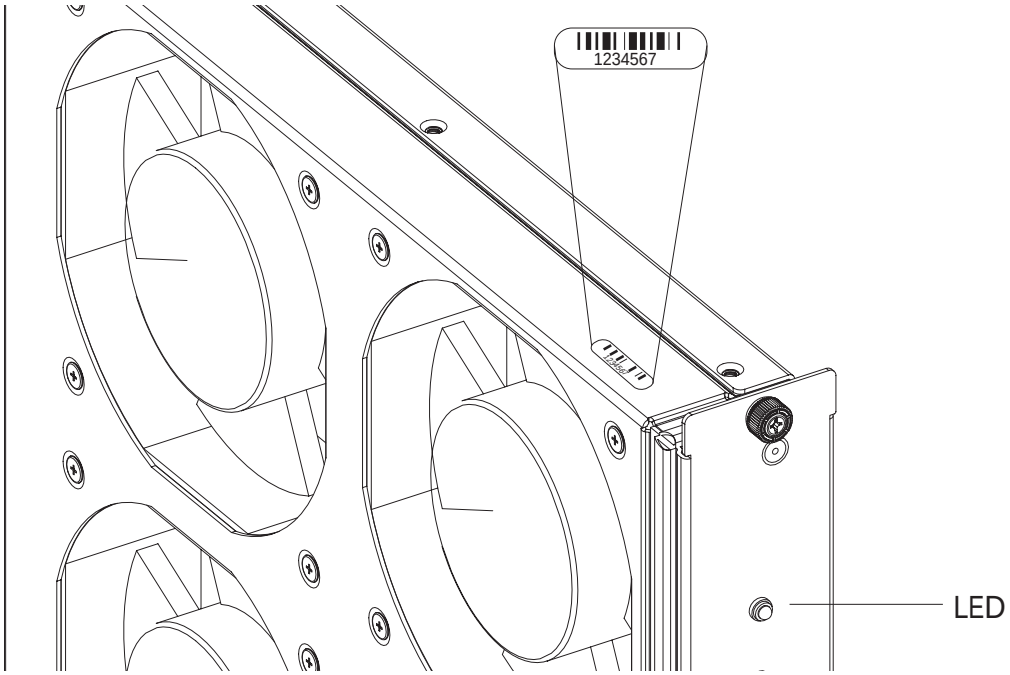
The serial number of the power supply module is located on a sticker on the right side. The serial number is below the bar code and has six digits.

Figure 24 Serial Number on Power Supply Module



The serial number of the fan tray is located on a sticker on the top of the fan tray. The serial number is below the bar code and has six digits.

Figure 25 Serial Number on Fan Tray



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 inventory** command.
	**Note:** The serial number for fan trays and AC power supplies will not appear in the hardware inventory listing. Check the failed component for the attached serial number label. **Note:** Quickly reinsert the fan tray back into the chassis once you have noted the serial number.

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 60).
	• Contacting Force10 directly by E-mail or by phone (see Contacting the Technical Assistance Center on page 60). 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:
	  • the **show tech** command output
	  • the **show trace** and **show trace hardware** command output
	  • for line card issues, the **show trace hardware linecard** command output
	  • console captures showing any error messages
	  • console captures showing the troubleshooting steps taken
	  • saved messages to a syslog server, if one is used
	• The support representative will validate your request and issue an RMA number for the return of the component.

3	Pack the component for shipment, as described in the Hardware Installation Guide. Label the package with the component RMA number.