Platform Guide: VIPRION® 4400 Series

MAN-0311-09

Table of Contents

The VIPRION® 4400 Series Platform

About the platform

The VIPRION® 4400 Series system provides you with the flexibility and feature-rich capabilities of F5® products on a powerful and highly-extensible hardware platform. With this platform, you install and configure multiple F5 products using hot-swappable blades. This provides you with the ability to add, remove, or change the platform's configuration to best fit your network. Many components are available for you to add, remove, or change including the blades, power supplies, fan tray, LCD panel, and more. This configuration allows for an extremely robust and flexible system that can manage large amounts of application traffic, and remain operational even if one of its components goes offline.

VIPRION platforms include two types of components: blades, which provide the hardware and software needed to manage network traffic, and a chassis, which houses the blades.

Important: *The chassis and blades are shipped in separate boxes. The blades are not designed to be shipped inside a chassis.*

Although the VIPRION 4400 Series platform is highly extensible and designed to be easy to implement, familiarity with the platform components can help ensure that you install and integrate the platform successfully and effectively.

About the chassis

The chassis is the housing unit that contains all of the components necessary for the VIPRION® 4400 Series platform to operate effectively.

The VIPRION 4400 Series includes two chassis models: the VIPRION C4400 and the VIPRION C4480. The two chassis models appear identical, with the exception of the model number on the front. The VIPRION C4480 is designed to support higher bandwidth blades, such as B4300 and B4400 Series blades.

The VIPRION C4400 and C4480 chassis and B4100, B4200, B4300, and B4400 Series blades are available in DC-powered Network Equipment-Building System (NEBS) compliant versions. For a system to be completely NEBS-compliant, you must use a NEBS-compliant chassis and blades.

1. Indicator LEDs (system and power status)
2. LCD display
3. LCD control buttons

Figure 1: Front view of a VIPRION C4400 chassis with four blades and front bezel (with LCD panel) attached

1. Indicator LEDs (system and power status)
2. LCD display
3. LCD control buttons

Figure 2: Front view of a VIPRION C4480 chassis with four blades and front bezel (with LCD panel) attached

The back of the AC-powered chassis includes four AC power receptacles.

Figure 3: Back view of the AC chassis

The back of the DC-powered chassis includes two DC power block terminals.

Figure 4: Back view of the DC chassis

About the blades

A blade is the primary component that handles the traffic management within the VIPRION® platform. You can install up to four blades in a VIPRION 4400 Series chassis. These blades comprise a group, known as a cluster. The chassis includes blanks in the slots where blades are not installed.

Blanks must be installed in all unused slots, as they help ensure proper airflow within the chassis and EMI compliance of the unit.

You can use B4100, B4200, or B4300 Series blades in a VIPRION 4400 Series chassis. You can use only B4200, B4300, and B4400 Series blades in the VIPRION 4480 chassis. For optimum performance, you should use B4300 or B4400 Series blades only in a VIPRION 4480 chassis.

Note: *You should not mix B4300 or B4400 blades with other blade types in a chassis.*

Figure 5: Front view of the B4100 Series blade

1. Compression screw
2. Blade indicator LEDs
3. Management port
4. USB ports (2)
5. Console port
6. Serial (hard-wired) failover port
7. XFP ports (2)
8. 10/100/1000 interfaces (8)
9. SFP ports (12)

Figure 6: Front view of the B4200 Series blade

1. Compression screw
2. Blade indicator LEDs
3. Management port
4. USB ports (2)
5. Console port
6. Serial (hard-wired) failover port
7. 10/100/1000 ports (4)
8. SFP+ ports (8)

Figure 7: Front view of a B4300 Series blade

1. Compression screw
2. Blade indicator LEDs
3. Management port
4. USB ports (2)
5. Console port

6. Serial (hard-wired) failover port
7. SFP+ ports (8)
8. 40GbE ports (2)
9. Interface indicator LEDs

Figure 8: Front view of a B4400 Series blade

1. Compression screw
2. Blade indicator LEDs
3. Management port
4. Console port
5. USB port
6. 100GbE ports (2)
7. 40GbE ports (4)
8. Interface indicator LED legend

LCD panel

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

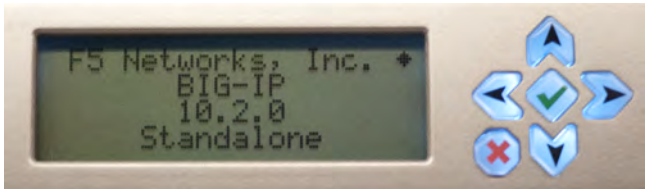


Figure 9: The LCD panel and control buttons

Using the LCD panel

Put the LCD panel into Menu mode to manage the platform using the LCD menus and control buttons.

Press the X button to activate Menu mode for the LCD.

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 switch the LCD screen between Hold and Rotate modes.

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

Clearing alerts

Use the LCD control buttons to clear alerts from the LCD screen.

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.

About LCD menus

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

Options menu

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

Option	Description
Backlight	Specifies an LCD screen backlighting option. Select from these options: • 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.

System menu

You can use the System menu to configure the management interface on both clusters and blades. This menu also provides various options for the hardware.

Option	Description	Suboptions
Cluster	Configures the cluster IP address, netmask, and default gateway for managing the cluster.	Cluster Mgmt Select from these suboptions: • Cluster IP sets the cluster IP address. • Cluster IP Mask sets the netmask. • Gateway sets the default gateway for managing the cluster. • Commit saves your changes.
	Configures the management IP addresses of the blades within the cluster.	Cluster Mbrs Select from these suboptions: • Blade [1-] Mgmt

Option	Description	Suboptions
		• Blade Mgmt IP sets the management IP address of the selected blade within the cluster. • Commit saves your changes.

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.
VersionScreen	Displays product version information.

Indicator LEDs

The VIPRION® 4400 Series platform includes indicator LEDs in two locations: on the LCD panel and on the individual blades. On the LCD panel, the LEDs provide information about platform power, blade alarms, and status.

On the blades, the LEDs indicate whether the blade is a primary or secondary blade, and show alarm and blade status. The Alarm LED status for blades is also displayed in the corresponding LED on the LCD panel.

Indicator LED actions

The behavior of the LEDs indicate system or component status.

Action	Description
Off (none)	LED is not lit and does not display any color.
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 appear solid.

Chassis standard operating states

The chassis LEDs indicate the operating state of a chassis.

System state	Status LED	Alarm LED
Active/Standalone	Green solid	Off/None
Standby	Green solid	Off/None
Powered off	Off/None	Off/None

Front bezel indicator LEDs

The front bezel LEDs indicate the overall operating status of the chassis.

LED	Status
Power	Indicates that a power supply is present and operational (green), present but non-functioning (amber), or does not have a power supply connected (off). The chassis front bezel has one LED per power supply. There are eight power supply LEDs; however, only the first four are functional in the four-slot chassis. The chassis front bezel has four power supply LEDs: one LED per supply.
Status	Indicates the overall state of the chassis: functional (green) or experiencing errors (amber).
Alarm	Indicates both blade and chassis alarms. If a blade indicates an alarm condition, the chassis Alarm LED mirrors that state. In situations where more than one blade is generating an alarm, the chassis Alarm LED displays the most severe alarm status.

Blade standard operating states

The blade LEDs indicate the operating state of a blade.

Note: *On power up, the Status LED of each blade turns amber. When the BIG-IP® software boots successfully, the Status LED changes to green.*

System state	Primary LED	Secondary LED	Status LED	Alarm LED
Active mode	Off/None	Off/None	Green solid	Off/None
Powered off	Off/None	Off/None	Off/None	Off/None

Blade indicator LEDs

The blade LEDs indicate whether the blade is a primary or secondary blade, and show alarm and blade status.

LED	Status
Primary	Indicates that the blade is a primary blade for a cluster.
Secondary	Indicates that the blade is a secondary blade for a cluster.
Status	Indicates the state of the system.
Alarm	Indicates a non-specific alert level. Use SNMP traps, system logs, or the LCD display for more information.

Blade LED status conditions

The blade LEDs indicate specific operating conditions, such as high availability (HA) status, or when a blade is shut down, reset, or not properly seated.

Blade state	Primary LED	Secondary LED	Status LED	Alarm LED
Blade is fully functional and operating as the primary in a high availability (HA) configuration	Green solid	Off/None	Green solid	Off/None
Blade is fully functional and operating as a secondary in a high availability (HA) configuration	Off/None	Amber solid	Green solid	Off/None
User-initiated blade power down	Green blinking	Green blinking	Green blinking	Off/None
Blade shut down due to thermal overtemp limit	Amber blinking	Amber blinking	Amber blinking	Red solid
Blade not seated properly	Amber blinking	Amber blinking	Amber solid	Red solid

LED alert conditions

The Alarm LED indicates when there is an alert condition on the system.

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
Alert or Critical	Red solid
Error	Amber blinking
Warning	Amber solid

Defining custom alerts

The `/etc/alertd/alert.conf` and the `/config/user_alert.conf` files on the VIPRION® 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. 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 these 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.

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 blade interfaces

B4100 and B4200 Series blades

The B4100 and B4200 Series blades have SFP optical interfaces, RJ45 10/100/1000 copper interfaces, and 10GbE XFP or 10GbE SFP+ optical interfaces that are connected internally. Each set of interfaces is numbered from x.1 through x.n, with each group of media types designated by a different prefix. It is important to note some facts about these interfaces:

- The RJ45 connectors can each support 10/100/1000 Mbit Ethernet speed, except where otherwise noted.
- The SFP connectors can each support 1000 Mbit speed with a 1GbE transceiver module installed or 10/100/1000Mbit speeds with an F5®-branded copper SFP module.
- The XFP connectors can each support 10G speed with an F5-branded XFP transceiver module installed. Only B4100 Series blades include XFP interfaces.
- The SFP+ connectors can each support 10G speed with an F5-branded SFP+ transceiver module or 1000 Mbit speed with an F5-branded SFP 1GbE transceiver module installed.

B4300 Series blades

The B4300 Series blade has eight SFP+ interfaces and two 40GbE interfaces that are connected internally. The blade supports up to four 40GbE ports (2.1-2.4) that you can use as individual 10GbE ports or as a 40GbE port, depending on how you bundle the ports.

Figure 10: B4300 Series blade interfaces and LEDs

B4400 Series blades

The B4400 Series blade has four 40GbE interfaces and two 100GbE interfaces that are connected internally. You can use the 40GbE interfaces as individual 10GbE ports or as a 40GbE port, depending on how you bundle the ports.

The B4400 Series blades use an updated numbering convention for interfaces.

Figure 11: B4400 Series blade interfaces and LEDs

About 40GbE interfaces

On VIPRION® platforms that include 40GbE interface ports, you can use the ports as a single 40GbE port or as four 10GbE SFP+ ports.

Note: *Only the B4300 and B4400 Series blades include 40GbE interface ports.*

VIPRION B4300 Series blades

On VIPRION B4300 Series blades, the first group of ports (1.1-1.4 and 1.5-1.8) defaults to 10GbE. You can bundle them as ports 2.1 and 2.2 using a QSFP+ breakout cable. When bundled, the cable that you use when operating at 40GbE is an industry-standard OM3 qualified multi-mode fiber optic cable with female MPO/MTP connectors at both ends. You must provide your own cable for 40GbE operation.

You can also disable the 40GbE bundle and use the ports as individual 10GbE ports (1.1-1.4, 1.5-1.8, 1.9-1.12, and 1.13-1.16) using a QSFP+ breakout cable. This cable has a female MPO/MTP connector at one end, which connects to a 40GbE port, and four LC duplex connectors at the other end, which connect to SFP+ ports on an upstream switch.

VIPRION B4400 Series blades

On VIPRION B4400 Series blades, the 40GbE ports (3.0-8.0) default to 40GbE. The cable that you use when operating at 40GbE is an industry-standard OM3 qualified multi-mode fiber optic cable with female MPO/MTP connectors at both ends. You must provide your own cable for 40GbE operation.

You can also disable the 40GbE bundle and use the ports as individual 10GbE ports (3.1-3.4, 4.1-4.4, 5.1-5.1, 6.1-6.4, 7.1-7.4, and 8.1-8.4) using a QSFP+ breakout cable. This cable has a female MPO/MTP connector

at one end, which connects to a 40GbE port, and four LC duplex connectors at the other end, which connect to SFP+ ports on an upstream switch.

40 GbE QSFP+ components

Note: *If you are using a breakout cable for 10GbE connectivity, you should use the supported distance as detailed in the Specifications for fiber QSFP+ modules section of this platform guide and not the Specifications for fiber SFP+ modules section.*

Figure 12: An example of a 40 GbE QSFP+ breakout cable

You can order these 40 GbE QSFP+ components from F5®:

- QSFP+ breakout cables (MTP to LC), provided as a pair, in these lengths:
  - 1 meter (F5-UPG-QSFP+-1M-2)
  - 3 meter (F5-UPG-QSFP+-3M-2+)
  - 10 meter (F5-UPG-QSFP+-10M-2)
- F5-branded 40GbE QSFP+ transceiver modules (F5-UPG-QSFP+ and F5-UPG-QSFP+LR4)

Configuring bundling for 40GbE interfaces using tmsh

You can use `tmsh` to configure bundling for the 40GbE interfaces on the platform. When you disable bundling, you can use the 40GbE ports as individual 10GbE ports using a QSFP+ breakout cable.

1. Open the Traffic Management Shell (tmsh).
   ```
   tmsh
   ```
2. Change to the network module.
   ```
   net
   ```
   The command prompt updates with the module name:
   ```
   user@bigip01(Active)(/Common)(tmos.net)#.
   ```
3. Configure bundling for a specific interface, where `<interface_key>` is 2.1, 2.2, 2.3, or 2.4.
   ```
   modify interface <interface_key> bundle [enabled | disabled]
   ```

   Note: *When a 2.x port is bundled, the LEDs for the 10GbE ports remain off. When a 2.x port is unbundled, the 40GbE LEDs remain off.*

Configuring bundling for 40GbE interfaces using the Configuration utility

You can use the Configuration utility to configure bundling for the 40GbE interfaces on the platform. When you disable bundling, you can use the 40GbE ports as individual 10GbE ports using a QSFP+ breakout cable.

1. On the Main tab, click **Network** > **Interfaces**.
   This displays the list of available interfaces.
2. Click an interface name.
   The properties screen for that interface opens.
3. From the **Bundled** list, select whether to enable or disable bundling.
4. Click **Update**.

About 100GbE interfaces

On platforms that include 100GbE interface ports, you can use only F5-branded 100GbE QSFP28 transceiver modules in those ports.

When a 100GbE interface operates at either 40GbE and 100GbE speeds, it is considered to be *bundled*.

VIPRION B4400 Series blades

On VIPRION B4400 Series blades, the 100GbE ports (1.0 and 2.0) default to 100GbE. The cable that you use when operating at 100GbE with 100GBASE-SR4 transceiver modules is an industry-standard OM4 qualified multi-mode fiber optic cable with female MPO/MTP connectors at both ends. The cable that you use with 100GBASE-LR4 transceiver modules is an industry-standard SMF fiber optic cable with LC duplex connectors and a reach of up to 10km. You must provide your own cable and F5-branded QSFP28 transceiver modules for 100GbE operation.

Configuring bundling for 100GbE interfaces using tmsh

You can use `tmsh` to configure bundling for the 100GbE QSFP28 interfaces on the platform at either 100GbE or 40GbE speeds.

1. Open the Traffic Management Shell (tmsh).
   ```
   tmsh
   ```
2. Change to the network module.
   ```
   net
   ```
   The command prompt updates with the module name:
   `user@bigip01(Active)(/Common)(tmos.net)#`.
3. Configure bundling for a specific interface using this syntax.
   ```
   modify interface <interface_key> bundle [enabled | disabled] bundle-speed
   [100G | 40G | not-supported]
   ```

Note: *The default value of* `bundle-speed` *is determined by the interface type. Unbundled interfaces have* `bundle-speed` *set to* `not-supported`.

Configuring FEC for 100GbE interfaces using tmsh

If your upstream switch does not support Reed-Solomon Forward Error Correction (RS-FEC), you can use `tmsh` to disable it for the 100GbE interfaces on your platform.

Note: *RS-FEC is intended to be enabled with 100GBASE-SR links and disabled for 100GBASE-LR4 links.*

1. Open the Traffic Management Shell (tmsh).
   ```
   tmsh
   ```
2. Change to the network module.
   ```
   net
   ```
   The command prompt updates with the module name:
   ```
   user@bigip01(Active)(/Common)(tmos.net)#.
   ```
3. Configure FEC for a specific interface using this syntax.
   ```
   modify interface <interface_key> forward-error-correction [enabled | disabled]
   ```

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 command prompt updates with the module name:
   ```
   user@bigip01(Active)(/Common)(tmos.net)#.
   ```
3. Display the current status of a specific interface.
   ```
   show interface <interface_key>
   ```
   This is an example of the output that you might see when you run this command on interface 1/1.2 (slot 1, interface 1.2):

```
-------------------------------------------------------------------
Net::Interface
Name   Status    Bits  Bits  Pkts  Pkts  Drops  Errs       Media
                 In    Out    In    Out
-------------------------------------------------------------------
1/1.2      up  637.8G  5.8M  1.1G  5.7K   1.1G     0  10000SR-FD
```

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 command prompt updates with the module name:
   ```
   user@bigip01(Active)(/Common)(tmos.net)#.
   ```
3. Display the current status of all interfaces.
   ```
   show interface
   ```
   This is an example excerpt of the output that you might see when you run this command on B4100/B4200/B4300 Series blades:

```
-------------------------------------------------------------------
Net::Interface
Name    Status    Bits    Bits    Pkts   Pkts  Drops  Errs       Media
                    In     Out      In    Out
-------------------------------------------------------------------
1/1.1     miss       0       0       0      0      0     0        none
1/1.2       up  636.5G    5.5M    1.1G   5.4K   1.1G     0  10000SR-FD
1/1.3     miss       0       0       0      0      0     0        none
1/1.4     miss       0       0       0      0      0     0        none
1/1.5     miss       0       0       0      0      0     0        none
1/1.6     miss       0       0       0      0      0     0        none
1/1.7     miss       0       0       0      0      0     0        none
1/1.8     miss       0       0       0      0      0     0        none
1/1.9   uninit       0       0       0      0      0     0        none
1/1.10  uninit       0       0       0      0      0     0        none
1/1.11  uninit       0       0       0      0      0     0        none
1/1.12  uninit       0       0       0      0      0     0        none
1/1.13  uninit       0       0       0      0      0     0        none
1/1.14  uninit       0       0       0      0      0     0        none
1/1.15  uninit       0       0       0      0      0     0        none
1/1.16  uninit       0       0       0      0      0     0        none
1/2.1   uninit       0       0       0      0      0     0        none
1/2.2   uninit       0       0       0      0      0     0        none
1/2.3     miss       0       0       0      0      0     0        none
1/2.4     miss       0       0       0      0      0     0        none
1/mgmt      up  248.3M   42.8M  392.2K  16.1K      0     0    1000T-FD
```

This is an example excerpt of the output that you might see when you run this command on B4400 Series blades:

```
Display all 147 items? (y/n) y

-------------------------------------------------------------------------
Net::Interface
Name    Status    Bits     Bits     Pkts     Pkts  Drops  Errs         Media
                    In      Out       In      Out
-------------------------------------------------------------------------
1/1.0     pend       0        0        0        0      0     0          none
1/2.0     pend       0        0        0        0      0     0          none
1/3.0     pend       0        0        0        0      0     0          none
1/4.0     pend       0        0        0        0      0     0          none
1/5.0     pend       0        0        0        0      0     0          none
1/6.0     pend       0        0        0        0      0     0          none
1/7.0     pend       0        0        0        0      0     0          none
1/8.0     pend       0        0        0        0      0     0          none
2/1.0     pend       0        0        0        0      0     0          none
2/2.0     pend       0        0        0        0      0     0          none
2/3.0     pend       0        0        0        0      0     0          none
2/4.0     pend       0        0        0        0      0     0          none
2/5.0     pend       0        0        0        0      0     0          none
2/6.0     pend       0        0        0        0      0     0          none
```

```
2/7.0     pend       0       0       0       0       0     0          none
2/8.0     pend       0       0       0       0       0     0          none
3/1.0     pend       0       0       0       0       0     0          none
3/2.0     pend       0       0       0       0       0     0          none
3/3.0     pend       0       0       0       0       0     0          none
3/4.0     pend       0       0       0       0       0     0          none
3/5.0     pend       0       0       0       0       0     0          none
3/6.0     pend       0       0       0       0       0     0          none
3/7.0     pend       0       0       0       0       0     0          none
3/8.0     pend       0       0       0       0       0     0          none
5/1.0       up   23.8G   19.4M   42.5M   12.2K   42.3M     0  100000AR4-FD
5/1.1   uninit       0       0       0       0       0     0          none
5/1.2   uninit       0       0       0       0       0     0          none
5/1.3   uninit       0       0       0       0       0     0          none
5/1.4   uninit       0       0       0       0       0     0          none
5/2.0     miss       0       0       0       0       0     0          none
5/2.1   uninit       0       0       0       0       0     0          none
5/2.2   uninit       0       0       0       0       0     0          none
5/2.3   uninit       0       0       0       0       0     0          none
5/2.4   uninit       0       0       0       0       0     0          none
5/3.0       up    2.2T   19.5M    4.2G   12.3K    4.2G     0   40000SR4-FD
5/3.1   uninit       0       0       0       0       0     0          none
5/3.2   uninit       0       0       0       0       0     0          none
5/3.3   uninit       0       0       0       0       0     0          none
5/3.4   uninit       0       0       0       0       0     0          none
```

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 full 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:

```
tmsh 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: *Auto-MDI/MDIX functionality is retained when you manually configure an interface to use specific speed and duplex settings. 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.*

Valid media types

These media types are valid for the `tmsh interface` command.

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

10BaseT half	10GBaseLR full
10BaseT full	10GBaseER full
100BaseTX half	10SFP+Cu full
100BaseTX full	40GBaseSR4 full
1000BaseT half	40GBaseLR4 full
1000BaseT full	100GbaseSR4 full
1000BaseSX full	100GbaseLR4 full
1000BaseLX full	auto
1000BaseCX full	none
10GBaseT full	no-phy
10GBaseSR full	

Viewing valid media types for an interface

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 command 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.*

   This is an example of the output that you might see when you run this command on interface 1.3:

```
net interface 1.3 {
    media-capabilities-sfp {
        none
        auto
        1000T-FD
        1000LX-FD
        1000SX-FD
        1000CX-FD
        10000SR-FD
```

```
        10000LR-FD
        10000SFPCU-FD
    }
}
```

Network interface LED behavior

The appearance and behavior of the network interface LEDs on the blades 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.

Blade type	Link	Speed LED	Activity LED
B4100, B4200	No link	Not lit	Not lit
B4100	10 Mbit/s, half duplex	Amber blinking (with traffic)	Amber (with traffic)
B4100	10 Mbit/s, full duplex	Amber blinking (with traffic)	Green (with traffic)
B4100	100 Mbit/s, half duplex	Amber solid	Amber (with traffic)
B4100	100 Mbit/s, full duplex	Amber solid	Green (with traffic)
B4100, B4200	1 Gbit/s, half duplex	Green solid	Amber (with traffic)
B4100, B4200	1 Gbit/s, full duplex	Green solid	Green (with traffic)

XFP port LED behavior

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

Blade type	Link	Speed LED	Activity LED
B4100	No link	Not lit	Not lit
B4100	10Gbit/s, full duplex	Green solid	Green (with traffic)

SFP port LED behavior

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

Blade type	Link	Speed LED	Activity LED
B4100	No link	Not lit	Not lit
B4100	10 Mbit/s, half duplex	Amber blinking (with traffic)	Amber (with traffic)
B4100	10 Mbit/s, full duplex	Amber blinking (with traffic)	Green (with traffic)
B4100	100 Mbit/s, half duplex	Amber solid	Amber (with traffic)
B4100	100 Mbit/s, full duplex	Amber solid	Green (with traffic)

Blade type	Link	Speed LED	Activity LED
B4100	1 Gbit/s, half duplex	Green solid	Amber (with traffic)
B4100	1 Gbit/s, full duplex	Green solid	Green (with traffic)

SFP+ port LED behavior

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

Note: *On the B4300 Series blade, the 40GbE interfaces are lit only when all four 10GbE interfaces contain transceiver modules and have a link.*

Blade type	Link	Speed LED	Activity LED
B4200	No link	Not lit	Not lit
B4200	10 Mbit/s, half duplex	Not supported	Not supported
B4200	10 Mbit/s, full duplex	Not supported	Not supported
B4200	100 Mbit/s, half duplex	Not supported	Not supported
B4200	100 Mbit/s, full duplex	Not supported	Not supported
B4200	1 Gbit/s, half duplex	Not supported	Not supported
B4200	1 Gbit/s, full duplex	Amber solid	Green (with traffic)
B4200	10 Gbit/s, half duplex	Not supported	Not supported
B4200	10 Gbit/s, full duplex	Green solid	Green (with traffic)
B4300	1 Gbit/s, full duplex	Amber solid	Green (with traffic)
B4300	10 Gbit/s, full duplex	Green solid	Green (with traffic)

QSFP+ port LEDs behavior

The appearance and behavior of the 40GbE QSFP+ interface LEDs indicate network traffic activity and interface speed.

On VIPRION® B4300 Series blades, there are two sets of LEDs for 40GbE ports. One set is for operation in 40GbE, and the other set is for operation in a 4 x 10GbE configuration.

On VIPRION B4350 blades, there is one set of LEDs for 40GbE ports.

Blade type	Link	Speed LED	Activity LED
B4300	No link	Not lit	Not lit
B4300	40 Gbit/s	Green solid	Green (with traffic)
B4450	No link	Not lit	Not lit
B4450	40 Gbit/s	Green solid (blinking with traffic)	N/A
B4450	10 Gbit/s	Amber solid (blinking with traffic)	N/A

QSFP28 port LEDs behavior

The appearance and behavior of the 100GbE QSFP28 port LEDs indicate network traffic activity and interface speed.

On VIPRION® B4350 blades, there is one set of LEDs for QSFP28 ports.

Blade type	Link	Speed
B4450	No link	Not lit
B4450	100 Gbit/s	Solid blue (blinking with traffic)

Transceiver module specifications

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

Cable pinout specifications

For current pinout information for this platform, see *F5® Platforms: Accessories*.

Platform Installation

About installing the platform

After you have reviewed the hardware requirements and become familiar with the VIPRION® 4400 Series platform, you can install the chassis.

Warning: *Due to the weight of the platform, at least two people are required to install this chassis into a rack. Failing to use two people can result in severe personal injury or equipment damage.*

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

Important: *F5® strongly recommends that you install the chassis into a rack before you install any blades. This ensures that the weight of the chassis remains manageable as you install the chassis into a rack.*

Note: *After you install a blade, wait approximately one to two minutes before installing another to ensure that each blade has sufficient time to boot. When the Status LED is green, the blade is fully booted.*

About general recommendations for rack mounting

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

Leaving at least 100 mm of space from the front panel of the chassis 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 chassis if only one person is installing the chassis.

Warning: *Due to the weight of the platform, at least two people are required to install this chassis into a rack. Failing to use two people can result in severe personal injury or equipment damage.*

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

Hardware included with the VIPRION 4400 Series AC chassis

The VIPRION 4400 Series AC-powered chassis should include all of the hardware components listed here.

Quantity	Hardware
4	AC power cables, black (C19 to NEMA 6-20P)
4	AC power cable retention clips
2	Mounting brackets
4	Mounting handles
8	#8-32 1/4 inch black rack mount bracket screws
1	Front bezel (with LCD component)
1	Electrical static discharge (ESD) strap

Hardware included with the VIPRION 4400 Series DC chassis

The VIPRION 4400 Series DC-powered chassis should include all of the hardware components listed here.

Quantity	Hardware
1	Two-ring grounding terminal lug, 5/8 inch (1.59 cm) holes on 1.25 inch (3.18 cm) centers
2	5/16-18 Keps nuts for the ground
2	Terminal block plugs for attaching leads to the platform
2	Quick-install rack mount brackets
8	Thumb screws
1	Front bezel (with LCD component)
2	Cable managers

Additional equipment for installing the VIPRION 4400 Series DC chassis

This equipment is required to install the VIPRION 4400 Series DC platform.

Quantity	Hardware
1	Rack-mounted power disconnect
2	AWG copper ground wire
8 (minimum)	AWG copper wiring leads for four power supplies
1	Molex crimping tool for the ground wire
1	Screwdriver, #2 Phillips head or flat head

Hardware included with blades

The VIPRION® B4000 Series blades should include all of the hardware components listed here.

Quantity	Hardware
1	Console cable, beige (B4100 and B4200 only)
1	RJ45 to DB9 console port cable, beige (B4300/B4400 only)
1	RJ45F to RJ45M rolled adapter, beige (B4300/B4400 only)
4	SFP transceiver modules (B4100 only)
2	SFP+ 10G transceiver modules (B4200 and B4300 only)
1	Electrical static discharge (ESD) strap

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 interface ports	You must provide networking devices that are compatible with the network interface ports on the platform. You can use either 10/100/1000/10000-Megabit or 40/100-Gigabit Ethernet switches.
External USB CD/DVD drive or USB flash drive	You can use a USB-certified CD/DVD mass storage device or a USB flash drive for installing upgrades and for system recovery.
	Note: *F5® recommends that external CD/DVD drives be externally powered.*
Serial console	You can remotely manage the platform by connecting to a serial console terminal server through 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 chassis. You should perform all installations and upgrades using the serial console, as these procedures require reboots, in which network connectivity is lost temporarily.*
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.

Unpacking the chassis

The VIPRION® 4400 Series chassis ships in a custom-designed package that protects the product during shipment and facilitates ease of removal when you are ready to install the chassis into a rack. Due to the weight of the chassis, there is a specific procedure that you must follow to ensure that you remove the chassis from its packaging safely and securely.

Warning: *To ensure your safety and to prevent damage to the chassis, at least two people are required to remove this chassis from the shipping box.*

1. Use a 3/8 inch drive socket to remove the outer metal brace.

2. Lift to remove the outer corrugated box from the chassis.

3. Remove the accessory boxes, cables and foam insert from the top of the chassis.

4. Install the handles onto the back of the chassis.

5. Use a 9/64 inch hex key to remove the shipping brackets from both sides of the chassis.

6. Use two people and have each person lift straight up to remove the chassis from the pallet.
7. Carefully move the chassis to a flat surface and set it down until you are ready to install the chassis into a rack.

About installing the chassis

You should select a location for installing the VIPRION 4400 Series chassis that is easy to access for adding or removing power supplies, the fan tray, or blades. The location should also provide adequate ventilation to allow sufficient airflow through the platform. The platform employs a negative pressure fan system, which draws cold air in from the front and right sides of the chassis and exhausts hot air out the back and left sides of the chassis. After you have identified the intended location for the platform, you can install the chassis into the rack.

The VIPRION 4400 Series chassis includes a rack mount kit and a handle installation kit. The rack mount kit consists of two mounting brackets that you can attach at either the front, middle, or back of the platform,

using the screws provided with the chassis. The location at which you attach the brackets depends on the configuration of the rack. The handle installation kit includes four handles and eight screws for attaching the handles to the chassis. The handles make it easier to lift the chassis into position for rack mounting. You must install the rack mount brackets before you can install the handle kit to lift the chassis into position.

The chassis is designed for 19-inch racks. If you are installing into a wider rack, you will need to provide adapters. The four-point rack mounting rail kit will not work with 23-inch racks.

Caution: *If you have not yet removed the chassis from the shipping pallet, F5® Networks highly recommends that you have at least two people remove the chassis from the pallet. This ensures your safety and prevents damage to the chassis.*

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

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

Installing the rack mount brackets

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

1. Locate the mounting brackets included with the chassis.

   These brackets, along with their corresponding screws, are in an accessory box that is included with the chassis.

2. Attach the mounting brackets to the appropriate location (front, middle, or rear) by using a Phillips screwdriver and the screws provided in the ship kit.

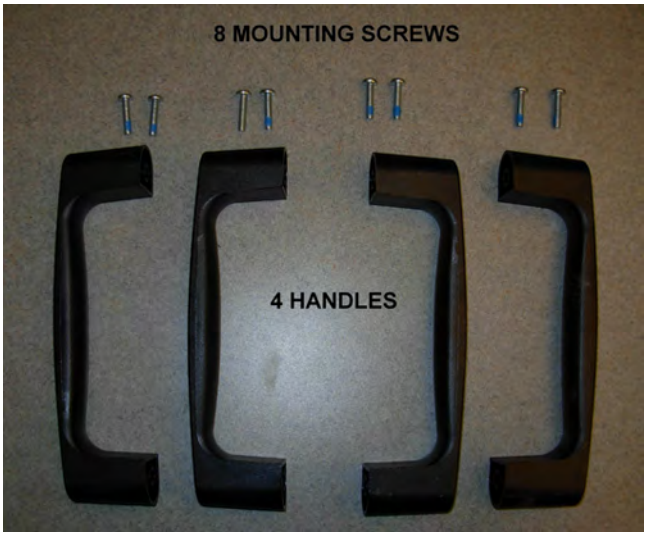
After you install the rack mount kit, you can install the handle kit and install the chassis into a rack.

Installing the handle kit

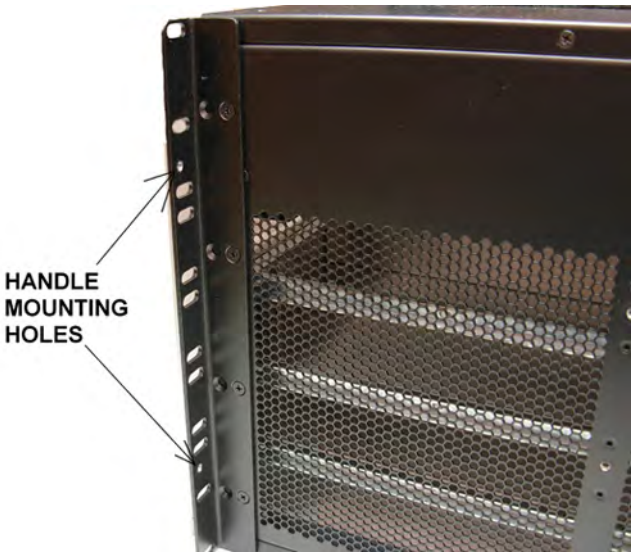
After the rack mounting rails are mounted on the chassis, you can mount the handle kit on the chassis.

1. Locate the handle kit included with the chassis.

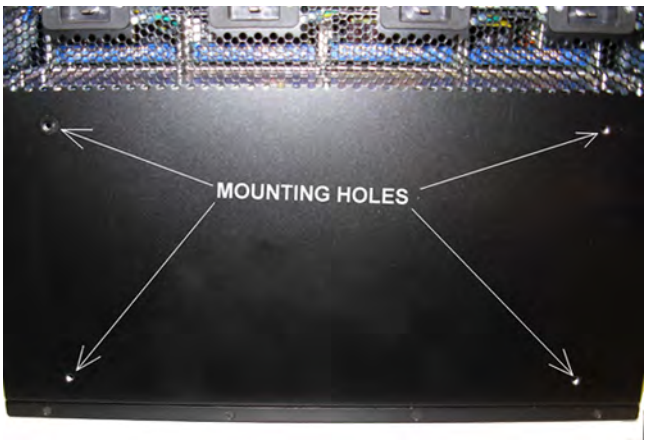
   These handles, along with their corresponding #10-32 7/8 inch screws, are in a box included with the chassis. Remove the covers on the handles if they are installed.



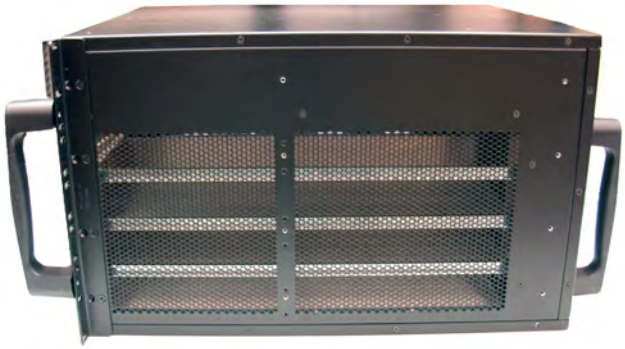
2. Mount the two front handles on the screw holes in the rack mounting brackets. Two screws are provided for each handle. Ensure the screws are tightened to 12 to 14 inch-pounds (1.4 to 1.6 Newton-meters).



3. Mount the two back handles using the mounting holes provided on the back of the chassis.



After the handles are installed, the chassis is ready to be installed in a rack.



Installing the chassis into a rack

Before you install the chassis into a rack, verify that the front and back lift handles are securely installed.

F5 recommends that you use two or more people to install the chassis into a rack. Be sure to install the chassis before you install blades.

Important: *If you are installing the chassis into a high position on the rack or if only one person is installing the unit, be sure to use a lift or similar device.*

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

---

1. Using two or more people, lift the chassis to the appropriate location on the rack.
2. Secure the chassis to the rack using four manufacturer-provided rack screws on each side.

   The chassis must be securely fastened to the rack to provide adequate stability and to prevent the unit from falling out of the rack.

Attaching the front bezel

The front bezel includes an LCD component, which enables you to access several functions associated with the platform, such as configuring the management port for the system. The front bezel is located in one of the small boxes included in the main platform shipping crate.

1. Grasp the front bezel on either side, using the indentations provided.

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

2. Align the guide pins on the front bezel to the corresponding holes in the chassis.

3. Press the front bezel onto the corresponding connections at the front of the chassis until it clicks into place.

About installing blades

The VIPRION® C4400 Series chassis supports up to four B4000 Series blades. The VIPRION C4400 chassis supports B4100 and B4200 Series blades. The VIPRION C4480 chassis supports B4200, B4300, and B4400 Series blades. For maximum performance, F5® recommends that you do not mix blade types in a chassis.

When you initially receive the chassis, the slots that can contain these blades are filled with blanks. A blank must be installed in each empty slot to ensure proper thermal management and regulatory compliance. To add a new blade, you first remove the blank from the corresponding slot and then insert the blade. Be sure to keep the blanks in case you need to change the blade configuration later. You should not operate the chassis for an extended period of time without all slots populated.

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

Note: *Ensure that you supply power to the chassis prior to installing any blades.*

Note: *You should install blades into the chassis starting at the top slot and then in each subsequent empty slot.*

Note: *After you install a blade, wait approximately one to two minutes before installing another to ensure that each blade has sufficient time to boot. When the Status LED is green, the blade is fully booted.*

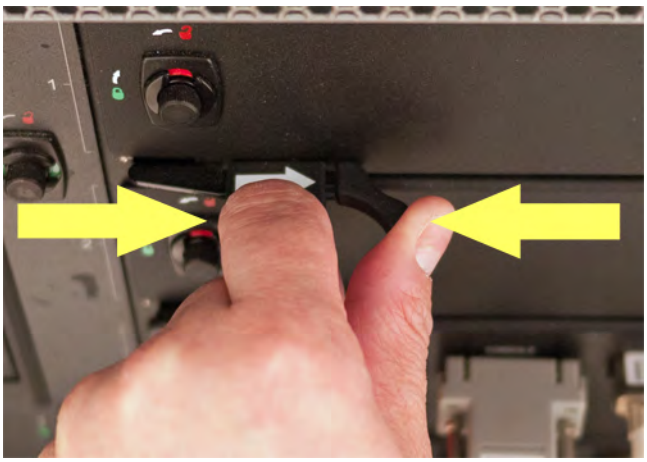
Note: *The last blade that you install in a fully-populated chassis typically requires more insertion force than the previous blades due to the cumulative compression of the electromagnetic interference (EMI) gaskets.*

Removing a blank

If a blank is installed in the slot where you want to install a blade, you must remove it. If the slot does not contain a blank, you can skip this procedure.

1. Select the slot in which you want to insert the blade.
2. Turn the compression screws (located on both sides of the blank) until the locking indicator changes color from green (locked) to red (unlocked).

3. Grasp the two eject levers on the front of the blank and pull toward you.



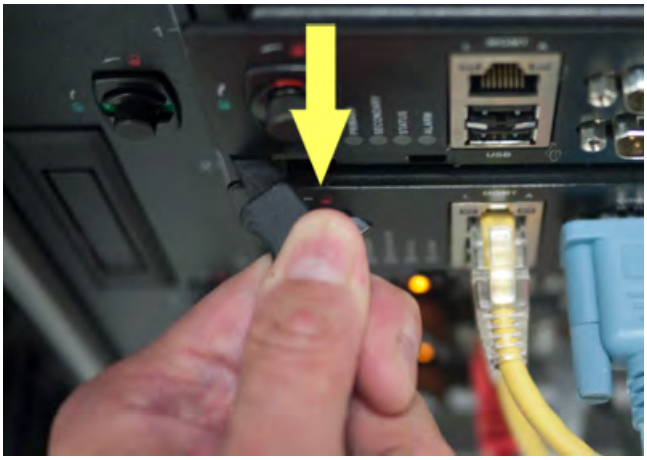
4. Fully extend the eject levers on both sides of the blank and pull out toward you to remove the blank.

Removing a blade

1. Identify the blade that you would like to remove from the chassis.
2. Halt the blade:
   a) Connect to the blade using the serial console.
   b) Halt the blade.
      `halt`
      The blade is halted when the system displays: `halted`.
3. Disconnect all cables and remove any optical modules.
4. Turn the compression screws, located on both sides of the blade, until the locking indicator changes color from green (locked) to red (unlocked).

5. Grasp the two eject levers on the front of the blade and pull toward you.

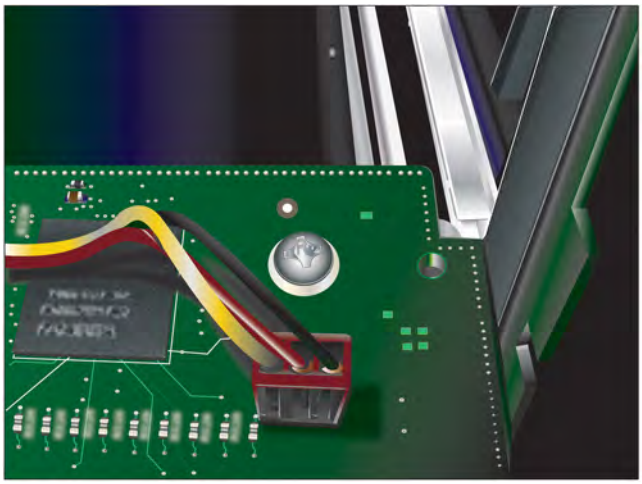
6. Fully extend the eject levers on both sides of the blade and pull out toward you to remove the blade.



Installing a blade

If a blank is installed in the slot in which you want to install a blade, you must first remove it.

1. Fully extend the eject levers, located on each side of the blade, into the open position.
2. Carefully lift the blade and align the guide grooves on either side with the corresponding grooves on the interior of the slot.



Important: *Verify that the blade is aligned with these grooves; otherwise, the blade does not seat correctly in the platform.*

3. Slide the blade in until it is fully seated in the slot.
4. When the eject levers engage the chassis, press the eject levers on the blade toward the center of the blade until locked in place.

5. Turn the compression screws clockwise until they are completely secured to the platform in the green (locked) position.

Note: *The locking indicator on the compression screws turns green before the screws are completely secured to the platform; however, F5 highly recommends that you continue turning the screws until they are firmly secured.*

6. Repeat this process with each blade until all blades are secured in the unit.

Note: *After you install a blade, wait approximately one to two minutes before installing another to ensure that each blade has sufficient time to boot. When the Status LED is green, the blade is fully booted.*

Blade compatibility

These are the supported VIPRION® 4000 Series chassis/blade configurations.

Chassis	B4100 Series blade	B4200 Series blade	B4300 Series blade	B4400 Series blade
C4400 chassis	x	x		
C4480 chassis		x	x	x

Important: *You can use a mixed cluster of VIPRION B4100 and B4200 Series blades only in a VIPRION 4400 chassis that is running BIG-IP® version 10.1 or later.*

Important: *For maximum performance, F5® recommends that you use only blades of the same model, either B4300 or B4400 Series, in a VIPRION 4480 chassis.*

Note: *You should not mix B4300 or B4400 blades with other blade types in a chassis.*

Blade performance in mixed clusters

If you choose to create a mixed cluster, a system that includes a mixture of VIPRION® blade types, all blades will perform at the same level as the earliest blade model installed in the chassis.

For example, if you have three B4200 Series blades and one B4100 Series blade installed in a chassis, the B4200 Series blades will perform at the same level as the B4100 Series blade. Removing all B4100 blades from a mixed cluster, leaving only B4200 Series blades, enables the B4200 Series blades to perform at their maximum capacity.

Important: *The VIPRION B4300 and B4400 Series blades do not support mixed cluster operation.*

Blade software versions in mixed clusters

The behavior of a mixed cluster differs depending on the software versions installed on the blades.

B4200 Series blades in a cluster running BIG-IP version 10.0.x and earlier

If you install a B4200 Series blade into a B4100 cluster running a version of the BIG-IP software that is earlier than version 10.1, you could experience these scenarios:

- You receive an error message in the cluster status for the slot in which the B4200 Series blade is installed, indicating that the blade is running the wrong software version. The software installation status also displays an error for the B4200 Series blade slot.
- Earlier BIG-IP software versions might display in the Configuration utility, but you will not be able to install them to the B4200 Series blade. You receive an installation error message if you attempt to install an earlier version of the BIG-IP software.
- If you upgrade the cluster to version 10.1 or later, the B4200 Series blade joins the cluster as an active member.
- If the B4100 Series blades are subsequently removed from the cluster, the situation does not correct itself automatically, as the system will remember that the version of software for that cluster is a version prior to version 10.1. You can correct this issue by specifying that version 10.1 or later run on the cluster.
- If you move a B4200 Series blade to a second chassis, this does not cause the other chassis to downgrade to a version earlier than version 10.1. Cluster configuration information, which includes the software version information, is tied to the chassis identifier on the chassis hardware and is removed from the blade when it is moved to another chassis.

B4100 Series blades in a cluster running BIG-IP version 10.1 and later

If you install a B4100 Series blade into a chassis with B4200 Series blades running version 10.1 or later, you could experience these scenarios:

- The B4100 Series blade upgrades to the new software and runs (this is the typical, expected behavior).
- The software images previously installed on the B4100 Series blade display as installable in the Configuration utility. If you attempt to install one of those images, you receive an error on the B4200 Series blades, but the installation completes successfully on the B4100 Series blades.

Trunk configuration in mixed clusters

If you replace a B4100 Series blade with a B4200 Series blade in a cluster that uses one or more trunks across the blades, you must adjust the trunk configuration to match the desired B4200 external interfaces. For example, if your trunk uses 10G ports, interface 1.1 on a B4100 Series blade is 10G, and interface 2.1 on a B4200 Series blade is 10G.

For information about configuring your VIPRION system and creating BIG-IP system objects (for example, trunks, VLANS, and self IP addresses), see *VIPRION® Systems: Configuration*.

Redundant system configuration and mixed clusters

If you have configured device service clustering (DSC™), previously known as a redundant system configuration, and would like to use a mixture of B4100 and B4200 Series blades, you must put the same blade type in the corresponding slots on each chassis. For example, if you install a B4200 Series blade in slot 1 and a B4100 Series blade in slot 2 on the active chassis, you must install a B4200 in slot 1 and a B4100 Series blade in slot 2 in the standby chassis.

About powering the VIPRION 4400 Series AC platform

The AC platform ships with four power cords that you must use with the installed power supplies to power the chassis.

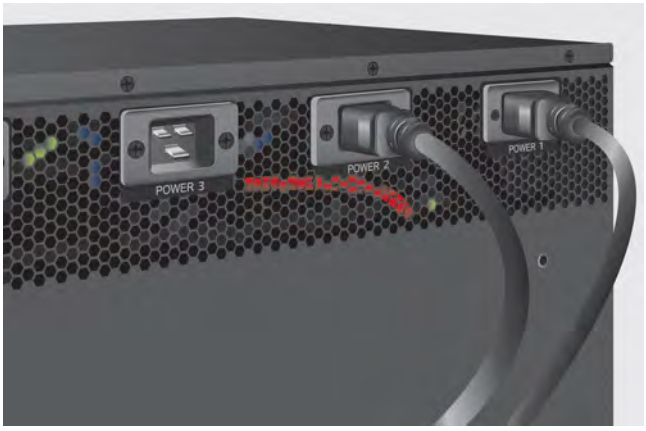
Important: *Do not use any power cords other than those specifically designed for the VIPRION 4400 Series platform.*

Powering the AC platform

You can connect the power cables to the platform after you install it in a rack.

1. On the back of the platform, locate the power outlets that correspond to the locations of the power supplies. Each outlet is labeled to ensure that you connect each power cord to the appropriate outlet.

2. Attach a power cord to the outlet and press firmly until it is fully seated.



3. Plug the power cord into an approved power source.
4. Repeat this process for each power supply in the chassis.

After you successfully install the platform and provide it with power, you must assign a management IP address to the cluster.

About powering the VIPRION 4400 Series DC platform

If you ordered DC power as a factory option, your VIPRION® 4400 Series platform comes pre-installed with DC power supplies.

Before you power this VIPRION DC platform, see *Guidelines for DC-powered equipment* and *Guidelines for VIPRION DC platform installation*.

Additional equipment for powering the DC platform

In addition to the equipment supplied with the standard AC platform, the DC platform requires some additional equipment for installation and wiring. This additional equipment is supplied with the platform.

- Two-ring grounding terminal lug, 5/8 inch (1.59 cm) holes on 1.25 inch (3.18 cm) centers
- Two 5/16-18 Keps nuts for the ground
- Two terminal block plugs for attaching leads to the platform

You need to supply this additional equipment.

- Rack-mounted power disconnect
- 2 AWG copper ground wire
- Minimum 8 AWG copper wiring leads for four power supplies
- Crimping tool for the ground wire
- Screwdriver, #2 Phillips head or flat head

About grounding the chassis

You should ground the platform after you install it in a rack.

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 safety standards.*

Note: *The VIPRION 4400 Series platform must be grounded to a common bonding network (CBN).*

Figure 13: Chassis ground lugs

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. Use a crimping tool to crimp the ground wire to the two-ring ground terminal lug.
   Use a 2 AWG copper wire for grounding.
2. Attach the two-ring ground terminal lug to the ground terminal.
3. Install the M6 Keps nuts on the ground terminal lugs.
   Use 16 to 18 inch-pounds (1.8 to 2.0 Newton-meters) of torque on these Keps nuts.
4. Connect the ground wire to a common bonding network (CBN).

About connecting the DC power source

After the platform is installed in a rack, you can wire the platform to the DC power source. When you connect the DC power source, you should also follow the safety requirements defined for your network operations center (NOC).

There are two groups of terminals on the back of the chassis. When you view the chassis from the rear, there is one on the left side and one on the right side. Each terminal group contains the leads for two power supplies.

- Use the group of leads on the right rear of the chassis labeled PWR 2 and PWR 1 for power supplies 2 and 1.
- Use the group of leads on the left rear of the chassis labeled PWR 4 and PWR 3 for power supplies 4 and 3.

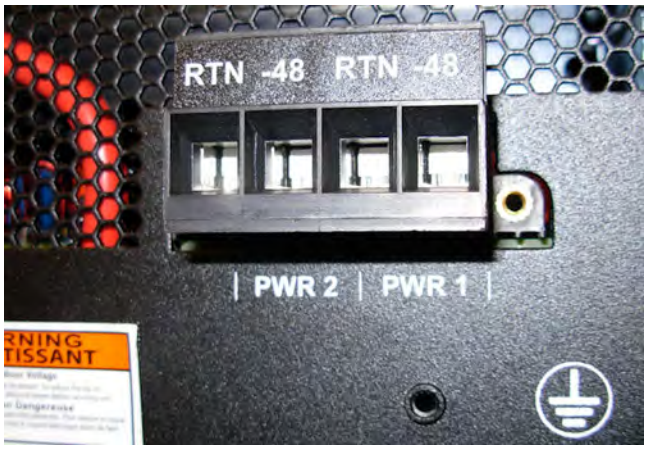


Figure 14: DC terminal block plug

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

Connecting DC power to the platform

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

1. After you are sure the power is off and the ground lug is connected to the ground terminal, you can connect the DC power source.
2. After you connect the ground lug, connect the negative DC power lead to the -48V terminal on the terminal block plug.

   The terminals are clearly labeled. You should strip at least 0.50 in. (12.7 mm) of insulation off of each wire where you connect the wire to the terminal block plug.
3. Connect the positive DC wire to the RTN terminal on the terminal block plug.

   You should strip at least 0.50 in. (12.7 mm) of insulation off of each wire where you connect the wire to the terminal block plug.
4. Wire each supply in this manner until you have wired each terminal block plug for the two power supplies.
5. Plug each terminal block plug into the plug on the back of the chassis.

   Use the screws supplied to attach each wiring block to the plug in the chassis. Use 16 to 18 inch-pounds (1.8 to 2.0 Newton-meters) of torque on these screws.
6. Power on the DC power source.
   The system begins to boot.

After you successfully install the platform and provide it with power, you must assign a management IP address to the cluster.

Connecting the cables and other hardware

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

Note: *Serial (hard-wired) failover is not currently supported between VIPRION chassis. If you would like to set up device service clustering (DSC®), previously known as a redundant system configuration, you must configure network failover. For more information, see BIG-IP® Device Service Clustering: Administration.*

1. Connect an Ethernet cable to the MGMT port if you are using the default network configured on the management interface.
2. Connect the platform to a serial console server.

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

   - Connect the serial console cable supplied by F5 to the CONSOLE port.

     Note: *The default serial port settings are 19200, n, 8, 1.*

   - Connect the RJ45F to RJ45M rolled serial adapter to the CONSOLE port if you are connecting the system to a serial console server with a standard CAT5 cable, and then connect the CAT5 cable to the adapter. The adapter provides the appropriate pinout connection to your equipment.

     Figure 15: The RJ45F to RJ45M rolled serial (pass-through) adapter

3. If you have not already done so, power on the chassis.

You can now assign a cluster 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 Support to aid in troubleshooting. For more information, see `http://support.f5.com/kb/en-us/solutions/public/1000/800/sol1858.html`.

About cluster management

The management IP address for a cluster is known as the cluster IP address. The cluster IP address enables you to access the browser-based Configuration utility to configure other aspects of the product, such as the product license, VLANs, trunks, and so on. Connecting to the cluster IP address connects you to the primary blade in the system.

With VIPRION® platforms, you assign cluster IP addresses on a per-cluster basis. Initially, all blades installed in the chassis belong to a single default cluster. During the initial setup, you only need to assign a single cluster IP address.

A blade within a cluster is known as a cluster member. You can assign a management IP address to each cluster member.

Important: *When you configure an IP address for a blade, that IP address corresponds to the slot in which the blade resides. If you replace that blade with another, the new blade automatically receives the previously-configured management IP address, provided that a second operating blade is installed in the system. At least one operational blade is required at all time to preserve the existing configuration data.*

You can manage clusters using these methods:

- LCD panel
- `config` utility
- `tmsh` commands

Configuring the cluster IP address from the LCD

You can use the LCD panel to configure the cluster IP address. The options for cluster and blade management are located in the Cluster menu item under the System menu.

Note: *When using the LCD to manage clusters, be sure to use the Commit menu option after changing each setting. Alternatively, you can change all cluster-related settings and use the Commit option to save all settings at once.*

1. Press the X button to access the LCD panel menus.
2. Use the arrow keys to select **System** and press the Check button.
3. Use the arrow keys to select **Cluster** and press the Check button.
4. Use the arrow keys to select **Cluster Mgmt** and press the Check button.
5. Use the arrow keys to select **Cluster IP** and press the Check button.
   The LCD panel shows the current IP address of the cluster. The default value is `192.168.1.246`.
6. Use the arrow keys to configure the IP address of the cluster.
7. Press the X button until you return to the **Cluster Mgmt** menu.
8. Use the arrow keys to select **Commit** and press the Check button.

The system saves the new IP address for the cluster. You can now access the browser-based Configuration utility using the cluster IP address you assigned.

Configuring the cluster IP subnet mask from the LCD

You can use the LCD panel to configure the cluster IP subnet mask.

1. Press the X button to access the LCD panel menus.
2. Use the arrow keys to select **System** and press the Check button.
3. Use the arrow keys to select **Cluster** and press the Check button.
4. Use the arrow keys to select **Cluster Mgmt** and press the Check button.
5. Use the arrow keys to select **Cluster IP Mask** and press the Check button.
   The LCD shows the current subnet mask address of the cluster. The default value is `255.255.255.0`.
6. Use the arrow keys to configure the subnet mask of the cluster.
7. Press the X button until you return to the **Cluster Mgmt** menu.
8. Use the arrow keys to select **Commit** and press the Check button.

The system saves the new subnet mask for the cluster.

Configuring the default gateway IP address for the cluster from the LCD

You can use the LCD panel to configure the default gateway IP address for the cluster.

1. Press the X button to access the LCD panel menus.
2. Use the arrow keys to select **System** and press the Check button.
3. Use the arrow keys to select **Cluster** and press the Check button.
4. Use the arrow keys to select **Cluster Mgmt** and press the Check button.
5. Use the arrow keys to select **Gateway** and press the Check button.
   The LCD shows the current gateway IP address of the cluster. The default value is `0.0.0.0`.
6. Use the arrow keys to configure the gateway IP address of the cluster.
7. Press the X button until you return to the **Cluster Mgmt** menu.
8. Use the arrow keys to select **Commit** and press the Check button.

The system saves the new default gateway IP address for the cluster.

Configuring the management IP address of a cluster member from the LCD

You can use the LCD panel to configure the management IP address of a cluster member.

1. Press the X button to access the LCD panel menus.
2. Use the arrow keys to select **System** and press the Check button.
3. Use the arrow keys to select **Cluster** and press the Check button.
4. Use the arrow keys to select **Cluster Mbrs** and press the Check button.
5. Use the arrow keys to select the appropriate blade () and press the Check button.
6. Use the arrow keys to select **Blade Mgmt IP** and press the Check button.
   The LCD shows the current IP address of the blade. The default value is `0.0.0.0`.
7. Use the arrow keys to configure the IP address of the blade.
8. Press the X button until you return to the Blade [1-] Mgmt menu.
9. Use the arrow keys to select **Commit** and press the Check button.

The system saves the new IP address for the blade.

Configuring the cluster IP address using the config utility

You can configure the cluster IP address using the `config` utility after you connect a blade to a serial console.

1. Connect to the system using the serial console.
2. Start the `config` utility.

   ```
   config
   ```

   The `config` utility displays.
3. Follow the prompts to configure the cluster IP address, subnet mask, and gateway address for the management port.

The system saves the new IP address, subnet mask, and gateway address for the cluster. You can now access the browser-based Configuration utility using the cluster IP address you assigned.

Configuring the cluster IP address using tmsh

You can configure the cluster IP address using `tmsh` after you connect a blade to a serial console.

1. Connect to the system using the serial console.
2. Set the cluster IP address and subnet mask.
   `tmsh modify sys cluster default address <ip_address/mask>`
   Example: `tmsh modify sys cluster default address 192.168.217.44/24`
3. Set the default gateway for the cluster.
   `tmsh modify sys management-route default gateway <gateway_ip>`
   Example: `tmsh modify sys management-route default gateway 172.20.80.254`
4. Write the running configuration to the stored configuration files.
   `tmsh sys save [base-config | config]`

The system saves the new IP address, subnet mask, and gateway address for the cluster. You can now access the browser-based Configuration utility using the cluster IP address you assigned.

Licensing the platform

Once the cluster 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 cluster IP address that you assigned to the VIPRION system.
   Use this format, where *<cluster_ip_address>* is the cluster IP address you assigned:
   `https://<cluster_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.

Verifying blade availability

At this point, you have installed the VIPRION platform, powered it, installed blades, assigned a cluster IP address to the system, and licensed it for use. Next, you need to ensure that the blades are recognized by the software and available for processing network traffic.

1. Using a Web browser, navigate to the cluster IP address that you have assigned to the VIPRION platform.
   The Configuration utility opens.
2. On the Main tab, click **System** > **Clusters**.
   The Clusters screen opens.

3. In the **Cluster Members** area, verify that all blades listed have a green status icon in the Status column.
   The green circle icon indicates that the cluster member is available.

Now you have installed a VIPRION platform successfully and prepared it for use on your network. The next steps involve further configuration of the platform by adding the trunks, VLANs, and self IP addresses that are necessary for the system to manage your network traffic effectively.

Platform Maintenance

About maintaining the platform

The VIPRION® 4400 Series platform contains several components that you can replace individually without exchanging the entire system. This platform contains these replaceable components:

- AC power supply
- DC power supply
- Fan tray
- Storage drive assembly

Note: *Applies only to the B4300 blade with hard disk drive (HDD).*

- Front bezel (with LCD component)
- Blades

About AC power supplies

The VIPRION® 4400 Series platform supports up to four hot swappable power supplies. These power supplies can operate in one of two modes: 120V and 220V, depending on the power source to which the power supplies are connected.

The platform supports both symmetric and asymmetric power redundancy. Symmetric redundancy (2 * N) requires an even number of power supplies, with half supplied by one power feed and half by another. If one power feed fails, the system is unaffected because the remaining supplies are sufficient for the entire load. With asymmetric redundancy (n + 1), it is not possible to split the supplies evenly between the power feeds. As a result, if one power feed fails, the entire system can go down. In either type of redundancy, if a single power supply fails, the system is unaffected by the loss of a single supply.

Figure 16: A power supply partially removed from the platform

Caution: *Running without all power supplies installed in the platform can affect cooling and electromagnetic interference (EMI). If a power supply fails, you can leave it installed in the chassis and remove the power cord; the system, however, will continue to log errors. If you need to run the unit without all power supplies installed, you must install a blank supply bracket into any empty power supply slots. The blank supply bracket is required to maintain proper airflow in the system.*

Caution: *The power socket outlet should be installed near the equipment and easily accessible.*

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

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

Installing an AC power supply

If a power supply is already installed in the bay where you are installing the replacement supply, disconnect the AC power cord for the corresponding power supply from the back of the chassis and remove the existing supply from the chassis.

In the event of a power supply failure, you can replace an AC power supply without powering down the system, provided that there are still enough power supplies to equal one less than the number of running blades. For example, if the chassis has three blades, you can replace a power supply, as long as the platform has at least two power supplies operating during the replacement process.

1. Using the indentations on either side of the LCD component, remove the front bezel from the chassis.
   With the front bezel removed, you can see the power supplies and the available power supply bays.
2. Remove the existing supply, if one is installed.
3. Slide the new power supply into the empty power supply bay.
4. Lower the power supply eject lever to fully seat the power supply in its bay.
5. Secure the power supply in its bay by tightening the screw in the middle of the power supply eject lever.

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

6. Attach the power cord for the new power supply to the back of the unit, using the corresponding power supply connector.
7. Replace the front bezel.

About DC power supplies

The VIPRION® 4400 Series platform supports up to four hot swappable DC power supplies.

You can install a DC power supply without powering down the system, provided that there are still enough power supplies to equal one less than the number of running blades. For example, if the chassis has three blades, you can replace a power supply, as long as the platform has at least two power supplies operating during the replacement process.

The platform supports both symmetric and asymmetric power redundancy. Symmetric redundancy (2 * N) requires an even number of power supplies, with half supplied by one power feed and half by another. If one power feed fails, the system is unaffected because the remaining supplies are sufficient for the entire load. With asymmetric redundancy (n + 1), it is not possible to split the supplies evenly between the power feeds. As a result, if one power feed fails, the whole system can go down. In either type of redundancy, if a single power supply fails, the system is unaffected by the loss of a single supply.

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.

Figure 17: VIPRION 4400 Series DC power supply

Caution: *Running without all power supplies installed in the platform can affect cooling and electromagnetic interference (EMI). If a power supply fails, you can leave it installed in the chassis and remove the power cord; the system, however, will continue to log errors. If you need to run the unit without all power supplies installed, you must install a blank supply bracket into any empty power supply slots. The blank supply bracket is required to maintain proper airflow in the system.*

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® 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 must meet all appropriate safety standards and local electric codes.*

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.*

Installing a DC power supply

If a power supply is already installed in the bay where you are installing the replacement supply, disconnect the DC terminal block for the corresponding power supply from the back of the chassis and remove the existing supply from the chassis.

In the event of a power supply failure, you can replace a DC power supply without powering down the system, provided that there are still enough power supplies to equal one less than the number of running blades. For example, if the chassis has three blades, you can replace a power supply, as long as the platform has at least two power supplies operating during the replacement process.

Note: *You should wait at least five seconds before re-inserting a power supply that you have removed. Otherwise, the LEDs for the power supply might remain OFF, and the system will report that power supply as being in a down state.*

1. Using the indentations on either side of the LCD component, remove the front bezel from the chassis.
   With the front bezel removed, you can see the power supplies and the available power supply bays.
2. Remove the existing supply, if one is installed.
3. Slide the new power supply into the empty power supply bay.
4. Lower the power supply eject lever to fully seat the power supply in its bay.
5. Secure the power supply in its bay by tightening the screw in the middle of the power supply eject lever.

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

6. Connect the DC terminal for the new power supply to the back of the unit, using the corresponding power supply connector.
7. Replace the front bezel.

About the fan tray

The VIPRION® 4400 Series 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® recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

Figure 18: Fan tray in the platform

Replacing the fan tray

You can replace the fan tray as part of routine maintenance or in the event of a fan tray failure. 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® 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. Turn the compression screws on the fan tray, until the locking indicator changes color from green (locked) to red (unlocked).
2. Stand at the front of the platform and locate the ejector handle on the fan tray.

   The ejector handle is located in the middle of the fan tray, which is located on the left side of the chassis.
3. Extend the fan tray handle by pressing the top portion of the handle into the unit.

   The handle extends, revealing a ring that you can use to extract the fan tray.
4. Grasp the ejector handle and remove the fan tray from the chassis by pulling straight toward you.
5. Place the new fan tray into the fan tray bay.
6. Push the fan tray into the chassis until it is seated firmly in the fan tray bay.

   Once seated, the fan tray automatically powers up and begins circulating air through the chassis.

Important: *Use only the fan tray handle to seat the fan tray in the chassis. Using the edges of the fan tray could result in pinched fingers, as a fully-seated fan tray is nearly flush with the other chassis components.*

About the storage drives

By default, VIPRION® B4000 blades contain one storage drive. You can remove the drive from the blade only if your company's security requirements necessitate it when performing a Return Material Authorization (RMA) on the platform.

Important: *F5® supports replacement of hard disk drives (HDD) only.*

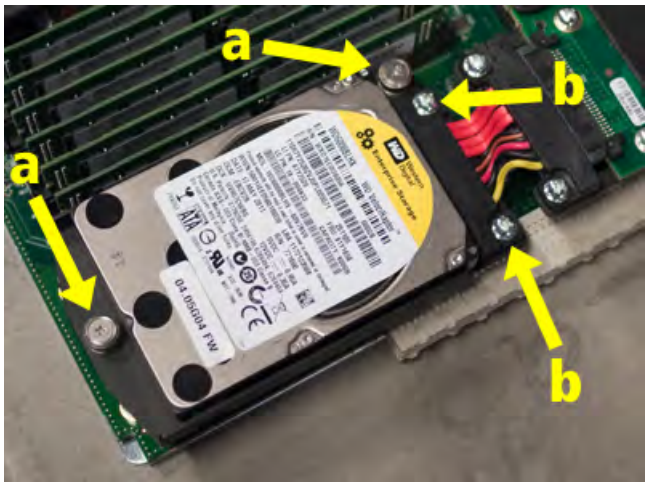
Important: *This product is sensitive to electrostatic discharge (ESD). F5® recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

Replacing a storage drive assembly on a B4300 blade

You can change or replace a drive assembly in a VIPRION® B4300 Series blade as part of the routine maintenance of the unit or in the event of a drive failure.

1. Disconnect all cables and remove any optical modules from the blade that contains the drive assembly to be replaced.
2. Remove the blade from the chassis.
3. Remove the existing drive assembly, if one is installed:
   a) Loosen the drive assembly screws (a) by turning them counterclockwise with a Phillips screwdriver, if necessary.

   Note: *These screws are captive and cannot be removed from the assembly.*

   b) Remove the SAS cable assembly screws (b) by turning them counterclockwise with a Phillips screwdriver.
   c) Grasp the drive assembly screw on the end, lift the drive assembly slightly, and then pull straight out to remove the drive assembly from the blade.
4. Slide the new drive assembly into the bay and connect it to the SAS cable assembly.

5. Tighten all screws into place using 4 inch-pounds (0.45 Newton-meters) of torque.
   The drive assembly is connected to the system when you tighten all screws completely.
6. Slide the blade back into the chassis.

About the front bezel (with LCD component)

The LCD component on the front bezel enables you to access several functions associated with the platform, such as configuring the management port for the system.

Replacing the front bezel

You can replace the front bezel in the unlikely event of an LCD component failure. You do not need special tools to replace the front bezel.

1. Remove the original front bezel by grasping the bezel on either side, using the indentations provided.

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

2. Pick up the replacement front bezel using the indentations provided.
3. Align the guide pins on the bezel to the corresponding holes in the chassis.

Environmental Guidelines

General environmental guidelines

The VIPRION® 4400 Series 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.
- Do not allow the air temperature in the room to exceed 104°F (40°C).

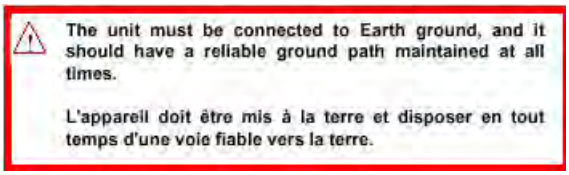
  Note: *NEBS-certified units can withstand air temperatures up to 131°F (55°C). The maximum temperature is only required to be met for a short period of time.*

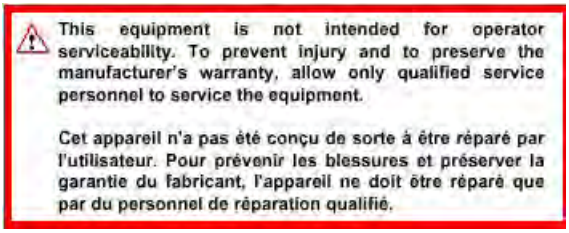
- Do not plug the unit into a branch circuit shared by more electronic equipment than the circuit is designed to manage safely at one time.

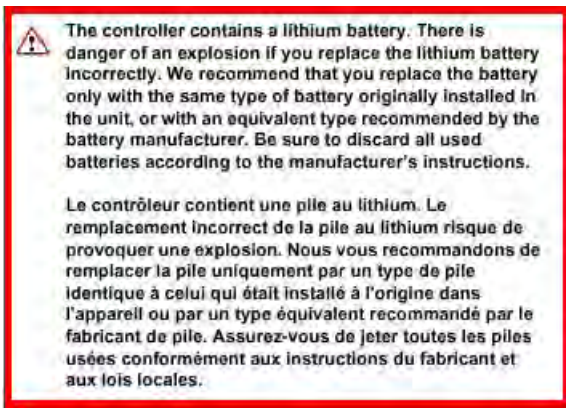
Important: *This product is sensitive to electrostatic discharge (ESD). F5® recommends that you use proper ESD grounding procedures and equipment when you install or maintain the unit.*

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 the AC-powered platform

An AC-powered installation must meet these requirements:

- Install the unit using a 20 amp external branch circuit protection device.
- Normally, one power feed is used 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 power cables included with this unit are for exclusive use with this unit and should not be used with other electrical appliances.*

Note: *These 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 the DC-powered platform

A VIPRION® DC-powered installation must meet these requirements:

- Install the unit using a 25 amp external branch circuit protection device.
- One power feed must be used for each individual power supply.
- For permanently connected equipment, incorporate a readily accessible disconnect in the fixed wiring.
- Use only copper conductors.

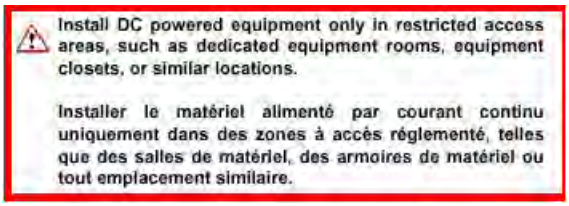
- The DC MAINS powering the equipment shall be connected to protective earth.

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

Note: *The power supply for the VIPRION® DC platform does not have an on/off switch. You control the power from the DC power source.*

Note: *You must use copper wire for the ground wire and all lead wires.*

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.*



NEBS platform guidelines

This information applies to the Network Equipment-Building System (NEBS) version of the VIPRION 4400 Series platform.

This equipment meets NEBS requirements per GR-63-CORE.

This equipment is suitable for installation in these locations:

- Network Telecommunication Facilities
- Locations where the National Electrical Code (NEC) applies

Important: *The intra-building interfaces of this platform, including Ethernet, are suitable for connection to intra-building, or unexposed wiring or cabling only with shielded and grounded cables at both ends. The intra-building ports of the equipment must not be metallically connected to interfaces that connect to the outside plant (OSP) or its wiring.*

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.*

Platform airflow diagram

When you install the platform into a rack, it is important to understand the unit's airflow direction so that you can ensure proper cooling.

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

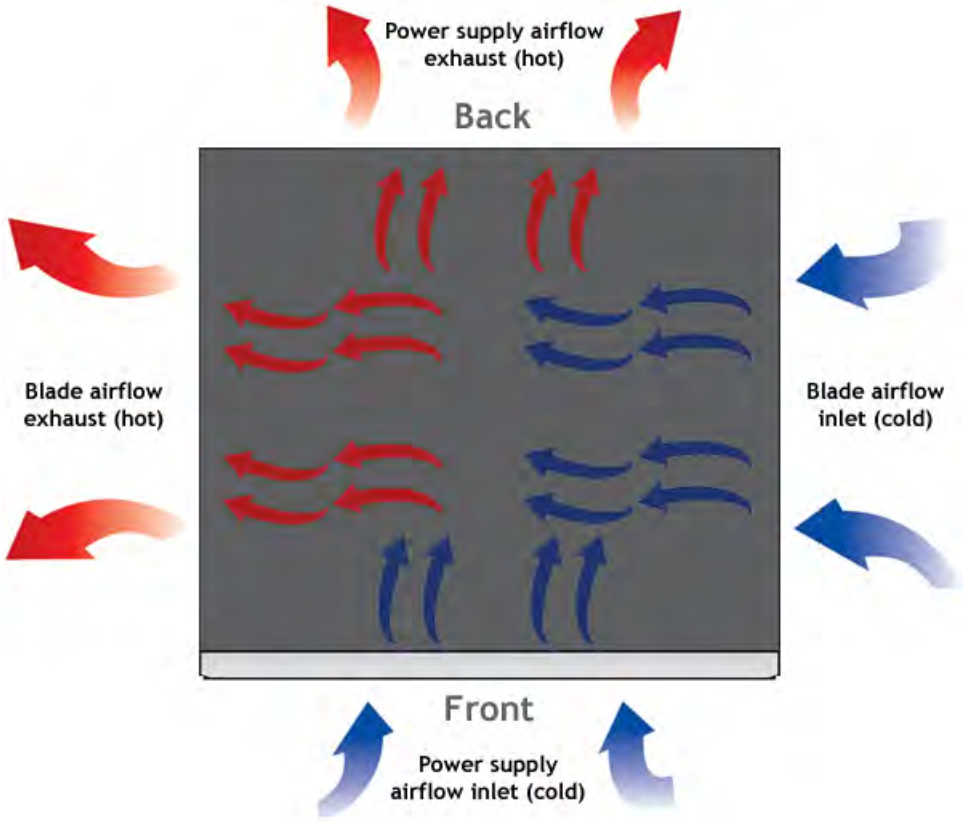


Figure 19: Airflow in the VIPRION 4400 Series platform

Platform Specifications

General specifications for system features

This table lists general specifications for the VIPRION® 4400 Series platform.

Item	Specification
Transceiver modules hot swap	Support for hot swap of transceiver modules
Dynamic routing protocols	BFD, BGP4, IS-IS, OSPFv2, OSPFv3, RIPv1/RIPv2, RIPng
Jumbo frames	Support for maximum Ethernet frame size of 1818 bytes and MTU of 1800 bytes (B4100 and B4200 Series blades) Support for maximum Ethernet frame size of 9216 bytes and MTU of 9128 bytes (B4300 and B4400 Series blades)
Virtual Clustered Multiprocessing™ (vCMP™)	Supports provisioning and managing multiple, hosted instances of the BIG-IP software on a single hardware device

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

VIPRION B4100/4200 Series blade hardware specifications

This table lists hardware specifications for VIPRION® B4100/B4200 Series blades.

Specification	B4100	B4200
Dimensions	Proprietary to fit F5® Networks chassis	
Weight	14.5 pounds (6.58 kg)	14.5 pounds (6.58 kg)
Processor	2 x Dual-Core AMD Opteron™ processors	2 x Quad-Core AMD Opteron™ processors
Communication interfaces	8x10/100/1000 Copper ports 12 x 1GbE SFP fiber ports • 10GBASE-SR - 850nm (LC connector, four modules included) 2 x 10G XFP ports 1 x 10/100/1000 Ethernet Management port	4 x 10/100/1000 Copper ports 8 x 1GbE/10GbE SFP+ fiber ports • 10GBASE-SR - 850nm (LC connector, two modules included) 1 x 10/100/1000 Ethernet Management port
Storage drive capacity	1 x 160 GB Hard Disk Drive (HDD) 1 x 8 GB CompactFlash	1 x 160 GB HDD 1 x 8 GB CompactFlash
RAM	8 GB	16 GB

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

Important: *F5® only provides support for F5-branded or F5-provided optical modules.*

Important: *The XFP ports on the B4100 Series blade are inverted. Insert XFP optical modules upside down.*

VIPRION B4300/B4400 Series blade hardware specifications

This table lists hardware specifications for VIPRION® B4300/B4400 Series blades.

Specification	B4300	B4340N	B4450
Dimensions	Proprietary to fit F5® Networks chassis		
Weight	18.5 pounds (8.39 kg)	18.5 pounds (8.39 kg)	19.0 pounds (8.62 kg)
Processor	2 x Hex-Core Intel® Xeon® processors	2 x Hex-Core Intel Xeon processors	2 x 12-Core Intel Xeon processors
Communication interfaces	2 x 40GbE QSFP+ fiber ports 8 x 10GbE SFP+ fiber ports • 10GBASE-SR - 850nm (LC connector, two modules included) 1 x 10/100/1000 Ethernet Management port	2 x 40GbE QSFP+ fiber ports 8 x 10GbE SFP+ fiber ports • 10GBASE-SR - 850nm (LC connector, two modules included) 1 x 10/100/1000 Ethernet Management port	2 x 40GbE QSFP+ fiber ports 2 x 100GbE QSFP28 fiber ports 6 x 40GbE QSFP_ fiber ports 1 x 10/100/1000 Ethernet Management port
Storage drive capacity	1 x 600 GB HDD	1 x 600 GB HDD	1 x 1.6 TB SSD
RAM	48 GB	96 GB	256 GB

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

Important: *F5® only provides support for F5-branded or F5-provided optical modules.*

Chassis hardware specifications

This table lists hardware specifications for the VIPRION 4400 and 4480 chassis.

Item	Specification
Dimensions	H: 12.2 inches (30.9 cm) x W: 17.4 inches (44.2 cm) x D: 21 inches (53.3 cm) rack-mount chassis
Weight	Fully-loaded system (4 blades, 4 power supplies, 1 fan tray, 1 system ID card): 143 pounds (64.9 kg) Half-loaded system (2 blades, 2 blanks, 2 power supplies, 1 fan tray, 1 system ID card): 109 pounds (49.4 kg) Empty chassis (0 blades, 3 blanks, 0 power supplies, 1 fan tray, 1 system ID card): 69 pounds (31.3 kg) Power supply: 4.5 pounds (2.0 kg)

Item	Specification
	B4100 Series blade: 14.5 pounds (6.58 kg) B4200 Series blade: 14.5 pounds (6.58 kg) B4300 Series blade: 18.5 pounds (8.39 kg) B4400 Series blade: 19.0 pounds (8.62 kg) Blank: 2 pounds (0.9 kg) Fan tray: 8.5 pounds (3.9 kg) System ID card: 0.5 pounds (0.2 kg)
Processor	See blade specifications
Hard drive capacity	See blade specifications
RAM	See blade specifications
AC power input requirements	1 to 4 x 90 VAC to 240 VAC auto-ranging 20A per input line (max)
DC power supply	1 to 4 x 1200W -36 to -72 VDC 10 to 40A maximum per supply

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

Chassis environmental operating specifications

This table lists environmental operating specifications for the VIPRION® chassis.

Item	Specification
Operational temperature	32° to 104°F (0° to 40°C)
Operational temperature (NEBS-certified system)	23° to 131°F (-5° to 55°C)
Operational relative humidity	5 to 85% at 104°F (40°C)
Non-operational temperature	-40 to 158°F (-40 to 70°C)
Non-operational temperature (NEBS-certified system)	-40° to 158°F (-40° to 70°C)
Non-operational humidity	5 to 95% at 40°C non-condensing

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

About AC power requirements

When working with an AC-powered VIPRION® platform, it is important to understand the AC power options and requirements.

About AC power cables

The power cable supplied with the hardware is a 220V high-line input cable. This type of cable requires a NEMA 6-20R wall outlet or a region-specific equivalent. For 115V VAC low-line input, a different cable is available that uses a NEMA 5-20P, or region-specific equivalent. Region-specific power cables are available from F5® Networks.

Note: *The power cables included with this unit are for exclusive use with this unit and should not be used with other electrical appliances.*

AC power redundancy provisioning

The platform supports one to four AC power supplies. The power supplies are auto-ranging 90VAC to 240VAC input. Each slot is provisioned to draw up to 600W, therefore, one power supply with low-line input can support two blades with no redundancy, or the same supply with high-line input can support up to three blades. This table shows some of the possible blade and power supply redundancy configurations.

Table 1: AC power provisioning recommendations

	No redundancy		1 + 1 redundancy	
Blade quantity	**Supplies (low-line)**	**Supplies (high-line)**	**Supplies (low-line)**	**Supplies (high-line)**
1 (600W)	1 (1200W available)	1 (2000W available)	2 (1200W available)	2 (2000W available)
2 (1200W)	1 (1200W available)	1 (2000W available)	2 (1200W available)	2 (2000W available)
3 (1800W)	2 (2400W available)	1 (2000W available)	4 (2400W available)	2 (2000W available)
4 (2400W)	2 (2400W available)	2 (4000W available)	4 (2400W available)	4 (4000W available)

AC platform power consumption (low-line input)

The actual amount of power draw from the AC source depends on the type and number of blades and the power supply AC source voltage and redundancy configuration. This table shows several possible configurations for low-line input voltage (110 VAC) and the typical and maximum power draw.

Table 2: AC mains total system power draw (low-line input)

Blade quantity and type	Typical system power draw (W) [1]	Maximum system power draw (W) [2]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
1 x B4100	650	875	2220	2990	2
2 x B4100	950	1250	3245	4265	2
3 x B4100	1300	1625	4440	5545	4
4 x B4100	1600	2000	5460	6825	4
1 x B4200	675	900	2305	3075	2

[2] **At 100% load and a temperature of 40°C.**
[1] **At 50% load and a temperature of 25°C.**

Blade quantity and type	Typical system power draw (W) [1]	Maximum system power draw (W) [2]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
2 x B4200	1000	1300	3415	4440	2
3 x B4200	1375	1700	4695	6825	4
4 x B4200	2000	2100	6825	7165	4
1 x B4300	655	740	2230	2520	2
2 x B4300	1085	1255	3695	4275	2
3 x B4300	1580	1835	5380	6250	4
4 x B4300	2010	2350	6845	8005	4
1 x B4450	805	940	2750	3210	2
2 x B4450	1240	1515	4235	5170	2
3 x B4450	1675	2090	5720	7135	4
4 x B4450	2110	2665	7200	9095	4

AC platform power consumption (high-line input)

The actual amount of power draw from the AC source depends on the type and number of blades and the power supply AC source voltage and redundancy configuration. This table shows several possible configurations for high-line input voltage (220 VAC) and the typical and maximum power draw.

Table 3: AC mains total system power draw (high-line input)

Blade quantity and type	Typical system power draw (W) [3]	Maximum system power draw (W) [4]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
1 x B4100	675	900	2305	3075	2
2 x B4100	975	1275	3330	4350	2
3 x B4100	1325	1650	4525	5630	4
4 x B4100	1625	2025	5545	6910	4
1 x B4200	700	925	2390	3160	2
2 x B4200	1025	1325	3500	4525	2
3 x B4200	1400	1725	4780	5890	4
4 x B4200	1725	2125	5890	7255	4
1 x B4300	825	910	2805	3095	2
2 x B4300	1255	1425	4275	4855	2
3 x B4300	1800	2055	6135	7005	4
4 x B4300	2230	2570	7605	8765	4

[2] At 100% load and a temperature of 40°C.
[1] At 50% load and a temperature of 25°C.
[4] At 100% load and a temperature of 40°C.
[3] At 50% load and a temperature of 25°C.

Blade quantity and type	Typical system power draw (W) [3]	Maximum system power draw (W) [4]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
1 x B4450	925	1055	3160	3600	2
2 x B4450	1360	1630	4645	5565	2
3 x B4450	1795	2205	6125	7525	4
4 x B4450	2230	2780	7610	9490	4

DC power requirements

When working with a DC-powered VIPRION® 4400 Series platform, it is important to understand the DC power options and requirements.

DC power redundancy provisioning

The platform supports one to four DC power supplies. Each slot is provisioned to draw up to 600W; therefore, one power supply can support two blade slots with no redundancy. This table shows some of the possible blade and power supply redundancy configurations.

Table 4: DC power provisioning recommendations

Blade quantity	No redundancy	1 + 1 redundancy
1 (600W)	1 (1200W available)	2 (1200W available)
2 (1200W)	1 (1200W available)	2 (1200W available)
3 (1800W)	2 (2400W available)	4 (4800W available)
4 (2400W)	2 (2400W available)	4 (4800W available)

DC platform power consumption

The actual amount of power draw from the DC power source depends on the type and number of blades and the redundancy configuration. This table shows several possible configurations and the typical and maximum power draw (at an input voltage of 48 VDC).

Table 5: DC Mains Total System Power Draw

Blade quantity and type	Typical system power draw (W) [5]	Maximum system power draw (W) [6]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
1 x B4100	400	475	1365	1625	2

[4] At 100% load and a temperature of 40°C.
[3] At 50% load and a temperature of 25°C.
[6] At 100% load and a temperature of 40°C.
[5] At 50% load and a temperature of 25°C.

Blade quantity and type	Typical system power draw (W) [5]	Maximum system power draw (W) [6]	Typical system heat (BTU/hr)	Maximum system heat (BTU/hr)	Number of power supplies installed
2 x B4100	650	800	2220	2730	2
3 x B4100	1000	1225	3415	4180	4
4 x B4200	1250	1550	4265	5290	4
1 x B4200	500	600	1710	2050	2
2 x B4200	850	1050	2900	3585	2
3 x B4200	1200	1400	4095	4780	4
4 x B4200	1550	1750	5290	5975	4
1 x B4300/B4340N	572	657	1955	2245	2
2 x B4300/B4340N	1002	1172	3420	4000	2
3 x B4300/B4340N	1463	1718	4995	5865	4
4 x B4300/B4340N	1893	2233	6460	7620	4
1 x B4450	820	1075	2800	3670	2
2 x B4450	1255	1650	4285	5630	2
3 x B4450	1690	2225	5770	7595	4
4 x B4450	2125	2800	7255	9555	4

NEBS-compliant VIPRION system configurations

This table lists available Network Equipment-Building System (NEBS)-compliant VIPRION® system configurations.

For a system to be completely NEBS-compliant, you must use a NEBS-compliant DC-powered chassis and blades.

Blade type	C4400 chassis	C4480 chassis	C4800 chassis
B4100N	x		
B4200N	x	x	
B4340N		x	x
B4450		x	x

Safety requirements

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

EC Type Examination Certificates: Master Contract 252302

[6] **At 100% load and a temperature of 40°C.**
[5] **At 50% load and a temperature of 25°C.**

CB Scheme

EN 60950-1:2006+A11:2009+A1:2010+A12:2011

IEC 60950-1:2005, A1:2009

CSA 60950-1-07, including A1:2011+A2:2014

ANSI/UL 60950-1-2011

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

EMC requirements

This equipment complies with these 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 these conditions:

- This equipment may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

European Union

This equipment complies with these 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:
ETSI EN	300 386 V1.6.1 (2012)
EN 55022:2012	Class A
EN 61000-3-2:2014	
EN 61000-3-3:2013	

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

Directive:	Required Limits:
EN 55024:2010	
EN 55032:2012	Class A
EN 61000-3-2:2014	
EN 61000-3-3:2013	

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 VIPRION 4400 Series platform.

Specification type	Detail	Units	Chassis with blade
Acoustic [7]	Front	dBA	72
	Left	dBA	77
	Right	dBA	75
	Rear	dBA	67
Altitude [8]	Operational	Feet	5905
	Non-operational	Feet	40,000
Airflow [9]	Entire chassis	CFM	650

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

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

[8] 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.

[9] Fan Tray airflow measurements taken at 100% duty cycle and in open air.

China RoHS Requirements

Hazardous substance levels for China

This table shows how the VIPRION® 4400 Series platform components conform to the Restriction of Hazardous substances Directive (RoHS) standards for China.

C4400, C4480 系列有害物质表

C4400, C4480 Series 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	o	o	o	o	o	o
电源底板组件 Power backplane Assembly	x	o	o	o	o	o
指示面板组件 Annunciator Assembly	x	o	o	o	o	o
液晶显示器组件 LCD Assembly	x	o	o	o	o	o
风扇组件 Fan Assembly	x	o	o	o	o	o
电源 Power Supplies	x	o	o	o	o	o

o: 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 is 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.

Viprion 刀片危害物质表

Viprion Blade 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	o	o	o	o	o	o
PCA 处理器板 PCA Processor Board	x	o	o	o	o	o
PCA 中楼板 PCA Mezzanine Board	x	o	o	o	o	o
内部电缆 Internal Cables	x	o	o	o	o	o

o: 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"×"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 is 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.

B4300 系列有害物质表

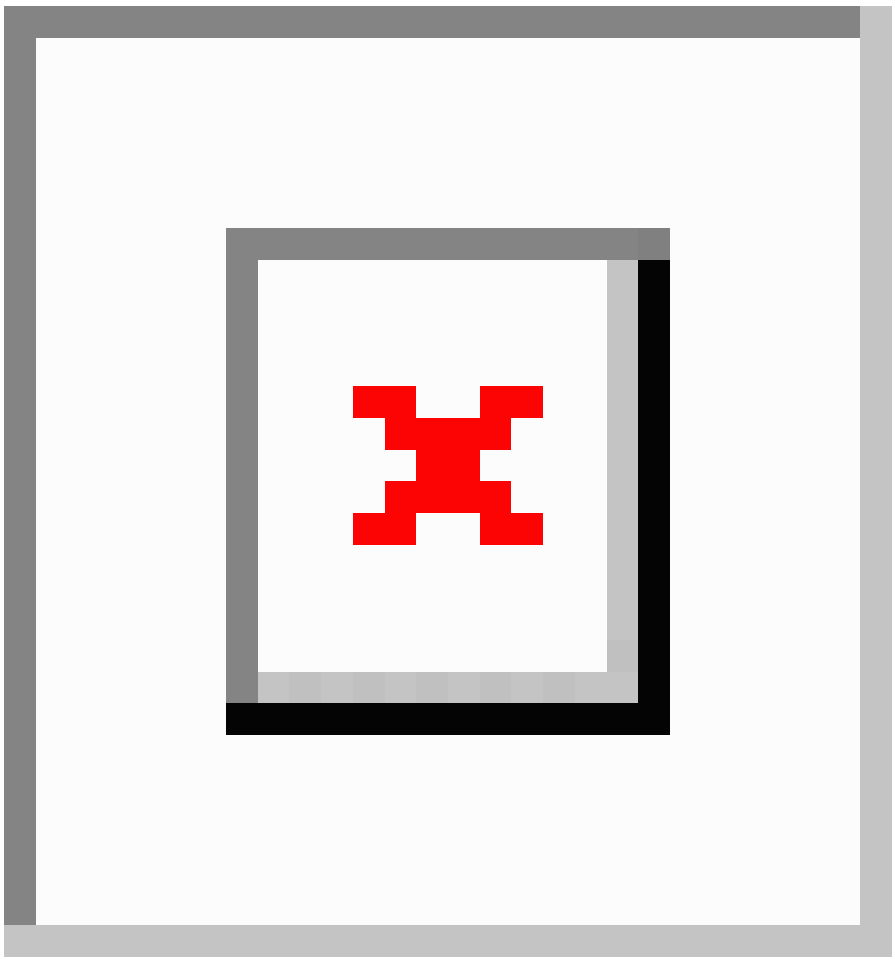
B4300 Series Hazardous Substance Table

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	x	o	o	o	o	o
PCA 处理器板 PCA Processor Board	x	o	o	o	o	o
PCA 中楼板 PCA Mezzanine Board	x	o	o	o	o	o
内部电缆 Internal Cables	x	o	o	o	o	o
硬盘 / 固态硬盘 Hard Drives or SSDs	o	o	o	o	o	o

o: 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 is 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.



Repackaging Guidelines

About repackaging the platform

The VIPRION® 4400 Series chassis and blades are designed to be shipped and packaged separately. If it becomes necessary to transport the platform to another location or return it to F5® Networks, these guidelines will help ensure that you repackage the platform properly.

Important: *Before returning any equipment, contact F5 to obtain a Return Material Authorization (RMA) case number.*

Important: *You must use shipping materials and packaging provided by F5 when repackaging the platform.*

Note: *Be sure to keep a record of the tracking number and ship date. These will be needed to track lost shipments.*

Note: *Do not include any cables, removable XFP/SFP/SFP+ modules, GBICs, or other peripheral items if you are returning the platform to F5 Networks.*

Repackaging the chassis

The VIPRION® 4400 Series chassis must be shipped empty (with no blades installed) and in F5®-provided packaging.

1. Disconnect the power cords and other cables from the platform.
2. Remove the front bezel from the chassis and place it in the bezel box.
3. (Optional) You can install the chassis handles if they are not already installed to help ease removal of the chassis from the rack.
4. Remove all blades from the chassis.
5. Remove the chassis from the rack.
6. Place the empty chassis onto the shipping pallet.

7. Secure the shipping brackets to both sides of the chassis and ensure that the brackets are securely fastened to the pallet.

   Use a 9/64 inch hex key for the four screws that secure each shipping bracket to the side of the chassis. Use a 3/8 inch drive socket to secure the shipping brackets to the pallet.

8. Remove the handles from the chassis (if installed).
9. Remove the front bezel from the chassis and place it in the bezel box.
10. Place the foam insert, including the two accessory boxes, on top of the chassis.

11. Place the outer corrugated box over the chassis.

12. Place the outer metal brace over the outer corrugated box and secure it to the pallet.
Use a 3/8 inch drive socket to secure the outer metal brace.

Repackaging a blade

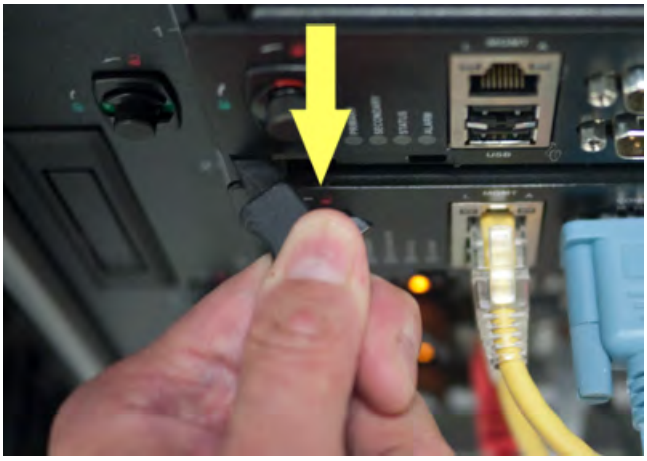
The VIPRION® B4000 Series blades must be shipped in F5-provided packaging.

1. Disconnect the network cables and other cables from the blade, and then remove any optical modules.
2. Turn the compression screws, located on either side of the blade, until the locking indicator changes from green (locked) to red (unlocked).

3. Grasp the two eject levers on the front of the blade and pull toward you.

4. Fully extend the eject levers on both sides of the blade and pull out toward you to remove the blade from the chassis.

Important: *You should handle blades only by the edges and avoid touching the board components.*



5. Place the blade into the antistatic bag, and then place the bagged blade into the black conductive wrapper sheet.

Note: *Use the printed guidelines inside the black wrapper sheet to orient the blade properly.*

6. Close the black wrapper sheet by securing the tabs on the left and right sides of the box.

7. Place the foam cover on top of the blade box.

8. Close the blade box.

9. Install the foam end caps onto the outside edges of the blade box, and then place the blade box into the outer shipping box.

10. Close and seal the outer shipping box.

Returned Material Data Security Statement

About returned material data security

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

About memory technologies used in F5 equipment

F5® 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
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
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® 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 and coin battery, and these components will be replaced during F5 reprocessing. Otherwise, HDD and SSD 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/sol13164.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)

If the system includes an internal hardware security module (HSM), also referred to as a FIPS card, you can remove the sensitive customer data from HSM before returning it to F5® Networks.

Important: *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 in 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`

   For more information on using this command on a FIPS platform, see *BIG-IP® Platform: FIPS Administration*.

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

Legal Notices

Legal Notices

Publication Date

This document was published on August 17, 2017.

Publication Number

MAN-0311-09

Copyright

Trademarks

For a current list of F5 trademarks and service marks, see *http://www.f5.com/about/guidelines-policies/trademarks/*.

All other product and company names herein may be trademarks of their respective owners.

Patents

This product may be protected by one or more patents indicated at: *https://f5.com/about-us/policies/patents*

Export Regulation Notice

This product may include cryptographic software. Under the Export Administration Act, the United States government may consider it a criminal offense to export this product from the United States.

RF Interference Warning

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

FCC Compliance

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.

Any modifications to this device, unless expressly approved by the manufacturer, can void the user's authority to operate this equipment under part 15 of the FCC rules.

Canadian Regulatory Compliance

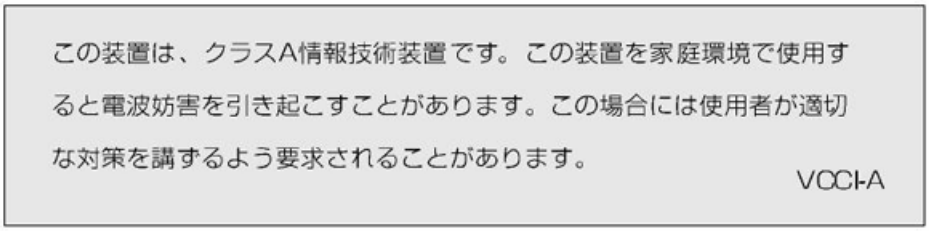
This Class A digital apparatus complies with Canadian ICES-003.

Standards Compliance

This product conforms to the IEC, European Union, ANSI/UL and Canadian CSA standards applicable to Information Technology products at the time of manufacture.

VCCI Class A Compliance

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions. VCCI-A



Index

D

E

F

G

H

I

J

L

M

N

O

P

Q

R

S

T

U

V

W

X