

SteelFusion™ Edge Hardware and Maintenance Guide

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riverbed®

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Riverbed Technology
680 Folsom Street
San Francisco, CA 94107

Phone: 415-247-8800
Fax: 415-247-8801
Web: <http://www.riverbed.com>

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Preface

This guide provides you with the basic steps for installing and maintaining your appliance.

This preface includes the following sections:

- [“About This Guide” on page 1](#)
- [“Electrostatic Discharge Guidelines” on page 1](#)
- [“Safety Guidelines” on page 2](#)
- [“Documentation and Release Notes” on page 2](#)
- [“Contacting Riverbed” on page 3](#)

About This Guide

This guide is written for people who need to install, replace, or troubleshoot SteelFusion Edge appliances including installing a rack, installing or replacing network interface cards, and replacing components.

Electrostatic Discharge Guidelines

Follow these ESD guidelines to ensure that your equipment is not damaged from improper handling:

- When you install or perform maintenance tasks, you must wear a grounded ESD antistatic strap to protect the hardware against electrostatic discharge. Make sure that the strap makes skin contact prior to handling equipment.
- Periodically check the resistance value of the antistatic strap to ensure it is functioning properly.
- If you remove or replace system components, you must transport the component in a conductive container or an ESD bag that has been grounded or neutralized.
- Store any system components in their protective packaging until you are ready to install them.
- Do not touch the electronic components on system hardware.

Safety Guidelines

Follow the safety precautions outlined in the *Safety and Compliance Guide* when installing and setting up your equipment.

Caution: Failure to follow these safety guidelines can result in injury or damage to the equipment. Mishandling of the equipment voids all warranties. Read and follow safety guidelines and installation instructions carefully.

Many countries require the safety information to be presented in their national languages. If this requirement applies to your country, consult the *Safety and Compliance Guide*. Before you install, operate, or service the Riverbed products, you must be familiar with the safety information. Refer to the *Safety and Compliance Guide* if you do not clearly understand the safety information provided in the product documentation.

Document Conventions

This guide uses the following standard set of typographical conventions

Convention	Meaning
<i>italics</i>	Within text, new terms and emphasized words appear in <i>italic</i> typeface.
boldface	Within text, CLI commands, CLI parameters, and REST API properties appear in bold typeface.
Courier	Code examples appear in Courier font: <pre>amnesiac > enable amnesiac # configure terminal</pre>
< >	Values that you specify appear in angle brackets: interface <ip-address>
[]	Optional keywords or variables appear in brackets: ntp peer <ip-address> [version <number>]
{ }	Elements that are part of a required choice appear in braces: {<interface-name> ascii <string> hex <string>}
	The pipe symbol represents a choice to select one keyword or variable to the left or right of the symbol. The keyword or variable can be either optional or required: { delete <filename> upload <filename>}

Documentation and Release Notes

To obtain the most current version of all Riverbed documentation, go to the Riverbed Support site at <https://support.riverbed.com>.

If you need more information, see the Riverbed Knowledge Base for any known issues, how-to documents, system requirements, and common error messages. You can browse titles or search for keywords and strings. To access the Riverbed Knowledge Base, log in to the Riverbed Support site at <https://support.riverbed.com>.

Each software release includes release notes. The release notes identify new features in the software as well as known and fixed problems. To obtain the most current version of the release notes, go to the Software and Documentation section of the Riverbed Support site at <https://support.riverbed.com>.

Examine the release notes before you begin the installation and configuration process.

Contacting Riverbed

This section describes how to contact departments within Riverbed.

- **Technical support** - If you have problems installing, using, or replacing Riverbed products, contact Riverbed Support or your channel partner who provides support. To contact Riverbed Support, open a trouble ticket by calling 1-888-RVBD-TAC (1-888-782-3822) in the United States and Canada or +1 415-247-7381 outside the United States. You can also go to <https://support.riverbed.com>.
- **Professional services** - Riverbed has a staff of professionals who can help you with installation, provisioning, network redesign, project management, custom designs, consolidation project design, and custom coded solutions. To contact Riverbed Professional Services, email proserve@riverbed.com or go to <http://www.riverbed.com/services-training/Services-Training.html>.
- **Documentation** - The Riverbed Technical Publications team continually strives to improve the quality and usability of Riverbed documentation. Riverbed appreciates any suggestions you might have about its online documentation or printed materials. Send documentation comments to techpubs@riverbed.com.

CHAPTER 1 SteelFusion Edge Overview

The SteelFusion Edge appliances contain two physical nodes per appliance, which provide true hardware resource separation and isolation. These two compute nodes, the RiOS node and the hypervisor node, are connected through Gigabit Ethernet interconnects that allow both nodes to communicate for management, networking, and storage data. Each node has its own resources with the exception that the hypervisor node does not contain storage resources other than hardware for the hypervisor boot device. Storage for the hypervisor node is provided from the RiOS node through the interconnects using iSCSI.

The SteelFusion Edge appliances are the virtual edge of the data center that allows end users in a branch to access and write to centralized storage over the WAN at local speeds. The SteelFusion Edge appliances consist of the following products:

- SteelFusion Edge 2100
- SteelFusion Edge 2200
- SteelFusion Edge 3100
- SteelFusion Edge 3200
- SteelFusion Edge 5100

This overview provides a description of the SteelFusion Edge appliances and includes the following sections:

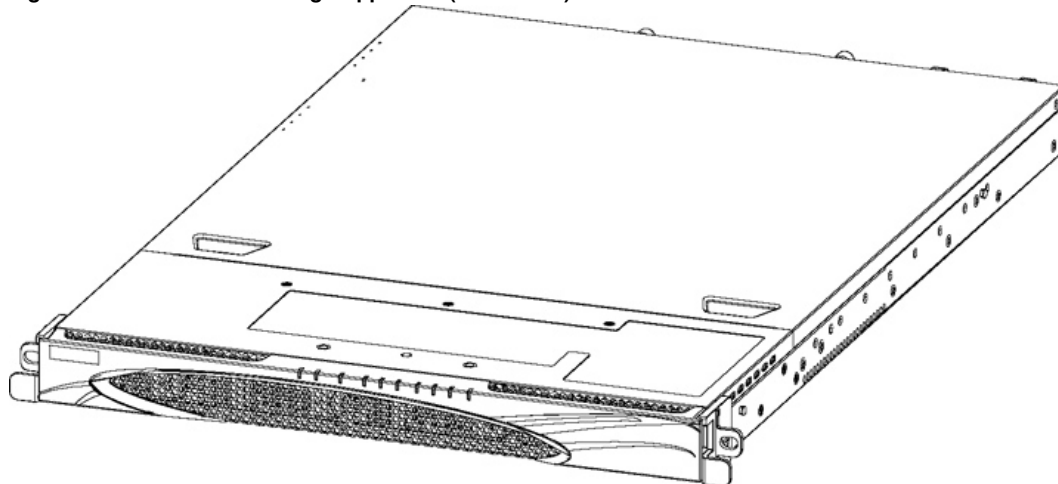
- [“1U SteelFusion Edge Appliances” on page 6](#)
- [“2U SteelFusion Edge Appliances” on page 10](#)
- [“FRUs” on page 12](#)

1U SteelFusion Edge Appliances

The SteelFusion Edge 2100 and SteelFusion Edge 2200 appliances are 1U appliances that can provide WAN optimization, BlockStream-enabled storage, and hypervisor functionality. (See [Figure 1-1](#).) They support two independent nodes with its own management and monitoring. The appliances have four disk drive slots that are numbered 0 to 3. (See [Figure 1-2](#).) The appliances also support different combinations of network interface cards (NIC) that can be installed in the back of the appliance. (See [Figure 1-3](#).) Slot 0 on the back of the appliance ships with NIC-2-001G-4TX-BP installed and is used for RiOS functionality while slot 2 can support an additional NIC also to be used for RiOS or as a bypass card.

Note: For detailed information on the cards supported for the SteelFusion Edge slot configuration, see [“NICs for SteelFusion Edge Appliances” on page 24](#).

Figure 1-1. 1U SteelFusion Edge Appliance (Front View)



The disk slots are numbered 0 to 3 beginning at the left. [Figure 1-2](#) shows the disk slot number scheme for the 1U SteelFusion Edge appliance.

Figure 1-2. 1U SteelFusion Edge Disk Slot Numbers (Front View)

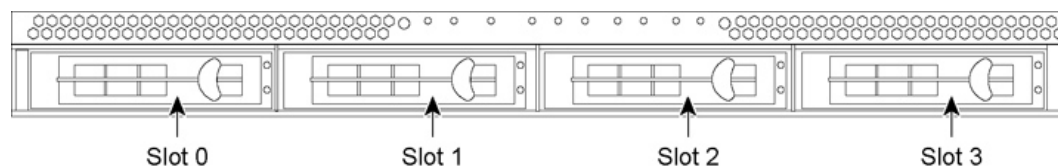
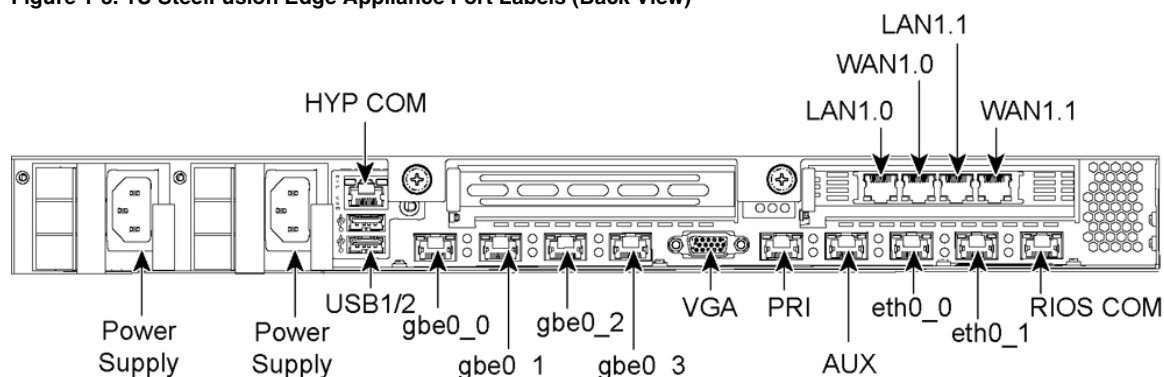


Figure 1-3 shows the ports on the 1U SteelFusion Edge appliance. They are described in the following table.

Figure 1-3. 1U SteelFusion Edge Appliance Port Labels (Back View)

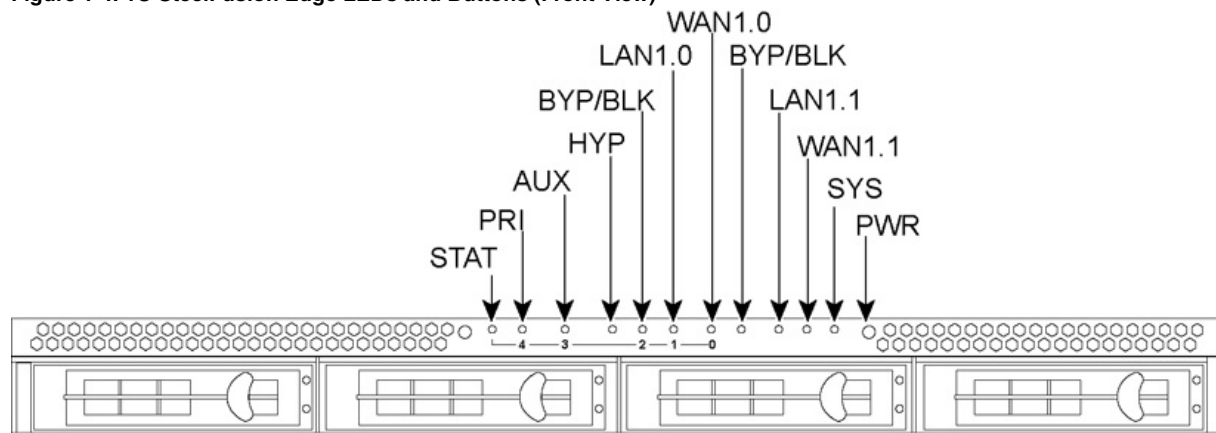


Port	Description
HYP COM	HYP serial RJ45 COM port manages the hypervisor node. Serial settings: 9600 bps, 8 data bit, 1 stop bit, no parity.
LAN1.0, WAN1.0, LAN1.1, WAN1.1	Provides access to the 10/100/1000 Base-TX. <ul style="list-style-type: none"> The LAN port connects the system to a LAN switch. A WAN port connects the system to the WAN router.
Power Supply	Supplies power to the appliance.
USB 1, USB 2	Optional USB ports for hypervisor connectivity.
gbe0_0, gbe0_1, gbe0_2, gbe0_3	1 Gbps interfaces used for hypervisor connectivity.
VGA	DB15 connector used for hypervisor video connectivity.
PRI (Primary)	The management interface that connects the SteelFusion Edge to a LAN switch. This management interface enables you to connect to the Management Console and the SteelFusion Edge CLI. The primary and auxiliary ports cannot share the same network subnet.
AUX (Auxiliary)	An optional port that provides an additional management interface for a secondary network. The primary and auxiliary ports cannot share the same network subnet.
eth0_0, eth0_1	Data interfaces that support the use of iSCSI, BlockStream heartbeat, and BlockStream sync.
RiOS COM	RiOS serial RJ45 COM port manages the RiOS node. Serial setting: 9600 bps, 8 data bit, 1 stop bit, no parity.

1U SteelFusion Edge LEDs

This section describes the ports and LEDs on the SteelFusion Edge 2100 and SteelFusion Edge 2200 appliances. [Figure 1-4](#) shows the front panel LED locations.

Figure 1-4. 1U SteelFusion Edge LEDs and Buttons (Front View)



The following tables summarize the system LEDs for the 1U SteelFusion Edge appliances.

Front Panel LEDs and Buttons	Status
STAT (Status)	Button (not an LED)
PRI (Primary)	Link and Traffic = Blinks blue
AUX (Auxiliary)	Link and Traffic = Blinks blue
HYP (Hypervisor)	Hypervisor Power On = Blue Hypervisor Power Off = No light
BYP/BLK BYP (Bypass) BLK = (Block) (Disconnect)	Normal = No Light Bypass or Block (Disconnect) = Orange
LAN1.0 LAN1.1	Link and Traffic = Blinking blue
WAN1.0 WAN1.1	Link and Traffic = Blinking blue
SYS (System)	Powering up = Red BIOS POST = Orange Normal = Blue
PWR (Power)	Button (not an LED)
HDDs/SSDs	Disk Connected = Blue Read/Write Activity = Blinks Blue Failed Disk = Orange

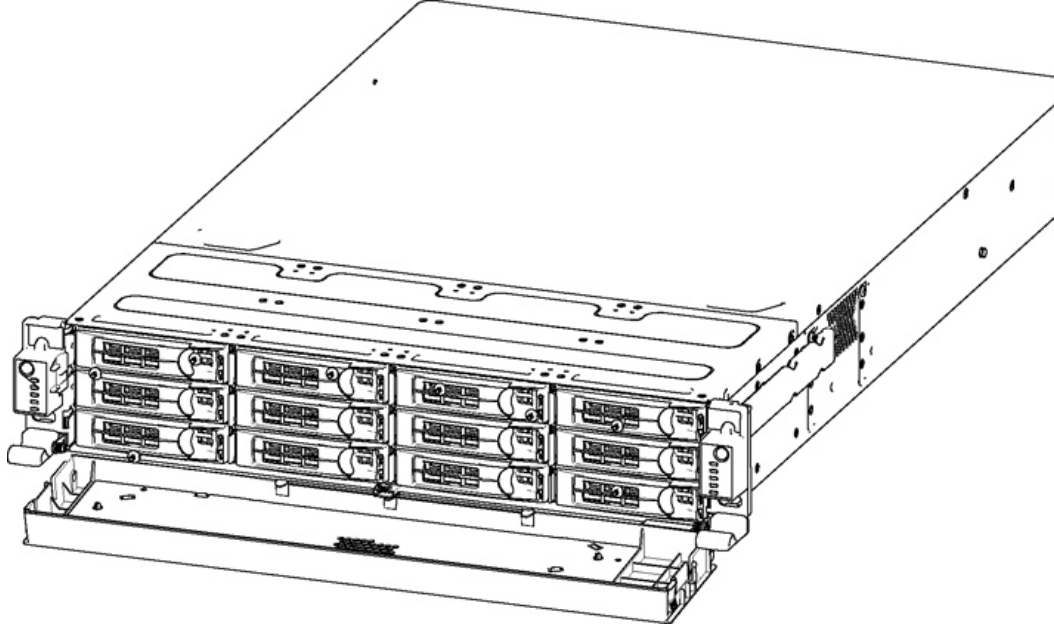
Back Panel LEDs and Buttons	Status
HYP (hypervisor)	Activity = Blinking
gbe0_x ports	Left LED Link = Green Activity = Blinking green Right LED GB = Orange 100 MB = Green 10 MB = No Light
PRI (Primary)	Left LED Link = Green Activity = Blinking green Right LED GB = Orange 100 MB = Green 10 MB = No light
AUX (Auxiliary)	Left LED Link = Green Activity = Blinking green Right LED GB = Orange 100 MB = Green 10 MB = No light BYP/BLK Normal = No light Bypass or Block (Disconnect) = Orange
LAN-WAN	Left LED Link = Green Activity = Blinking green Right LED GB = Orange 100 MB = Green 10 MB = No light BYP/BLK Normal = No light Bypass or Block (Disconnect) = Orange
eth0_x ports	Left LED Link = Green Activity = Blinking green Right LED GB = Orange 100 MB = Green 10 MB = No light
RiOS	Activity = Blinking

2U SteelFusion Edge Appliances

The SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 are 2U appliances that can provide WAN optimization, BlockStream-enabled storage, and hypervisor functionality. (See [Figure 1-5](#).) They support two independent nodes with its own management and monitoring. The appliances have 12 disk drive slots that are numbered 0 to 11. (See [Figure 1-6](#).) The appliances also support different combinations of network interface cards (NIC) that can be installed in the back of the appliance. (See [Figure 1-7](#).) Slots 1 to 4 are reserved for RiOS functionality while slots 5 and 6 are reserved for the hypervisor (HYP). Slot 1 ships with the NIC-2-001G-4TX-EXP-BP already installed and is used for RiOS functionality. The SteelFusion Edge is managed through the primary and auxiliary interfaces using VMware tools, such as the vSphere Client and vCenter.

Note: For detailed information on the cards supported for the SteelFusion Edge slot configuration, see [“Supported NICs” on page 25](#).

Figure 1-5. 2U SteelFusion Edge Appliance (Front View)



The disk slots are numbered 0 to 11 beginning at the top left. [Figure 1-6](#) shows the disk slot number scheme for the 2U SteelFusion Edge appliance.

Figure 1-6. 2U SteelFusion Edge Disk Slot Numbers (Front View)

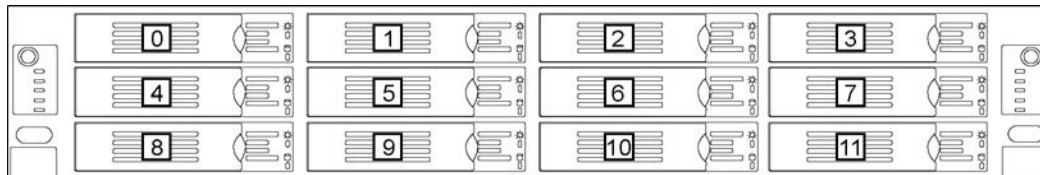
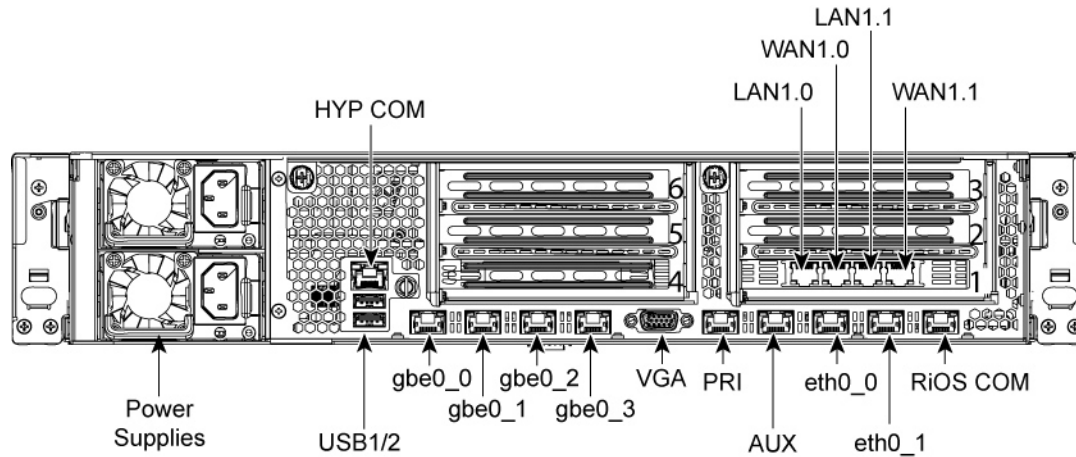


Figure 1-7 shows the port labels on the 2U SteelFusion Edge appliance. They are described in the following table.

Figure 1-7. 2U SteelFusion Edge Appliance Port Labels (Back View)

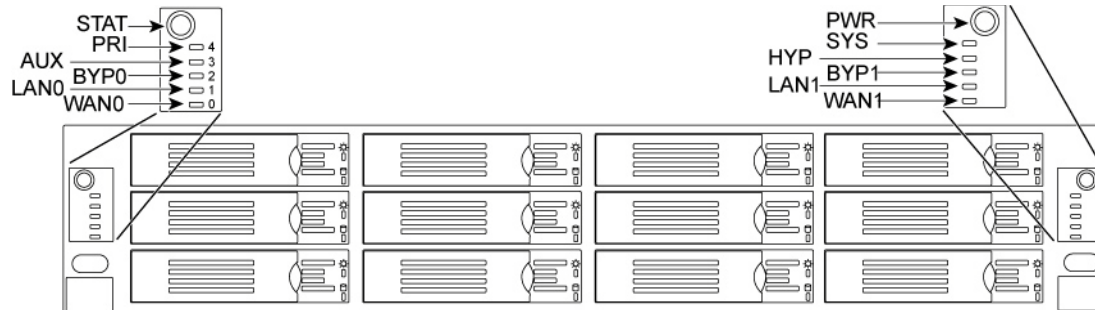


Port	Description
HYP COM	HYP serial RJ45 COM port manages the hypervisor node. Serial settings: 9600 bps, 8 data bit, 1 stop bit, no parity.
LAN1.0, WAN1.0, LAN1.1, WAN1.1	Provides access to the 10/100/1000 Base-TX. <ul style="list-style-type: none"> The LAN port connects the system to a LAN switch. A WAN port connects the system to the WAN router.
Power Supply	Supplies power to the appliance.
USB 1, USB 2	Optional USB ports for hypervisor connectivity.
gbe0_0, gbe0_1, gbe0_2, gbe0_3	1 Gbps interfaces used for hypervisor connectivity.
VGA	DB15 connector used for hypervisor video connectivity.
PRI (Primary)	The management interface that connects the SteelFusion Edge to a LAN switch. This management interface enables you to connect to the Management Console and the SteelFusion Edge CLI. The primary and auxiliary ports cannot share the same network subnet.
AUX (Auxiliary)	An optional port that provides an additional management interface for a secondary network. The primary and auxiliary ports cannot share the same network subnet.
eth0_0, eth0_1	Data interfaces that support the use of iSCSI, BlockStream heartbeat, and BlockStream sync.
RiOS COM	RiOS serial RJ45 COM port manages the RiOS node. Serial setting: 9600 bps, 8 data bit, 1 stop bit, no parity.

2U SteelFusion Edge LEDs

This section describes the ports and LEDs for the SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 appliances. [Figure 1-8](#) shows the LEDs for the 2U SteelFusion Edge appliances.

Figure 1-8. 2U SteelFusion Edge LEDs (Front View)



The following table summarizes the LEDs and buttons.

LEDs and Buttons	Status
STAT (Status)	Button (not an LED)
PRI (Primary)	Link and Traffic = Blinking blue
AUX (Auxiliary)	Link and Traffic = Blinking blue
BYP/BLK BYP (Bypass) BLK = (Block) (Disconnect)	Normal = No light Bypass or Block (Disconnect) = Solid orange
LAN	Link and Traffic = Blinking blue
WAN	Link and Traffic = Blinking blue
PWR (Power)	Button (not an LED)
SYS (System)	Powering up = Solid red BIOS POST = Solid orange Normal = Blue
HYP (Hypervisor)	Hypervisor On = Solid blue Hypervisor Off = No light

FRUs

The SteelFusion Edge appliances contain several field replaceable units (FRUs) that you or a certified service technician can troubleshoot, remove from the system, and replace without having to send the system to a repair facility.

Note: Perform troubleshooting or repairs only as directed in the product documentation or by the online or telephone service and support team. All other servicing should be performed by a certified service technician only. Your warranty does not cover damage due to servicing that is not authorized by Riverbed. Read and follow the safety instructions in the *Safety and Compliance Guide*.

For more information and a list the FRUs available for SteelFusion Edge appliances, see [Chapter 4, “Replacing SteelFusion Edge Components.”](#)

CHAPTER 2 Rack Mounting the SteelFusion Edge Appliances

This chapter describes how to install SteelFusion Edge appliances in a rack. It includes the following sections:

- [“Rack Installation Safety Guidelines” on page 15](#)
- [“Required Tools and Equipment” on page 16](#)
- [“Mounting the SteelFusion Edge Appliances Using the Extendable Rail” on page 17](#)
- [“Connecting the SteelFusion Edge to Your Network” on page 21](#)
- [“Powering On the System” on page 21](#)

Use only the racks that ship with this appliance. Use of other racks is not supported.

Rack Installation Safety Guidelines

When installing the appliance in a rack, follow these guidelines:

- Do not block or cover the openings to the appliance.
- Never push objects of any kind through openings in the appliance. Dangerous voltages might be present.
- Do not use conductive foreign objects; they can produce a short circuit and cause fire, electric shock, or damage to your appliance.
- Lift appliances using both hands and with your knees bent.
- Observe local occupational health and safety requirements and guidelines for manual materials handling.
- Do not attempt to move a rack by yourself; a minimum of two people is needed to move a rack.
- Do not attempt to move a rack on an incline that is greater than 10 degrees from the horizontal.
- Installing components in a rack without the front and side stabilizers can cause the rack to tip over. Always install rack stabilizers before you install components in a rack.
- Make sure the rack is properly secured to the floor or ceiling.
- Always load the rack from the bottom. Load the heaviest component in the rack first.
- Make sure racks are coupled together if it is a multiple-rack installation.

- Make sure the rack is level and stable before installing an appliance in the rack.
- Make sure the leveling jacks are extended to the floor.
- Make sure the full weight of the rack rests on the leveling jacks.
- Make sure the rack is level and stable before pulling a component out of the rack.
- Make sure only one component is extended at a time. A rack might become unstable if more than one component is extended.
- Ensure that there is adequate airflow in the rack. Improper installation or restricted airflow can damage the appliance.
- The rack cannot have solid or restricted airflow doors. You must use a mesh door on the front and back of the rack or remove the doors to ensure adequate airflow to the appliance.
- The rack width and depth must allow for proper serviceability and cable management.
- Ensure that there is adequate airflow in the rack. Improper installation or restricted airflow can damage the appliance.
- Make sure the product is properly mated with the rails. Products that are improperly mated with the rails might be unstable.
- Verify that the AC power supply branch circuit that provides power to the rack is not overloaded. Overload power increases the risk of personal injury, fire, or damage to the appliance. The total rack load should not exceed 80 percent of the branch circuit rating. Consult the electrical authority having jurisdiction over your facility wiring and installation requirements.
- The appliances produce front-to-back cooling airflow that requires an unobstructed airflow to the fan housing. Do not mount the appliance near other electronic devices that produce back-to-front airflow.
- This appliance is for use only in a machine room or IT room.
- Make sure that the area in which you install the appliance is properly ventilated and climate controlled.
- Ensure the voltage and frequency of your power source match the voltage and frequency inscribed on the electrical rating label of the appliance.
- Do not install the appliance in or near a plenum, air duct, radiator, or heat register.
- Never use the appliance in a wet location.

For detailed safety information, see the *Safety and Compliance Guide*.

Required Tools and Equipment

You need the following tools and equipment to mount the appliance in a rack:

- A standard server-type rack
- A standard Phillips screwdriver
- The enclosed rack mount kit that ships with your appliance

Mounting the SteelFusion Edge Appliances Using the Extendable Rail

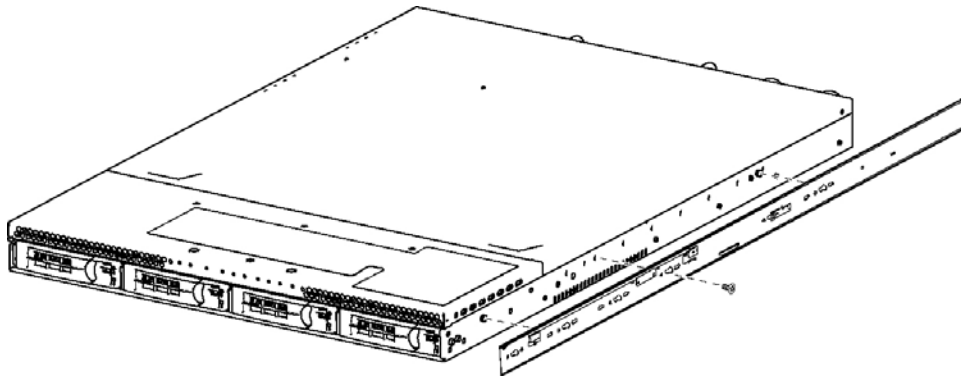
This section describes how to mount an appliance using the extendable rail (RMK-2-EXPRAIL) and contains the following procedures:

- [“Setting Up the Rails” on page 17](#)
- [“Mounting the Appliance” on page 17](#)
- [“Operating the Rails” on page 19](#)
- [“Center Mounting 1U Appliances in a Two-Post Rack” on page 19](#)

Setting Up the Rails

To set up the rails, attach the inner rails to the appliance. (See [Figure 2-1](#).)

Figure 2-1. Attaching the Inner Rails



Mounting the Appliance

After you have adjusted the length of the outer rails to fit your rack posts, you are ready to install the outer rail assemblies to the rack.

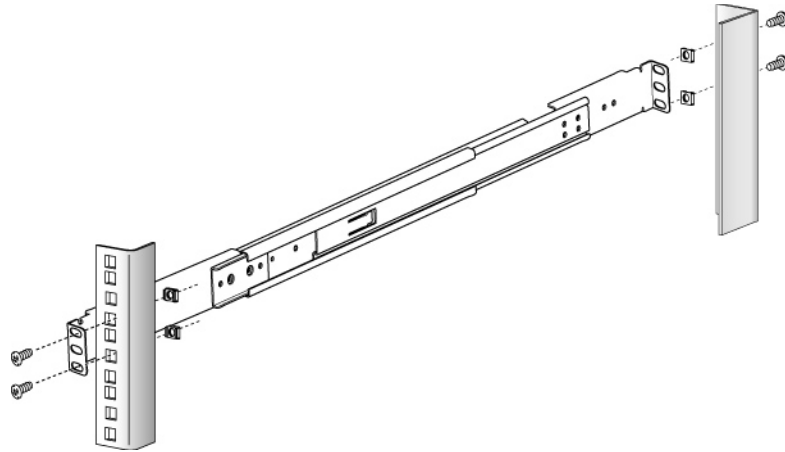
Note: All 2U appliances must be mounted to a four-post rack.



Caution: A minimum of two people is required to move a 2U appliance. Lift the appliance using both hands and with your knees bent.

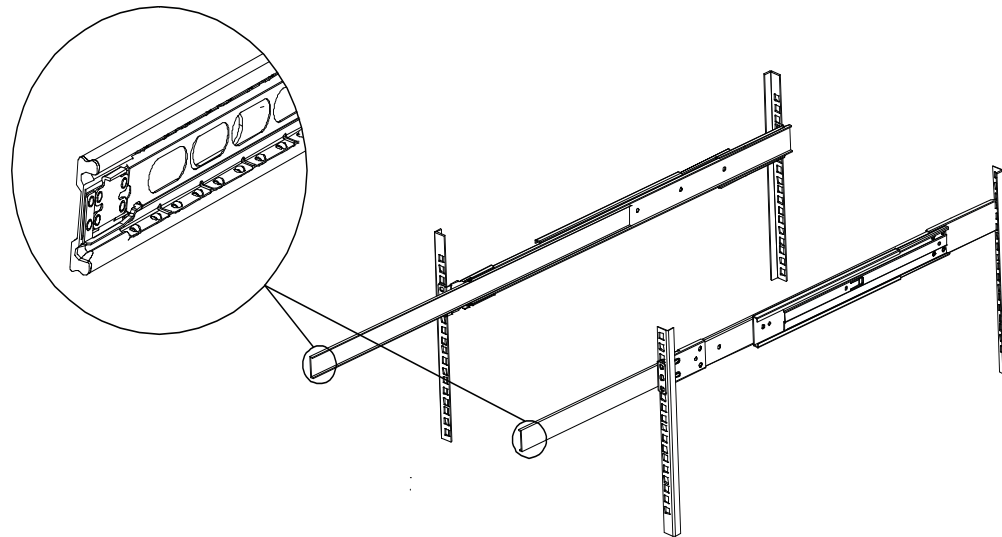
To mount the appliance to a four-post rack

1. Install the outer rails to the rack posts. (See [Figure 2-2.](#))

Figure 2-2. Installing the Outer Rails to the Rack

2. Verify the ball bearing retainer is locked in the forward position of the outer rails. (See [Figure 2-3.](#))

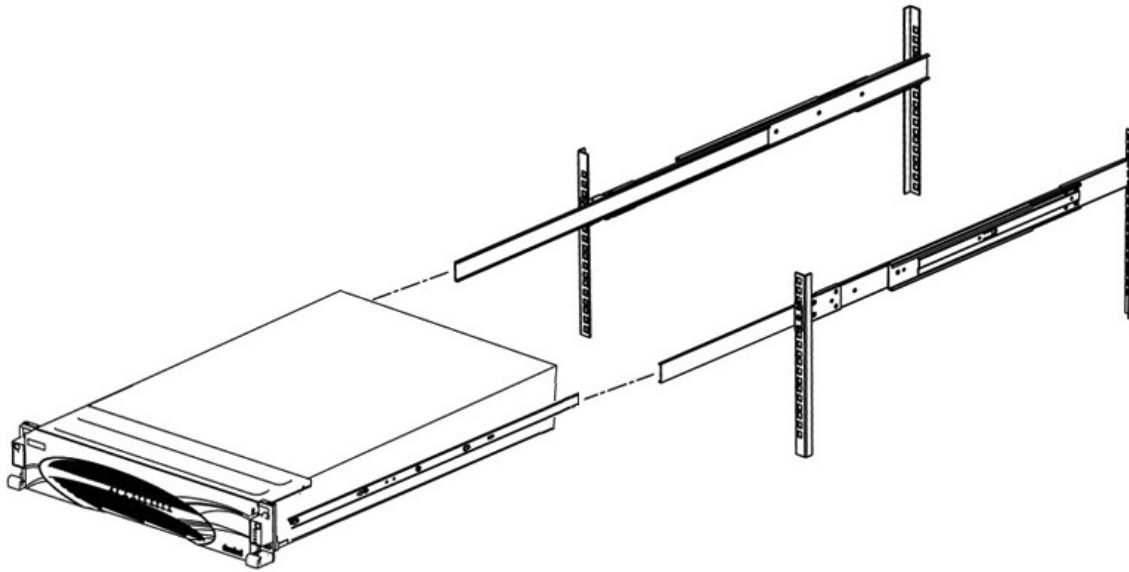
Caution: The ball bearing retainer on the outer rail must be returned to the forward position to connect with the inner rail on the chassis. The bearings might fall off if the ball bearing retainer is not pushed forward.

Figure 2-3. Ensuring the Ball Bearing Retainer Is Locked

3. With two people lifting the appliance, gently slide the inner rails into the outer rails until you reach a hard stop.

4. Pull the release tabs on both of the inner rails and push the appliance all the way into the rack. (See [Figure 2-4.](#))

Figure 2-4. Sliding the Appliance into the Rack and Pulling the Inner Rail Release Tab



Operating the Rails

To operate the rails, follow these guidelines:

- To pull the appliance from the rack without removing it, pull it until it stops.
- To remove the appliance from the rack, push the release tab and remove the appliance.
- To push the appliance back into the rack, use the inner rail release tab shown in [“Sliding the Appliance into the Rack and Pulling the Inner Rail Release Tab”](#) on page 19.



Caution: Use caution when the appliance is mounted in a rack and the outer rails are extended; do not place objects or additional weight on the appliance.

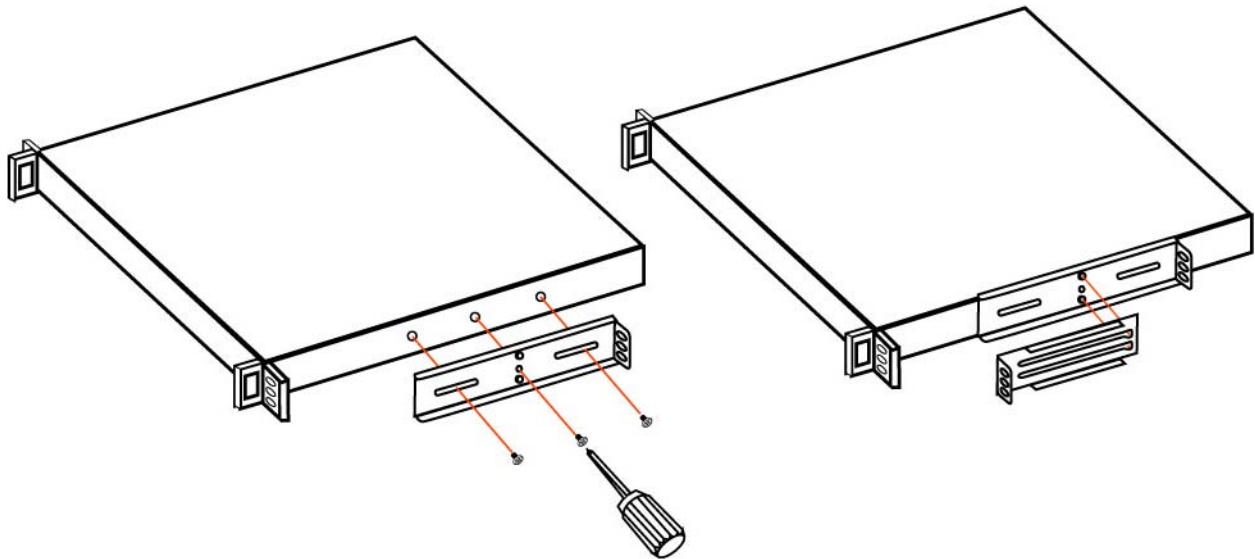
Center Mounting 1U Appliances in a Two-Post Rack

You can mount 1U appliances in a two-post rack in the center-mount position.

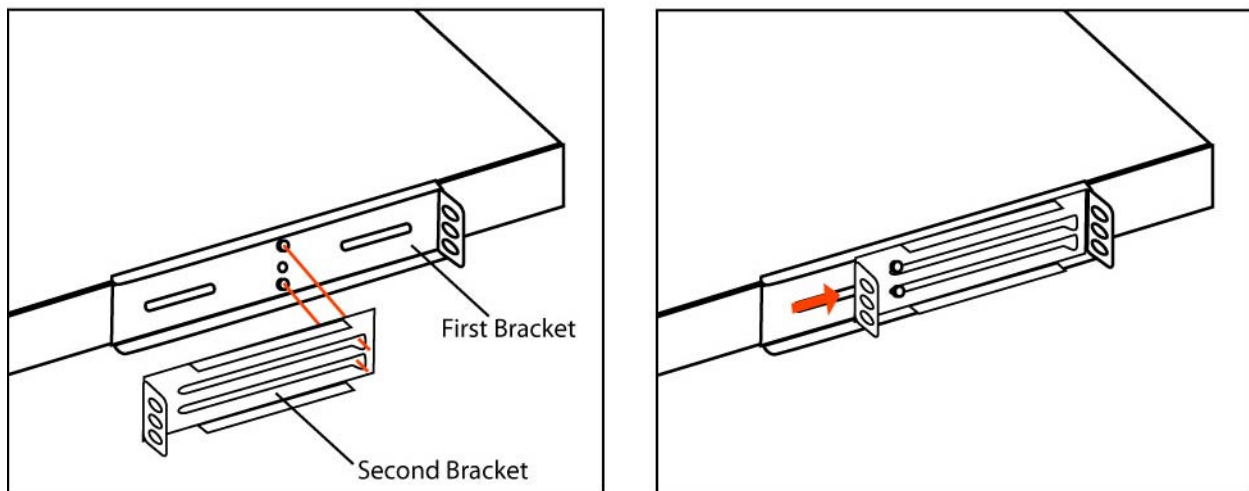
Note: 2U appliances cannot be mounted to a two-post rack.

To center mount appliances in a two-post rack

1. Attach the first bracket to the chassis with the three included screws. Select a position that centers and balances the appliance on the bracket. (See [Figure 2-5.](#))

Figure 2-5. Attaching Two-Post Center-Mount Brackets

2. Slide the second bracket onto the pegs of the first bracket by placing the second bracket over the first bracket at the widest opening and then slide toward the narrower part to secure. (See [Figure 2-6.](#))

Figure 2-6. Attaching Second Bracket to First Bracket

3. Repeat Steps 1 and 2 on the other side of the chassis.
4. Center mount the appliance in a two-post rack.

Connecting the SteelFusion Edge to Your Network

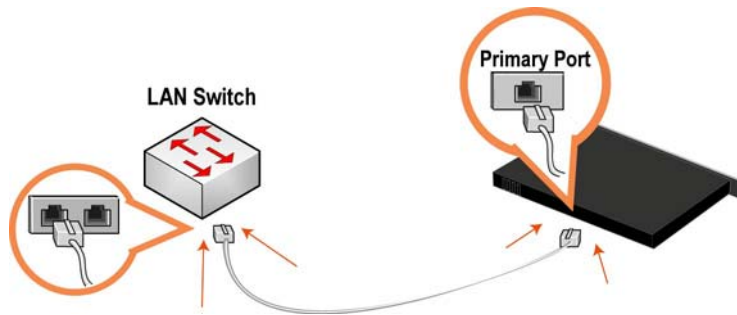
Use standard Ethernet straight-through and crossover cables to connect to your network in an in-path configuration. Make sure that you use the correct cables to establish your network connections:

- **Straight-through cables** - Typically used for RiOS management or data ports. The straight-through cables are used to connect the primary, LAN, and AUX ports as well as the hypervisor node interfaces for branch hypervisor connectivity.
- **Crossover cable** - Connects the WAN port on the appliance to the WAN router.

To connect the appliance to your network

- Plug the straight-through cable into the primary port of the SteelFusion Edge appliance and the LAN switch. This can be any port on your LAN switch configured to connect to a host. (See [Figure 2-7](#).)

Figure 2-7. Connecting the Primary Port to the LAN Switch



For more information on how to connect the appliance to your network, refer to the *SteelFusion Edge Installation and Configuration Guide*.

Powering On the System

This section describes how to connect the AC power and how to power on the system.

Caution: In European electrical environments, you must ground (earth) the Green/Yellow tab on the power cord or risk electrical shock.

To power on the appliance

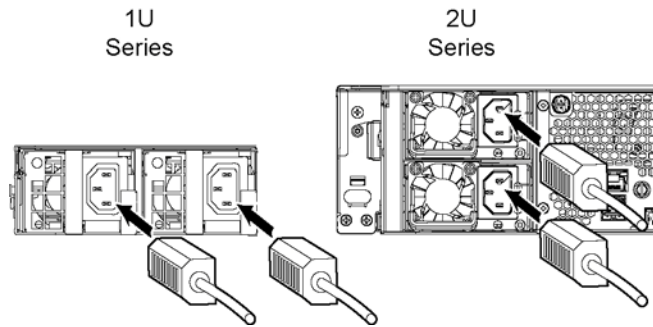
1. Remove the foam piece that sits between the bezel and the hard drives.

Caution: Failure to remove this piece on newly shipped appliances will block proper airflow through the unit and cause overheating.

2. Plug the AC power cord into the SteelFusion Edge appliance.

Note: If your appliance has multiple power supplies, you must plug in all the power cords.

Figure 2-8. Connecting the AC Power



3. Plug the AC power cord into an uninterrupted AC power source.
4. Check the status lights on the SteelFusion Edge appliance. See [Chapter 1, "SteelFusion Edge Overview,"](#) for LED descriptions.

CHAPTER 3 Installing Network Interface Cards in SteelFusion Edge Appliances

This chapter provides information about how to install network interface cards (NICs) on your SteelFusion Edge appliance and includes the following sections:

- [“Overview” on page 23](#)
- [“Before You Begin” on page 23](#)
- [“Required Tools and Equipment” on page 24](#)
- [“Ethernet Network Compatibility” on page 24](#)
- [“NICs for SteelFusion Edge Appliances” on page 24](#)
- [“Installing NICs in 1U SteelFusion Edge Appliances” on page 26](#)
- [“Installing NICs in 2U SteelFusion Edge Appliances” on page 29](#)
- [“NIC Self-Test for SteelFusion Edge” on page 33](#)
- [“Network Interface Card Status Lights” on page 34](#)

Overview

The SteelFusion Edge appliances are equipped with and can accommodate add-on NICs. You can install multiport NICs to connect to multiple routers and switches.

Before You Begin

This chapter assumes you have installed and configured the appliance.

During installation, make sure you follow proper ESD procedures when you handle the NIC:

- Wear properly grounded ESD straps.
- If an ESD strap is not available, touch a properly grounded metallic surface prior to handling the NIC.
- Do not touch the electronic components on the NIC.

Required Tools and Equipment

You need the following tools and equipment to install a card:

- Antistatic strap (required)
- A Phillips screwdriver
- Straight-through cables to connect the LAN ports to the LAN switches
- Crossover cables to connect the WAN ports to the WAN routers

Ethernet Network Compatibility

The SteelFusion Edge appliances support the following Ethernet networking standards:

- Ethernet Logical Link Control (LLC) (IEEE 802.2 - 1998)
- Fast Ethernet 100 Base-TX (IEEE 802.3 - 2008)
- Gigabit Ethernet over Copper 1000 Base-T and Fiber 1000 Base-SX (LC connector) and Fiber 1000 Base LX (IEEE 802.3 - 2008)
- 10 Gigabit Ethernet over Fiber, 10GBase-LR Single Mode, and 10GBase-SR Multimode (IEEE 802.3 - 2008)

The ports support the following connection types and speeds:

- **Primary** - 10/100/1000 Base-T, autonegotiating
- **Auxiliary** - 10/100/1000 Base-T, autonegotiating
- **LAN** - 10/100/1000 Base-TX or 1000 Base-SX or 1000 Base-LX or 10GBase-LR or 10GBase-SR, depending on configuration
- **WAN** - 10/100/1000 Base-TX or 1000 Base-SX or 1000 Base-LX or 10GBase-LR or 10GBase-SR, depending on configuration
- **Management** - 10/100/1000 Base-T, autonegotiating

The appliance supports VLAN tagging (IEEE 802.3 - 2008). It does not support the ISL protocol.

All copper interfaces are autosensing for speed and duplex (IEEE 802.3 - 2008).

The appliance autonegotiates speed and duplex mode for all data rates and supports full-duplex mode and flow control (IEEE 802.3 - 2008).

A SteelFusion Edge appliance with a Gigabit Ethernet card supports jumbo frames on in-path and primary ports.

NICs for SteelFusion Edge Appliances

This section describes the cards that you can install on SteelFusion Edge appliances.

Supported NICs

The SteelFusion Edge appliances support two independent nodes with their own management and monitoring. The RiOS node and hypervisor node each operate independently of each other and support their own NICs. NICs are supported for their intended use. Nonbypass cards are treated as data NICs, and bypass cards are treated as in-path NICs. You cannot change a data NIC to an in-path NIC, or vice versa, from the GUI or the CLI.

The SteelFusion Edge 2100 and SteelFusion Edge 2200 offer two slots for RiOS functionality. Slot 1 is populated by default with the four-port 1-GbE copper bypass card. Slot 2 can support an additional NIC. See the table below for the options available on the 1U SteelFusion Edge appliance.

The SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 offer six slots where slots 1 to 4 support RiOS management and functionality and slots 5 and 6 support hypervisor functionality. Slot 1 is populated by default with the four-port 1-GbE copper bypass card with LSI controller. See the table below for the options available on the 2U SteelFusion Edge appliance.

Note: Card naming will occur accordingly when a NIC is installed. If you replace a nonbypass card with a bypass card in the same slot, the card naming will change and you may see unexpected results.

The following table lists the NICs supported on the SteelFusion Edge appliances for RiOS and hypervisor functionality.

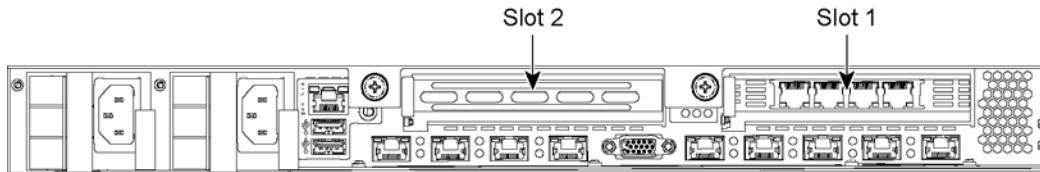
Note: Do not install other cards on the SteelFusion Edge appliances.

Part Number	NIC Description	1U Slots Supported	2U Slots Supported	Node
NIC-2-001G-4TX-BP	Quad 1 GbE Copper Base-T	Slot 1 only	Not supported	RiOS
NIC-1-001G-4TX-BP	Quad 1 GbE Copper Base-T	Slot 2 only	Slot 2 only	RiOS
NIC-1-001G-2SX-BP	Dual 1 GbE Fiber SX	Slot 2 only	Slot 2 only	RiOS
NIC-1-001G-2LX-BP	Dual 1 GbE Fiber LX	Slot 2 only	Slot 2 only	RiOS
NIC-1-001G-4LX-BP	Quad 1 GbE Fiber LX	Slot 2 only	Slot 2 only	RiOS
NIC-1-010G-2SR-BP	Dual 10 GbE Fiber SR	Slot 2 only	Slot 2 only	RiOS
NIC-1-010G-2LR-BP	Dual 10 GbE Fiber LR	Slot 2 only	Slot 2 only	RiOS
NIC-2-001G-4TX-EXP-BP	Combo Card - Quad 1GbE Copper Base-T + LSI Controller	Not supported	Slot 1 only	RiOS
NIC-1-001G-4TX	Quad 1 GbE Copper Base-T	Slot 2 only	Slots 2, 5, or 6	RiOS or Hypervisor
NIC-1-010G-2TX	Dual 10 GbE Copper Base-T	Not supported	Slots 2, 5, or 6	RiOS or Hypervisor
NIC-1-010G-4TX	Quad 10 GbE Copper Base-T	Not supported	Slots 2, 5, or 6	RiOS or Hypervisor

Installing NICs in 1U SteelFusion Edge Appliances

This section describes how to install NICs in 1U SteelFusion Edge appliances. [Figure 3-1](#) identifies the Peripheral Component Interconnect Express (PCIe) slot locations.

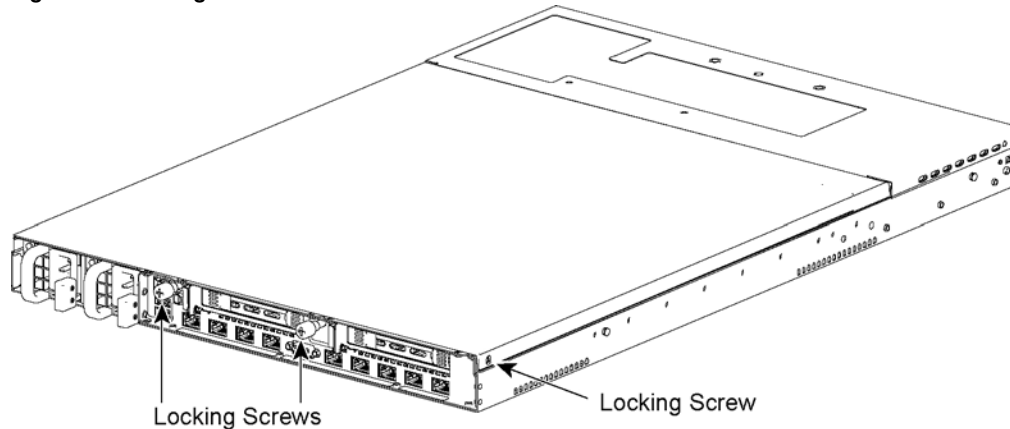
Figure 3-1. NIC Slot Locations for 1U SteelFusion Edge Appliance



To install a NIC in the 1U appliances

1. Power down the appliance.
2. Remove the power-supply cord.
3. Remove the cables connected to the appliance.
4. Remove the appliance from the mounting rack, if necessary.
5. Unscrew the two locking screws on the back of the chassis. (See [Figure 3-2](#).)

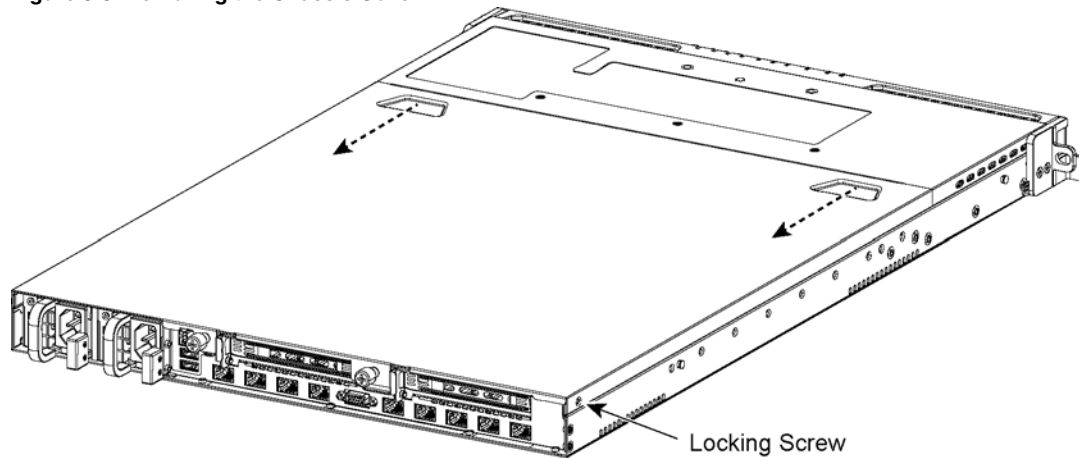
Figure 3-2. Locking Screws



6. Remove a third locking screw on the left side near the back of the top cover.

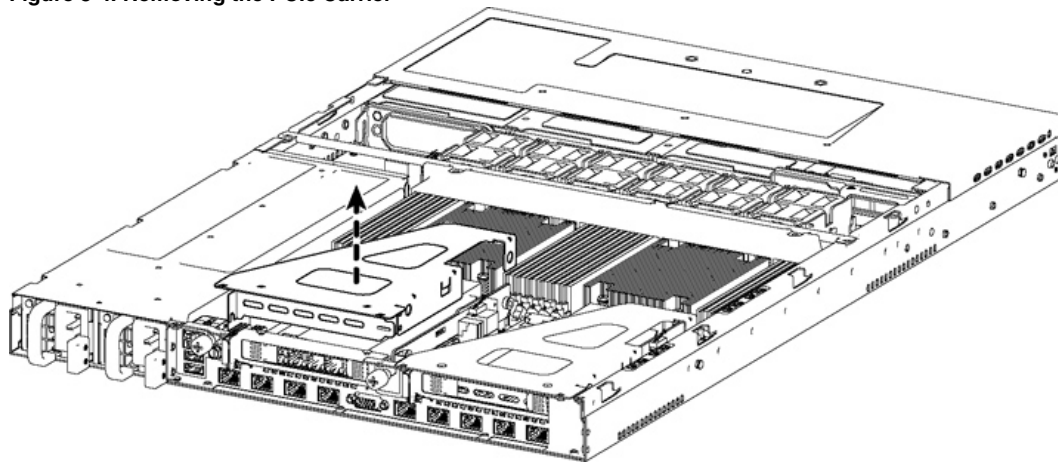
7. Position your thumbs in the indentations at the front of the appliance and slide the cover back from the chassis. (See [Figure 3-3](#).)

Figure 3-3. Removing the Chassis Cover



8. To release the PCIe carrier, remove the two locking screws.
9. Pull the PCIe carrier straight up to remove it from the appliance. (See [Figure 3-4](#).)

Figure 3-4. Removing the PCIe Carrier

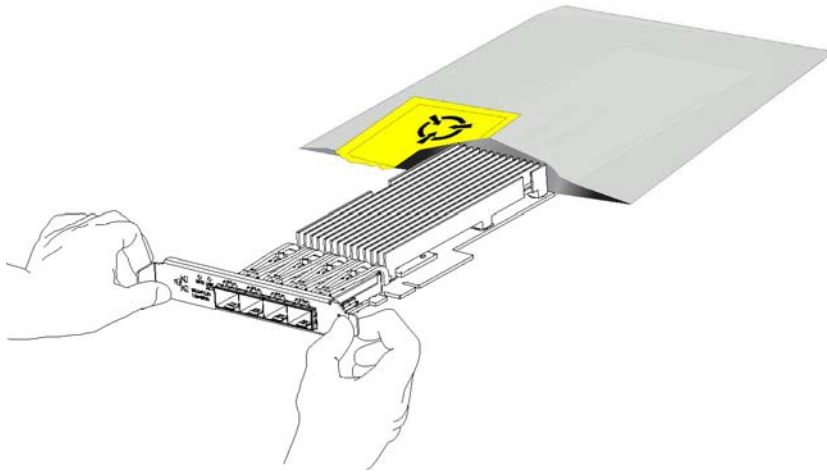


10. Remove the two locking screws on the faceplate of the filler bracket on the rear panel of the PCIe carrier.
11. If you are replacing an existing NIC, carefully pull the NIC from the riser card.

Do not attempt to remove the onboard NIC built into the motherboard. The NICs fit horizontally into the PCIe carrier. The NIC connectors fit into the bus slots on the motherboard.

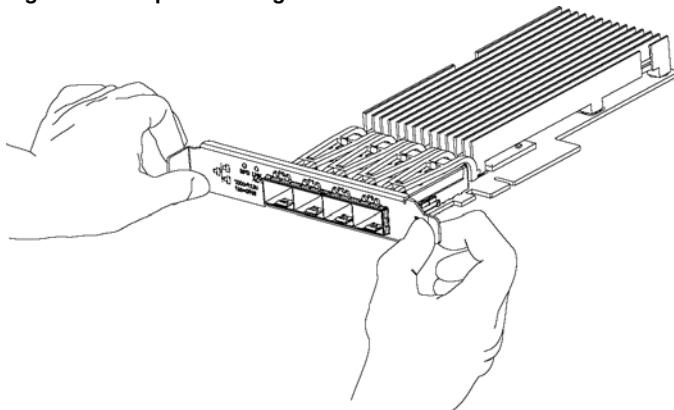
12. Gently pull the new NIC from the ESD bag. (See [Figure 3-5](#).)

Figure 3-5. Removing the NIC from the ESD Bag



13. Hold the new NIC between the front bezel and the rear of the card to avoid ESD damage. (See [Figure 3-6](#).)

Figure 3-6. Proper Handling of the NIC



14. Plug the new NIC into the slot on the PCIe carrier.

Note: Make sure the NICs are seated properly in the PCIe carrier. If they are not seated properly, NICs do not function.

15. Secure the NIC in the PCIe carrier at the back panel with the locking screws. When replacing the carrier, the metal peg must line up with the stand on the motherboard.
16. Replace the PCIe carrier in the chassis. Make sure that the NIC connectors fit securely into the bus slots on the motherboard and that the stand on the motherboard lines up with the peg on the PCIe carrier.
17. Replace the two retaining screws on the top of the PCIe carrier and the one screw on the rear panel.
18. Replace the cover on the chassis and tighten the locking screws at the back of the chassis.

19. Connect the power cords.
20. Connect the NIC cables.
21. Power on the appliance and check the status lights.

To test SteelFusion Edge NICs

1. Connect to the SteelFusion Edge CLI.

For detailed information, see the *Riverbed Command-Line Interface Reference Manual*.

2. Enter enable mode. At the system prompt, enter the following command:

```
amnesiac > enable
amnesiac #
```

3. Verify that the NIC is correctly installed.

To verify a Two-Port Gigabit Ethernet Copper PCIe card, use the **show hardware all** command:

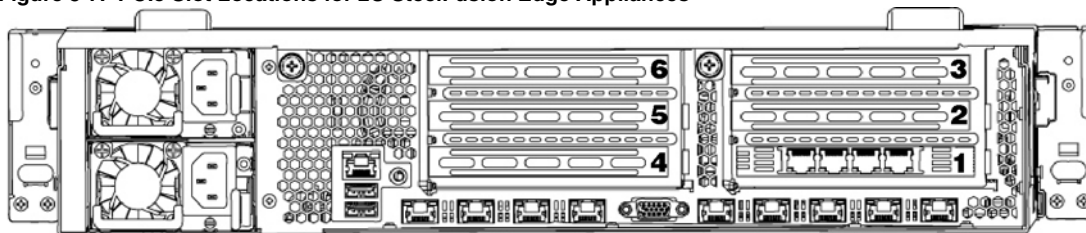
```
amnesiac # show hardware all
Hardware revision: A
Mainboard: SteelFusion RiOS Motherboard 1U, 425-00218-01
Slot 1: ..... 2 Port Copper GigE Gen2 PCIe Non-Bypass Module, Integrated
Slot 2: ..... 4 Port NIC,PCIE,Bypass+LSi,Mitac, 410-00166-01
System led: Blue
amnesiac #
```

Installing NICs in 2U SteelFusion Edge Appliances

This section describes how to install NICs in the 2U SteelFusion Edge appliances.

[Figure 3-7](#) identifies the NIC slot locations and number scheme.

Figure 3-7. PCIe Slot Locations for 2U SteelFusion Edge Appliances

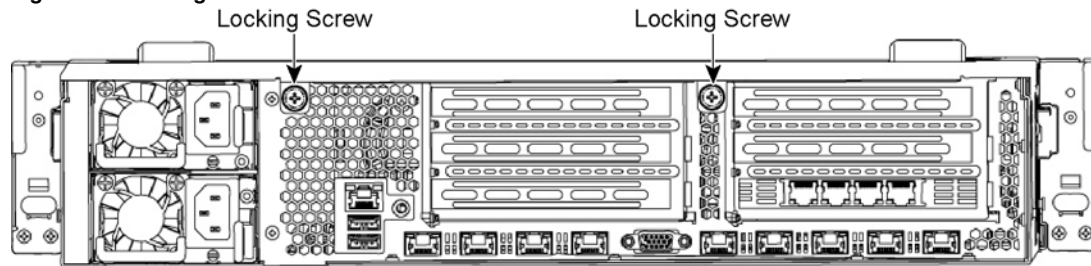


To install a NIC in the 2U Appliances

1. Power down the appliance.
2. Remove the power-supply cord and all cables connected to the appliance.
3. Remove the appliance from the mounting rack, if necessary.

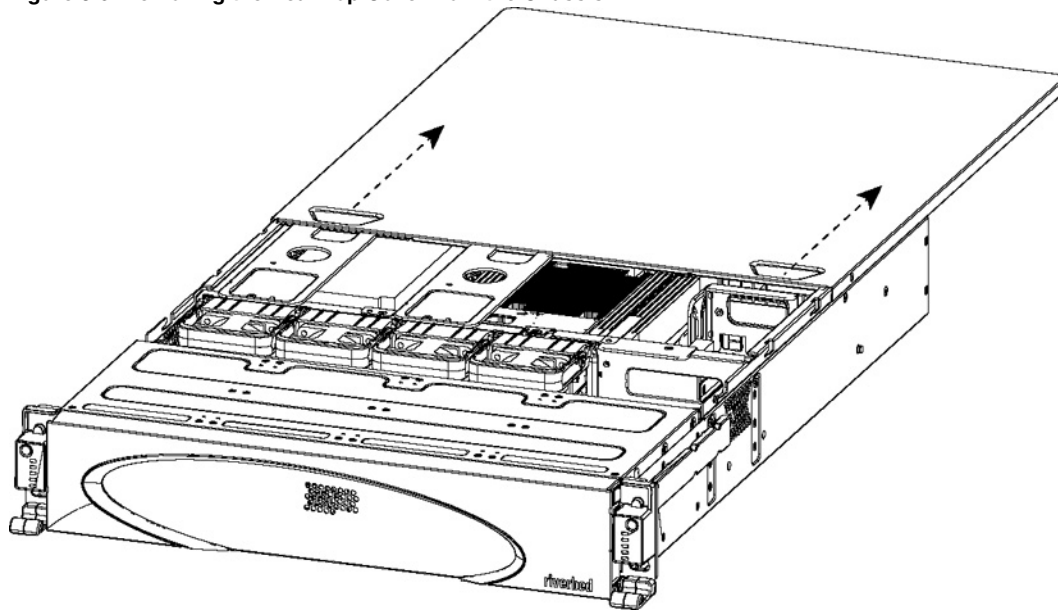
4. Release the two locking screws on the back of the appliance to remove the cover. (See [Figure 3-8](#).)

Figure 3-8. Locking Screws



5. Remove a third locking screw on the right side of the top cover.
6. Press down on the indentations and slide back the cover several inches, and then lift up and away from the chassis. (See [Figure 3-9](#).)

Figure 3-9. Removing the Rear Top Cover from the Chassis

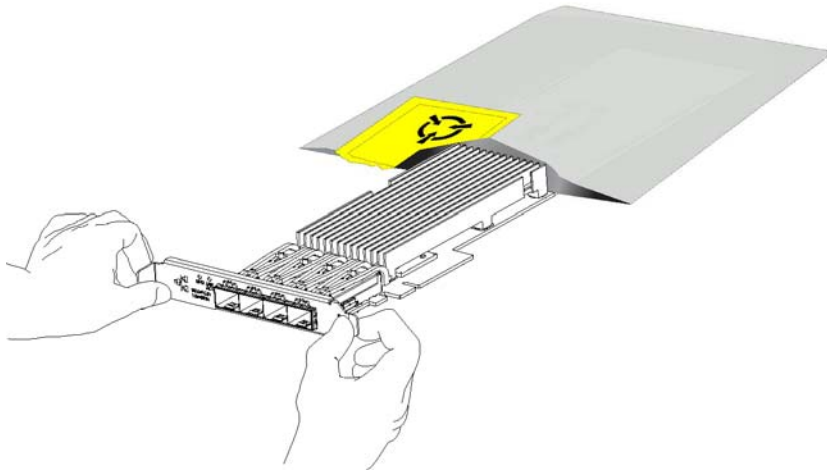


7. To release the PCIe carrier, remove the two retaining screws on the top of the carrier and the two retaining screws on the rear panel.
8. To remove the right or left PCIe carrier from the chassis, place your fingers in the carrier holes and lift straight up.
9. Turn over the carrier to reveal the PCIe slots.

PCIe cards fit horizontally in the carrier slots and are secured with screws in the rear panel. The connector at the bottom of the carrier fits into bus slots on the motherboard.
10. Remove the filler bracket on the rear of the PCIe carrier.

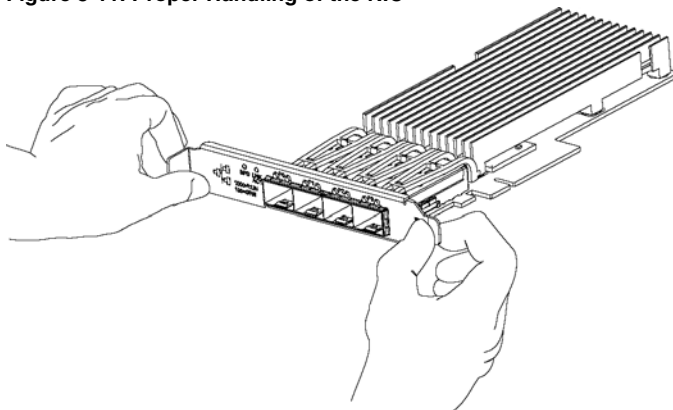
11. Gently pull the new NIC from the ESD bag. (See [Figure 3-10](#).)

Figure 3-10. Removing the NIC from the ESD Bag



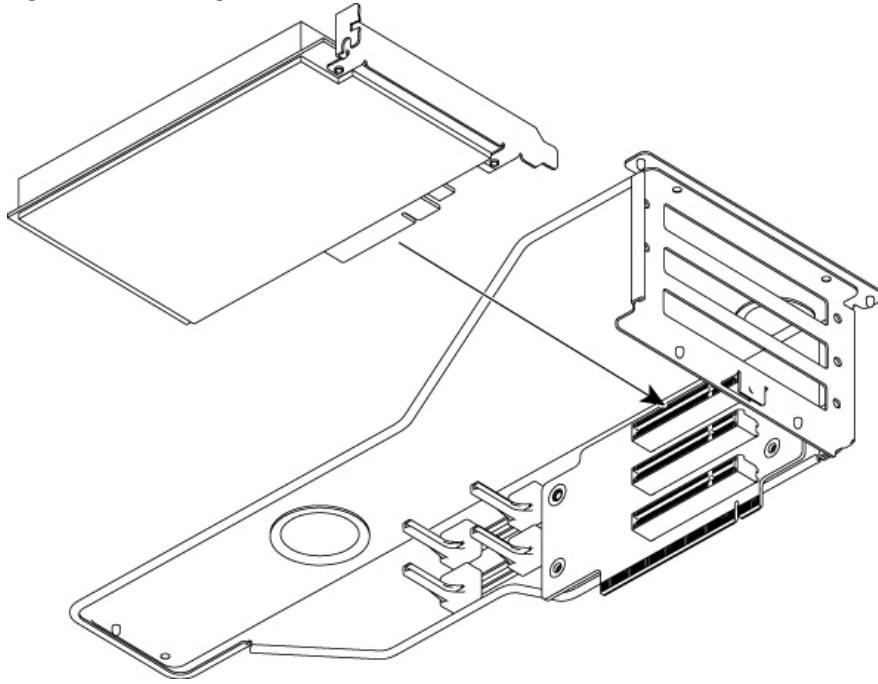
12. Hold the new NIC between the front bezel and the rear of the card to avoid ESD damage. (See [Figure 3-11](#).)

Figure 3-11. Proper Handling of the NIC



13. Plug the new NIC into the slot on the PCIe carrier. The NIC is attached with screws to the rear of the PCIe carrier. (Figure 3-12.)

Figure 3-12. Installing the New NIC into the PCIe Carrier



Note: Make sure the NICs are seated properly in the PCIe carrier. If they are not seated properly, the NICs do not function.

14. Replace the PCIe carrier in the chassis. Make sure that the carrier connectors fit securely into the bus slots on the motherboard.
15. Replace the two retaining screws on the top of the PCIe carrier and the one screw on the rear panel.
16. Replace the cover on the chassis and tighten the locking screws at the back of the chassis.
17. Connect the power cords.
18. Connect the NIC cables.
19. Power on the appliance and check the status lights.

To test NIC connections in the SteelFusion Edge

1. Connect to the SteelFusion Edge CLI.

For detailed information, see the *Riverbed Command-Line Interface Reference Manual*.

2. Enter enable mode. At the system prompt, enter the following command:

```
amnesiac > enable
amnesiac #
```

3. Verify that the NIC is correctly installed.

To verify a Four-Port Gigabit Ethernet Copper PCIe card, use the **show hardware all** command:

```
amnesiac # show hardware all
Hardware revision: A
Mainboard: SteelFusion RiOS Motherboard 2U 3.5, 425-00218-01
Slot 0: ..... 2 Port Copper GigE Gen2 PCIe Non-Bypass Module, Integrated
Slot 1: ..... 4 Port NIC,PCIE,Bypass+LSi,Mitac, 410-00166-01
Slot 7: ..... SteelFusion Backplane Interconnect, Integrated
Slot 8: ..... SteelFusion Backplane Interconnect, Integrated
Slot 9: ..... SteelFusion VSP Hardware Management Interconnect, Integrated
System led: Blue
amnesiac #
```

NIC Self-Test for SteelFusion Edge

The following self-test helps you verify that your card functions properly.

Before you begin, plug a crossover cable between the LAN and WAN on the SteelHead. With the service enabled and an IP address on the inpath0_0 interface, you will see a link on both interfaces.

To validate a Four-Port TX Copper Gigabit Ethernet Card

For the Four-Port TX Copper Gigabit Ethernet card, the LEDs are indicated by the following status lights:

- The Link/Activity LEDs are solid green when there is a link, and they blink to show network activity.
- The Bypass LEDs are solid green to indicate the card is in bypass mode.
- The Disconnect/LEDs are solid yellow in disconnect mode.

You must induce traffic to ensure the card works correctly. Removing the cable from the ports turns off the LEDs.

To induce traffic to verify the NIC

1. Connect to the Riverbed CLI.

For detailed information, see the *Riverbed Command-Line Interface Reference Manual*.

2. To check for connectivity, at the system prompt, enter the following **ping** command:

```
amnesiac > ping -c 1 -I <inpath-ipaddress> -b <broadcast-ip-address>
```

For example (where the netmask is /24):

```
amnesiac > ping -c 1 -I 10.11.128.8 -b 10.11.128.255
```

This **ping** command creates a loop for testing the appliance in isolation.

Network Interface Card Status Lights

The following table describes the status lights that appear on Riverbed network cards.

LED	Condition
Link/Activity	Solid green (or yellow) on link. Blinks green (or yellow) on activity. <hr/> Note: Some cards have separate link and activity LEDs.
Speed 1G Cards	1 Gb - Yellow or orange 100 M - Green 10 M - Off Blinks green on activity.
Speed 10G Cards	10 Gb - Green or blue 1 Gb - Yellow or orange 100 M - Off
Bypass/Disconnect	Solid green in bypass mode. Solid yellow in disconnect mode. <hr/> Note: Some cards share Bypass/Disconnect function with speed function when integrated in to RJ Connector LED will blink in this case.

CHAPTER 4 Replacing SteelFusion Edge Components

This chapter describes how to replace components in SteelFusion Edge appliances. It includes the following sections:

- [“Field Replaceable Units” on page 35](#)
- [“Required Tools” on page 36](#)
- [“Opening the Bezel” on page 37](#)
- [“Removing the Chassis Cover” on page 38](#)
- [“Replacing Disk Drives” on page 39](#)
- [“Replacing Power Supply Units” on page 43](#)
- [“Replacing Memory Modules” on page 44](#)
- [“Replacing Fans” on page 58](#)

Field Replaceable Units

The SteelFusion Edge appliances contain several field replaceable units (FRUs) that you or a certified service technician can troubleshoot, remove from the system, and replace without having to send the system to a repair facility.

Caution: Perform troubleshooting or repairs only as directed in the product documentation or by the online or telephone service and support team. All other servicing should be performed by a certified technician. Your warranty does not cover damage due to servicing that is not authorized by Riverbed.

Note: For a list of supported NICs, see [Chapter 3, “Installing Network Interface Cards in SteelFusion Edge Appliances.”](#)

The following table lists the FRUs available for the SteelFusion Edge appliances.

FRU	Description	SFED Appliance	Instructions
MEM-1-002	8 GB DRAM DIMM	2100, 2200, 3100, 3200, 5100	“Replacing Memory Modules”
MEM-1-003	16 GB 1600, x4/DR, 16 GB RAM	2100, 2200, 3100, 3200, 5100	“Replacing Memory Modules”
MEM-1-004	32 GB DRAM DIMM	5100	“Replacing Memory Modules”
HDD-2-002	3.5-inch 1-TB SATA	2100	“Replacing Disk Drives”
HDD-2-003	3.5-inch 2-TB SATA	2200, 3100, 3200	“Replacing Disk Drives”
HDD-2-006	3.5-inch 4-TB SATA	5100	“Replacing Disk Drives”
SSD-2-002	100–120 GB	2100, 2200	“Replacing Disk Drives”
SDD-2-004	200–240 GB SSD	3100, 3200	“Replacing Disk Drives”
SSD-2-006	400–480 GB SSD	5100	“Replacing Disk Drives”
PWS-2-AC-1U	770 Watt PSU AC -1U	2100, 2200	“Replacing Power Supply Units”
PWS-2-AC-2U	1000 Watt PSU AC -2U	3100, 3200, 5100	“Replacing Power Supply Units”
FAN-2-1U-KIT	Fan assembly, 1U, bank of 2x6, 12 fans with the 6 cables/connectors	2100, 2200	“Replacing Fans”
FAN-2-2U-KIT	Fan assembly, 2U, 1 cableless pluggable, consists of 2 fans	3100, 3200, 5100	“Replacing Fans”
RMK-2-EXPRAIL	Rack kit, 1U and 2U, fully extendable	2100, 2200, 3100, 3200, 5100	“Mounting the SteelFusion Edge Appliances Using the Extendable Rail”
BZL-2-1U	1U locking/hinged Bezel Replacement Kit	2100, 2200	“Opening the Bezel”
BZL-2-2U	2U locking/hinged Bezel Replacement Kit	3100, 3200, 5100	“Opening the Bezel”

Required Tools

You need the following tools and equipment to replace components:

- You must use approved components for the appliance to function properly. Installation of unapproved components will result in boot failure. To order appliance components, contact Riverbed Support at <https://support.riverbed.com>.
- An antistatic strap. When you replace components, you must wear a grounded ESD antistatic strap to protect the hardware against electrostatic discharge. Make sure that the strap makes skin contact prior to handling equipment.
- A magnetic Phillips screwdriver.

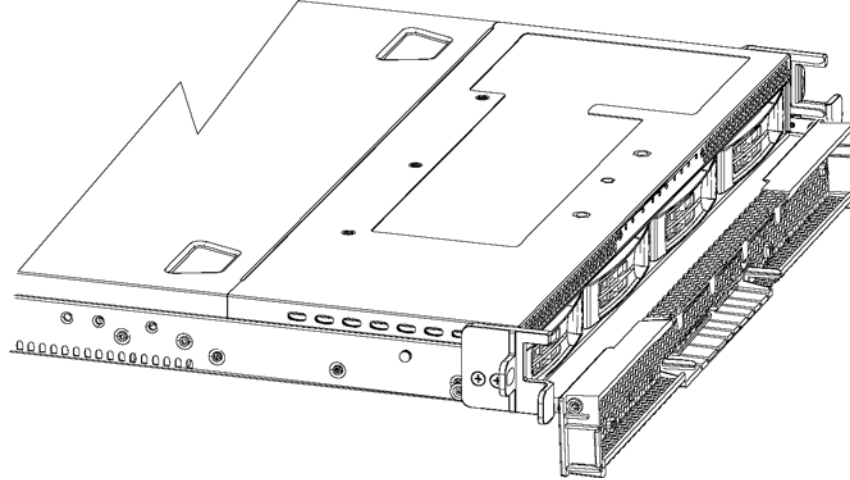
Opening the Bezel

The bezel on the SteelFusion Edge appliances is attached to the front panel.

To open and remove the bezel on SteelFusion Edge appliances

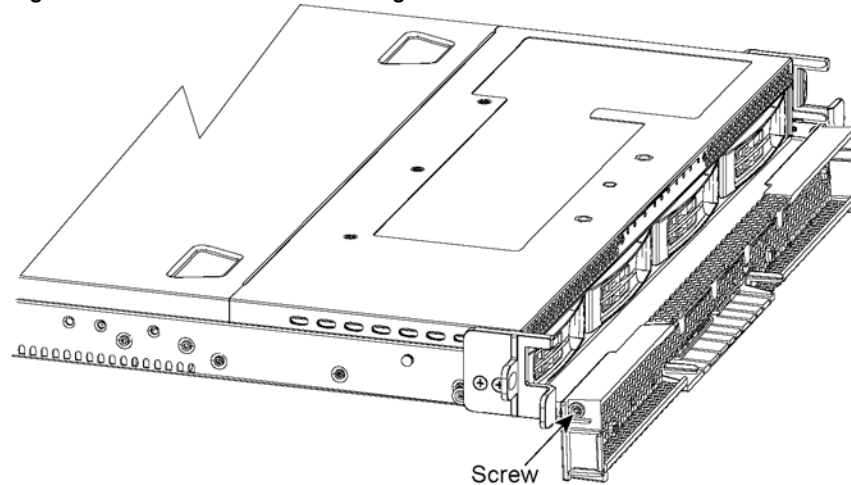
1. Press the release tabs on each side of the bezel and pull it toward you to open the bezel. The bezel flips down and remains attached to the hinges. (See [Figure 4-1](#).)

Figure 4-1. Opening the Bezel on SteelFusion Edge Appliances



2. Use a Phillips screwdriver to loosen the screws on both sides of the hinges to remove the bezel from the appliance. (See [Figure 4-2](#).)

Figure 4-2. Screw Location on the Hinge



3. Place the new bezel between the hinges and tighten the screws on both sides to secure the bezel to the hinges.
4. Flip the bezel up to put it in the closed position.

Removing the Chassis Cover

This section describes how to remove the chassis cover on SteelFusion Edge appliances. It includes the following procedures:

- “Removing the Chassis Cover on 1U Appliances” on page 38
- “Removing the Chassis Cover on 2U Appliances” on page 38

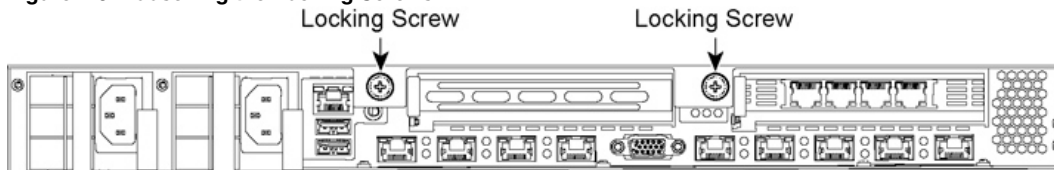
Removing the Chassis Cover on 1U Appliances

This section describes how to remove the chassis covers for the SteelFusion Edge 2100 and SteelFusion Edge 2200 appliances.

To remove the chassis cover on 1U appliances

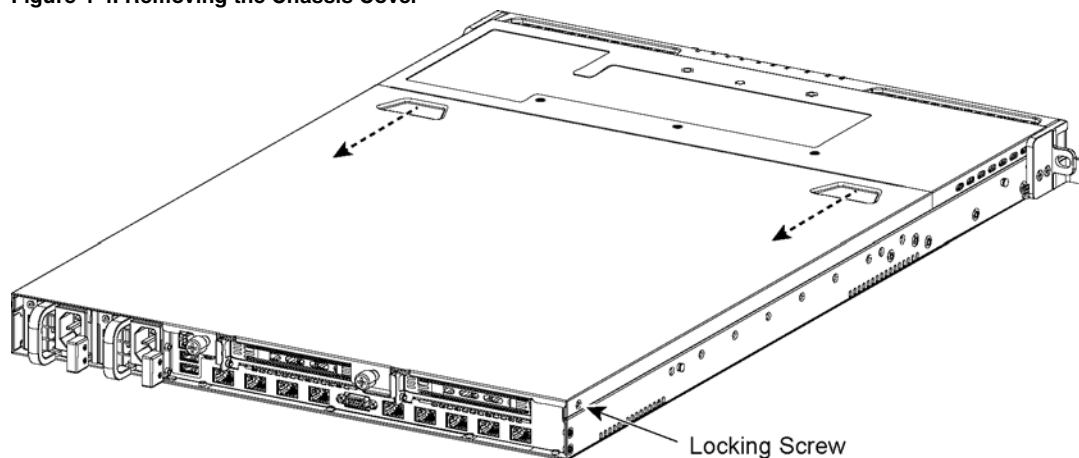
1. Loosen the two locking screws on the back of the chassis. (See [Figure 4-3](#).)

Figure 4-3. Loosening the Locking Screws



2. Remove the third locking screw on the left side near the back of the top cover.
3. Position your thumbs in the indentations at the front of the appliance and slide the cover back from the chassis. (See [Figure 4-4](#).)

Figure 4-4. Removing the Chassis Cover

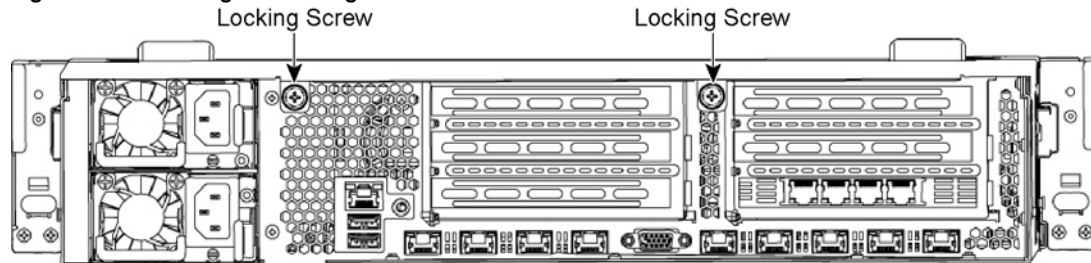


Removing the Chassis Cover on 2U Appliances

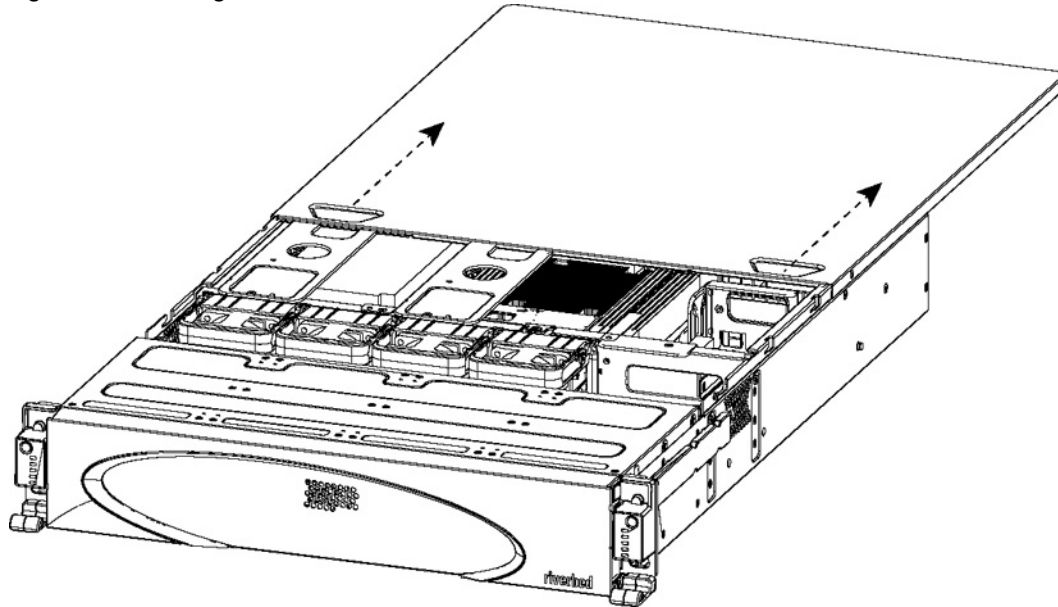
This section describes how to remove the chassis covers for the SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 appliances.

To remove the chassis cover on 2U appliances

1. Loosen the two locking screws on the back of the chassis. (See [Figure 4-5](#).)

Figure 4-5. Loosening the Locking Screws

2. Remove the third locking screw on the right side of the top cover.
3. Position your thumbs in the indentations at the front of the appliance and slide the cover back from the chassis. (See [Figure 4-6](#).)

Figure 4-6. Removing the Chassis Cover

Replacing Disk Drives

This section describes how to remove and replace disk drives and includes the following procedures:

- [“Replacing Disk Drives in 1U SteelFusion Edge Appliances” on page 40](#)

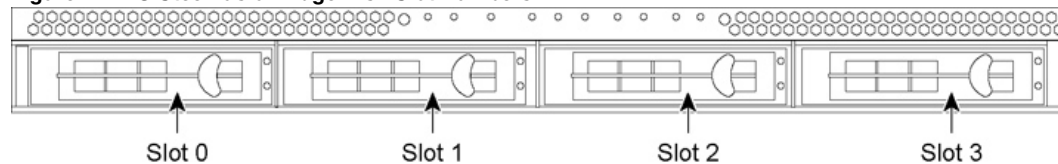
- [“Replacing Disk Drives in 2U SteelFusion Edge Appliances” on page 41](#)

Note: If you need to replace an appliance, you cannot move the disks to preserve your data. Each disk is encoded with machine-level information, and moving disks is not supported.

Replacing Disk Drives in 1U SteelFusion Edge Appliances

1U SteelFusion Edge appliances are equipped with replaceable, hot-swappable hard disk drives (HDD) and solid-state drives (SSD). The disk slot numbers for the drives are numbered in ascending order from left to right.

Figure 4-7. 1U SteelFusion Edge Disk Slot Numbers



You must use approved disk drives. Slots 0 and 1 support HDD and slots 2 and 3 support SSD. The following table lists the disk drive configuration available for the 1U SteelFusion Edge appliances.

Appliance	Quantity	Slots Supported
SteelFusion Edge 2100	2 x 3.5-inch 1-TB HDD	0 and 1
	2 x 2.5-inch 100 GB– 120 GB SSD	2 and 3
SteelFusion Edge 2200	2 x 3.5-inch 2-TB HDD	0 and 1
	2 x 2.5-inch 100 GB–120 GB SSD	2 and 3

Note: When you replace disk drives, you must wear a grounded ESD antistatic strap to protect the hardware against electrostatic discharge. Make sure that the strap makes skin contact prior to handling equipment.



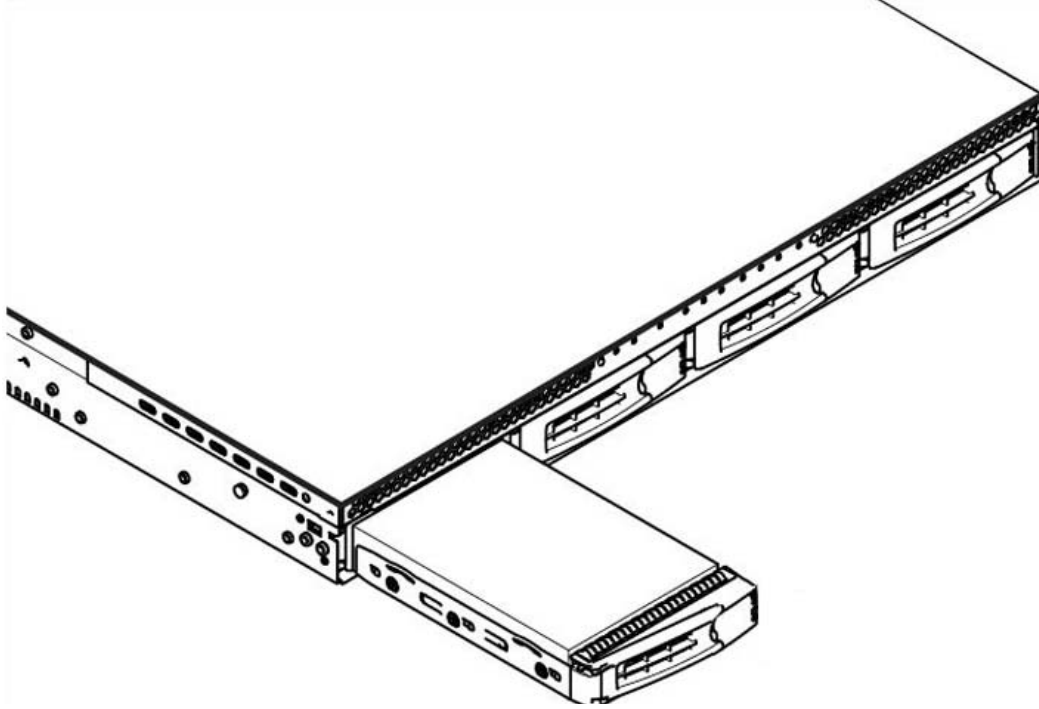
Caution: Use caution when you remove or replace components; they can become hot to the touch.

To replace the disk drive in 1U appliances

1. Open the bezel. See [“Opening the Bezel” on page 37](#).
2. Identify the faulty disk drive.
3. Press the orange release button and pull the drive handle toward you.

- Slide the faulty disk drive out of the slot. (See [Figure 4-8](#).)

Figure 4-8. Removing the Disk Drive



- Slide in the new disk drive until it mates with the back connectors in the chassis.

The disk drive LED lights blue when connected.

- Press in the disk-drive handle to close.

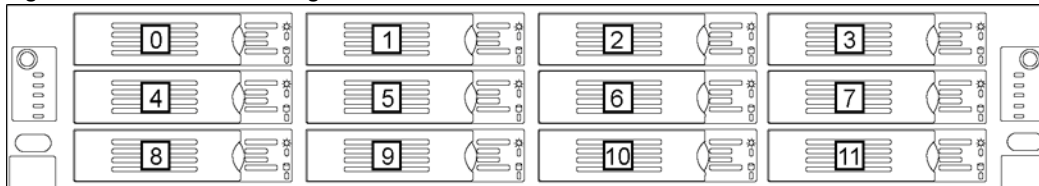
The new disk drive runs through a self-test automatically and then begins proper operation with the other disk drives. You do not need to set up or configure the new disk drive.

Note: It takes approximately 3 to 4 hours, depending on the system load, to rebuild a new disk drive. When the disk drive has finished rebuilding, the system sends an email to the administrator user.

Replacing Disk Drives in 2U SteelFusion Edge Appliances

The 2U SteelFusion Edge appliances are equipped with replaceable, hot-swappable disk drives. The drives are numbered in ascending order from the upper-left corner to the lower-right corner. (See [Figure 4-9](#).)

Figure 4-9. 2U SteelFusion Edge Disk Slot Numbers



You must use approved disk drives. Slots 0 through 7 support HDD and slots 8 through 11 support SSD. The following table lists the disk drive configuration available for the 2U SteelFusion Edge appliances.

Appliance	Quantity	Slots Supported
SteelFusion Edge 3100	4 x 3.5-inch 2-TB HDD	0 to 7
	4 x 2.5-inch 200 –240 GB SSD	8 to 11
SteelFusion Edge 3200	8 x 3.5-inch 2TB HDD	0 to 7
	4 x 2.5-inch 200 –240 GB SSD	8 to 11
	4 x 2.5-inch 240 –400 GB SSD	8 to 11
SteelFusion Edge 5100	8 x 3.5-inch 4-TB HDD	0 to 7
	4 x 2.5-inch 400–480 GB SSD	8 to 11

Note: When you replace disk drives, you must wear a grounded ESD antistatic strap to protect the hardware against electrostatic discharge. Make sure that the strap makes skin contact prior to handling equipment.



Caution: Use caution when you remove or replace components; they can become hot to the touch.

To replace a disk drive in the 2U SteelFusion Edge appliances

1. Open the bezel.

See [“Opening the Bezel” on page 37](#).

2. Identify the faulty disk drive.

The Alarm Status page in the Management Console identifies the faulty disk drive.

The disk drive LED is orange for failed drives.

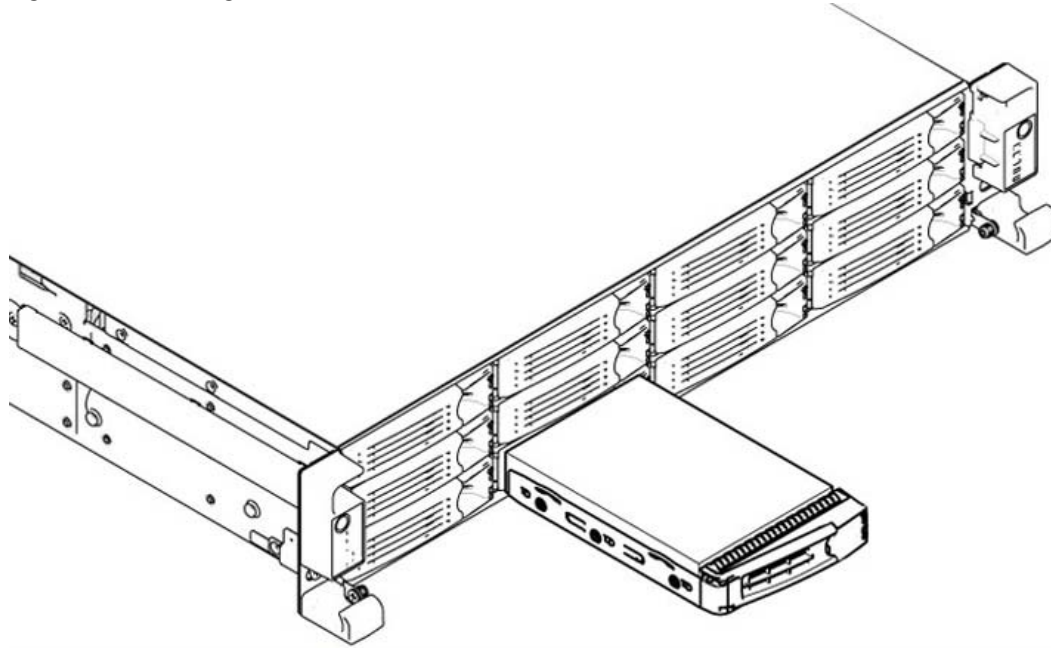
3. Connect to the CLI and enter the **raid swraid fail-disk** command:

```
amnesiac> raid swraid fail-disk <slot-number>
```

This command ensures the RAID system removes the disk partitions before the drive is removed from the slot. For details, see the *Riverbed Command-Line Interface Reference Manual*.

4. Press the orange release button and pull the drive handle toward you to release the disk drive. (Figure 4-10.)

Figure 4-10. Releasing the Disk Drive



5. Slide the faulty disk drive out of the slot. Make sure you remove the correct drive.
6. Wait 60 seconds between removing the old drive and adding the new drive.
Waiting ensures the system detects the drive removal so it can rebuild properly after you insert the new drive. If you insert the new drive before the system detects the removal, data might be corrupted.
7. Open the new disk-drive handle by pressing the orange release button.
8. Slide in the new disk drive until it mates with the back connectors in the chassis.
The disk drive LED is blue when connected.
9. Press in the disk-drive handle to close.

The new disk drive runs through a self-test automatically and then begins proper operation with the other disk drives. You do not need to set up or configure the new disk drive.

Replacing Power Supply Units

This section describes how to remove and replace a power supply unit in SteelFusion Edge appliances.

Replacing Power Supply Units in 1U and 2U Appliances

This section describes how to replace a power supply in SteelFusion Edge appliances. These appliances are equipped with replaceable, hot-swappable power supply units.

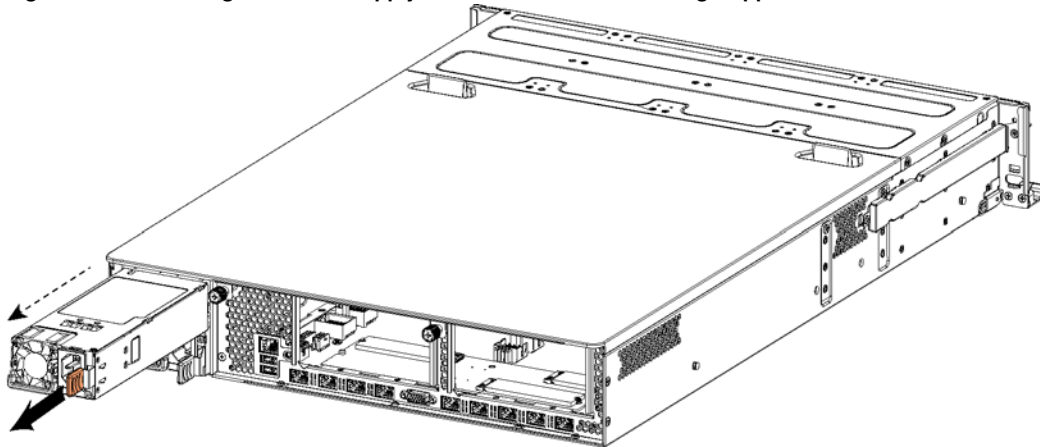


Caution: Use gloves when replacing the power supply units; they can become hot to the touch.

To replace power supply units in 1U and 2U appliances

1. Locate the defective power supply unit and remove the power cord.
2. Press the release tab toward the black handle, and pull the power supply unit toward you. (Figure 4-11.)

Figure 4-11. Removing the Power Supply Unit from a SteelFusion Edge Appliance



Note: Power Supply 1 (PS1) is on top, and Power Supply 2 (PS2) is on the bottom.

3. Pull the power supply unit out of the chassis.



Caution: Put the defective power supply unit aside; wait until it cools down before touching it.

4. Slide in the new power supply unit until it mates with the back connectors in the chassis.
When the power supply unit is pushed all the way in, the button clicks to the right.
5. Plug the AC power cord into the new power supply unit.

Replacing Memory Modules

This section describes how to remove and replace memory modules in the SteelFusion Edge appliances. This section includes the following procedures:

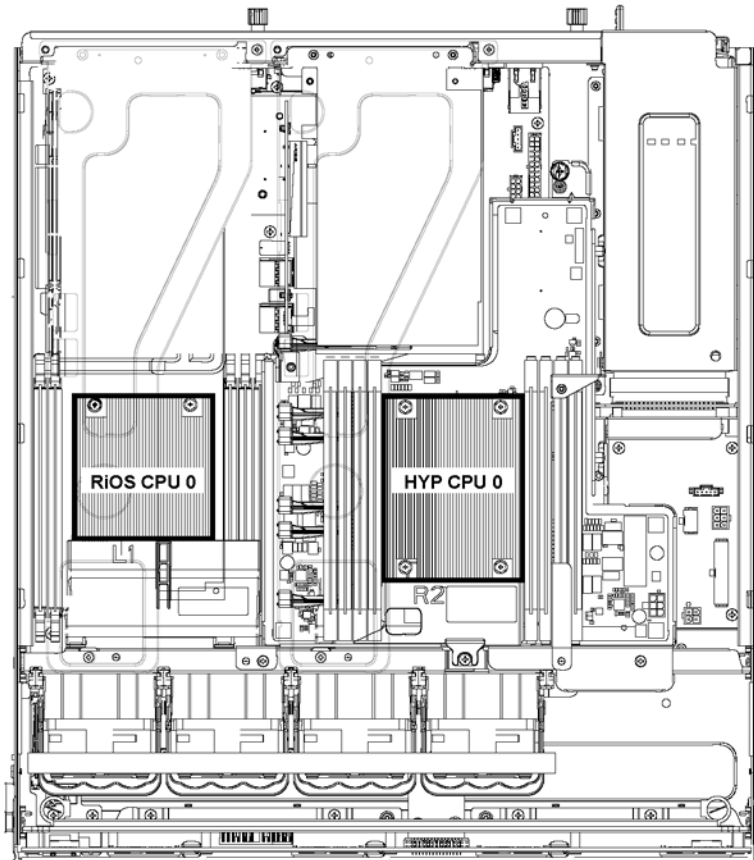
- [“Replacing Memory Modules in 1U SteelFusion Edge Appliances” on page 45](#)
- [“Replacing Memory Modules in 2U SteelFusion Edge Appliances” on page 49](#)

Replacing Memory Modules in 1U SteelFusion Edge Appliances

This section describes how to replace memory modules in SteelFusion Edge 2100 and SteelFusion Edge 2200 appliances. When replacing memory in the appliances, install the memory in the same slots.

The following diagram shows memory module slot locations in these appliances. ([Figure 4-12.](#))

Figure 4-12. Memory Module Slot Locations in 1U SteelFusion Edge Appliances
Chassis Rear

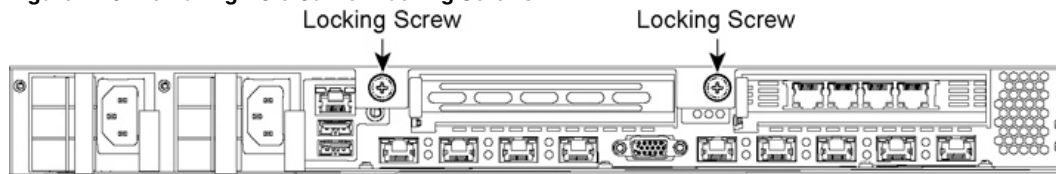


To replace the memory modules in the 1U SteelFusion Edge appliances

1. Power down the appliance.
2. Remove the chassis cover.
See [“Removing the Chassis Cover”](#) on page 38.

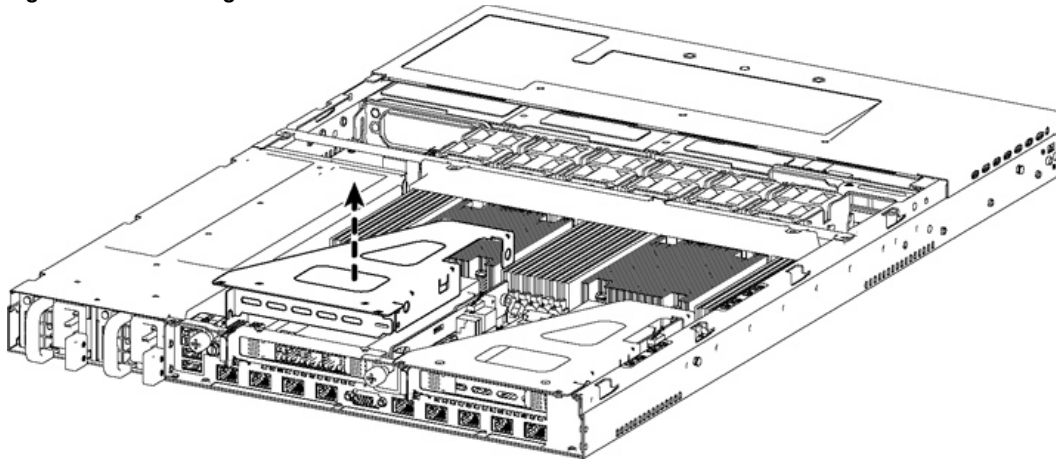
3. To access the memory modules, you must remove the PCIe carriers. Remove the locking screws of the PCIe carrier on the back of the appliance. (Figure 4-13.)

Figure 4-13. Removing PCIe Carrier Locking Screws



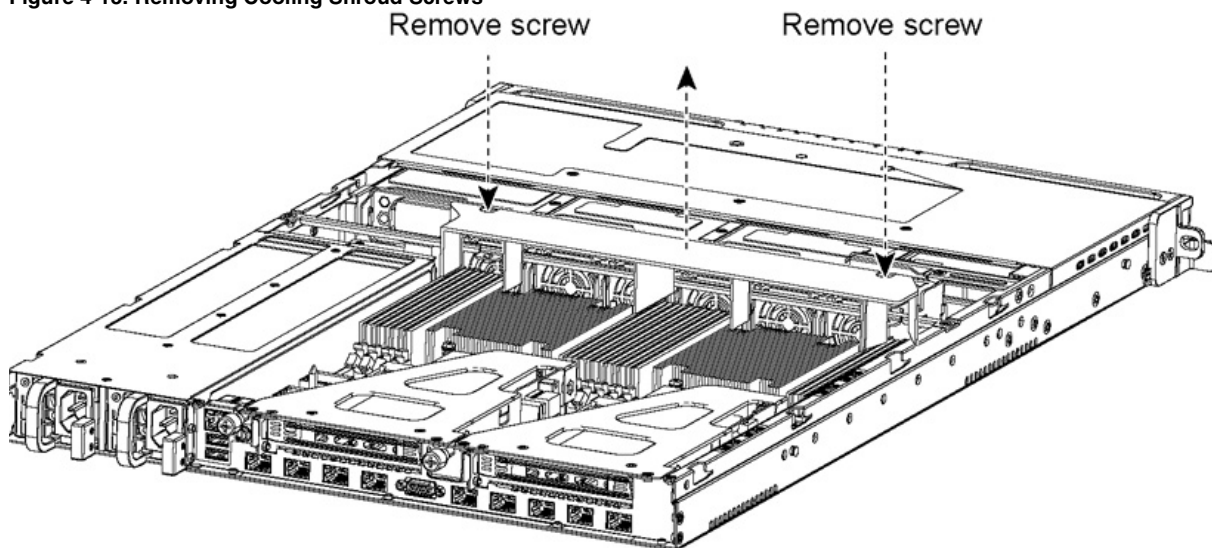
4. Lift the PCIe carrier straight out of the appliance using the attached strap. (Figure 4-14.)

Figure 4-14. Removing PCIe Carrier



5. Remove the two screws securing the cooling shroud. Lift the cooling shroud straight up and out of the appliance. (See Figure 4-15.)

Figure 4-15. Removing Cooling Shroud Screws

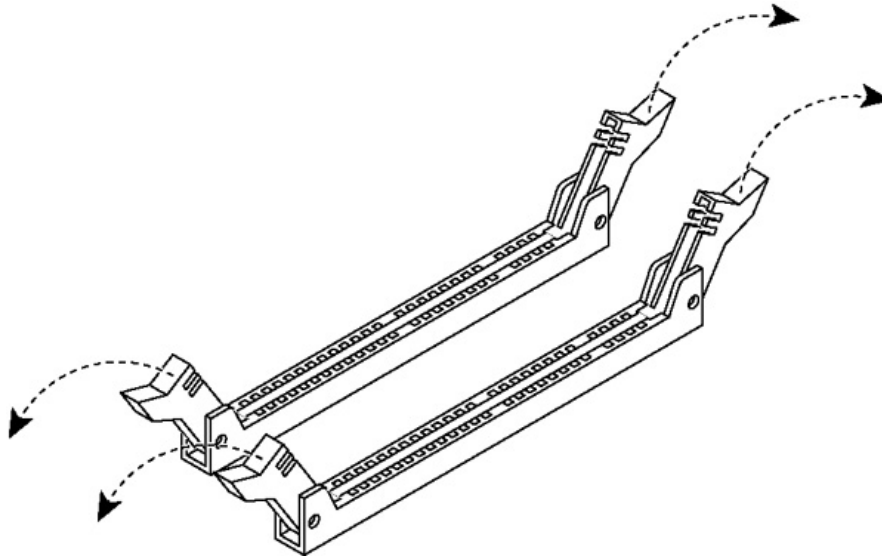




Caution: Lift the shroud straight up to avoid damaging any components of the appliance.

6. Press the ejector tabs on the memory slots down and outward, and gently pull the memory module out of the slot. (Figure 4-16.)

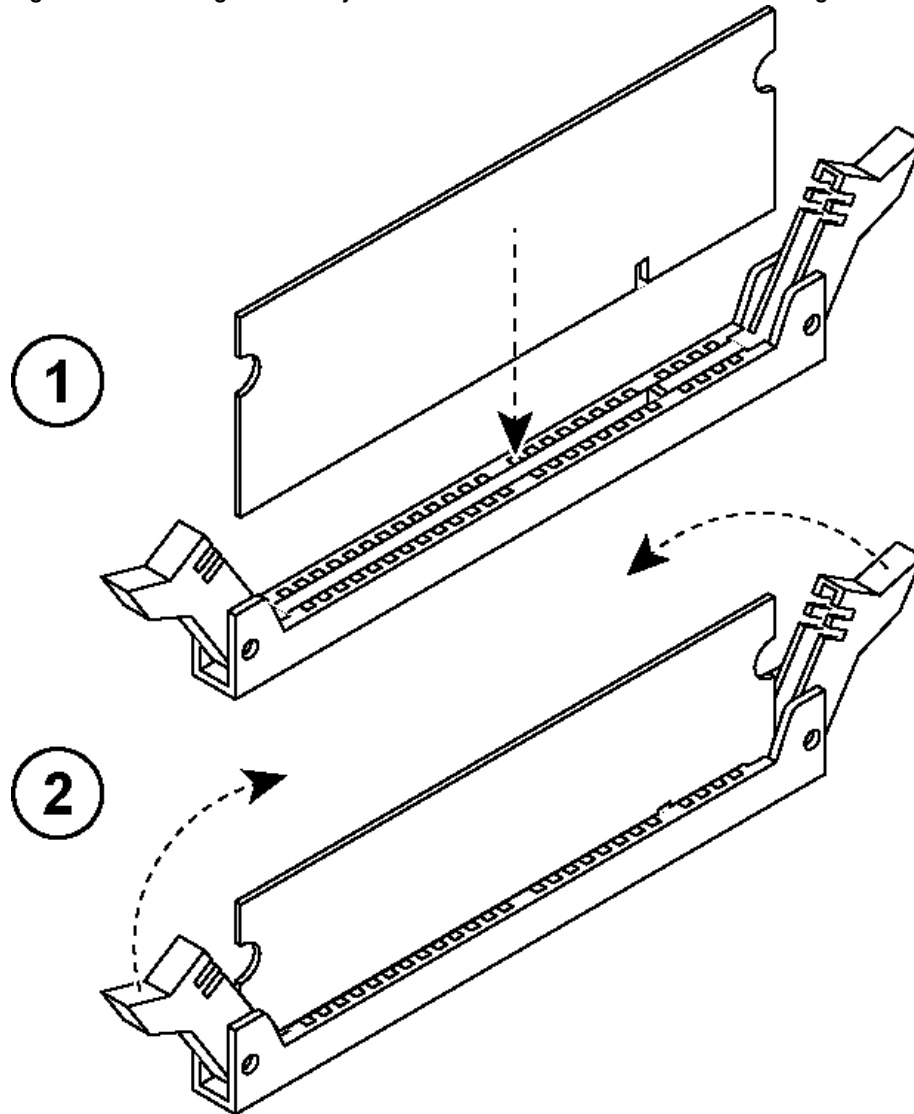
Figure 4-16. Accessing the Memory Modules



7. Remove the existing memory module and replace it with an approved memory module of the same size.
8. Align the memory-module edge connector with the slot alignment keys and insert it into the slot.

The module slot has two alignment keys that allow you to install the module in only one direction. (Figure 4-17.)

Figure 4-17. Inserting the Memory Modules into the Connector Slot and Securing



9. Press down on the memory module with your thumbs until you hear it click.
10. Ensure that all ejector tabs are in the upright locked position.
11. If necessary, replace the PCIe carrier.
12. Reinstall the cooling shroud.
13. Reinstall the chassis cover.

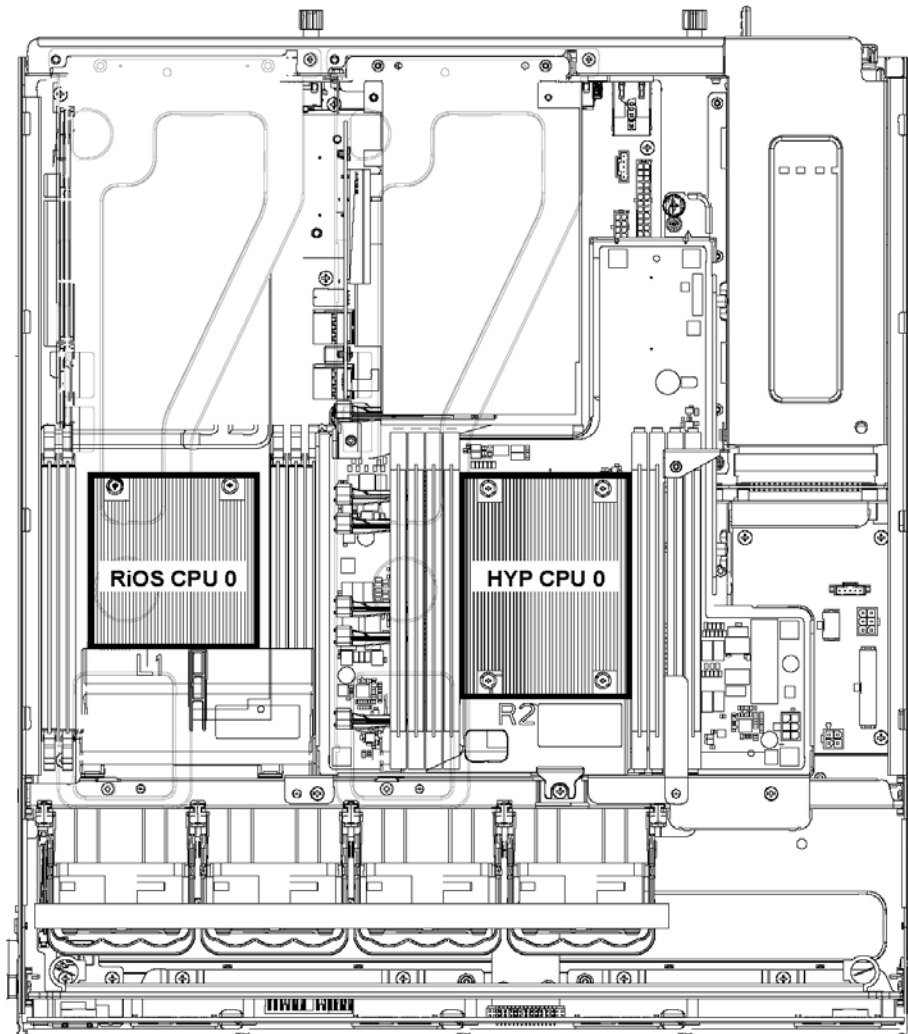
14. Reinstall the power cords and peripherals.
15. Power on the appliance.

Replacing Memory Modules in 2U SteelFusion Edge Appliances

This section describes how to replace memory modules in the SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 appliances. When replacing memory in the appliances, install the memory in the same slots.

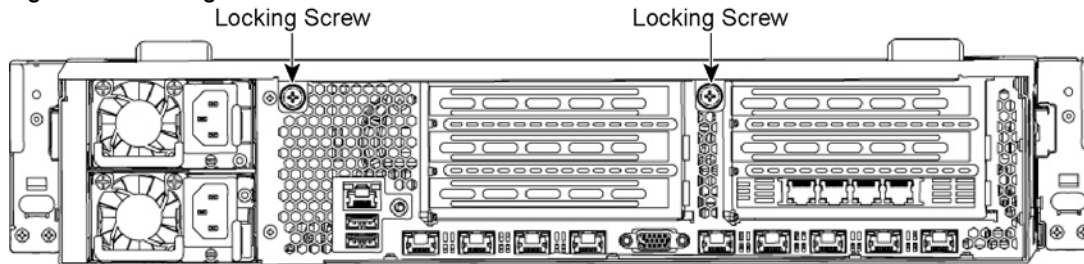
The following diagram illustrates memory module slot locations in these appliances. (See [Figure 4-18](#).)

Figure 4-18. Memory Module Slot Locations in 2U SteelFusion Edge Appliances
Chassis Rear

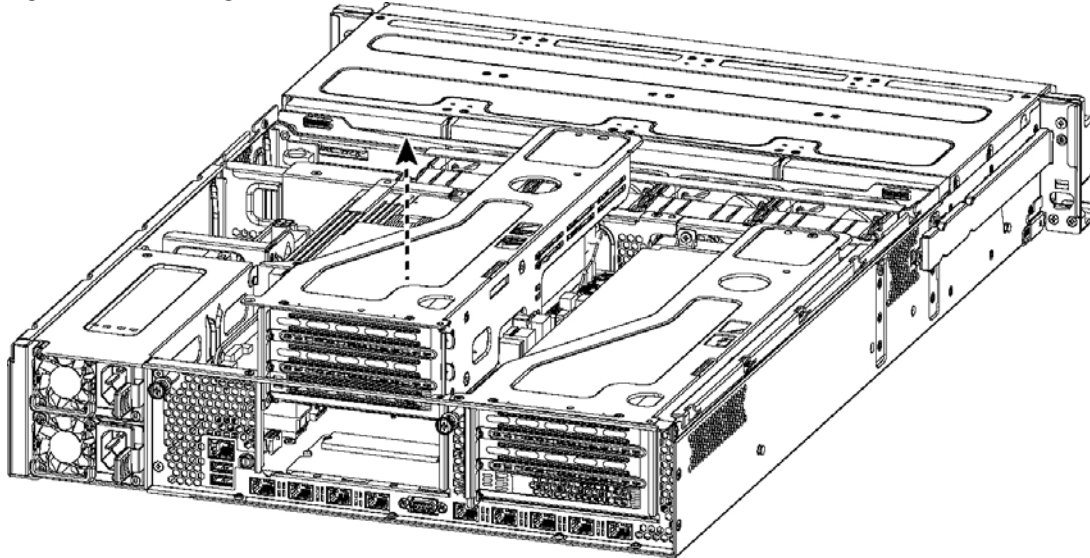


To replace memory modules in a 2U SteelFusion Edge appliance

1. Power down the appliance.
2. Remove the chassis cover.
See [“Opening the Bezel” on page 37](#).
3. To release the PCIe carrier, remove the two locking screws on the top of the carrier (see [Figure 4-19](#)) and the one locking screw on the rear panel.

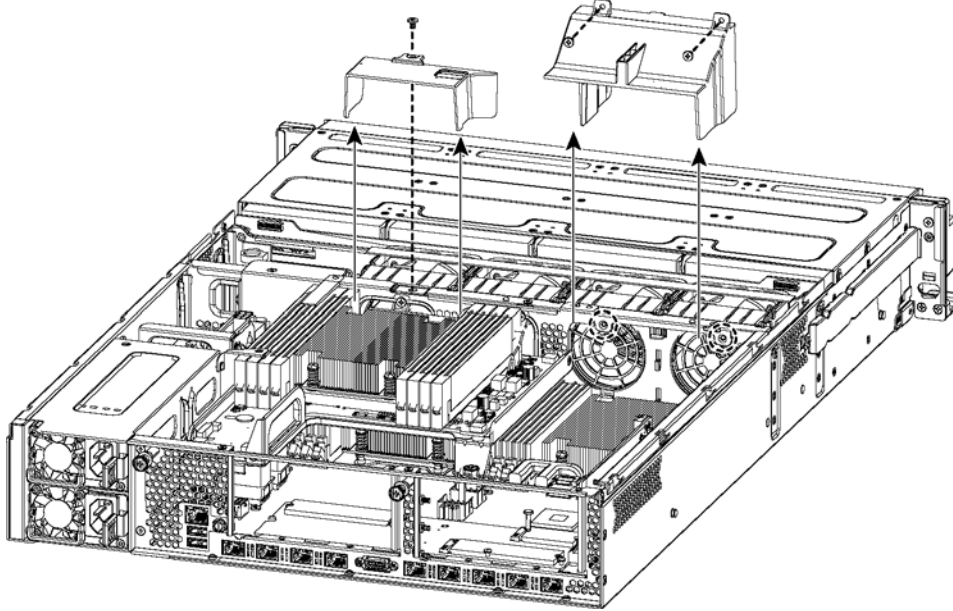
Figure 4-19. Locking Screws

4. To remove the right and left PCIe carrier from the chassis, place your fingers in the carrier holes and lift straight up. (See [Figure 4-20](#).)

Figure 4-20. Removing the PCIe Carriers from the Chassis

5. Remove the screws securing the cooling shroud to access the memory module slots. (See [Figure 4-21.](#))

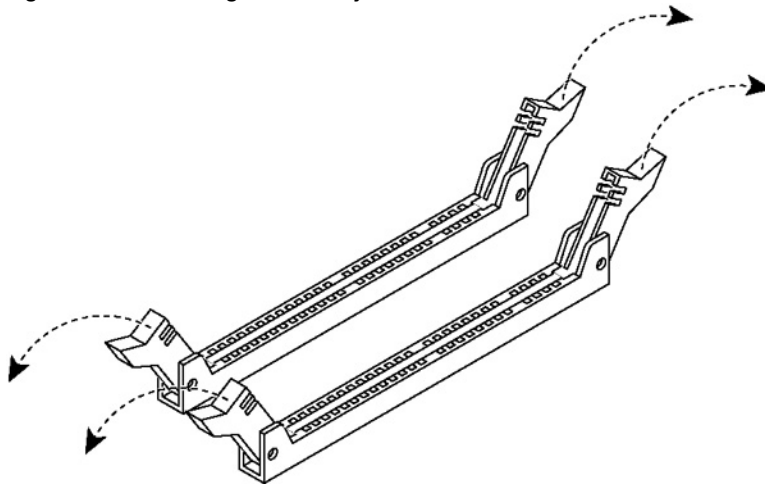
Figure 4-21. Removing Cooling Shroud



Caution: Be careful not to damage any surrounding components when removing and installing the cooling shroud. Lift the shroud straight up to avoid damaging any components of the appliance.

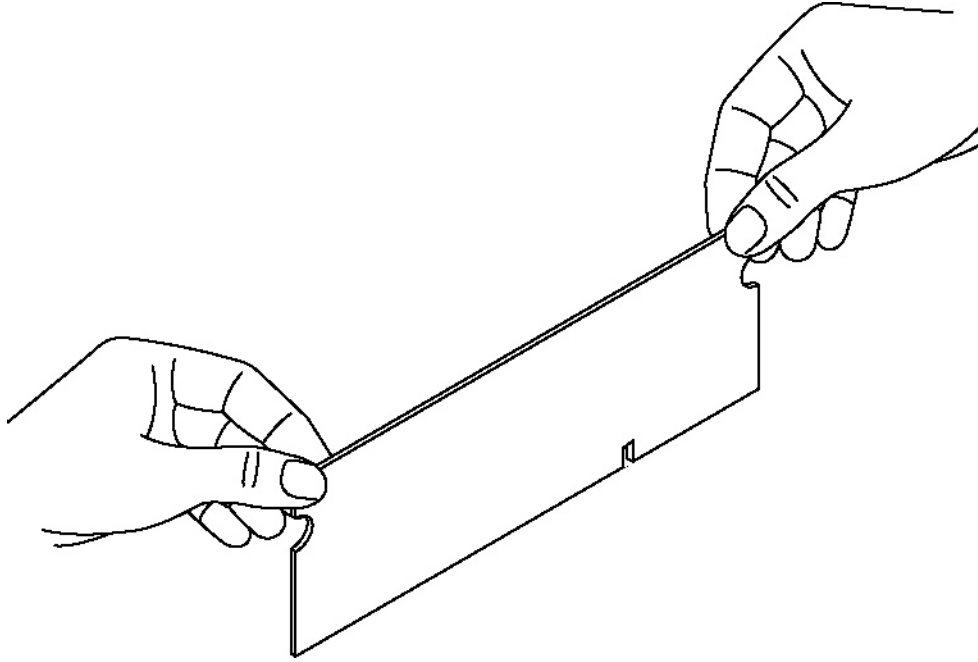
6. Press the ejector tabs on the memory module slot down and outward and gently pull the memory module out of the slot. (See [Figure 4-22.](#))

Figure 4-22. Accessing the Memory Modules



7. Hold the memory module on the outside edges to prevent damage to the module. (See [Figure 4-23.](#))

Figure 4-23. Proper Handling of the Memory Module

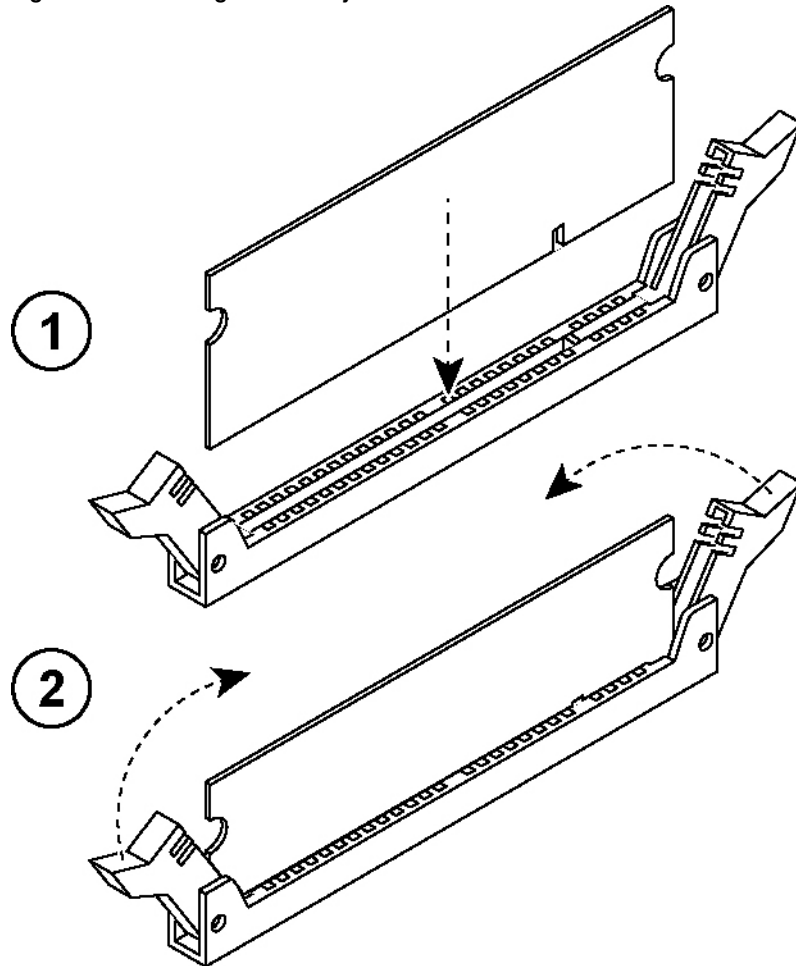


8. Remove the existing memory module and replace it with an approved memory module of the same size. When adding memory, always replace the memory in the black slots first. Make sure the memory is equally distributed on both sides.

Note: Replacing the existing memory module with a module of a different size is not recommended. Replace the failed memory module with the same memory module size. You must use approved memory modules. Contact Riverbed Support at <https://support.riverbed.com> to obtain the correct memory modules.

9. Align the memory-module edge connector with the slot alignment keys and insert it into the slot. The module slot has two alignment keys that allow you to install the module in only one direction. (Figure 4-24.)

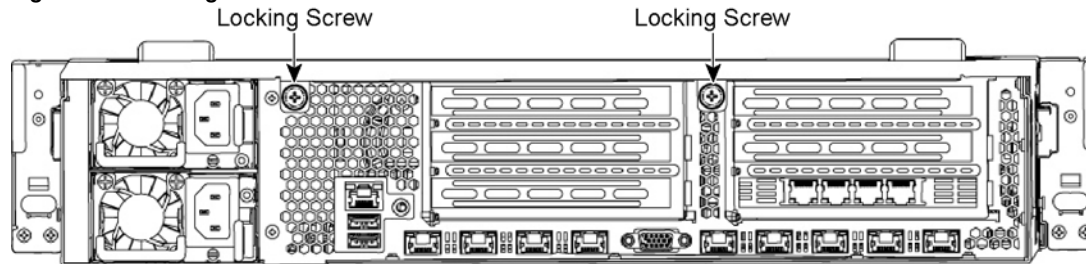
Figure 4-24. Inserting the Memory Modules into the Connector Slot and Securing



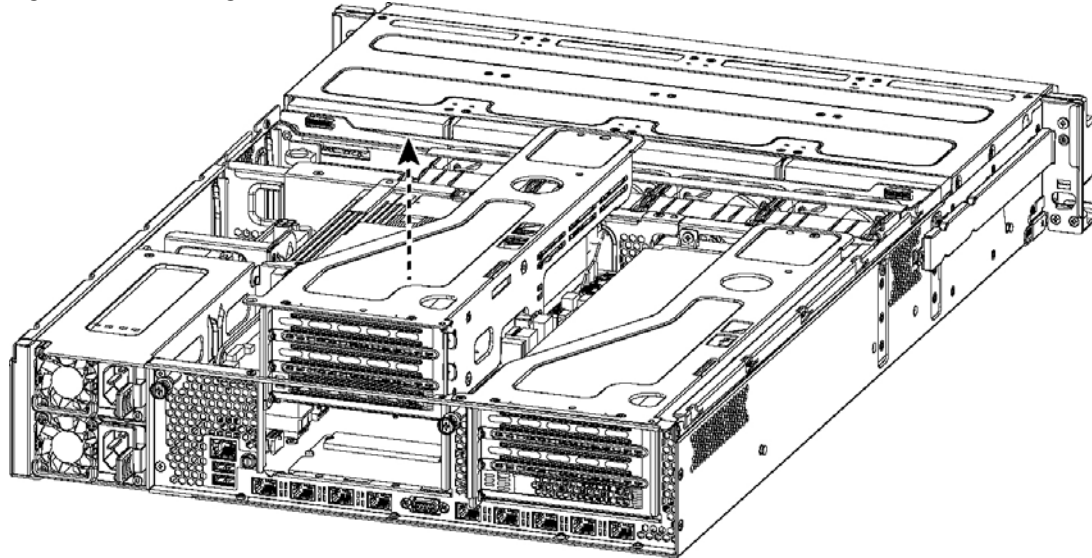
10. Press down on the memory module with your thumbs while pulling up on the ejectors with your index fingers to lock the module into the slot.
11. Ensure that all ejector tabs are in the upright locked position.
12. Repeat [Step 6](#) to [Step 11](#) to install the remaining memory modules.
13. Reinstall the cooling shroud.
14. Reinstall the chassis cover.
15. Plug in the power cords and the peripherals.
16. Power on the appliance.

To replace memory modules in a 2U SteelFusion Edge appliance with the QPI module installed

1. Power down the appliance.
2. Remove the chassis cover.
See [“Opening the Bezel” on page 37](#).
3. To release the PCIe carrier, remove the two locking screws on the top of the carrier (see [Figure 4-25](#)) and the one locking screw on the rear panel.

Figure 4-25. Locking Screws

4. To remove the right and left PCIe carrier from the chassis, place your fingers in the carrier holes and lift straight up. (See [Figure 4-26](#).)

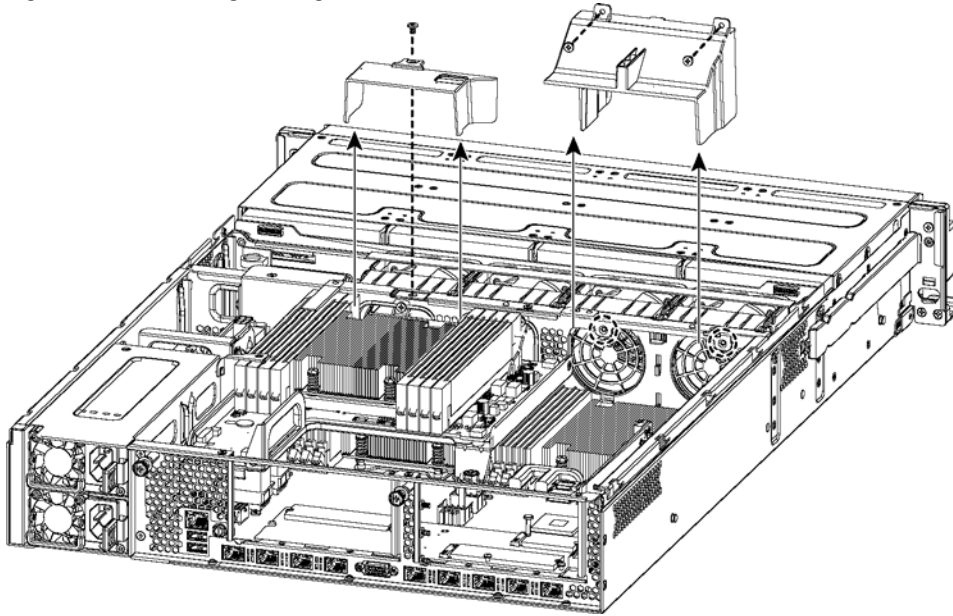
Figure 4-26. Removing the PCIe Carriers from the Chassis

Note: Use extreme care when removing the QPI module. Damage to the module can cause unexpected results.

5. Remove the two small cooling shrouds by flipping them up and off of the module.
6. Disconnect the power to the QPI module.
7. Unscrew the four screws on the QPI module. There are two on the top, one in the middle, and one at the bottom of the QPI module.

8. Carefully lift the QPI module up and remove it from the appliance.
9. Remove the screws securing the cooling shroud to access the memory module slots. (See [Figure 4-27.](#))

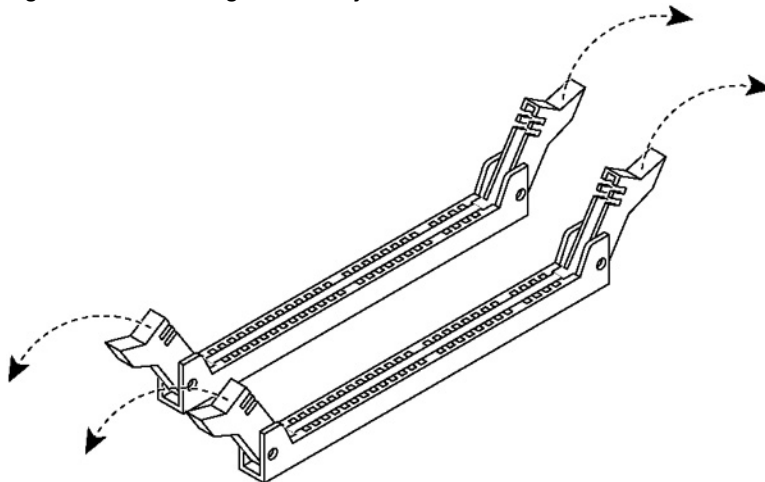
Figure 4-27. Removing Cooling Shroud



Caution: Be careful not to damage any surrounding components when removing and installing the cooling shroud. Lift the shroud straight up to avoid damaging any components of the appliance.

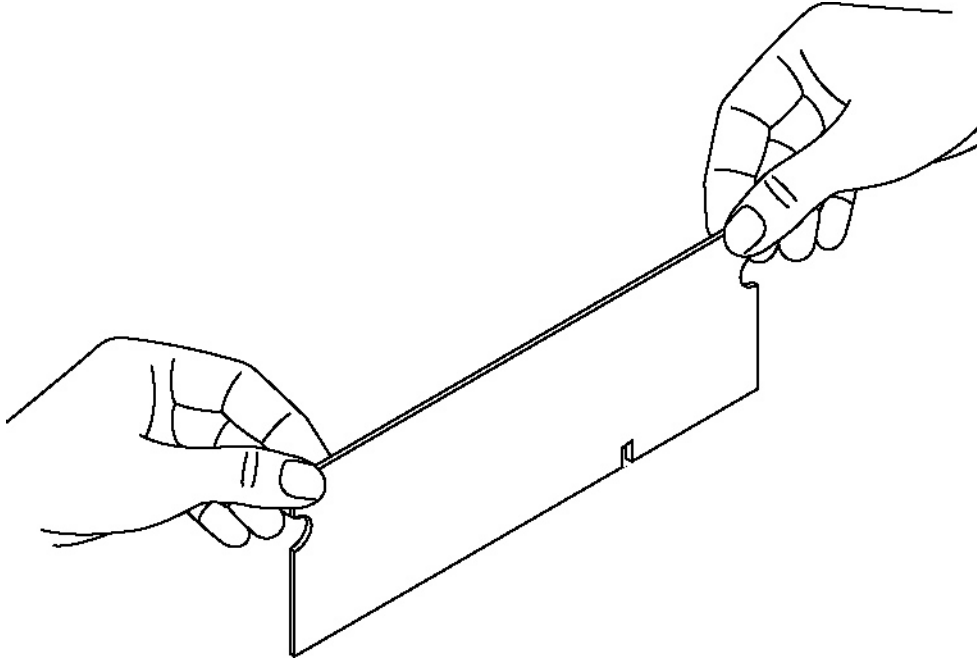
10. Press the ejector tabs on the memory module slot down and outward and gently pull the memory module out of the slot. (See [Figure 4-28.](#))

Figure 4-28. Accessing the Memory Modules



11. Hold the memory module on the outside edges to prevent damage to the module. (See [Figure 4-29](#).)

Figure 4-29. Proper Handling of the Memory Module

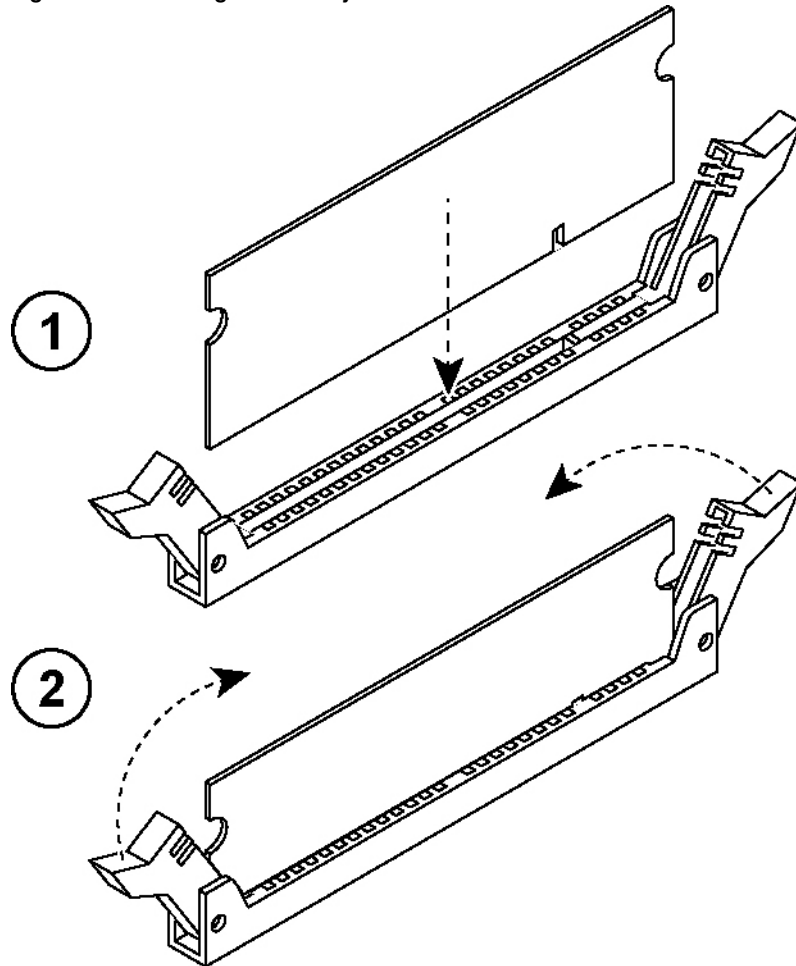


12. Remove the existing memory module and replace it with an approved memory module of the same size. When adding memory, always replace the memory in the black slots first. Make sure the memory is equally distributed on both sides.

Note: Replacing the existing memory module with a module of a different size is not recommended. Replace the failed memory module with the same memory module size. You must use approved memory modules. Contact Riverbed Support at <https://support.riverbed.com> to obtain the correct memory modules.

13. Align the memory-module edge connector with the slot alignment keys and insert it into the slot. The module slot has two alignment keys that allow you to install the module in only one direction. (Figure 4-30.)

Figure 4-30. Inserting the Memory Modules into the Connector Slot and Securing



14. Press down on the memory module with your thumbs while pulling up on the ejectors with your index fingers to lock the module into the slot.
15. Ensure that all ejector tabs are in the upright locked position.
16. Repeat [Step 6 to Step 11](#) to install the remaining memory modules.
17. Reinstall the cooling shroud.
18. Reinstall the QPI module.
19. Connect the power wires for the QPI module.
20. Reinstall the small cooling shrouds.
21. Reinstall the chassis cover.

22. Plug in the power cords and the peripherals.

23. Power on the appliance.

Replacing Fans

This section describes how to identify fan status and replace fans in the SteelFusion Edge appliances and includes the following procedures:

- [“Determining Fan Status” on page 58](#)
- [“Replacing Fans in 1U SteelFusion Edge Appliances” on page 59](#)
- [“Replacing Fans in 2U SteelFusion Edge Appliances” on page 60](#)

Note: You must power down the 1U SteelFusion Edge appliances prior to replacing fans.

Note: The 2U SteelFusion Edge appliances contain hot-swappable fans.

Determining Fan Status

This section describes how to determine the status of individual fans in the appliance.

To determine fan status

1. Connect to the CLI.

For details, see the *Riverbed Command-Line Interface Reference Manual*.

2. At the system prompt, enter the **show stats fan** command:

```
amnesiac # show stats fan
FanId   RPM    Min RPM Status
1        4700    100    ok
2        5700    100    ok
3        4700    100    ok
4        5800    100    ok
5        4700    100    ok
6        5700    100    ok
7        4900    100    ok
8        5900    100    ok
amnesiac #
```

The output and number of fans vary depending on your appliance.

Replacing Fans in 1U SteelFusion Edge Appliances

This section describes how to replace fans in the 1U SteelFusion Edge appliances. These appliances are equipped with six fans in a single casing. The fans are not hot swappable; you must power down the appliance before replacing the fans.

Note: You must use approved fans. To order fans, contact Riverbed Support at <https://support.riverbed.com>.

To replace the fans in the 1U SteelFusion Edge appliances

1. Remove the chassis cover.
See [“Opening the Bezel” on page 37](#).
2. Unplug the fan cables from the cable jacks on the motherboard.
3. Pull the fan unit up and out of the chassis. The fans are encased in one unit.
4. Seat the fan unit on the metal peg on the floor of the chassis.
5. Plug the cables of the replacement fan unit into the cable jacks.
6. Replace the chassis cover.

Note: If the RiOS IPMI alarm triggers when you open the chassis cover, run the **clear hardware error-log** command in the CLI to clear the alarm. For details, see the *Riverbed Command-Line Interface Reference Manual*.

Replacing Fans in 2U SteelFusion Edge Appliances

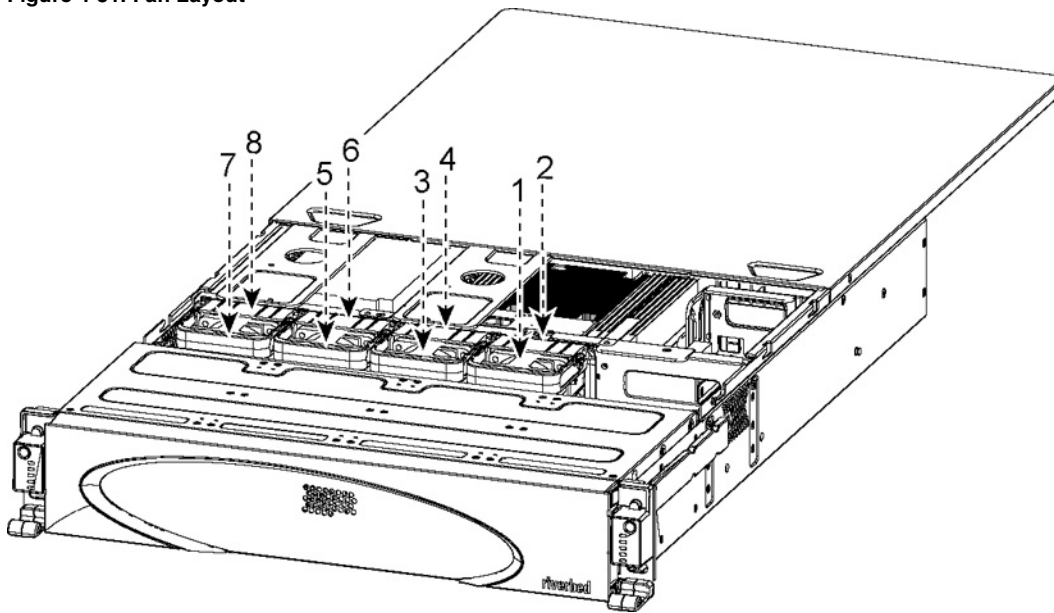
This section describes how to replace fans in the 2U SteelFusion Edge appliances. These appliances are equipped with four dual-unit hot-swappable fans at the front of the chassis.

Note: You must use approved fans. To order fans, contact Riverbed Support at <https://support.riverbed.com>.

To replace the fans in the 2U appliances

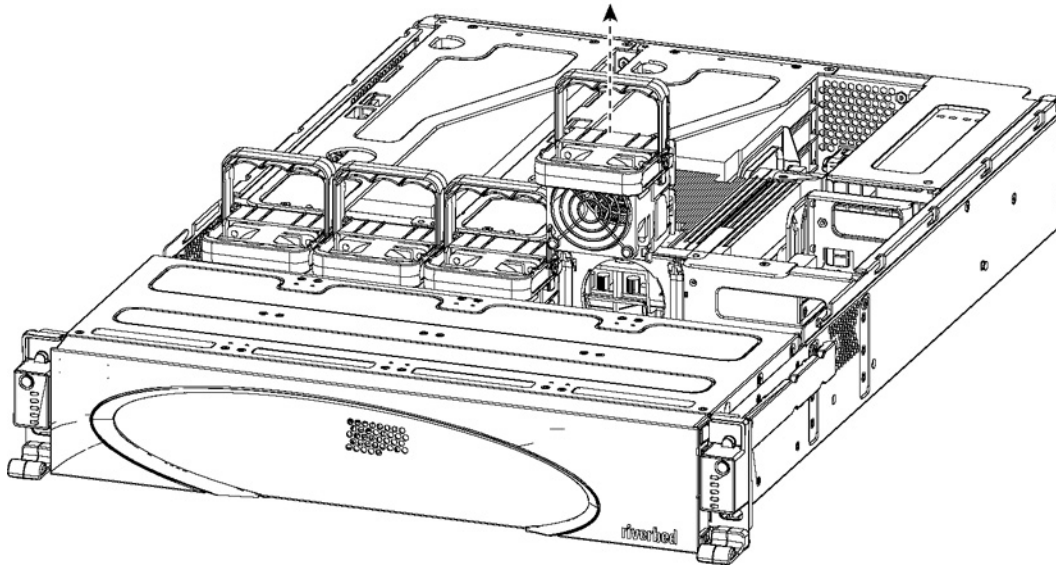
1. Remove the chassis cover.
See [“Opening the Bezel” on page 37](#).
2. Identify the faulty fan.
The appliance has four fan units, each with two fans.

Figure 4-31. Fan Layout



3. Pull the fan release lever upward and pull the fan up from the chassis.

Figure 4-32. Removing the Fan



4. Plug the replacement fan into the chassis.
5. Replace the chassis cover.

Note: If the IPMI alarm triggers when you open the chassis cover, enter the **clear hardware error-log** command in the CLI to clear the alarm. For details, see the *Riverbed Command-Line Interface Reference Manual*.

APPENDIX A Upgrading SteelFusion Edge Appliances

This chapter describes how to upgrade SteelFusion Edge appliances. It includes the following sections:

- [“Overview” on page 63](#)
- [“Installing Licenses and Activating Specifications” on page 64](#)

Overview

A model upgrade enables you to add a license to an existing SteelFusion Edge appliance to increase the capacity and the model specification of the appliance within its platform family.

You can install licenses using the Riverbed CLI or the Management Console. Model upgrades always preserve the configuration of the appliance.

Model Upgrades and Platform Requirements

The following table describes the available model upgrades, the system requirements for the upgrade, and the impact of the upgrade on the appliance.

Source Model	Destination Model	Upgrade Requirements	Minimum Software Version	Impact on Data Store	Impact on Configuration	Reboot Required
SFE 2100 W1	SFE 2100 W2	License only	SF Edge 4.0	None	None	No
SFE 2100 W1	SFE 2100 W3	License only	SF Edge 4.0	None	None	No
SFE 2100 W2	SFE 2100 W3	License only	SF Edge 4.0	None	None	No
SFE 2200 W1	SFE 2200 W2	License only	SF Edge 4.0	None	None	No
SFE 2200 W1	SFE 2200 W3	License only	SF Edge 4.0	None	None	No
SFE 2200 W2	SFE 2200 W3	License only	SF Edge 4.0	None	None	No
SFE 3100 W0	SFE 3100 W1	License only	SF Edge 4.0	None	None	No
SFE 3100 W0	SFE 3100 W2	License only	SF Edge 4.0	None	None	No
SFE 3100 W0	SFE 3100 W3	License only	SF Edge 4.0	None	None	No
SFE 3100 W1	SFE 3100 W2	License only	SF Edge 4.0	None	None	No

Source Model	Destination Model	Upgrade Requirements	Minimum Software Version	Impact on Data Store	Impact on Configuration	Reboot Required
SFE 3100 W1	SFE 3100 W3	License only	SF Edge 4.0	None	None	No
SFE 3100 W2	SFE 3100 W3	License only	SF Edge 4.0	None	None	No
SFE 3200 W0	SFE 3200 W1	License only	SF Edge 4.0	None	None	No
SFE 3200 W0	SFE 3200 W2	License only	SF Edge 4.0	None	None	No
SFE 3200 W0	SFE 3200 W3	License only	SF Edge 4.0	None	None	No
SFE 3200 W1	SFE 3200 W2	License only	SF Edge 4.0	None	None	No
SFE 3200 W1	SFE 3200 W3	License only	SF Edge 4.0	None	None	No
SFE 3200 W2	SFE 3200 W3	License only	SF Edge 4.0	None	None	No
SFE 5100 W0	SFE 5100 W1	License only	SF Edge 4.0	None	None	No
SFE 5100 W0	SFE 5100 W2	License only	SF Edge 4.0	None	None	No
SFE 5100 W1	SFE 5100 W2	License only	SF Edge 4.0	None	None	No

Upgrading a Model

You perform the following steps to upgrade a model.

To perform a license-only upgrade

1. Install the model upgrade license.

You can install the model upgrade license in the CLI or the Management Console. For detailed information, see [“Installing Licenses and Activating Specifications” on page 64](#). After you install the license, the system indicates the model specifications available and if hardware is required for activation.

2. Stop the service.

You need to stop the optimization service to activate a model upgrade specification.

3. Activate the specification.

Activate the model upgrade specification in the CLI or the Management Console. For detailed information, see [“Installing Licenses and Activating Specifications” on page 64](#).

4. Restart the service.

Installing Licenses and Activating Specifications

The following sections describe how to install model upgrade licenses and activate model specifications using the CLI or the Management Console.

After you install a model upgrade license, you must stop the optimization service to activate the model specification.

Model Upgrades Using the CLI

This section describes how to install a model upgrade license and activate a specification using the CLI.

To install a model upgrade license from the CLI

1. Connect to the Riverbed CLI.

For detailed information about using the CLI, see the *Riverbed Command-Line Interface Reference Manual*.

2. Enter enable mode; at the system prompt, enter the **enable** command:

```
amnesiac > enable
```

3. Enter configuration mode; at the system prompt, enter the **configure terminal** command:

```
amnesiac # configure terminal
amnesiac (config) #
```

4. View current and available model specifications; enter the **show hardware spec** command:

```
amnesiac (config) # show hardware spec
  Spec      Description
-----
* SF2100W1   BW Limit: 10000 Kb/s      Connection Limit: 1500

  SF2100W2   BW Limit: 20000 Kb/s      Connection Limit: 2500
              (activation requires license)
  SF2100W3   BW Limit: 50000 Kb/s      Connection Limit: 6000
              (activation requires license)

* = active
```

5. Install the model upgrade license; enter the **license install <license-key>** command:

```
amnesiac (config) # license install LK1-MSPECSF2200W2-0000-0000-1-4A3A-1480-0CDF
```

Note: Riverbed recommends you write the license to memory after it has been installed.

6. Write the model upgrade license to memory; enter the **write memory** command:

```
amnesiac (config) # write memory
```

7. View licenses installed on the appliance; enter the **show licenses** command:

```
amnesiac (config) # show licenses
Local: LK1-SH10BASE-0000-0000-1-D2F9-EFAA-5244
  Index:      1
  Feature:    SH10BASE
  Valid:      yes
  Active:     yes
  Start date:
  End date:
```

8. View the available model upgrade specification; enter the **show hardware spec** command:

```
amnesiac (config) # show hardware spec
  Spec      Description
-----
* SF3100W1   BW Limit: 30000 Kb/s      Connection Limit: 2500
```

```

SF3100W2      BW Limit: 50000 Kb/s      Connection Limit: 5000
              (activation requires license)
SF3100W3      BW Limit: 100000 Kb/s     Connection Limit: 10000
              (activation requires license)

```

* = active

9. Stop the optimization service; enter the `no service enable` command:

```

amnesiac (config) # no service enable
Terminating optimization service.....

```

Note: You must stop the optimization service prior to model upgrade activation.

10. Activate the model specification; enter the `hardware spec activate <model-number>` command:

```

amnesiac (config) # hardware spec activate EXAMPLE-SF2100W2
Appliance upgrade to EXAMPLE-SF2100W2 successful

```

Note: Upgrades that require additional hardware automatically shut down the appliance after you activate the model upgrade specification. Install the new hardware and power on the system. The system reformats the drives and completes the upgrade.

11. Restart the optimization service for model upgrades that do not require a reboot, enter the `restart` command:

```

amnesiac (config) # restart
Terminating optimization service.....
Relaunching optimization service.

```

Note: After upgrading a model, you need to reapply admission control overrides relative to the default admission control values of the new model.

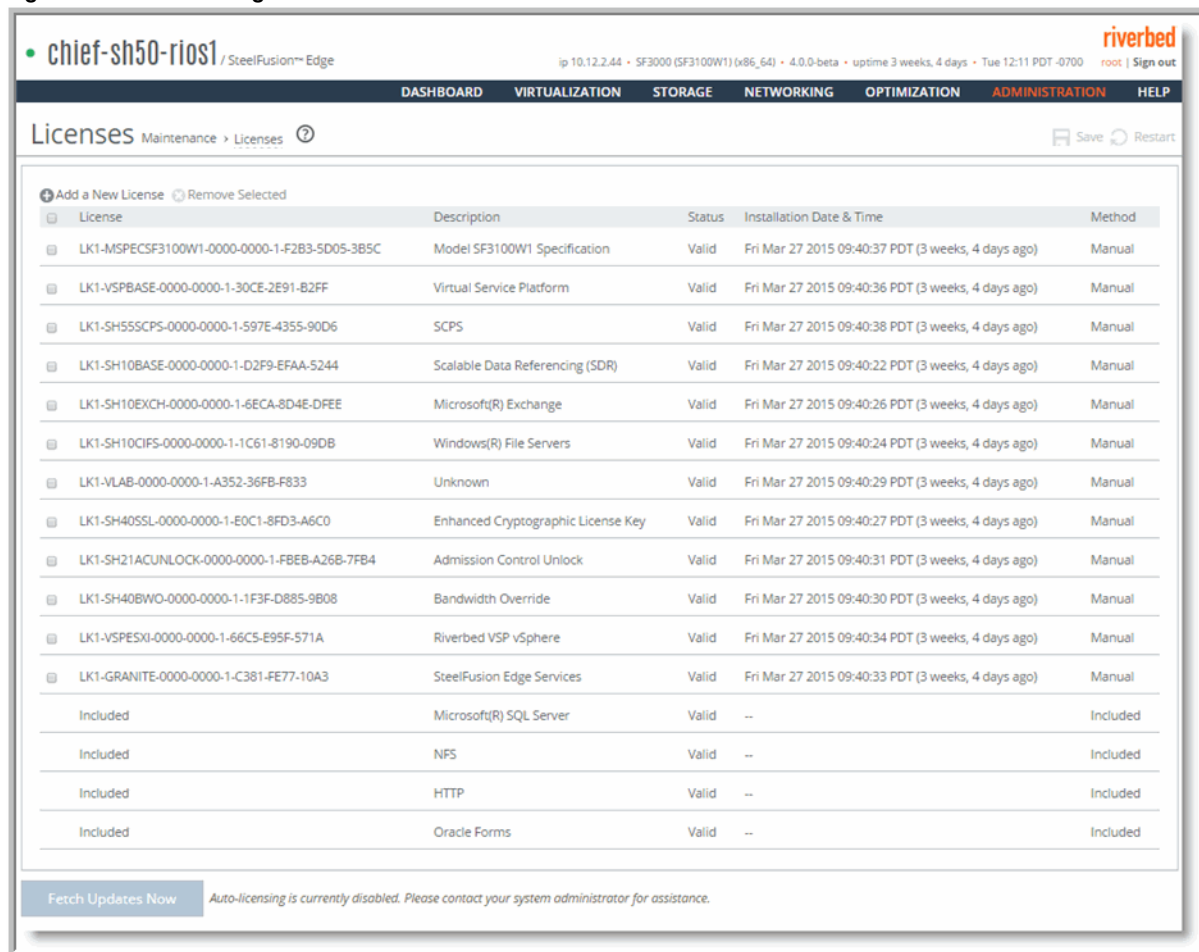
Model Upgrades Using the Management Console

This section describes how to install a model upgrade license and activate the specification using the SteelFusion Edge management console. For more information about using the Management Console, see the *SteelFusion Edge Installation and Configuration Guide*.

To install a model upgrade license using the Management Console

1. Choose Administration > Maintenance: Licenses to display the Licenses page.

Figure A-1. Licenses Page



chief-sh50-rios1 / SteelFusion™ Edge

ip 10.12.2.44 • SF3000 (SF3100W1) (x86_64) • 4.0.0-beta • uptime 3 weeks, 4 days • Tue 12:11 PDT -0700 root | Sign out

DASHBOARD VIRTUALIZATION STORAGE NETWORKING OPTIMIZATION **ADMINISTRATION** HELP

Licenses Maintenance > Licenses ? Save Restart

+ Add a New License - Remove Selected

License	Description	Status	Installation Date & Time	Method
LK1-MSPECSF3100W1-0000-0000-1-F2B3-5D05-3B5C	Model SF3100W1 Specification	Valid	Fri Mar 27 2015 09:40:37 PDT (3 weeks, 4 days ago)	Manual
LK1-VSPBASE-0000-0000-1-30CE-2E91-B2FF	Virtual Service Platform	Valid	Fri Mar 27 2015 09:40:36 PDT (3 weeks, 4 days ago)	Manual
LK1-SH55SCPS-0000-0000-1-597E-4355-90D6	SCPS	Valid	Fri Mar 27 2015 09:40:38 PDT (3 weeks, 4 days ago)	Manual
LK1-SH10BASE-0000-0000-1-D2F9-EFAA-5244	Scalable Data Referencing (SDR)	Valid	Fri Mar 27 2015 09:40:22 PDT (3 weeks, 4 days ago)	Manual
LK1-SH10EXCH-0000-0000-1-6ECA-8D4E-DFEE	Microsoft(R) Exchange	Valid	Fri Mar 27 2015 09:40:26 PDT (3 weeks, 4 days ago)	Manual
LK1-SH10CIFS-0000-0000-1-1C61-8190-09DB	Windows(R) File Servers	Valid	Fri Mar 27 2015 09:40:24 PDT (3 weeks, 4 days ago)	Manual
LK1-VLAB-0000-0000-1-A352-36FB-F833	Unknown	Valid	Fri Mar 27 2015 09:40:29 PDT (3 weeks, 4 days ago)	Manual
LK1-SH40SSL-0000-0000-1-E0C1-8FD3-A6C0	Enhanced Cryptographic License Key	Valid	Fri Mar 27 2015 09:40:27 PDT (3 weeks, 4 days ago)	Manual
LK1-SH21ACUNLOCK-0000-0000-1-FBEB-A26B-7FB4	Admission Control Unlock	Valid	Fri Mar 27 2015 09:40:31 PDT (3 weeks, 4 days ago)	Manual
LK1-SH40BWO-0000-0000-1-1F3F-D885-9B08	Bandwidth Override	Valid	Fri Mar 27 2015 09:40:30 PDT (3 weeks, 4 days ago)	Manual
LK1-VSPESXI-0000-0000-1-66C5-E95F-571A	Riverbed VSP vSphere	Valid	Fri Mar 27 2015 09:40:34 PDT (3 weeks, 4 days ago)	Manual
LK1-GRANITE-0000-0000-1-C381-FE77-10A3	SteelFusion Edge Services	Valid	Fri Mar 27 2015 09:40:33 PDT (3 weeks, 4 days ago)	Manual
Included	Microsoft(R) SQL Server	Valid	--	Included
Included	NFS	Valid	--	Included
Included	HTTP	Valid	--	Included
Included	Oracle Forms	Valid	--	Included

Fetch Updates Now Auto-licensing is currently disabled. Please contact your system administrator for assistance.

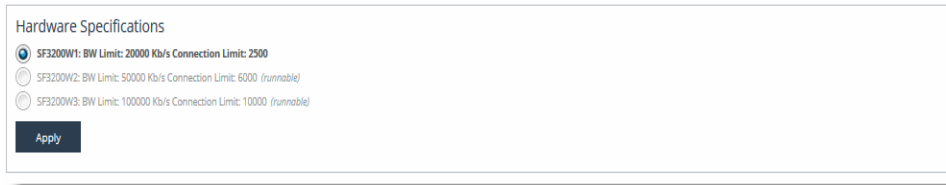
2. Click **Add a New License** to display the text box to add a new license.
3. Copy and paste the license key into the text box.
4. Click **Add** to add the license.
5. Click **Save** to save your settings permanently.

To activate a model upgrade specification using the Management Console

1. Choose Administration > Maintenance : Services to display the Services page.
2. Under Optimization Service, click **Stop** to stop the optimization service.
3. Choose Administration > Maintenance: Licenses to display the Licenses page.

The hardware model specifications appear at the bottom of the page. The current specification appears in bold.

Figure A-2. Hardware Model Specifications



4. Select the model specification you want to activate.

If a model specification requires an appliance reboot after activation, the message "activation reboots appliance" appears.

5. Click **Apply**.

6. Click the Restart icon to restart the optimization service.

When the upgrade is complete, the appliance is transformed into the new model. The model number appears on the appliance banner in the upper-right corner of the screen. The appliance retains its original serial number.

Note: After upgrading a model, you need to reapply admission control overrides relative to the default admission control values of the new model.

APPENDIX B SteelFusion Edge Technical Specifications

This appendix describes the technical and environmental specifications. It includes the following sections:

- [“1U SteelFusion Edge Specifications” on page 69](#)
- [“2U SteelFusion Edge Specifications” on page 71](#)
- [“Power Specifications” on page 72](#)

1U SteelFusion Edge Specifications

This section describes the technical and environmental specifications for the SteelFusion Edge 2100 and SteelFusion Edge 2200 appliances.

Technical Specifications

The following table lists the technical specifications for the appliances.

	SteelFusion Edge 2100	SteelFusion Edge 2200
Form Factor	1U	1U
Dimensions (HxWxD)	1.72 x 17.2 x 25.4 in (43.6 x 436 x 644.4 mm)	1.72 x 17.2 x 25.4 in (43.6 x 436 x 644.4 mm)
Weight (without packaging)	36 lb (16.33 kg)	36 lb (16.33 kg)
PCIe Slots	2	2
Bypass Ports/Max # Ports	2/2	2/2
HDD/SSD	2 x 1TB, 2 x 100/120 GB	2 x 2 TB, 2 x 100/120 GB
Data Store	170 GB	170 GB
Blockstore	750 GB	1500 GB
CPU	E5-2609v2 2.5 GHz 4 Cores	E5-2609v2 2.5 GHz 4 cores

Note: This table indicates the SSD disk capacity available to the appliance. Replacement disks might be capable of a higher capacity (such as 200 GB instead of 120 GB), but the appliance still limits them to the capacity expected by the system and defined in this table.

Environmental Specifications

This table summarizes the environmental requirements for the 1U SteelFusion Edge appliances.

	SteelFusion Edge 2100 and 2200
Operating Acoustic	46.4 dBA Sound pressure (Typical)
Temperature (Operating)	10°–40°C 50°–104°F
Temperature (Storage)	–40°–65°C –40°–149°F
Relative Humidity need	20%–80% noncondensing
Storage Humidity need	5%–95% noncondensing
Operating Altitude	Up to 10,000 ft (Up to 3048 m)

2U SteelFusion Edge Specifications

This section describes the technical and environmental specifications for the SteelFusion Edge 3100, SteelFusion Edge 3200, and SteelFusion Edge 5100 appliances.

Technical Specifications

The following table summarizes the technical specifications for the appliances.

	SteelFusion Edge 3100	SteelFusion Edge 3200	SteelFusion Edge 5100
Form Factor	2U	2U	2U
Dimensions (HxWxD)	3.24 x 17.56 x 25.27 in. (87 x 446 x 644.4 mm)	3.24 x 17.56 x 25.27 in. (87 x 446 x 644.4 mm)	3.24 x 17.56 x 25.27 in. (87 x 446 x 644.4 mm)
Weight (without packaging)	48 lb (21.77 kg)	60 lb (27.22 kg)	60 lb (27.22 kg)
PCIe Slots	6 (4 for RiOS, 2 for hypervisor)	6 (4 for RiOS, 2 for hypervisor)	6 (4 for RiOS, 2 for hypervisor)
Bypass Ports/Max # Ports	2 /12	2 /12	2 /12
HDD/SSD	2 TB / 1 x 240 GB or 2 TB / 1 x 200 GB	2 TB / 1 x 240 GB or 2 TB / 1 x 400 GB	4 TB / 1 x 480 GB or 4 TB / 1 x 400 GB
Data Store	280 GB	280 GB	320 GB
Blockstore	3500 GB	7400 GB	15200 GB
CPU	E5-2630v2 2.6GHz 6 cores	2 x E5-2630v2 2.6GHz 12 cores	2 x E5-2660v2 2.1GHz 20 cores

Environmental Specifications

The following table summarizes the environmental requirements for the 2U SteelFusion Edge appliances.

SteelFusion Edge 3100, 3200, and 5100	
Operating Acoustic	56.4 dBA Sound pressure (Typical)
Temperature (Operating)	0°–40° C 32°–113° F
Temperature (Storage)	-40°–65° C -40°–149° F
Relative Humidity	20%–80% noncondensing
Storage Humidity	5%–95% noncondensing
Operating Altitude	Up to 10,000 ft Up to 3048 m

Power Specifications

This table summarizes the power specifications for the SteelFusion Edge appliances.

	SFED 2100 SFED 2200		SFED 3100		SFED 3200		SFED 5100	
Chassis	1U		2U		2U		2U	
PSU Type	2 x 770 W		2 x 1000 W		2 x 1000 W		2 x 1000 W	
Input Power	100–127 VAC 10 A 50–60 Hz 200–240 VAC 5 A 50–60 Hz		100–127 VAC 12.47 A 50–60 Hz 200–240 VAC 7.08 A 50–60 Hz					
AC input	120 V	230 V	120 V	230 V	120 V	230 V	120 V	230 V
Max. Amps	3.0	1.4	5.0	2.1	6.2	2.5	6.5	2.6
Max. Watts	364	369	597	590	750	745	773	763
Typical Watts	291	295	478	472	600	596	619	611
Max. VA	367	392	615	627	766	768	789	787
Power Factor	99	94	97	94	98	97	98	97
BTU	992	1006	1629	1609	2047	2032	2109	2083

APPENDIX C Monitoring and Managing the Appliances with BMC

The SteelFusion Edge appliances include Baseboard Management Controller (BMC) support for the RiOS node.

The BMC monitors the physical state of the appliance. The BMC tracks system and network watchdogs, error logs, and sensors. The sensors of a BMC measure internal physical variables such as temperature, power settings, voltage levels, and fan speeds. You can configure alerts for activity detected outside specified limits.

The BMC also lets you start, restart, and turn off the appliance remotely.

This appendix provides an overview of the features of the BMC on the SteelFusion Edge appliances. It includes the following sections:

- [“Setting Up the BMC for Initial Access” on page 74](#)
- [“Logging In to the BMC” on page 74](#)
- [“Using the BMC Dashboard” on page 75](#)
- [“Viewing Field Replaceable Unit Information” on page 76](#)
- [“Controlling the Power” on page 82](#)
- [“Changing the BMC Administrator Password” on page 83](#)

Note: This appendix describes some of the key features of the BMC. For complete details about each page, log in to the BMC and click the Help icon in the upper-right corner.

Setting Up the BMC for Initial Access

Before you can access the BMC, you need to configure its network settings.

Note: Use the AUX port on your appliance for BMC access.

To configure the BMC on a SteelFusion Edge through the CLI

- Enable DHCP on the remote management port using the **remote dhcp** command:

```
amnesiac (config) # remote dhcp
```

- Set up a static network configuration using the **remote ip address**, **remote ip netmask**, and **remote ip default-gateway** commands.

The BMC address can be on a different subnet than the appliance. (Make sure that the routers are configured to support a different subnet.)

To verify the network configuration

- Enter the **show remote ip** command:

```
amnesiac (config) # show remote ip
DHCP:           Enabled
IP Address:     192.168.229.185
Netmask:        255.255.255.0
Gateway:        192.168.229.1
Mac Address:    99:0e:b6:b0:2e:2f
```

Logging In to the BMC

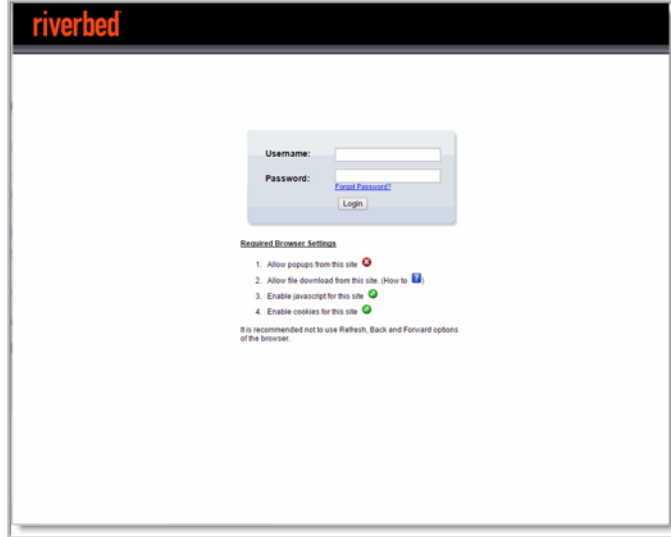
The BMC provides a Web interface for monitoring and management. You can access this interface through HTTP or HTTPS.

To connect to the BMC Web interface

1. In a Web browser, enter the IP address for the BMC management port.
To display the BMC IP address, from the SteelFusion Edge command line use the **show remote ip** command.
2. If the connection is not trusted (possibly using a self-signed certificate), you are prompted to add and confirm a security exception.
3. When prompted, log in to the Web interface. (See [Figure C-1.](#))

The default user name is **root**; the default password is **superuser**.

Figure C-1. BMC Log In Page

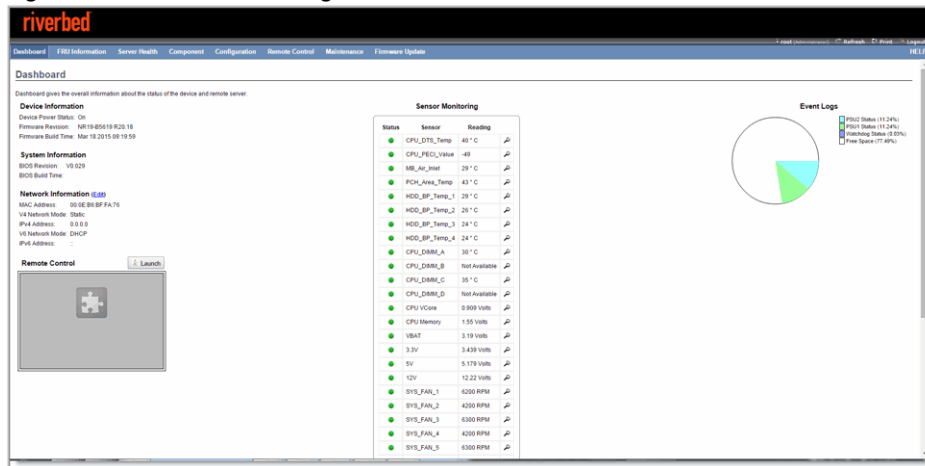


Allow pop-ups in your browser in order to log in.

Using the BMC Dashboard

When you log in, the BMC Dashboard appears and displays appliance information. (See [Figure C-2.](#)) The dashboard gives overall information about the status of the appliance and remote server.

Figure C-2. BMC Dashboard Page



The dashboard displays an overview of the appliance status. The dashboard provides the following information:

- **Device Information** - Displays the firmware revision and date and time of the build for the BMC firmware.
- **System Information** - Displays the BIOS revision and date and time of the build for the BMC firmware.

- **Network Information** - Displays network settings for the BMC. Click **Edit** to make any changes.
- **Remote Control** - Allows you to access the appliance console.
- **Sensor Monitoring** - Lists the appliance sensors with information such as a status icon, name, and reading. Click the magnifying glass to view the details for the sensor.

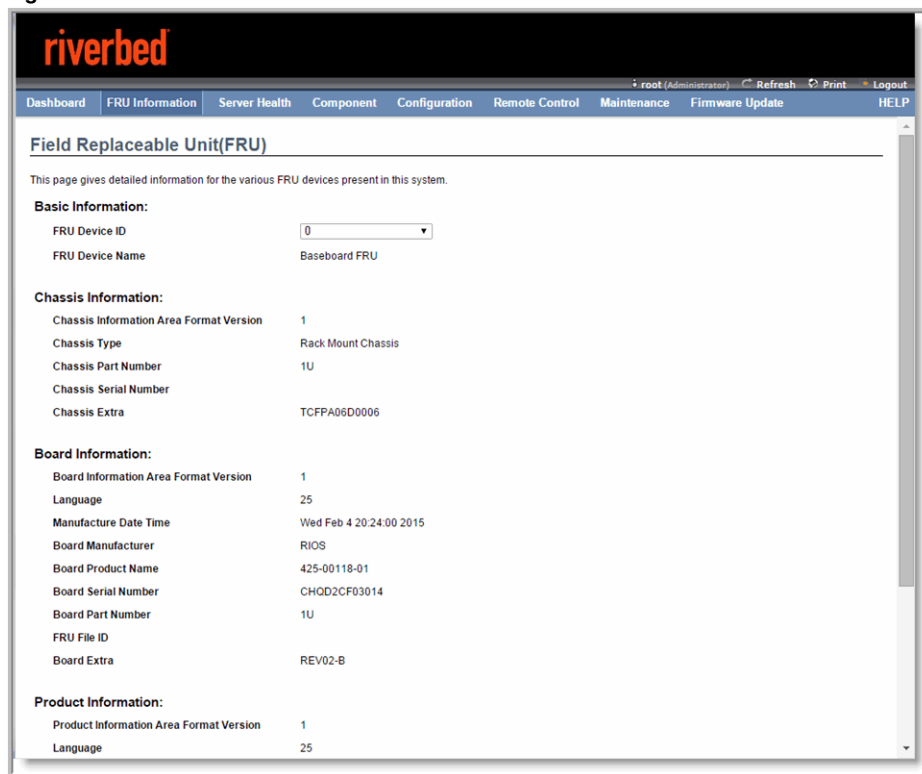
There are three possible status icons for a sensor:

- A green dot indicates a Normal state.
 - A yellow exclamation mark indicates a Warning state.
 - A red x indicates a Critical state.
- **Event Logs** - Provide a graphical representation of all events incurred by the sensors and available space in logs. Click an icon in the legend of the chart to view details of each type of event.

Viewing Field Replaceable Unit Information

The FRU Information page displays chassis, board, and product information. (See [Figure C-3](#).)

Figure C-3. FRU Information



Viewing Event Logs

Choose Server Health > Event Log to display a list of events incurred by different sensors on this device. Double click a record to see additional details. You can also sort the list of entries by clicking any of the column headers. (See [Figure C-4](#).)

You can use the sensor type or sensor name filter options to view specific events logged in the appliance.

Figure C-4. Event Log

The screenshot shows the Riverbed Event Log interface. At the top, there's a navigation bar with tabs: Dashboard, FRR Information, Server Health, Component, Configuration, Remote Control, Maintenance, and Firmware Update. Below this is the 'Event Log' section. It includes a filter dropdown set to 'All Events' and a 'Filter by: All Sensors' option. A note states 'Events generated by the system will be logged here. Double click on a record to see the description.' The main table displays a list of events, each with an ID, timestamp, sensor name, sensor type, and status. The table is paginated, showing 17 pages in total.

Event ID	Time & Date	Sensor Name	Sensor Type	Event Status
116	04/14/2015 21:52:28	PSU2 Status	Power Supply	Presence Detected - Assembled
118	04/14/2015 21:52:28	PSU1 Status	Power Supply	Presence Detected - Assembled
117	04/14/2015 20:56:28	PSU2 Status	Power Supply	Presence Detected - Assembled
116	04/14/2015 20:56:28	PSU1 Status	Power Supply	Presence Detected - Assembled
115	04/14/2015 20:44:28	PSU2 Status	Power Supply	Presence Detected - Assembled
114	04/14/2015 20:44:28	PSU1 Status	Power Supply	Presence Detected - Assembled
113	04/14/2015 20:32:28	PSU2 Status	Power Supply	Presence Detected - Assembled
112	04/14/2015 20:32:28	PSU1 Status	Power Supply	Presence Detected - Assembled
111	04/14/2015 20:20:38	PSU2 Status	Power Supply	Presence Detected - Assembled
110	04/14/2015 20:20:38	PSU1 Status	Power Supply	Presence Detected - Assembled
109	04/14/2015 20:08:28	PSU2 Status	Power Supply	Presence Detected - Assembled
108	04/14/2015 20:08:28	PSU1 Status	Power Supply	Presence Detected - Assembled
107	04/14/2015 19:56:30	PSU2 Status	Power Supply	Presence Detected - Assembled
106	04/14/2015 19:56:30	PSU1 Status	Power Supply	Presence Detected - Assembled
105	04/14/2015 19:44:28	PSU2 Status	Power Supply	Presence Detected - Assembled
104	04/14/2015 19:44:28	PSU1 Status	Power Supply	Presence Detected - Assembled
103	04/14/2015 19:32:27	PSU2 Status	Power Supply	Presence Detected - Assembled
102	04/14/2015 19:32:27	PSU1 Status	Power Supply	Presence Detected - Assembled
101	04/14/2015 19:20:29	PSU2 Status	Power Supply	Presence Detected - Assembled
100	04/14/2015 19:20:29	PSU1 Status	Power Supply	Presence Detected - Assembled
99	04/14/2015 19:08:36	PSU2 Status	Power Supply	Presence Detected - Assembled
98	04/14/2015 19:08:36	PSU1 Status	Power Supply	Presence Detected - Assembled
97	04/14/2015 18:56:28	PSU2 Status	Power Supply	Presence Detected - Assembled
96	04/14/2015 18:56:28	PSU1 Status	Power Supply	Presence Detected - Assembled
95	04/14/2015 18:44:27	PSU2 Status	Power Supply	Presence Detected - Assembled
94	04/14/2015 18:44:27	PSU1 Status	Power Supply	Presence Detected - Assembled
93	04/14/2015 18:32:29	PSU2 Status	Power Supply	Presence Detected - Assembled
92	04/14/2015 18:32:29	PSU1 Status	Power Supply	Presence Detected - Assembled

Configuring the Network

Initially, you configure the network settings for the BMC through the appliance CLI. You can use the Configuration > Network page to manage or change the settings.

Note: RiOS will not recognize an IP address change made in the BMC. Use the appliance CLI to change the IP address used to connect to the BMC module.

To change the network settings

1. Choose Configuration > Network.
2. Complete the configuration as described in this table.

Control	Description
LAN Interface	Select the LAN interface to configure.
LAN Settings	Check this option to enable LAN support for the selected interface.
MAC Address	This read-only field displays the MAC address of the selected interface.
Obtain an IP address automatically	Enable Use DHCP to dynamically configure the IP address using Dynamic Host Configuration Protocol (DHCP).
IPv4 Address, Subnet Mask, Default Gateway	If DHCP is disabled, specify a static IP address, Subnet Mask, and Default Gateway for the selected interface.
IPv6 Settings	Check this option to enable IPv6 support for the selected interface.
Subnet Prefix length	Specify the subnet prefix length for the IPv6 settings. Value ranges from 0 to 128.
VLAN Settings	Check this option to enable VLAN support for the selected interface.
VLAN ID	Specify the Identification for VLAN configuration. Value ranges from 2 to 4094. VLAN ID 0, 1, and 4095 are reserved VLAN IDs. You cannot change the VLAN ID without resetting the VLAN configuration.
VLAN Priority	Specify the priority for VLAN configuration. Value ranges from 1 to 7. (7 is the highest priority for the VLAN.)

3. Click **Save**.

You are prompted to log out of the current session and log back in at the new IP address.

4. Click **Reset** to revert the changes.

Configuring Platform Event Filtering

You can use the Configuration > PEF page to manage the Platform Event Filtering settings. You can configure the Event Filter, Alert Policy, and LAN Destination for alerts. (See [Figure C-5](#).)

To view the page, you must at least be an Operator. To modify or add a PEF, the user must be an administrator.

The PEF page lets you configure the following:

- **Event Filter** - Select the Event Filter tab to display configured event filters and available slots. You can modify or add new event filter entry. By default, 15 event filter entries are configured among the 40 available slots.
- **Alert Policy** - Select the Alert policy tab to show configured Alert policies and available slots. You can modify or add a new alert policy entry from here. A maximum of 60 slots is available.
- **LAN Destination** - Select the LAN Destination tab to show configured LAN destinations and available slots. You can modify or add a new LAN destination entry. A maximum of 15 slots is available.

A tilde character (~) indicates a free slot.

Figure C-5. Platform Event Filtering

PEF Management

Use this page to configure Event Filter, Alert Policy and LAN Destination. To delete or modify a entry, select it in the list and click "Delete" or "Modify". To add a new entry, select an unconfigured slot and click "Add".

Event Filter

Alert Policy

LAN Destination

Configured Event Filter count: 15

PEF ID	Filter Configuration	Event Filter Action	Event Severity	Sensor Name
1	Enabled	[Alert]	Critical	Any
2	Enabled	[Alert]	Critical	CPU-TMP
3	Disabled	[Alert]	Unspecified	Any
4	Disabled	[Alert]	Unspecified	Any
5	Disabled	[Alert]	Unspecified	Any
6	Disabled	[Alert]	Unspecified	Any
7	Disabled	[Alert]	Unspecified	Any
8	Disabled	[Alert]	Unspecified	Any
9	Disabled	[Alert]	Unspecified	Any
10	Disabled	[Alert]	Unspecified	Any
11	Disabled	[Alert]	Unspecified	Any
12	Disabled	[Alert]	Unspecified	Any
13	Disabled	[Alert]	Unspecified	Any
14	Disabled	[Alert]	Unspecified	Any
15	Disabled	[Alert]	Unspecified	Any
16	~	~	~	~
17	~	~	~	~
18	~	~	~	~

Add

Modify

Delete

To add a new entry

- Select a free slot and click **Add**. Alternatively, double click a free slot.

To modify an entry

- Select a configured entry and click **Modify**. Alternatively, double click the entry.

To delete an entry

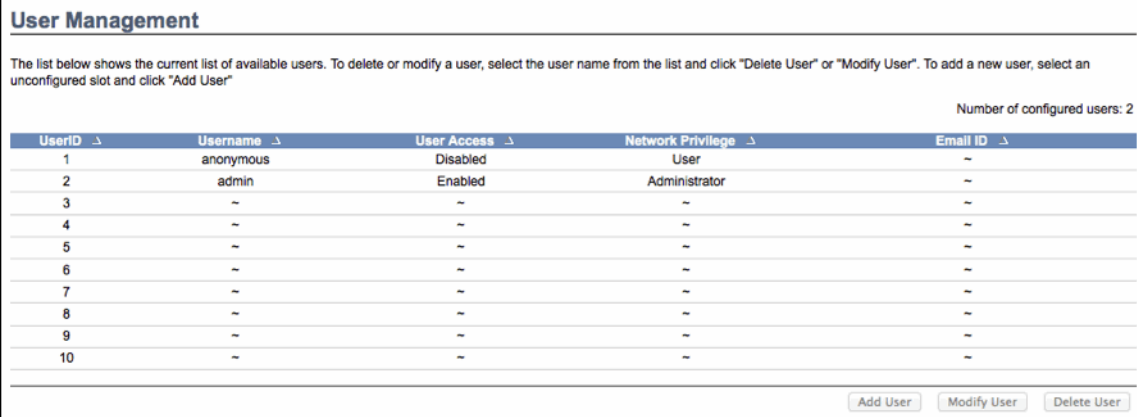
- Select the entry to be deleted and click **Delete**.

Configuring Users

You can view and manage users with access to the BMC in the Configuration > Users page. The page shows all configured users and available spaces. To view the page, you must have operator privileges.

You can set up 10 users, including the defaults of admin and anonymous. To modify or add a user, you must have administrator privileges. (See [Figure C-6](#).)

Figure C-6. User Configuration



User Management

The list below shows the current list of available users. To delete or modify a user, select the user name from the list and click "Delete User" or "Modify User". To add a new user, select an unconfigured slot and click "Add User"

Number of configured users: 2

UserID	Username	User Access	Network Privilege	Email ID
1	anonymous	Disabled	User	~
2	admin	Enabled	Administrator	~
3	~	~	~	~
4	~	~	~	~
5	~	~	~	~
6	~	~	~	~
7	~	~	~	~
8	~	~	~	~
9	~	~	~	~
10	~	~	~	~

A tilde character (~) indicates a free slot.

To add a user

- Select a free slot and click **Add User**. Alternatively, double click a free slot.

To modify a user

- Select a configured user and click **Modify User**. Alternatively, double click the user.

To delete a user

- Select the user to be deleted and click **Delete User**.

Configuring SSL

You can use SSL to access the BMC in a secure mode. You can upload a certificate and private key file into the BMC or you can generate an SSL certificate based on configuration details.

To upload a certificate and private key

1. Choose Configuration > SSL and select the Upload SSL tab.

The Current Certificate and Current Privacy Key appear with the date and time of the upload.

Figure C-7. Upload SSL Certificate

Upload SSL	Generate SSL	View SSL
Current Certificate Fri Apr 4 01:41:24 2014		
New Certificate Browse... No file selected.		
Current Privacy Key Fri Apr 4 01:41:24 2014		
New Privacy Key Browse... No file selected.		
<div>Upload</div>		

2. Click **Browse** and navigate to the certificate and privacy key file.

The file needs to be a PEM file.

3. Click **Upload** to transfer the SSL certificate and privacy key to the BMC.

Once uploaded, the HTTPS service restarts and begins using the uploaded SSL certificate.

4. Restart your browser to begin using the new certificate.

You can view the certificate details in the View SSL tab.

If this is a self-signed certificate, you need to add the certificate to the trusted list of certificates for your browser.

To generate an SSL certificate

1. Choose Configuration > SSL and select the Generate SSL tab.

Figure C-8. Generate SSL Certificate

Upload SSL	Generate SSL	View SSL
Common Name(CN) <input type="text"/>		
Organization(O) <input type="text"/>		
Organization Unit(OU) <input type="text"/>		
City or Locality(L) <input type="text"/>		
State or Province(ST) <input type="text"/>		
Country(C) <input type="text"/>		
Email Address <input type="text"/>		
Valid for <input type="text"/> days		
Key Length <input type="text"/> 512 bits		
<div>Generate</div>		

2. Complete the configuration as described in this table.

Control	Description
Common Name (CN)	Specify a common name for the certificate. The name can contain up to 64 alphanumeric characters. Special characters # and \$ are not allowed.
Organization (O)	Specify the organization name for the certificate. The name can contain up to 64 alphanumeric characters. Special characters # and \$ are not allowed.
Organization Unit (OU)	Specify the organization section unit name for certificate. The name can contain up to 64 alphanumeric characters. Special characters # and \$ are not allowed.
City or Locality (L)	Specify the city or locality. The name can contain up to 64 alphanumeric characters. Special characters # and \$ are not allowed.
State or Province (ST)	Specify the state or province. The name can contain up to 64 alphanumeric characters. Special characters # and \$ are not allowed.
Country (C)	Specify the country code. This must be two characters. Special characters are not allowed.
Email Address	Specify the email address of the organization.
Valid for	Specify the number of days the certificate is valid. Value ranges from 1 to 3650 days.
Key Length	Choose the key length bit value of the certificate.

3. Click **Generate** to create a new SSL certificate.

The HTTPS service restarts and begins using the new SSL certificate.

4. Restart your browser to begin using the new certificate.

You can view the certificate details in the View SSL tab.

Controlling the Power

You can reboot or restart the appliance from the BMC. The page also shows the current status of the appliance.

To reboot, restart, or power on the appliance

- Choose Remote Control > Server Power Control.
- Select one of the following power control options:
 - Reset Server** - Reboot the system without powering off (warm boot).
 - Power Off Server - Immediate** - Immediately power off the SteelHead.
 - Power Off Server - Orderly Shutdown** - Shut down the operating system and then power off the SteelHead.
 - Power On Server** - Select this option to power on the SteelHead.
 - Power Cycle Server** - Power off and then reboot the appliance (cold boot).
 - Power Button**

3. Click **Perform Action**.

Changing the BMC Administrator Password

The System Administrator page lets you change the BMC password.

To change the BMC administrator password

1. Choose Maintenance > System Administrator.
2. Select Change Password.
3. Enter and confirm the new password.
The password must be between 8 and 64 characters and it cannot contain spaces.
4. Click **Save**.

