Hardware Installation Guide for vEdge Routers

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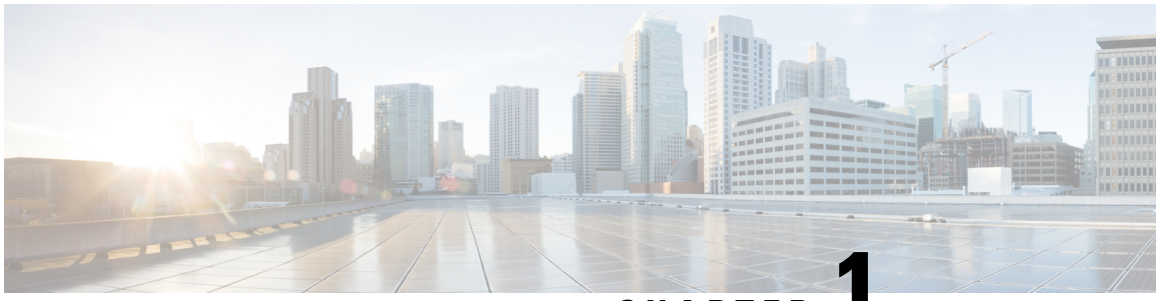


CHAPTER 1

vEdge 100 Router

The vEdge 100 router delivers highly secure site-to-site data connectivity to small business and home offices (SOHO). The vEdge 100 router is a fixed-port-configuration router with the following features:

- Five built-in 10/100/1000 Mbps Ethernet ports
- Power over Ethernet (PoE) source support on one Ethernet port
- Encryption and QoS support
- 100 Mbps aggregate bandwidth (IPSEC IMIX)
- Secure identification chip for anti-counterfeit and secure authentication
- Integrated power supply
- Kensington security lock slot to physically lock down the router
- Desktop mount, wall mount, or rack-mountable in a 19-inch rack

Chassis Views

The following figures show the front and back panels of the vEdge 100 router, indicating the location of the power interfaces, status indicators, and chassis identification labels.

Figure 1: Front Panel of the vEdge 100 Router

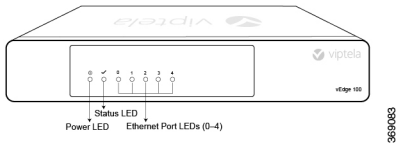
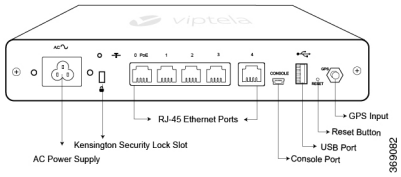


Figure 2: Back Panel of the vEdge 100 Router



- Declaration of Conformity, on page 2

Declaration of Conformity

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Components and Specifications

This article provides the chassis specifications of the vEdge 100 router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 100 router chassis.

Table 1:

Item	Specification
Services and Slot Density	
RJ45 Ports 10/100/1000 Mbps	5 ports, one of which has 802.3af PoE source capability
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	2 GB

Item	Specification
NAND storage (internal)	4 GB
USB host port (Type A USB 3.0)	1
Mini USB connector console port (default baud rate 115.2 Kbps)	1
Power supply	AC Input (C6 inlet connector)
Power Specifications	
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on ge0/0	15 Watts
Typical power consumption with PoE enabled on ge0/0	32 Watts maximum
Physical Specifications	
Chassis height	1.5 in. (3.8 cm)
Chassis width	9 in. (22.9 cm)
Chassis depth	5.5 in. (14 cm)
Rack height	Can be accommodated in 1 RU
Chassis weight	3.1 lb (1.4 kg)
Rack-mount accessory kit 19 in (48.3 cm) EIA	Provided with the unit
Packaging Specifications	
Package height	2.5 in. (6.4 cm)
Package width	12.4 in. (31.6 cm)
Package depth	9.6 in. (24.4 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)

Item	Specification
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	104K hours
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1
EMC	AS/NZS CISPR22 Class A EN 300 386 EN 55022 Class A FCC Class A ICES Class A VCCI Class A
Environmental	ROHS 6/6

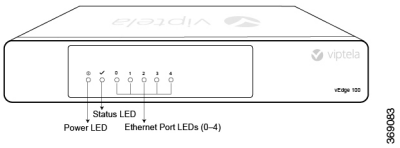
Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 100 router. See At a Glance for the exact location of these components on the router.

Front Panel LEDs

The vEdge 100 router has five chassis status LEDs located in the front. See the following figure.

Figure 3: Chassis Status LEDs in a vEdge 100 Router



The following table describes the LEDs , their color and states, and the status they indicate.

Table 2:

LED	Color	Status
Power	Green/Red	• Off: System is not on • Green: System is healthy and operating fine • Red: Power supply fault

LED	Color	Status
Status	Green/Yellow/Red	• Off: System is not on • Solid Green: System is fully functional • Blinking Green: System is booting up • Solid Yellow: No Internet connectivity or the system has detected a minor alarm • Red: System has detected a major system level fault or alarm
Ethernet Port (LED 0–4)	Green/Yellow	• Off: No link • Solid Green: 1000 Mbps link detected • Blinking Green: 1000 Mbps link detected and link activity • Solid yellow: 10/100 Mbps link detected • Blinking Yellow: 10/100 Mbps link detected and link activity

Rear Panel

The rear panel of the vEdge 100 router has a Reset button, a Kensington security lock slot, and a GPS antenna input. See Chassis Views for the location of these components.

Reset Button

The Reset button on the rear panel is recessed, to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool. The following table describes the effects of pressing the Reset button.

Table 3:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

Kensington Security Lock Slot

The rear panel of the vEdge 100 router has a small metal-enforced hole for attaching a Kensington lock to secure the router.

Ports and Connectors

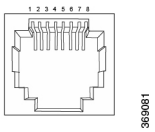
The vEdge 100 router supports three types of ports: RJ-45 Ethernet ports, USB port, and USB serial console port.

RJ-45 Ethernet Ports

There are five built-in RJ-45 Ethernet ports on the vEdge 100 router. These ports support 10/100/1000 Mbps and are numbered 0 through 4. Port 0 supports PoE capability.

The following figure provides the pinout information for the RJ-45 ports. The RJ-45 ports comply with the 801 standards.

Figure 4: RJ-45 Ports Pinout Information



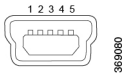
USB Port

There is one USB port on the vEdge 100 router with a type A connector. The USB port complies with USB 3.0 specification.

Console Port

The console port on the vEdge 100 router is a serial port and is accessible via a USB Mini-B connector. See the following figure.

Figure 5: FUSB Mini-B Connector



A USB Type-A to Mini-B connector cable is shipped with the vEdge 100 router as standard accessory for console port connection.

Note When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

Power Supply and Cooling System

The vEdge 100 router has an built-in AC-to-DC power supply unit. Read this article to learn more about the AC power supply in the router as well as about the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 100 Router

The vEdge 100 router has an integrated AC power supply that exposes a C6 male AC inlet connector externally. The unit can be powered by connecting the supplied power cord to AC mains with the C5 female connector end of power cord plugged into the unit.

The following table describes the AC power supply specifications for the vEdge 100 router.

Table 4:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on transport interface	15 Watts
Typical power consumption with PoE enabled on transport interface	32 Watts maximum

AC Power Cord Specifications

The vEdge 100 router ships with a detachable AC power cord. The power cord has a C5 female connector at one end and the other end is specific to the country/locality to which the product is shipped.

Cooling System in a vEdge 100 Router

The cooling system in a vEdge 100 router consists of internal heat sinks and an internal fan with adjustable speed. The fan speed is algorithmically controlled, based on readings obtained from internal temperature sensors that in turn is determined by factors such as external ambient as well as the traffic workload.

If the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

General Safety Standards

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Caution Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.

  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.

- Permit only trained and qualified personnel to install or replace switch components.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Site Preparation Guidelines

Efficient operation of routers requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Airflow Requirements

When planning your site for installing vEdge routers, allow enough clearance around the installed router. Since the routers work with a front-to-back airflow there are no clearance requirements for the sides, but it is recommended that you provide at least 3 inches of clearance at the back.

Install the vEdge 100 Router

Once you have prepared your site for router installation, unpack the vEdge 100 router and mount it either on the wall or in a 19-inch rack.

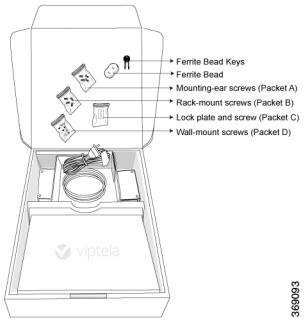
Unpack the vEdge 100 Router

A vEdge 100 router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains a packing list and Quick Start instructions. It is recommended that you do not unpack the router till you are ready to install it.

To unpack the router:

1. Open the top flaps of the carton.
2. Gradually remove the packing foam holding the router and the accessories in place. See the following figure.
3. Take out the router and each accessory.
4. Verify the router components against the packing list included in the box (see packing list below).

Figure 6: Unpacking the vEdge 100 Router



Note: It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware .

Packing List for a vEdge 100 Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

The following table lists the parts shipped with the vEdge 100 router and their quantities.

Table 5:

Component	Quantity
Router chassis	1
AC power cord appropriate for your geographical location (ferrite bead attached)	1
USB console cable	1

Component	Quantity
Ferrite bead and key (to be attached to the USB cable)	1 + 1
Mounting ears, left and right	2
Wall-mount bracket	1
Mounting ears screws (Packet A)	4
Rack-mount screws (Packet B)	4
Lock plate and screw (Packet C)	1
Wall-mount screws (Packet D)	4
Quick Start document	1

Mount the vEdge 100 Router

You can mount the vEdge 100 router in one of the following ways:

- Mount the router in a 19-inch rack
- Mount the router on the wall

In addition to the accessory box, you need the following tools to mount a vEdge 100 router:

- Number 2 Phillips (+) screwdriver
- Tape measure or level

Mount the vEdge 100 Router in a Rack

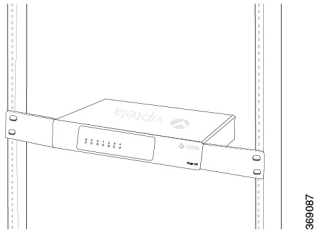
You can mount the vEdge 100 router on two front posts in a 19-inch rack using simple rack mount ear accessories. To do so:

1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The rack-mount tray is 440 mm wide and must fit within the mounting posts.
3. Secure the left and right mounting ears to either side of the router chassis using the four screws (two on each side) in the packet marked A.

Figure 7: Attaching the Mounting Ears to the vEdge 100 Router Chassis

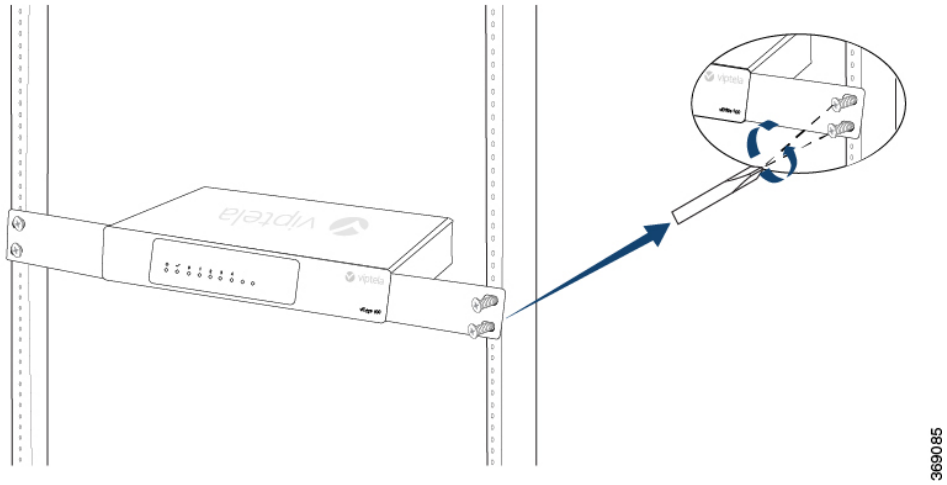
4. Grasp both sides of the router, then lift and position it in the rack, making sure that the mounting ear holes are aligned with the threaded holes in the rack rail.

Figure 8: Positioning the vEdge 100 Router in the Rack



5. Secure the mounting ears to the two front posts of the rack using the four rack-mount screws (two on each side) in the packet marked B. Tighten the screws.

Figure 9: Attaching the Mounting Ears to the Rack



6. Use a tape measure or level to verify that the tray is installed straight and the holes at either ends of the rack align properly.
7. Secure the router with a Kensington lock. To do so, first attach the lock plate from packet C to the back of the chassis, then insert the lock in the slot.

Figure 10: Securing the Router with a Kensington Lock

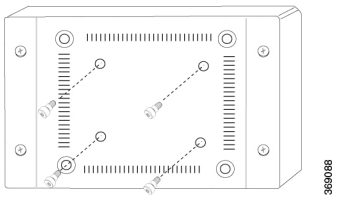
Tip: It is recommended that you retain the dust covers on any unused ports.

Mount the vEdge 100 Router on the Wall

To mount the vEdge 100 router on the wall:

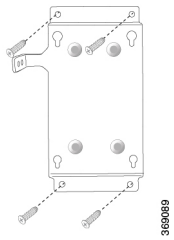
1. Screw the four shoulder screws in the packet marked D into the pre-drilled holes on the underside of the router chassis as shown in Figure 6. Tighten the screws until wrist tight. Note that the screw heads will not be flush with the chassis bottom.

   Figure 11: Attach Screws to the Underside of the vEdge 100 Router Chassis



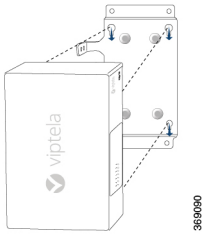
2. Secure the mounting plate to the wall using four screws appropriate for your wall type (screws not included). Ensure that the L-shaped bracket of the mounting plate is to the upper left.

   Figure 12: Securing the Mounting Plate to the Wall



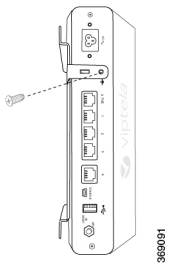
3. Mount the router on the mounting plate by aligning the four screws on the underside of the router chassis to the holes in the mounting plate. Then gently slide the router chassis into the slots.

   Figure 13: Mounting the vEdge 100 Router on the Mounting Plate



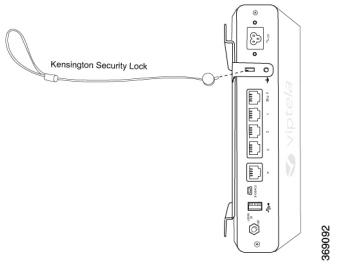
4. Secure the router by aligning the round hole on the L-shaped bracket of the mounting plate with the screw hole in the rear of the router chassis. Then attach the L-shaped bracket to the router using a mounting ear screw from packet A.

Figure 14: Securing the vEdge 100 Router to the Mounting Plate



5. Secure the router with a Kensington security lock using the slot in the rear of the chassis.

Figure 15: Securing the Router with a Kensington Security Lock



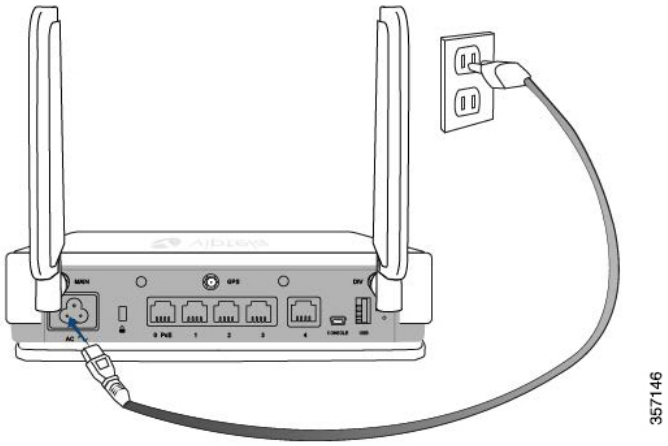
Connect the vEdge 100 Router

This article describes how to connect the vEdge 100 router to an AC power source and to a management console.

Connect AC Power to the Router

To connect the vEdge 100 router to an AC power source, plug one end of the AC power cord into the back of the router, and plug the other end into an AC power outlet as shown in the following figure.

Figure 16: Connecting AC Power Supply to a vEdge 100 Router



Note It is strongly recommended that you use the power cord supplied with the router.

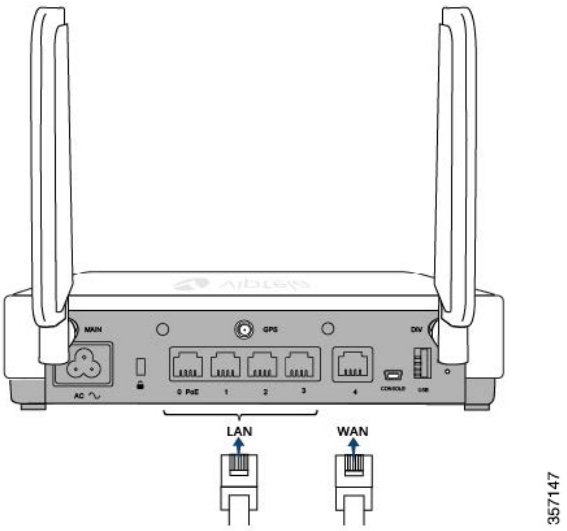
Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

Connect the Router to LAN and WAN Interfaces

To connect the vEdge 100 router to the LAN, plug the appropriate cable into any port except Port 4 on the front of the router.

To connect the vEdge 100 router to a WAN, plug the appropriate cable into Port 4 on the front of the router.

Figure 17: Connecting a vEdge 100 Router to LAN and WAN Interfaces

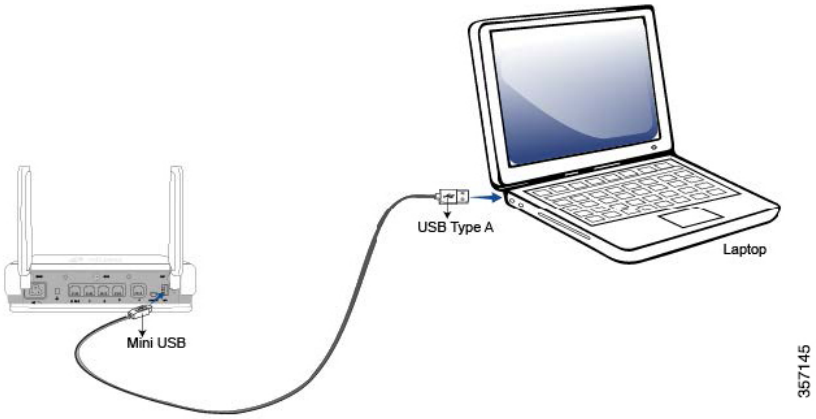


Connect the Router to a Management Console

To connect the vEdge 100 router to a management console:

1. Connect one end of the USB Type-A to Mini-B connector cable into the console port, labeled CONSOLE, on the vEdge router.
2. Connect the other end of the console cable into a management console.

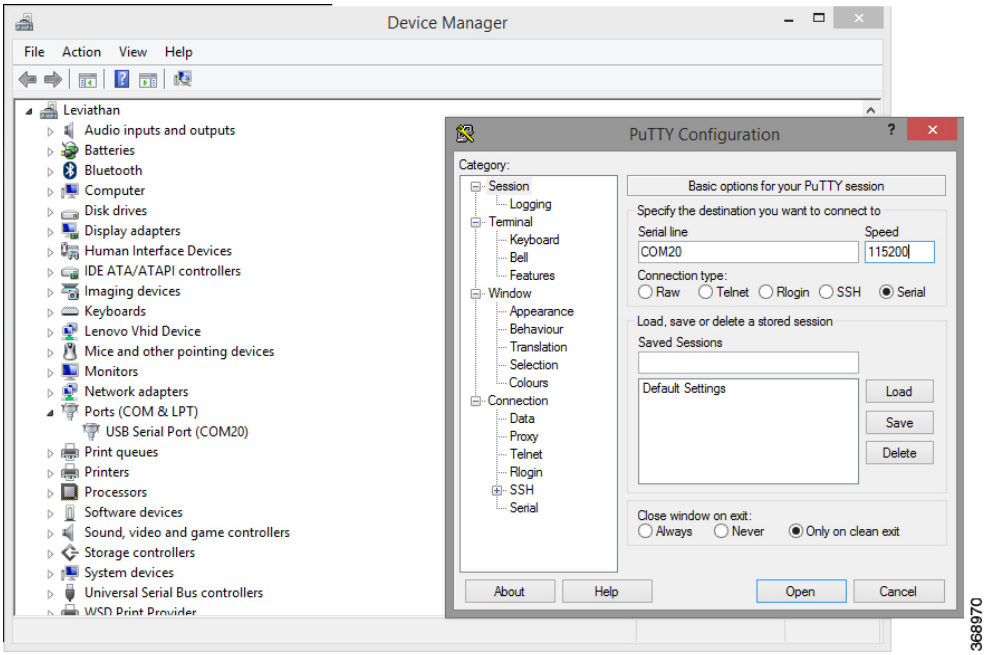
Figure 18: Connecting a vEdge 100 Router to a Management Console



To use the USB console from a Windows device:

1. In the Device Manager, determine which COM port is being used for the USB serial port.
2. In the PuTTY SSH/Telnet client, in **Connection Type**, select **Serial**. Specify the COM port and a speed of 115200.

Figure 19: PuTTY Configuration



To use the USB console from a Macintosh device:

1. Install the necessary USB serial driver to enable you to connect the Macintosh to the console port of the router.
2. Launch the Terminal utility.
3. From a terminal shell, access the console port with this command:

```
$ screen /dev/tty.usbserial* 115200,cs8
```

vEdge 100 Router Default Configuration

The default configuration file looks like this:

```
vEdge100# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
```

```
   password
$6$qtmMiZWj6W6Kh3nr$<wbr/>MAyIfWUVDPDP2q04LqhdIi6kSXySX7<wbr/>fudpwNOg1.<wbr/>6e4XgpKwwNMkV7gx69O4WWtnvInUg8<wbr/>acUGw972PHMNati1

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface ge0/4
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service ntp
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 100 router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 100 router have two types of severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold.

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 100 router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 100 router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has one temperature sensing point (board sensor 0). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has a fixed built-in fan for system cooling which runs at a fixed speed. If the fan stops running, the system triggers an alarm. Also if the fan starts to run below a predefined RPM threshold, the system triggers an alarm.

Table 1 lists the yellow and red alarm threshold for the temperature sensing points in the system—one board sensor on the board and one CPU junction temperature sensor. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise the higher threshold value applies (normal).

Table 6:

Item	Yellow Alarm(degrees C)		Red Alarm(degrees C)	
	Normal	**Bad Fan**	**Normal**	**Bad Fan**
Board sensor 0	65	60	80	75
CPU junction temperature	80	75	95	90

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 100 router indicate the status of the router.

If there are one or more major alarms active in the router, the Status LED is lit red. If there are one or more minor alarms active in the router, the Status LED is lit solid yellow. See Front and Rear Panel Components for details of the LEDs and the status they indicate.

Additional Information

show hardware alarms show hardware environment show notification stream show hardware temperature-thresholds Front and Rear Panel Components Check Alarms and Events

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

vEdge# **request software reset**

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 20: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router
- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
1. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note: Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

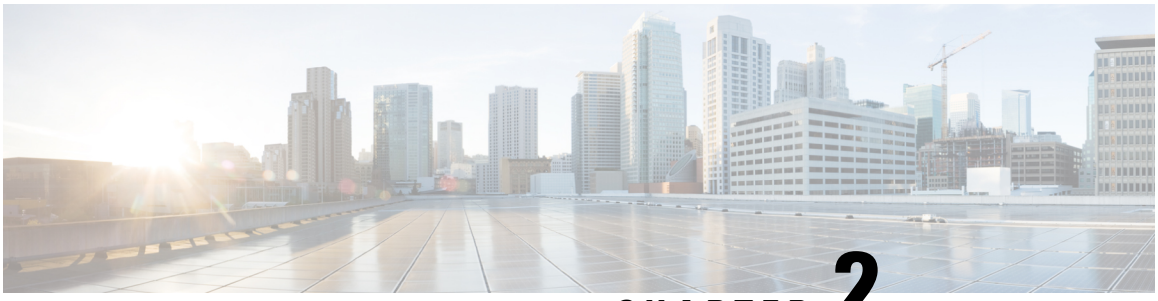
If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.

4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 2

vEdge 100b Router

The vEdge 100b router delivers highly secure site-to-site data connectivity to small business and home offices (SOHO). The vEdge 100b router is a fixed-port-configuration router with the following features:

- Five built-in 10/100/1000 Mbps Ethernet ports
- Encryption and QoS support
- 50-Mbps of unidirectional Internet Mix (IMIX) forwarding traffic (inclusive of encryption)
- Secure identification chip for anti-counterfeit and secure authentication
- External power supply
- Kensington security lock slot to physically lock down the router
- Desktop mount, wall mount, or rack-mountable in a 19-inch rack
- Fanless design

Chassis Views

The following figures show the front and back panels of the vEdge 100b router, indicating the location of the power interfaces, status indicators, and chassis identification labels.

Figure 21: Front Panel of the vEdge 100b Router

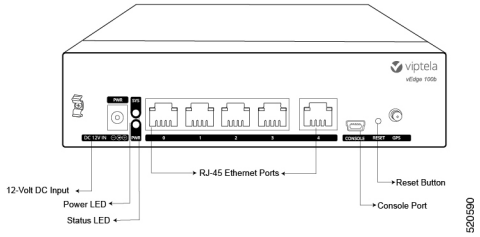
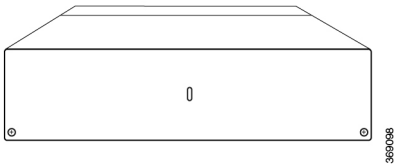


Figure 22: Back Panel of the vEdge 100b Router



Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .

Components and Specifications

This article provides the chassis specifications of the vEdge 100b router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 100b router chassis.

Table 7:

Item	Specification
Services and Slot Density	
RJ45 Ports 10/100/1000 Mbps	5 ports
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	2 GB
NAND storage (internal)	4 GB
Mini USB connector console port (default baud rate 115.2 Kbps)	1
Power supply	12 Volt DC Input External AC-DC power adapter provided
Power Specifications	
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption	15 Watts
Physical Specifications	
Chassis height	1.75 in. (4.4 cm)
Chassis width	6.75 in. (17 cm)
Chassis depth	5.5 in. (14 cm)
Rack height	Can be accommodated in 1 RU
Chassis weight	1.75 lb (0.79 kg)
Rack-mount accessory kit 19 in (48.3 cm) EIA	Provided with the unit
Packaging Specifications	
Package height	3.58 in. (9.09 cm)
Package width	7.75 in. (19.68 cm)
Package depth	13 in. (33 cm)
Operating Condition	

Item	Specification
Temperature	Fanless design 0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	Approximately 592,000 hours (about 67 years)
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1
EMC	AS/NZS CISPR22 Class A EN 300 386 EN 55022 Class A FCC Class A ICES Class A VCCI Class A
Environmental	ROHS 6/6

Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 100b router.

Front Panel

The front panel of the vEdge 100b router has the DC power socket, chassis status LEDs, and reset button. See Chassis Views for the location of these components.

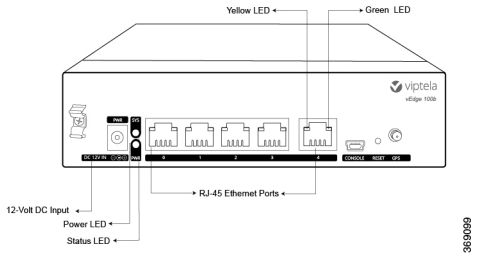
DC Power Socket

The front panel of the vEdge 100b router has a DC power input socket for plugging in the external 12-Volt AC-DC power adapter that is shipped with the router.

Chassis Status LEDs

The vEdge 100b router has a power LED, a status LED, and Ethernet port LEDs located in the front panel. Each RJ-45 port has two built-in LEDs.

Figure 23: Chassis Status LEDs in a vEdge 100b Router



The following table describes the LEDs , their color and states, and the status they indicate.

Table 8:

LED	Color	Status
Power	Green/Red	• Off: System is not on • Green: System is powered on • Red: Power supply fault
Status (SYS)	Green/Yellow/Red	• Off: System is not on • Solid Green: System is fully functional and OMP connection is in the Up state • Blinking Green: System is booting up • Solid Yellow: System is up but OMP connection is in the Down state • Solid Red: System has detected a major system level fault—one of the necessary daemons in the system is down (system will usually reboot shortly after this)
RJ-45 Ethernet Port LEDs (0–4)	Green	• Off: No link and corresponding yellow LED is off • Solid Green: 1000 Mbps link detected • Blinking Green: 1000 Mbps link detected and link activity
RJ-45 Ethernet Port LEDs (0–4)	Yellow	• Off: No link and corresponding green LED is off • Solid Yellow: 10/100 Mbps link detected • Blinking Yellow: 10/100 Mbps link detected and link activity

Reset Button

The Reset button on the front panel is recessed, to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool. The following table describes the effects of pressing the Reset button.

Table 9:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

Rear Panel

The rear panel of the vEdge 100b router has a small metal-enforced hole for attaching a Kensington lock to secure the router. See Chassis Views for the location of these components.

Ports and Connectors

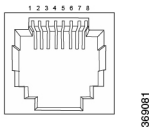
The vEdge 100b router supports two types of interface ports: RJ-45 Ethernet ports and USB serial console port.

RJ-45 Ethernet Ports

There are five built-in RJ-45 Ethernet ports on the vEdge 100b router. These ports support 10/100/1000 Mbps and are numbered 0 through 4.

The following figure provides the pinout information for the RJ-45 ports. The RJ-45 ports comply with the 801 standards.

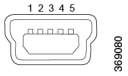
Figure 24: RJ-45 Ports Pinout Information



Console Port

The console port on the vEdge 100b router is a serial port and is accessible via a USB Mini-B connector. See the following figure.

Figure 25: USB Mini-B Connector



A USB Type-A to Mini-B connector cable is shipped with the vEdge 100b router as standard accessory for console port connection.

Note When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

Power Supply

The vEdge 100b router has an external power supply and ships with a 12-Volt AC-DC power adapter.

AC-DC Power Adapter

The vEdge 100b router accepts a DC power input of 12 Volts. You can power the router by plugging one end of the AC power adapter into the front of the router, and the other end into an AC power outlet.

The AC-DC power adapter has the following wall-connector options:

- Type A (commonly used for Canada, Japan, Mexico, and US)
- Type C (commonly used for Asia, Europe, and South America)
- Type G (commonly used for Ireland, Malaysia, Singapore, and United Kingdom)
- Type I (commonly used for Argentina, Australia, China, and New Zealand)

The following table describes the AC power supply specifications for the vEdge 100b router.

Table 10:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption	15 Watts

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 100b router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.

- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 100b router.

Site Preparation Guidelines

Efficient operation of your vEdge 100b router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 100b router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, non-condensing.

Rack Requirements

You can mount the vEdge 100b router in a two-post or a four-post rack. The following table provides the rack requirements for the router.

Table 11:

Rack Requirement	Guidelines
Rack type	Use a two-post or a four-post rack that meets the size requirements for the router, provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments, and is strong enough to support the weight of the router.
Mounting brackets	Ensure that the holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm). This allows you to mount the router in any location in the rack.
Rack size	It is recommended that the rack comply with the size and strength standards of a 19-inch rack as defined in Cabinets, Racks, Panels, and Associated Equipment (document number EIA-310–D), published by the Electronics Industry Association http://www.eia.org . Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the chassis and that the outer edges of the front mount brackets extend the width of the chassis to 19 in. (48.2 cm). You must also ensure that the spacing of rails and adjacent racks allows for the proper clearance around the router and rack.
Rack secured to building structure	For maximum stability, secure the rack to ceiling brackets and to floor brackets.

Install the vEdge 100b Router

Once you have prepared your site for router installation, unpack the vEdge 100b router and mount it either on the wall or in a 19-inch rack.

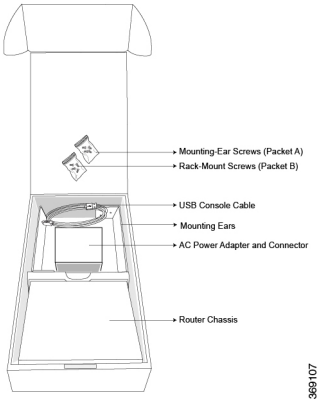
Unpack the vEdge 100b Router

A vEdge 100b router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains a packing list and Quick Start instructions. It is recommended that you do not unpack the router till you are ready to install it.

To unpack the router:

1. Open the top flaps of the carton.
2. Gradually remove the packing foam holding the router and the accessories in place. See Figure 1.
3. Take out the router and each accessory.
4. Verify the router components against the packing list included in the box (see packing list below).

Figure 26: Unpacking the vEdge 100b Router



Note It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware.

Packing List for a vEdge 100b Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

The following table lists the parts shipped with the vEdge 100b router and their quantities.

Table 12:

Component	Quantity
Router chassis	1
USB console cable	1
Mounting ears, left and right	2
Mounting-ear screws (Packet A)	6
Rack-mount screws (Packet B)	4
AC power adapter and connectors	1 + 4
Quick Start document	1

Mount the vEdge 100b Router

You can mount the vEdge 100b router in one of the following ways:

- Mount the router in a 19-inch rack
- Mount the router on the wall

In addition to the accessory box, you need the following tools to mount a vEdge 100b router:

- Number 2 Phillips (+) screwdriver
- Tape measure or level

Mount the vEdge 100b Router in a Rack

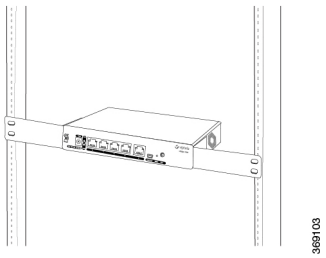
You can mount the vEdge 100b router on two front posts in a 19-inch rack using simple rack mount ear accessories. To do so:

1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The rack-mount tray is 440 mm wide and must fit within the mounting posts.
3. Secure the left and right mounting ears to either side of the router chassis using the six screws (two on each side) in the packet marked A.

Figure 27: Attaching the Mounting Ears to the vEdge 100b Router Chassis

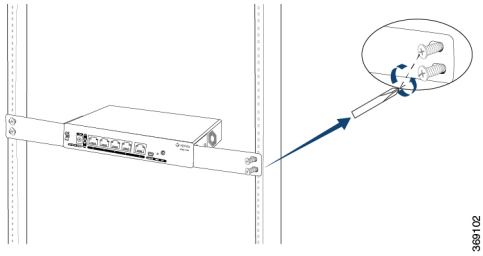
4. Grasp both sides of the router, then lift and position it in the rack, making sure that the mounting ear holes are aligned with the threaded holes in the rack rail.

Figure 28: Positioning the vEdge 100b Router in the Rack



5. Secure the mounting ears to the two front posts of the rack using the four rack-mount screws (two on each side) in the packet marked B. Tighten the screws.

Figure 29: Attaching the Mounting Ears to the Rack



6. Use a tape measure or level to verify that the tray is installed straight and the holes at either ends of the rack align properly.

   Tip: It is recommended that you retain the dust covers on any unused ports.

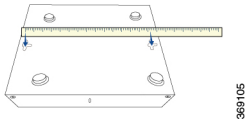
Mount the vEdge 100b Router on the Wall

You can mount the vEdge 100b router on the wall either horizontally or vertically.

To mount the vEdge 100b router on the wall:

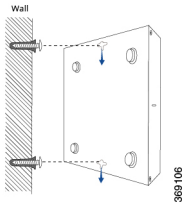
1. Measure the distance between the two wall-mount holes on the underside of the router chassis.

   Figure 30: Measuring the Distance Between the Wall-Mount Holes



2. Insert two wall-mount screws in the wall where you are mounting the router (screws not provided). The screws must align with the wall-mount holes on the router's underside.
3. Align the wall-mount holes on the router's underside to the screws in the wall, and gently slide the chassis, from side to side or up and down, onto the wall-mount screws.

   Figure 31: Sliding the Router Chassis onto the Wall-Mount Screws



Connect the vEdge 100b Router

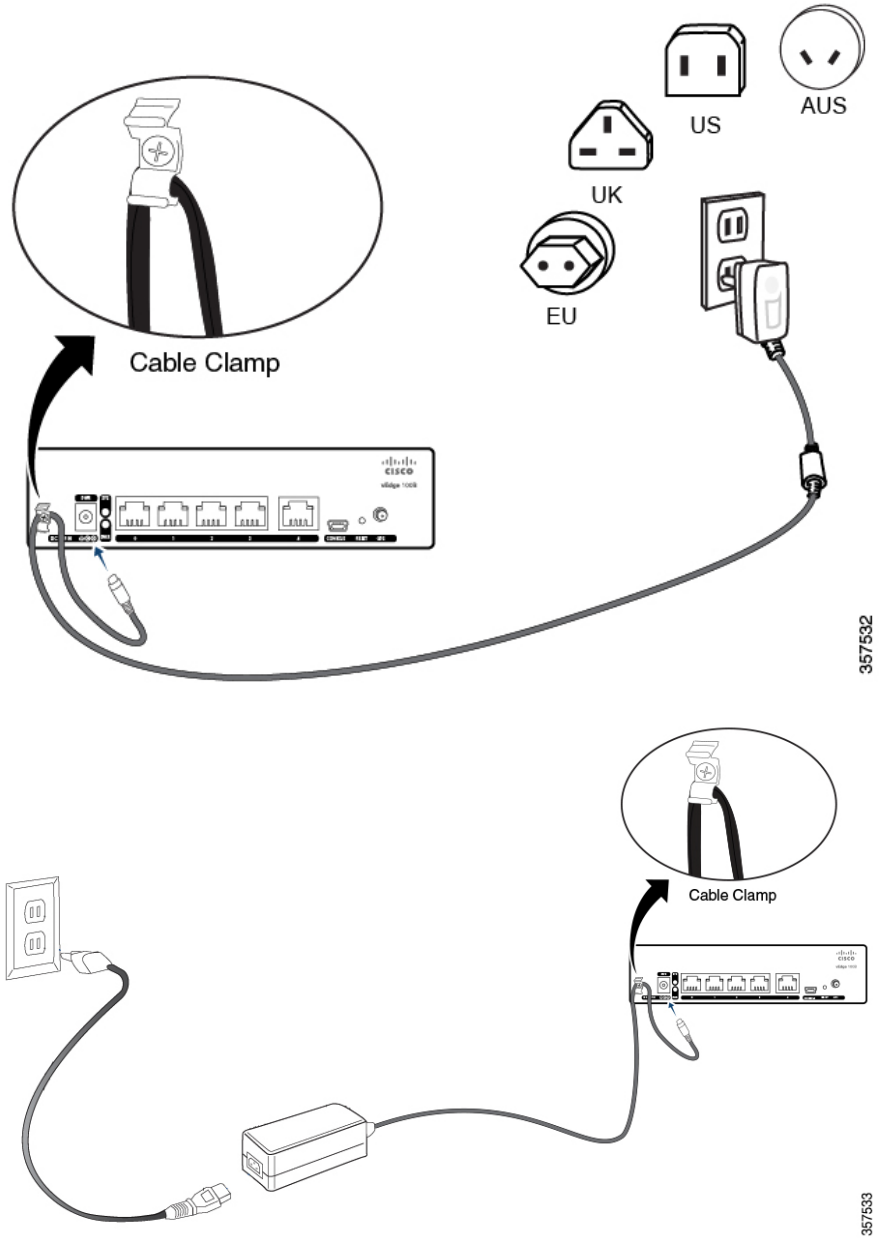
This article describes how to connect the vEdge 100b router to an AC power source and to a management console.

Connect AC Power to the Router

To connect the vEdge 100b router to an AC power source, plug one end of the AC power adapter into the front of the router, and plug the other end into an AC power outlet as shown in the following figures.

Note Depending on the AC power adapter that is provided, it can either be directly plugged to the power outlet without a cord between the adapter and the outlet, or can be connected to the power outlet with a cord, as shown in the following figures.

Figure 32: Connecting the AC Power Adapter to a vEdge 100b Router, Two Types



Note It is strongly recommended that you use the power cord supplied with the router.

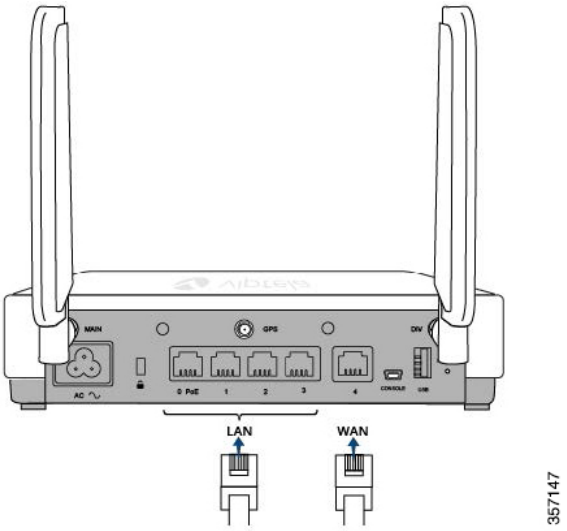
Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

Connect the Router to LAN and WAN Interfaces

To connect the vEdge 100b router to the LAN, plug the appropriate cable into any port except Port 4 on the front of the router.

To connect the vEdge 100b router to a WAN, plug the appropriate cable into Port 4 on the front of the router.

Figure 33: Connecting a vEdge 100b Router to LAN and WAN Interfaces

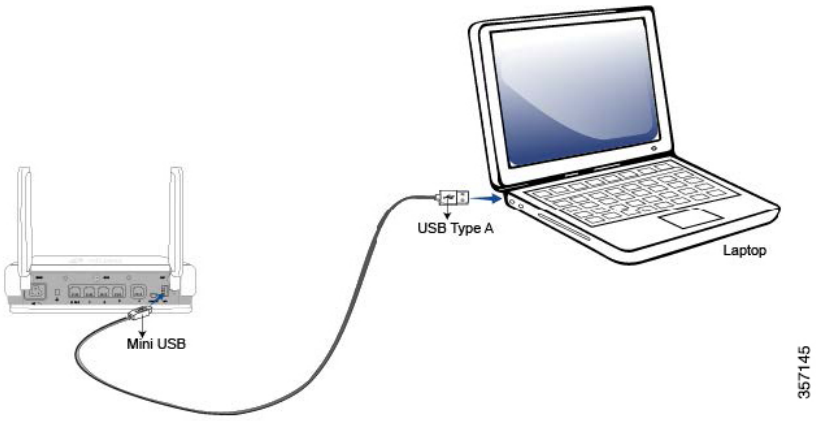


Connect the Router to a Management Console

To connect the vEdge 100b router to a management console:

1. Connect one end of the USB Type-A to Mini-B connector cable into the console port, labeled CONSOLE, on the vEdge router.
2. Connect the other end of the console cable into a management console.

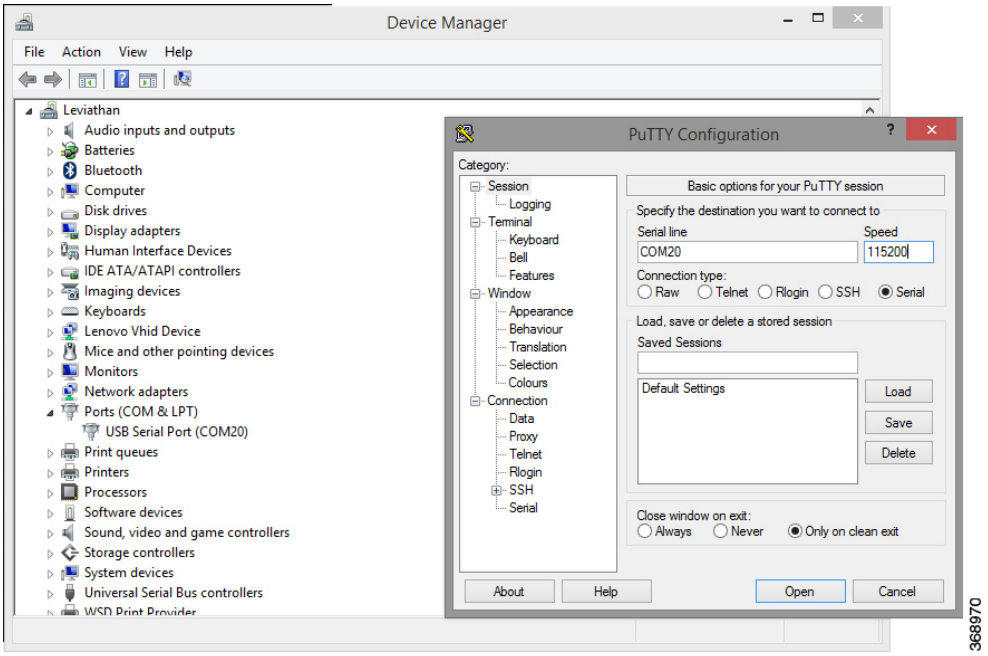
Figure 34: Connecting a vEdge 100b Router to a Management Console



To use the USB console from a Windows device:

1. In the Device Manager, determine which COM port is being used for the USB serial port.
2. In the PuTTY SSH/Telnet client, in **Connection Type**, select **Serial**. Specify the COM port and a speed of 115200.

Figure 35: PuTTY Configuration



To use the USB console from a Macintosh device:

1. Install the necessary USB serial driver to enable you to connect the Macintosh to the console port of the router.
2. Launch the Terminal utility.
3. From a terminal shell, access the console port with this command:

```
$ screen /dev/tty.usbserial* 115200,cs8
```

vEdge 100b Router Default Configuration

Default Configuration for Software Releases 16.1 and Later

For Releases 16.1 and later, the default configuration file looks like this:

```
vEdge100b# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$3qFDal/MH1FMQrOU$bGhvUMbglG26UqXpZytrcCgUWvuV.PRJavnWjOvsUPNMWjomWCdUrwMe1sF/fI58nYYB03prGJJs59xSPKLov/

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface ge0/4
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
```

```
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

Default Configuration for Software Releases 15.4 and Earlier

For Releases 15.4 and earlier, the default configuration file looks like this:

```
vEdge100b# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$3qFDal/MH1FMQrOU$bGhvUMbglG26UqXpZytrcCgUWvuV.PRJavnWjOvsUPNMWjomWCdUrwMe1sF/fI58nYYB03prGJJs59xSPKLov/

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface ge0/4
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service all
```

```
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 100b router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 100b router have two types of severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold.

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 100b router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 100b router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has one temperature sensing point (board sensor 0). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.

The following table lists the yellow and red alarm threshold for the temperature sensing points in the system—one board sensor on the board and one CPU junction temperature sensor.

Table 13:

Item	Yellow Alarm (ºC)	Red Alarm (°C)	Hardware-Enforced Safety Cut-Off (°C)
Board sensor 0	85	90	100
CPU junction temperature	91	96	100

In the unlikely event that the temperature measured by the sensors reaches the hardware enforced cut-off limit, the router shuts down without any software intervention.

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 100b router indicate the status of the router.

If there are one or more major alarms active in the router, the Status LED is lit red. See Front and Rear Panel Components for details of the LEDs and the status they indicate.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

vEdge# **request software reset**

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number (sample shown in Figure 1) is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component

- Model number of the router or component
- Physical location of the router
- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
   - A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.

c. Place the rack-mount tray on a firm, flat surface.

d. Slide out the vEdge 1000 router from the rack-mount tray.

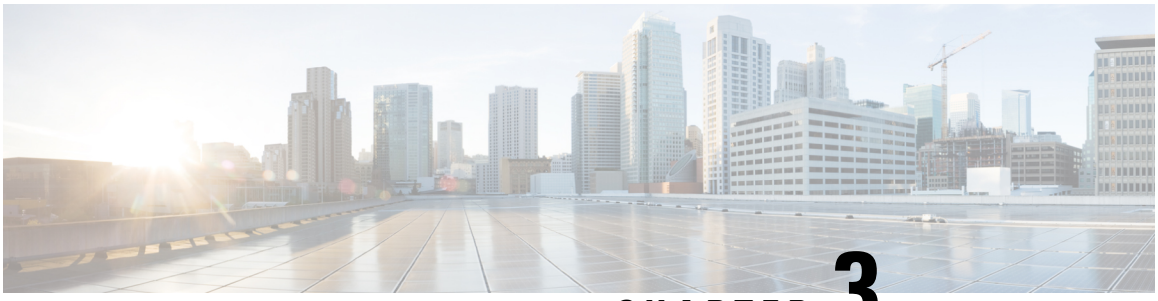
2. Place the router chassis in the plastic packing bag.
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 3

vEdge 100m Router

The vEdge 100m router delivers highly secure site-to-site data connectivity to small business and home offices (SOHO). The vEdge 100m router is a fixed-port-configuration router with the following features:

- Built-in LTE modem with mini-SIM (or 2FF) card
- Two multiband swivel-mount dipole antennas
- Supports a 4G/3G/2G–capable modem to connect to cellular networks
- Five built-in 10/100/1000–Mbps Ethernet ports
- Power over Ethernet (PoE) source support on one Ethernet port
- Encryption and QoS support
- 50-Mbps of unidirectional Internet Mix (IMIX) forwarding traffic (inclusive of encryption)
- Secure identification chip for anticounterfeit and secure authentication
- Integrated power supply
- Kensington security lock slot to physically lock down the router
- Desktop mount or wall mount

Chassis Views

The following figures show the front and back panels of the vEdge 100m router, indicating the locations of the power interfaces, status indicators, and chassis identification labels.

Figure 36: Front Panel of the vEdge 100m Router

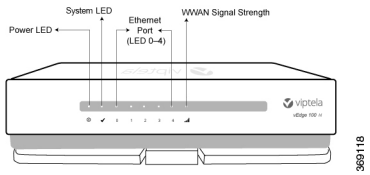
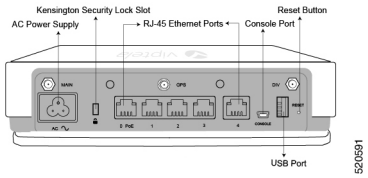


Figure 37: Back Panel of the vEdge 100m Router



At a Glance

Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com
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Components and Specifications

Components and Specifications

This article provides specifications for the vEdge 100m chassis, wireless platforms, and multiband swivel-mount dipole antennas.

Chassis Specifications

The following table lists the specifications for the vEdge 100m router chassis.

Table 14:

Item	Specification
Services and Slot Density	
RJ45 Ports 10/100/1000 Mbps	5 ports, one of which has 802.3af PoE source capability
Embedded hardware-based cryptographic acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	2 GB
NAND storage (internal)	4 GB
USB host port	1
Mini USB connector console port (default baud rate 115.2 Kbps)	1
Power supply	AC input (C6 inlet connector)
Power Specifications	
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on interface ge0/0	20 Watts
Typical power consumption with PoE enabled on interface ge0/0	35 Watts maximum
Physical Specifications (excluding the multiband antennas)	
Chassis height	1.8 in. (4.5 cm)
Chassis width	9.25 in. (23.5 cm)

Item	Specification
Chassis depth	5.75 in. (14.6 cm)
Chassis weight	1.45 lbs (0.67 kg)
Wall-mount plate accessory	Provided with the unit
Packaging Specifications	
Package height	5.375 in. (13.6 cm)
Package width	11.94 in. (30.3 cm)
Package depth	9.19 in. (23.3 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature derating of 1.5°C per 1000 feet of altitude, up to a maximum of 10,000 ft, or 3000 m)
Altitude	Maximum 3000 m (10,000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	–40 to 70°C (–40 to 158°F)
Humidity	5 to 95% RH
Altitude	4570 m (15,000 ft)
Reliability	
MTBF	104,000 hours
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1
EMC	AS/NZS CISPR22 Class B EN 300 386 EN 55022 Class B FCC Class B ICES Class B VCCI Class B
Environmental	ROHS 6/6

Wireless Platform Specifications

The following table lists the specifications for the vEdge 100m wireless platforms.

Table 15:

Platform	Specification
vEdge 100m-AT	
SKU	100m-AT
Carrier	AT&T
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 2 (1900 MHz), Band 4 (AWS 1700/2100 MHz), Band 5 (850 MHz), Band 17 (700 MHz)
Region	United States
vEdge 100m-GB	
SKU	100m-GB
Certification	GCF
Modem	Sierra Wireless MC7304
4G LTE Bands	Band 1 (2100 MHz), Band 3 (1800 MHz), Band 7 (2600 MHz), Band 8 (900MHz), Band 20 (800 MHz)
Regions	Australia, Europe, Middle East, Latin America, Asia Pacific, Japan
vEdge 100m-NA	
SKU	100m-NA
Certification	PTCRB
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 2 (1900 MHz), Band 4 (AWS 1700/2100 MHz), Band 5 (850 MHz), Band 13 (700 MHz), Band 17 (700 MHz), Band 25 (1900 MHz)
Region	North America
vEdge 100m-NT	
SKU	100m-NT
Carrier	NTT Docomo
Modem	Sierra Wireless MC7330
4G LTE Bands	Band 1 (2100 MHz), Band 19 (850 MHz), Band 21 (1500 MHz)
Region	Japan
vEdge 100m-SP	

Platform	Specification
SKU	100m-SP
Carrier	Sprint
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 25 (1900 MHz)
Region	United States
vEdge 100m-VZ	
SKU	100m-VZ
Carrier	Verizon
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 4 (AWS 1700/2100 MHz), Band 13 (700 MHz)
Region	United States

Multiband Antenna Specifications

The vEdge 100m router ships with two multiband swivel-mount dipole antennas. The articulating joint of the antenna provides 0 to 90 degrees pivot and 180-degree swivel movement, allowing vertical and horizontal orientation of the antenna.

The following table lists the electrical, mechanical, and frequency specifications for the antennas.

Table 16: vEdge 100m Multiband Antenna Specifications

Item	Specification
Antenna type	MIMO, dipole swivel
Input power	10 Watts
Connector	SMA male
Nominal impedance	50 Ohms
Radiation pattern	Omnidirectional
Frequency range	698MHz to 960MHz and 1710MHz to 2700Mhz
Temperature range	F (–40°C to 85°C)
Antenna dimensions	Length: 6.37 in. (16.19 cm) Width: 0.9 in. (2.38 cm) Depth: 0.63 in. (1.59 cm)

Item	Specification
Humidity	Noncondensing, 65°C, 95% RH

Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 100m router. See At a Glance for the exact location of these components on the router.

Front Panel LEDs

The vEdge 100m router has five chassis status LEDs located on the front panel. The following table describes the LEDs , their color and states, and the status they indicate.

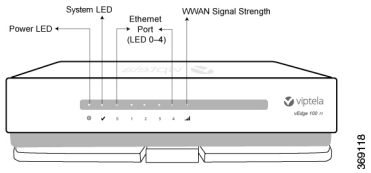
Table 17:

LED	Color	Status
Power	Green/Red	• Off: System is not on • Green: System is healthy and operational • Red: Power supply fault
System	Green/Yellow/Red	• Off: System is not on • Solid Green: System is fully functional • Blinking Green: System is booting up • Solid Yellow: No Internet connectivity or the system has detected a minor alarm • Red: System has detected a major system level fault or alarm
Ethernet Port (LED 0–4)	Green/Yellow	• Off: No link • Solid Green: 1000 Mbps link detected • Blinking Green: 1000 Mbps link detected and link activity • Solid yellow: 10/100 Mbps link detected • Blinking Yellow: 10/100 Mbps link detected and link activity

LED	Color	Status
WWAN Signal Strength	Green/Yellow/Red	• Off: LTE interface disabled/off • Solid Green: LTE enabled, excellent signal strength, dormant mode • Blinking Green: LTE enabled, excellent signal strength, active mode • Solid yellow: LTE enabled, good signal strength, dormant mode • Blinking Yellow: LTE enabled, good signal strength, active mode • Solid Orange: LTE enabled, poor signal strength, dormant mode • Blinking Orange: LTE enabled, poor signal strength, active mode • Solid Red: LTE enabled but faulty such as no connectivity with BTS, errors, or no signal

The following figure shows the location of the chassis status, LEDs on the front panel of the vEdge 100m router.

Figure 38: Chassis Status LEDs in a vEdge 100m Router



Rear Panel

The rear panel of the vEdge 100m router has two antenna terminals, a Kensington security lock slot, and a Reset button. See Chassis Views for the location of all components on the rear panel of the router.

Antenna Terminals

The rear panel of the vEdge 100m router has two SMA antenna terminals for attaching the two multiband swivel-mount dipole antennas that ship with the router. For antenna specifications, see Multiband Antenna Specifications .

Kensington Security Lock Slot

The rear panel of the vEdge 100m router has a small metal-enforced hole for attaching a Kensington lock to secure the router.

Reset Button

The Reset button on the rear panel of the vEdge 100m router is recessed, to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool. The following table describes the effects of pressing the Reset button.

Table 18:

Press Duration	Behavior
Short press	Press for 2 seconds to reset and reboot the router.
Long press	Press for 10 seconds to reset the router and reboot it with factory default configuration.

Ports and Connectors

The vEdge 100m router supports three types of ports:

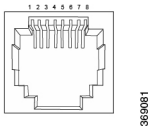
- RJ-45 Ethernet ports
- USB port
- USB serial console port.

RJ-45 Ethernet Ports

The vEdge 100m router has five built-in RJ-45 Ethernet ports. These ports support 10/100/1000 Mbps and are numbered 0 through 4. Port 0 supports PoE capability.

The following figure provides the pinout information for the RJ-45 ports. The RJ-45 ports comply with the 801 standards.

Figure 39: RJ-45 Ports Pinout Information



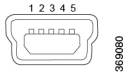
USB Port

The vEdge 100m router has one USB port with a type A connector. The USB port complies with USB 3.0 specification.

Console Port

The vEdge 100m console port is a serial port and is accessible via a USB Mini-B connector. See the following figure.

Figure 40: USB Mini-B Connector



A USB Type-A to Mini-B connector cable ships with the vEdge 100m router as standard accessory for console port connection.

Note When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

Power Supply and Cooling in a Cisco vEdge 100m Router

The vEdge 100m router has an built-in AC-to-DC power supply unit. This article describes the AC power supply in the router and the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 100m Router

The vEdge 100m router has an integrated AC power supply that exposes a C6 male AC inlet connector externally. The unit can be powered by connecting the supplied power cord to AC mains with the C5 female connector end of power cord plugged into the unit.

The following table describes the AC power supply specifications for the vEdge 100m router.

Table 19:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on transport interface	20 Watts
Typical power consumption with PoE enabled on transport interface	32 Watts maximum

AC Power Cord Specifications

The vEdge 100m router ships with a detachable AC power cord. The power cord has a C5 female connector at one end, and the other end is specific to the country/locality to which the product is shipped.

Cooling System in a vEdge 100m Router

The cooling system in a vEdge 100m router consists of internal heat sinks and an internal fan with adjustable speed. The fan speed is algorithmically controlled, based on readings obtained from internal temperature sensors. The internal temperature is affected by factors such as the external ambient temperature and the traffic workload.

If the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Planning and Installation

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 100m router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 100m router.

Site Preparation Guidelines

Efficient operation of your vEdge 100m router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 100m router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the intake air is too warm, the router can become overheated.
- The airflow to the router is from the top surface near the Viptela logo. To ensure that the airflow to the router is not blocked, keep an air gap of 2-3 inches (5-8 cm) above the router and do not place anything directly on top of the router.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.5°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, noncondensing.

Install the vEdge 100m Router

After you have prepared your site for router installation, unpack the vEdge 100m router and install the SIM card and the antennas before you mount the router on the wall.

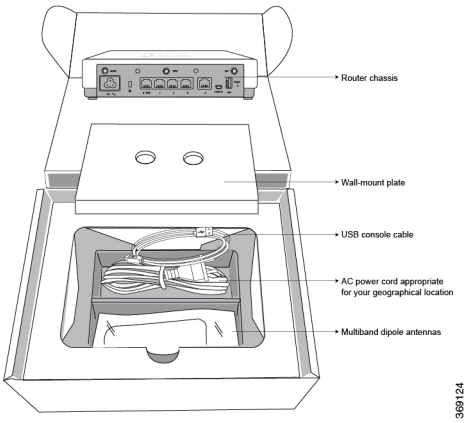
Unpack the vEdge 100m Router

A vEdge 100m router is shipped in a cardboard carton and is secured firmly in place with foam packing material. The carton contains a packing list and Quick Start instructions. It is recommended that you not unpack the router until you are ready to install it.

To unpack the router:

1. Open the top flaps of the carton.
2. Gradually remove the packing foam holding the router and the accessories in place. See Figure 1.
3. Take out the router and each accessory.
4. Verify the router components against the packing list included in the box (see packing list below).

Figure 41: Unpacking the vEdge 100m Router



Note It is recommended that you not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware .

Packing List for a vEdge 100m Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

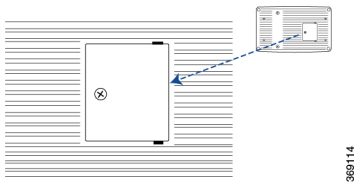
The following table lists the parts shipped with the vEdge 100m router and their quantities.

Component	Quantity
Router chassis	1
Multiband dipole antenna	2
AC power cord appropriate for your geographical location (ferrite bead attached)	1
USB console cable	1
Wall-mount plate	1
Quick Start document	1

Install the SIM Card Into the vEdge 100m Router

Before you connect power to the vEdge 100m router, you must install the SIM card that you received from your carrier. The SIM card socket is located on the bottom of the vEdge 100m chassis. See Figure 2.

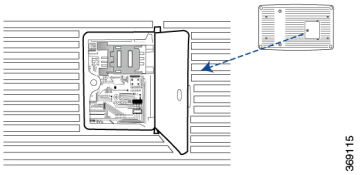
Figure 42: SIM Card Holder



To install the SIM card into the socket:

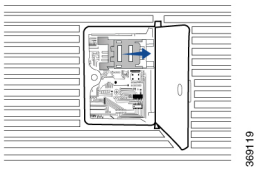
1. Unscrew the socket cover and open it.

   Figure 43: Opening the Socket Cover

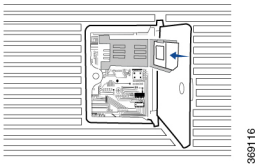
2. Slide the metallic SIM card holder cover towards the socket cover hinge and open it.

   Figure 44: Opening the SIM Card Holder Cover

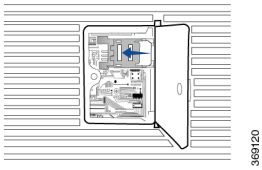
3. Insert the SIM card firmly into the metallic SIM card holder, with the SIM card correctly aligned and its contacts facing downward. Ensure that the SIM card is inserted fully.

   Figure 45: Sliding the SIM Card into the Socket

4. Push down and slide the metallic SIM card holder until it clicks. Ensure that the SIM card is seated correctly.

   Figure 46: Closing the SIM Card Holder Cover

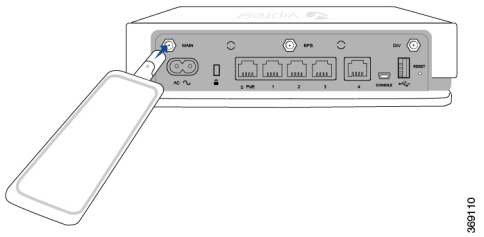
If you need to change the SIM card later, make sure you disconnect the router's power first, before installing the new card.

Attach the Antennas to the vEdge 100m Router

The rear panel of the vEdge 100m router has two antenna terminals. To attach the multiband antennas to the router:

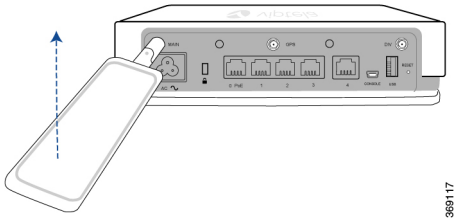
1. Screw one antenna into the terminal marked MAIN, and screw the other antenna into the terminal marked DIV.

Figure 47: Attaching the Antennas to the Rear of the Router



2. Turn each antenna so that it is vertical. See Figure 8.

Figure 48: Turning the Antenna to a Vertical Position



Mount the vEdge 100m Router on the Wall

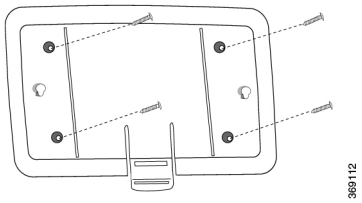
In addition to the accessory box, you need the following tools to mount a vEdge 100m router:

- Number 2 Phillips (+) screwdriver
- Tape measure or level

To mount the vEdge 100m router on the wall:

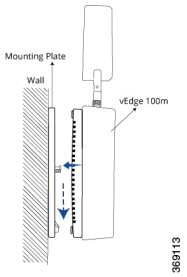
1. Secure the mounting plate to the wall using four screws appropriate for your wall type (screws not included).

Figure 49: Securing the Mounting Plate to the Wall



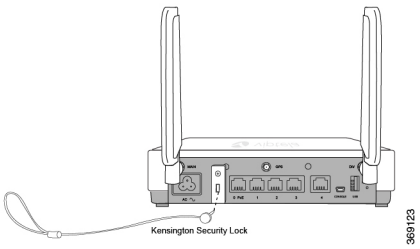
2. Mount the router on the mounting plate by aligning the two slots on the underside of the router chassis to the notches in the mounting plate. Then gently slide the router chassis down onto the notches.

Figure 50: Mounting the vEdge 100m Router on the Mounting Plate



3. Secure the router with a Kensington security lock using the slot in the rear of the chassis.

Figure 51: Securing the Router with a Kensington Security Lock



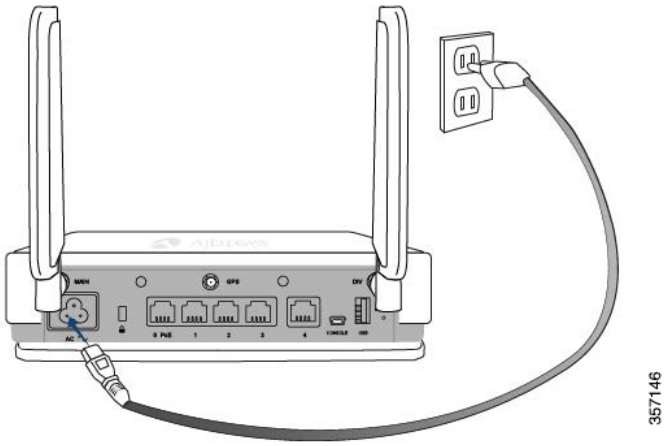
Connect the vEdge 100m Router

This article describes how to connect the vEdge 100m router to an AC power source and to a management console.

Connect AC Power to the Router

To connect the vEdge 100m router to an AC power source, plug one end of the AC power cord into the back of the router, and plug the other end into an AC power outlet as shown in the following figure.

Figure 52: Connecting AC Power Supply to a vEdge 100m Router



Note It is strongly recommended that you use the power cord supplied with the router.

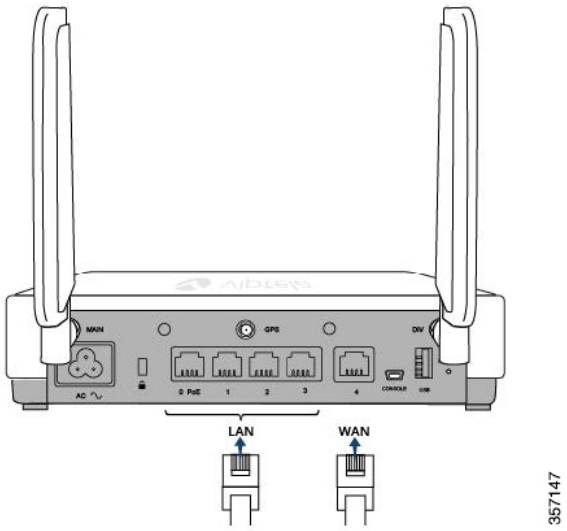
Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

Connect the Router to LAN and WAN Interfaces

To connect the vEdge 100m router to the LAN, plug the appropriate cable into any port except Port 4 on the front of the router.

To connect the vEdge 100m router to a WAN, plug the appropriate cable into Port 4 on the front of the router.

Figure 53: Connecting a vEdge 100m Router to LAN and WAN Interfaces

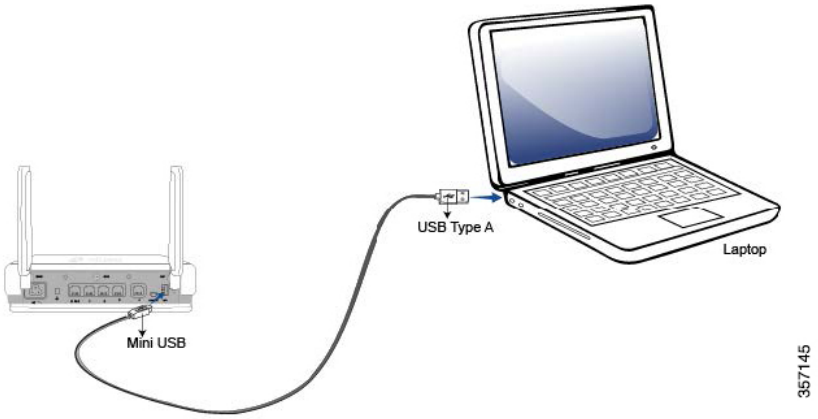


Connect the Router to a Management Console

To connect the vEdge 100m router to a management console:

1. Connect one end of the USB Type-A to Mini-B connector cable into the console port, labeled CONSOLE, on the vEdge router.
2. Connect the other end of the console cable into a management console.

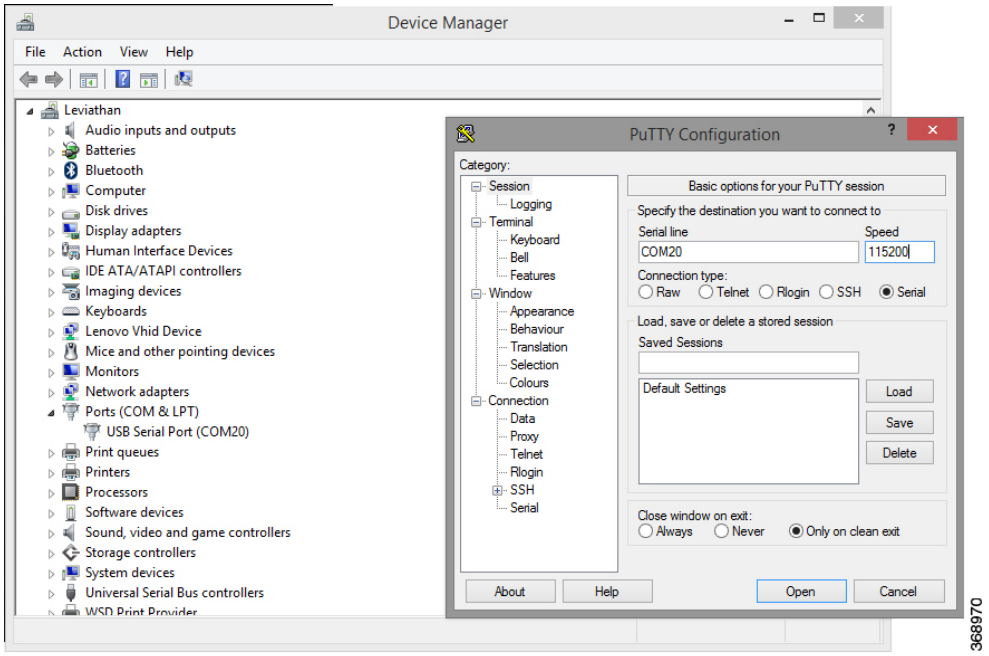
Figure 54: Connecting a vEdge 100m Router to a Management Console



To use the USB console from a Windows device:

1. In the Device Manager, determine which COM port is being used for the USB serial port.
2. In the PuTTY SSH/Telnet client, in **Connection Type**, select **Serial**. Specify the COM port and a speed of 115200.

Figure 55: PuTTY Configuration



To use the USB console from a Macintosh device:

1. Install the necessary USB serial driver to enable you to connect the Macintosh to the console port of the router.
2. Launch the Terminal utility.
3. From a terminal shell, access the console port with this command:

   ```
   $ screen /dev/tty.usbserial* 115200,cs8
   ```

vEdge 100m Router Default Configuration

Default Configuration for Software Releases 16.3 and Later

For Releases 16.3 and later, the default configuration file looks like this:

```
vEdge100m# show running-config
system
 host-name vedge
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
```

```
   task routing read
   task security read
  !
  user admin
   password
$6$qKmsMYJ084t8bH5e$vz1mCDB76u74UPJ29cFo7vK5JjNBTutvlT9WhH/EHgUCHwMwoWU9XzfQ4eqUtgwEMdFzWcskcAtb97GxLArXX1

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface cellular0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   color lte
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  mtu      1428
  profile  0
  technology auto (in Releases 16.3.2 and later)
  no shutdown
 !
 interface ge0/4
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
```

```
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

Default Configuration for Software Releases 16.2 and Earlier

For Release 16.2, the default configuration file looks like this:

```
vEdge100m# show running-config
system
 host-name vedge
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$fTBoB4hFbObL96Rh$<wbr/>Tx3voGhKPNeTSjRsQ4AVd3dvS3R.<wbr/>A0DsOcBaNjZgXJiiUU6OldFVpqKKBP<wbr/>1CafW56nMDIi2PNEvVeBSKMf1RL0

  !
 !
logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface ge0/4
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
```

```
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

For Releases 16.2.10 and later, after you install the software and issue the **request software reset** command, the default configuration file looks like this:

```
vEdge100m# show running-config
system
 host-name vedge
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$qKmsMYJ084t8bH5e$vz1mCDB76u74UPJ29cFo7vK5JjNBTutvlT9WhH/EHgUCHwMwoWU9XzfQ4eqUtgwEMdFzWcskcAtb97GxLArXX1

  !
!
logging
  disk
   enable
  !
!
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface cellular0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
```

```
   color lte
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  mtu      1428
  profile  0
  technology auto
  no shutdown
 !
 interface ge0/4
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

Maintenance and Troubleshooting

Maintenance and Troubleshooting

You can monitor and troubleshoot the vEdge 100m router using the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 100m router have two severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold.

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 100m router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 100m router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has one temperature sensing point (board sensor 0). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has a fixed built-in fan for system cooling which runs at a variable speed. The Viptela software maintains the fan at an optimal fan speed, raising the speed as the ambient temperature increases and decreasing the speed as the temperature decreases, to keep the router operating at the lowest possible temperature in the green temperature threshold. If the fan stops running, the system triggers an alarm. Also if the fan starts to run below a predefined RPM threshold, the system triggers an alarm.

The following table lists the yellow and red alarm threshold for the temperature sensing points in the system—one board sensor on the board and one CPU junction temperature sensor. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise, the higher threshold value (normal) applies.

Table 20:

Item	Yellow Alarm (ºC)	Red Alarm (ºC)		
	Normal	Bad Fan	Normal	Bad Fan
Board sensor 0	75	70	90	85
CPU junction temperature	80	75	95	90

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 100m router indicate the status of the router.

If one or more major alarms are active in the router, the Status LED is lit red. If one or more minor alarms are active in the router, the Status LED is lit solid yellow. See Front and Rear Panel Components for details of the LEDs and the status they indicate.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

vEdge# **request software reset**

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 56: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router
- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
    - Log in to www.viptela.com/support
    - Send email to support@viptela.com

- Call toll-free 800-525-5033

2. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

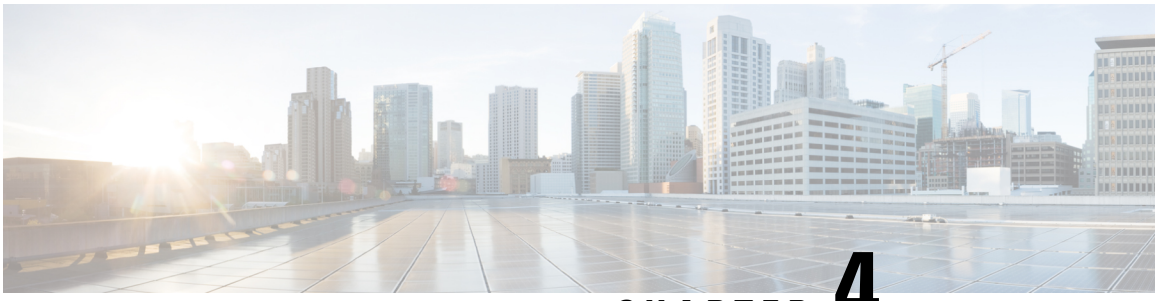
1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 4

vEdge 100wm Router

The vEdge 100wm router delivers highly secure site-to-site data connectivity to small business and home offices (SOHO). The vEdge 100wm router is a fixed-port-configuration router with the following features:

- Built-in LTE modem with mini-SIM (or 2FF) card
- Two multiband swivel-mount dipole antennas
- Supports a 4G/3G/2G–capable modem to connect to cellular networks
- Wi-Fi access point capability
- Wi-Fi radio configurable for 2.4 GHz or 5.0 GHz
- Five built-in 10/100/1000–Mbps Ethernet ports
- Power over Ethernet (PoE) source support on one Ethernet port
- Encryption and QoS support
- 100 Mbps aggregate bandwidth (IPSEC IMIX)
- Secure identification chip for anticounterfeit and secure authentication
- Integrated power supply
- Kensington security lock slot to physically lock down the router
- Desktop mount or wall mount

Chassis Views

The following figures show the front and back panels of the vEdge 100wm router, indicating the locations of the power interfaces, status indicators, and chassis identification labels.

Figure 57: Front Panel of the vEdge 100wm Router

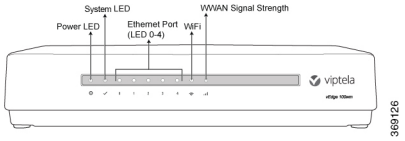
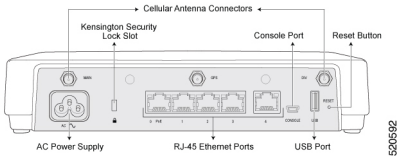


Figure 58: Back Panel of the vEdge 100wm Router



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Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

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Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .

Components and Specifications

This article provides specifications for the vEdge 100wm chassis, wireless platforms, and multiband swivel-mount dipole antennas.

Chassis Specifications

The following table lists the specifications for the vEdge 100wm router chassis.

Table 21:

Item	Specification
Services and Slot Density	
RJ45 Ports 10/100/1000 Mbps	5 ports, one of which has 802.3af PoE source capability
Embedded hardware-based cryptographic acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	2 GB
NAND storage (internal)	4 GB
USB host port	1
Mini USB connector console port (default baud rate 115.2 Kbps)	1
Power supply	AC input (C6 inlet connector)
Power Specifications	
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on interface ge0/0	20 Watts
Typical power consumption with PoE enabled on interface ge0/0	35 Watts maximum
Physical Specifications (excluding the multiband antennas)	
Chassis height	1.8 in. (4.5 cm)
Chassis width	9.25 in. (23.5 cm)
Chassis depth	5.75 in. (14.6 cm)
Chassis weight	1.45 lbs (0.67 kg)
Wall-mount plate accessory	Provided with the unit
Packaging Specifications	
Package height	5.375 in. (13.6 cm)
Package width	11.94 in. (30.3 cm)
Package depth	9.19 in. (23.3 cm)

Item	Specification
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature derating of 1.5°C per 1000 feet of altitude, up to a maximum of 10,000 ft, or 3000 m)
Altitude	Maximum 3000 m (10,000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	–40 to 70°C (–40 to 158°F)
Humidity	5 to 95% RH
Altitude	4570 m (15,000 ft)
Reliability	
MTBF	104,000 hours
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1
EMC	AS/NZS CISPR22 Class B EN 300 386 EN 55022 Class B FCC Class B ICES Class B VCCI Class B
Environmental	ROHS 6/6

Wireless Platform Specifications

The following table lists the specifications for the vEdge 100wm wireless platforms.

Table 22:

Platform	Specification
vEdge 100wm-AT	
SKU	100wm-AT
Carrier	AT&T
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 2 (1900 MHz), Band 4 (AWS 1700/2100 MHz), Band 5 (850 MHz), Band 17 (700 MHz)
Region	United States

Platform	Specification
vEdge 100wm-GB	
SKU	100wm-GB
Certification	GCF
Modem	Sierra Wireless MC7304
4G LTE Bands	Band 1 (2100 MHz), Band 3 (1800 MHz), Band 7 (2600 MHz), Band 8 (900MHz), Band 20 (800 MHz)
Regions	Australia, Europe, Middle East, Latin America, Asia Pacific
vEdge 100wm-NA	
SKU	100wm-NA
Certification	PTCRB
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 2 (1900 MHz), Band 4 (AWS 1700/2100 MHz), Band 5 (850 MHz), Band 13 (700 MHz), Band 17 (700 MHz), Band 25 (1900 MHz)
Region	North America
vEdge 100wm-NT	
SKU	100wm-NT
Carrier	NTT Docomo
Modem	Sierra Wireless MC7330
4G LTE Bands	Band 1 (2100 MHz), Band 19 (850 MHz), Band 21 (1500 MHz)
Region	Japan
vEdge 100wm-SP	
SKU	100wm-SP
Carrier	Sprint
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 25 (1900 MHz)
Region	United States
vEdge 100wm-VZ	
SKU	100wm-VZ
Carrier	Verizon

Platform	Specification
Modem	Sierra Wireless MC7354
4G LTE Bands	Band 4 (AWS 1700/2100 MHz), Band 13 (700 MHz)
Region	United States

Multiband Cellular Antenna Specifications

The vEdge 100wm router ships with two multiband swivel-mount dipole antennas. The articulating joint of the antenna provides 0 to 90 degrees pivot and 180-degree swivel movement, allowing vertical and horizontal orientation of the antenna.

The following table lists the electrical, mechanical, and frequency specifications for the antennas.

Table 23: vEdge 100wm Multiband Cellular Antenna Specifications

Item	Specification
Antenna type	MIMO, dipole swivel
Input power	10 Watts
Connector	SMA male
Nominal impedance	50 Ohms
Radiation pattern	Omnidirectional
Frequency range	698MHz to 960MHz and 1710MHz to 2700Mhz
Temperature range	F (–40°C to 85°C)
Antenna dimensions	Length: 6.37 in. (16.19 cm) Width: 0.9 in. (2.38 cm) Depth: 0.63 in. (1.59 cm)
Humidity	Noncondensing, 65°C, 95% RH

Wi-Fi Specifications

The vEdge 100wm router provides the following Wi-FI capabilities:

- Embedded Wi-Fi radio for access point functionality
- Wi-Fi radio configurable for 2.4-GHz or 5.0-GHz operation
- Supports IEEE 802.11a, 802.11b, 802.11g, 802.11 n, and 802.11ac protocols
- Supports channel bandwidth of 20 MHz, 40 MHz, and 80 MHz
- Supports IEEE 802.11h DFS channels

- 3x3 MIMO with three spatial streams
- Supports up to four different SSIDs
- Supports up to 50 concurrent clients
- Supports wireless security and authentication:
  - Personal and enterprise WPA/WPA2
  - AES/CCMP encryption
  - TKIP encryption
- Internal embedded antennas

Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 100wm router. For the exact location of these components on the router, see At a Glance .

Front Panel LEDs

The vEdge 100wm router has five chassis status LEDs located on the front panel. Table 1 describes the LEDs, their color and states, and the status they indicate.

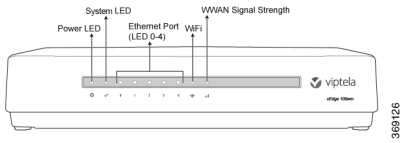
Table 24:

LED	Color	Status
Power	Green/Red	• Off: System is not on • Green: System power is healthy and operational • Red: Power supply fault
System	Green/Yellow/Red	• Off: System is not on • Solid Green: System is fully functional • Blinking Green: System is booting up • Solid Yellow: No Internet connectivity or the system has detected a minor alarm • Red: System has detected a major system level fault or alarm
Ethernet Port (LED 0–4)	Green/Yellow	• Off: No link • Solid Green: 1000 Mbps link detected • Blinking Green: 1000 Mbps link detected and link activity • Solid yellow: 10/100 Mbps link detected • Blinking Yellow: 10/100 Mbps link detected and link activity

LED	Color	Status
WiFi Status	Green	• Off: WiFi interface disabled/off • Solid Yellow: WiFi enabled • Blinking Green: WiFi client connected and link activity
WWAN Signal Strength	Green/Yellow/Red	• Off: LTE interface disabled/off • Solid Green: LTE enabled, excellent signal strength, dormant mode • Blinking Green: LTE enabled, excellent signal strength, active mode • Solid yellow: LTE enabled, good signal strength, dormant mode • Blinking Yellow: LTE enabled, good signal strength, active mode • Solid Orange: LTE enabled, poor signal strength, dormant mode • Blinking Orange: LTE enabled, poor signal strength, active mode • Solid Red: LTE enabled but faulty such as no connectivity with BTS, errors, or no signal

The following figure shows the location of the chassis status LEDs on the front panel of the vEdge 100wm router.

Figure 59: Chassis Status LEDs in a vEdge 100wm Router (UPDATE)



Rear Panel

The rear panel of the vEdge 100wm router has two cellular antenna terminals, a Kensington security lock slot, and a Reset button. See Chassis Views for the location of these components.

Cellular Antenna Terminals

The rear panel of the vEdge 100wm router has two SMA antenna terminals for attaching the two multiband swivel-mount dipole antennas that ship with the router. For antenna specifications, see Multiband Cellular Antenna Specifications .

Kensington Security Lock Slot

The rear panel of the vEdge 100wm router has a small metal-enforced hole for attaching a Kensington lock to secure the router.

Reset Button

The Reset button on the rear panel of the vEdge 100wm router is recessed, to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool. The following table describes the effects of pressing the Reset button.

Table 25:

Press Duration	Behavior
Short press	Press for 2 seconds to reset and reboot the router.
Long press	Press for 10 seconds to reset the router and reboot it with factory default configuration.

Ports and Connectors

The vEdge 100wm router supports three types of ports:

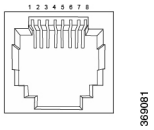
- RJ-45 Ethernet ports
- USB port
- USB serial console port.

RJ-45 Ethernet Ports

The vEdge 100wm router has five built-in RJ-45 Ethernet ports. These ports support 10/100/1000 Mbps and are numbered 0 through 4. Port 0 supports PoE capability.

The following figure provides the pinout information for the RJ-45 ports. The RJ-45 ports comply with the 801 standards.

Figure 60: RJ-45 Ports Pinout Information



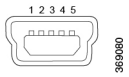
USB Port

The vEdge 100wm router has one USB host port with a type A connector. The USB port supports USB 3.0 speeds.

Console Port

The vEdge 100wm console port is a serial port and is accessible via a USB Mini-B connector. See the following figure.

Figure 61: USB Mini-B Connector



A USB Type-A to Mini-B connector cable ships with the vEdge 100wm router as standard accessory for console port connection.

Note When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

Power Supply and Cooling System

The vEdge 100wm router has an built-in AC-to-DC power supply unit. This article describes the AC power supply in the router and the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 100wm Router

The vEdge 100wm router has an integrated AC power supply that exposes a C6 male AC inlet connector externally. The unit can be powered by connecting the supplied power cord to AC mains with the C5 female connector end of power cord plugged into the unit.

The following table describes the AC power supply specifications for the vEdge 100wm router.

Table 26:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption with PoE disabled on ethernet port 0	20 Watts
Typical power consumption with PoE enabled on ethernet port 0	35 Watts maximum

AC Power Cord Specifications

The vEdge 100wm router ships with a detachable AC power cord. The power cord has a C5 female connector at one end, and the other end is specific to the country/locality to which the product is shipped.

Cooling System in a vEdge 100wm Router

The cooling system in a vEdge 100wm router consists of internal heat sinks and an internal fan with adjustable speed. The fan speed is algorithmically controlled, based on readings obtained from internal temperature sensors. The internal temperature is affected by factors such as the external ambient temperature and the traffic workload.

If the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 100wm router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 100wm router.

Site Preparation Guidelines

Efficient operation of your vEdge 100wm router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.

- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 100wm router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the intake air is too warm, the router can become overheated.
- The airflow to the router is from the top surface near the Viptela logo. To ensure that the airflow to the router is not blocked, keep an air gap of 2-3 inches (5-8 cm) above the router and do not place anything directly on top of the router.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.5°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, noncondensing.

Install the vEdge 100wm Router

Once you have prepared your site for router installation, unpack the vEdge 100wm router and install the SIM card and the antennas before you mount the router on the wall.

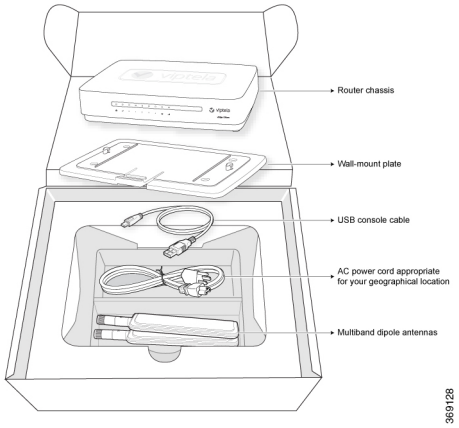
Unpack the vEdge 100wm Router

A vEdge 100wm router is shipped in a cardboard carton and is secured firmly in place with foam packing material. The carton contains a packing list and Quick Start instructions. It is recommended that you not unpack the router until you are ready to install it.

To unpack the router:

1. Open the top flaps of the carton.
2. Gradually remove the packing foam holding the router and the accessories in place.
3. Take out the router and each accessory.
4. Verify the router components against the packing list included in the box (see packing list below).

Figure 62: Unpacking the vEdge 100wm Router



Note It is recommended that you not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware.

Packing List for a vEdge 100wm Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

The following table lists the parts shipped with the vEdge 100wm router and their quantities.

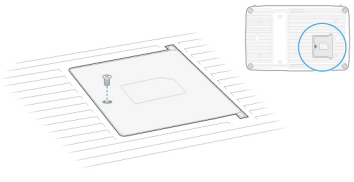
Table 27:

Component	Quantity
Router chassis	1
Multiband dipole antenna	2
AC power cord appropriate for your geographical location (ferrite bead attached)	1
USB console cable	1
Wall-mount plate	1
Quick Start document	1

Install the SIM Card Into the vEdge 100wm Router

Before you connect power to the vEdge 100wm router, you must install the SIM card that you received from your carrier. The SIM card socket is located on the bottom of the vEdge 100wm chassis.

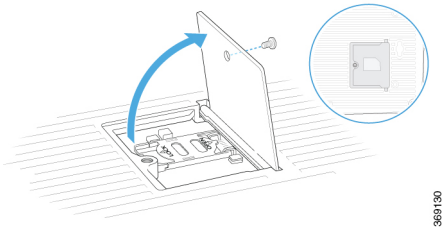
Figure 63: SIM Card Socket



To install the SIM card into the SIM card holder:

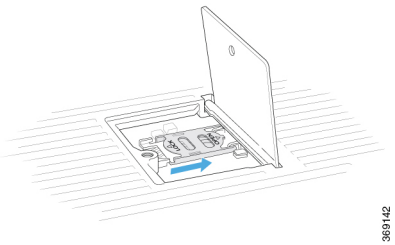
1. Unscrew the SIM card socket cover and open it.

   Figure 64: Opening the SIM Card Socket Cover

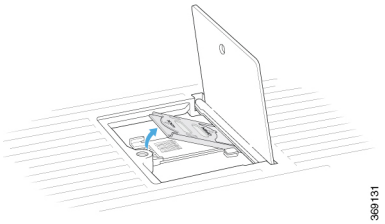
2. Slide the SIM card holder towards the socket cover hinge.

   Figure 65: Sliding the SIM Card Holder

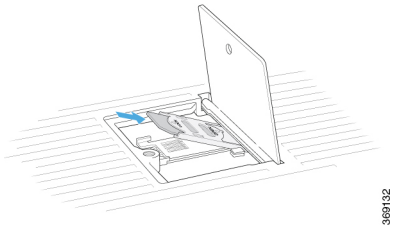
3. Open the SIM card holder.

   Figure 66: Opening the SIM Card Holder

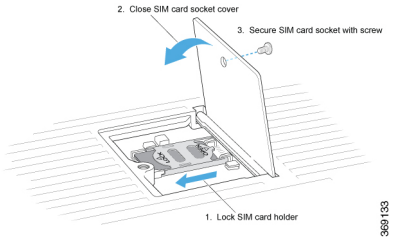
4. Insert the SIM card firmly into the SIM card holder.

Figure 67: Inserting the SIM Card into the SIM Card Holder



5. Close and lock the SIM card holder. Then close the socket cover and screw it shut.

Figure 68: Locking the SIM Card Holder and Closing the Socket Cover



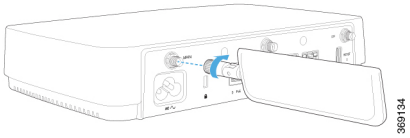
If you need to change the SIM card later, make sure you disconnect the router's power first, before installing the new card.

Attach the Antennas to the vEdge 100wm Router

The rear panel of the vEdge 100wm router has two antenna terminals. To attach the multiband antennas to the router:

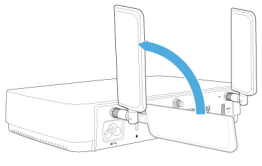
1. Screw one antenna into the terminal marked MAIN, and screw the other antenna into the terminal marked DIV.

Figure 69: Attaching the Antennas to the Rear of the Router



2. Turn each antenna so that it is vertical.

Figure 70: Turning the Antenna to a Vertical Position



Mount the vEdge 100wm Router on the Wall

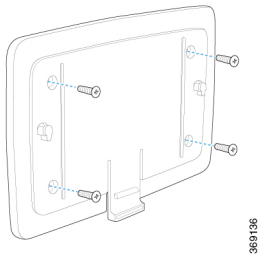
In addition to the accessory box, you need the following tools to mount a vEdge 100wm router:

- Number 2 Phillips (+) screwdriver
- Tape measure or level

To mount the vEdge 100wm router on the wall:

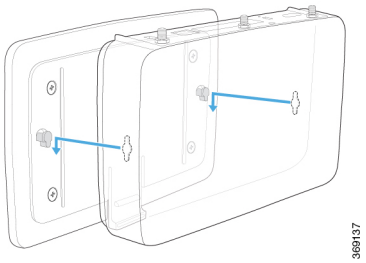
1. Secure the mounting plate to the wall using four screws appropriate for your wall type (screws not included).

   Figure 71: Securing the Mounting Plate to the Wall



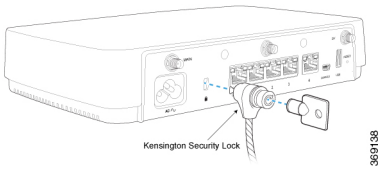
2. Mount the router on the mounting plate by aligning the two slots on the underside of the router chassis to the notches in the mounting plate. Then gently slide the router chassis down onto the notches.

   Figure 72: Mounting the vEdge 100wm Router on the Mounting Plate



3. Secure the router with a Kensington security lock using the slot in the rear of the chassis.

   Figure 73: Securing the Router with a Kensington Security Lock



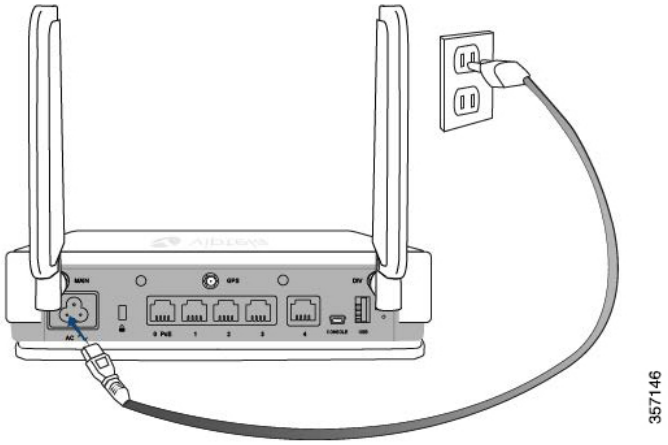
Connect the vEdge 100wm Router

This article describes how to connect the vEdge 100wm router to an AC power source and to a management console.

Connect AC Power to the Router

To connect the vEdge 100wm router to an AC power source, plug one end of the AC power cord into the back of the router, and plug the other end into an AC power outlet as shown in the following figure.

Figure 74: Connecting AC Power Supply to a vEdge 100wm Router



Note It is strongly recommended that you use the power cord supplied with the router.

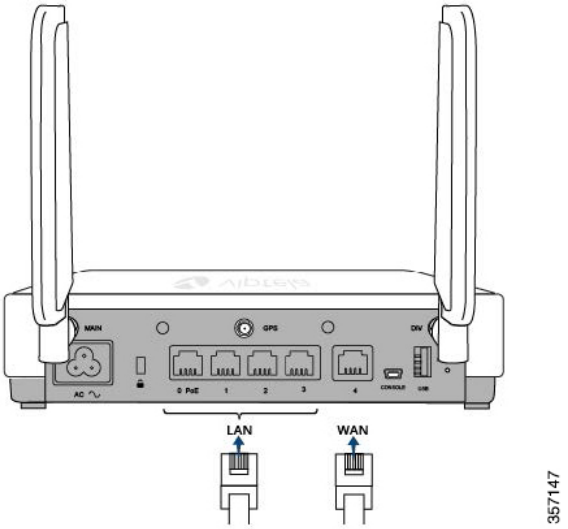
Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

Connect the Router to LAN and WAN Interfaces

To connect the vEdge 100wm router to the LAN, plug the appropriate cable into any port except Port 4 on the front of the router.

To connect the vEdge 100wm router to a WAN, plug the appropriate cable into Port 4 on the front of the router.

Figure 75: Connecting a vEdge 100wm Router to LAN and WAN Interfaces

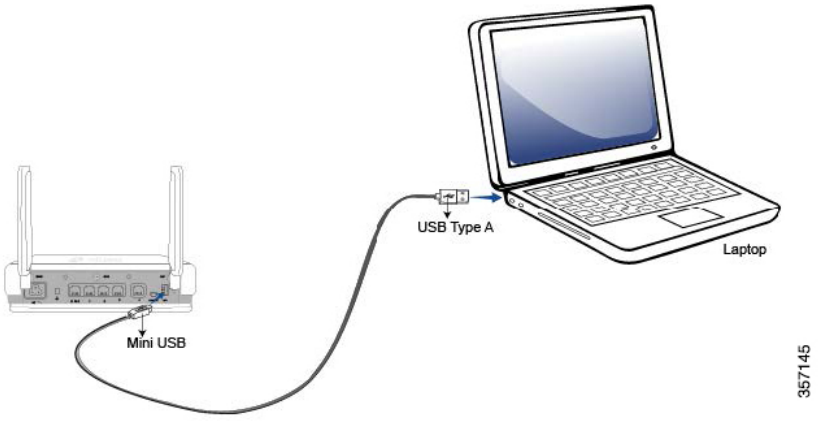


Connect the Router to a Management Console

To connect the vEdge 100wm router to a management console:

1. Connect one end of the USB Type-A to Mini-B connector cable into the console port, labeled CONSOLE, on the vEdge router.
2. Connect the other end of the console cable into a management console.

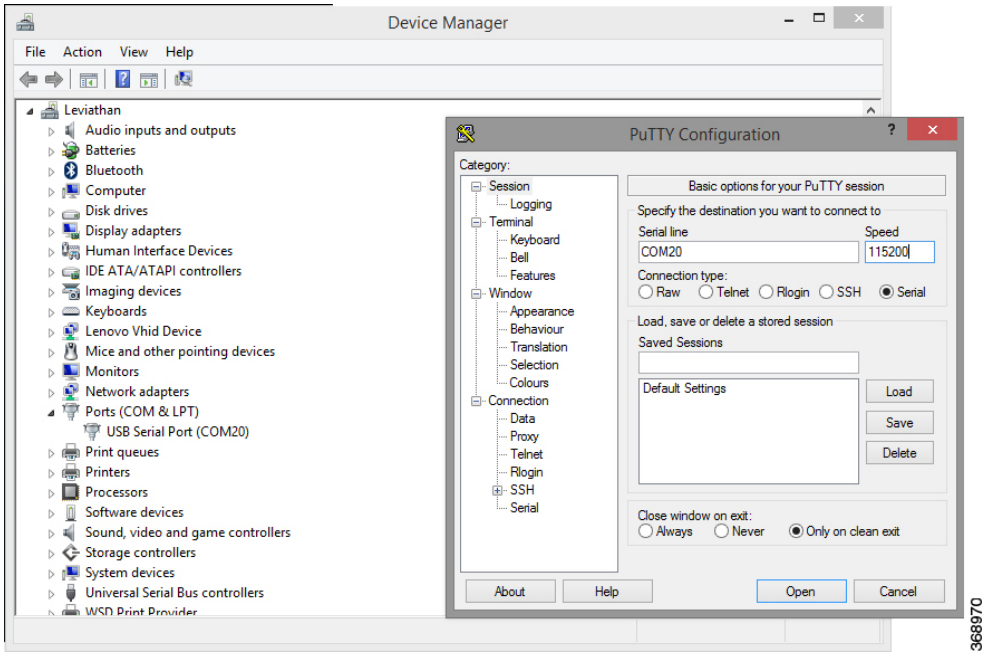
Figure 76: Connecting a vEdge 100wm Router to a Management Console



To use the USB console from a Windows device:

1. In the Device Manager, determine which COM port is being used for the USB serial port.
2. In the PuTTY SSH/Telnet client, in **Connection Type**, select **Serial**. Specify the COM port and a speed of 115200.

Figure 77: PuTTY Configuration



To use the USB console from a Macintosh device:

1. Install the necessary USB serial driver to enable you to connect the Macintosh to the console port of the router.
2. Launch the Terminal utility.
3. From a terminal shell, access the console port with this command:

   ```
   $ screen /dev/tty.usbserial* 115200,cs8
   ```

vEdge 100wm Router Default Configuration

Default Configuration for Software Releases 16.3 and Later

For Releases 16.3 and later, the default configuration file looks like this:

```
vEdge100wm# show running-config
system
 host-name vedge
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
```

```
   task routing read
   task security read
  !
  user admin
   password
$6$kIUhwl5BwngDJKLk$Qt9Xj3WwN90bzIDL/mRmpJ33Q1nAnMGSSNK1SKhWCK/pjnM2047hYntW8C4PKUpPgYuW8FiS4KKZrN/Wx4uOY1

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface cellular0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   color lte
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  mtu      1428
  profile  0
  technology auto (in Releases 16.3.2 and later)
  no shutdown
 !
 interface ge0/4
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
```

```
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

Default Configuration for Software Releases 16.2 and Earlier

For Releases 16.2 and earlier, the default configuration file looks like this:

```
vEdge100wm# show running-config
system
 host-name vedge
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$kIUhwl5BwngDJKLk$Qt9Xj3WwN90bzIDL/mRmpJ33Q1nAnMGSSNK1SKhWCK/pjnM2047hYntW8C4PKUpPgYuW8FiS4KKZrN/Wx4uOY1

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface cellular0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   color lte
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
```

```
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  mtu      1428
  profile  0
  technology auto (in Releases 16.3.2 and later)
  no shutdown
 !
 interface ge0/4
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
 interface ge0/0
  ip address 192.168.1.1/24
  no shutdown
 !
!
```

Maintenance and Troubleshooting

You can monitor and troubleshoot the vEdge 100wm router using the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 100wm router have two severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold.

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 100wm router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 100wm router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has one temperature sensing point (board sensor 0). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has a fixed built-in fan for system cooling which runs at a variable speed. The Viptela software maintains the fan at an optimal fan speed, raising the speed as the ambient temperature increases and decreasing the speed as the temperature decreases, to keep the router operating at the lowest possible temperature in the green temperature threshold. If the fan stops running, the system triggers an alarm. Also if the fan starts to run below a predefined RPM threshold, the system triggers an alarm.

The following table lists the yellow and red alarm threshold for the temperature sensing points in the system—one board sensor on the board and one CPU junction temperature sensor. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise, the higher threshold value (normal) applies.

Table 28:

Item	Yellow Alarm (°C)	Red Alarm (°C)		
	Normal	Bad Fan	Normal	Bad Fan
Board sensor 0	75	70	90	85
CPU junction temperature	80	75	95	90

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 100wm router indicate the status of the router.

If one or more major alarms are active in the router, the Status LED is lit red. If one or more minor alarms are active in the router, the Status LED is lit solid yellow. See Front and Rear Panel Components for details of the LEDs and the status they indicate.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

```
vEdge# request software reset
```

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.

- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number (sample shown in Figure 1) is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 78: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router
- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
2. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

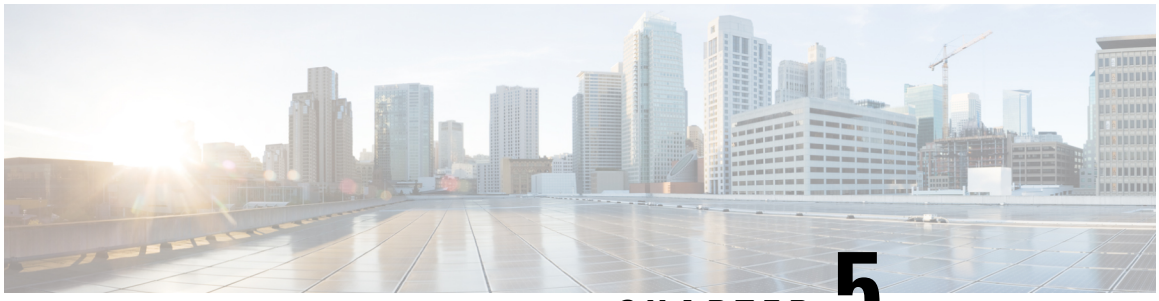
1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 5

vEdge 1000 Router

The vEdge 1000 router delivers highly secure site-to-site data connectivity to large enterprises. The vEdge 1000 router is a fixed-port-configuration router with the following features:

- 1RU, half rack width, standard rack mountable with up to two units side by side in a 19-inch rack
- Eight built-in 1-Gigabit Ethernet SFP ports (8x1-Gigabit Ethernet)
- Encryption and QoS support
- 100-Mbps of unidirectional Internet Mix (IMIX) forwarding traffic (inclusive of encryption)
- Secure identification chip for anti-counterfeit and secure authentication
- Dual power supplies with two external AC power adapters
- Hardware capable of supporting 3G/4G interfaces via USB ports
- Front to back cooling

Chassis Views

The following figures show the front and back panels of the vEdge 1000 router, indicating the location of the power interfaces, status indicators, and chassis identification labels.

Figure 79: Front Panel of the vEdge 1000 Router

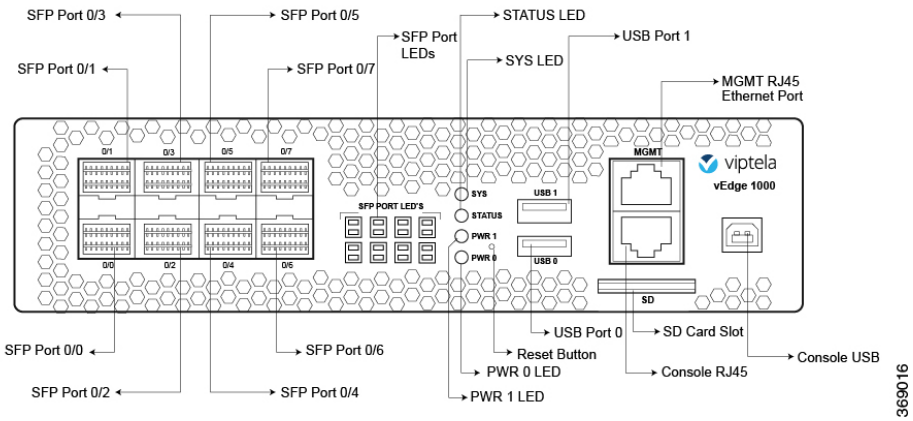
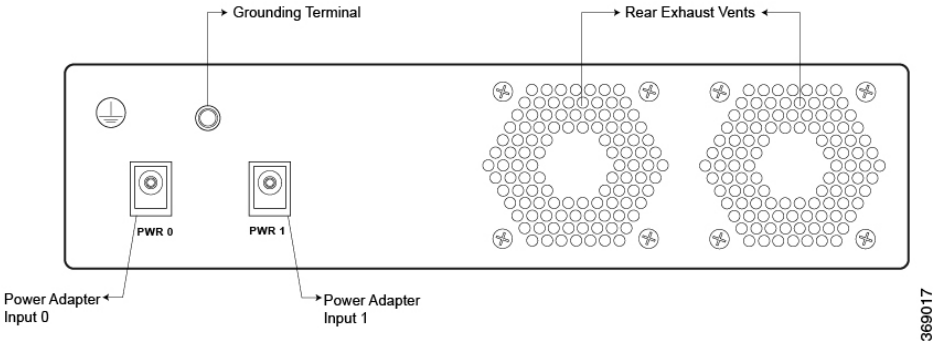


Figure 80: Back Panel of the vEdge 1000 Router



- Declaration of Conformity, on page 100
- Components and Specifications, on page 100
- Planning and Installation, on page 116
- Maintenance and Troubleshooting, on page 129

Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .

Components and Specifications

This article provides the chassis specifications of the vEdge 1000 router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 1000 router chassis.

Table 29:

Item	Specification
Services and Slot Density	
SFP-based traffic ports (max 1 Gbps)	8
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	Chassis revisions D1 or earlier: 2 GB Chassis revisions D2 or later (including G revisions): 4 GB **Note** Characters in the serial number indicate the chassis revision. Example of a revision D2 serial number: 11O**D2**11111111
SD card slot (external)	Maximum capacity supported 32 GB
NAND storage (internal)	8 GB
External USB flash memory slots (Type A USB 3.0)	2
USB console port (Type B default 115.2 Kbps)	1
Serial console port (RJ-45 default 115.2 Kbps)	1
Management Ethernet port (RJ-45 10/100/1000 Mbps)	1
Power supply option	External AC-DC power adapter
Redundant power supply support	Yes
Power Specifications	
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption	28 Watts
Physical Specifications	
Chassis height	1.75 in. (4.4 cm)
Chassis width	7.5 in. (19 cm)
Chassis depth	10 in. (25.4 cm)

Item	Specification
Rack height	1 RU
Chassis weight	3.55 lb (1.6 kg)
Airflow	Front to back
Rack-mount accessory kit 19 in (48.3 cm) EIA	Available and sold separately
Packaging Specifications	
Package height	8.5 in. (21.6 cm)
Package width	11.75 in. (29.84 cm)
Package depth	16.5 in. (41.9 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	80K hours
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1
EMC	AS/NZS CISPR22 Class A EN 300 386 EN 55022 Class A FCC Class A ICES Class A VCCI Class A
Environmental	ROHS 6/6

Rack-Mount Tray Specifications

The following table lists the specifications for the rack-mount tray. You can use the rack-mount tray to install the vEdge 1000 router if you want to install two vEdge routers in the same slot in a 19-inch rack or if you want to mount the router on all four posts of the rack. See Install the vEdge 1000 Router .

Table 30:

Item	Specification
Height	18.9 in. (48 cm)
Width	1.75 in. (4.45 cm)
Depth	22.36 in. (56.8 cm) including the cable management ears

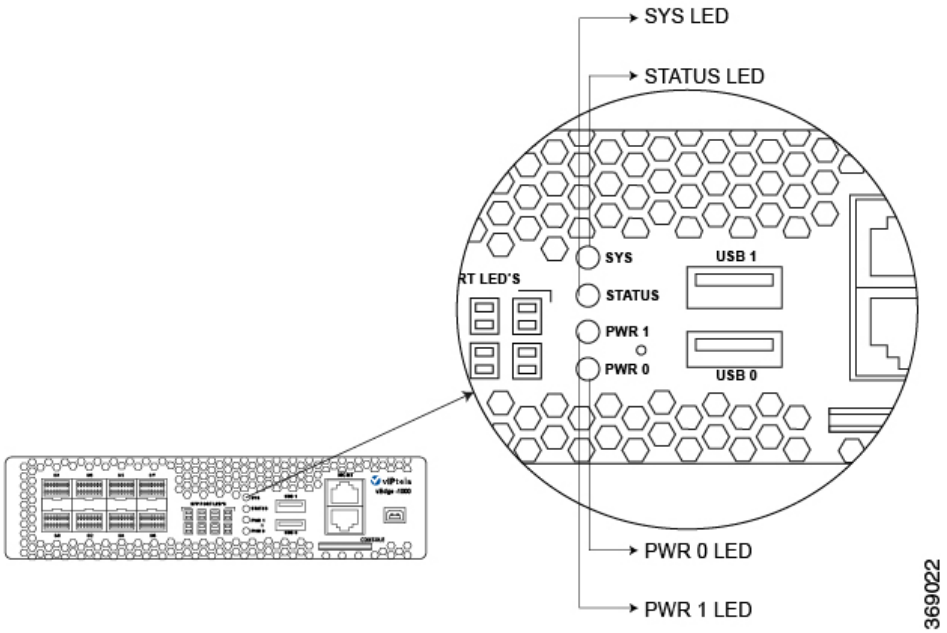
Front Panel Components

This article describes the LEDs, reset button, and the SD card slot on the front panel of the vEdge 1000 router. See Chassis Views for the location of all components on the front panel of the router.

LEDs

The vEdge 1000 router has four chassis status LEDs located in the center of the front panel next to the USB ports.

Figure 81: Chassis Status LEDs in a vEdge 1000 Router



The following table describes the LEDs , their color and states, and the status they indicate.

Table 31:

LED	Color	Status
SYS	Green/Red	• Off: System is not on • Green: System is healthy and operating fine • Blinking Green: System is booting up • Red: One of the daemons has failed
STATUS	Green	• Off: OMP is down • Green: OMP with vSmart is up
PWR 0	Green/Red	• Off: Power adapter input 0 is unpowered • Green: 12-Volt output is OK on power input 0 • Red: Fault on power input 0
PWR 1	Green/Red	• Off: Power adapter input 1 is unpowered • Green: 12-Volt output is OK on power input 1 • Red: Fault on power input 1

Reset Button

The front panel of the vEdge router has a Reset button. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool. The following table describes the effects of pressing the Reset button.

Table 32:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

SD Card Slot

The front panel of the vEdge 1000 router has an SD card slot. The SD card slot has the following specifications:

- Normal speed bus: maximum 10 MB/second
- Supported card types: SD, SDHC

Supported Transceivers

This article provides a list of copper and fiber transceivers that have been tested and qualified for use in vEdge 1000 and vEdge 2000 routers. You can order the transceivers that have a Viptela part number in the tables below directly from Viptela.

Table 33:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FCLF-8521-3	SFP-1GE-Base-T	X	X	X	• Small form-factor pluggable (SFP) transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Finisar FCLF8521P2BTL	SFP-1GE-Base-T	X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco-Avago SFBR-5766PZ-CS2		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Bel-Fuse 1GBT-SFP05		X	X		• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Avago ABCU-5710RZ		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco GLC-T1000BASE-T		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet

Table 34:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge5000 Router	Description
Avago AFBR-5710PZ		X	X	X	• Small form-factor pluggable (SFP) transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Avago AFCT-5710PZ		X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Finisar FTLF1318P3BTL	SFP-1GE-LX	X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Cisco-Finisar FTLF8519P2BCL-C4		X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Finisar FTLF8519P3BNL	SFP-1GE-SX	X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics for multi-mode fiber for 1-Gbps applications
Finisar FTLX8574D3BCL	SFP+-10GE-SR		X	X	• SFP+ transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 10-Gbps applications

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FTLX8571D3BCV			X	X	• SFP+ transceiver • LC-type transceiver • Short-reach 850-nm optics for multi-mode fiber for dual-rate 1 Gbps/10 Gbps applications **Note** : The SFP+ ports of the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCV			X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for dual-rate 1 Gbps/10 Gbps applications **Note**: The SFP+ ports on the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCL	SFP+-10GE-LR		X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 10-Gbps applications

Ports and Connectors

The vEdge 1000 router supports three types of ports: network ports (also called SFP ports), management port, and console port.

Network Ports (SFP Ports)

The built-in Gigabit Ethernet network ports on the vEdge 1000 router support 1-Gbps SFP transceiver modules.

The following table provides the pinout information for the built-in SFP port connector. The SFP ports comply with the SFP MSA standards.

Table 35:

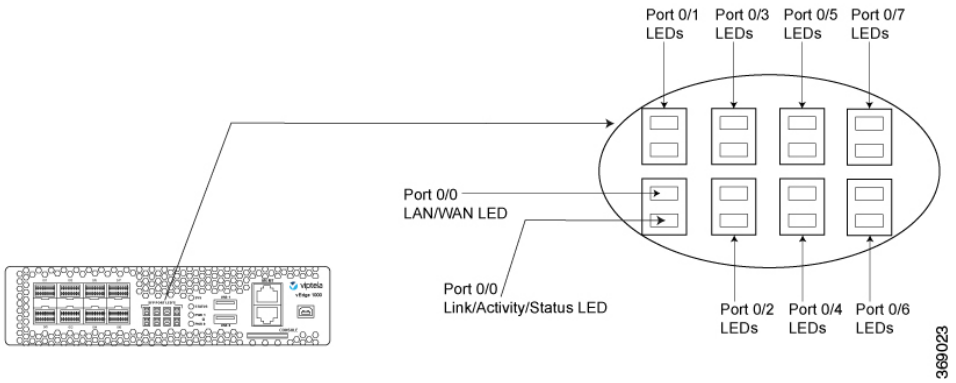
Pin	Signal	Description
1	VeeT	Module transmitter ground

Pin	Signal	Description
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disable
4	SDA	Two-wire serial interface data line
5	SCL	Two-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0; optionally controls SFP module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1; optionally controls SFP transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver non-inverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3-V supply
16	VccT	Module transmitter 3.3-V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter non inverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Network Port LEDs

Each network port on the vEdge 1000 router has two LEDs—the link/activity/status LED and the LAN/WAN LED. See the following figure.

Figure 82: LEDs on the SFP Network Ports on a vEdge 1000 Router



The following table describes the Link/Activity/Status LED on the network ports.

Table 36:

Color	State & Description
Green	• Blinking—The port and the link are active, and there is link activity. • On steadily—The port and the link are active, but there is no link activity.
Yellow	• Blinking—The link is negotiated and active at a speed of 10M/100M, and there is link activity. • On steadily—The link is negotiated and active at a speed of 10M/100M, but there is no link activity.
Alternating green and yellow	• An SFP has been detected in the port.
Off	• The port and link are not active.

The following table describes the LAN/WAN LED on the network ports.

Table 37:

Color	State & Description
Green	• On steadily—The port is configured as a WAN port. • Off—The port is configured as a LAN port.

Management Port

The management Ethernet port on a vEdge 1000 router uses an RJ-45 connector to connect to a management device for out-of-band management.

The management port uses an autosensing RJ-45 connector to support a 10/100/1000Base-T connection. The two LEDs on the port indicate link/activity on the port as well as the link speed status of the port. See Management Port LEDs below.

The following table provides the pinout information for the RJ-45 connector for the management port.

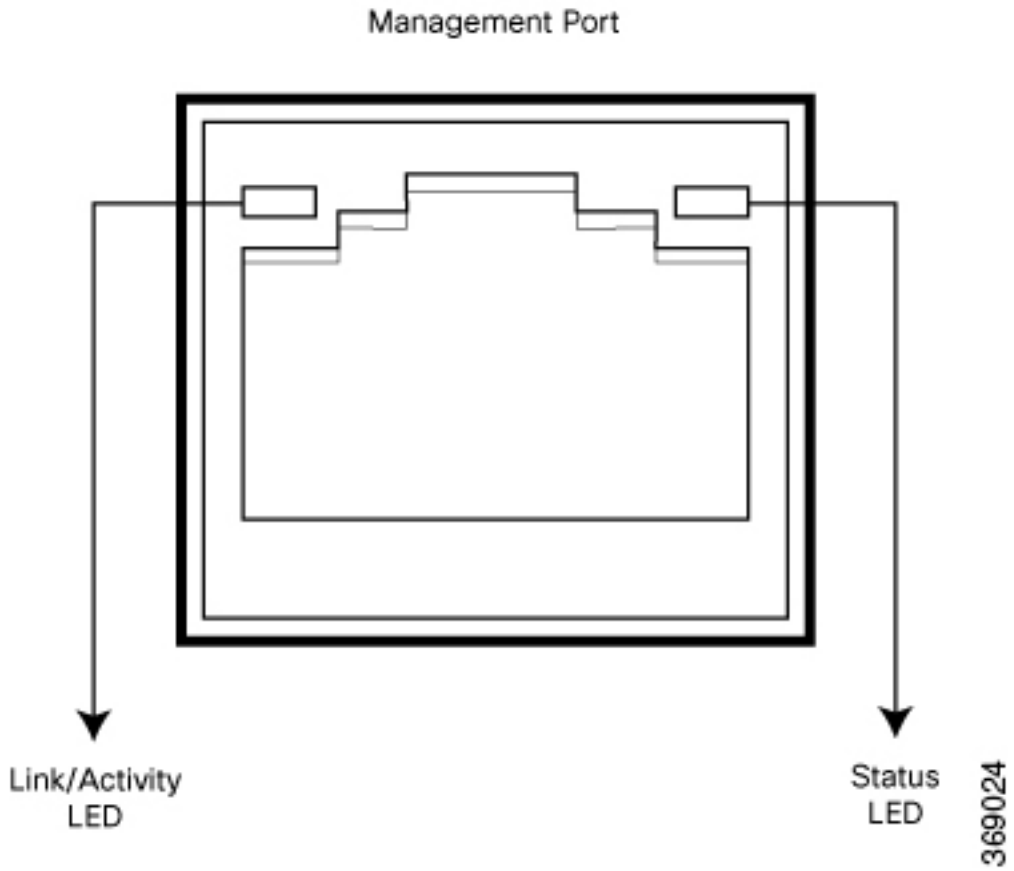
Table 38:

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Management Port LEDs

The management port on the vEdge 1000 router has two LEDs that indicate link/activity and port status. See the following figure.

Figure 83: LEDs on the Management Port on a vEdge 1000 Router



The following table describes the LEDs on the management port.

Table 39:

LED	Color	State & Description
Link/Activity	Green	Blinking—Link is up and there is link activity Steady On— Link is up but there is no link activity Off —Link is not up
Status	Green/Yellow/Off	Indicates the speed of the link: Green—1000 Mbps Yellow—100 Mbps Off—10 Mbps

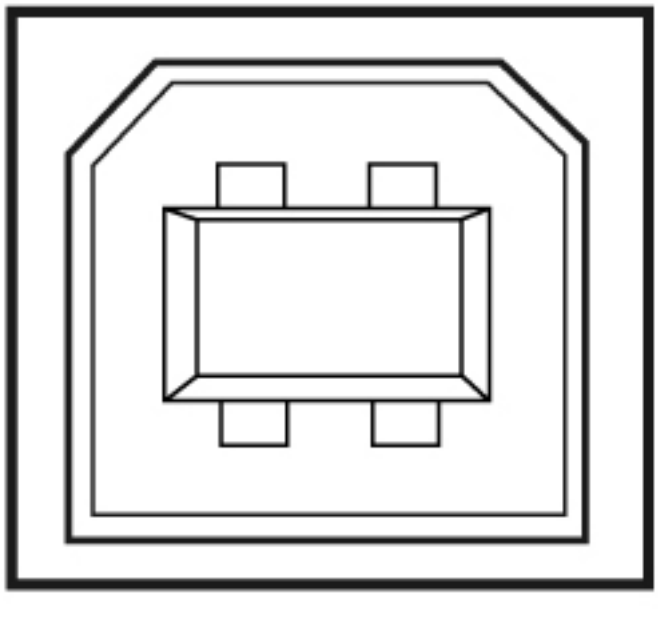
Console Port

The console port on a vEdge 1000 router is accessible via the following external interfaces:

- An RS-232 serial interface that uses an RJ-45 connector to connect to a console management device.

- A USB serial interface that uses a standard USB Type B connector to connect to a console management device. See the following figure.

Figure 84: USB Type B Connector



Note

- At any given time, you can activate only one of the external interfaces.
- The default baud rate for the console port is 115,200 baud.
- When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

The following table provides the pinout information for the RJ-45 console port connector. A USB Type-A to Type-B cable is shipped with the vEdge 1000 router as standard accessory for console port connection.

When you connect a device, such as a PC or a terminal server, to the console port of the vEdge 1000 router, ensure that flow control is disabled on the device that is connecting to the vEdge router, for the serial port it uses to connect to the vEdge router.

Table 40:

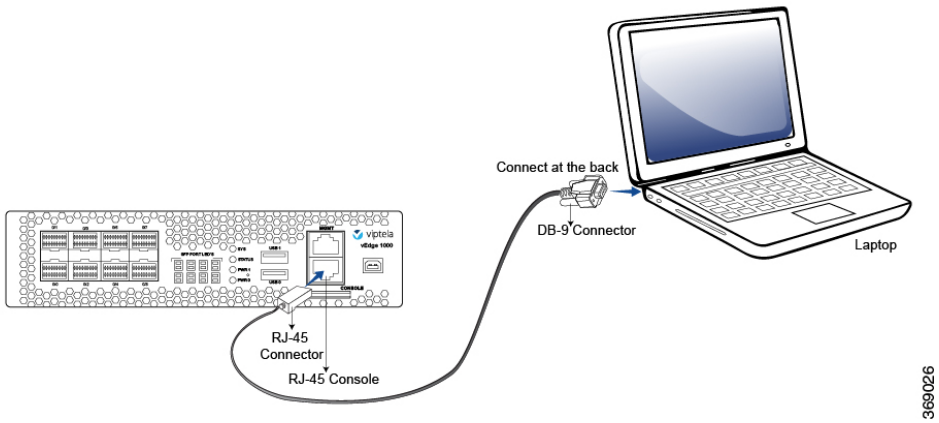
Pin	Signal	Description
1	RTS Output	Request to send
2	NC	No connect
3	TxD Output	Transmit data

Pin	Signal	Description
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	NC	No connect
8	CTS Input	Clear to send

RJ-45–to–DB-9 Serial Port Adapter Pinout

The console port on a vEdge 1000 router is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a PC or a laptop. If your laptop or PC does not have a DB-9 male connector pin and you want to connect your laptop or PC to a vEdge 1000 router, use a combination of the RJ-45–to–DB-9 female adapter along with a USB–to–DB-9 male adapter as shown in the following figure. Note that the vEdge router does not ship with an RJ-45–to–DB-9 serial port adapter cable.

Figure 85: vEdge 1000 Router Connected to a Laptop via RJ-45–to–DB-9 Cable



The following table provides the wiring and pinout information for the RJ-45–to–DB-9 serial port adapter cable.

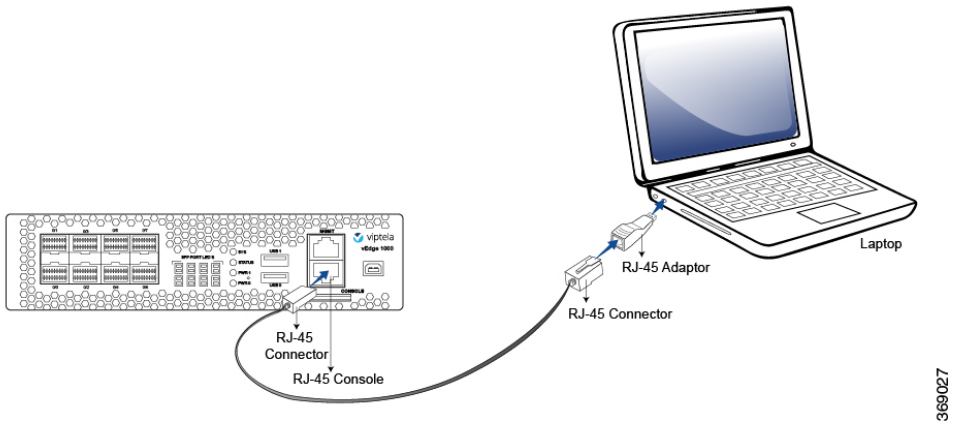
Table 41:

RJ-45 Pin	Signal	DB9 Pin	Signal
1	RTS	8	CTS
3	TXD	2	RXD
4	GND	5	GND
6	RXD	3	TXD

RJ-45 Pin	Signal	DB9 Pin	Signal
8	CTS	7	RTS

You can also connect the vEdge 1000 router to a management device such as a PC or a laptop using an RJ-45–to–RJ45 cable as shown in the following figure. Note that the vEdge router does not ship with an RJ-45–to–RJ-45 cable.

Figure 86: vEdge 1000 Router Connected to a Laptop via RJ-45–to–RJ-45 Cable



Power Supply and Cooling in Cisco vEdge 1000 Routers

The vEdge 1000 router has two built-in fans and ships with two external AC power supply adapters. Read this article to learn more about the AC power supply adapter in the router as well as about the cooling system and airflow through the router chassis.

AC Power Supply Adapter

You can connect up to two AC power supply adapters to the vEdge 1000 router for redundancy purposes.

The following table provides the power requirements for the external AC power supply adapter for the vEdge 1000 router.

Table 42:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Typical power consumption	28 Watts

Note It is strongly recommended that you use the power supply adapters provided by Viptela to power your vEdge 1000 router.

AC Power Cord Specifications

The vEdge 1000 router ships with a detachable AC power cord. The power cord has a C13 connector at one end and the other end is specific to the country/locality to which the product is shipped.

Cooling System and Airflow in vEdge 1000 Router

The vEdge 1000 router has built-in fans that provide front-to-back airflow for the router.

The air intake to cool the chassis is through the perforations in the front of the chassis. Hot air exits from the rear of the chassis via the vents provided near the fans.

Figure 87: vEdge 1000 Router Airflow

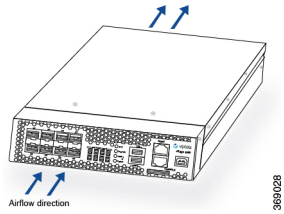
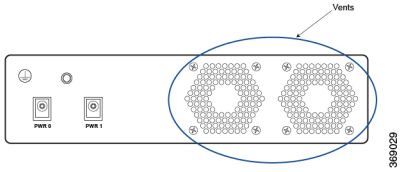


Figure 88: Vents Near the Fan Area of a vEdge 1000 Router



Temperature sensors in the chassis monitor the internal chassis temperature. When a single fan fails at room temperature, the system can still provide sufficient cooling.

If a fan fails or if the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Field-Replaceable Units

The vEdge 1000 router is a stiff sheet-metal structure that houses the hardware components. Field-replaceable units (FRUs) are hardware components that you can remove and replace at your site. The table below lists the FRUs in the vEdge 1000 router.

Table 43: vEdge 1000 Router FRUs

FRU	FRU Model Number
External AC power supply adapters	• VEDGE-1000-PWR

FRU	FRU Model Number
Gigabit Ethernet transceivers	• SFP-1GE-SX • SFP-1GE-LX • SFP-1GE-Base-T

The transceivers in the router are hot-removable and hot-insertable. You can remove and replace them without powering off the router or disrupting router functions.

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 1000 router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Note Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 1000 router.

Site Preparation Guidelines

Efficient operation of your vEdge 1000 router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 1000 router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, non-condensing.

Rack Requirements

You can mount the vEdge 1000 router in a two-post or a four-post rack. The following table provides the rack requirements for the router.

Table 44:

Rack Requirement	Guidelines
Rack type	Use a two-post or a four-post rack that meets the size requirements for the router, provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments, and is strong enough to support the weight of the router.
Mounting brackets	Ensure that the holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm). This allows you to mount the router in any location in the rack.
Rack size	It is recommended that the rack comply with the size and strength standards of a 19-inch rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D), published by the Electronics Industry Association (http://www.eia.org). Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the chassis and that the outer edges of the front mount brackets extend the width of the chassis to 19 in. (48.2 cm). You must also ensure that the spacing of rails and adjacent racks allows for the proper clearance around the router and rack.
Rack secured to building structure	For maximum stability, secure the rack to ceiling brackets and to floor brackets.

Airflow Requirements

When planning your site for installing the vEdge 1000 router, allow enough clearance around the installed router. Since the router works with a front-to-back airflow there are no clearance requirements for the sides, but it is recommended that you provide at least 3 in. of clearance at the back.

Install the vEdge 1000 Router

Once you have prepared your site for router installation, unpack the vEdge 1000 router and mount it in a 19-inch rack using the mounting ears shipped with the router. Optionally, you can order the rack-mount kit from Viptela to mount the router. Read this article for step-by-step instructions for mounting the router in a 19-inch rack.

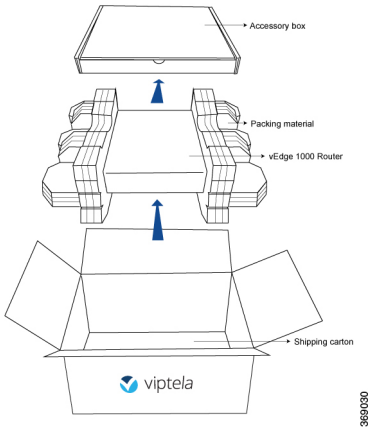
Unpack the vEdge 1000 Router

A vEdge 1000 router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains an accessory box and Quick Start instructions. It is recommended that you do not unpack the router till you are ready to install it.

To unpack the router:

1. Move the cardboard carton close to the installation site, making sure you have adequate space to remove all the contents of the box.
2. Open the top flaps of the carton.
3. Gradually remove the accessory box and the packing foam holding the router and the accessories in place.
4. Take out the router and each accessory.
5. Verify the router components against the packing list included in the box (see packing list below).

Figure 89: Unpacking the vEdge 1000 Router



Note It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware.

Packing List for a vEdge 1000 Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

The following table lists the parts shipped with the vEdge 1000 router and their quantities.

Table 45:

Component	Quantity
Router chassis	1
AC power adapters	2
AC power cords appropriate for your geographical location	2
Cable ties (to secure the power adapter cord to the rack)	6
USB console cable	1
Mounting ears (right and left)	2
Mounting-ear screws (Packet A)	4
Rack-mount screws (Packet B)	4

Component	Quantity
vEdge 1000 Router Quick Start document	1

Mount a vEdge 1000 Router Using Mounting Ears

The most common way to mount a vEdge 1000 router is on two front posts in a 19-inch rack using the mounting ears shipped with the router.

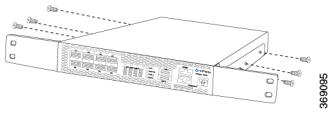
In addition to the items in the accessory box, you need the following tools to mount a vEdge 1000 router in a 19-inch rack:

- Number 2 Phillips (+) screwdriver
- Tape measure

To mount the vEdge 1000 router on two front posts in a 19-inch rack:

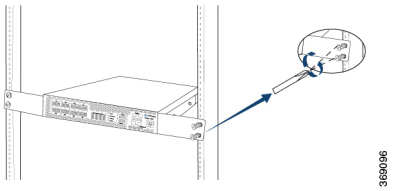
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure.
3. Secure the left and right mounting ears to either side of the router chassis using the four shoulder screws in packet A.

   Figure 90: Attaching the Mounting Ears to the vEdge 1000 Router Chassis

4. Grasp both sides of the router, then lift and position it in the rack, making sure that the mounting ear holes are aligned with the threaded holes in the rack rail.
5. Secure the mounting ears to the two front posts of the rack using the four rack-mount screws in packet B. Tighten the screws.

   Figure 91: Screwing the Mounting Ears to the Rack

6. Use a tape measure or level to verify that the router is installed straight and the holes at either ends of the rack align properly.

Tip t is recommended that you retain the dust covers on any unused ports.

Mount a vEdge 1000 Router Using a Rack-Mount Tray

You can use a rack-mount tray to install the vEdge 1000 router if you want to install two vEdge routers in the same slot in a 19-inch rack or if you want to mount the router on all four posts of the rack. See Rack-Mount Tray Specifications .

You need to order the rack-mount kit from Viptela separately.

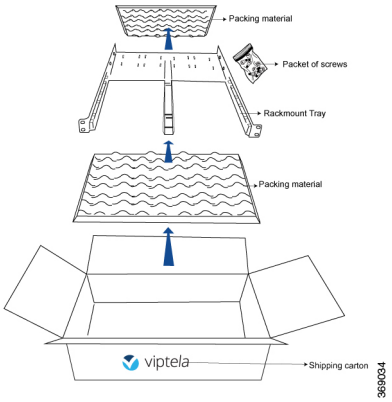
Unpack the Rack-Mount Tray Kit

The rack-mount kit includes a dual rack-mount tray and an accessory box for mounting up to two vEdge routers.

To unpack the rack-mount kit:

1. Open the top flaps of the cardboard box.
2. Gradually remove the accessory box and the packing foam holding the rack-mount tray and the accessories in place.
3. Take out the rack-mount tray and each accessory.
4. Verify the components against the packing list included in the box (see packing list below).

Figure 92: Unpacking the Rack-Mount Kit



Packing List for the Rack-Mount Tray Kit

The cardboard carton in which the rack-mount tray and the accessory box are packed includes a packing list. Check the parts you receive with your rack-mount kit against the items on the packing list. The packing list specifies the part number, name, and quantity of each item in the carton.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

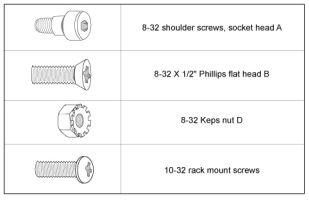
The following table lists the parts shipped in the rack-mount kit and their quantities.

Table 46:

Component	Quantity
vEdge 1000 dual rack-mount tray	1

Component	Quantity
Condor AC adapter housing bracket	4
Sparkle AC adapter housing bracket	4
Front stopper	1
Left extended ear	1
Right extended ear	1
8-32 socket head shoulder screws (A)	8
8-32 X 1/2" flat-head screws (B)	4
8-32 Kep nuts (D)	4
10-32 rack-mount screws	8
Allen key (to use with the #8-32 shoulder screws, socket head 'A')	1

Figure 93: Screws and Nuts Included in the Rack-Mount Kit



Mount a vEdge 1000 Router Using a Rack-Mount Tray

In addition to the rack-mount accessory kit, you need the following tools to mount a vEdge 1000 router in a 19-inch rack using a rack-mount tray:

- Number 2 Phillips (+) screwdriver
- Tape measure

Mounting a vEdge 1000 router in a 19-inch rack is a two-step process:

- First, you prepare the rack-mount tray for installation by securing the vEdge 1000 router and the AC power adapters to the tray.
- Next, you install the rack-mount tray into the rack.

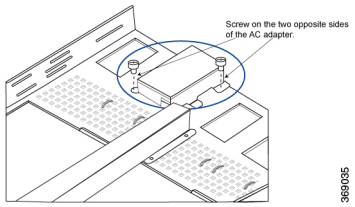
Prepare the Rack-Mount Tray for Installation

To prepare the rack-mount tray for mounting the vEdge 1000 router on two or four posts in a 19-inch rack:

1. Place the two AC power adapters, side by side, in their designated slots towards the rear end of the rack-mount tray. If you are installing two vEdge routers, place four AC power adapters on the tray.

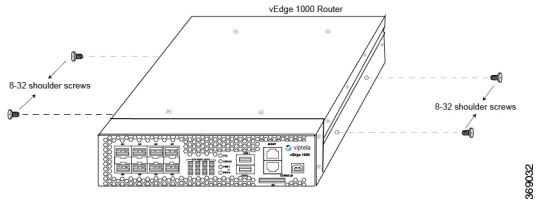
2. Place the adapter housing bracket over the AC power adapter and secure it in place by screwing down the two thumbscrews attached to the housing bracket.

Figure 94: Screwing the AC Adapter Housing Bracket to the Rack-Mount Tray



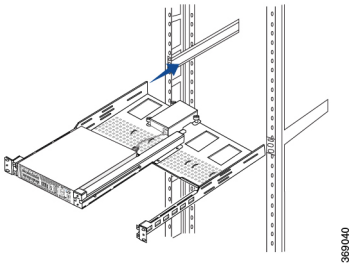
3. Using the Allen key provided in the rack-mount kit, screw the four 8-32 shoulder screws to either side of the router (two on each side), as shown in the following figure. If you plan to mount two routers side-by-side on the same rack-mount tray, screw the nuts to either sides of the second router too.

Figure 95: Screwing the 8-32 Shoulder Screws to the vEdge 1000 Router



4. Gently slide the vEdge 1000 router into the groove at the front of the rack-mount tray until it goes all the way in. If you plan to install two routers side by side, gently slide in the second router also.

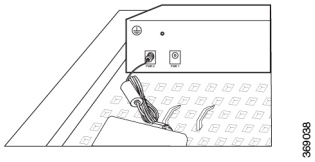
Figure 96: Sliding the vEdge 1000 Router into the Rack-Mount Tray



5. Plug the DC 12-volt jack of the AC power adapter into the receptacle at the rear of the router.

6. Use cable ties to neatly secure, in place, the extra cable on the DC end. To do this, first pass the cable ties through the two hooks provided on the tray and then tie the cable with it.

Figure 97: Securing the Cable on the DC End with Cable Ties



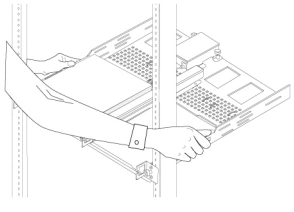
Note There are two types of housing bracket sets provided in the rack-mount kit. Use the housing bracket set that fits the AC power adapter you received with the vEdge 1000 router.

Install the Rack-Mount Tray on Two Front Posts

To install the rack-mount tray on two front posts in a 19-inch rack:

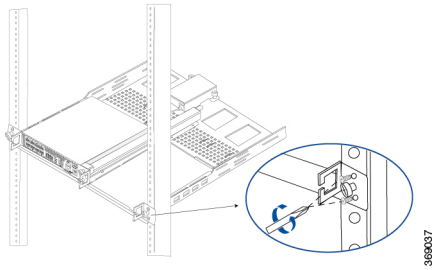
1. Verify the internal dimensions of the rack with a tape measure. The rack-mount tray is 440 mm wide and must fit within the mounting posts.
2. Have one person grasp both sides of the rack-mount tray on which you secured the vEdge router(s) and position it in the rack.

Figure 98: Holding the Rack-Mount Tray with the vEdge Router(s) in Place



3. Have a second person secure the rack-mount tray to the two front posts of the rack using four rack-mount screws provided in the rack-mount kit.

Figure 99: Screwing the Rack-Mount Tray to the Two Front Posts of the Rack



4. Use a tape measure or level to verify that the tray is installed straight and the holes at either end of the rack align properly.

Tip It is recommended that you retain the dust covers on any unused ports.

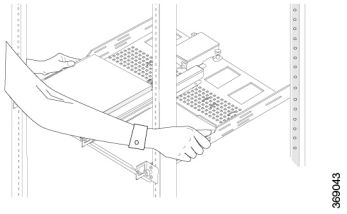
Install the Rack-Mount Tray on All Four Posts

To install the rack-mount tray on all four posts in a 19-inch rack:

1. Verify the internal dimensions of the rack with a tape measure. The rack-mount tray is 440 mm wide and must fit within the mounting posts.

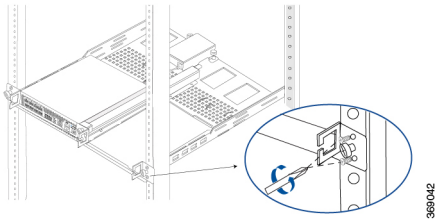
2. Have one person grasp both sides of the rack-mount tray on which you secured the vEdge router(s) and position it in the rack.

Figure 100: Holding the Rack-Mount Tray with the vEdge 1000 Router in Place



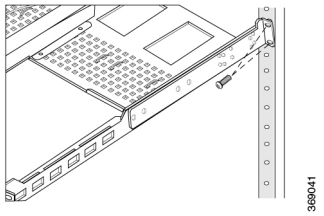
3. Have a second person secure the rack-mount tray to the two front posts of the rack using four rack mount screws provided in the rack-mount kit.

Figure 101: Screwing the Rack-Mount Tray to the Four Posts of the Rack



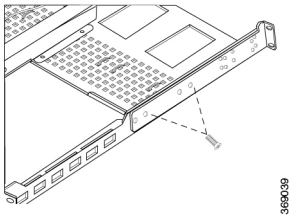
4. Screw the L-shaped side of each extended ear bracket (marked Left and Right) to the rear posts of the rack using the 10-32 rack mount screws (two on each side) provided in the rack-mount kit.

Figure 102: Screwing the Extended Ear Bracket to the Four Post Rack



5. Screw the extended ear brackets to either sides of the rack-mount tray using the 8-32 x 1/2 flat screws and the 8-32 Kep nuts provided in the accessory kit.

Figure 103: Attaching the Extended Ear Bracket to the Rack-Mount Tray



6. Use a tape measure or level to verify that the tray is installed straight and the holes at either ends of the rack align properly.

Note The two extended ear brackets in the rack-mount kit have different part numbers and are not interchangeable.

Note You may need to adjust the position of the extended ear brackets to match the depth of your rack.

Tip It is recommended that you retain the dust covers on any unused ports.

Connect the vEdge 1000 Router

This article describes how to connect the vEdge 1000 router to system ground, an AC power source, a management console, and to a network for out-of-band-management.

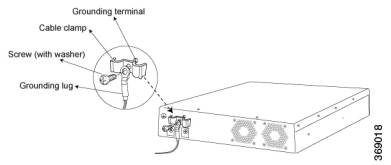
Step 1: Connect Earth Ground to the Router

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation of your vEdge 1000 router, connect the router to earth ground before you power it on. To do so, you need a number 2 Phillips (+) screwdriver.

To connect system ground to the vEdge 1000 router:

1. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the router is mounted.
2. Secure the grounding lug to the protective grounding terminal with the washers and screws. If you are using the cable clamp to secure the power cords, slide the grounding lug onto the screw before the cable clamp.
3. Dress the grounding cable, and make sure that it does not touch or block access to other router components.

Figure 104: Connecting a Grounding Cable to a vEdge 1000 Router



Note If you plan to mount the vEdge 1000 router on four posts of a rack, mount the router in the rack before attaching the grounding lug to the router.

Step 2: Connect AC Power to the Router

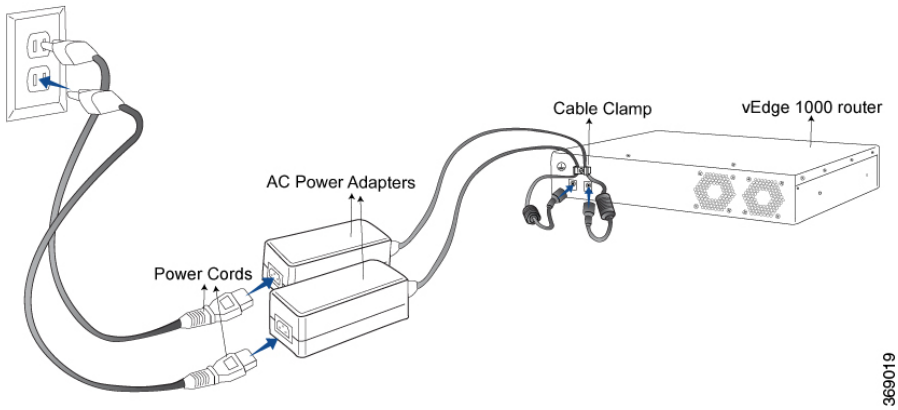
To connect the vEdge 1000 router to an AC power source:

1. Attach an ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.

2. Plug the AC power adapter cords into inputs PWR 0 and PWR 1 on the back of the router. Note that the second power adapter is for redundancy. If you are using only one power adapter, you can plug it into PWR 0 or PWR 1.
3. Secure the power adapter cords in place by loosening the cable clamp screw, tucking the cords under the clamp, and then tightening the screw as shown in Figure 2.
4. Plug one end of each power cord into an AC power adapter, and plug the other end into an AC power outlet.

Note Secure the AC power cord to the side of the rack post with the help of the cable ties supplied with Cisco vEdge 1000 routers.

Figure 105: Connecting an AC Power Supply Adapter to a vEdge 1000 Router



Note It is strongly recommended that you use the power supply adapter and the power cord supplied with the vEdge 1000 router.

Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

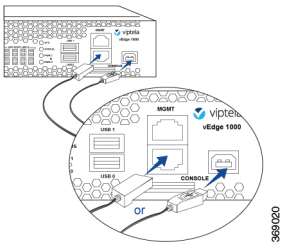
Step 3: Connect the Router to a Management Console

You can configure and manage a vEdge 1000 router using a management console. To connect the router to a management console, use the console port which accepts a cable with an RJ-45 connector. See Console Port .

To connect the vEdge 1000 router to a management console:

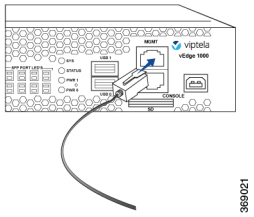
1. Connect one end of the console cable into the console port, labeled CONSOLE, on the vEdge router (see Figure 3).
2. Connect the other end of the console cable into the console server or to a management console.

Figure 3: Connecting a vEdge 1000 Router to a Management Console



To use the USB console from a Windows device:

1. Go to the Device Manager to determine which COM port is being used for the USB serial port.
2. In the PuTTY SSH/Telnet client, in Connection Type, select Serial. Then, specify the COM port and a speed of 115200.



vEdge 1000 Router Default Configuration

The default configuration file looks like this:

```
vEdge1000# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$t.vzhbSwOJaaCnRu$<wbr/>AiJYG3VFRlNurXPY7YXSputMMv4hg3<wbr/>Bign362rj4IIWXm7uVfiReqv/<wbr/>4EhKG2QUUSaZnZZPveQYBfIozCioyE<wbr/>/

  !
!
logging
  disk
   enable
  !
 !
```

```
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface ge0/0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
!
!
vpn 512
 interface mgmt0
  ip address 192.168.1.1/24
  no shutdown
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 1000 router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 1000 router have two types of severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold.

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 1000 router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 1000 router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has four temperature sensing points (board sensor 1 through 4). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU and DRAM temperature alarm—If the temperature of the system CPU or of the DRAM module crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has fixed built-in fans for system cooling which run at a fixed speed. If a fan stops running, the system triggers an alarm. Also if a fan starts to run below a predefined RPM threshold, the system triggers an alarm.
- Power supply alarm—The router has two power adapter inputs for redundancy reasons. If one of the power adapters is not plugged in or there is a failure on a power adapter input, the system triggers an alarm.

The following table lists the yellow and red alarm threshold for the six temperature sensing points in the system—four board sensors spread across the board, 1 CPU junction temperature sensor, and 1 DRAM temperature sensor). The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise, the higher threshold value applies (normal).

Table 47:

Item	Yellow Alarm(degrees C)	Red Alarm(degrees C)		
	Normal	Bad Fan	Normal	Bad Fan
Chassis board sensor1	65	60	80	75
Chassis board sensor2	65	60	80	75
Chassis board sensor3	65	60	80	75
Chassis board sensor4	65	60	80	75
CPU junction temperature	85	80	100	95
DRAM DIMM	65	60	80	75

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment**command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU and DRAM.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 1000 router indicate the status of the router.

If there are one or more major alarms active in the router, the SYS LED is lit red. If there are one or more minor alarms active in the router, the SYS LED is lit amber. See Front Panel Components for details of the LEDs and the status they indicate.

Install a Transceiver

The transceivers for the vEdge 1000 router are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the router or disrupting router functions.

Caution Before you install a transceiver or any component in the router chassis, make sure that you understand how to prevent electrostatic discharge (ESD) damage. See General Safety Standards.

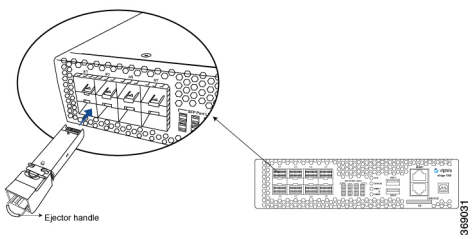
Note It is recommended that you purchase the optical transceivers and optical connectors for the vEdge router from Viptela.

Install a Transceiver

To install a transceiver in a vEdge router:

1. Gently remove the new transceiver from the plastic bag in which it was shipped.
2. If the port in which you plan to install the transceiver is covered with a dust cover, remove the cover, and save it for later use.
3. Carefully slide the transceiver in the empty port until it is firmly seated.
4. Remove the safety cap when you are ready to connect an optic fiber cable to the port.

Figure 106: Installing a Transceiver in a vEdge 1000 Router



Warning Do not look directly into fiber-optic transceivers and fiber-optic cables connected to a transceiver as they emit laser light that can damage your eyes.

Remove a Transceiver

The transceivers for the vEdge router are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the router or disrupting router functions.

Caution: Before you remove a transceiver or any component from the router chassis, make sure that you understand how to prevent Electrostatic discharge (ESD) damage. See General Safety Standards .

Note: It is recommended that you purchase the optical transceivers and optical connectors for the vEdge router from Viptela.

Remove a Transceiver

To remove any type of transceiver from a vEdge router, you need the following parts and tools:

- A transceiver slot dust cover
- An antistatic mat or an electrostatic bag
- A rubber safety cap for the transceiver

To remove any type of transceiver from a vEdge router:

1. Place the antistatic mat or the electrostatic bag on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Label the cables connected to the transceiver so that you can reconnect them correctly later.
4. Remove the cable connector from the transceiver.
5. Unlock the transceiver by pulling down the ejector handle from the transceiver.
6. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. out of the router.
7. Using your fingers, grasp the body of the transceiver and pull it out of the router completely.
8. Place a rubber safety cap over the transceiver.
9. Place the removed transceiver on the antistatic mat or in an electrostatic bag.
10. If you are not installing a new transceiver, place the transceiver slot dust cover over the empty port.

Warning Do not look directly into fiber-optic transceivers and fiber-optic cables connected to a transceiver as they emit laser light that can damage your eyes.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

vEdge# **request software reset**

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 107: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router
- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033

A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.

3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

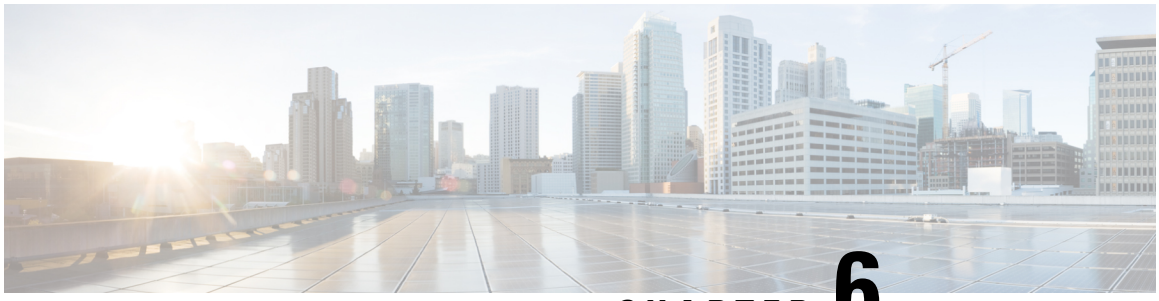
1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 6

vEdge 2000 Router

The vEdge 2000 router delivers highly secure site-to-site data connectivity to large enterprises, offers interface modularity, and provides the following features:

- 1RU, standard rack mountable in a 19-inch rack
- Support for AC input power
- Four built-in 1-Gigabit Ethernet SFP ports (4x1-Gigabit Ethernet)
- Two Pluggable Interface Module (PIM) slots that support two types of PIMs:
  - Eight ports of 1-Gigabit Ethernet (8x1-Gigabit Ethernet)
  - Two ports of 10-Gigabit Ethernet (2x10-Gigabit Ethernet)
- Encryption and QoS support
- 1-Gbps of unidirectional Internet Mix (IMIX) forwarding traffic (inclusive of encryption)
- Secure identification chip for anti-counterfeit and secure authentication
- Redundant hot-swappable fan tray modules
- Dual redundant hot-swappable power supply slots
- Front to back cooling

Chassis Views

The following figures show the front and back panels of the vEdge 2000 router, indicating the location of the power interfaces, module slots, status indicators, and chassis identification labels.

Figure 108: Front Panel of the vEdge 2000 Router

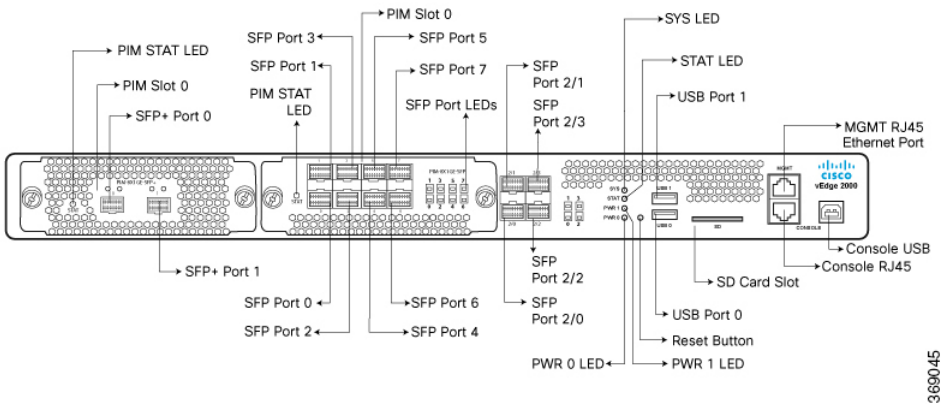
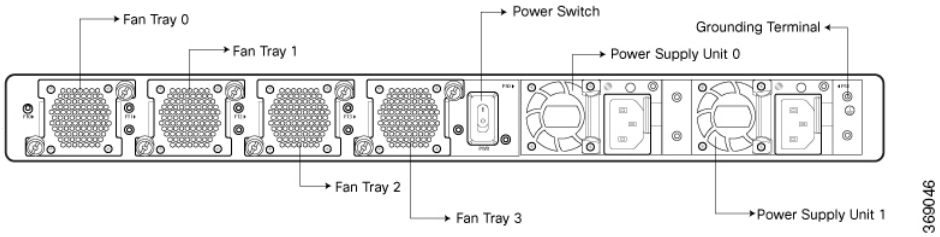


Figure 109: Back Panel Slots and Connectors of the vEdge 2000 Router



- Declaration of Conformity, on page 138
- Components and Specifications, on page 139
- Planning and Installation, on page 162
- Maintenance and Troubleshooting, on page 177

Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .

Components and Specifications

This article provides the chassis specifications of the vEdge 2000 router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 2000 router chassis.

Table 48: vEdge 2000 Router Chassis Specifications

Item	Specification
Services and Slot Density	
Fixed SFP-based traffic ports (max 1 Gbps)	4
Pluggable Interface Module (PIM) slots	2
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR3 ECC DRAM	8 GB
SD card slot (external)	Maximum capacity supported 32 GB
NAND storage (internal)	8 GB
External USB flash memory slots (Type A USB 3.0)	2
USB console port (Type B default 115.2 Kbps)	1
Serial console port (RJ-45 default 115.2 Kbps)	1
Management Ethernet port (RJ-45 10/100/1000 Mbps)	1
Power supply option	Hot-swappable Power Supply Units (PSUs)
Redundant power supply support	Active–Active redundancy
Power Specifications	
AC input voltage	100-240 Volts
AC input line frequency	50-60 Hz
Typical power consumption	125 Watts
Physical Specifications	

Item	Specification
Chassis height	1.75 in. (4.45 cm)
Chassis width	Chassis only: 17.25 in. (43.82 cm) Chassis with mounting brackets attached: 19 in. (48.2 cm)
Chassis depth	18.5 in. (47 cm)
Rack height	1 RU
Rack-mount accessory kit 19 in (48.3 cm)	Provided with the unit
Weight	Chassis only: 11 lb (5 kg) Chassis with two power supplies installed: 15 lb (6.8 kg)
Airflow	Front to back
Packaging Specifications	
Package height	8.5 in. (21.6 cm)
Package width	22 in. (55.88 cm)
Package depth	23.5 in. (59.7 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	420K hours
Regulatory Compliance	
Safety	AS/NZS 60950-1 CAN/CSA 60950-1 CB-IEC60950-1 CE Marking EN 60950-1 UL60950-1

Item	Specification
EMC	AS/NZS CISPR22 Class A EN 300 386 EN 55022 Class A FCC Class A ICES Class A VCCI Class A
Environmental	ROHS 6/6

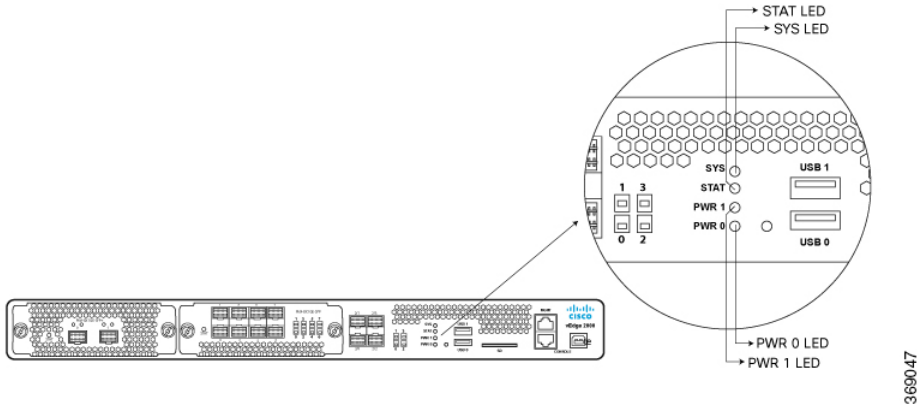
Front Panel Components

This article describes the LEDs, reset button, and the SD card slot on the front panel of the vEdge 2000 router. See At a Glance for the exact location of these components on the front panel of the router.

LEDs

The vEdge 2000 router has four chassis status LEDs located in the center of the front panel next to the USB ports. See the following figure.

Figure 110: Chassis Status LEDs in a vEdge 2000 Router



The following table describes the LEDs , their color and states, and the status they indicate.

Table 49:

LED	Color	Description
SYS	Green/Amber/Red	• Off: System is off • Green: System is healthy and operating correctly • Blinking Green: System is booting up • Red: Major failure or alarm is present
STAT	Green	• Off: Status of OMP to vSmart controller is down • Green: Status of OMP to vSmart controller is up

LED	Color	Description
PWR 1	Green/Red	• Off: Power supply unit 1 is not present, or router is not powered • Green: 12-Volt output is OK on power supply unit 1 • Red: Fault on power supply unit 1, or only power supply unit 0 is connected
PWR 0	Green/Red	• Off: Router is not powered • Green: 12-Volt output is OK on power supply unit 0 • Red: Fault on power supply unit 0, or only power supply unit 1 is connected

Reset Button

The front panel of the vEdge 2000 router has a reset button. The reset button is recessed to avoid accidentally pressing it while the router is operational. To press the reset button, use a sharp narrow tool. The following table describes the effects of pressing the reset button.

Table 50:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

SD Card Slot

The front panel of the vEdge 2000 router has an SD card slot. The SD card slot has the following specifications:

- High speed bus: maximum 25 MB/second
- Supported card types: SD, SDHC

PIM and Transceiver Modules

This article describes the Pluggable Interface Modules (PIMs) for the vEdge 2000 router as well as the SFP and SFP+ transceivers for those PIMs.

PIMs for the vEdge 2000 Router

The vEdge 2000 router offers interface modularity, providing two PIM slots that support two types of PIMs:

- 8x1-Gigabit Ethernet SFP PIM (Model: PIM-8x1GE-SFP)

- 2x10-Gigabit Ethernet SFP+ PIM (Model: PIM-2x10GE-SFP+)

The two PIM slots are labeled PIM Slot 0 and PIM Slot 1.

The following figures show the front panel of the 8x1-Gigabit Ethernet SFP PIM and the 2x10-Gigabit Ethernet SFP+ PIM, respectively.

Figure 111: Front Panel of 8x1-Gigabit Ethernet SFP PIM

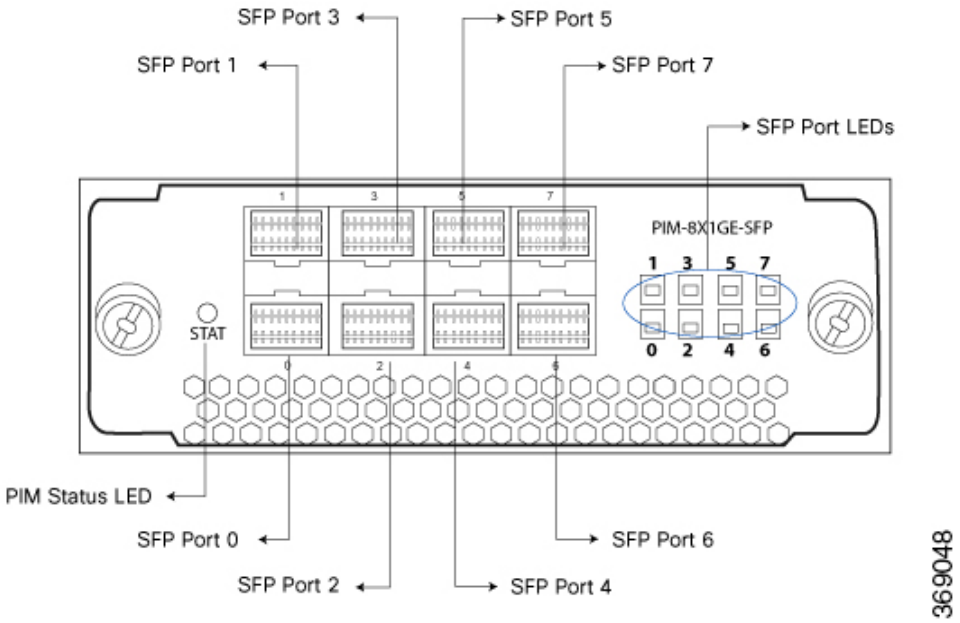
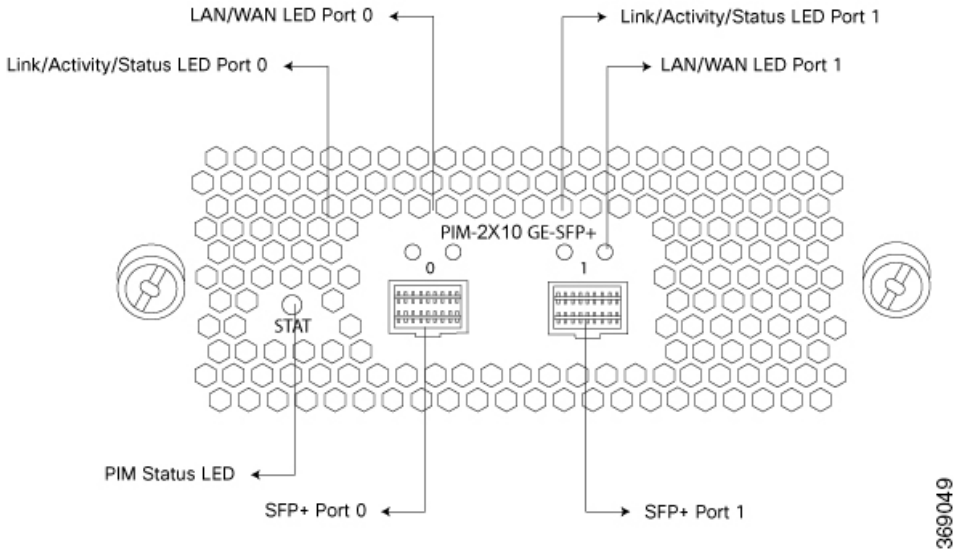


Figure 112: Front Panel of 2x10-Gigabit Ethernet SFP+ PIM



The status LED on the front panel indicates the status of the PIM. For an explanation of the LAN/WAN LED and the Link/Activity/Status LED, see Network Port LEDs .

Table 51:

LED State	Description
Off	• The PIM module is offline. • The router is powered off.
Green	• The PIM module is online and functioning normally.
Red	• The PIM module is online but is not functioning normally.

Note You can install the 8x1-Gigabit Ethernet SFP PIM in either PIM Slot 0 or PIM Slot 1. However, when it is installed in PIM Slot 0, only four ports are usable. When it is installed in PIM Slot 1, all eight ports are usable. There is no such restriction with the 2x10-Gigabit Ethernet SFP+ PIM. For details, see Interface Port Combinations for the vEdge 2000 Router below.

Interface Port Combinations for the vEdge 2000 Router

A vEdge 2000 router has four fixed 1-Gigabit Ethernet interfaces, and you can install one or two PIM modules for additional interfaces.

You can combine the fixed interfaces and the PIM modules as follows:

- Two 2x10-Gigabit Ethernet SFP+ PIMs. This combination allows you to configure four 10-Gigabit Ethernet interfaces. This would give you a total of four 10-Gigabit Ethernet interfaces and four 1-Gigabit Ethernet interfaces in the router.
- One 2x10-Gigabit Ethernet SPF+ PIM (in PIM Slot 0) and one 8x1-Gigabit Ethernet SPF PIM (in PIM Slot 1). This combination allows you to configure two 10-Gigabit Ethernet interfaces and eight 1-Gigabit Ethernet interfaces. This would give you a total of two 10-Gigabit Ethernet interface and twelve 1-Gigabit Ethernet interfaces in the router.
- Two 8x1-Gigabit Ethernet SFP PIMs. This combination allows you to configure twelve 1-Gigabit Ethernet interfaces. This would give you a total of sixteen 1-Gigabit Ethernet interfaces in the router.

Table 52:

PIM Slot 0	PIM Slot 1	Total 10GE Interfaces	Total 1GE Interfaces
2x10-Gigabit Ethernet SFP+ PIM	2x10-Gigabit Ethernet SFP+ PIM	4	4 (fixed)
2x10 Gigabit Ethernet SFP+ PIM	8x1-Gigabit Ethernet SFP PIM	2	12 (8 on PIM plus 4 fixed)

PIM Slot 0	PIM Slot 1	Total 10GE Interfaces	Total 1GE Interfaces
8x1-Gigabit Ethernet SFP PIM	8x1-Gigabit Ethernet SFP PIM	0	16 (12 on PIM plus 4 fixed)

When the 8x1-Gigabit Ethernet SFP PIM is in PIM Slot 0, only the first four ports are usable; the remaining four ports are unusable.

Changing PIM Types

If you change the type of PIM that is installed in a vEdge 2000 router slot from a 1-Gigabit Ethernet to a 10-Gigabit Ethernet PIM, or vice versa, possibly as part of an RMA process, follow these steps:

1. Delete the configuration for the old PIM (the PIM you are removing or returning as part of the RMA process).
2. Remove the old PIM.
3. Insert the new PIM (the PIM you received as part of the RMA process).
4. Reboot the vEdge 2000 router.
5. Configure the interfaces for the new PIM.

Supported Transceiver Modules

The built-in Gigabit Ethernet network ports on the vEdge 2000 router and the network ports on the 8x1-Gigabit Ethernet SFP PIM support SFP transceivers. The 10-Gigabit Ethernet ports on the 2x10-Gigabit Ethernet SFP+ PIM support SFP+ transceivers.

This section describes the optical interfaces supported for the SFP and SFP+ transceivers and the copper interfaces supported for the SFP transceivers.

Note It is recommended that you use the optical transceivers and optical connectors purchased from Viptela for your vEdge routers.

The tables below describe the optical interface support over single-mode fiber-optic (SMF) and multimode fiber-optic (MMF) cables for SFP and SFP+ transceivers and over the copper interface for SFP transceivers.

Table 53:

Ethernet Standard	Specification	Value
1000 BASE-T	Model Number	SFP-1GE-Base-T
	Rate	10/100/1000 Mbps
Connector Type	RJ-45	
Fiber Count	N/A	

Ethernet Standard	Specification	Value
Transmitter Wavelength	N/A	
Minimum Launch Power	N/A	
Maximum Launch Power	N/A	
Minimum Receiver Sensitivity	N/A	
Maximum Input Power	N/A	
Cable Type	Copper	
Distance	100 m (328 ft)	
DOM Support	Not available	
1000 BASE-SX	Model Number	SFP-1GE-SX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-9.5 dBm	
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-21 dBm	
Maximum Input Power	0 dBm	
Fiber Type	MMF	
Distance	220 m (721 ft) to 550 m (1804 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
1000 BASE-LX	Model Number	SFP-1GE-LX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-9.5 dBm	

Ethernet Standard	Specification	Value
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-25 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	
1000 BASE-EX	Model Number	SFP-1GE-EX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-14 dBm	
Maximum Launch Power	-8 dBm	
Minimum Receiver Sensitivity	-45 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	40 km (24.8 miles)	
DOM Support	Available	

Table 54:

Ethernet Standard	Specification	Value
10G BASE-SR	Model Number	SFP+-1GE-SR
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-7.3 dBm	

Ethernet Standard	Specification	Value
Maximum Launch Power	-1 dBm	
Minimum Receiver Sensitivity	-9.9 dBm	
Maximum Input Power	-1 dBm	
Fiber Type	MMF	
Distance	26 m (85 ft) to 300 m (984 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
10G BASE-LR	Model Number	SFP+-1GE-LR
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-8.2 dBm	
Maximum Launch Power	0.5 dBm	
Minimum Receiver Sensitivity	-18 dBm	
Maximum Input Power	0.5 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	

Supported Transceivers

This article provides a list of copper and fiber transceivers that have been tested and qualified for use in vEdge 1000, vEdge 2000, and vEdge 5000 routers. You can order the transceivers that have a Viptela part number in the tables below directly from Viptela.

Table 55:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FCLF-8521-3	SFP-1GE-Base-T	Supported	Supported	Supported	• Small form-factor pluggable (SFP) transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Finisar FCLF8521P2BTL	SFP-1GE-Base-T	Supported	Supported	Supported	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco-Avago SFBR-5766PZ-CS2		Supported		Supported	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Bel-Fuse 1GBT-SFP05		Supported			• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Avago ABCU-5710RZ		Supported		Supported	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco GLC-T1000BASE-T		Supported		Supported	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet

Table 56:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge5000 Router	Description
Avago AFBR-5710PZ		Supported		Supported	• Small form-factor pluggable (SFP) transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Avago AFCT-5710PZ		Supported		Supported	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Finisar FTLF1318P3BTL	SFP-1GE-LX	Supported	Supported	Supported	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Cisco-Finisar FTLF8519P2BCL-C4		Supported		Supported	• SFP transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Finisar FTLF8519P3BNL	SFP-1GE-SX	Supported	Supported	Supported	• SFP transceiver • LC-type connector • Short-reach 850-nm optics for multi-mode fiber for 1-Gbps applications
Finisar FTLX8574D3BCL	SFP+-10GE-SR		Supported	Supported	• SFP+ transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 10-Gbps applications

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FTLX8571D3BCV				Supported	• SFP+ transceiver • LC-type transceiver • Short-reach 850-nm optics for multi-mode fiber for dual-rate 1 Gbps/10 Gbps applications **Note** : The SFP+ ports of the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCV				Supported	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for dual-rate 1 Gbps/10 Gbps applications **Note**: The SFP+ ports on the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCL	SFP+-10GE-LR		Supported	Supported	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 10-Gbps applications

Ports and Connectors

The vEdge 2000 router supports three types of ports: network ports (also called SFP ports), management port, and console port.

Network Ports (SFP Ports)

The built-in network ports on the vEdge 2000 router as well as the 8x1-Gigabit Ethernet SFP PIM module support 1-Gbps SFP module. The 2x10-Gigabit Ethernet SFP+ PIM module supports 10-Gbps SFP+ module.

The following table provides the pinout information for the built-in SFP and the PIM SFP/SFP+ port connector. The SFP/SFP+ ports comply with the SFP/SFP+ MSA standards.

Table 57:

Pin	Signal	Description
1	VeeT	Module transmitter ground
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disable
4	SDA	Two-wire serial interface data line
5	SCL	Two-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0; optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1; optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver non-inverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3-V supply
16	VccT	Module transmitter 3.3-V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter non inverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Network Port LEDs

Each network port on the vEdge 2000 router has two LEDs—the link/activity/status LED and the LAN/WAN LED. See the following figures.

Figure 113: LEDs on the Built-in SFP Network Ports on a vEdge 2000 Router

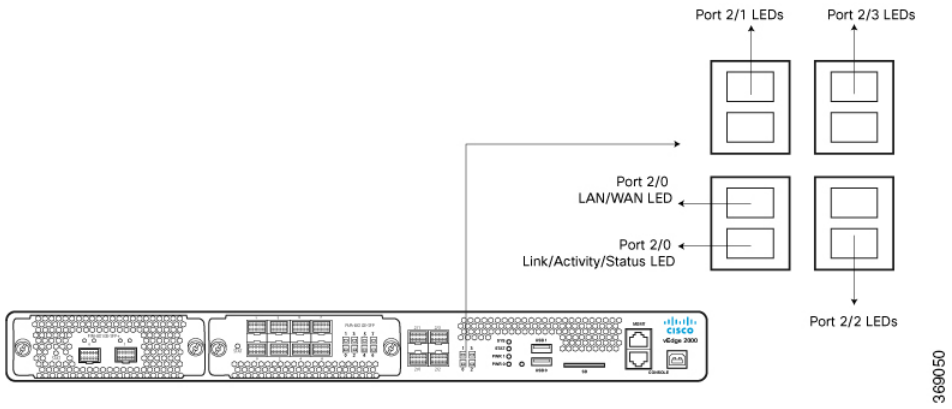


Figure 114: LEDs on the Network Ports on an 8x1GE SFP PIM

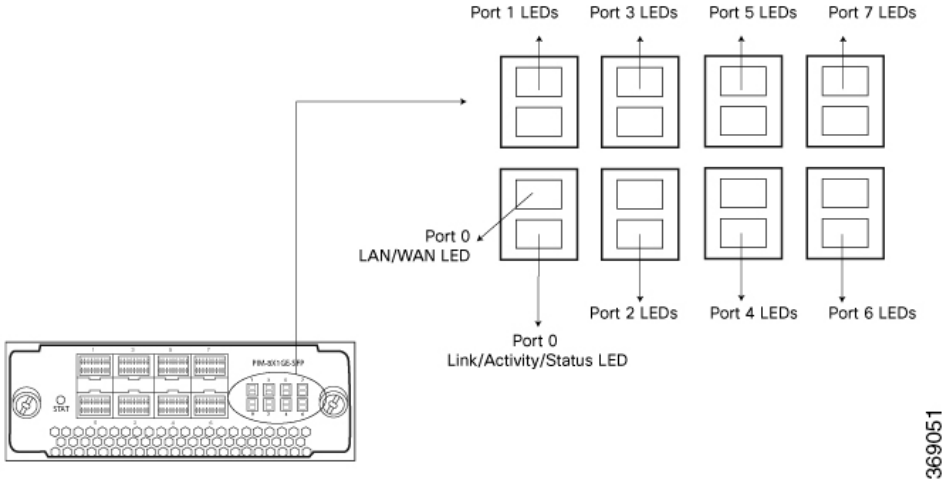


Figure 115: LEDs on the Network Ports on a 2x10GE SFP+ PIM

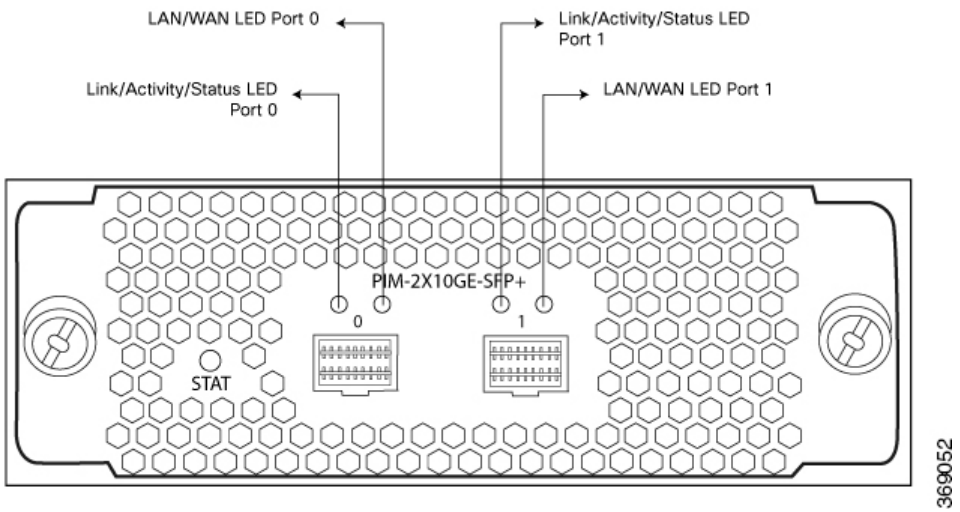


Table 58:

Color	State & Description
Green	• Blinking—The link is negotiated and active at maximum speed, and there is link activity. • On steadily—The link is negotiated and active at maximum speed, but there is no link activity.
Yellow (SFP ports only)	• Blinking—The link is negotiated and active at a speed of 10M/100M, and there is link activity. • On steadily—The link is negotiated and active at a speed of 10M/100M, but there is no link activity.
Alternating green and yellow	• An SFP has been detected in the port but the link is not active.
Off	• There is no SFP present in the port and the link is not active.

The following table describes the LAN/WAN LED on the network ports.

Table 59:

Color	State & Description
Green	• On steadily—The port is configured as a WAN port. • Off—The port is configured as a LAN port.

Management Port

The management port on a vEdge 2000 router uses an RJ-45 connector to connect to a management device for out-of-band management.

The management port uses an autosensing RJ-45 connector to support a 10/100/1000Base-T connection. The two LEDs on the port indicate link/activity on the port and the administrative status of the port. See Management Port LEDs below.

The following table provides the pinout information for the RJ-45 connector for the management port.

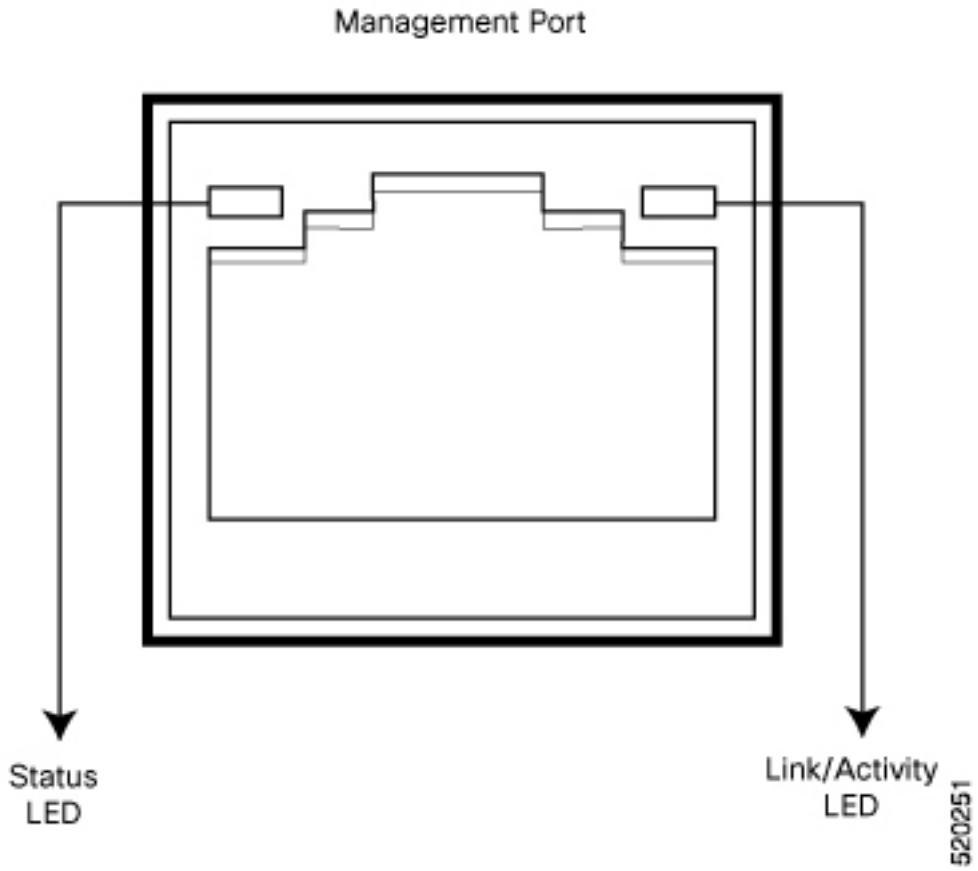
Table 60:

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Management Port LEDs

The management port on the vEdge 2000 router has two LEDs that indicate link/activity and port status. See the following figure.

Figure 116: LEDs on the Management Port on a vEdge 2000 Router



The following table describes the LEDs on the management port.

Table 61:

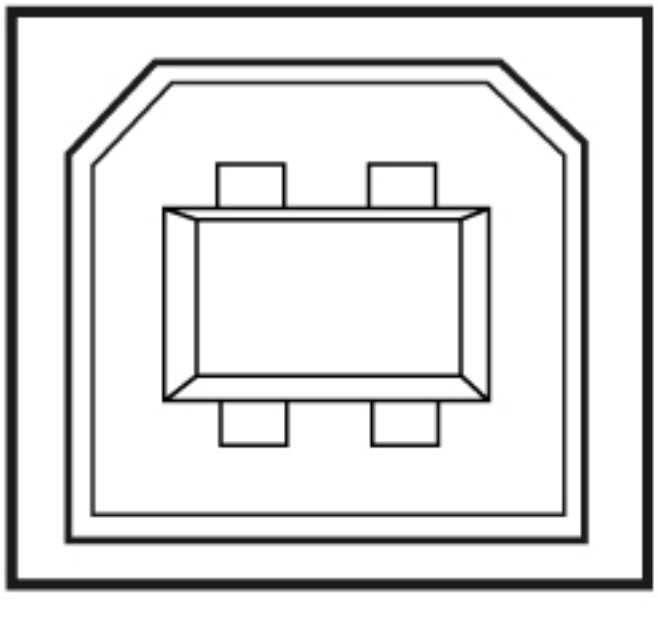
LED	Color	State and Description
Link/Activity	Green	• Blinking—There is link activity • Off—There is no link activity
Status	Green/Yellow	Indicates the speed of the link: • Green—1000 Mbps • Yellow—10/100 Mbps • Off—Link is not up

Console Port

The console port on a vEdge 2000 router is accessible via the following external interfaces:

- An RS-232 serial interface that uses an RJ-45 connector to connect to a console management device.
- A USB serial interface that uses a standard USB Type B connector to connect to a console management device. See Figure 5.

Figure 117: USB Type B Connector



Note

- At any given time, you can activate only one of the external interfaces.
- The default baud rate for the console port is 115,200 baud.
- When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

The following table provides the pinout information for the RJ-45 console port connector.

Table 62:

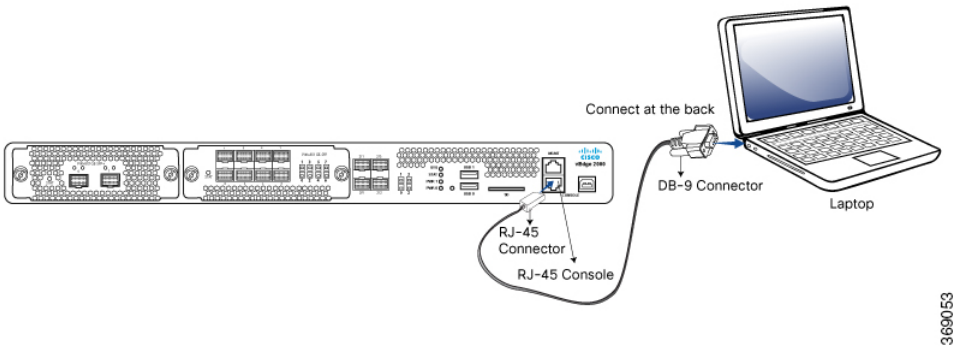
Pin	Signal	Description
1	RTS Output	Request to send
2	NC	No connect
3	TxD Output	Transmit data

Pin	Signal	Description
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	NC	No connect
8	CTS Input	Clear to send

RJ-45-to-DB-9 Serial Port Adapter Pinout

The console port on a vEdge 2000 router is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a PC or a laptop. If your PC or laptop does not have a DB-9 male connector pin and you want to connect your PC or laptop to a vEdge 2000 router, use a combination of the RJ-45-to-DB-9 female adapter along with a USB-to-DB-9 male adapter. See the following figure.

Figure 118: vEdge 2000 Router Connected to a Laptop via RJ-45-to-DB-9 Cable



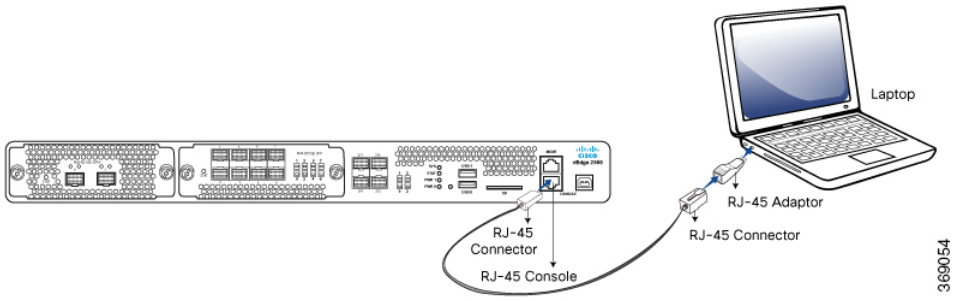
The following table provides the wiring and pinout information for the RJ-45-to-DB-9 serial port adapter cable.

Table 63:

RJ-45 Pin	Signal	DB9 Pin	Signal
1	RTS	8	CTS
3	TXD	2	RXD
4	GND	5	GND
6	RXD	3	TXD
8	CTS	7	RTS

You can also connect the vEdge 2000 router to a management device such as a PC or a laptop using an RJ-45-to-RJ45 cable as shown in the following figure. Note that the vEdge 2000 router does not ship with an RJ-45-to-RJ-45 cable.

Figure 119: vEdge 2000 Router Connected to a Laptop via RJ-45-to-RJ-45 Cable



Field-Replaceable Units

The vEdge 2000 router is a stiff sheet-metal structure that houses the hardware components. Field-replaceable units (FRUs) are hardware components that you can remove and replace at your site. Table 1 lists the FRUs in the vEdge routers.

The power supply, transceivers, and fan tray are hot-removable and hot-insertable. You can remove and replace these components without powering off the router or disrupting router functions.

Table 64:

FRU	FRU Model Number
AC power supply	• vEdge-2000-Power-Supply-AC
8-Port 1-Gigabit Ethernet SFP PIM	• PIM-8x1GE-SFP
2-Port 10-Gigabit Ethernet SFP+ PIM	• PIM-2x10GE-SFP+
Gigabit Ethernet transceivers	• SFP-1GE-SX • SFP-1GE-LX • SFP-1GE-EX • SFP-1GE-Base-T
10-Gigabit Ethernet transceivers	• SFP+-10GE-SR • SFP+-10GE-LR
Fan tray	• vEdge-2000-Fan

Power Supply and Cooling in Cisco vEdge 2000 Routers

The vEdge 2000 router ships with two AC power supplies installed. Read this article to learn more about the AC power supply in the router as well as about the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 2000 Router

The vEdge 2000 router ships with two AC power supplies installed. The second power supply is for redundancy and load-balancing. If one of the AC power supplies fails due to device failure or input power line failure, a single unit is sufficient to power the entire router.

The AC power supply in a vEdge 2000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply in the rear of the chassis without powering off the router or disrupting normal functioning.

The following table describes the AC power supply specifications for the vEdge 2000 router.

Table 65:

Item	Specification
AC input voltage	90-264 Vrms
AC input line frequency	47-63 Hz
Maximum output power	800 W
Nominal power consumption	125 Watts

AC Power Supply LEDs

The vEdge 2000 AC power supply has an LED faceplate that displays information about the status of the power supply. The following table describes the LEDs on an AC power supply in a vEdge 2000 router.

Table 66:

LED State	Description
OFF	No AC power to all PSU
1Hz Flashing Blue	AC present; only standby output on
Blue	Power supply DC output on and OK
Red	Power supply has failed
0.5Hz Flashing Red*/Blue*	Power supply warning

*Flashing frequency: 1Hz (0.5 seconds Red/0.5 seconds Blue)

AC Power Cord Specifications

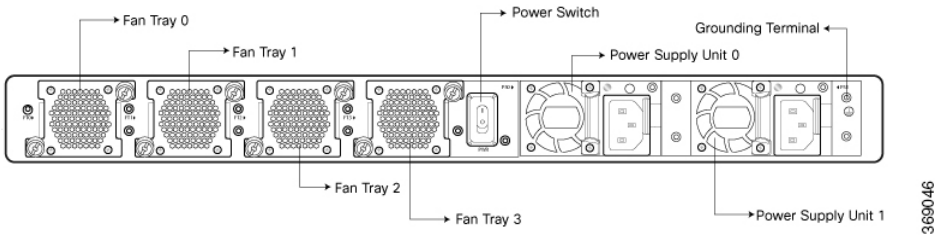
The vEdge 2000 router ships with a detachable AC power cord. The power cord has a C13 connector at one end and the other end is specific to the country/locality to which the product is shipped.

Cooling System and Airflow in a vEdge 2000 Router

The cooling system in a vEdge 2000 router consists of four individual fan trays, each comprising a double-stacked fan module. The fan trays cool the router itself, except the power supply units, which have their own fans for cooling.

The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). The fan trays provide front-to-back cooling, as shown in Figure 4. If one of the fans in a fan tray fails, you can remove the specific fan tray and replace it with a spare fan tray module without powering off the router or disrupting normal functions. Also, if one of the fans fails, the rest of the working fans will keep the system running indefinitely.

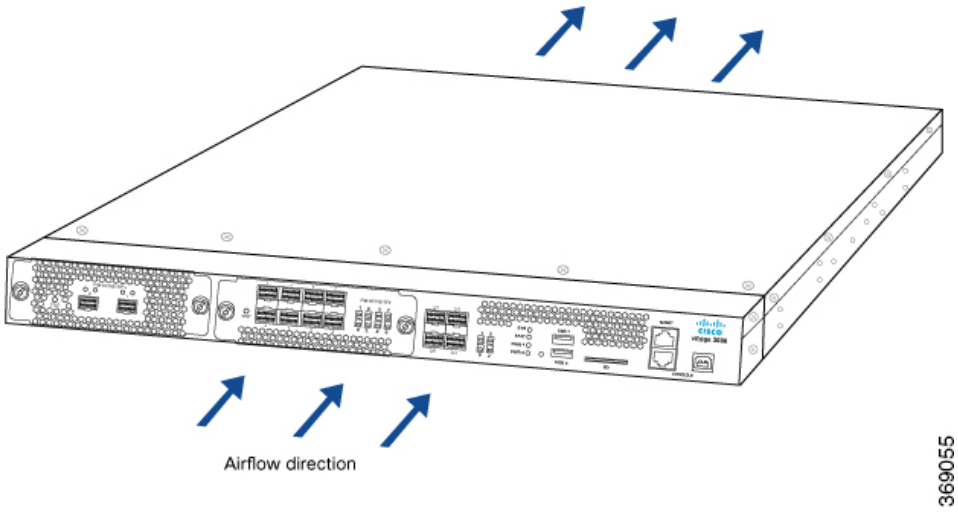
Figure 120: Fan Tray in a vEdge 2000 Router



The fan tray installs horizontally in the rear of the chassis. It has two thumbscrews that serve as handles and also as a mechanism to secure the fan tray to the main chassis.

The air intake to cool the chassis flows through the perforations in the front of the chassis. Hot air exits from the rear of the chassis via the vents provided near the fans.

Figure 121: vEdge 2000 Router Airflow



Temperature sensors in the chassis monitor the internal chassis temperature. When a single fan/fan tray fails at room temperature, the system can still provide sufficient cooling.

If a fan/fan tray fails or if the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 2000 router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Permit only trained and qualified personnel to install or replace switch components.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the vEdge router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Note Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 2000 router.

Site Preparation Guidelines

Efficient operation of your vEdge 2000 router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 2000 router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, non-condensing.

Rack Requirements

You can mount the vEdge 2000 router in a two-post or a four-post rack. The following table provides the rack requirements for the router.

Table 67:

Rack Requirement	Guidelines
Rack type	Use a two-post or a four-post rack that meets the size requirements for the router, provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments, and is strong enough to support the weight of the router.
Mounting brackets	Ensure that the holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm). This allows you to mount the router in any location in the rack.

Rack Requirement	Guidelines
Rack size	It is recommended that the rack comply with the size and strength standards of a 19-inch rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D), published by the Electronics Industry Association (http://www.eia.org). Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the chassis and that the outer edges of the front mount brackets extend the width of the chassis to 19 in. (48.2 cm). You must also ensure that the spacing of rails and adjacent racks allows for the proper clearance around the router and rack.
Rack secured to building structure	For maximum stability, secure the rack to ceiling brackets and to floor brackets.

Airflow Requirements

When planning your site for installing the vEdge 2000 router, allow enough clearance around the installed router. Since the router works with a front-to-back airflow there are no clearance requirements for the sides, but it is recommended that you provide at least 3 in. of clearance at the back.

Install the vEdge 2000 Router

Once you have prepared your site for router installation, follow the instructions below to unpack the vEdge 2000 router and install it on either two front posts, four posts, or two mid-posts in a 19-inch rack.

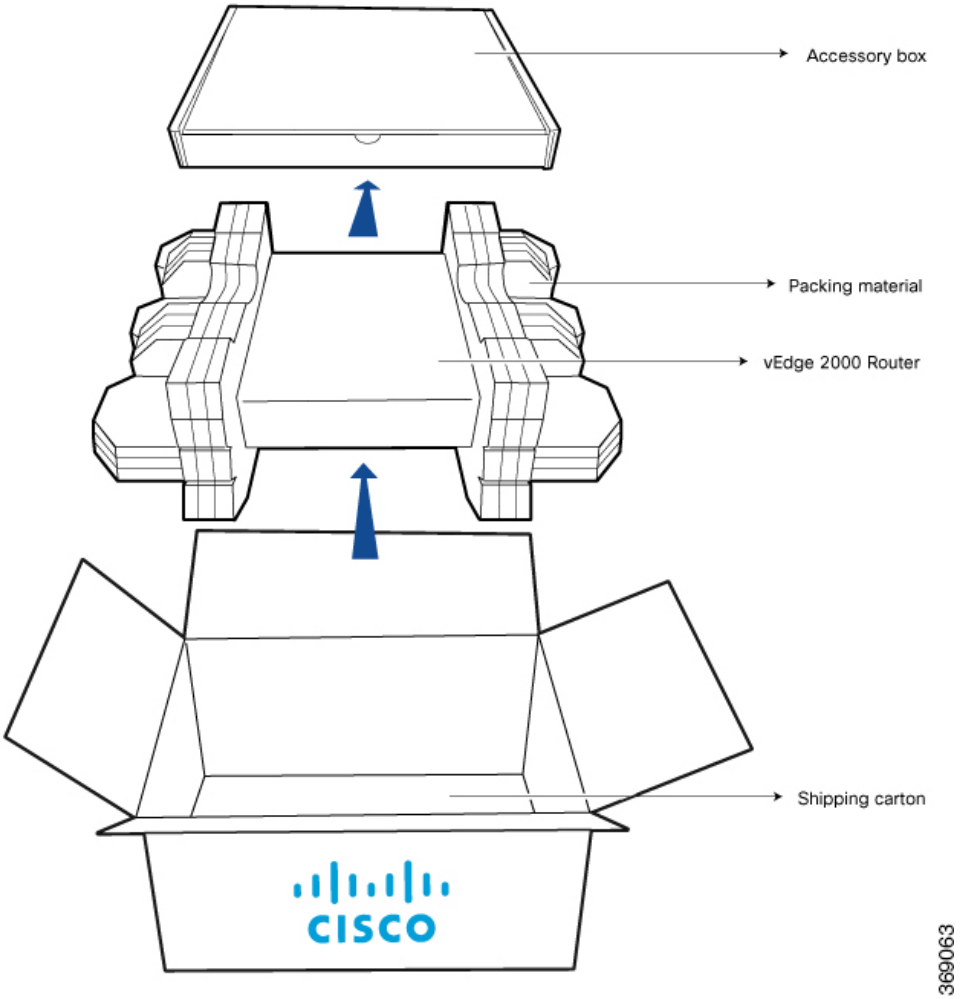
Unpack the vEdge 2000 Router

A vEdge 2000 router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains an accessory box with Quick Start instructions. It is recommended that you do not unpack the router until you are ready to install it.

To unpack the router>

1. Move the cardboard carton close to the installation site, making sure you have adequate space to remove all the contents of the box.
2. Open the top flaps of the carton. The router chassis and the accessories are packed together in the same box with partitions in the packing foam to accommodate the accessories.
3. Gradually remove the packing foam holding the router and the accessories in place. See Figure 1.
4. Take out the router and each accessory.
5. Verify the router components against the packing list included in the box.

Figure 122: Unpacking the vEdge 2000 Router



Note It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware .

Packing List for a vEdge 2000 Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the name, part number, and quantity of each item in the carton and the accessory box.

If any part on the packing list is missing, contact your customer service representative or contact Viptela customer support from within the U.S. or Canada by telephone at 800-525-5033 or by email to support@viptela.com .

The following table lists the parts shipped with the vEdge 2000 router and their quantities.

Table 68:

Component	Quantity
Router chassis	1
Fan tray (preinstalled)	4
AC power supply (preinstalled)	2
AC power cord appropriate for your geographical location (AC router models only)	2
Blanking cover panel for PIM slots (preinstalled)	2 (1 per PIM slot)
Dust covers for ports (attached to router ports)	1 per port (both built-in and PIM ports included)
USB console cable	1
Short mounting ear, Right	1
Short mounting ear, Left	1
Extended mounting ear, Right	1
Extended mounting ear, Left	1
1U slider	2
Screws for rack mount (A)	8
Screws for short or extended mounting ears (B)	8
Additional screws for extended mounting ears (C)	4
Screws for sliders (D)	8
Screws for locking 1U sliders (E)	4
vEdge 2000 Router Quick Start	1

Mount the vEdge 2000 Router in a Rack

You can mount the vEdge 2000 router in a 19-inch rack in one of the following ways:

- Mount the router on two front posts
- Mount the router on all four posts
- Mount the router on two mid-posts

In addition to the accessory box, you need the following tools to mount a vEdge 2000 router in a 19-inch rack:

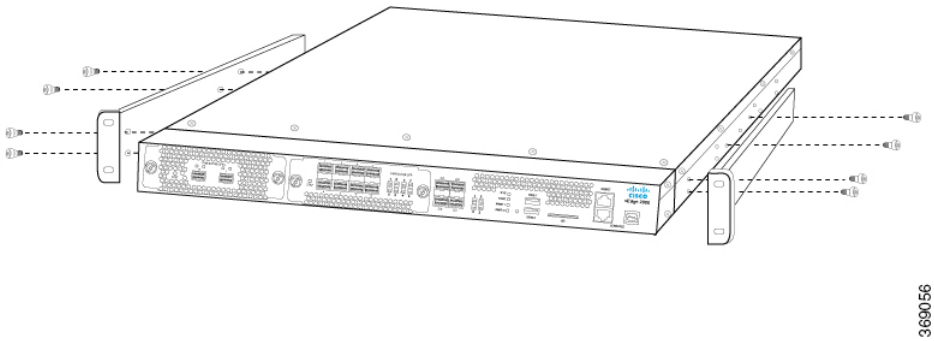
- Number 2 Phillips (+) screwdriver
- Tape measure

Mount the vEdge 2000 Router on Two Posts

To mount the vEdge 2000 router on two front posts in a 19-inch rack:

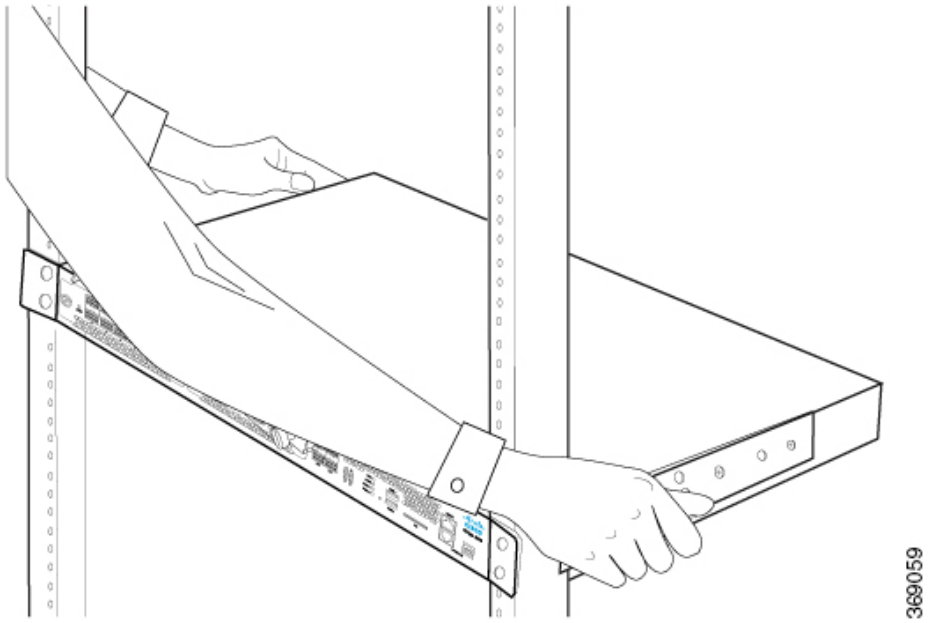
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The chassis is 440 mm wide and must fit within the mounting posts.
3. Secure the two extended mounting ears, marked Left and Right, to either side of the router chassis using the eight screws for mounting ears (four on each side) in the packet marked B plus the four additional screws for extended mounting ears (two on each side) in the packet marked C.

Figure 123: Attaching the Extended Mounting Ears to the vEdge 2000 Router Chassis



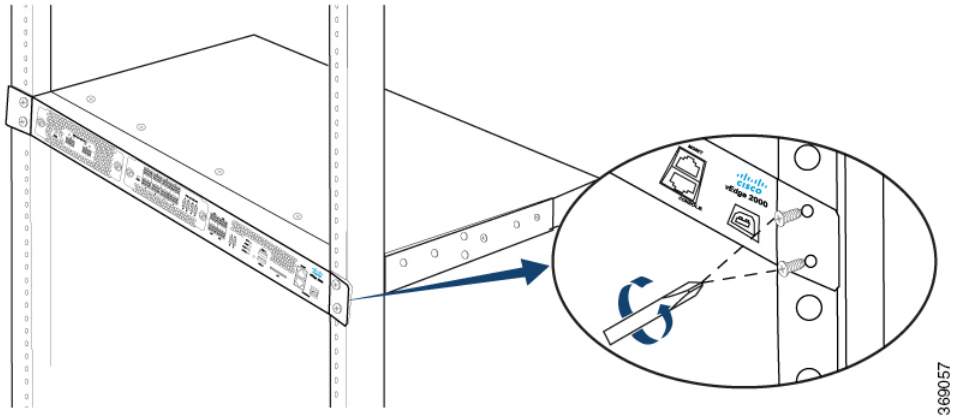
4. Grasp both sides of the router, then lift and position it in the rack, making sure that the mounting ear holes are aligned with the threaded holes in the rack rail. Align the bottom hole in both the mounting ears with a hole in each rack rail, making sure the chassis is level.

Figure 124: Positioning the vEdge 2000 Router in the Rack



5. Have a second person secure the mounting ears to the rack, using four rack-mount screws (two on each side) from the packet marked A. Tighten the screws.

Figure 125: Attaching the Extended Mounting Ears to the Rack



6. Use a tape measure or level to verify that the chassis is installed straight and that all screws on one side of the rack are aligned with the screws on the other side.

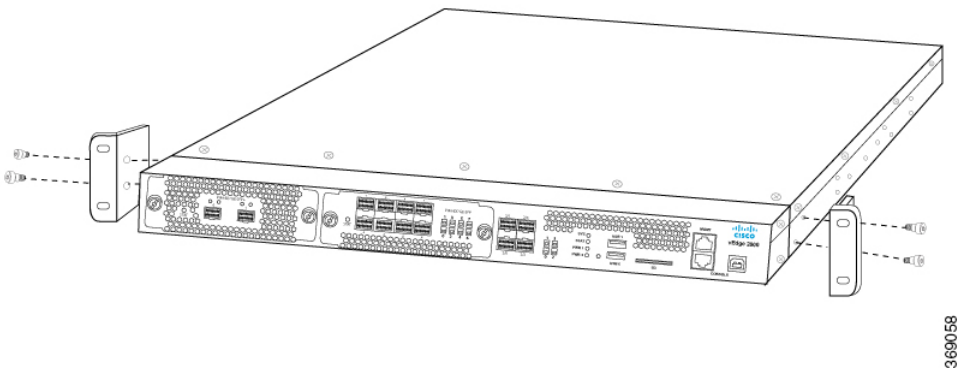
Tip It is recommended that you retain the dust covers in any unused ports.

Mount the vEdge 2000 Router on Four Posts

To mount a vEdge 2000 router on four posts in a 19-inch rack:

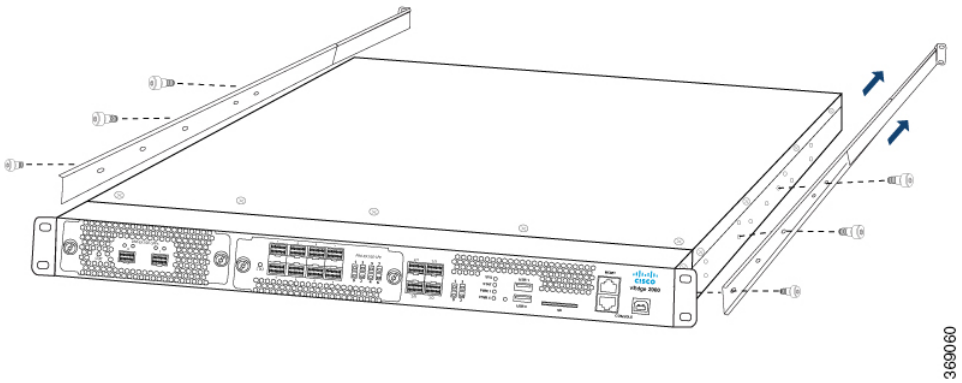
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The chassis is 440 mm wide and must fit within the mounting posts.
3. Secure the two short mounting ears, marked Left and Right, to either side of the router chassis using the eight screws for mounting ears (four on each side) in the packet marked B.

Figure 126: Attaching the Short Mounting Ears to the vEdge 2000 Router Chassis



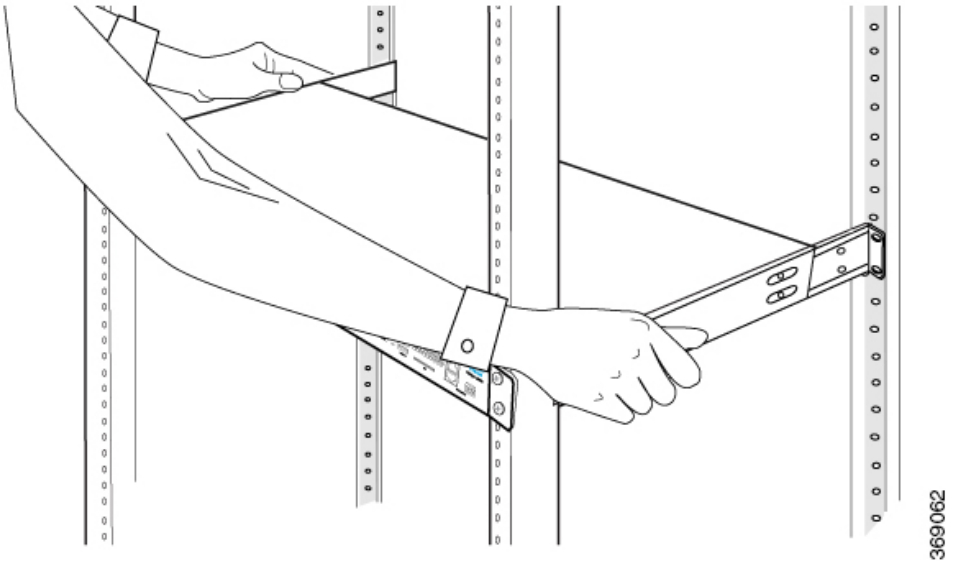
4. Slide out the two interchangeable 1U sliders, and secure to either side of the router chassis using the eight screws for sliders (four on each side) in the packet marked D.

Figure 127: Attaching the 1U Sliders to the vEdge 2000 Router Chassis



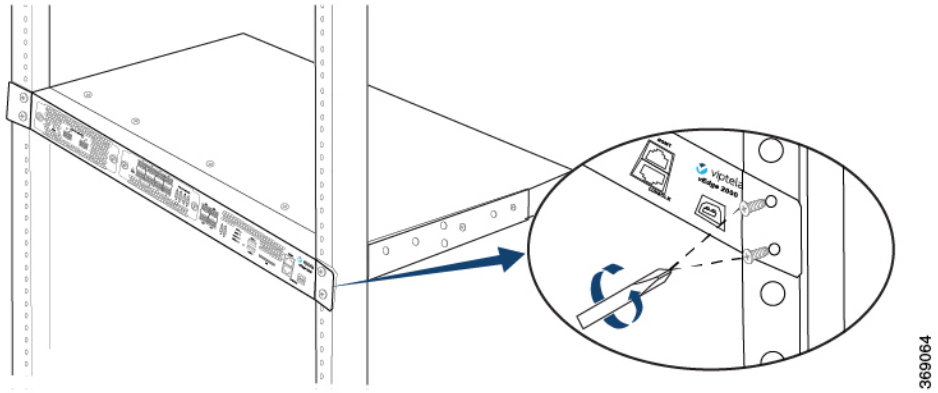
5. Grasp both sides of the router, then lift and position it in the rack, aligning the front bracket holes with the threaded holes in the front post of the rack rail. Align the bottom hole in both the mounting brackets with a hole in each rack rail, making sure the chassis is level.

Figure 128: Positioning the vEdge 2000 Router in the Rack



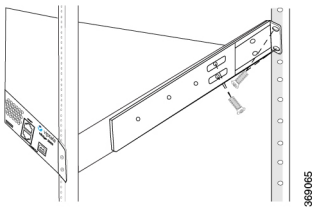
6. Have a second person secure the mounting ears to the front of the rack using four rack-mount screws (two on each side) from the packet marked A. Tighten the screws.

Figure 129: Attaching the Short Mounting Ears to the Rack



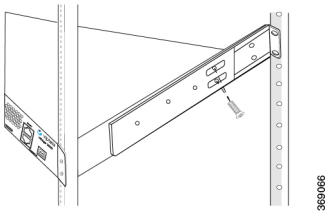
7. Secure the 1U sliders to the rear post, using the remaining four rack-mount screws (two on each side) in the packet marked A. Tighten the screws.

Figure 130: Attaching the 1U Sliders to the Rear of the Rack



8. Lock the 1U sliders in place using the screws in the packet marked E. Tighten the screws.

Figure 131: Locking the 1U Sliders in Place



9. Verify that the router chassis is straight by making sure that all screws in the front are aligned with the screws in the back of the chassis.

Warning To prevent bodily injury when mounting or servicing the vEdge 2000 router in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

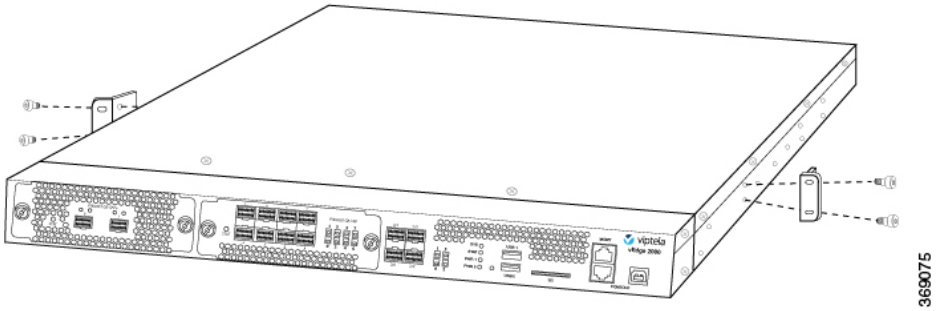
- If this is the only router in the rack, mount it at the bottom of the rack.
- If you are mounting the router in a partially filled rack, start to load the rack from the bottom, placing the heaviest component at the bottom of the rack.

Mount the vEdge 2000 Router on Mid-Posts

To mount a vEdge 2000 router on two mid-posts in a 19-inch rack:

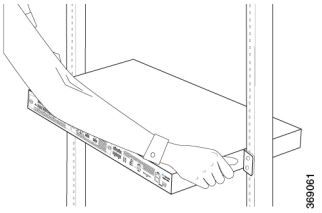
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The chassis is 440 mm wide and must fit within the mounting posts.
3. Secure the two short mounting ears, marked Left and Right, to either side of the router chassis using the eight screws for mounting ears (four on each side) in the packet marked B.

Figure 132: Attaching the Short Mounting Ears to the Center of the Router Chassis



4. Grasp both sides of the router, then lift and position it in the rack, making sure that the mounting ear holes are aligned with the threaded holes in the rack rail. Align the bottom hole in both the mounting ears with a hole in each rack rail, making sure the chassis is level.

Figure 133: Positioning the vEdge 2000 Router in the Rack



5. Have a second person attach the mounting ears to the rack, using four rack-mount screws (two on each side) from the packet marked A. Tighten the screws.
6. Use a tape measure or level to verify that the chassis is installed straight and that all screws on one side of the rack are aligned with the screws on the other side.

Tip It is recommended that you retain the dust covers in any unused ports.

Connect the vEdge 2000 Router

This article describes how to connect the vEdge 2000 router to system ground, an AC power source, a management console, and to a network for out-of-band-management.

Step 1: Connect Earth Ground to the Router

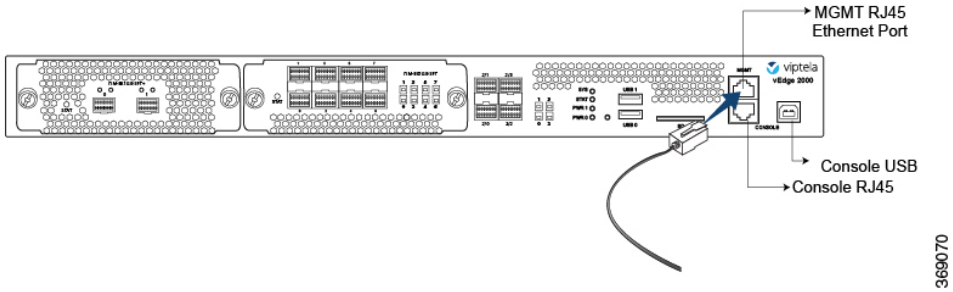
To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation of the vEdge 2000 router, connect the router to earth ground before you power it on. To do so, you need the following tools:

- Number 2 Phillips (+) screwdriver

To connect system ground to the vEdge 2000 router:

1. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the vEdge 2000 router is mounted.
2. Secure the grounding lug to the protective grounding terminal with the washers and screws.
3. Dress the grounding cable, and make sure that it does not touch or block access to other router components.

Figure 134: Connecting a Grounding Cable to a vEdge 2000 Router



Install vEdge 2000 Router Components

The vEdge 2000 router is a stiff sheet-metal structure that houses various hardware components. Some of these hardware components are field-replaceable units (FRUs) including:

- Power supplies
- Fan trays
- Pluggable Interface Modules (PIMs)
- SFP and SFP+ transceivers

This article provides step-by-step procedures for installing these router components. For instructions on removing the components, see Remove Router Components.

Caution Before you install any components in the router chassis, make sure that you understand how to prevent electrostatic discharge (ESD) damage. See General Safety Standards.

Note Before you install any components in the router chassis, ensure that you have an ESD grounding strap and a number 2 Phillips (+) screwdriver.

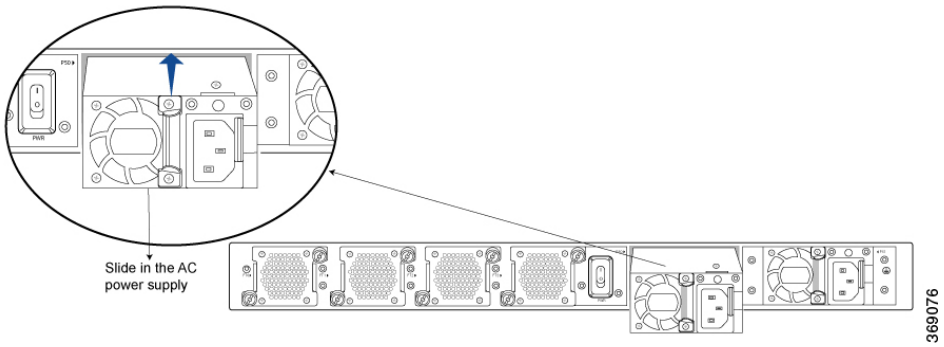
Install an AC Power Supply in a vEdge 2000 Router

The AC power supply in a vEdge 2000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To install an AC power supply in a router:

1. Check the model number and ensure that you have the correct power supply.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Press the release latch to carefully remove the existing power supply from the power supply slot in the rear panel of the router chassis.
4. Remove the new power supply from the plastic bag in which it was shipped, taking care that you do not touch any of the power supply pins, leads, or solder connections.
5. With both hands, place the new power supply into the power supply slot in the rear panel of the router chassis and slide it in until it is firmly seated. You will hear a click sound when the power supply is firmly seated in the slot. See Figure 1.

Figure 135: Installing an AC Power Supply in a vEdge 2000 Router



Install a Fan Tray in a vEdge 2000 Router

The vEdge 2000 router contains four individual fan trays, each comprising a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

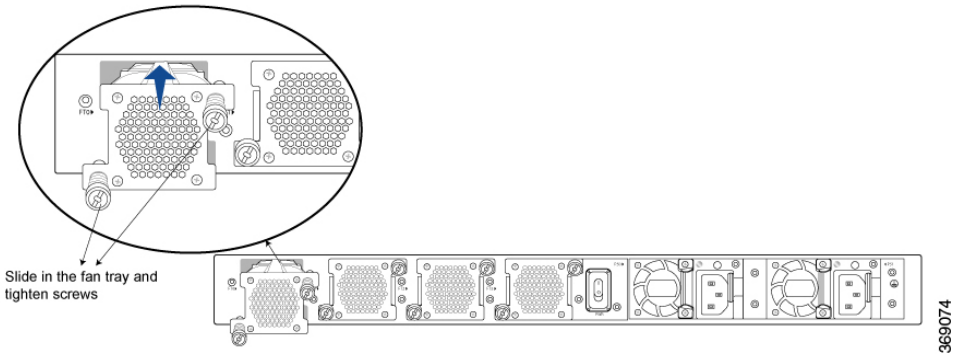
The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

To install a fan tray in a vEdge 2000 router:

1. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the router chassis.
2. Unscrew and carefully remove the existing fan tray from the fan tray slot in the rear of the chassis.
3. Gently remove the new fan tray from the plastic bag in which it was shipped.
4. With both hands, hold the thumb screws on each side of the fan tray and align the fan tray along the fan tray slot.

5. Slide in the fan tray until it is firmly seated in the router chassis and then tighten the screws. See Figure 2.

Figure 136: Installing a Fan Tray in a vEdge 2000 Router



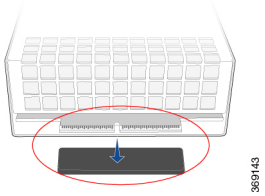
Install a PIM in a vEdge 2000 Router

The vEdge 2000 router supports two types of Pluggable Interface Modules (PIMs).

To install a PIM in a vEdge 2000 router:

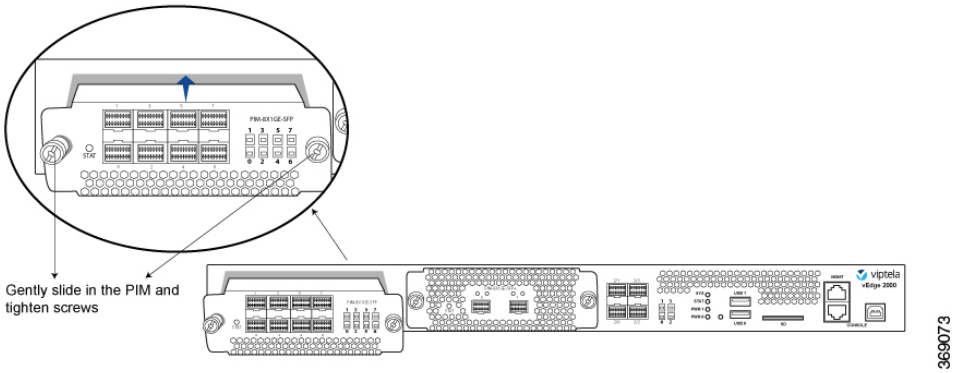
1. Remove the PIM from its bag, taking care not to touch module components, pins, leads, or solder connections.
2. Remove the black plastic protective cover that covers the gold-plated contact pins.

Figure 137: Removing the Black Plastic Protective Cover



3. Using both hands, place the PIM in the empty slot and slide it in gently until it is fully seated.

Figure 138: Installing a PIM in a vEdge 2000 Router



4. Tighten the captive thumb screws using the number 2 Phillips (+) screwdriver.

Note To remove a PIM and replace it with a different type of PIM in a PIM slot, you must do the following: 1. Delete the configuration for the old PIM (the PIM you are removing). 2. Remove the PIM from the router. 3. Insert the new PIM. 4. Reboot the router. 5. Configure the interfaces for the new PIM.

Note If you do not remove the black plastic protective cover before installing the PIM, you will damage the PIM slot in the router chassis and the entire unit will become unusable.

Caution Before you slide the PIM into the slot in the router chassis, make sure that the PIM is aligned correctly. Misalignment might cause the pins to bend, making the PIM unusable.

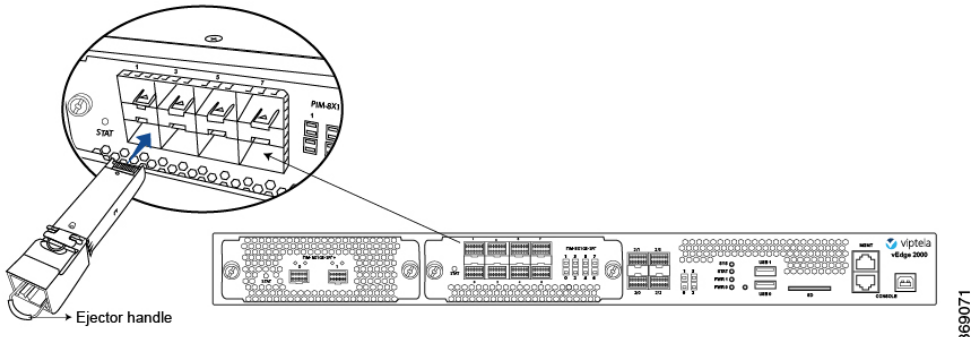
Install a Transceiver in a vEdge 2000 Router

The transceivers for the vEdge 2000 router are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the router or disrupting router functions.

To install any type of transceiver in a vEdge 2000 router:

1. Gently remove the new transceiver from the plastic bag in which it was shipped.
2. Cover the transceiver with a rubber safety cap, if it is not already covered.
3. If the port in which you plan to install the transceiver is covered with a dust cover, remove the cover, and save it for later use.
4. Carefully slide the transceiver in the empty port until it is firmly seated. See Figure 5.
5. Remove the safety cap when you are ready to connect an optic fiber cable to the port.

Figure 139: Installing a Transceiver in a vEdge 2000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

vEdge 2000 Router Default Configuration

The default configuration file looks like this:

```
vEdge2000# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$t.vzhbSwOJaaChRu$<wbr/>AiJYG3VFRlNurXPY7YXSputMMv4hg3<wbr/>Bign362rj4IIWXm7uVfiReqv/<wbr/>4EhKG2QUUSaZnZZPveQYBfIozCioyE<wbr/>/

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
interface ge2/0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
```

```
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
interface mgmt0
  ip address 192.168.1.1/24
  no shutdown
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 2000 router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 2000 router have two types of severity levels:

- Major (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold

A major alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Minor (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 2000 router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 2000 router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has four temperature sensing points (board sensor 1 through 4). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU and DRAM temperature alarm—If the temperature of the system CPU or of the DRAM modules crosses the predefined threshold level, the system triggers an alarm.
- PIM temperature alarm—If the temperature of the PIM modules crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has modular fan trays for system cooling. The Viptela software maintains the fans at an optimal fan speed, raising the speed as the ambient temperature increases and decreasing the speed as the temperature decreases, to keep the router operating at the lowest possible temperature in the

green temperature threshold. If a fan stops running, the system triggers an alarm. Also if a fan starts to run below a predefined RPM threshold, the system triggers an alarm.

- Power supply alarm—The router has two power supplies for redundancy reasons. If one of the power supplies is not plugged in or there is a failure on a power supply input, the system triggers an alarm

The following table lists the yellow and red alarm threshold for the nine temperature sensing points in the system—four board sensors spread across the board, one CPU junction temperature sensor, two DRAM temperature sensors, and two PIM temperature sensors. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise the higher threshold value applies (normal).

Table 69:

Item	Yellow Alarm (degrees C)	Red Alarm (degrees C)		
	Normal	**Bad Fan**	**Normal**	**Bad Fan**
Chassis board sensor1	65	60	80	75
Chassis board sensor2	65	60	80	75
Chassis board sensor3	65	60	80	75
Chassis board sensor4	65	60	80	75
CPU junction temperature	85	80	100	95
DRAM DIMM 0	65	60	80	75
DRAM DIMM 1	65	60	80	75
PIM 0	65	60	80	75
PIM 1	65	60	80	75

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a specific board or all boards in the router and for the router's CPU and DRAM.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs

The chassis LEDs located on the front panel of the vEdge 2000 router indicate the status of the router.

If there are one or more major alarms active in the router, the SYS LED is lit red. If there are one or more minor alarms active in the router, the SYS LED is lit amber. See Front Panel Components for details of the LEDs and the status they indicate.

Remove vEdge 2000 Router Components

The vEdge 2000 router is a stiff sheet-metal structure that houses the hardware components. The field-replaceable units (FRUs) in the vEdge routers are:

- Power supply
- Fan tray
- Pluggable Interface Modules (PIM)
- SFP and SFP+ transceiver

This article provides step-by-step procedures for removing these router components. For instructions on installing the components, see Install vEdge 2000 Router Components .

Caution Before you install any components in the router chassis, make sure that you understand how to prevent Electrostatic discharge (ESD) damage. See General Safety Standards.

Remove an AC Power Supply from a vEdge 2000 Router

The AC power supply in a vEdge 2000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To remove the power supply from the router chassis, you need the following parts and tools:

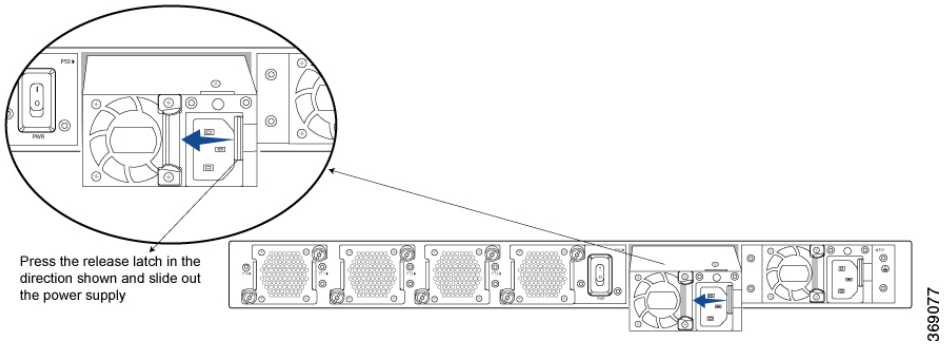
- An antistatic bag or an antistatic mat
- A replacement power supply or a cover panel for the power supply slot

To remove an AC power supply from the router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Turn the power switch on the outlet (if one exists) to the OFF (0) position.
4. Disconnect the power cord from the power source.
5. Press the release latch on the right side of the power supply to disconnect the power supply from the chassis.
6. Grasp the power supply handle with one hand and slide the power supply firmly halfway out of the chassis.
7. Place the other hand underneath the power supply and slide it completely out of the chassis making sure not to touch any power supply pins, leads, or solder connection.

8. Place the removed power supply in the antistatic bag or on the antistatic mat.

Figure 140: Removing an AC Power Supply from a vEdge 2000 Router



Caution Make sure that you do not leave the power supply slot in the rear of the chassis empty for a long time while the router is operational. Once you remove the power supply, either replace it promptly or install a cover panel over the empty slot.

Remove a Fan Tray from a vEdge 2000 Router

The vEdge 2000 router contains four individual fan trays each comprising of a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

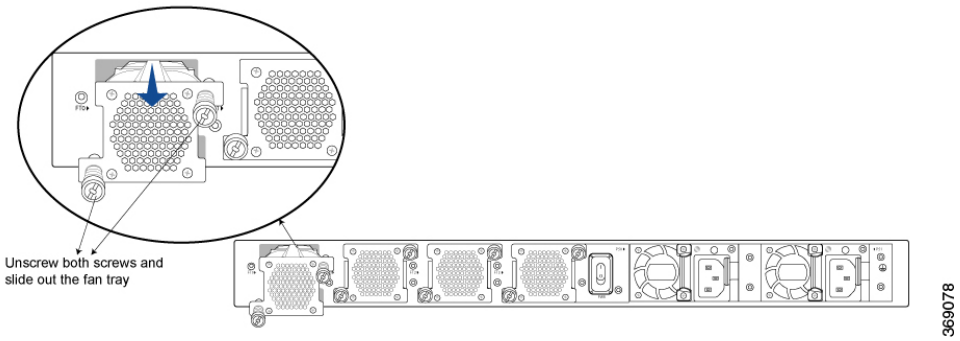
To remove the fan tray from the router chassis, you need the following parts and tools:

- An antistatic bag or an antistatic mat
- A replacement fan tray

To remove a fan tray from a vEdge 2000 router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Unscrew the two thumb screws on the fan tray to release it from the router chassis. Then remove the fan tray.
4. Place the fan tray in the antistatic bag or the antistatic mat.

Figure 141: Removing a Fan Tray from a vEdge 2000 Router



Warning When removing the fan tray, keep your hands and finger away from the spinning fan blades as the fans might still be spinning.

Remove a PIM from a vEdge 2000 Router

The vEdge 2000 router supports two flavors of the Pluggable Interface Modules (PIMs). Both modules install horizontally on the front of the chassis. See Front Panel of the vEdge 2000 Router .

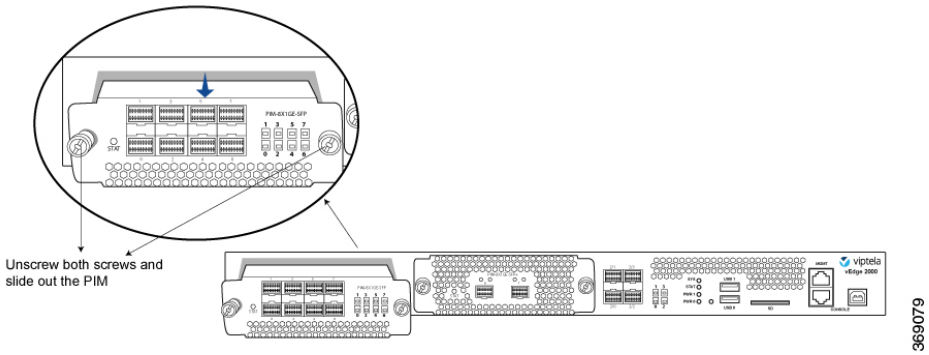
To remove a PIM from a PIM slot in a vEdge 2000 router, you need the following parts and tools:

- Number 2 Phillips (+) screwdriver
- A replacement PIM or cover panel
- An antistatic bag or antistatic mat

To remove a PIM from a PIM slot in a vEdge 2000 router:

1. Power down the router.
2. Using a number 2 Phillips (+) screwdriver, loosen the captive screws.
3. Pull the PIM halfway out by holding on to the captive thumb screws.
4. Hold the front edge of the PIM with both hands and slide it completely out of the chassis.
5. Place the PIM in an antistatic bag or on an antistatic mat.
6. Power up the router.

Figure 142: Removing a PIM from a vEdge 2000 Router



Note To remove a PIM and replace it with a different type of PIM in a PIM slot, you must power down the router, replace the PIM, and then power the router back again. Also, if there are any transceivers installed in the PIM, remove them before you remove the PIM. For instructions on removing a transceiver from a vEdge router, see below.

Caution Make sure that you do not leave the PIM slot in the front of the chassis empty for a long time while the router is operational. Once you remove the PIM, either replace it promptly or install a cover panel over the empty slot.

Remove a Transceiver from a vEdge 2000 Router

The transceivers for the vEdge router are hot-removable and hot-insertable field-replaceable units (FRUs): You can remove and replace them without powering off the router or disrupting router functions.

To remove any type of transceiver from a vEdge 2000 router, you need the following parts and tools:

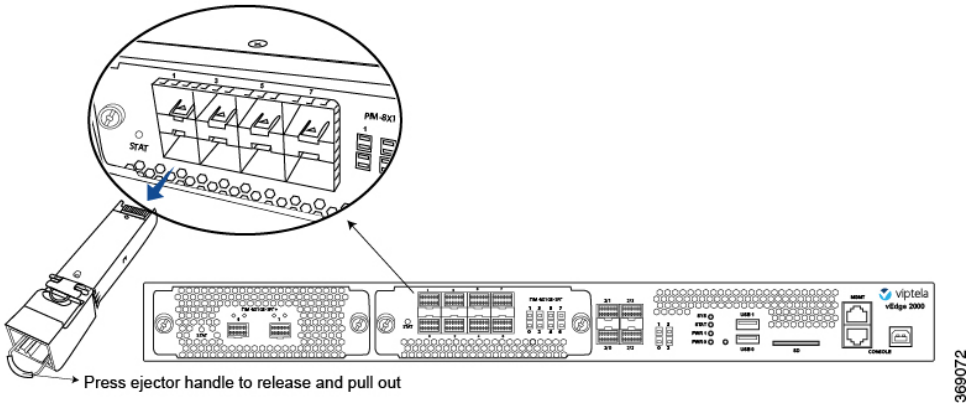
- A transceiver slot dust cover
- An antistatic mat or an electrostatic bag
- A rubber safety cap for the transceiver

To remove any type of from a vEdge router:

1. Place the antistatic mat or the electrostatic bag on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Label the cables connected to the transceiver so that you can reconnect them correctly later.
4. Remove the cable connector from the transceiver.
5. Unlock the transceiver by pulling down the ejector handle from the transceiver.
6. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. out of the router.
7. Using your fingers, grasp the body of the transceiver and pull it out of the router completely.

8. Place a rubber safety cap over the transceiver.
9. Place the removed transceiver on the antistatic mat or in an electrostatic bag.
10. If you are not installing a new transceiver, place the transceiver slot dust cover over the empty port.

Figure 143: Removing a Transceiver from a vEdge 2000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

```
vEdge# request software reset
```

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory** command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 144: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router

- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
2. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.

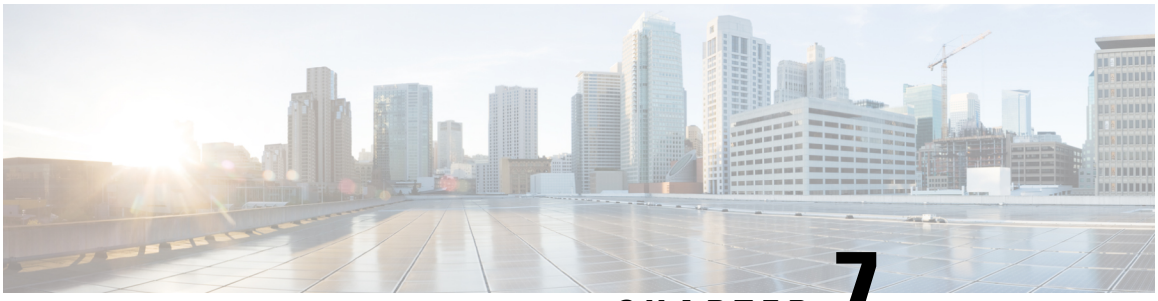
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 7

vEdge 5000 Router

The vEdge 5000 router delivers highly secure site-to-site data connectivity to large enterprises, offers interface modularity, and provides the following features:

- 1RU, standard rack mountable in a 19-inch rack
- Support for AC input power
- Four pluggable Network Interface Module (NIM) slots that support three types of NIMs:
  - 8x1-Gigabit Ethernet SFP NIM (Model: NIM-8-1GE-SFP)
  - 8x1-Gigabit Ethernet Copper Rj45 NIM (Model: NIM-8-1GE-RJ45)
  - 4x10-Gigabit Ethernet SFP+ NIM (Model: NIM-4-10GE-SFPP)
- Encryption and QoS support
- Secure identification chip for anti-counterfeit and secure authentication
- Redundant hot-swappable fan tray modules
- Dual redundant hot-swappable power supply slots
- Front-to-back cooling

Chassis Views

The following figures show the front and back panels of the vEdge 5000 router, indicating the location of the power interfaces, module slots, status indicators, and chassis identification labels.

Figure 145: Front Panel of the vEdge 5000 Router

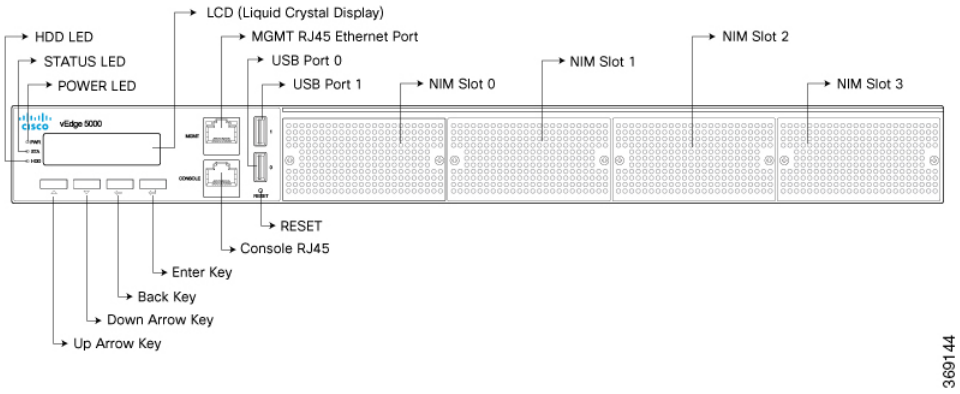
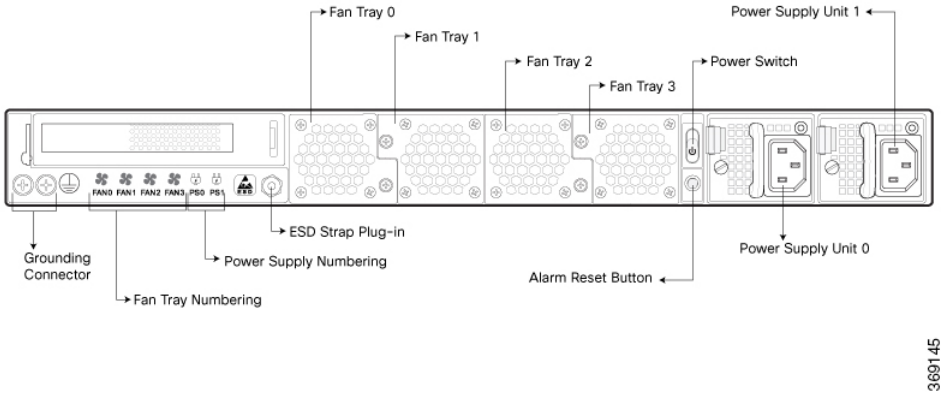


Figure 146: Back Panel Slots and Connectors of the vEdge 5000 Router



- Declaration of Conformity, on page 188
- Components and Specifications, on page 189
- Planning and Installation, on page 211
- Maintenance and Troubleshooting, on page 227

Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .

Components and Specifications

This article provides the chassis specifications of the vEdge 5000 router and lists the other router components.

Chassis Specifications

The following table lists the specifications for the vEdge 5000 router chassis.

Table 70: vEdge 5000 Router Chassis Specifications

Item	Specification
Services and Slot Density	
Fixed traffic ports	None
Network Interface Module (NIM) slots	4
Embedded hardware-based crypto acceleration (IPSec)	Yes
Memory DDR4 ECC DRAM	32 GB
SATA SSD flash storage (internal)	128 GB
External USB Ports (Type A USB 2.0)	2
Serial console port (RJ-45 default 115.2 Kbps)	1
Management Ethernet port (RJ-45 10/100/1000 Mbps)	1
LCD panel with keypad	1
Power supply option	Hot-swappable Power Supply Units (PSUs)
Redundant power supply support	Active–Active redundancy
Power Specifications	
AC input voltage	100-240 Volts

Item	Specification
AC input line frequency	50-60 Hz
Maximum power consumption	285 Watts
Physical Specifications	
Chassis height	1.73 in. (4.4 cm)
Chassis width	Chassis only: 17.2 in. (43.8 cm) Chassis with mounting brackets attached: 19 in. (48.2 cm)
Chassis depth	22.83 in. (58 cm)
Rack height	1 RU
Rack-mount accessory kit 19 in (48.3 cm)	Provided with the unit
Weight	Chassis only: 36.3 lb (16.5 kg) Chassis with packaging: 40 lb (18 kg)
Airflow	Front to back
Packaging Specifications	
Package height	9 in. (22.86 cm)
Package width	24 in. (60.96 cm)
Package depth	31 in. (78.74 cm)
Operating Condition	
Temperature	0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	178K hours

Item	Specification
Regulatory Compliance	
Safety	CE Marketing CAN/CSA C22.2 No. 60905-1-07 UL60950-1
EMC	EN 550332: 2012+AC: 2013 Class A AS/NZS CISPR 32: 2015 CISPR32: 2015 EN55024: 2012 +A1: 2015 EN61000-3-2: 2014 CLASS A EN61000-3-3: 2013 FCC PART 15, SUBPART B ANSI C63, 4-2014 ICES-003 ISSUE 6: 2016 CISPR 22: 2008 CAN/CSA-CISPR 22-10
Environmental	ROHS

Front and Rear Panel Components

This article describes the components on the front and rear panels of the vEdge 5000 router. For the exact location of these components on the router, see At a Glance.

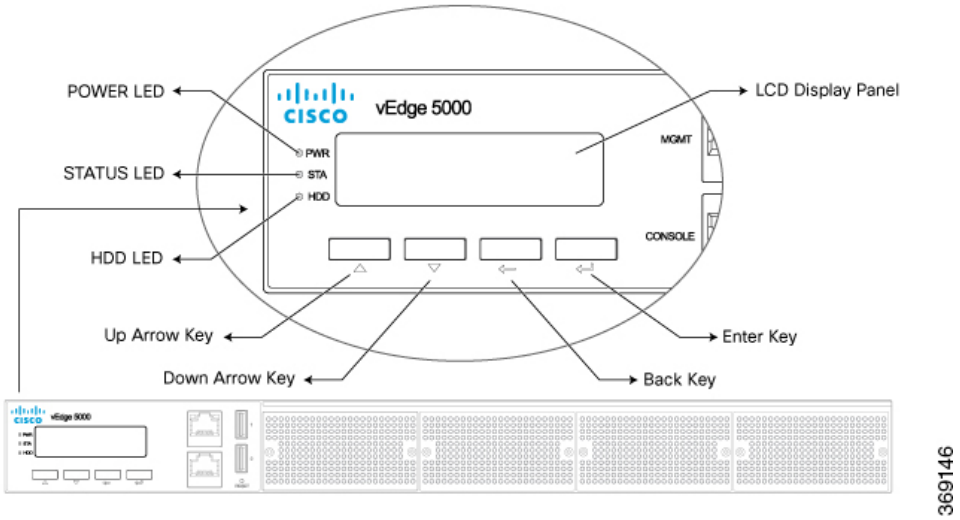
Front Panel

The front panel of the vEdge 5000 router has three status LEDs, a reset button, and the LCD panel and keypad.

LEDs

The vEdge 5000 router has three chassis status LEDs located in the left-hand corner of the front panel.

Figure 147: Chassis Status LEDs in a vEdge 5000 Router



The following table describes the LEDs , their color and states, and the status they indicate.

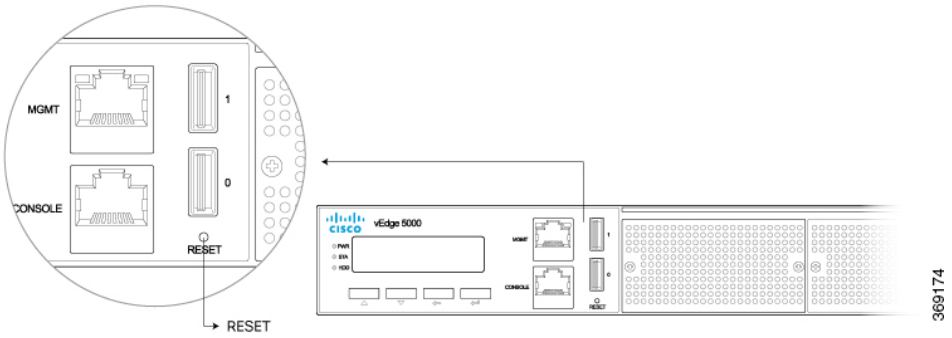
Table 71:

LED	Color	Description
STA	Green/Amber	• Off: System is not powered on • Blinking Amber: System is booting up • Blinking Green: System has booted but OMP is down • Solid green: System is up and running and OMP is up • Solid Amber: System software is down or an alarm is present
PWR	Green	• Off: System is not powered on • Green: System is powered on
HDD	Green	• Off: System is not powered on or there is no HDD activity • Blinking Green: SSD disk activity is ongoing

Reset Button

The front panel of the vEdge 5000 router has a reset button. The reset button is recessed to avoid accidentally pressing it while the router is operational.

Figure 148: Reset Button on the vEdge 5000 Router



To press the reset button, use a sharp narrow tool. The following table describes the effects of pressing the reset button.

Table 72:

Press Duration	Behavior
Short press	Pressing for two seconds resets and reboots the router.
Long press	Pressing for 10 seconds resets the router and reboots it with factory default configuration.

LCD Panel and Key Pad

The LCD panel displays status information about the state of the system. It also provides some boot control options while the system is booting up. The key pad consists of the following buttons:

- Up arrow
- Down arrow
- Back
- Enter

Rear Panel

The rear panel of the vEdge 5000 router has a power button and an alarm reset button.

Power Button

To gracefully shutdown the vEdge 5000 router, briefly press the power button on the rear panel. If pressed for 5 seconds, the router will be forced to shutdown ungracefully.

Alarm Button

The alarm button is located directly beneath the power button. If a power supply in the vEdge 5000 router fails or is not plugged in, the router raises an alarm. To cancel the alarm until the next reboot, press the alarm button.

NIM and Transceiver Modules

This article describes the Network Interface Modules (NIMs) for the vEdge 5000 router as well as the SFP and SFP+ transceivers for those NIMs.

NIMs for the vEdge 5000 Router

The vEdge 5000 router offers interface modularity, providing four NIM slots that support three types of NIMs:

- 8x1-Gigabit Ethernet SFP NIM (Model: NIM-8-1GE-SFP)
- 8x1-Gigabit Ethernet Copper Rj45 NIM (Model: NIM-8-1GE-RJ45)
- 4x10-Gigabit Ethernet SFP+ NIM (Model: NIM-4-10GE-SFPP)

The four NIM slots are labeled NIM Slot 0 to NIM Slot 3. You can install any combination of the above three NIM types in the four available NIM slots.

The following figures show the front panel of the 8x1-Gigabit Ethernet SFP NIM, 8x1-Gigabit Ethernet Copper Rj45 NIM, and 4x10-Gigabit Ethernet SFP+ NIM, respectively.

Figure 149: Front Panel of 8x1-Gigabit Ethernet SFP NIM

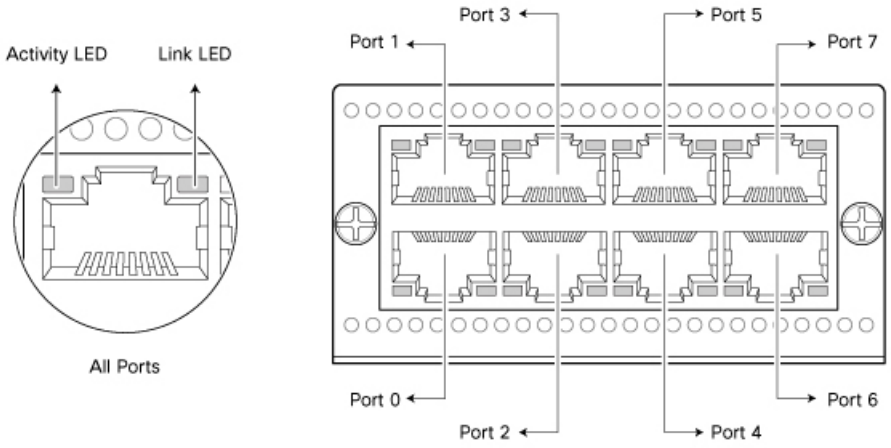


Figure 150: Front Panel of 8x1-Gigabit Ethernet Copper Rj45 NIM

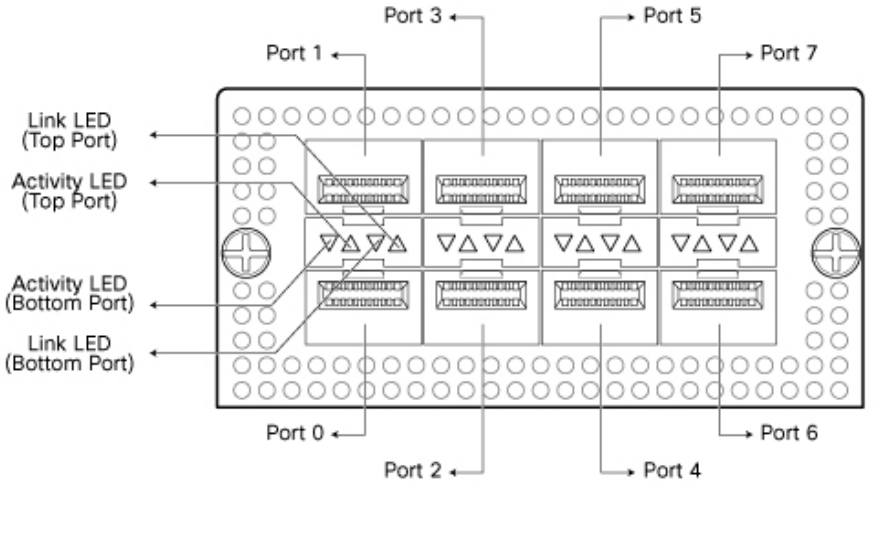
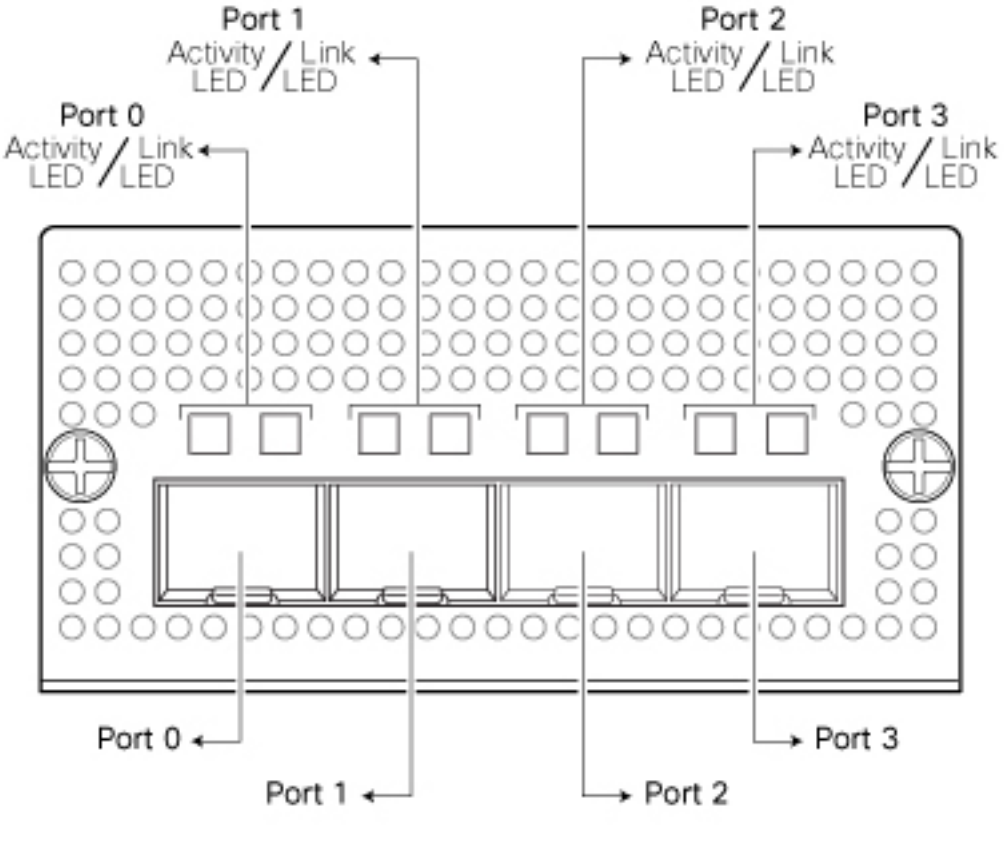


Figure 151: Front Panel of 4x10-Gigabit Ethernet SFP+ NIM



Supported Transceiver Modules

The network ports on the 8x1-Gigabit Ethernet SFP NIM support SFP transceivers. The 10-Gigabit Ethernet ports on the 4x10-Gigabit Ethernet SFP+ NIM support SFP+ transceivers.

This section describes the optical interfaces supported for the SFP and SFP+ transceivers and the copper interfaces supported for the SFP transceivers.

Note It is recommended that you use the optical transceivers and optical connectors purchased from Cisco for your vEdge routers.

The tables below describe the optical interface support over single-mode fiber-optic (SMF) and multimode fiber-optic (MMF) cables for SFP and SFP+ transceivers and over the copper interface for SFP transceivers.

Table 73:

Ethernet Standard	Specification	Value
1000 BASE-T	Model Number	SFP-1GE-Base-T
	Rate	10/100/1000 Mbps
Connector Type	RJ-45	
Fiber Count	N/A	
Transmitter Wavelength	N/A	
Minimum Launch Power	N/A	
Maximum Launch Power	N/A	
Minimum Receiver Sensitivity	N/A	
Maximum Input Power	N/A	
Cable Type	Copper	
Distance	100 m (328 ft)	
DOM Support	Not available	
1000 BASE-SX	Model Number	SFP-1GE-SX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-9.5 dBm	
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-21 dBm	
Maximum Input Power	0 dBm	
Fiber Type	MMF	
Distance	220 m (721 ft) to 550 m (1804 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
1000 BASE-LX	Model Number	SFP-1GE-LX

Ethernet Standard	Specification	Value
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-9.5 dBm	
Maximum Launch Power	-3 dBm	
Minimum Receiver Sensitivity	-25 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	
1000 BASE-EX	Model Number	SFP-1GE-EX
	Rate	1000 Mbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-14 dBm	
Maximum Launch Power	-8 dBm	
Minimum Receiver Sensitivity	-45 dBm	
Maximum Input Power	-3 dBm	
Fiber Type	SMF	
Distance	40 km (24.8 miles)	
DOM Support	Available	

Table 74:

Ethernet Standard	Specification	Value
10G BASE-SR	Model Number	SFP+-1GE-SR

Ethernet Standard	Specification	Value
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	850 nm	
Minimum Launch Power	-7.3 dBm	
Maximum Launch Power	-1 dBm	
Minimum Receiver Sensitivity	-9.9 dBm	
Maximum Input Power	-1 dBm	
Fiber Type	MMF	
Distance	26 m (85 ft) to 300 m (984 ft) depending on fiber core size/modal bandwidth specification	
DOM Support	Available	
10G BASE-LR	Model Number	SFP+-1GE-LR
	Rate	10 Gbps
Connector Type	LC	
Fiber Count	Dual	
Transmitter Wavelength	1310 nm	
Minimum Launch Power	-8.2 dBm	
Maximum Launch Power	0.5 dBm	
Minimum Receiver Sensitivity	-18 dBm	
Maximum Input Power	0.5 dBm	
Fiber Type	SMF	
Distance	10 km (6.2 miles)	
DOM Support	Available	

Supported Transceivers

This article provides a list of copper and fiber transceivers that have been tested and qualified for use in vEdge 1000 and vEdge 2000 routers. You can order the transceivers that have a Viptela part number in the tables below directly from Viptela.

Table 75:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FCLF-8521-3	SFP-1GE-Base-T	X	X	X	• Small form-factor pluggable (SFP) transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Finisar FCLF8521P2BTL	SFP-1GE-Base-T	X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco-Avago SFBR-5766PZ-CS2		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Bel-Fuse 1GBT-SFP05		X	X		• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Avago ABCU-5710RZ		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet
Cisco GLC-T1000BASE-T		X	X	X	• SFP transceiver • RJ45-type connector • 10/100/1000-Mbps Ethernet

Table 76:

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge5000 Router	Description
Avago AFBR-5710PZ		X	X	X	• Small form-factor pluggable (SFP) transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Avago AFCT-5710PZ		X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Finisar FTLF1318P3BTL	SFP-1GE-LX	X	X	X	• SFP transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 1-Gbps applications
Cisco-Finisar FTLF8519P2BCL-C4		X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 1-Gbps applications
Finisar FTLF8519P3BNL	SFP-1GE-SX	X	X	X	• SFP transceiver • LC-type connector • Short-reach 850-nm optics for multi-mode fiber for 1-Gbps applications
Finisar FTLX8574D3BCL	SFP+-10GE-SR		X	X	• SFP+ transceiver • LC-type connector • Short-reach 850-nm optics over multimode fiber for 10-Gbps applications

Manufacturer & Part Number	Viptela Part Number	vEdge 1000 Router	vEdge 2000 Router	vEdge 5000 Router	Description
Finisar FTLX8571D3BCV			X	X	• SFP+ transceiver • LC-type transceiver • Short-reach 850-nm optics for multi-mode fiber for dual-rate 1 Gbps/10 Gbps applications **Note** : The SFP+ ports of the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCV			X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for dual-rate 1 Gbps/10 Gbps applications **Note**: The SFP+ ports on the 10-Gigabit Ethernet PIM support a rate of 10 Gbps only. 1 Gbps is not supported.
Finisar FTLX1471D3BCL	SFP+-10GE-LR		X	X	• SFP+ transceiver • LC-type connector • Long-reach 1310-nm optics for single-mode fiber up to 10 km for 10-Gbps applications

Ports and Connectors

The vEdge 5000 router supports three types of ports: network ports, management port, and console port.

Network Ports (SFP Ports)

The 8x1-Gigabit Ethernet SFP NIM module support 1-Gbps SFP module. The 4x10-Gigabit Ethernet SFP+ NIM module supports 10-Gbps SFP+ module.

The following table provides the pinout information for the NIM SFP/SFP+ port connector. The SFP/SFP+ ports comply with the SFP/SFP+ MSA standards.

Table 77:

Pin	Signal	Description
1	VeeT	Module transmitter ground

Pin	Signal	Description
2	TX_Fault	Module transmitter fault
3	TX_Disable	Transmitter disable
4	SDA	Two-wire serial interface data line
5	SCL	Two-wire serial interface clock
6	MOD_ABS	Module absent
7	RS0	Rate select 0; optionally controls SFP+ module receiver
8	RX_LOS	Receiver loss of signal indication
9	RS1	Rate select 1; optionally controls SFP+ transmitter
10	VeeR	Module receiver ground
11	VeeR	Module receiver ground
12	RD-	Receiver inverted data output
13	RD+	Receiver non-inverted data output
14	VeeR	Module receiver ground
15	VccR	Module receiver 3.3-V supply
16	VccT	Module transmitter 3.3-V supply
17	VeeT	Module transmitter ground
18	TD+	Transmitter non inverted data input
19	TD-	Transmitter inverted data input
20	VeeT	Module transmitter ground

Network Port LEDs

Each network port on the vEdge 5000 router has two LEDs—the activity LED and the link LED. See the following figures.

Figure 152: LEDs on the 8x1GE Copper Rj45 NIM

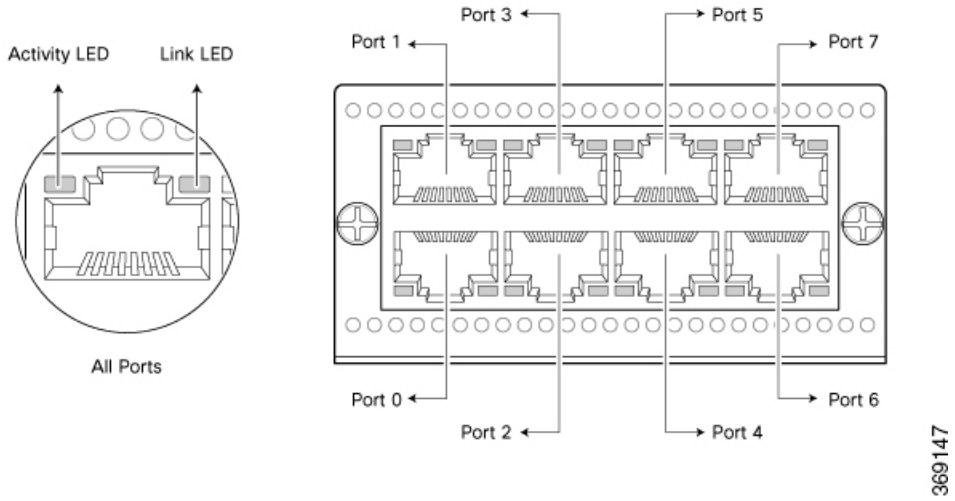


Figure 153: LEDs on the Network Ports on an 8x1GE SFP NIM

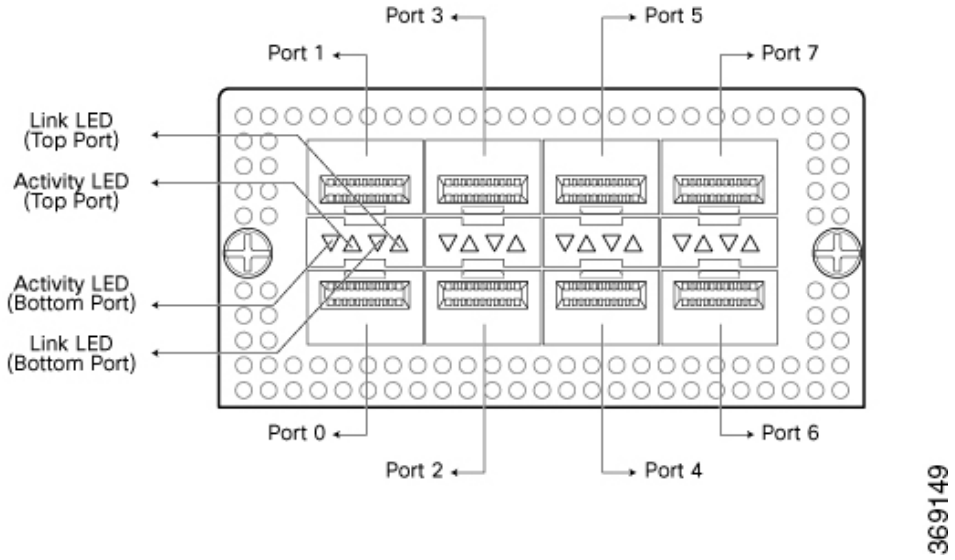


Figure 154: LEDs on the Network Ports on a 4x10GE SFP+ NIM

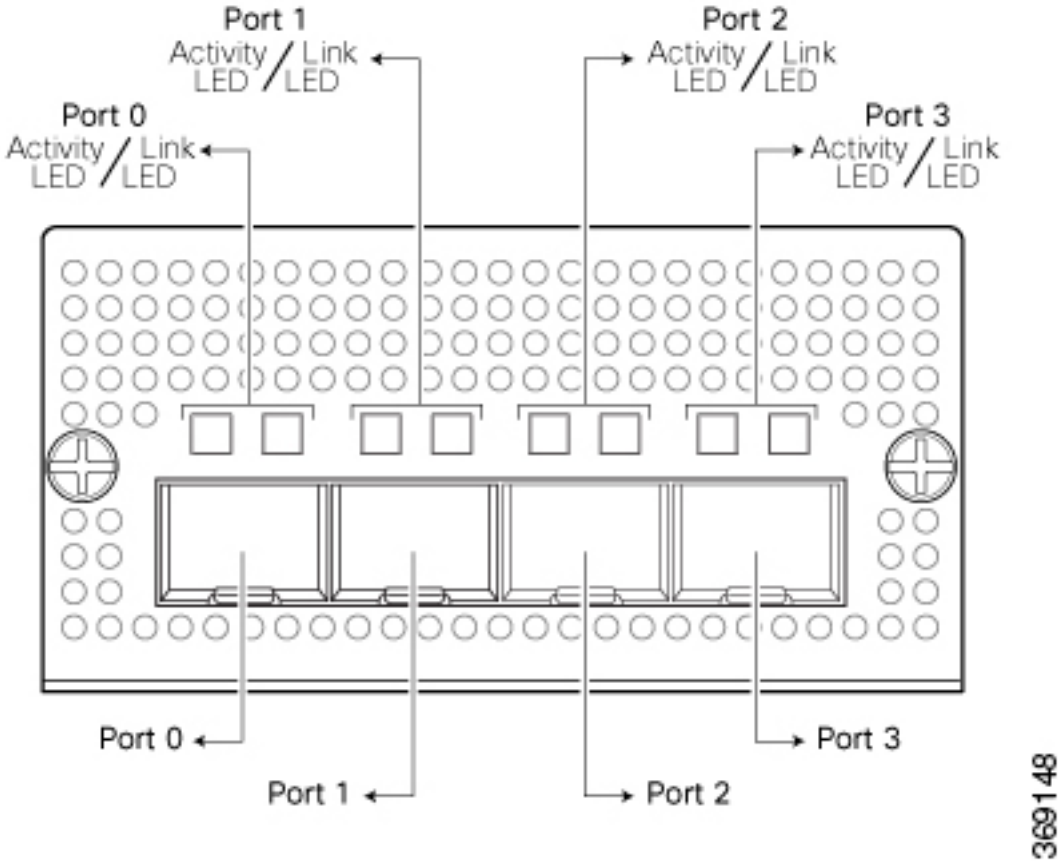


Table 78:

Color	State & Description
Amber	• Blinking—There is link activity. • Off—There is no link activity.

The following table describes the Link LED on the network ports.

Table 79:

NIM Type	Color	State & Description
8x1-Gigabit Ethernet Copper Rj45 NIM	Amber	Link is up at the rate of 1,000 Mbps.
	Green	Link is up at the rate of 100 Mbps.
	Off	Link is down or is up at the rate of 10 Mbps.

NIM Type	Color	State & Description
8x1GE SFP NIM	Amber Off	Link is up at the rate of 1,000 Mbps. Link is down.
4x10GE SFP+ NIM	Green Off	Link is up at the rate of 10 Gbps. Link is down.

Management Port

The management port on a vEdge 5000 router uses an RJ-45 connector to connect to a management device for out-of-band management.

The management port uses an autosensing RJ-45 connector to support a 10/100/1000Base-T connection. The two LEDs on the port indicate link/activity on the port and the administrative status of the port. See Management Port LEDs below.

The following table provides the pinout information for the RJ-45 connector for the management port.

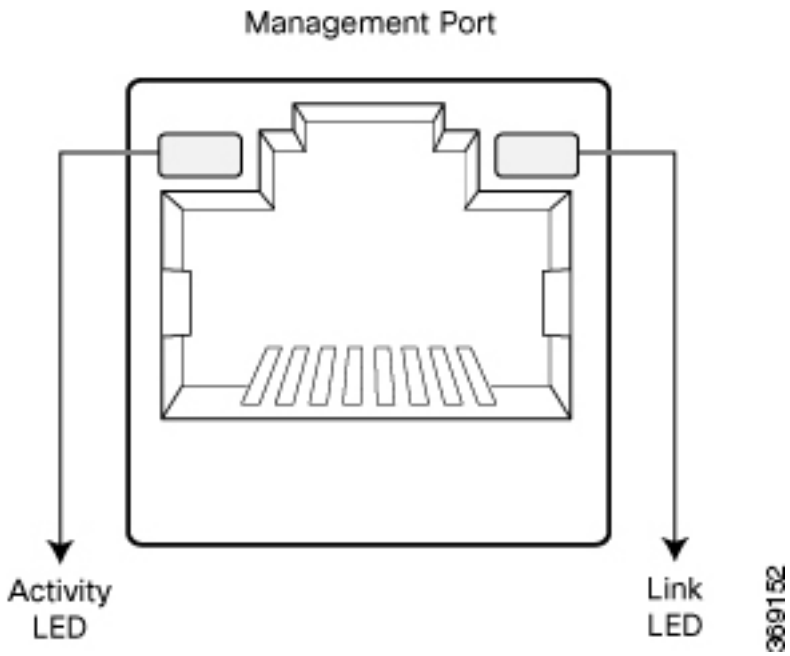
Table 80:

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Management Port LEDs

The management port on the vEdge 5000 router has two LEDs that indicate link/activity and port status. See the following figure.

Figure 155: LEDs on the Management Port on a vEdge 5000 Router



The following table describes the LEDs on the management port.

Table 81:

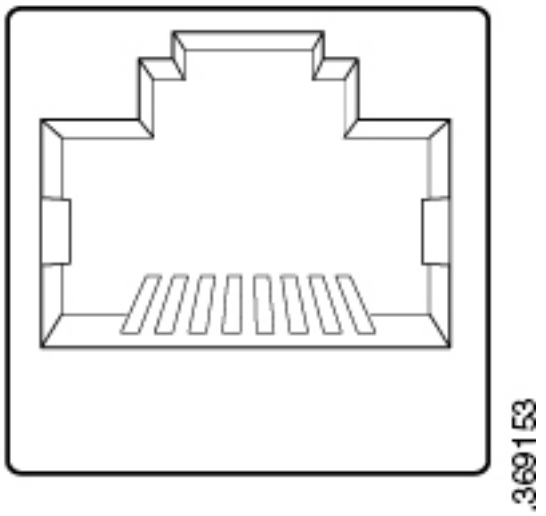
LED	Color	State and Description
Activity	Amber	• Blinking—There is link activity. • Off—There is no link activity.
Link	Amber	Link is up at the rate of 1,000 Mbps.
	Green	Link is up at the rate of 100 Mbps.
	Off	Link is down or is up at the rate of 10 Mbps.

Console Port

The console port on a vEdge 5000 router is accessible via the following external interface:

- An RS-232 serial interface that uses an RJ-45 connector to connect to a console management device. See the following figure.

Figure 156: RJ-45 Connector



Note

- The default baud rate for the console port is 115,200 baud.
- When you connect a device such as a PC or a terminal server to the console serial port of a vEdge router, ensure that the PC or terminal serial port is configured to disable flow control.

The following table provides the pinout information for the RJ-45 console port connector.

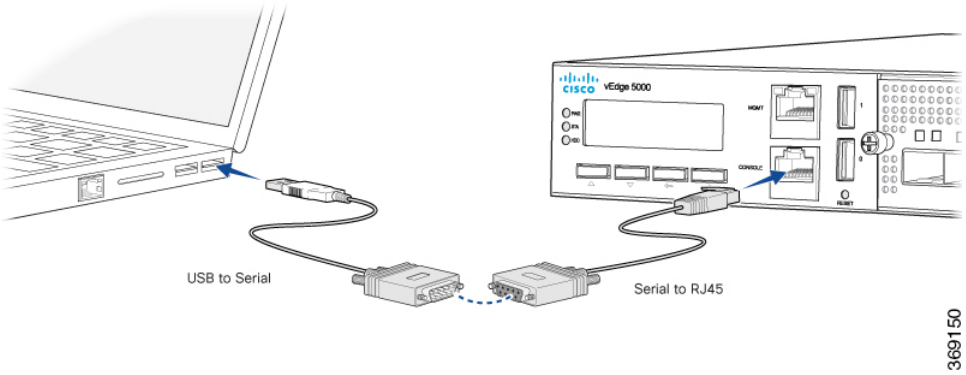
Table 82:

Pin	Signal	Description
1	RTS Output	Request to send
2	NC	No connect
3	TxD Output	Transmit data
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	NC	No connect
8	CTS Input	Clear to send

RJ-45-to-DB-9 Serial Port Adapter Pinout

The console port on a vEdge 5000 router is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a PC or a laptop. If your PC or laptop does not have a DB-9 male connector pin and you want to connect your PC or laptop to a vEdge 5000 router, use a combination of the RJ-45-to-DB-9 female adapter along with a USB-to-DB-9 male adapter. See the following figure.

Figure 157: vEdge 5000 Router Connected to a Laptop via RJ-45-to-DB-9 Cable



The following table provides the wiring and pinout information for the RJ-45-to-DB-9 serial port adapter cable.

Table 83:

RJ-45 Pin	Signal	DB9 Pin	Signal
1	RTS	8	CTS
3	TXD	2	RXD
4	GND	5	GND
6	RXD	3	TXD
8	CTS	7	RTS

Field-Replaceable Units

The vEdge 5000 router is a stiff sheet-metal structure that houses the hardware components. Field-replaceable units (FRUs) are hardware components that you can remove and replace at your site. The following table lists the FRUs in the vEdge routers.

The power supply, transceivers, and fan tray are hot-removable and hot-insertable. You can remove and replace these components without powering off the router or disrupting router functions.

Table 84:

FRU	Cisco FRU PID required for RMA	Part ID as per "show hardware inventory"
AC power supply	• VEDGE-5000-PWR=	
8-Port RJ-45 Copper Gigabit Ethernet NIM	• NIM-8-1GE-RJ45=	NCS2-IGM806B-VV1
4-Port 10-Gigabit Ethernet SFP+ NIM	• NIM-4-10GE-SFPP=	NCS2-IXM407A-VV1
8-Port Gigabit Ethernet SFP NIM	• NIM-8-1GE-SFP=	NCS2-ISM802A-VV1
Gigabit Ethernet transceivers	• VIP-SFP-1GE-SX= • VIP-SFP-1GE-LX= • VIP-SFP-1GE-BASET=	
10-Gigabit Ethernet transceivers	• VIP-SFP+-10GE-SR= • VIP-SFP+-10GE-LR=	
Fan tray	• VEDGE-5000-FAN=	

Power Supply and Cooling in Cisco vEdge 5000 Routers

The vEdge 5000 router ships with two AC power supplies installed. Read this article to learn more about the AC power supply in the router as well as about the cooling system and airflow through the router chassis.

AC Power Supply in vEdge 5000 Router

The vEdge 5000 router ships with two AC power supplies installed. The second power supply is for redundancy and load-balancing. If one of the AC power supplies fails due to device failure or input power line failure, a single unit is sufficient to power the entire router.

The AC power supply in a vEdge 5000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply in the rear of the chassis without powering off the router or disrupting normal functioning.

The following table describes the AC power supply specifications for the vEdge 5000 router.

Table 85:

Item	Specification
AC input voltage	110/230 Vrms
AC input line frequency	60/50 Hz
Maximum output power	300 Watts

Item	Specification
Maximum power consumption	285 Watts

AC Power Supply LEDs

The vEdge 5000 AC power supply has an LED faceplate that displays information about the status of the power supply. The following table describes the LEDs on an AC power supply in a vEdge 5000 router.

Table 86:

LED State	Description
OFF	No AC power to all or any Power Supply Unit (PSU) in the system
0.5Hz Flashing Red	No AC power to this PSU only
1Hz Flashing Green	AC present but only standby output on
Green	Power supply DC output ON and OK
Red	Power supply has failed
0.5Hz Flashing Red*/Green*	Power supply warning

*Flashing frequency: 1Hz (0.5 seconds Red/0.5 seconds Green)

AC Power Cord Specifications

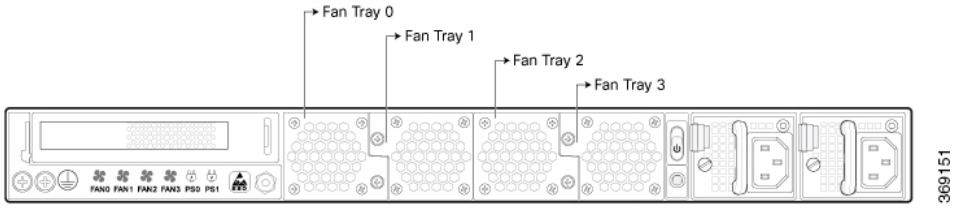
The vEdge 5000 router ships with a detachable AC power cord. The power cord has a C13 connector at one end and the other end is specific to the country/locality to which the product is shipped.

Cooling System and Airflow in a vEdge 5000 Router

The cooling system in a vEdge 5000 router consists of four individual fan trays, each comprising a double-stacked fan module. The fan trays cool the router itself, except the power supply units, which have their own fans for cooling.

The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). The fan trays provide front-to-back cooling. If one of the fans in a fan tray fails, you can remove the specific fan tray and replace it with a spare fan tray module without powering off the router or disrupting normal functions. Also, if one of the fans fails, the rest of the working fans will keep the system running indefinitely.

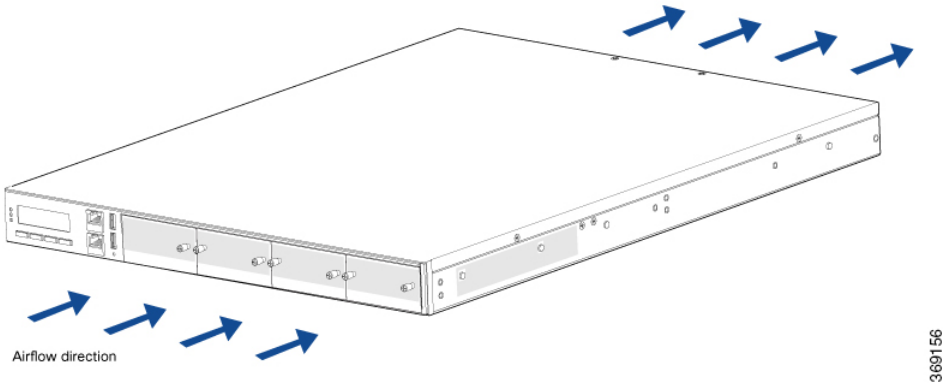
Figure 158: Fan Tray in a vEdge 5000 Router



The fan tray installs horizontally in the rear of the chassis. It has two thumbscrews that serve as handles and also as a mechanism to secure the fan tray to the main chassis.

The air intake to cool the chassis flows through the perforations in the front of the chassis. Hot air exits from the rear of the chassis via the vents provided near the fans.

Figure 159: vEdge 5000 Router Airflow



Temperature sensors in the chassis monitor the internal chassis temperature. When a single fan/fan tray fails at room temperature, the system can still provide sufficient cooling.

If a fan/fan tray fails or if the ambient temperature inside the chassis rises above the acceptable range, the router raises an alarm. If the temperature inside the chassis rises above the maximum threshold temperature, the router shuts down automatically.

Planning and Installation

This article provides general safety standards to adhere to when installing or connecting a vEdge 5000 router or its components.

General Safety Standards

- Install your vEdge router in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.

  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.

- Permit only trained and qualified personnel to install or replace switch components.
- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the vEdge router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Make sure that grounding surfaces are thoroughly cleaned and well-finished before grounding connections are made.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Note Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

Prepare for Router Installation

This article provide guidelines and requirements for preparing your site to install the vEdge 5000 router.

Site Preparation Guidelines

Efficient operation of your vEdge 5000 router requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.

- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.
- Install the router in an enclosed, secure area allowing only authorized personnel to access the device.

Environmental Requirements

Install the vEdge 5000 router in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The device supports 10% to 85% humidity levels, non-condensing.

Rack Requirements

You can mount the vEdge 5000 router in a four-post rack using slide rails. The following table provides the rack requirements for the router.

Table 87:

Rack Requirement	Guidelines
Rack type	Use a four-post rack that meets the size requirements for the router, provides bracket holes or hole patterns spaced at 1 U (1.75 in. or 4.45 cm) increments, and is strong enough to support the weight of the router.
Mounting brackets	Ensure that the holes in the mounting brackets are spaced at 1 U (1.75 in. or 4.45 cm). This allows you to mount the router in any location in the rack.
Rack size	It is recommended that the rack comply with the size and strength standards of a 19-inch rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D), published by the Electronics Industry Association (http://www.eia.org). Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the chassis and that the outer edges of the front mount brackets extend the width of the chassis to 19 in. (48.2 cm). You must also ensure that the spacing of rails and adjacent racks allows for the proper clearance around the router and rack.
Rack secured to building structure	For maximum stability, secure the rack to ceiling brackets and to floor brackets.

Airflow Requirements

When planning your site for installing the vEdge 5000 router, allow enough clearance around the installed router. Since the router works with a front-to-back airflow there are no clearance requirements for the sides, but it is recommended that you provide at least 3 in. of clearance at the back.

Install the vEdge 5000 Router

Once you have prepared your site for router installation, follow the instructions below to unpack the vEdge 5000 router and install it on four posts in a 19-inch rack.

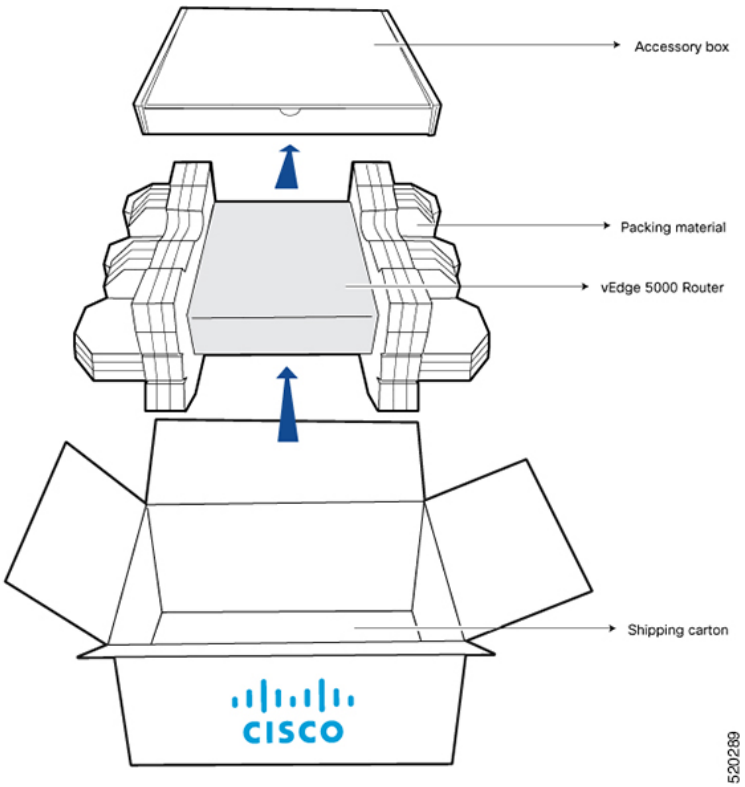
Unpack the vEdge 5000 Router

A vEdge 5000 router is shipped in a cardboard carton and secured firmly in place with foam packing material. The carton contains an accessory box with Quick Start instructions. It is recommended that you do not unpack the router until you are ready to install it.

To unpack the router:

1. Move the cardboard carton close to the installation site, making sure you have adequate space to remove all the contents of the box.
2. Open the top flaps of the carton. The router chassis and the accessories are packed together in the same box with partitions in the packing foam to accommodate the accessories.
3. Gradually remove the packing foam holding the router and the accessories in place.
4. Take out the router and each accessory.
5. Verify the router components against the packing list included in the box.

Figure 160: Unpacking the vEdge 5000 Router



Note It is recommended that you do not discard the shipping carton and packing material when you unpack the router. Flatten and store the box in case you need to move or return the router in the future. See Return Hardware.

Packing List for a vEdge 5000 Router

The cardboard carton in which the router is packed includes a packing list. Check the parts you receive with your router against the items on the packing list. The packing list specifies the name, part number, and quantity of each item in the carton and the accessory box.

The following table lists the parts shipped with the vEdge 5000 router and their quantities.

Table 88:

Component	Quantity
Router chassis	1
Fan tray (preinstalled)	4
AC power supply (preinstalled)	2
AC power cord appropriate for your geographical location (AC router models only)	2
Blanking cover panel for NIM slots (preinstalled)	4 (1 per NIM slot)
RJ-45 to DB-9 console cable	1
Rack-mounting ears	2
Slide rails	2
Screws/cage nuts for rack mount	6/6
Screws for inner rails	10
Screws for mounting ears	6
vEdge 5000 Router Quick Start	1

Mount the vEdge 5000 Router in a Rack

You can mount the vEdge 5000 router on four posts in a 19-inch rack.

In addition to the accessory box, you need the following tools to mount a vEdge 5000 router in a 19-inch rack:

- Number 2 Phillips (+) screwdriver
- Tape measure

The accessory box ships with two slide rails. Each slide rail has two parts: an inner rail that attaches to the router chassis and an outer rail that attaches to the 19-inch rack.

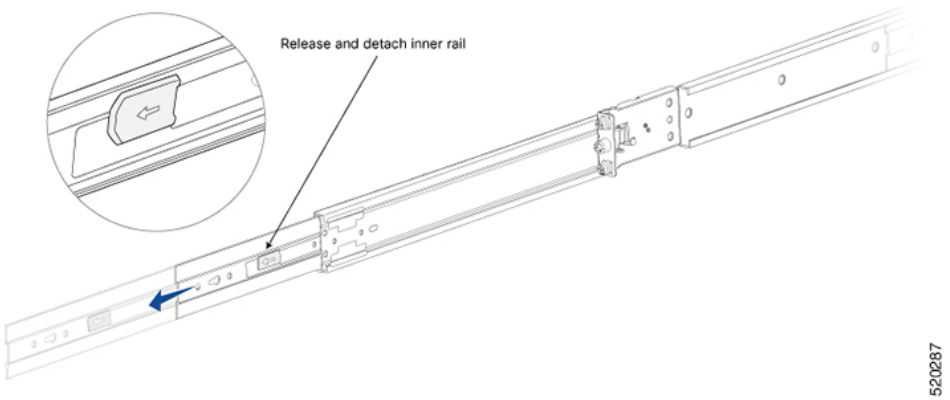
Warning Warning: To prevent bodily injury when mounting or servicing the vEdge 5000 router in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- If this is the only router in the rack, mount it at the bottom of the rack.
- If you are mounting the router in a partially filled rack, start to load the rack from the bottom, placing the heaviest component at the bottom of the rack.

To mount the vEdge 5000 router on all four posts in a 19-inch rack:

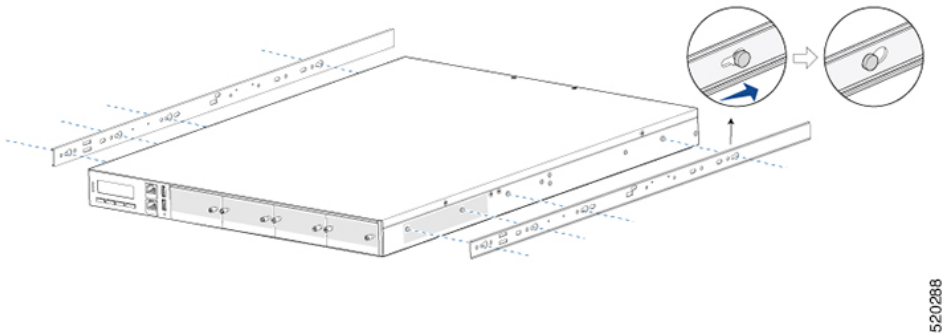
1. Place the router chassis on the floor or on a sturdy table near the rack.
2. Verify the internal dimensions of the rack with a tape measure. The chassis is 440 mm wide and must fit within the mounting posts.
3. Detach both inner rails from the two slide rails:
   a. Take one of the slide rails, and slide the inner bracket all the way up to the end of the slide rail until you hear a click.
   b. Push the slide rail lock outwards in the direction indicated by the arrow in Figure 2. Then pull the inner bracket out of the slide rail.
   c. Repeat Steps 3a and 3b to release the inner rail from the second slide rail.

Figure 161: Detaching the Inner Rail from the Slide Rail



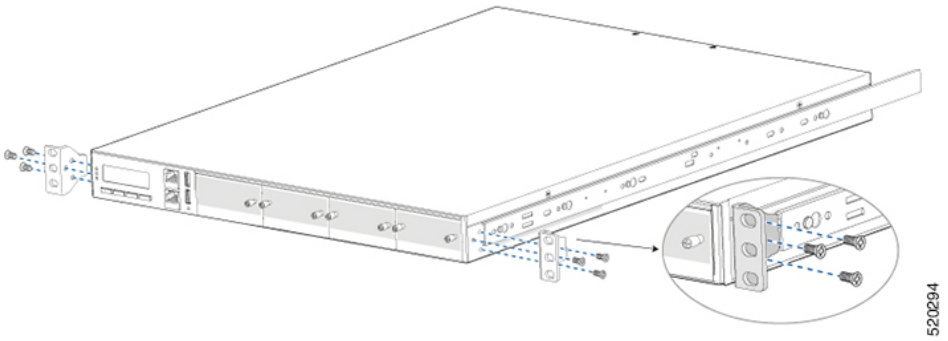
4. Attach the two inner rails to either side of the router chassis using the inner rail screws in the accessory box. Use five screws to secure each inner rail.

Figure 162: Attaching the Inner Rails to the vEdge 5000 Router Chassis



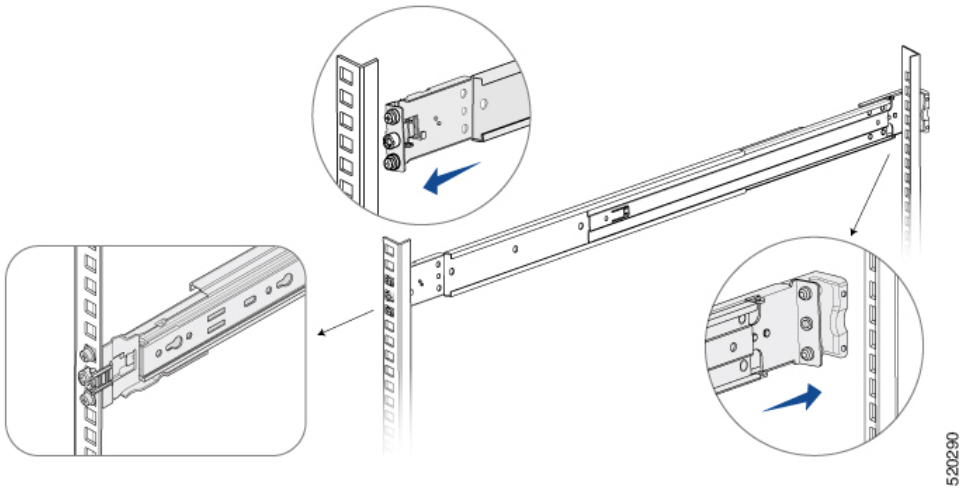
5. Attach the two mounting ears to either side of the router chassis using the mounting ear screws in the accessory box. Use three screws to attach each mounting ear.

Figure 163: Attaching the Mounting Ears to the vEdge 5000 Router Chassis



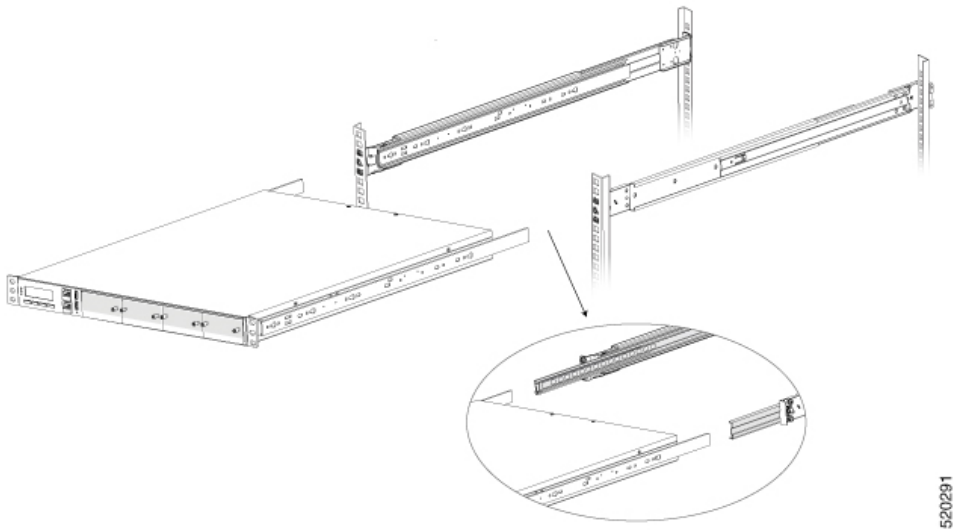
6. Install the two outer rails into the 19-inch rack:
   a. Clip the outer rail to the front of the rack, aligning the three holes on the outer rail with the threaded holes in the front post of the rack. You will hear a click once the outer rail is firmly attached.
   b. Clip the outer rail to the rear of the rack, aligning the three holes on the outer rail with the threaded holes in the rear post of the rack. You will hear a click once the rail is firmly attached.
   c. Repeat Steps 6a and 6b for the other slide rail.

Figure 164: Clipping the Outer Rail to the Front and Rear of the Rack



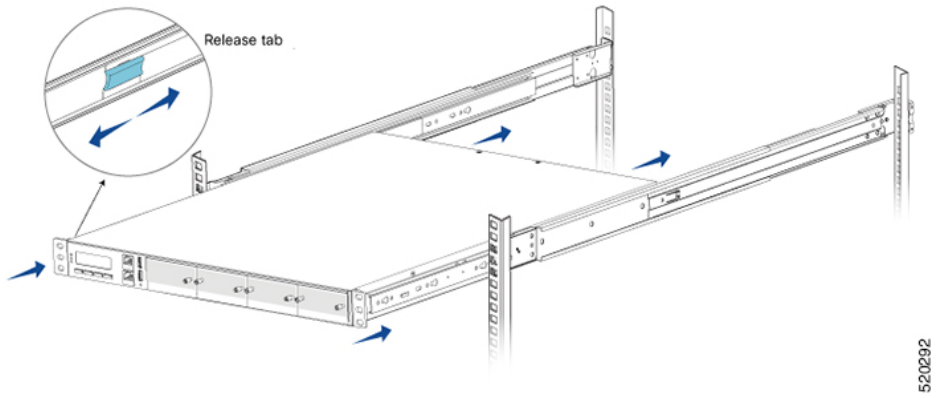
7. Grasp both sides of the router chassis, making sure that the front of the chassis is facing you.
8. Stand at the front of the rack, and lift the router to align it with the slide rails.
9. Gently insert the chassis into the outer rails on both sides of the rack, as shown in Figure X.

Figure 165: Inserting the Chassis Into the Outer Rails



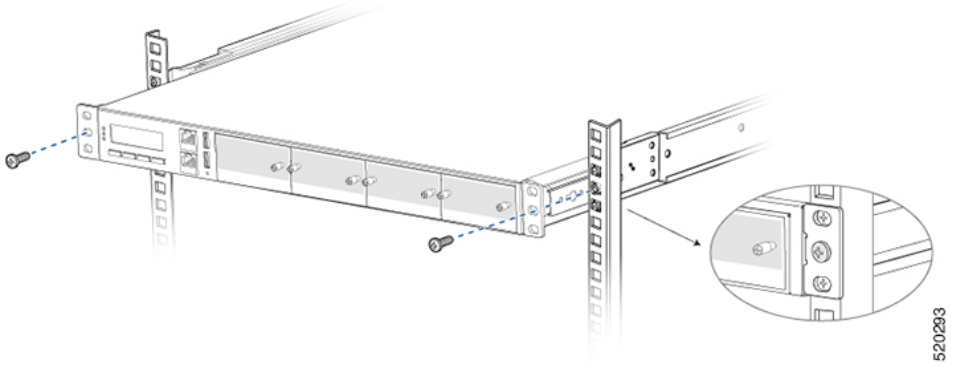
10. Slide the chassis as far back as possible until you hear a click. While sliding the chassis in, push the release tabs on both the inner rails in the direction of the arrow shown in Figure 11. If you do not push the release tabs, you will be able to slide the router in only halfway.

Figure 166: Pushing the Release Tabs on the Inner Rails



11. Secure the mounting ears to the front of the rack using the rack-mount screws in the accessory box. Use one screw in the center. Then, tighten the screws.

Figure 167: Securing the Mounting Ears to the Front of the Rack



12. To slide the router chassis out of the slide rails, gently pull it outwards. Then, press the blue slide rail locks on both sides and slide the chassis out.

Install vEdge 5000 Router Components

The vEdge 5000 router is a stiff sheet-metal structure that houses various hardware components. Some of these hardware components are field-replaceable units (FRUs) including:

- Power supplies
- Fan trays
- Network Interface Modules (NIMs)
- SFP and SFP+ transceivers

This article provides step-by-step procedures for installing these router components. For instructions on removing the components, see Remove Router Components.

Caution Before you install any components in the router chassis, make sure that you understand how to prevent electrostatic discharge (ESD) damage. See General Safety Standards .

Note Before you install any components in the router chassis, ensure that you have:

- An ESD grounding strap
- Number 2 Phillips (+) screwdriver

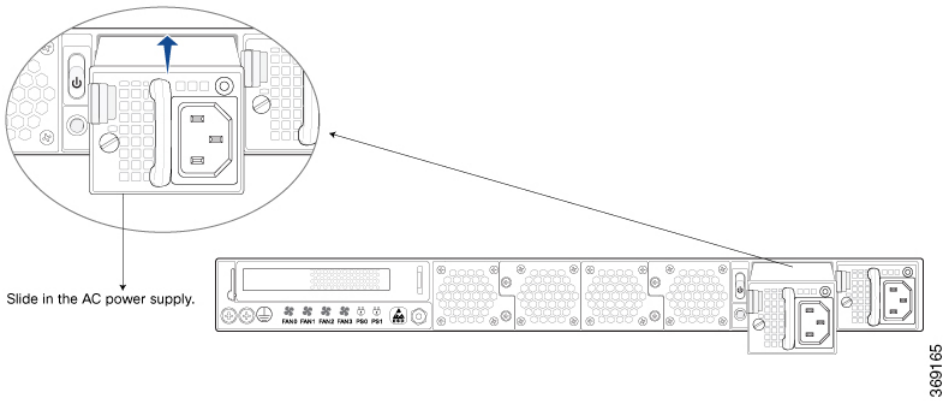
Install an AC Power Supply in a vEdge 5000 Router

The AC power supply in a vEdge 4000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To install an AC power supply in a router:

1. Check the model number and ensure that you have the correct power supply.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Press the release latch to carefully remove the existing power supply from the power supply slot in the rear panel of the router chassis.
4. Remove the new power supply from the plastic bag in which it was shipped, taking care that you do not touch any of the power supply pins, leads, or solder connections.
5. With both hands, place the new power supply into the power supply slot in the rear panel of the router chassis and slide it in until it is firmly seated. You will hear a click sound when the power supply is firmly seated in the slot. See Figure 1.

Figure 168: Installing an AC Power Supply in a vEdge 5000 Router



Install a Fan Tray in a vEdge 5000 Router

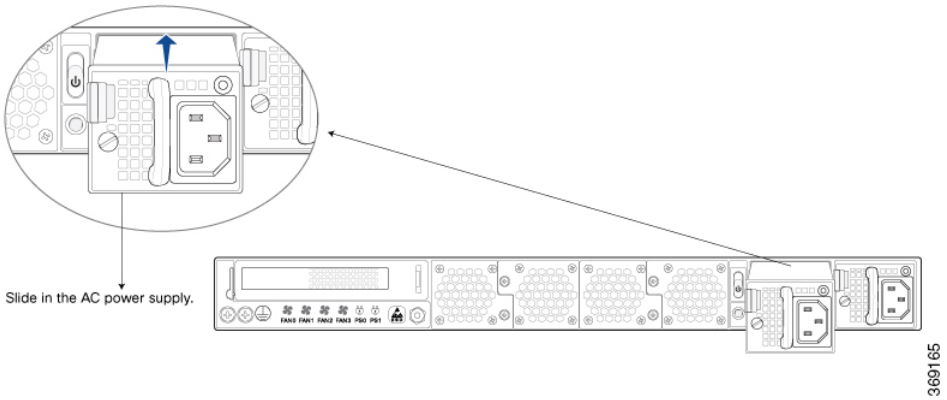
The vEdge 5000 router contains four individual fan trays, each comprising a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

To install a fan tray in a vEdge 5000 router:

1. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the router chassis.
2. Unscrew and carefully remove the existing fan tray from the fan tray slot in the rear of the chassis.
3. Gently remove the new fan tray from the plastic bag in which it was shipped.
4. With both hands, hold the thumb screws on each side of the fan tray and align the fan tray along the fan tray slot.
5. Slide in the fan tray until it is firmly seated in the router chassis and then tighten the screws. See Figure 2.

Figure 169: Installing a Fan Tray in a vEdge 5000 Router



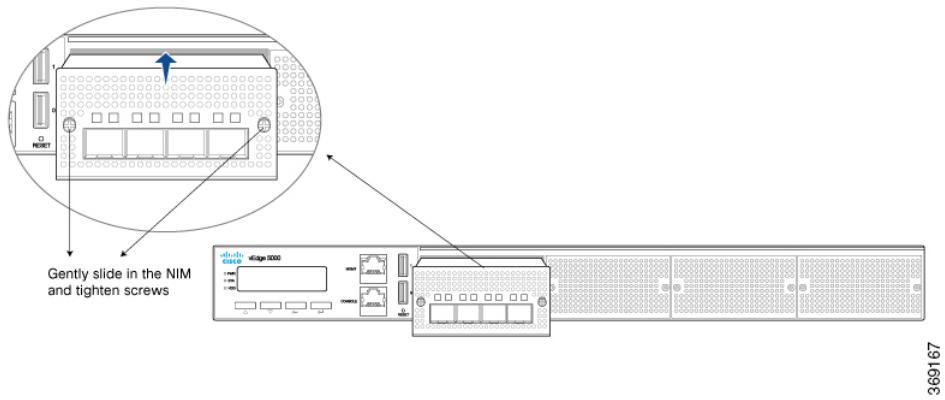
Install a NIM in a vEdge 5000 Router

The vEdge 5000 router supports two types of Network Interface Modules (NIMs).

To install a NIM in a vEdge 5000 router:

1. Remove the NIM from its bag, taking care not to touch module components, pins, leads, or solder connections.
2. Using both hands, place the NIM in the empty slot and slide it in gently until it is fully seated. See Figure 3.
3. Tighten the captive thumb screws using the number 2 Phillips (+) screwdriver.

Figure 170: Installing a NIM in a vEdge 5000 Router



Note To remove a NIM and replace it with a different type of NIM in a NIM slot, you must power down the router, replace the NIM, and then power up the router again.

Caution Before you slide the NIM into the slot in the router chassis, make sure that the NIM is aligned correctly. Misalignment might cause the pins to bend, making the NIM unusable.

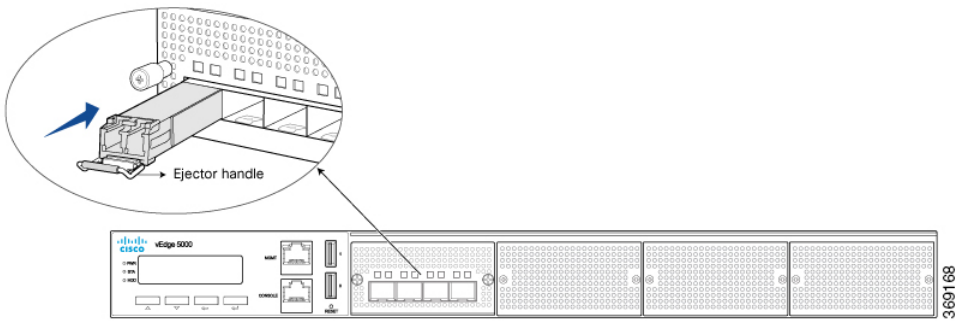
Install a Transceiver in a vEdge 5000 Router

The transceivers for the vEdge 5000 router are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the router or disrupting router functions.

To install any type of transceiver in a vEdge 5000 router:

1. Gently remove the new transceiver from the plastic bag in which it was shipped.
2. Cover the transceiver with a rubber safety cap, if it is not already covered.
3. If the port in which you plan to install the transceiver is covered with a dust cover, remove the cover, and save it for later use.
4. Carefully slide the transceiver in the empty port until it is firmly seated.
5. Remove the safety cap when you are ready to connect an optic fiber cable to the port.

Figure 171: Installing a Transceiver in a vEdge 5000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

Connect the vEdge 5000 Router

This article describes how to connect the vEdge 5000 router to system ground, an AC power source, a management console, and to a network for out-of-band-management.

Step 1: Connect Earth Ground to the Router

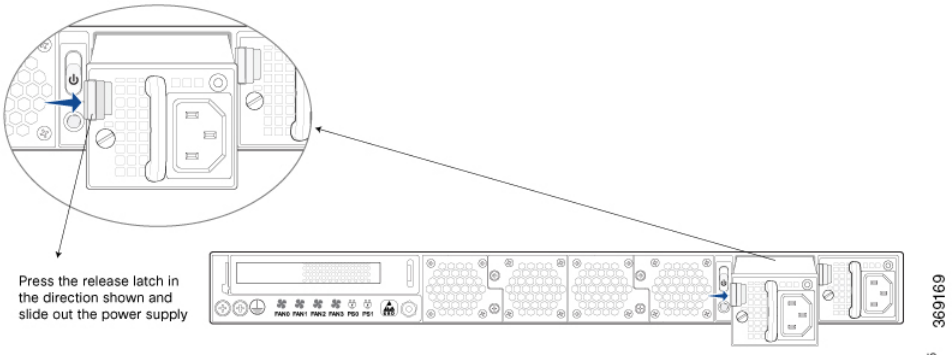
To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation of the vEdge 5000 router, connect the router to earth ground before you power it on. To do so, you need the following tools:

- Number 2 Phillips (+) screwdriver

To connect system ground to the vEdge 5000 router (see Figure 1):

1. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the vEdge 5000 router is mounted.
2. Secure the grounding lug to the protective grounding terminal with the washers and screws.
3. Dress the grounding cable, and make sure that it does not touch or block access to other router components.

Figure 172: Connecting a Grounding Cable to a vEdge 5000 Router



Note Mount the vEdge 5000 router on a four-post rack before attaching the grounding lug to the router.

Step 2: Connect AC Power to the Router

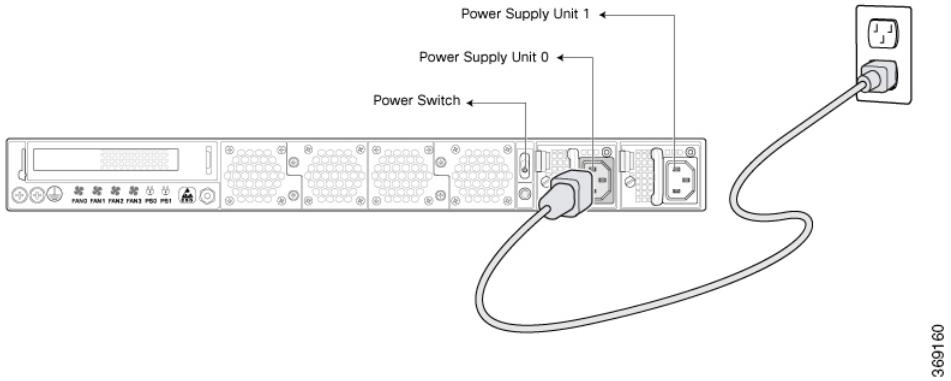
Once you have connected the vEdge 5000 router to system ground and at least one power supply is installed, you can connect AC power to the router. Before you connect power to the router, make sure you have:

- Electrostatic discharge (ESD) grounding strap
- Power cords appropriate for your geographical location. See AC Power Cord Specifications .

To connect the vEdge 5000 router to an AC power source:

1. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
2. Locate the AC power cord or cords shipped with the router. The AC power cords have plugs that are appropriate for your geographical location.
3. Insert the coupler end of the power cord into the AC appliance inlet.
4. If the AC power source outlet has a power switch, turn it to the OFF (0) position.
5. Insert the power cord plug into an AC power source outlet.
6. If the AC power source outlet has a power switch, turn it to the ON (|) position.
7. Turn the power switch at the back of the vEdge 4000 router chassis to the ON position.
8. Check that the LED on the power supply faceplate is lit and is on steadily.
9. Repeat Steps 2 through 7 for the second power supply.

Figure 173: Connecting AC Power Supply to a vEdge 5000 Router



Warning Only qualified personnel should be allowed to install and connect power to the vEdge router.

Note It is strongly recommended that you use the power cord supplied with the vEdge 5000 router.

Caution If you are connecting AC power to the router, it is recommended that the building have an external surge protective device installed.

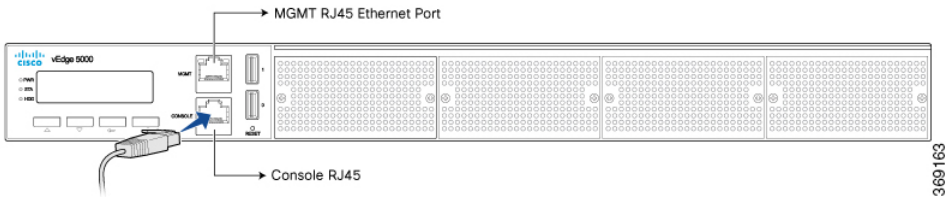
Step 3: Connect the Router to a Management Console

You can configure and manage a vEdge 5000 router using a management console. To connect the router to a management console, use the console port which accepts a cable with an RJ-45 connector. See Console Port.

To connect the vEdge 5000 router to a management console:

1. Connect one end of the console cable into the console port (labeled CONSOLE) on the vEdge 5000 router.
2. Connect the other end of the console cable into the console server or to a management console.

Figure 174: Connecting a vEdge 5000 Router to a Management Console



Warning Power over Ethernet (PoE) enabled cables can damage the console port. Do not accidentally connect these cables to the console port.

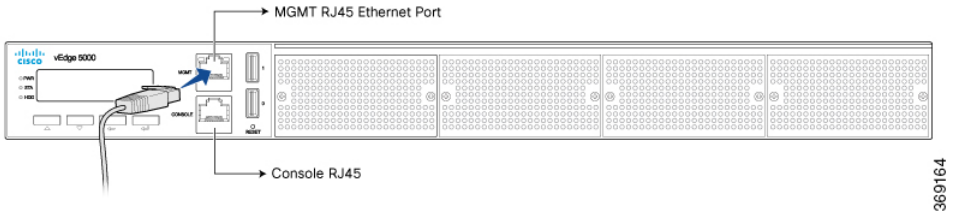
Step 4: Connect the Router to a Network for Out-of-Band Management

You can monitor and manage the vEdge 5000 router using a dedicated management channel.

To connect the vEdge 5000 router to a network for out-of-band management:

1. Connect one end of the Ethernet cable to the management port (labeled MGMT) on the vEdge 5000 router. The management Ethernet port is a 10/100/1000 Mbps port that supports autonegotiation.
2. Connect the other end of the Ethernet cable to the management device.

Figure 175: Connecting a vEdge 5000 Router to a Network for Out-of-Band Management



vEdge 5000 Router Default Configuration

If you install the 8x1-Gigabit Ethernet SFP NIM in NIM Slot 0, the default configuration file on the vEdge 5000 router looks like this:

```
vEdge5000# show running-config
system
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  user admin
   password
$6$t.vzhbSwOUaaCnRu$<wbr/>AiJYG3VFRlNurXPY7YXSputMMv4hg3<wbr/>Bign362rj4IIWXm7uVfiReqv/<wbr/>4EhKG2QUUSaZnZZPveQYBfIozCioyE<wbr/>/

  !
 !
 logging
  disk
   enable
```

```
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
interface ge0/0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
  !
  no shutdown
 !
!
vpn 512
interface mgmt0
  ip address 192.168.1.1/24
  no shutdown
!
```

Maintenance and Troubleshooting

Now that you have installed and connected the vEdge 5000 router, you can monitor and troubleshoot the various LEDs and system alarms on the router.

Alarm Severity Levels

The system alarms on the vEdge 5000 router have two types of severity levels:

- Critical (red)—Indicates a critical situation on the router resulting from one of two conditions:
  - One or more hardware components on the router has failed.
  - One or more hardware components on the router has exceeded the temperature threshold

A critical alarm condition requires immediate attention. If a temperature related major alarm persists for more than five minutes, the router will shut down.

- Major (yellow)—Indicates a warning on the router that, if left unattended, might result in an interruption in router operation or degradation in router performance. A yellow alarm condition requires further monitoring and/or maintenance.

Hardware Alarms

Hardware alarms on the vEdge 5000 router are predefined and are triggered by a physical condition on the router such as a power supply failure, excessive component temperature, or fan failure. The vEdge 5000 router triggers the following types of hardware alarms:

- Main board temperature alarm—The main board of the router has four temperature sensing points (board sensor 1 through 4). If the temperature of the sensor location crosses the predefined threshold level, the system triggers an alarm.
- CPU Junction temperature alarm—If the temperature of the system CPU crosses the predefined threshold level, the system triggers an alarm.
- PIM temperature alarm—If the temperature of the PIM modules crosses the predefined threshold level, the system triggers an alarm.
- Fan alarm—The router has modular fan trays for system cooling. The Viptela software maintains the fans at an optimal fan speed, raising the speed as the ambient temperature increases and decreasing the speed as the temperature decreases, to keep the router operating at the lowest possible temperature in the green temperature threshold. If a fan stops running, the system triggers an alarm. Also if a fan starts to run below a predefined RPM threshold, the system triggers an alarm.
- Power supply alarm—The router has two power supplies for redundancy reasons. If one of the power supplies is not plugged in or there is a failure on a power supply input, the system triggers an alarm

The following table lists the yellow and red alarm threshold for the nine temperature sensing points in the system—four board sensors spread across the board, one CPU junction temperature sensor, and two PIM temperature sensors. The lower threshold value (Bad Fan) applies if a fan failure condition is also detected; otherwise the higher threshold value applies (normal).

Table 89:

Item	Yellow Alarm (degrees C)		Red Alarm (degrees C)	
	Normal	Bad Fan	Normal	Bad Fan
Chassis board sensor0	50	45	70	65
Chassis board sensor1	50	45	70	65
CPU junction temperature	85	80	95	90

Checking Alarms and Notifications

To view the current chassis environment condition , enter the **show hardware environment** command at the system prompt. The system displays the power supply status, temperature sensor readings, fan speed, and related alarm status if any exists.

To view the severity of active alarms, enter the **show hardware alarms** command at the system prompt. The system displays the alarm severity and a brief description of the cause of each active alarm.

To view temperature thresholds at which green, yellow, and red alarms are generated, enter the **show hardware temperature-thresholds** command at the system prompt. The system displays the alarm temperature threshold information for a mother board in the router and for the router's CPU.

To view all other events on a Viptela device, enter the **show notification stream** command. The system displays notifications about events that have occurred on the Viptela device.

LEDs and LCD Panel

The chassis LED located on the front panel of the vEdge 5000 router indicates the status of the router. See Front Panel Components for details of the LEDs and the status they indicate.

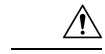
The LCD panel also displays information about the status and health of the router.

Remove vEdge 5000 Router Components

The vEdge 5000 router is a stiff sheet-metal structure that houses the hardware components. The field-replaceable units (FRUs) in the vEdge routers are:

- Power supply
- Fan tray
- Pluggable Interface Modules (PIM)
- SFP and SFP+ transceiver

This article provides step-by-step procedures for removing these router components. For instructions on installing the components, see Install vEdge 2000 Router Components.



Caution Before you install any components in the router chassis, make sure that you understand how to prevent Electrostatic discharge (ESD) damage. See General Safety Standards.

Remove an AC Power Supply from a vEdge 5000 Router

The AC power supply in a vEdge 5000 router is a hot-insertable and hot-removable field replacement unit (FRU). You can remove and replace the power supply without powering off the router or disrupting normal functioning.

To remove the power supply from the router chassis, you need the following parts and tools:

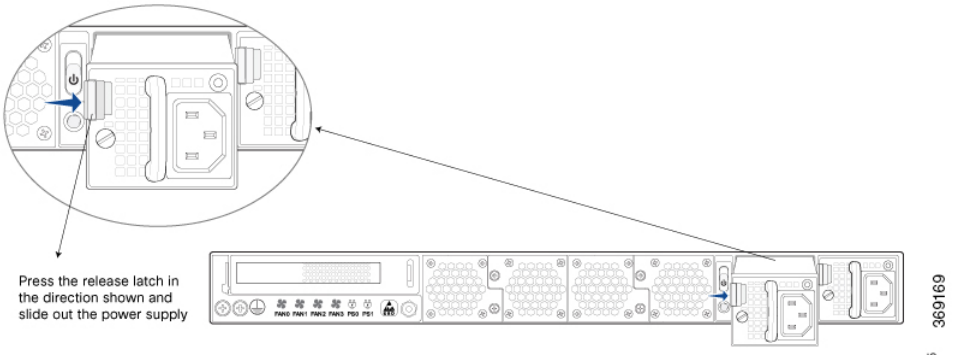
- An antistatic bag or an antistatic mat
- A replacement power supply or a cover panel for the power supply slot

To remove an AC power supply from the router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Turn the power switch on the outlet (if one exists) to the OFF (0) position.
4. Disconnect the power cord from the power source.
5. Press the release latch on the right side of the power supply to disconnect the power supply from the chassis.
6. Grasp the power supply handle with one hand and slide the power supply firmly halfway out of the chassis.

7. Place the other hand underneath the power supply and slide it completely out of the chassis making sure not to touch any power supply pins, leads, or solder connection.
8. Place the removed power supply in the antistatic bag or on the antistatic mat.

Figure 176: Removing an AC Power Supply from a vEdge 5000 Router



Caution Make sure that you do not leave the power supply slot in the rear of the chassis empty for a long time while the router is operational. Once you remove the power supply, either replace it promptly or install a cover panel over the empty slot.

Remove a Fan Tray from a vEdge 5000 Router

The vEdge 5000 router contains four individual fan trays each comprising of a double-stacked fan module. The fan tray is a hot-insertable and hot-removable field-replaceable unit (FRU). You can remove and replace an individual fan tray without powering off the router or disrupting normal functioning.

The fan tray installs horizontally in the rear of the router chassis. Handles on each side facilitate installing and removing of the fan tray.

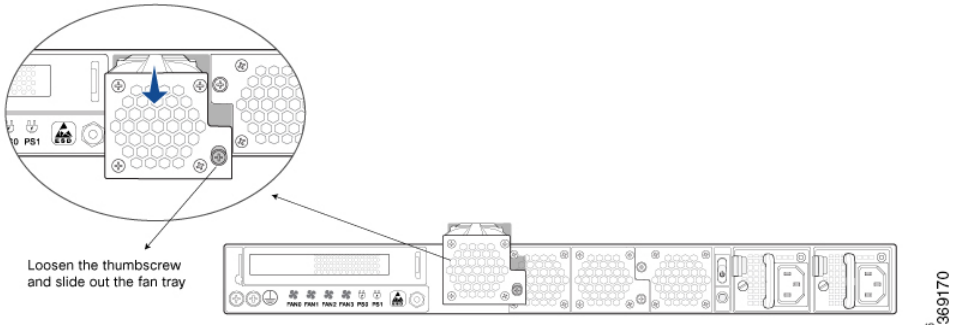
To remove the fan tray from the router chassis, you need the following parts and tools:

- An antistatic bag or an antistatic mat
- A replacement fan tray

To remove a fan tray from a vEdge 5000 router:

1. Place the antistatic bag or the antistatic mat on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Unscrew the two thumb screws on the fan tray to release it from the router chassis. Then remove the fan tray.
4. Place the fan tray in the antistatic bag or the antistatic mat.

Figure 177: Removing a Fan Tray from a vEdge 5000 Router



Warning When removing the fan tray, keep your hands and finger away from the spinning fan blades as the fans might still be spinning.

Remove a NIM from a vEdge 5000 Router

The vEdge 5000 router supports two flavors of Network Interface Modules (NIMs). Both modules install horizontally on the front of the chassis. See Front Panel of the vEdge 5000 Router.

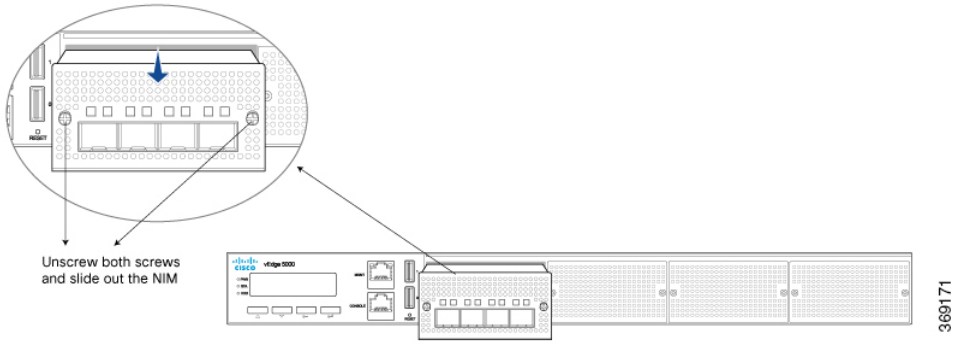
To remove a NIM from a NIM slot in a vEdge 5000 router, you need the following parts and tools:

- Number 2 Phillips (+) screwdriver
- A replacement NIM or cover panel
- An antistatic bag or antistatic mat

To remove a NIM from a NIM slot in a vEdge 5000 router:

1. Using a number 2 Phillips (+) screwdriver, loosen the captive screws.
2. Pull the NIM halfway out by holding on to the captive thumb screws.
3. Hold the front edge of the NIM with both hands and slide it completely out of the chassis.
4. Place the NIM in an antistatic bag or on an antistatic mat.

Figure 178: Removing a NIM from a vEdge 5000 Router



Note To remove a NIM and replace it with a different type of NIM in a NIM slot, you must power down the router, replace the NIM, and then power the router back again. Also, if there are any transceivers installed in the NIM, remove them before you remove the NIM. For instructions on removing a transceiver from a vEdge router, see below.

Caution Make sure that you do not leave the NIM slot in the front of the chassis empty for a long time while the router is operational. Once you remove the NIM, either replace it promptly or install a cover panel over the empty slot.

Remove a Transceiver from a vEdge 5000 Router

The transceivers for the vEdge router are hot-removable and hot-insertable field-replaceable units (FRUs): You can remove and replace them without powering off the router or disrupting router functions.

To remove any type of transceiver from a vEdge 5000 router, you need the following parts and tools:

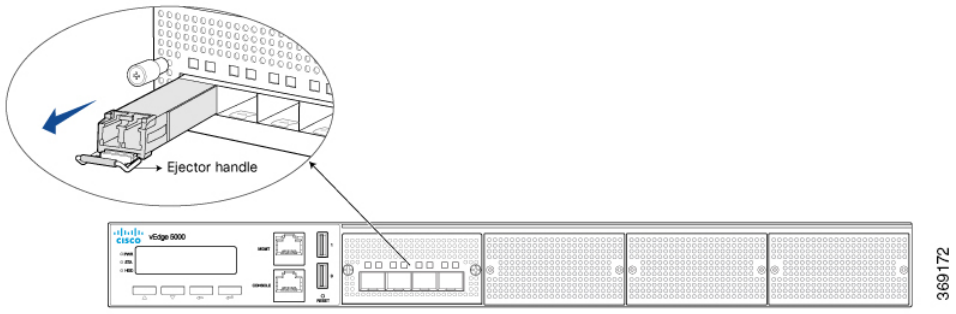
- A transceiver slot dust cover
- An antistatic mat or an electrostatic bag
- A rubber safety cap for the transceiver

To remove any type of from a vEdge router:

1. Place the antistatic mat or the electrostatic bag on a firm, flat surface.
2. Attach the ESD grounding strap to your bare wrist. Then connect the strap to the ESD point on the rack.
3. Label the cables connected to the transceiver so that you can reconnect them correctly later.
4. Remove the cable connector from the transceiver.
5. Unlock the transceiver by pulling down the ejector handle from the transceiver.
6. Grasp the transceiver ejector handle and pull the transceiver approximately 0.5 in. out of the router.
7. Using your fingers, grasp the body of the transceiver and pull it out of the router completely.

8. Place a rubber safety cap over the transceiver.
9. Place the removed transceiver on the antistatic mat or in an electrostatic bag.
10. If you are not installing a new transceiver, place the transceiver slot dust cover over the empty port.

Figure 179: Removing a Transceiver from a vEdge 5000 Router



Note It is recommended that you purchase the optical transceivers and optical connectors for your vEdge routers from Viptela.

Warning Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to a transceiver emit laser light that can damage your eyes.

Restore a vEdge Router

This article explains how to revert the configuration for a vEdge router to the factory-default values. It also explains how to do a soft and hard reset of the router.

Reverting to the vEdge Router Factory-Default Configuration

After you set up and start the virtual machines (VMs) for the vEdge Cloud routers and set up and start the hardware vEdge routers in your overlay network, they come up with a factory-default configuration . When you make and commit changes to the default configuration, a new configuration file is created. This new configuration file then becomes the active configuration.

If desired, you can revert to the default factory configuration:

```
vEdge# request software reset
```

Reset the Router

You can reset the vEdge router by doing either a hard press or a soft press. To perform either type of press, locate the Reset button on the front panel of the router. The Reset button is recessed to avoid accidentally pressing it while the router is operational. To press the Reset button, use a sharp narrow tool.

Perform a Long Press Reset

A long press reset of the vEdge router erases passwords, keys, and most other configuration parameters, restoring the router to its factory-default configuration.

To perform a long press reset, press the Reset button for more than 10 seconds. After you release the Reset button, the router will reboot and resume normal operation.

Perform a Short Press Reset

A short press reset of the Edge router is equivalent to a graceful software reboot and is the same as entering the **reboot** command at the CLI prompt.

To perform a short press reset, press the Reset button for two seconds. The short press reset takes effect almost instantaneously and reboots the router.

Return Hardware

This article describes how to return a vEdge router or a hardware component to Viptela for repair or replacement.

Locate Serial and Model Number

To return a vEdge router or a hardware component to Viptela, you need the serial and model number of the router or the component being returned.

You can locate the serial and model number of a vEdge router in one of the following ways:

- In vManage NMS, select the Configuration ► Devices screen. The device table lists the serial and model numbers of the routers in the network.
- Enter the **show hardware inventory**command at the CLI prompt.
- The serial number is printed on a label on the right side of the router; the model number is printed on a label on the back of the router.

Figure 180: Sample Serial Number Label for a vEdge Router

Obtain an RMA Number

If you are returning a vEdge router or a hardware component to Viptela for repair or replacement, contact the Viptela Customer Support team to open a support case and obtain a Return Materials Authorization (RMA) number.

Before you open a case and request an RMA number, keep the following information ready:

- Your existing service contract number, if you have one
- Serial number of the router or component
- Model number of the router or component
- Physical location of the router

- Your name, organization name, telephone number, fax number, and shipping address
- Failure or problem description with details
- Type of activity being performed on the router when the problem occurred
- Configuration data displayed by one or more show commands

To obtain an RMA number:

1. Open a support case with Viptela in one of the following ways:
   - Log in to www.viptela.com/support
   - Send email to support@viptela.com
   - Call toll-free 800-525-5033
2. A Viptela Customer Support representative validates your request and issues an RMA number for returning the router or a hardware component.

Note Do not return the router or any component to Viptela before first obtaining an RMA number. Viptela reserves the right to refuse to take any shipment that does not have an RMA number.

Repack the Router

If you need to move or return the vEdge router, repack the router in its original packing. Before you repack the router follow these steps:

1. Shut down the vEdge router by issuing the **poweroff** command at the CLI prompt.
2. Disconnect power to the router.
3. Remove the cables and transceivers.

You will need the following tools to repack the router:

- Phillips Number 2 (+) screwdriver
- Cardboard carton and original packing in which you received the router

To repack the router in its original packing:

1. If you do not have a vEdge 1000 router, skip this step. Otherwise:
   a. If the router is installed in a rack using the rack-mount kit from Viptela, remove the front stopper screwed along the front side of the rack-mount tray.
   b. Then remove the rack-mount tray from the rack by having one person support the weight of the rack-mount tray while a second person unscrews the rack-mount screws.
   c. Place the rack-mount tray on a firm, flat surface.
   d. Slide out the vEdge 1000 router from the rack-mount tray.
2. Place the router chassis in the plastic packing bag.

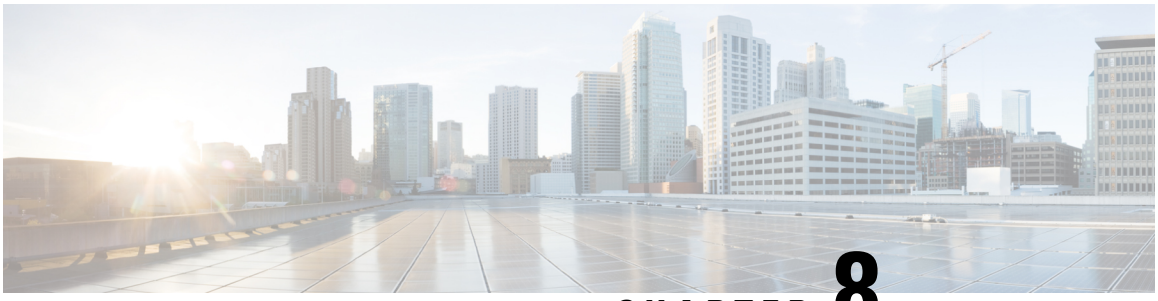
3. Place the side packing foam on both sides of the router chassis.
4. Secure the chassis in the cardboard carton.
5. Secure the top of the chassis by placing the top packing foam over the top of the chassis.
6. Close the cardboard shipping box and seal it with packing tape.
7. Write the RMA number on top of the box for purposes of tracking.

If you are returning any field-replaceable units with the router, repack them as described in Repack Router Components below.

Repack Router Components

If you need to return any router components, follow these steps:

1. Ensure that you have the antistatic bag for each component and an ESD grounding strap.
2. Place each component in its antistatic bag.
3. Pack each component in its original packing material. If you do not have the original packing material, ensure that the component is packed adequately with packing material to prevent any damage in transit.
4. Place the component in the original cardboard box or another cardboard box if the original is not available.
5. Secure the box with tape.
6. Write the RMA number on top of the box for purposes of tracking.



CHAPTER 8

vEdge Cloud Router

The vEdge Cloud is a virtualized version of the vEdge router, inheriting all the capabilities offered on Viptela's physical branch routers. vEdge Cloud can be instantiated as a virtual machine (VM) on a KVM hypervisor or as a VM on a VMware ESXi hypervisor, as well as in public cloud environments, such as Amazon AWS or Google Cloud Platform. vEdge Cloud can be used as a Virtual Network Function (VNF) for a Virtual CPE (vCPE) deployment at the branch. It can also be used as a Virtual Private Cloud (VPC) Gateway for customers that have workload residing in Amazon Web Services (AWS).

Start and Configure the vEdge Cloud Router

To start the vEdge Cloud router, you create a VM instance for it on a server on which the VMware vSphere ESXi Hypervisor or the Kernel-based Virtual Machine (KVM) Hypervisor software is installed. For server requirements, see Server Hardware Requirements .

To create a vEdge Cloud VM instance, see Deploy the vEdge Routers .

To configure the vEdge Cloud router, see Configure the vEdge Routers .

vEdge Cloud Router Default Configuration

Each vEdge Cloud router has a default configuration. The default configuration file sets the default CLI prompt to vEdge#, configures OMP, and enables logging of syslog messages to a file.

The default configuration file looks like this:

```
vEdge# show running-configsystem host-name vedge vbond  ztp.viptela.com  aaa  auth-order
local radius tacacs  usergroup basic   task system read write   task interface read write
 !  usergroup netadmin  !  usergroup operator   task system read  task interface read
task policy read   task routing read   task security read  !  user admin   password
$6$F1rfcIs0C/GI3RPc$jo/<wbr/>wlF0Ivv2aOlslWO3qEhVTFAVjpoTbz<wbr/>lEzckuzFLXvYK59JhpcqR7rtqY6pni<wbr/>eg/0m.X85SxShYxy9PQ7.r.
  ! ! logging  disk   enable  ! !!omp no shutdown graceful-restart advertise connected
advertise static!security ipsec  authentication-type ah-sha1-hmac sha1-hmac !!vpn 0 interface
 ge0/0  ip dhcp-client  tunnel-interface   encapsulation ipsec   no allow-service bgp
allow-service dhcp   allow-service dns   allow-service icmp   no allow-service sshd   no
allow-service netconf   no allow-service ntp   no allow-service ospf   no allow-service
stun  !  no shutdown !!vpn 512 interface eth0  ip dhcp-client  no shutdown !!
```

• Declaration of Conformity, on page 238

Declaration of Conformity

The Viptela products are controlled under the Commerce Control List (CCL) of the U.S. Export Administration Regulations (EAR) as networking equipment within the following U.S. Export Control Classification Numbers (ECCN): 5A002, 5D002, and 5E002.

The vEdge hardware and software products and the Viptela encryption technology can be delivered to most end users and destinations worldwide without a licensing requirement. The Viptela solution and products have undergone a one-time review by the Government of the United States of America and qualify for License Exception ENC. As such, they are eligible for export according to Section 740.17 of the EAR.

The Viptela solutions and products can be delivered to most end users worldwide, except to entities or end users in the following countries: Cuba, Iran, North Korea, Sudan, and Syria.

Controlled Technologies

Viptela manages technology subject to the U.S. Export Administration Regulations (EAR). These controlled technologies may include items under U.S. ECCN 5E002 encryption technology. The Viptela encryption technology is for the development, production, and use of Viptela products that implement or use encryption.

The Viptela software distribution policy allows only authenticated users to download the Viptela encryption software. Recipients of controlled technology are obliged to maintain adequate controls to prevent nationals from outside the U.S. and Canada from accessing Viptela information, subject to ECCN5E002, without first obtaining authorization from the U.S. government.

For additional information on controlled technologies, please contact Viptela support at support@viptela.com .