

Platform Guide: 8950

MAN-0320-05



Table of Contents

Legal Notices.....	5
Chapter 1: The 8950 Platform.....	7
About the 8950 Platform.....	8
Components provided with the platform.....	9
Peripheral hardware requirements.....	9
LCD panel.....	9
About LCD menus.....	10
Using LCD menus.....	11
Indicator LEDs.....	12
Indicator LED behavior.....	12
Status LED.....	13
Power supply LEDs.....	13
LED alert conditions.....	13
Defining custom alerts.....	14
Additional indicator LED status conditions.....	14
Platform interfaces.....	15
About managing interfaces.....	15
About interface media type and duplex mode.....	16
Network interface LED behavior.....	18
Optical transceiver specifications.....	19
Cable pinout specifications.....	19
Always-On Management.....	20
AOM Command Menu options.....	20
Accessing the AOM Command Menu from the serial console.....	21
Setting up Always-On Management SSH access.....	21
Accessing the AOM Command Menu using SSH.....	21
Chapter 2: Platform Installation.....	23
About platform installation.....	24
Determining which rack mounting kit to use.....	24
About general recommendations for rack mounting.....	24
About the front-mounting kit.....	24
Front-mounting kit hardware.....	24
Installing using a front-mounting kit.....	25
About the quick-install rail kit.....	25
Installing the rail lock brackets.....	26
About grounding the platform.....	27
Connecting the ground lug to the ground terminal.....	28
Connecting the cables and other hardware.....	28

Configuring a management IP address.....	29
Licensing the platform.....	29
Chapter 3: Platform Maintenance.....	31
About platform maintenance.....	32
About AC power supplies.....	32
Installing an AC power supply.....	33
About DC power supplies.....	34
Wiring the DC power supply terminal block.....	35
Installing a DC power supply.....	36
About the fan tray.....	37
Replacing the fan tray.....	38
About the hard disk drives.....	38
About hard disk drive replacement on an 8950 platform.....	38
Appendix A: Environmental Guidelines.....	43
General environmental and installation guidelines.....	44
Guidelines for AC-powered equipment.....	45
Guidelines for DC-powered equipment.....	45
Platform airflow diagram.....	46
Appendix B: Platform Specifications.....	47
General specifications for system features.....	48
Platform hardware specifications.....	48
Platform environmental operating specifications.....	49
Platform power specifications.....	50
Safety requirements.....	50
EMC requirements.....	50
Acoustic, airflow, and altitude specifications.....	52
Appendix C: China RoHS Requirements.....	53
Hazardous substance levels for China.....	54
Appendix D: Returned Material Data Security Statement.....	55
About returned material data security.....	56
About memory technologies used in F5 equipment.....	56
Volatile memory.....	56
Battery-backed volatile memory.....	56
Non-volatile memory.....	56
About removing data from F5 components.....	57
Removing sensitive data from storage drives.....	57
Removing IP address data from Always-On Management.....	58
Removing sensitive data from an internal hardware security module (HSM).....	58

Legal Notices

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This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful

interference when the equipment is operated in a commercial environment. This unit generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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VCCI-A

Chapter

1

The 8950 Platform

- *About the 8950 Platform*
- *Components provided with the platform*
- *Peripheral hardware requirements*
- *LCD panel*
- *Indicator LEDs*
- *Platform interfaces*
- *Always-On Management*

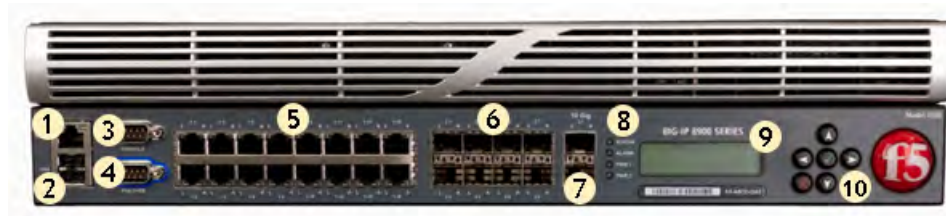
About the 8950 Platform

The BIG-IP® 8950 platform is a powerful system that is capable of managing traffic for any size of enterprise.

The 8950 platform features high performance SSL hardware that frees up servers from the task of encrypting and decrypting data. F5 offers two performance levels of SSL offload in the 8950 series: the 8950 and the 8950S. Please see the data sheet on <http://www.f5.com> for more information on these platforms.

Before you install the 8950 platform, review helpful information about the controls and ports located on both the front and the back of the platform.

On the front of the platform, you can reset the unit using the LCD control buttons and view the indicator LEDs for hard disk access. You can also use the front-panel LEDs to assess the condition of the unit. On the back, you can power off the unit.



1. Management port
2. USB ports
3. Console port
4. Hard-wired failover port
5. 10/100/1000 interfaces
6. SFP ports
7. SFP+ ports
8. Indicator LEDs
9. LCD display
10. LCD control buttons

Figure 1: Front view of the platform

The back of the platform includes two power supplies.



1. Power input panel (power switch and power receptacle)
2. Power input panel (power switch and power receptacle)
3. Fan tray

Figure 2: Back view of the platform

Components provided with the platform

When you unpack the platform, verify that the following components are included.

Quantity	Hardware
2	Power cables (black), AC power only
2	DC terminal blocks, DC power option only
1	Serial failover cable (blue)
1	Console cable (beige)
1	Front-mounting kit
1	Rail-mounting kit
1	Front bezel
4	SFP optical transceivers

Peripheral hardware requirements

For each platform, you might need to provide additional peripheral hardware. If you plan to remotely administer the system, it would be helpful to have a workstation already connected to the same subnet as the management interface.

Type of hardware	Description
Network hubs, switches, or connectors to connect to the platform network interfaces	You must provide networking devices that are compatible with the network interface cards installed in the platform. You can use either 10/100/1000 Ethernet or 10 Gigabit Ethernet switches.
External USB CD/DVD drive or USB flash drive	You can use any USB-certified CD or DVD mass storage device for installing upgrades and for system recovery. <i>Note: External CD/DVD drives must be externally powered.</i>
Serial terminal console	You can remotely manage the platform by connecting to a serial terminal console through the console port.
Management workstation on the same IP network as the platform	You can use the default platform configuration if you have a management workstation set up.

LCD panel

The LCD panel provides the ability to manage the unit without attaching a console or network cable.



Figure 3: The LCD panel and control buttons

About LCD menus

There are three menus on the LCD panel. You can configure the display options to meet your needs.

LCD config menu

You can use the LCD config menu to adjust the display properties of the LCD panel.

Option	Description
Backlight	Specifies an LCD screen backlighting option. Select from the following options: <ul style="list-style-type: none"> • ON enables the backlight. • GRAY enables the software to specify when the backlight is illuminated. • OFF disables the backlight.
Contrast	Sets the contrast of the LCD.
On Brightness	Adjusts LCD backlight brightness.
Off Brightness	Controls the brightness of the LCD when the backlight is off.

Screens menu

You can use the Screens menu to specify the information that is displayed on the default screens.

Option	Description
DateScreen	Displays the date and time.
InfoScreen	Displays the information screen menu.
MACscreen	Displays the MAC addresses on the unit.
SysinfoScreen	Displays system information.
TMMAuthScreen	Displays the number of authentication requests being processed.
TMMCPUScreen	Displays the CPU usage percentage.
TMMMemoryScreen	Displays the memory usage.
TMMStatScreen	Displays simple statistics, such as bytes and packets in and out of the system.

Option	Description
VersionScreen	Displays product version information.

System menu

You can use the System menu to view options for rebooting, halting, and netbooting the hardware. This menu also provides options for configuring the management interface.

Option	Description
Management	Changes the management interface information. Select from the following options: <ul style="list-style-type: none"> • Mgmt IP sets the management interface IP address. You can use only an IPv4 address. • Mgmt Mask sets the netmask for the management interface IP address. • Mgmt Gateway sets the default route for the management interface. This route is necessary if you plan to manage the unit from a different subnetwork. • Commit saves your changes.
Serial Speed	Changes the baud rate of the serial port. Select from the following options: <ul style="list-style-type: none"> • 9600 • 19200 (default) • 57600 • 115200
Reboot	Reboots the unit.
Halt	Halts the unit.
Netboot	Boots the unit over an IP network. Select this option if you are installing software from a PXE server.

Using LCD menus

Press the X button to put the LCD in Menu mode.

The Left Arrow, Right Arrow, Up Arrow, and Down Arrow buttons are functional only when the LCD is in Menu mode.

Pausing on a screen

Normally, the screens cycle on the LCD panel at a constant rate, but you can pause on a specific screen.

Push the Check button to toggle the LCD screen between Hold and Rotate modes.

In Hold mode, a single screen is displayed. The Rotate mode changes the screen displayed on the LCD every four seconds.

Powering on the unit

Press the Check button to power on a unit that is shut down.

Halting the unit

We recommend that you halt the unit before you power it down or reboot it using the LCD menu options.

1. Press the X button, then use the arrow keys to navigate to the System menu.
2. Press the Check button.
3. Navigate to the Halt menu.
4. Press the Check button.
5. Press the Check button again at the confirmation screen.

Wait 30 seconds before powering the machine off or rebooting it.

Putting the unit into standby mode

Hold the X button for four seconds to put the unit in standby mode and power off the host subsystem. F5 Networks recommends that you halt the system before you power off the system in this manner.

Rebooting the unit

Hold the Check button for four seconds to reset the unit. You should only use this option after you halt the unit.

Clearing alerts

Press the Check button to clear any alerts on the LCD screen. You must clear any alerts on the screen before you can use the LCD panel.

Indicator LEDs

The behavior of each LED indicates the status of the system.

Indicator LED behavior

The indicator LEDs behave in a specific manner to indicate system or component status.

Behavior	Description
Off (none)	LED is not lit and does not display any color.

Behavior	Description
Solid	LED is lit and does not blink.
Blinking	LED turns on and off at a regular frequency.
Intermittent	LED turns on and off with an irregular frequency and might sometimes appear solid.

Status LED

When the unit is in a standard operating state, the Status LED behaves in a defined manner.

State	Description
off/none	System is halted and powered down.
green solid	System is running in normal mode. Also indicates that the system is in an Active state of a device group.
yellow solid	System is running in an impaired mode. The condition is not considered to be significant enough to be considered an alarm condition. Also indicates that the system is the Standby member of a device group.
yellow blinking	The system is not under host computer control. This might be due to the host being halted or due to a software or hardware problem that interferes with the host's control of the LED.

Power supply LEDs

The power supply LEDs indicate the operating state of the power supplies.

Power 1 state	Power 2 state	Description
green solid	green solid	Power supply is present and operating properly.
yellow solid	yellow solid	Power supply is present, but not operating properly. Also indicates when the system is in power standby mode.
off/none	off/none	No power supply present.

LED alert conditions

When there is an alert condition on the unit, the Alarm LED behaves in a specific manner.

Note: The Alarm LED might continue to display until alerts are cleared using the LCD panel.

Action	Description
System situation	Alarm LED behavior
Emergency	Red blinking

Action	Description
Alert or Critical	Red solid
Error	Yellow blinking

Defining custom alerts

The `/etc/alertd/alert.conf` and the `/config/user_alert.conf` files on the BIG-IP system define alerts that cause the indicators to change. The `/etc/alertd/alert.conf` file defines standard system alerts, and the `/config/user_alert.conf` file defines custom settings.

Note: You should edit only the `/config/user_alert.conf` file.

1. Open a command prompt on the system.
2. Change to the `/config` directory.

```
cd /config
```
3. Using a text editor, such as `vi` or `Pico`, open the `/config/user_alert.conf` file.
4. Add the following lines to the end of the file:

```
alert BIGIP_MCPD_MCPDERR_POOL_MEMBER_MON_DOWN "Pool member (.?):(.?) monitor status down."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.10";
  lcdwarn description="Node down" priority="1"
}
alert BIGIP_MCPD_MCPDERR_NODE_ADDRESS_MON_DOWN "Node (.?) monitor status down." {
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.12";
  lcdwarn description="Node address down" priority="1"
}
alert BIGIP_MCPD_MCPDERR_POOL_MEMBER_MON_UP "Pool member (.?):(.?) monitor status up."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.11"
}
alert BIGIP_MCPD_MCPDERR_NODE_ADDRESS_MON_UP "Node (.?) monitor status up."
{
  snmptrap OID=".1.3.6.1.4.1.3375.2.4.0.13"
}
```

5. Save the file and exit the text editor.
The front panel LEDs now indicate when a node is down.

Additional indicator LED status conditions

A few LED status conditions are not covered in the definition tables in the `/etc/alertd/alert.conf` file.

Yellow intermittent Status LED indicator

A yellow intermittent Status LED indicates that the unit is not under host computer control. This might be due to the host being halted or due to a software or hardware problem that interferes with the host's control of the LED.

Green/Yellow solid Status LED indicator

When the Status LED indicator is solid yellow or green, it indicates that the system is in a Standby state (yellow) or an Active state (green). It displays solid green if the unit is Standalone or if it is the Active unit of a redundant system configuration. It displays yellow if the unit is the Standby member of a redundant system configuration.

Platform interfaces

Every platform includes multiple interfaces. The exact number of interfaces that are on the system depends on the platform type.

Each interface on the platform has a set of properties that you can configure, such as enabling or disabling the interface, setting the requested media type and duplex mode, and configuring flow control.

About managing interfaces

You can use `tmsh` or the Configuration utility to configure platform interfaces.

Viewing the status of a specific interface using `tmsh`

You can use `tmsh` to view the status of a specific interface on a platform.

1. Open the Traffic Management Shell (`tmsh`).

```
tmsh
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: `user@bigip01 (Active) (/Common) (tmsh.net) #`.

3. Display the current status of a specific interface.

```
show interface <interface_key>
```

The following is an example of the output you might see when you issue this command on interface 1.2:

```
-----
Net::Interface
Name  Status  Bits  Bits  Errs  Errs  Drops  Drops  Colli
      In   Out   In   Out   In   Out   sions
-----
1.2   up  191.4K  0    0    0    374   0    0
```

Viewing the status of all interfaces using `tmsh`

You can use `tmsh` to view the status of all interfaces on the platform.

1. Open the Traffic Management Shell (`tmsh`).

```
tmsh
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: user@bigip01 (Active) (/Common) (tmos.net) #.

3. Display the current status of all interfaces.

```
show interface
```

The following is an example of the output you might see when you issue this command:

```
-----
```

Net::Interface									
Name	Status	Bits In	Bits Out	Errs In	Errs Out	Drops In	Drops Out	Colli sions	
1.1	down	0	0	0	0	0	0	0	
1.2	up	191.4K	0	0	0	374	0	0	
1.3	down	0	0	0	0	0	0	0	
1.4	up	22.5K	0	0	0	44	0	0	
2.1	miss	0	0	0	0	0	0	0	
2.2	miss	0	0	0	0	0	0	0	
mgmt	up	43.2G	160.0G	0	0	0	0	0	

```
-----
```

Viewing the status of all interfaces using the Configuration utility

You can use the Configuration utility to view the status of all interfaces on the platform.

1. On the Main tab, click **Network > Interfaces**.
This displays the list of available interfaces.
2. Click **Statistics**.
The Statistics screen for all interfaces opens.

About interface media type and duplex mode

All interfaces on the system default to auto-negotiate speed and duplex settings. We recommend that you also configure any network equipment that you plan to use with the system to auto-negotiate speed and duplex settings. If you connect the system to network devices with forced speed and duplex settings, you must force the speed and duplex settings of the system to match the settings of the other network device.

Important: *If the system is attempting to auto-negotiate interface settings with an interface that has the speed and duplex settings forced (that is, auto-negotiation is disabled), you will experience severe performance degradation. This applies to 10GbE and 40GbE interfaces.*

By default, the media type on interfaces is set to automatically detect speed and duplex settings, but you can specify a media type as well. Use the following syntax to set the media type:

```
tmssh modify net interface <interface_key> media <media_type> | auto
```

If the media type does not accept the duplex mode setting, a message appears. If media type is set to `auto`, or if the interface does not accept the duplex mode setting, the duplex setting is not saved to the `/config/bigip_base.conf` file.

Important: *If you manually configure the platform to use specific speed and duplex settings on interfaces, Auto-MDI/MDIX functionality is disabled by default. When an interface is set manually, it functions as a data terminal equipment (DTE) port. This means that crossover cables are required to connect to other*

DTE devices (such as servers), and straight-through cables are required for connecting to data communications equipment (DCE) devices (for example, switches or routers). Be sure to use the correct cable type (straight-through or crossover) if you manually set interface speed and duplex settings.

Important: *Starting with BIG-IP software versions 9.4.8 and 10.1.0, Auto-MDI/MDIX functionality is retained when you manually configure an interface to use specific speed and duplex settings. With these versions of the BIG-IP system, you can use either a straight-through cable or a crossover cable when media settings are forced, and you will be able to successfully link to either DTE or DCE devices.*

Viewing valid media types for an interface using tmsh

You can use `tmsh` to view the valid media types for an interface.

Note: *This platform might not support all of the media type options that are available in `tmsh`.*

1. Open the Traffic Management Shell (`tmsh`).

```
tmsh
```

2. Change to the network module.

```
net
```

The system prompt updates with the module name: `user@bigip01 (Active) (/Common) (tmos.net) #`.

3. Display the valid media types for a specific interface.

```
show running-config interface <interface_key> media-capabilities
```

Important: *In all Gigabit Ethernet modes, the only valid duplex mode is full duplex.*

The following is an example of the output you might see when you issue this command on interface 1.3:

```
net interface 1.3 {
  media-capabilities {
    none
    auto
    10T-FD
    10T-HD
    100TX-FD
    100TX-HD
    1000T-FD
    1000T-HD
  }
}
```

Valid media types

The following table lists the valid media types for the `tmsh interface` command.

Note: *This platform might not support all of the media type options that are available in `tmsh`.*

10BaseT half	100BaseTX full
10BaseT full	1000BaseLX full
10GBaseER full	1000BaseCX full

10GBaseLR full	1000BaseT half
10GBaseSR full	1000BaseT full
10GBaseT full	1000BaseSX full
10SFP+Cu full	auto
40GBaseSR4 full	none
40GBaseLR4 full	no-phy
100BaseTX half	

Network interface LED behavior

The appearance and behavior of the network interface LEDs on the platform indicate network traffic activity, interface speed, and interface duplexity.

RJ45 Copper interface LED behavior

The appearance and behavior of the RJ45 network interface LEDs indicate network traffic activity, interface speed, and interface duplexity.

Link	Speed LED	Activity LED
No Link	Not lit	Not lit
10Mbit/s, half duplex	Yellow blinking	Yellow solid
10Mbit/s, full duplex	Yellow blinking	Green blinking
100Mbit/s, half duplex	Yellow solid	Yellow blinking
100Mbit/s, full duplex	Yellow solid	Green blinking
1Gbit/s, half duplex	Green solid	Yellow blinking
1Gbit/s, full duplex	Green solid	Green blinking

SFP port LED behavior

The appearance and behavior of the SFP optic interface LEDs indicate network traffic activity, interface speed, and interface duplexity.

Link	Speed LED	Activity LED
No link	Not lit	Not lit
10 Mbit/s, half duplex	Yellow blinking	Yellow solid
10 Mbit/s, full duplex	Yellow blinking	Green blinking
100 Mbit/s, half duplex	Yellow solid	Yellow blinking
100 Mbit/s, full duplex	Yellow solid	Green blinking
1 Gbit/s, half duplex	Green solid	Yellow blinking
1 Gbit/s, full duplex	Green solid	Green blinking

Optical transceiver specifications

For current specification information for optical transceivers that are supported by this platform, see *F5[®] Platforms: Accessories*.

Cable pinout specifications

The following pinouts describe how specified connectors are wired. Pinouts are helpful when building and testing connectors, cables, and adapters.

RJ-45 connector pinouts for the console port

This table lists the pinouts for the RJ-45 console (upper) port.

Pin number	Name
1	RTS
2	DTR
3	TX
4	GND
5	GND
6	RX
7	DSR (no connect)
8	CTS

RJ-45 connector pinouts for the failover port

This table lists the pinouts for the RJ-45 failover (lower) port.

Pin number	Name
1	RTS
2	DTR
3	CTS
4	GND
5	GND
6	DSR
7	TX
8	RX

Always-On Management

The Always-On Management (AOM) subsystem enables you to manage the BIG-IP® system remotely using SSH or serial console, even if the host is powered down. The AOM Command Menu operates independently of the BIG-IP Traffic Management Operating System® (TMOS).

You can use the command menu to reset the unit if TMOS® has locked up, or get access to TMOS directly, so that you can configure it from the command line interface.

AOM consists of the host console shell (hostconsh) and the AOM Command Menu, which contains the options for AOM.

Note: The available functionality and options in AOM vary depending on the platform type.

AOM Command Menu options

The AOM Command Menu provides Always-On Management options for the BIG-IP system.

Number/Letter	Option	Description
1	Connect to Host subsystem console	Exits the AOM Command Menu and returns to terminal emulation mode.
2	Reboot Host subsystem (sends reboot command)	Reboots the host subsystem. In this case, the Traffic Management Operating System (TMOS) is rebooted.
3	Reset Host subsystem (issues hardware reset--USE WITH CARE!)	Resets the host subsystem. In this case, TMOS is halted. <i>Important: We do not recommend using this option under normal circumstances. It does not allow for graceful shutdown of the system.</i>
4	Reset AOM subsystem (issues hardware reset--USE WITH CARE!)	Resets the AOM subsystem. In this case, the system is reset with a hardware reset. <i>Important: We do not recommend using this option under normal circumstances. It does not allow for graceful shutdown of the system.</i>
5	Power off/on Host subsystem (issues hardware shutdown--USE WITH CARE!)	Powers off the Host subsystem. In this case, TMOS is powered off. If the Host subsystem is already powered off, this option powers on the Host subsystem.
B	AOM baud rate configurator	Configures the baud speed for connecting to AOM using the serial console.
L	AOM subsystem login	Presents a logon prompt for the AOM subsystem. This subsystem cannot be configured by end users.
N	AOM network configurator	Runs the AOM network configuration utility. This utility enables you to reconfigure the IP address, netmask, and default gateway used by AOM. If you use this option while connected using SSH, your session will be disconnected as a part of the network configuration operation.

Number/Letter	Option	Description
P	AOM platform information	Displays information about the platform, including serial number and MAC address.

Accessing the AOM Command Menu from the serial console

You can access the AOM Command Menu through the host console shell (hostconsh) using the front panel serial console.

1. Connect to the system using the serial console.
2. Open the AOM Command Menu.

`Esc (`

Setting up Always-On Management SSH access

You can use the AOM Command Menu to set up remote SSH access to the system and then connect remotely using an SSH client.

1. Connect to the system using the serial console.
2. Open the AOM Command Menu.
`Esc (`
3. Type `n` to open the AOM network configuration utility.
4. Configure an IP address and gateway for the AOM subsystem.

Accessing the AOM Command Menu using SSH

You can access the AOM Command Menu through the host console shell (hostconsh) remotely through SSH, provided you have configured an IP address for AOM.

1. Open an SSH session, where `<ip addr>` is the IP address that you configured for AOM:

```
ssh root@<ip addr>
```

2. Type the root password.
3. Open the hostconsh shell.

```
hostconsh
```

4. Open the AOM Command Menu.

```
Esc (
```

Chapter 2

Platform Installation

- *About platform installation*
- *Determining which rack mounting kit to use*
- *About general recommendations for rack mounting*
- *About the front-mounting kit*
- *About the quick-install rail kit*
- *Installing the rail lock brackets*
- *About grounding the platform*
- *Connecting the cables and other hardware*
- *Configuring a management IP address*
- *Licensing the platform*

About platform installation

After you have reviewed the hardware requirements and become familiar with the 8950 platform, you can install the unit.

Determining which rack mounting kit to use

The 8950 platform comes with two types of rack mounting kits: stationary front-mounting and sliding rail-mounting. An advantage of installing the sliding rail-mounting kit is that you can then slide the unit in and out of the rack as needed.

The tasks required to install the platform differ depending on the type of rack mount you decide to use or which type of cabinet unit you are installing into (single two-post cabinet or four-post cabinet).

About general recommendations for rack mounting

Although not required, a 1U space between units makes it easier for you to remove the unit from the rack if that the unit requires service. A 1U space between units also provides additional cable routing options.

Leaving at least 100 mm spacing from the front panel of the unit to the rack front or rack door provides enough room for you to route the cables without excessive bending or insulation damage.

A shelf or similar device is required to support the unit if only one person is installing the unit.

Caution: To prevent personal injury or damage to the unit, F5 Networks strongly recommends that at least two people perform the installation.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.

About the front-mounting kit

You can use the front-mounting kit if you are installing into a two-post rack.

Front-mounting kit hardware

The front-mounting kit includes these parts.

Quantity	Hardware
2	front-mounting brackets
8	M4 x 10mm flat head screws

Installing using a front-mounting kit

Before you install this platform, review the environmental guidelines to make sure that you are installing and using the platform in the appropriate environment.

This platform includes front-mounting brackets, which you can use to attach the unit directly to the rack.

1. Align the bracket's keyhole slots with the PEM fasteners on the side of the unit.
2. Slide the bracket toward the front of the unit to lock the bracket into place.

Note: You must secure the bracket to the unit using four of the flat head screws provided with the platform.



3. Repeat steps 1 and 2 for the other bracket.
4. Secure the front-mounting brackets to the rack using eight rack manufacturer-provided screws. The unit must be securely fastened to the rack to provide adequate stability and to prevent the unit from falling out of the rack.



5. Attach the front bezel to the unit by grasping the bezel on either side using the indentations provided.

Note: Failure to use the indentations could result in pinched fingers.

If the rack you have does not provide adequate support for the unit, you might need a shelf kit. We recommend that you use a shelf kit created by the rack manufacturer, if available.

About the quick-install rail kit

Use the quick-install rail kit if you want to be able to slide the unit in or out of the rack for maintenance activities.

The kit includes the following hardware:

- two rails (left and right)
- eight #8-32 thumb screws

The rails snap into place in the rack, and no tools are required to install a platform using this kit. The rails are optimized for installation into square hole cabinets, but they can be installed in other cabinet styles, such as round hole cabinets, using the screws provided. The rails are easily converted to mount to either cabinet style.



Figure 4: Quick-install rail kit

For information about installing the platform using the quick-install rail kit, see the instruction guide provided by the manufacturer, which is included with the kit hardware.

***Note:** Before you install this platform, review the environmental guidelines to make sure that you are installing and using the platform in the appropriate environment.*



Figure 5: An example of a platform installed using the quick-install rail kit

After installing the platform, you should secure it to the rack using the included rail locks. You should also attach the front bezel to the unit by grasping the bezel on either side using the indentations provided.

Installing the rail lock brackets

The rail lock brackets help secure a rail kit-mounted platform to the rack.

1. Attach the rail lock brackets to each side of the unit using the rail lock screws that are included in the kit.



2. Secure the rail lock brackets to the rack on each side of the unit using either a rack manufacturer-provided screw or one #10-32 and one #8-32 screw provided with the kit per side.

The #8-32 screw goes through the bottom hole on the bracket, and the #10-32 screw goes through the top hole.

Use 6 to 7 inch-pounds (0.7 to 0.8 Newton-meters) of torque on these screws.



About grounding the platform

You should ground the platform after you install it in a rack. The chassis ground lug is located on the back of the platform.

Do not secure multiple bonding or grounding connectors with the same bolt. The grounding connectors do not need to be removed to perform service or installation procedures. You can connect other bonding or grounding conductors to a grounding connector provided a reliable bond between the connector and the equipment is not disturbed during installation, service, or maintenance of the platform.

Important: All copper grounding cable compression-type terminal lugs used for grounding must meet all appropriate UL standards.

Note: The platform must be grounded to a common bonding network (CBN).



Figure 6: Chassis ground lug

Connecting the ground lug to the ground terminal

After the unit is installed in the rack and before you provide power to the system, you need to connect the grounding hardware.

1. Attach a two-hole grounding terminal lug to 12 AWG copper ground wire.
2. Install the M6 Keps nuts on the ground terminal lugs.
Use 60 to 70 inch-pounds (6.8 to 8.0 Newton-meters) of torque on these Keps nuts.
3. Connect the ground wire to a common bonding network (CBN).

Connecting the cables and other hardware

After you have installed the unit into the rack, connect the cables and other hardware.

1. Connect an Ethernet cable to the MGMT port if you are using the default network configured on the management interface.

Note: For EMI compliance, shielded cables are required for the MGMT port.

2. Connect the serial console cable supplied by F5[®] Networks to the CONSOLE port.

Important: In the event that network access is impaired or not yet configured, the serial console might be the only way to access the unit. F5 Networks recommends that you perform all installations and upgrades using the serial console, as these procedures require reboots, in which network connectivity is lost temporarily.

Note: The default baud rate is 19200,n,8,1.

3. For AC-powered systems, connect the power cable to the power input panel, and then connect the cable to the power source. For DC-powered systems, wire the DC power terminal block and connect the power supply to a DC power source.

4. Connect the serial failover cable to the failover port on each unit if you plan to set up device service clustering (DSC™) with hard-wired failover capacity.
For more information about configuring failover, see *BIG-IP® Device Service Clustering: Administration*.
5. If you have not already done so, power on the unit.

You can now assign a management IP address to the system, and then license and provision the software.

Optionally, you should run the latest version of the qkview utility. This utility collects configuration and diagnostic information about your system into a single file that you can provide to F5 Technical Support to aid in troubleshooting. For more information, see <http://support.f5.com/kb/en-us/solutions/public/1000/800/sol11858.html>.

Configuring a management IP address

You can use the LCD panel to configure the management IP address. The management IP address enables you to access the Configuration utility to configure other aspects of the product, such as the product license, VLANs, and trunks. The options are located in the System menu.

Note: When using the LCD panel to configure the unit, be sure to use the Commit option to save all settings.

1. Press the X button to activate Menu mode for the LCD.
2. Use the arrow keys to select **System**, and then press the Check button.
3. Press the Check button to select **Management**.
4. Press the Check button to select **Mgmt IP**.
5. Enter your management IP address using the up and down arrow keys, and then press the Check button.
6. Use the arrow keys to select **Mgmt Mask**, and then press the Check button.
7. Enter the netmask using the up and down arrow keys, and then press the Check button.
8. Use the arrow keys to select **Mgmt Gateway**, and then press the Check button.
9. Enter your default route using the up and down arrow keys, and then press the Check button. If you do not have a default route, enter 0.0.0.0.
10. Use the arrow keys to select **Commit**, and then press the Check button.
11. Press the Check button to select **OK**.

Licensing the platform

After the management IP address is configured for the platform, you can use the browser-based Configuration utility to license the appropriate BIG-IP software.

1. Using a Web browser, navigate to the management IP address that you assigned to the platform.
Use the following format where *<mgmt_ip_address>* is the management IP address you assigned:
`https://<mgmt_ip_address>`
2. Type `admin` as the user name and `admin` as the password.
If this is the first time you have accessed the Configuration utility, the first screen you see is the License screen.

3. Follow the instructions in the Configuration utility to license the platform.
For more information about licensing the system, click the Help tab.

Chapter

3

Platform Maintenance

- *About platform maintenance*
 - *About AC power supplies*
 - *About DC power supplies*
 - *About the fan tray*
 - *About the hard disk drives*
-

About platform maintenance

The 8950 platform contains several components that can be replaced individually without exchanging the entire system. This platform contains the following replaceable components:

- AC power supply
- DC power supply
- Fan tray
- Hard drive

About AC power supplies

BIG-IP® platforms can support up to two AC power supplies. Some platforms come with only one power supply by default. You can hot swap power supplies if there are two installed in your system.



Figure 7: A power supply partially removed from the platform

The platform supports power redundancy, which ensures that the system is unaffected if a single power supply fails in a system containing more than one power supply.

Caution: *Running without power supplies installed in all available bays in the platform can affect cooling and electromagnetic interference (EMI). If you need to run the unit with fewer power supplies, you must install a blank supply bracket into any empty power supply bays. The blank supply bracket is required to maintain proper airflow in the system. If you do not have a blank supply bracket, leave all supplies installed and unplug any unused power supplies.*

Caution: *As a safety precaution, the socket outlet must be installed near the equipment and be easily accessible.*

Important: *This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

Important: F5 Networks strongly recommends that you use only one power supply type (AC or DC) in a platform.

Note: Depending on the model and revision of the power supply, you might need either a Phillips or a slotted screwdriver to replace the power supply.

Installing an AC power supply

In the event of a power supply failure, you can replace an AC power supply without powering down the system, provided that there is at least one power supply operating during the replacement process.

1. Disconnect the AC power cord or DC terminal block from the power supply.
2. Loosen the power supply screw by turning it counterclockwise with an appropriate screwdriver, if necessary.

Note: The screw that holds the ejector handle in place is captive and cannot be removed from the assembly.



3. Grasp the ejector handle and rotate it downward to eject the power supply from the system.



4. Remove the power supply from the system by pulling straight toward you.
5. Ensure that the latch on the new power supply is in the down position and slide the power supply into the power supply slot until the latch engages.
6. Rotate the latch upward to fully seat the power supply.
7. Tighten the screw into place.
The power supply is connected to the system when you tighten the screw completely.
8. Attach the power cord to the new power supply.
9. Ensure that the power switch, located on the power supply next to the screw, is in the ON position.

About DC power supplies

The BIG-IP® platforms support DC power supplies. You can hot swap power supplies if there are two installed in your system. The DC power supply does not have an on/off switch. You can control the power from the rack switch or the DC power source.

The DC power supply includes a DC terminal block that connects the power supply to the DC power source.

The platform supports power redundancy, which ensures that the system is unaffected if a single power supply fails in a system containing more than one power supply.



Figure 8: The 8950 platform DC power supply and terminal block

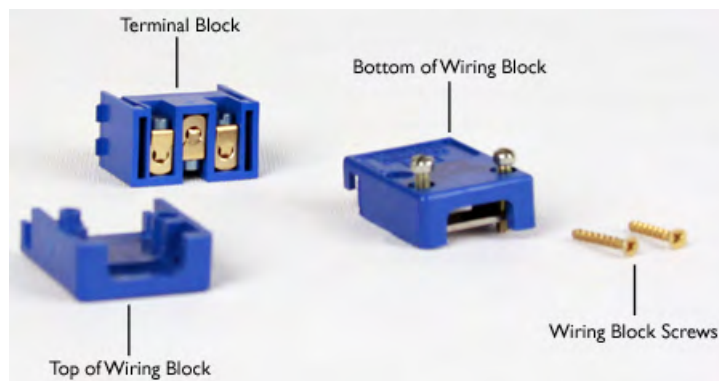


Figure 9: DC terminal block components

Caution: Before installing a DC power supply, be sure that the DC power source for the rack is powered off.

Caution: Running without power supplies installed in all available bays in the platform can affect cooling and electromagnetic interference (EMI). If you need to run the unit with fewer power supplies, you must install a blank supply bracket into any empty power supply bays. The blank supply bracket is required to maintain proper airflow in the system. If you do not have a blank supply bracket, leave all supplies installed and unplug any unused power supplies.

Caution: Before you begin to work with one of these platforms, refer to the DC-powered equipment environmental warnings for this platform and review any safety requirements for the facilities where the DC-powered platforms will be installed.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.

Important: The platform must be installed in a RESTRICTED ACCESS LOCATION, such as a central office or customer premises environment.

Note: All copper grounding cable used for grounding must meet all appropriate UL standards.

Note: You should coat bare conductors with an appropriate antioxidant compound before you make crimp connections. You should bring all unplated connectors, braided strap, and bus bars to a bright finish and then coat them with an antioxidant before you connect them.

Note: The platform must be grounded to a common bonding network (CBN).

Note: The battery return terminals on the platform are in an isolated DC return (DC-I) configuration.

Wiring the DC power supply terminal block

You will need the following tools to assemble and wire the DC terminal block:

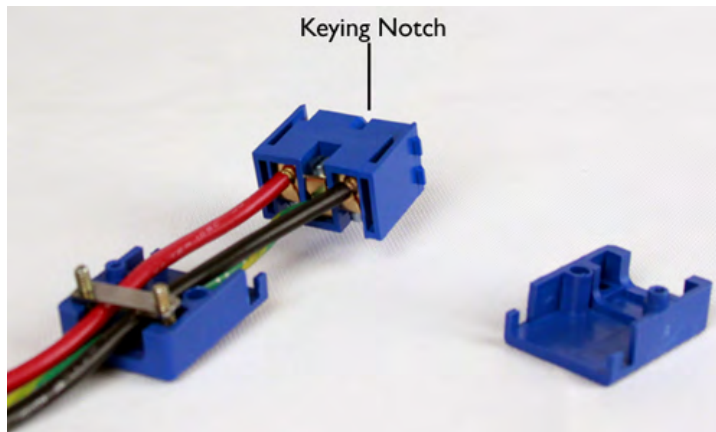
- Wire stripping tool
- Small Phillips screwdriver
- Small flat head screwdriver

The DC power supply for the 8950 platform includes a DC terminal block. You connect the wires to the terminal block and then insert the terminal block into the DC power supply.

1. Review the DC power supply label and determine the correct wire size for your installation.
2. Use the wire stripping tool to remove 3/8 inch (9.56 mm) of insulation.

Important: Be sure to remove the appropriate amount of insulation from each wire. If you remove too much insulation, exposed wire protruding from the terminal block can create an electrical hazard. If you do not remove enough insulation, the wire might not make proper contact with the terminal.

3. Thread the wires through the bottom of the terminal block, with the positive DC wire (typically red) on the left, the chassis ground wire in the middle, and the negative DC wire (typically black) on the right. Note the orientation of the keying notch on the terminal block. When the keying notch is up, the positive terminal is on the left.



4. Insert each exposed wire into the appropriate connector on the terminal block.
If necessary, use a small flat head screwdriver to loosen the screws above the openings in the terminal block to open the terminal connectors.
5. Attach the wired half of the terminal block to the other half of the terminal block, and then connect the top of the terminal block until the two halves click into place.
6. Tighten the wire clamp screws on the bottom of the terminal block using a small flat head screwdriver.
7. Insert the two gold screws that are provided with the DC power supply kit into the top and bottom of the terminal block, and then use a Phillips screwdriver to secure the two halves.



Installing a DC power supply

After you have assembled and wired the terminal block, you can install the DC power supply into the platform and connect the platform to the DC power source. The DC power supply does not have an on/off switch. You can control the power from the rack switch or the DC power source.

Important: When you connect the DC power source, F5 Networks recommends that you follow the safety requirements defined for the facilities where the DC-powered platforms will be installed.

1. Make sure that the power from the DC power source is off.
2. Ensure that the terminal block is not connected to the power supply before adding it to the unit.
3. Remove the existing AC or DC power supply, if one is installed.
 - a) Disconnect the AC power cord or DC terminal block from the power supply.
 - b) Loosen the power supply screw by turning it counterclockwise with an appropriate screwdriver, if necessary.

Note: The screw that holds the ejector handle in place is captive and cannot be removed from the assembly.



- c) Grasp the ejector handle and rotate it downward to eject the power supply from the system.



- d) Remove the power supply from the system by pulling straight toward you.
 e) Ensure that the latch on the new power supply is in the down position, and then slide the power supply into the power supply slot until the latch engages.
 f) Rotate the latch upward to fully seat the power supply.
 g) Tighten the screw into place.

Use 4 to 5 inch-pounds (0.45 to 0.56 Newton-meters) of torque on the screw. The power supply is connected to the system when you tighten the screw completely.

4. Loosen the power supply screw on the DC power supply by using an appropriate screwdriver, if necessary.
5. Slide the DC power supply into the power supply slot.
6. Connect the terminal block that you assembled earlier to the DC power source and be sure to connect the ground wire to a common bonding network (CBN).
7. Power on the DC power source.

If the system does not boot after you power on the DC power source, press the Check button on the LCD panel to begin booting the system.

About the fan tray

The 8950 platform has a removable fan tray that is designed to maintain airflow throughout the chassis. You can change or replace the fan tray as part of the routine maintenance of the unit, or in the event of a fan failure. The fans in the fan tray run constantly while the unit is on. Over time, the fans can wear out, requiring you to replace the fan tray.

Important: This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.



Figure 10: An example of a fan tray in a platform

Replacing the fan tray

You do not need special tools to replace the fan tray. You do not need to power down the unit when replacing the fan tray; however, F5 Networks highly recommends that you do not leave the unit operating without a fan tray for longer than 30 seconds.

Caution: *Operating the unit without a fan tray for more than 30 seconds might cause permanent damage.*

1. Stand at the back of the platform and locate the ejector handle on the fan tray.
2. Loosen the fan tray screws by turning them counterclockwise with a Phillips screwdriver, if necessary.

Note: *The screws that hold the ejector handle in place are captive and cannot be removed from the assembly.*

3. Grasp the ejector handle and rotate it downward to eject the fan tray from the system.
4. Remove the fan tray from the system by pulling straight toward you.
5. Ensure that the handle on the new fan tray is in the down position and slide the fan tray into the fan tray slot until the latch engages.
6. Rotate the handle upward to fully seat the fan tray.
7. Tighten the screws into place.

The fan tray is connected to the system when you tighten the screws completely. Once seated, the fan tray automatically powers up and begins circulating air through the chassis.

About the hard disk drives

The BIG-IP® 8950 platform has two hot swappable hard disk drives (HDDs). You can change or replace the drives as part of routine maintenance of the unit or in the event of a drive failure.

About hard disk drive replacement on an 8950 platform

The 8950 platform supports hard disk drive mirroring using RAID. You can install the replacement drive that you received from F5® into the system.



Figure 11: The front of a platform with front bezel removed and the orientation of the drive bays

1. Drive bay 1
2. Drive bay 2



Figure 12: An example of a hard disk drive shown partially removed from the system

Identifying the faulty hard disk drive

To access the hard disk drives (HDDs), you must first remove the bezel from the unit.

Before you remove the hard disk drive from the system, you should first identify the faulty drive.

1. Open the Traffic Management Shell (tmsh).
2. View the status of the drives:

```
tmsh show sys raid
```

A disk summary similar to the following displays:

```
Sys::Raid::Array: MD1
-----
Size (MB)  305245

Sys::Raid::ArrayMembers
Bay ID  Serial Number  Name  Array Member  Array Status
-----
1       WD-WCAT1E477614  HD2   yes           failed
2       WD-WCAT1E420107  HD1   yes           ok

Sys::Raid::Bay: 1
-----
Name      Serial Number  Array Member  Array Status
HD2      WD-WCAT1E477614  yes          failed
```

```
Sys::Raid::Bay: 2
```

```
-----
Name      Serial Number      Array Member      Array Status
HD1       WD-WCAT1E420107    yes               ok
```

```
Sys::Raid::Disk
```

```
-----
Name      Serial Number      Array Member      Array Status
CF1       C932427402720909XX02  no               undefined
HD1       WD-WCAT1E420107    yes               ok
HD2       WD-WCAT1E477614    yes               failed
```

3. Make note of the bay number and serial number for the faulty hard disk drive.

Note: You can also locate the last seven digits of the serial number on the front of the drive. The serial number is printed in its entirety on the labels, on top of the drive.

4. Before you physically remove the hard disk drive from the system, type the following command to remove the faulty hard disk drive (HD2 in the example) from the array:

```
tmsm modify sys raid array MD1 remove HD2
```

5. (Optional) To ensure that you remove the correct drive, you can make the LED blink for that bay (bay 1 in the example).

```
tmsm modify sys raid bay 1 flash-led
```

The LED continues to blink until the new hard drive begins the replication process.

Note: If the drive is no longer responsive, the LED might not blink.

Next, you can physically remove the hard disk drive and replace it with the new one that you received from F5 Networks. You do not have to power down the system before you remove the hard disk drive.

Replacing a hard disk drive

After you have identified and removed the faulty hard disk drive (HDD) from the platform, you can install the replacement drive that you received from F5®.

1. Remove the front bezel from the unit.
2. Verify the location of the faulty hard disk drive by comparing the serial number and drive bay that you noted earlier.

Note: The last seven digits of the serial number are printed on the front of the hard disk drive, behind the metal grille.

Note: The STAT LED for the failed hard disk drive will be lit solid amber.

3. Remove the faulty hard disk drive:
 - a) Loosen the hard disk drive screw by turning it counterclockwise with an appropriate screwdriver, if necessary.

Note: The screw that holds the ejector handle in place is captive and cannot be removed from the assembly.

- b) Grasp the ejector handle and pull straight toward you to eject the hard disk drive from the system.
4. Slide the new hard disk drive into the empty hard drive bay.

5. Tighten the screw into place.

Use 4 to 5 inch-pounds (0.45 to 0.56 Newton-meters) of torque on the screw. The hard disk drive is connected to the system when you tighten the screw completely.

6. Type the following command to see the status of the hard disk drives:

```
tmsh show sys raid disk
```

A disk summary similar to the following displays:

```
Sys::Raid::Disk
Name  Serial Number          Array Member  Array Status
-----
CF1   C932427402720909XX02  no           undefined
HD1   WD-WCAT1E420107       yes          ok
HD2   WD-WCAT10944438       yes          undefined
```

The status of the replacement hard disk drive is undefined, and the serial number should match that of the replacement drive.

Note: *If after a few seconds, you do not see the recently-added hard disk drive in the disk summary, the drive might not be seated properly. If this occurs, remove and reinsert the hard disk drive.*

7. Add the replacement drive (HD2 in the example) to the array by typing the following command:

```
tmsh modify sys raid array MD1 add HD2
```

The status of the replacement drive should change to replicating, and the STAT LED should change to solid green. The replication process typically takes between 15 and 45 minutes.

8. Attach the front bezel to the unit by grasping the bezel on either side using the indentations provided.

Note: *Failure to use the indentations could result in pinched fingers.*

Appendix

A

Environmental Guidelines

- *General environmental and installation guidelines*
- *Guidelines for AC-powered equipment*
- *Guidelines for DC-powered equipment*
- *Platform airflow diagram*

General environmental and installation guidelines

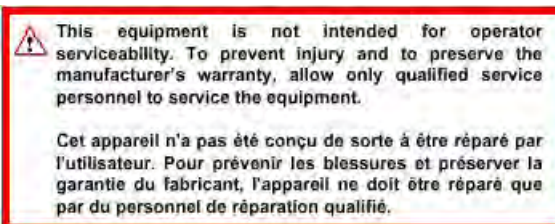
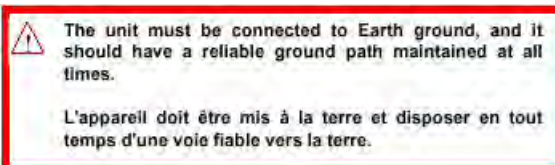
The 8950 platform is an industrial network appliance that is designed to be mounted in a standard 19-inch EIA rack. Follow these guidelines to adhere to safety precautions:

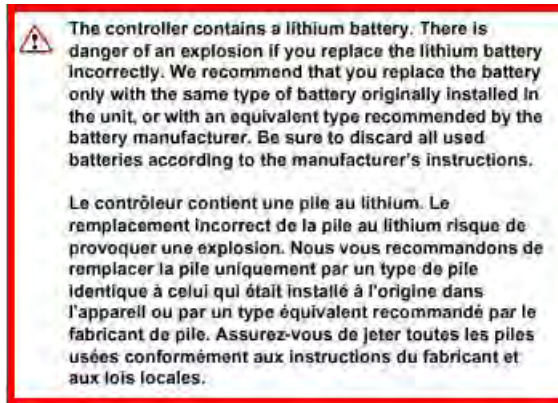
- Install the rack according to the manufacturer's instructions and check the rack for stability before placing equipment in it.
- Build and position the rack so that once you install the platform, the power supply and the vents on both the front and back of the unit remain unobstructed. The platform must have adequate ventilation around the unit at all times.
- Although not required, a 1U space between units makes it easier for you to remove the unit from the rack in the event that the unit requires service. A 1U space between units also provides additional cable routing options.
- Leaving at least 100 mm of space from the front panel of the unit to the rack front or rack door provides enough room for you to route the cables without excessive bending or insulation damage.
- Do not allow the air temperature in the room to exceed 104°F (40°C).
- Do not plug the unit into a branch circuit shared by more electronic equipment than the circuit is designed to manage safely at one time.

Important: *This product is sensitive to electrostatic discharge (ESD). F5 Networks recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

Caution: *Customers should not attempt to replace batteries. There is a risk of explosion if a battery is replaced with an incorrect type. Field technicians should dispose of used batteries according to the instructions.*

Attention: *Il y a risque d'explosion si la batterie est remplacée par une batterie de type incorrect. Mettre au rebut les batteries usagées conformément aux instructions.*





Guidelines for AC-powered equipment

An AC-powered installation must meet the following requirements:

- Use a 20 amp external branch circuit protection device to install the unit.
- Use one power feed for each individual power supply.

Important: *The platform must be installed in a RESTRICTED ACCESS LOCATION, such as a central office or customer premises environment.*

Note: *The following guidelines apply to STATIONARY PLUGGABLE EQUIPMENT TYPE A with simultaneous multiple connections to the AC MAINS SUPPLY:*

- The building installation shall provide a means for connection to protective earth; and
- The equipment is to be connected to that means; and
- A SERVICE PERSON shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective earthing terminal to the protective earth wire in the building.

Note: *High leakage current. Earth connection essential before connecting supply.*

Guidelines for DC-powered equipment

A DC-powered installation must meet the following requirements:

- Use a 25 amp external branch circuit protection device to install the unit.
- For permanently connected equipment, incorporate a readily accessible disconnect in the fixed wiring.
- Use only copper conductors.
- Ground the cabling for the system on both sides.
- Use one power feed for each individual power supply.

 Install DC powered equipment only in restricted access areas, such as dedicated equipment rooms, equipment closets, or similar locations.

Installer le matériel alimenté par courant continu uniquement dans des zones à accès réglementé, telles que des salles de matériel, des armoires de matériel ou tout emplacement similaire.

Platform airflow diagram

The platform employs a negative pressure fan system, which draws cold air in from the front of the chassis and exhausts hot air out the back of the chassis.

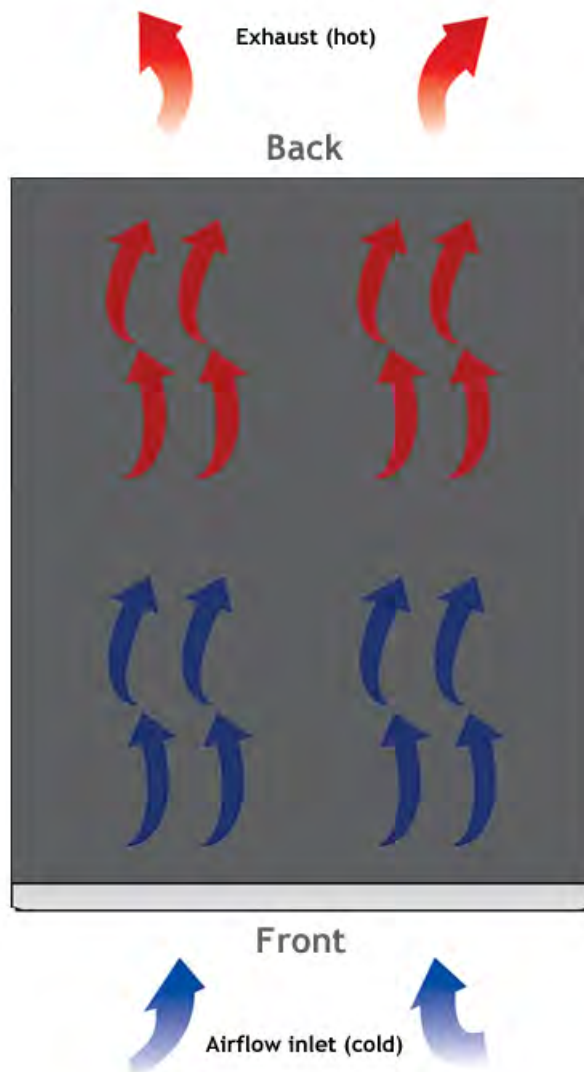


Figure 13: Airflow in the 8950 platform

Appendix

B

Platform Specifications

- *General specifications for system features*
- *Platform hardware specifications*
- *Platform environmental operating specifications*
- *Platform power specifications*
- *Safety requirements*
- *EMC requirements*
- *Acoustic, airflow, and altitude specifications*

General specifications for system features

This table lists general specifications for BIG-IP® system features for the 8950 platform.

Item	Specification
Server/Node operating system compatibility	Load balancing of any TCP/IP operating system: 32- and 64-bit Windows® operating systems; all UNIX® platforms; and Mac OS
Internet/Intranet protocol support	All TCP services, UDP, SIP, and SSL; nearly all IP-based protocols
Administrative environment support	DNS proxy, SMTP, SSH, SNMP, dynamic/static network monitoring, scheduled batch job processing, system status reports, and alarms event notification
Network management and monitoring	Secure SSL browser-based interface, remote encrypted logon and file transfer using SSH monitor, BIG-IP system network monitoring utilities and additional contributed software; SNMP gets and traps; iControl API using CORBA and SOAP/XML
Dynamic content support	ASP, VB, ActiveX, Java, VRML, CGI, Cool Talk, Net Meeting, Real Audio, Real Video, Netshow, QuickTime, PointCast, or any HTTP-encapsulated data
Device redundancy	Watchdog timer, failsafe cable (primary and secondary)
SFP hot swap	Support for hot swap of the SFP modules
Web server application compatibility	Any IP-based web or application server
Routing protocols	RIP, OSPF, and BGP with optional ZebOS Advanced Routing Modules

Important: Specifications are subject to change without notification.

Platform hardware specifications

This table lists hardware specifications for the 8950 platform.

Item	Specification
Dimensions	H: 3.5 inches (8.89 cm) x W: 17.75 inches (45.09 cm) x D: 20.75 inches (52.71 cm) (per unit) 2U industry standard rack-mount chassis
Weight	45.5 pounds (20.64 kg) with two power supplies, two hard drives, and bezel installed (per unit) <ul style="list-style-type: none"> • Front mount rack brackets add 1 pound (0.45 kg). • Quick install rail kit adds 5.5 pounds (2.27 kg). • Hard drives add 1.5 pounds (0.68 kg) each.

Item	Specification
Processor	2 x Quad-Core AMD Opteron® processors
Network interface	16 x 10/100/1000 copper ports 8 x 1000Base-X SFP fiber ports <ul style="list-style-type: none"> • 1000BASE-SX - 850 nm (LC connector, four modules included) • 1000BASE-LX - 1310 nm (LC connector, optional) • 1000BASE-T copper SFP (RJ45 connector, optional) • 10BASE-T, 100BASE-T, 1000BASE-T copper SFP (RJ45 connector, optional) 2 x 10GE SFP+ fiber ports <ul style="list-style-type: none"> • 10GBASE-SR – 850nm (LC connector, optional) 1 x 10/100/1000 Ethernet Management port
Hard drive capacity	2 x 320 GB
RAM	16 GB
AC power supply	2 x 850 W 90 - 125 VAC(+/- 10%) or 200 - 240 VAC(+/- 10%) AUTO Switching 2 x NEMA 5-15P power cords
DC power supply	2 x 850W DC Operating range: 44 to 72 VDC Minimum start up voltage: 44 VDC
<hr/> <i>Note: Power supply will not start below 44 VDC.</i> <hr/>	

Important: Specifications are subject to change without notification.

Important: F5 Networks only provides support for F5-branded optical modules.

Platform environmental operating specifications

This table lists platform environmental operating specifications.

Item	Specification
Operational temperature	32 to 104°F (0 to 40°C)
Operational relative humidity	10 to 90% (40°C)
Non-operational temperature	-40 to 158°F (-40 to 70°C)
Non-operational relative humidity	5 to 95% (40°C) non-condensing

Important: Specifications are subject to change without notification.

Platform power specifications

This table lists power specifications for the 8950 platform.

Item	Specification
Typical power draw (dual AC power supplies; 50% load; temp 25°C)	110VAC input: 419 W 220VAC input: 409 W
Typical power draw (dual DC power supplies; 50% load; temp 25°C)	48VDC input: 376 W
Maximum power draw (AC power)	220VAC input: 513 W
Maximum power draw (DC power)	48VDC input: 424 W
Typical heat generated (AC power)	110VAC input: 1431 BTU/hour 220VAC input: 1509 BTU/hour
Typical heat generated (DC power)	48VDC input: 1284 BTU/hour
Maximum heat generated (AC power)	1751 BTU/hour
Maximum heat generated (DC power)	1448 BTU/hour

Important: *Specifications are subject to change without notification.*

Safety requirements

This equipment complies with the following requirements of the Low Voltage Directive 2006/95/EC.

EC Type Examination Certificates:

EN 6090-1:2006+A11:2009

IEC 60950-1:2005, 2nd Edition

CB Scheme

UL 60950-1 2nd Edition, CSA C22.2 No. Master Contract 252302
60950-1-07

Important: *Specifications are subject to change without notification.*

EMC requirements

USA--FCC Class A, Canada--Industry Canada Class A

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This equipment may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

European Union

This equipment complies with the following requirements of the EMC Directive 2004/108/EC:

As Telecommunication Network Equipment (TNE) in Both Telecom Centers and Other than Telecom Centers per (as applicable):

Directive	Required Limits
ESTI EN 300 386 V1.3.3 (2005-04)	
EN 55022:2006 + C1:2006	Class A
EN 61000-3-2:2006	
EN 61000-3-3:1995 + A1:2001 + A2:2005	
IEC61000-4-2	6 kV (Direct), 8 kV (Air)
IEC61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz and 1400-2700 MHz
IEC61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines
IEC61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor Signal Lines > 10m
IEC61000-4-6	3 V
IEC61000-4-11	

As Information Technology Equipment (ITE) Class A per (as applicable):

EN 55024:1998 + A1:2001 + A2:2003	
EN 55022:2006 + C1:2006 Class A	Class A
EN 61000-3-3:1995 + A1:2001 + A2:2003	
EN 55024:1998 + A1:2001 + A2:2003	
IEC61000-4-2	4 kV (Direct), 8 kV (Air)
IEC61000-4-3	3 V/m
IEC61000-4-4	1 kV AC Power Lines, 0.5 kV Signal, and DC Power Lines
IEC61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines, 2 kV AC Line-Gnd, 0.5 kV DC Power Lines
IEC61000-4-6	3 V
IEC61000-4-11	

Important: Specifications are subject to change without notification.

Acoustic, airflow, and altitude specifications

This table lists acoustic levels, airflow movement, and operational altitude specifications for the 8950 platform.

Specification type	Detail	Units	Value
Acoustic ¹	Front	dBa	66
	Left	dBa	72
	Right	dBa	61
	Rear	dBa	64
	Top		67
Altitude ²	Operational	Feet	13,000
	Non-operational	Feet	40,000
Airflow ³	Open air	CFM	xx

Important: Specifications are subject to change without notification.

¹ All measurements taken at 0.6 meter with one power supply operational and fans at 75% duty cycle. Measurements recorded in Decibels A-weighting.

² Per BELCORE GR-63-CORE, section 4.1.3: This unit is functional when installed at elevations between 60m (197 feet) below sea level and 1800m (6000 feet) above sea level at the aisle ambient temperatures of 40°C.

³ Fan Tray airflow measurements taken at 100% duty cycle and in open air.

Appendix

C

China RoHS Requirements

- *Hazardous substance levels for China* |

Hazardous substance levels for China


This table shows how the F5 Networks® 8950 platform components conform to the Restriction of Hazardous Substances Directive (RoHS) standards for China.

6900/8900/8950 平台危害物质表
6900/8900/8950 Platform Hazardous Substance Table

部件名称 Part Name	有毒有害物质 Hazardous Substance					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	铬 6+ (Cr ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 Metal Parts	0	0	0	0	0	0
电源 Power Supplies	X	0	X	0	0	0
主板 Motherboard	X	0	0	0	0	0
散热器部件 Heatsink Assemblies	0	0	0	0	0	0
风扇装置 Fan Assembly	X	0	0	0	0	0
硬盘 Hard Drives	X	0	0	0	0	0

0: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006标准规定的限量要求以下
Expresses that this hazardous substance is below the specified limits as described in SJ/T 11363-2006.
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006标准规定的限量要求
(企业可在此处, 根据实际情况对上表中打“X”的技术原因进行进一步说明)
Expresses that this hazardous substance is above the specified limits as described in SJ/T 11363-2006.

除非另外特别的标注, 此标志为针对所涉及产品的环保使用期标志。某些零部件会有一个不同的环保使用期(例如, 电池单元模块)贴在其产品上。
此环保使用期限只适用于产品是在产品手册中所规定的条件下工作。
The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here, unless otherwise marked. Certain parts may have a different EFUP (for example, battery modules) and so are marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.



Appendix

D

Returned Material Data Security Statement

- *About returned material data security*
- *About memory technologies used in F5 equipment*
- *About removing data from F5 components*

About returned material data security

Follow these data security guidelines when returning equipment to F5® Networks for reprocessing or repair. The guidelines include reprocessing procedures and optional customer-end procedures.

About memory technologies used in F5 equipment

F5® Networks equipment contains volatile, battery-backed volatile, and non-volatile memory. Volatile memory loses all traces of data on power down. Battery-backed volatile memory retains data as long as battery charge is maintained. Non-volatile memory retains data indefinitely.

Volatile memory

Volatile memory loses all traces of data on power down; therefore, customer data that is stored in volatile memory is secure when power is removed from the platform. No further action is required by customers for equipment that includes volatile memory.

Battery-backed volatile memory

This F5® platform contains a coin battery for maintaining BIOS settings and the system clock. All data maintained by the coin battery is used only for system specific tasks. No customer data is maintained by the battery-backed volatile memory. No further action is required by customers for equipment that includes volatile memory.

Non-volatile memory

F5® platforms include various non-volatile memory components. These non-volatile memory components can be categorized as either user inaccessible or user accessible.

Inaccessible non-volatile memory components are programmed during manufacture or software installation. The data stored in user inaccessible non-volatile memory is used for setting voltage levels, determining the sequence of operational events, and the managing appliance operational condition. Data held within user inaccessible, non-volatile memory represents no data security risk to customers. User inaccessible, non-volatile memory cannot be modified by appliance users, and therefore, contains no customer data.

Inaccessible non-volatile memory

This table lists the inaccessible non-volatile memory in this system.

Description	Data	Customer data
Programmable firmware stores	Firmware	No
Switch Card SEEPROM	Platform ID, serial number, part number, and so on.	No

Description	Data	Customer data
PHY EEPROMs	PHY MAC address	No

Accessible non-volatile memory

This table lists the accessible non-volatile memory in this system. Not all platform variants include all of these non-volatile memory items.

Description	Data	Customer data	Data security method
Hard disk drive (HDD)	F5 [®] product software, customer configuration, and log files	Yes	Standard reprocessing or customer removal
Solid-state drive (SSD)	F5 product software, customer configuration and log files	Yes	Standard reprocessing or customer removal
Removable CompactFlash (CF) card	F5 product software, customer configuration	Yes	Standard reprocessing or customer removal
Always-On Management (AOM) Flash chip (soldered-down flash chip)	AOM boot code and customer custom configuration	Yes	Standard reprocessing or customer action
FIPS card (if present)	FIPS security domain and private keys	Yes	Standard reprocessing or customer action

About removing data from F5 components

For components that contain sensitive customer data and cannot be removed from your F5[®] Networks system, you can take optional steps to remove the data from these components before you return the system to F5 for processing.

Removing sensitive data from storage drives

The hard disk drive (HDD) and solid-state drive (SSD) components included in F5[®] platforms might include sensitive customer data. If you purchase the HDD removal SKU, you can remove the HDD/SSD, CompactFlash (CF), and coin battery, and these components will be replaced during F5 reprocessing. Otherwise, HDD, SSD, and CF components are processed by F5 through standard processing. You can perform a disk erase operation on your system to remove sensitive customer data.

Perform a disk erase operation using one of these methods:

- On systems running BIG-IP[®] software version 11.6.0 and later, you can use the F5 Disk Erase utility to remove all data on hard disk drives (HDDs) or solid-state drives (SSDs) using a single-pass, zero write disk erase operation. For more information, see <http://support.f5.com/kb/en-us/solutions/public/15000/500/sol15521.html>.
- On systems running earlier versions of BIG-IP software, you can create and use a bootable USB drive to rebuild the system with a clean image of BIG-IP software. This runs a disk erase operation

and removes the master boot record (MBR). For more information see <http://support.f5.com/kb/en-us/solutions/public/13000/100/sol113164.html>.

Removing IP address data from Always-On Management

If you have configured an IP address for the Always-On Management (AOM) subsystem, you can remove the customized IP address from the system before returning it to F5® Networks.

1. Connect to the system using the serial console.
2. Open the AOM Command Menu.
`Esc (`
3. Assign a new management IP address, netmask, and gateway:
 - To use DHCP to assign the addresses, type `y` when prompted about using DHCP.
 - To manually assign the addresses, type `n` when prompted about using DHCP. At the prompts, type values for IP address (required), netmask (required), and gateway (optional).

A confirmation message displays the configured management IP address, netmask, and gateway.
4. (Optional) Type `i` to verify the assigned addresses.

Removing sensitive data from an internal hardware security module (HSM)

You can remove the sensitive customer data from the hardware security module (HSM) installed in the system before returning it to F5® Networks.

Note: *The HSM cannot be removed from the platform.*

1. Use the Configuration utility to delete all key/certificate pairs.
 - a) On the Main tab, click **System > File Management > SSL Certificate List**. This displays the list of certificates installed on the system.
 - b) Select the certificates that you want to delete and click **Delete**.

This removes all `.crt`, `.exp`, and `.key` files from the system.

2. Log on to the command line of the system using an account with root access.
3. Initialize the HSM and reconfigure it using fictitious data.
`run util fips-util -f init`

Important: *This deletes all keys and makes any previously exported keys unusable.*

Index

A

- acoustic specifications *52*
- AC-powered equipment
 - guidelines *45*
- AC power supply
 - about *32*
 - hot swapping *32*
- administrative environment support *48*
- airflow specifications *52*
- Alarm LED
 - behavior *13*
- alerts
 - clearing *12*
 - defining custom alerts *14*
- altitude specifications, operational *52*
- Always-On Management
 - setting up remote SSH access *21*
- Always-On Management (AOM)
 - hostconsh *20*
- AOM, See Always-On Management (AOM).
- AOM Command Menu
 - 20*
 - accessing using serial console *21*
 - accessing using SSH *21*
 - options for *20*
- AOM IP address data
 - removing *58*
- Authorization requests screen *10*
- Auto-MDI/MDIX *16*

C

- cables
 - connecting *28*
- CD/DVD-ROM drives
 - support for *9*
- chassis
 - DC power supplies *36*
- chassis ground
 - location of *8*
- chassis ground wire *35*
- Check button
 - clearing alerts *12*
 - for power on *12*
- China material content listing, See China RoHS Directive standards.
- China RoHS Directive standards *54*
- clear alert operation *12*
- Configuration utility
 - licensing the platform *29*
- cooling system
 - platform *46*
- CPU usage screen *10*

D

- data communications equipment (DCE) *16*

- data terminal equipment (DTE) *16*
- Date and Time screen *10*
- DC-powered equipment
 - guidelines *45*
- DC power supply
 - connecting the DC power source *36*
 - hot swapping *34*
 - terminal block *35*
 - wiring the DC power supply terminal *36*
 - wiring the DC terminal block *35*
- DC terminal block
 - assembling and preparing *35*
- device redundancy *48*
- device service clustering *28*
- DSC, See device service clustering.
- duplex mode *16*
- dynamic content support *48*

E

- electromagnetic compatibility (EMC) certifications *50*
- electrostatic discharge (ESD) *24, 44*
- EMC certifications *50*
- environmental *54*
- See also China RoHS Directive standards.
 - guidelines *44*
 - operating specifications *49*
 - See also China RoHS Directive standards.
- ESD, See electrostatic discharge (ESD).
- Ethernet hub requirements *9*

F

- failover cable *28*
- fan tray
 - about *37*
 - replacing the fan tray *38*
- FIPS cards, See hardware security module (HSM).
- front mount
 - kit hardware *24*
- front-mounting kit
 - installing *25*

G

- Gigabit Ethernet *9*
- grounding the platform *27*
- ground lug
 - connecting to ground terminal *28*
- guidelines
 - AC-powered equipment *45*
 - DC-powered equipment *45*
 - environmental *44*

H

- halting *11*

Index

- halt operation 12
- hard disk drive (HDD)
 - 38
 - identifying a faulty hard disk drive 39
 - replacing on a BIG-IP 10.1 and later system 38
 - replacing on a BIG-IP version 10.1 or later 40
- hardware
 - for AC-powered equipment 45
 - for DC-powered equipment 45
 - installation planning 24
 - requirements for peripherals 9
- hardware security module (HSM)
 - removing data 58
- hardware specifications 48
- hard-wired failover 28
- hazardous substance restrictions, See China RoHS Directive standards.
- Hold mode 11
- hostconsh shell
 - defined 20
- hot swap
 - DC power supply 34, 36
 - of power supply 32
 - of SFP modules 48
- hubs 9

I

- indicator LEDs
 - about 12
 - additional status conditions 14
 - behavior 12
 - for alert conditions 13
 - locating 8
- interface command
 - valid media types 17
- interface media type 16
- interface mode 16
- interfaces
 - duplex mode 16
 - media type 16
 - viewing status of all interfaces using Configuration utility 16
 - viewing status of all interfaces using tmsh 15
 - viewing status of a specific interface using tmsh 15
 - viewing valid media types 17
- Internet/Intranet protocol support 48

J

- jumbo frames 48

L

- LCD config menu 10
- LCD menus
 - 10
 - using 11
- LCD panel
 - 9
 - backlight option 10
 - brightness option 10

- LCD panel (*continued*)
 - contrast option 10
 - control buttons 10
 - menus 10
 - pausing on a screen 11
- license
 - configuring 29

M

- MAC addresses screen 10
- maintenance
 - AC power supply 33
 - DC power supply 36
 - fan tray 38
- management interface
 - 28
 - setting the gateway 11
 - setting the IP address 11
 - setting the netmask 11
- management IP address
 - configuring using LCD panel 29
- memory technologies
 - about 56
 - battery-backed volatile memory 56
 - non-volatile memory 56
 - volatile memory 56
- Memory usage screen 10

N

- NEBS
 - air temperature 44
- negative pressure fan system 46
- netbooting 11
- network interface LEDs
 - appearance of 18
 - RJ45 18
 - SFP 18
- network interface specifications, See optical transceiver specifications.
- network management and monitoring 48
- non-volatile memory
 - types 56

O

- optical interfaces
 - configuring 15
 - managing 15
- optical transceiver specifications 19

P

- pinouts
 - for cables 19
 - for console port 19
 - for failover port 19
 - specifications 19
- platform
 - about 8

platform (*continued*)
 airflow 46
 components provided 9
 cooling system 46
 grounding 27
 installing 24
 replaceable components 32
 SSL 8
 ventilation 44, 46
 platform specifications
 48
 environmental 49
 operating 49
 power 50
 power cable 28
 power cord
 adding an AC power supply 33
 powering off
 host subsystem 12
 power on operation 12
 power specifications 50
 power supply
 installing a DC power supply 36
 replacing a DC power supply 36
 replacing an AC power supply 33
 wiring the DC terminal block 35
 power supply LED
 states 13
 Product version screen 10
 PXE server
 installing software from 11

Q

qkview utility 28
 quick-install rail kit 25

R

rack mount ears, See front-mounting brackets.
 rack mounting
 front mount 24–25
 general environmental guidelines 44
 quick-install rail kit 25
 screws 25
 unit spacing 24
 rack mounting kits
 types of 24
 rack rail, See rail mount.
 rail lock brackets
 installing 26
 rail locks 26
 rail mount
 installing rail lock brackets 26
 quick-install rail kit 25
 rebooting 11
 redundancy
 system 28
 redundant system configuration 15, 28
 See also device service clustering.
 remote administration 9

replaceable components
 32
 AC power supply 32
 DC power supply 34, 36
 fan tray 37
 hard disk drive (HDD) 38
 reset operation 12
 returned material data security
 about 56
 accessible non-volatile memory 57
 battery-backed volatile memory 56
 hard disk drive (HDD) 57
 inaccessible non-volatile memory 56
 memory technologies 56
 non-volatile memory 56
 removing data from components 57
 volatile memory 56
 RJ45 interface LEDs 18
 Rotate mode 11
 routing protocols 48

S

safety agency approvals 50
 Screens menu 10
 serial failover 28
 serial port
 setting baud rate 11
 serial terminal
 hardware installation 9, 28
 server/node operating system compatibility 48
 SFP hot swap 48
 SFP interface LEDs 18
 specifications
 acoustic 52
 airflow 52
 altitude, operational 52
 for China RoHS 54
 for hardware 48
 for hardware operation 49
 for power 50
 for system features 48
 SSL
 platform 8
 standby mode 12
 Statistics screen 10
 Status LED
 states 13
 when intermittently blinking yellow 14
 when solid green 15
 when solid yellow 15
 storage drives
 removing sensitive data 57
 switches 9
 system
 resetting 20
 resolving when locked up 20
 System information screen 10
 System menu 11

Index

T

TMOS, See Traffic Management Operating System (TMOS).

tmsb, See Traffic Management Shell.

Traffic Management Operating System (TMOS)
relation to AOM *20*

Traffic Management Shell *15*

two-post rack *24*

U

USB port

supported CD/DVD-ROM drives *9*

V

ventilation *46*

W

warnings

environmental *44*

Web server application compatibility *48*