GigaVUE-HC1
Hardware Installation Guide

GigaVUE-OS 5.6.00

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Change Notes

When a document is updated, the document revision number on the cover page will indicate a new revision number, the Document Revision date is updated on the title page, and this table will describe what changed.

Rev	Date	Change
rev 1	03/29/2019	Original release of document with the 5.6.00 release.
rev 2	04/12/2019	Bug fixes and technical review updates.

Contents

Introducing the GigaVUE-HC1

This chapter introduces the GigaVUE-HC1 of Gigamon Traffic Platform nodes, describes their features and functions, and provides an orientation to the physical layout of the GigaVUE-HC1.

Refer to the following sections for details:

About the GigaVUE H Series and TA Series

The GigaVUE Visibility Platform provides 1Gb/10Gb/40Gb/100Gb support. The GigaVUE H Series and TA Series include the following models that run GigaVUE-OS:

- GigaVUE-HB1
- GigaVUE-HC1
- GigaVUE-HC2
- GigaVUE-HC3
- GigaVUE-HD4
- GigaVUE-HD8
- GigaVUE-TA1
- GigaVUE-TA10
- GigaVUE-TA40
- GigaVUE-TA100
- GigaVUE-TA100-CXP
- GigaVUE-TA200
- Certified Traffic Aggregation White Boxes

GigaVUE-HC1 Overview

The GigaVUE-HC1 is an H Series Visibility Platform node with a modular 1RU design for small enterprises with network security needs and large enterprises with remote sites. It is optimized for 10Gb connectivity and offers built-in GigaSMART support and inline bypass.

GigaVUE-HC1	• **1RU Footprint** • **Two Module Slots (Bays)** • **Dedicated Cluster Management Port** • **Supports all GigaVUE-HC1 Modules**	GigaVUE-HC1
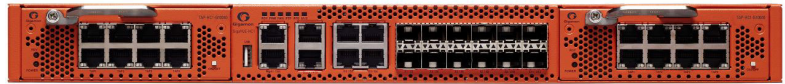
Introducing the GigaVUE-HC1 Chassis

The fully-assembled GigaVUE-HC1 chassis consists of a 1RU, rack-mountable, 19in-wide chassis with management, network, and tool ports at the front and power connections and fans at the rear. *GigaVUE-HC1 Chassis – Front View* on page 9 summarizes the bays and components at the front and *Rear View of the GigaVUE-HC1 Chassis* on page 9 summarizes the rear of the GigaVUE-HC1 chassis.

The base chassis provides twelve 10Gb/1Gb SFP+ network ports, four 1Gb/100Mb RJ45 copper ports, and GigaSMART, capable of processing packets at 20Gb. The faceplate of the chassis has ports for MGMT interface, cluster management, PTP and PPS over Ethernet, Console, as well as a USB port.

NOTE: The GigaVUE-HC1 chassis arrives from the factory with power supply modules and fans installed. The GigaVUE-HC1 modules are shipped separately. Refer to *Unpacking the GigaVUE-HC1 Shipment* on page 23 for assembly instructions.

GigaVUE-HC1 Chassis – Front View
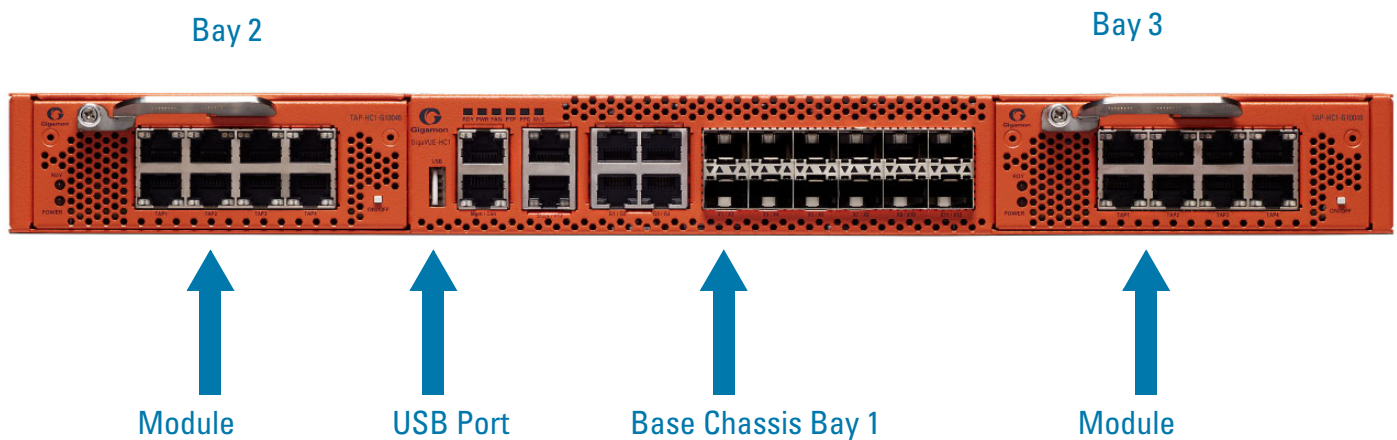
Figure 1-1: Front View of the GigaVUE-HC1 Chassis
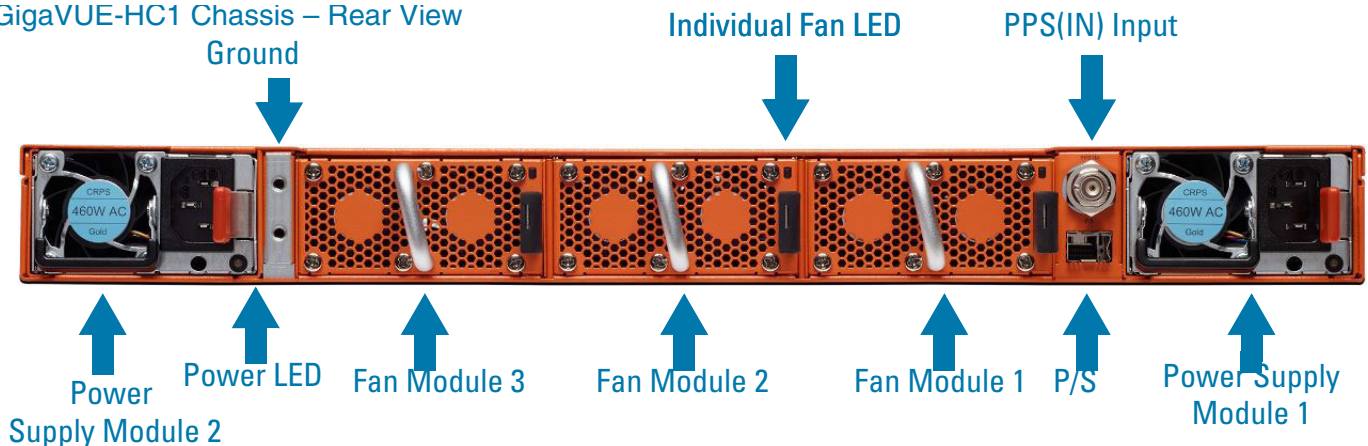
Figure 1-2: Rear View of the GigaVUE-HC1 Chassis

Table 1-1: GigaVUE-HC1 Chassis Components

Front Components on the GigaVUE-HC1 Chassis	
Module Bays	The base chassis is in the center and numbered 1. Slots (bays) are numbered 2-3 from left to right.
Base Chassis	The GigaVUE-HC1 includes a base chassis which holds the management and processing components installed inside the unit. It is located in the center of the front of the chassis.
	NOTE: The base chassis is not hot-swappable.
	The base chassis also controls the Mgmt port and console port on the front of the node for network and local administrative access to the GigaVUE-OS command-line interface (CLI). The base chassis provides twelve 10Gb/1Gb SFP+ network ports, four 1Gb/100Mb RJ45 copper ports, and GigaSMART, capable of processing packets at 20Gb.
	Refer to *GigaVUE-HC1 Base Chassis* on page 13 for more information.
USB	Use the USB port to upgrade software on the GigaVUE-HC1 using a software image on an external USB drive. Refer to *Software Upgrade Using USB Drive* on page 10.
Rear Components on the GigaVUE-HC1 Chassis	
Power Supply Modules	The GigaVUE-HC1 includes two separate power supply modules already installed at the rear of the node. Each power supply module can independently operate the GigaVUE-HC1 for 1+1 system redundancy. Separate AC and DC power units are available.
	Refer to *Power Configuration* on page 76 for information on power characteristics of the GigaVUE-HC1.
Fan Trays	The fan trays installed at the rear of the node provide system cooling.
PPS(IN)	The GigaVUE-HC1 includes a BNC connector for an optional PTP 1PPS reference clock. (Reserved for future use).
P/S	Inter-chassis primary and secondary connection (Reserved for future use).

Software Upgrade Using USB Drive

If a GigaVUE-HC1 does not have network access, there is a USB port on the front of the chassis. A software image can be downloaded to a USB drive, the drive can be inserted into the USB port, and the software image can be installed from the drive.

The following are ways to download a software image to a USB drive:

- Insert the drive into your computer or laptop and drag and drop the software image onto the drive.

- Insert the drive into a GigaVUE-HC1 with network access and use the **image fetch** CLI command with the **usb** download parameter.

Chassis Cooling

The fans on the GigaVUE-HC1 run at 100% of their maximum speed on power up, then drop to approximately 65% during normal operations. The fans are deployed in 2+1 redundancy mode, meaning that a single fan can fail and immediately the third fan can help the chassis maintain the appropriate cooling temperature at 40ºC ambient.

The temperatures of five components: intake, exhaust, CPU, switch CPU, and GigaSMART CPU temperatures, are monitored. When a component crosses a pre-defined threshold, the fan speed is adjusted dynamically, in increments of approximately 10%.

An SNMP trap is sent when a component reaches the threshold for warning, alert, or critical temperature conditions. Refer to Table 1-2 for the temperatures at which the warning, alert, and critical traps are sent.

Table 1-2: Component Temperature Thresholds and Actions

Exhaust Temperature	CPU Temperature	Switch CPU Temperature	GigaSMART CPU Temperature
85ºC Warning trap sent	90ºC Warning trap sent	105ºC Warning trap sent	90ºC Warning trap sent
90ºC Alert trap sent	95ºC Alert trap sent	115ºC Alert trap sent	95ºC Alert trap sent
95ºC Critical trap sent	100ºC Critical trap sent	140ºC Critical trap sent	100ºC Critical trap sent

The output of the following CLI command displays the current intake, exhaust, CPU, switch CPU temperatures, as well as the GigaSMART CPU temperature:

(config) show environment

```
...
-------------------------------------------------------
Card cc1 (GVS-HC100/MB):
Intake temperature :          36 C
Exhaust temperature :         35 C
Cpu temperature :             28 C
Switch temperature :          51 C
Cav temperature :             53 C
-------------------------------------------------------
Card 2 (TAP-HC1-G10040):
Intake temperature :          32 C
Exhaust temperature :         31 C
-------------------------------------------------------
Card 3 (TAP-HC1-G10040):
Intake temperature :          33 C
Exhaust temperature :         33 C
=======================================================
```

The output of the following CLI command displays the fan speed in RPM (the normal operational speed is approximately 12000 RPM; the maximum speed is approximately 19000 RPM):

(config) show environment

```
...
------------------------------------------------------------
Fan tray 1 (FAN-HC1):
1st fan :                      12136 RPM
2nd fan :                      12136 RPM
------------------------------------------------------------
Fan tray 2 (FAN-HC1):
1st fan :                      12136 RPM
2nd fan :                      12136 RPM
------------------------------------------------------------
Fan tray 3 (FAN-HC1):
1st fan :                      12288 RPM
2nd fan :                      12136 RPM
------------------------------------------------------------...
```

Air Flow Direction

The air flow direction is from the front of the GigaVUE chassis to the rear. The rear-mounted fans pull air from the front to the back of the chassis. For environments with hot/cold aisles, install the chassis so the intake air at the front of the chassis is cold.

AC- and DC-Powered GigaVUE-HC1

Gigamon provides both AC- and DC-powered versions of the GigaVUE-HC1. Refer to *Connecting Power to the GigaVUE-HC1* on page 33 for information on connecting AC and DC power supplies.

GigaVUE-HC1 Base Chassis

The base chassis is the heart of the GigaVUE-HC1, providing both processing and switching fabric resources, as well as user access to the CLI via the Mgmt/console ports.

Status LEDs

Shows the status of the control module. including whether the module has power (PWR), whether the module is successfully booted and ready for operations (RDY)
- RDY - Module booted and ready for operations
- PWR -Illuminated when power is present
- FAN - Illuminated when fans are operating
- PTP - Illuminated when node is synchronized with PTP source (Reserved for future use)
- PPS - Illuminated when node is synchronized with PTP source (Reserved for future use)
- M/S - Master/Slave: Illuminated when it is a master in a cluster; it is off when it is a normal or standby node in a cluster; it is either off or illuminated when it is a standalone node, depending on whether or not it was ever the master node in a cluster previously (Reserved for future use)

Management Port (eth0)

Standard 10/100/1000 RJ45 Ethernet port supports remote connections to the GigaVUE-OS using Telnet/SSH. Green LED shows link status; amber LED shows activity.

Console Port

Use the console port for serial terminal connections to the GigaVUE-OS. Unless you requested custom factory settings, the serial settings are 8N1, 115,200 bps. The GigaVUE-HC1 node includes a standard console cable.

Stack Port

Provides cluster support, with a dedicated out-of-band network connection for stack management traffic

PTP Port

Reserved for future use.

Figure 1-3: GigaVUE-HC1 Management Ports

Port Numbering

The base chassis uses standard conventions for identifying network/tool ports, both on the modules themselves, as well as in the CLI:

10Gb Ports	• Numbered with a leading **X**. For example, the base chassis includes 10Gb ports **X1** to **X12**.
1Gb Ports	• Numbered with a leading **G**. For example, the base chassis includes 1Gb ports **G1** to **G4**.

NOTE: When referring to ports in the CLI, the format is **box ID/slot ID/port ID**. For example, **1/1/x6** refers to box 1, slot 1, port X6.

• **GigaVUE-HC1**: The base chassis is numbered 1. Slots (bays) are numbered 2-3 from left to right.

NOTE: The port labels on the base chassis faceplate use upper-case X, and G characters to identify ports. However, the CLI uses lowercase notation to refer to ports (for example, x1 and g1).

Module Status LEDs

The module status LEDs are as follows:

• RDY is the Ready LED. It has the following states:
  • RED indicates the system is booting up
  • GREEN indicates the system is ready
• POWER is the Power LED. It has the following state:
  • GREEN indicates the module is receiving power

Base Chassis Port Status LEDs

The 10Gb port status LED has the following states:

• Off indicates the port is administratively enabled, but the link is operationally down
• GREEN indicates the link is operationally up

GigaVUE-HC1 Modules

The GigaVUE-HC1 has two bays for replaceable modules. The following modules are available for the GigaVUE-HC1:

Module	Description	Section
TAP-HC1-G10040	Copper TAP and bypass module, with 4 x 1Gb 10/100/1000Mb ports for either four TAPs or bypass copper (BPC) port pairs	*TAP-HC1-G10040 Module* on page 15
BPS-HC1-D25A24	Bypass Combo Module, GigaVUE-HC1, with **Two** SX/SR (50/125μm multimode) inline network port pairs and **Four** SFP+ and SFP+ copper port cages	*BPS-HC1-D25A24 Bypass Combo Module* on page 17

Modules are hot-swappable and can be installed in any of the available front bays in a GigaVUE-HC1 node. However, refer to *Module Removal and Replacement Procedure (Hot Removal)* on page 28 for instructions – you must follow a specific procedure when removing modules to preserve node stability.

TAP-HC1-G10040 Module

The TAP-HC1-G10040 module provides four 1Gb Copper TAP connections to be used as network ports. This module has 8 ports, enabling 4 TAPs. Each port pair is arranged with one port above the other, providing bidirectional traffic flow between two nodes. Traffic is copied through the use of a port pair, unless the port pair is in the physical bypass state. Refer to Figure 1-4 on page 15.
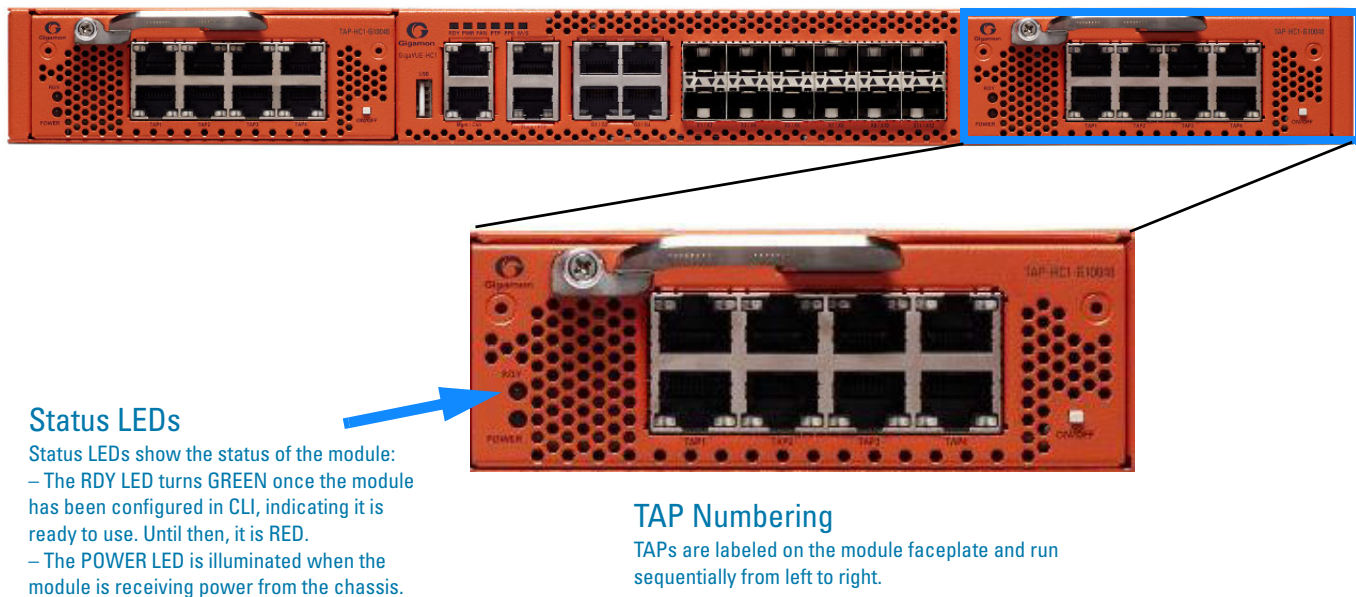
Status LEDs
Status LEDs show the status of the module:
– The RDY LED turns GREEN once the module has been configured in CLI, indicating it is ready to use. Until then, it is RED.
– The POWER LED is illuminated when the module is receiving power from the chassis.

TAP Numbering
TAPs are labeled on the module faceplate and run sequentially from left to right.

Figure 1-4: TAP-HC0-G10040 Module

Using the TAP-HC1-G10040 Module for Copper Bypass

The network ports on the TAP-HC1-G10040 module can be configured through software to be inline network ports. This allows the TAP-HC1-G10040 module to act as a copper bypass module, providing protected inline networks for copper ports.

To use the copper bypass functionality, the GigaVUE-HC1 must be running GigaVUE-OS version 4.8 or higher. For configuration information, refer to the chapter "Configuring Inline Bypass Solution on GigaVUE TAP Modules" in the *GigaVUE-OS CLI Reference Guide*.

Using TAP-HC1-G10040 Module for Gigamon Resiliency for Inline Protection

Gigamon Resiliency for Inline Protection (GRIP)™ is an inline bypass solution that connects two GigaVUE-HC1 nodes together so that one node provides high availability to the other node when there is a loss of power. This redundant arrangement of two GigaVUE-HC1 nodes maintains traffic monitoring by inline tools when one of the nodes is down.

GRIP™ makes use of the bypass protection switch relays for protected inline networks on GigaVUE-HC1 nodes. The TAP-HC1-G10040 module can provide physical protection for protected pairs of copper inline network ports required by the GRIP solution.

For solution and configuration information, refer to the chapter "Configuring Inline Bypass Solutions" in the *GigaVUE-OS CLI Reference Guide*.

BPS-HC1-D25A24 Bypass Combo Module

There is one 10Gb bypass combo module as follows:

- Bypass Combo Module with two SX/SR (50/125µm multimode) inline network port pairs and four regular SFP+ and SFP+ copper port cages (BPS-HC1-D25A24) (Figure 1-5 on page 18)

Before installing the BPS-HC1-D25A24 Bypass Combo Module, the GigaVUE-HC1 must be running software version 5.0 or higher.

For internal transceiver and loss summary specifications, refer to *Bypass Combo Module Specifications* on page 69.

Bypass Combo Modules

Security tools such as firewall and intrusion detection/protection systems are often connected inline on production networks, with traffic flowing from the network segment through the tool and then back onto the production network.

The GigaVUE-HC1 offers physical and logical inline bypass. Physical bypass provides automatic failover protection in the case of a power failure. The bypass combo modules provide the physical bypass function. As it applies to a single pair of inline network ports, the physical bypass function is as follows:

- When the module is not powered, (either the entire node is powered down or the module is removed from the node), the inline network port pair is in the physical bypass mode. That means that traffic is exchanged directly between network Port A and network Port B of the inline network pair.

- When the module is powered, the mode (inline or bypass) of the inline network port pair is controlled through software. In the physical bypass mode, the inline network port pair behaves exactly as if the module was not powered. In the inline mode, the inline network port pair behaves as any other inline network port pair configured for working with an inline tool.

Features of the 10Gb Bypass Combo Module

The 10Gb bypass combo module has the following features:

- Two inline network port pairs that pass traffic bi-directionally.

- Port pairs that offer optical protection switch for physical bypass.

- Four regular SFP ports that can operate at 1Gb, and SFP+ and SFP+ Copper ports that can operate at 10Gb. These ports can be configured as any port type.

- A mode to select either bypass or inline.

- A module that is hot swappable. Refer to procedures in *Module Removal and Replacement Procedure (Hot Removal)* on page 28.

BPS-HC1-D25A24

Module Status LEDs   Inline Network Ports   Ports   H/S Button
Reserved for future use

Inline Network LEDs   Port Status LEDs
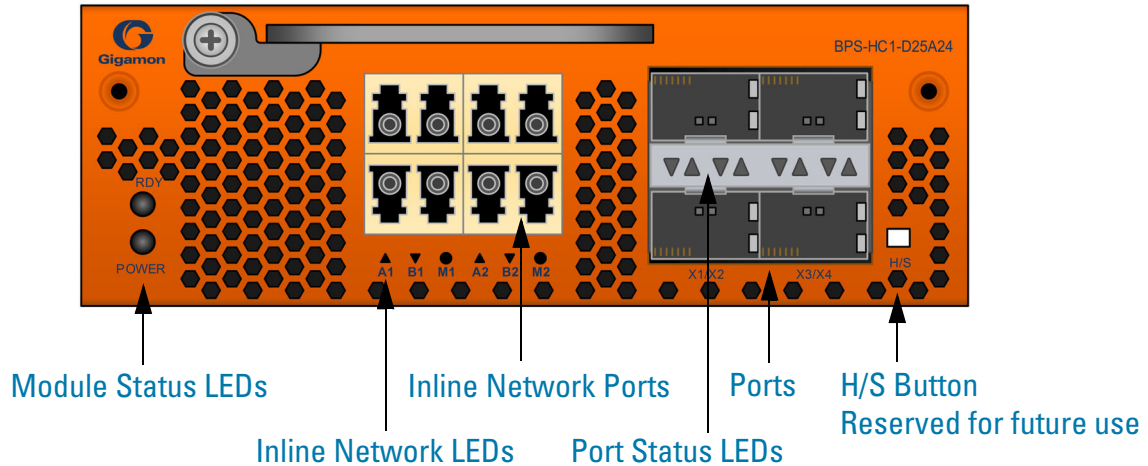
Figure 1-5: Bypass Combo Module BPS-HC1-D25A24

Module Status LEDs

The following module status LEDs are located on the front of the bypass combo module:

- RDY is the Ready LED. It has the following states:
  - RED indicates system booting or module down
  - GREEN indicates normal condition
- POWER is the Power LED. It has the following state:
  - GREEN indicates the module is receiving power

Port Status LEDs

The SFP+ Port Status LEDs have the following states:

- Off indicates that the port is disabled or the link is down
- GREEN indicates that the link is established

Ports

You can configure any two of the four 10Gb ports as an inline tool port pair and connect an inline tool to them.

For tool ports, you can also use ports on any module in the chassis, including ports on other bypass combo modules or ports on other GigaVUE-HC1 modules.

Ports have the following labels: X1 to X4. In the CLI, these ports are referred to as: x1 to x4.

Inline Network Ports

Connect inline networks to the inline network ports. The inline network ports have built-in protection for power down.

The inline network status LEDs have the following labels:

- A1—Inline network LED A (for network 1 through network 2)
- B1—Inline network LED B (for network 1 through network 2)
- M1—Mode LED (on is inline and off is bypass)
- A2—Inline network LED A (for network 1 through network 2)
- B2—Inline network LED B (for network 1 through network 2)
- M2—Mode LED (on is inline and off is bypass)

NOTE: In the CLI, the inline network ports are referred to as x5 to x8.

Using Bypass Combo Modules for Gigamon Resiliency for Inline Protection

Gigamon Resiliency for Inline Protection (GRIP)™ is an inline bypass solution that connects two GigaVUE-HC1 nodes together so that one node provides high availability to the other node when there is a loss of power. This redundant arrangement of two GigaVUE-HC1 nodes maintains traffic monitoring by inline tools when one of the nodes is down.

GRIP™ makes use of the bypass protection switch relays for protected inline networks on GigaVUE-HC1 nodes. The bypass combo modules can provide physical protection for protected pairs of optical inline network ports required by the GRIP solution.

To configure the GRIP solution, the GigaVUE-HC1 must be running GigaVUE-OS version 5.0 or higher. For solution and configuration information, refer to the chapter "Configuring Inline Bypass Solutions" in the *GigaVUE-OS CLI Reference Guide*.

GigaVUE-HC1 Installation Roadmap

This chapter provides a flow chart of the major steps you need to perform to get a GigaVUE-HC1 node unpacked, rack-mounted, installed, and connected. It also describes what you should do once you have completed the initial setup of the node. Refer to the following sections for details:

- *First Steps – Getting Unpacked, Racked, Installed and Connected* on page 21
- *Next Steps* on page 22

First Steps – Getting Unpacked, Racked, Installed and Connected

You have received your GigaVUE-HC1 node and now you are ready to get up and running. Figure 2-1 on page 22 shows the major steps you need to perform to get the GigaVUE-HC1 chassis out of the box, into a rack, installed with modules, plugged in, and running on your network.

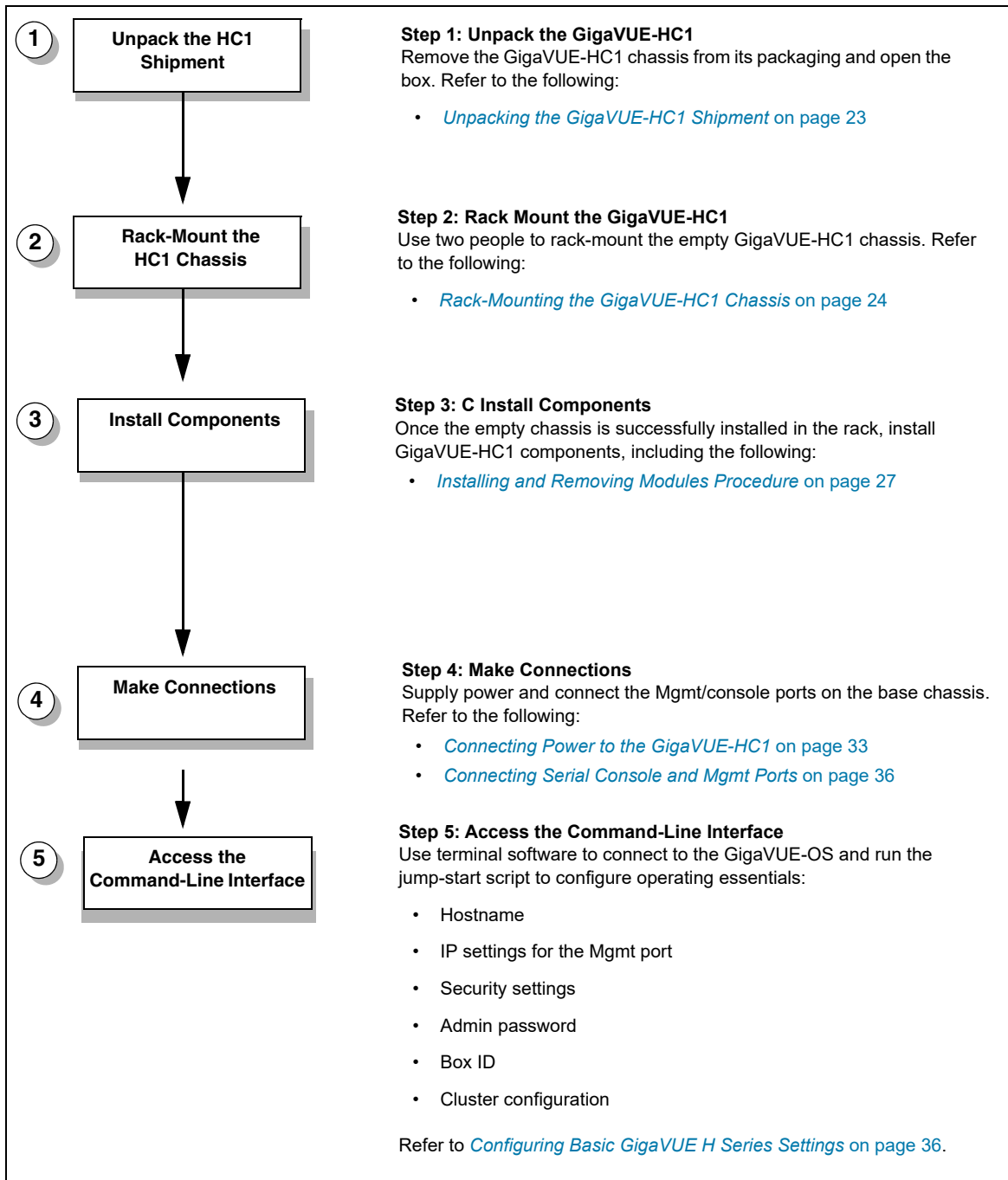|		
① **Unpack the HC1 Shipment**	**Step 1: Unpack the GigaVUE-HC1** Remove the GigaVUE-HC1 chassis from its packaging and open the box. Refer to the following:	
	• *Unpacking the GigaVUE-HC1 Shipment* on page 23	
② **Rack-Mount the HC1 Chassis**	**Step 2: Rack Mount the GigaVUE-HC1** Use two people to rack-mount the empty GigaVUE-HC1 chassis. Refer to the following:	
	• *Rack-Mounting the GigaVUE-HC1 Chassis* on page 24	
③ **Install Components**	**Step 3: C Install Components** Once the empty chassis is successfully installed in the rack, install GigaVUE-HC1 components, including the following:	
	• *Installing and Removing Modules Procedure* on page 27	
④ **Make Connections**	**Step 4: Make Connections** Supply power and connect the Mgmt/console ports on the base chassis. Refer to the following:	
	• *Connecting Power to the GigaVUE-HC1* on page 33	
	• *Connecting Serial Console and Mgmt Ports* on page 36	
⑤ **Access the Command-Line Interface**	**Step 5: Access the Command-Line Interface** Use terminal software to connect to the GigaVUE-OS and run the jump-start script to configure operating essentials:	
	• Hostname	
	• IP settings for the Mgmt port	
	• Security settings	
	• Admin password	
	• Box ID	
	• Cluster configuration	
	Refer to *Configuring Basic GigaVUE H Series Settings* on page 36.	

Figure 2-1: Getting Started Roadmap

Next Steps

Once you have performed the initial configuration of the GigaVUE-HC1 node, installing, connecting, and configuring the node, you are ready to get started mapping traffic between network and tool ports.

Refer to the *GigaVUE-OS CLI Reference Guide, GigaVUE-OS H-VUE Administration Guide,* and online help for information.

Assembling the GigaVUE-HC1 Node

This chapter explains how to unpack, rack-mount, and assemble the GigaVUE-HC1 node using the components that came with your shipment.

Separate sections are provided for unpacking and rack-mounting the GigaVUE-HC1 nodes, as well as installing and removing modules. Refer to the following sections for details:

Unpacking the GigaVUE-HC1 Shipment

The GigaVUE-HC1 node is shipped with either DC or AC power supply modules, fans, and filler panels installed. The chassis and parts kit are shipped in one box – modules are shipped in separate boxes. Use the following procedure to unpack the node:

1. Inspect the shipping boxes. If any of the cartons were damaged, file a claim with the carrier who delivered them.

2. Open the box containing the GigaVUE-HC1 chassis and remove the parts kit from the top of the shipment. The parts kit contains the power cords, console cable and adapter, and power supply module covers.

3. Open the additional boxes containing the ordered modules and set them aside for assembly (each module is shipped in separate boxes).

4. Leave all protective filler panels in place in the chassis. **DO NOT** install the modules yet. Gigamon recommends rack-mounting the GigaVUE-HC1 chassis empty.

FILLER PANELS
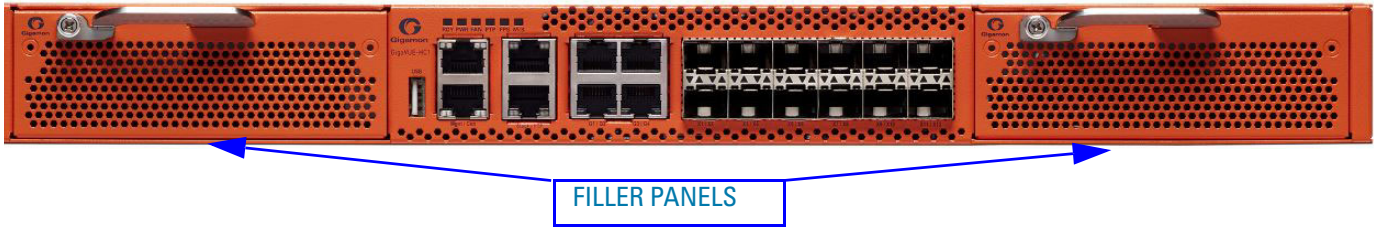
Figure 3-1: GigaVUE-HC1 Out of the Box

Rack-Mounting the GigaVUE-HC1 Chassis

This section describes how to rack-mount the GigaVUE-HC1 chassis in a standard 1RU rack space using the hardware provided with the chassis. You can install the GigaVUE-HC1 chassis in two-post or four-post racks with a minimum depth of 16in (40.64cm).

Safety Precautions

Before you get started rack-mounting the GigaVUE-HC1 chassis, make sure you have read the following safety precautions:

- There are a wide variety of racks available on the market. Make sure you consult the instructions provided by your rack vendor for detailed mounting instructions before installing the GigaVUE-HC1 chassis.

- Make sure you install any stabilizers provided for the rack before installing the chassis. Unsecured racks can tip over and cause injury or death.

- Make sure you install devices in the rack from the bottom up with the heaviest devices at the bottom.

- Make sure you provide adequate ventilation to the nodes installed in the rack.

Rack-Mounting Procedure

Use the following procedure to rack-mount the GigaVUE-HC1 chassis:

1. **Decide whether you want to front-mount or center-mount the chassis in the rack.** Front-mounted nodes will sit flush with the front of the rack while center-mounted nodes will extend in front of it.

NOTE: The GigaVUE-HC1 chassis is not shipped with its standard rack ears attached. However, they are available in the accessory kit. Install the rack ears facing towards the node for a front-mounting position. You can reverse the direction of the rack-ears to center-mount the node.

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Front-Mount GigaVUE-HC1

Front-Mount Position (With Rack Ears Attached)

Rack ears face towards the front of the node for front-mounting.

Center-Mount Position

Reverse the rack ears so they face towards the rear of the node for center-mounting.
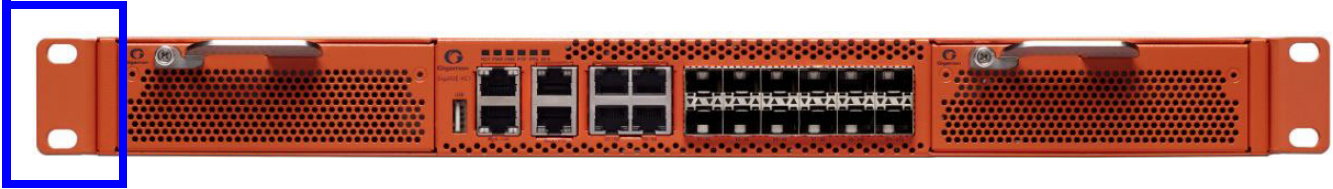
Figure 3-2: Rack Ears for Front Mount (Reverse Rack Ears for Center Mount)

2. Make sure you have not installed any modules in the chassis yet. Gigamon recommends rack-mounting the GigaVUE-HC1 chassis before installing modules to make it easier to handle the chassis during the installation.

3. Select a suitable location for the rack that will hold the GigaVUE-HC1 chassis. Choose a location that is clean, dust free, and well-ventilated. You will need access to grounded power sources. Avoid areas where heat, electrical wire, and electromagnetic fields are generated.

   Plan for enough clearance in front of a rack so you can access the modules easily (approximately 25in [63.50cm]) and enough clearance in the back of the rack to allow sufficient airflow and installation of the rear components such as power supply modules.

4. Locate an open 1RU rack space and lift the node into place. It takes two people to lift to place the GigaVUE-HC1 in the rack. Insert a screw through the rack ear on each side into the rack, to hold the node in place. Tighten the screws.

5. Carefully lift the chassis into the rack and place a screw on each side to hold the chassis.

6. Tighten the screws and add additional screws to secure the node. **Use two screws on each rack ear**.

Four-Post Rack Mounting

To mount the GigaVUE-HC1 in a four-post rack, use rack ears and full-length brackets. The rack ears attach at the front of the unit and the brackets attach at the rear, as follows:

- Attach the rack ears so they face towards the front of the system for mounting in four-post racks.

- Attach the full-length brackets to the sides of the GigaVUE-HC1 with enough free play to position them to fit your rack's dimensions. After the brackets are attached to the rack's rear posts, tighten the bracket connections to the sides of the GigaVUE-HC1.

Refer to Figure 3-3 on page 26 for the four-post rack installation using the extended brackets.

Extended Bracket

Figure 3-3: Extended Bracket Installation

Installing and Removing Modules Procedure

The procedure for installing modules is to remove the filler panels, install the module, then fasten with the ejector lever and tighten the thumb screw on top of the lever. The following procedure has the details.

Hot Swapping Modules

Modules are hot-swappable – they can be installed or removed from the chassis with the power on. **To remove a module safely with the power on, you must follow the procedure in** *Module Removal and Replacement Procedure (Hot Removal) on page 28*.

Install proper software versions prior to inserting any new modules.

Gigamon often makes new modules available for GigaVUE-HC1 nodes. New modules are usually introduced starting with a new software release. Make sure you install the supporting software release before physically installing the new module.

If you do install a new module before its supporting release, the module will appear in the **show cards** output with an **Operational Status** of **unsupported**.

In some cases, if you subsequently upgrade the node to the release that does support the new module, it can appear persistently in the **show cards** output with an **Operational Status** of **inserted**. To make the module operational, you must unconfigure it with the **no card slot *x*** command, followed by configuring the module with **card slot *x***.

Module Installation Procedure

Use the following procedure to install GigaVUE-HC1 modules:

1. Make sure you are wearing an ESD-preventive wrist or ankle strap.

2. Locate the modules and remove them from their packaging.

3. Remove the protective filler panels from the target bays for all modules to be installed. Keep the filler panels so they can be easily reused if the module is ever removed. You can install modules in either of the two available front bays on the GigaVUE-HC1.

    NOTE: To prevent any improper air flow and overheating the node, **do not leave any bays uncovered.**

4. Pull out the lever on the top of the module. Carefully slide the module into the bay. Push the lever back in and tighten using the thumb screw on the lever.

Filler Panels
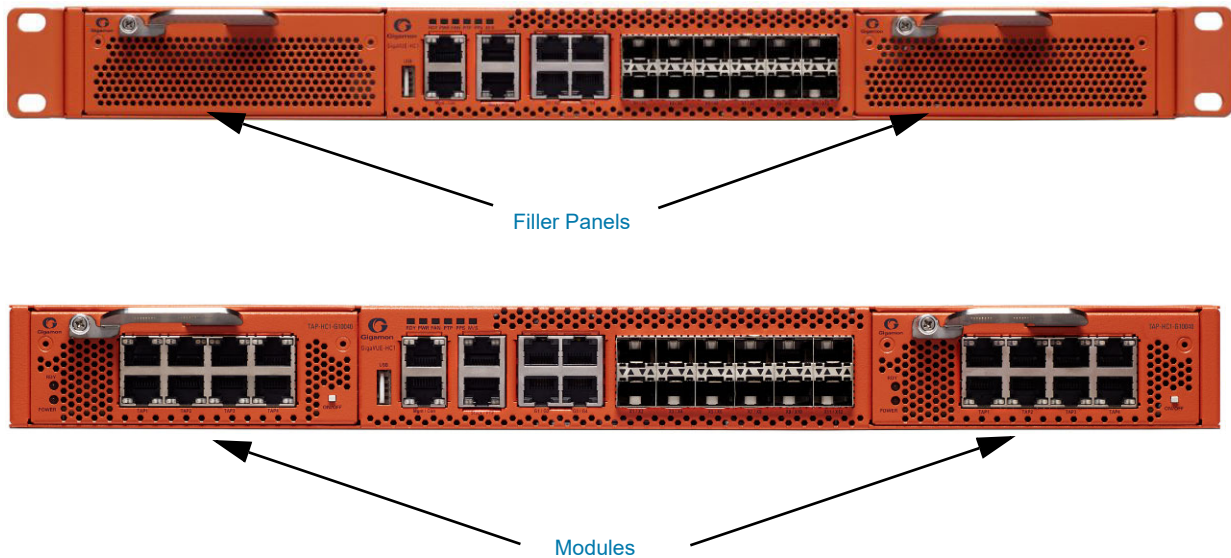
Modules

Figure 3-4: Installing Modules

5. Install any additional modules by repeating the previous two steps.

NOTE: The first time you install a module in the node, you need to configure the node to recognize it with the **card** command and save your changes with **write memory**. Refer to *Configure Modules and Enable Ports* on page 40 for details.

This completes the installation of the modules on the GigaVUE-HC1.

Module Removal and Replacement Procedure (Hot Removal)

Use the following procedure to remove a module from the GigaVUE-HC1 node with the power on.

IMPORTANT: Hot removal of modules without following the listed steps can cause system instability and require a reboot.

Before starting, make sure you are wearing an ESD-preventive wrist or ankle strap.

Replacing a Module with the Same Type of Module

1. Shut down the module to prepare for removal with the following CLI command:

    (config) # card slot <slot id> down

2. Slide the module out of the chassis and store it in a static-safe location.

3. Insert the new module of the same type.

Next Steps

Refer to *Configuring Basic GigaVUE H Series Settings* on page 36 for information on getting connected with the GigaVUE-OS to make your initial configuration settings.

Basic GigaVUE H Series Connections and Configuration

This chapter describes how to establish your first configuration session with the GigaVUE-HC1 and set the basic initial configuration options necessary to get the node up and running.

Refer to the following sections for details:

Grounding the GigaVUE-HC1 Chassis

⚠ WARNING
HIGH LEAKAGE CURRENT.
Earth connection essential before connecting supply.

The GigaVUE-HC1 chassis is drilled for ground screws near the left corner at the rear of the chassis. Connect grounding wire with spade lugs to the ground screws on the chassis and earth ground using the following procedure.

1. Locate the grounding holes near the left corner at the rear of the chassis (shows the location on a GigaVUE-HC1 node).
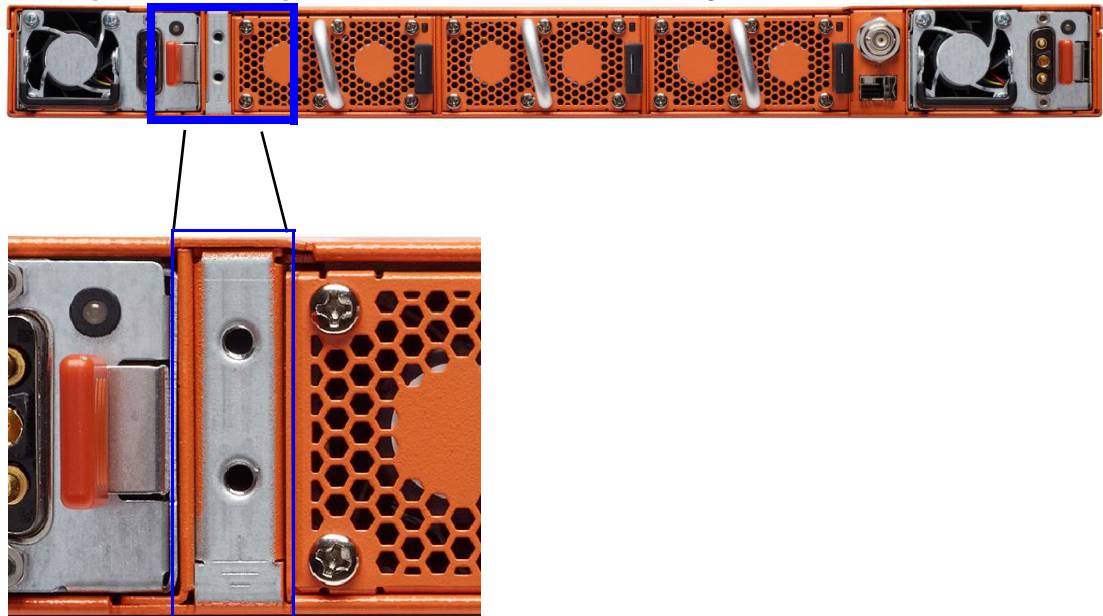
Figure 4-1: Holes for Ground Screws (DC-Powered GigaVUE-HC1)

2. Install ground screws meeting the following specifications:

   #8 Panhead, Phillips-drive, Exterior SEM screw.
   Thread size = 32
   Length = 1/2in (1.27cm)

3. Connect grounding wire with spade lugs both to the ground screws and to earth ground. The specifications for the ground wire and lugs are as follows:

   Standard Wire 14 (AWG); Stud Size #6 (0.138in/0.351cm); Spade Width 0.32in/0.813cm

4. Tighten the screws to secure both the chassis ground screws and the earth ground screws.

Connecting Power to the GigaVUE-HC1

The GigaVUE-HC1 supports AC and DC power in a 1+1 redundant configuration. In all cases, only a single power supply module is required to operate the node. However, connecting both modules in a 1+1 configuration provides redundant power.

The procedure for connecting power to the GigaVUE-HC1 is similar to the other GigaVUE H Series nodes:

GigaVUE Chassis Type	Number of Power Supply Modules
GigaVUE-HC1	2

1. Plug an approved C13 power cable into each of the power supply modules at the rear of the GigaVUE-HC1 chassis.

   NOTE: For information on connecting the optional DC power supply modules, refer to Figure 4-4 on page 35.

Power supply module -
Three-prong plug

Power supply module -
Three-prong plug

Figure 4-2: Connecting AC Power (GigaVUE-HC1)

2. Plug the other end of the power cables into a power source that can supply adequate power. For optimal power protection, plug the power supply modules into separate circuits.

   When connecting to the external AC power source, ensure that a Surge Protective Device (SPD) is installed at the AC power inlet.

   For information on GigaVUE-HC1 power requirements, refer to *AC- and DC-Powered GigaVUE-HC1* on page 12.

3. Power is turned on when the unit is plugged in, and turned off when the unit is unplugged.

To remove a power supply module, refer to *Removing a Power Supply Module* on page 34.

Removing a Power Supply Module

When removing a power supply module, refer to the following label on the chassis:
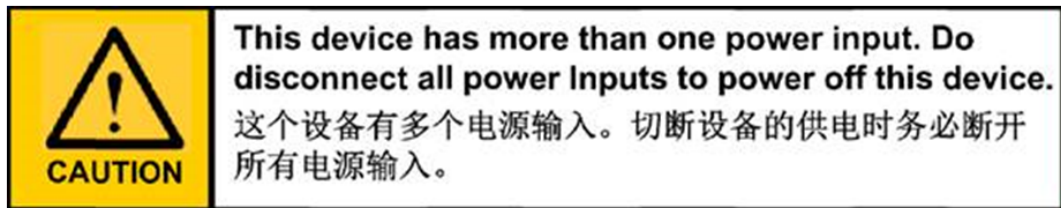
Figure 4-3: Power Caution Label

To remove a power supply module:

1. Power down the module by disconnecting the power inputs.

2. Wait about 90 seconds for the node to stabilize.

3. Remove the power supply module.

NOTE: Do not remove a power supply module while inputs are still connected.

Connecting -48V DC Power Supply Modules

The GigaVUE-HC1 is available with DC power supply modules. This section provides instructions for connecting a -48V DC power source to the DC power supply modules.

To connect a -48V DC input to the DC power supply module:

1. Plug the DC power cable adapter into the DC power supply.

NOTE: Terminal block supports 10AWG.

2. If PSM grounding is required, connect earth ground to the SAFETY GROUND (green/yellow) terminal using a straight blade screwdriver.

Figure 4-4: Connecting DC Power Supply Module

3. Connect the positive and negative power wires to the appropriate terminals using a straight blade screwdriver.

- Connect positive source wire to the + RETURN (black) terminal using a straight blade screwdriver.

- Connect -48V source wire to the -48V (blue) terminal using a straight blade screwdriver.

IMPORTANT: The leads to the DC power supply modules on the GigaVUE-HC1 node should attach from the side of the chassis *away* from the terminal block. Run the wires to avoid obstructing airflow for the adjacent fans.

4. Repeat Step 2 and Step 3 for the other power supply module in the GigaVUE-HC1 chassis.

Connecting Serial Console and Mgmt Ports

To make basic GigaVUE-HC1 connections (serial console and Mgmt ports):

1. Locate the DB9-to-RJ45 serial cable provided with the GigaVUE-HC1. This cable is called a *console cable*.

   NOTE: This cable is Cisco-compatible. Refer to Appendix D, *Console Port Signaling and Cabling* for pinout details.

2. Connect the RJ45 end of the console cable to the **console** port on the left.

3. Connect the DB9 end of the console cable to a PC's COM port.

4. Connect a standard Ethernet cable (Cat5e or better) to the 10/100/1000 **Mgmt** port on the chassis.

5. Connect the other end of the Ethernet cable to an Ethernet network.

Configuring Basic GigaVUE H Series Settings

This section describes how to perform the initial configuration of basic GigaVUE H Series node settings over a serial terminal connection to the console port.

The system administrator must initially log in with a default **admin** account using a default password, and then must immediately change the password through the **jump-start** script. Refer to *Access the Command-Line Interface over the Console Port* on page 36.

Once you have used the console port to configure the Mgmt port's network properties, you can configure the GigaVUE H Series node remotely using the Mgmt port's network connection.

The same commands are available in the GigaVUE-OS command-line interface regardless of whether you are connected over the Mgmt or console port.

Access the Command-Line Interface over the Console Port

Use the console port on the left side of the base chassis to access the GigaVUE-HC1 as follows:

1. Make the basic power and console cable connections described in *Connecting Serial Console and Mgmt Ports* on page 36 and power on GigaVUE-HC1.

2. Start a terminal application on the PC. Common terminal applications include TeraTerm, PuTTY, and Hyperterminal.

3. Select the COM port connected to the console cable attached to control module. For example, **COM1**.

4. Configure the port settings for the console connection as follows:
   - **Bits per second** – 115,200
   - **Data bits** – 8
   - **Parity** – None

- **Stop bits** – 1
- **Flow control** – None

Figure 4-5 on page 37 shows an example of how these settings are configured in Hyperterminal.
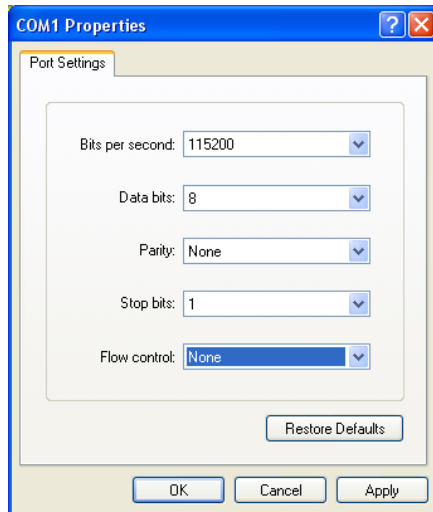
Figure 4-5: Setting COM Port Properties for the Console Connection

5. Start the terminal connection. You may need to press **Enter** a few times before you see the **login:** prompt.

6. Log in to the command-line interface with the following default user account and password:

User	**admin**
Password	**admin123A!**

Starting in software version 4.7, the **configuration jump-start** automatically starts and forces a password change.

The system administrator must change the password on the default **admin** account through the **jump-start** script. The default password (admin123A!) is no longer allowed. Refer to *Run the Jump-Start Script* on page 38 for details.

A password must meet the following standards:

- include 8-30 characters
- include at least one numeral
- include at least one upper case letter
- include at least one lower case letter
- include at least one special character (for example, !, @ , #, $, %, ^, &, or * – ASCII 0x21, 0x2F, 0x3A, 0x40, 0x5B, 0x5F, 0x7B, 0x7E)

At the Admin password? prompt in the **jump-start** script, enter a new password that meets the standards, then confirm the password.

You will also configure some Admin and Monitor level users with the procedure described in *Initial User Account Configuration* on page 56.

Run the Jump-Start Script

Gigamon provides GigaVUE H Series nodes with a **jump-start** script that walks you through the process of configuring basic settings. Run this script as follows:

1. Switch to **Configure** mode.

    The GigaVUE H Series provides three command entry modes, each with increasingly powerful rights – **Standard, Enable,** and **Configure**. The jump-start script is only available in Configure mode:

    a. Type **en <Enter>** to switch to Enable mode.

    The system prompt changes from *[hostname] >* to *[hostname] #*.

    b. Type **config t <Enter>** to switch to Configure mode.

    The system prompt changes from *[hostname] #* to *[hostname] (config) #*.

2. Run the jump-start script with the following command:

    (config) # config jump-start

3. Follow the jump-start script's prompts to configure each of the settings listed in the following table.

    NOTE: If you change your mind about a particular setting, you will have a chance to change it at the end of the script.

Hostname	The hostname appears in the system prompt and is used to identify the chassis in SNMP traps.

Management Port Network Settings	Use either DHCP or specify a static IP address and netmask. If you do not use DHCP, you are prompted to configure the following additional options:
	• **Default Gateway**
	  Supply the IP address of the default gateway for the node.
	• **DNS Server**
	  Supply the IP address of the DNS server for the node. A valid DNS server is required for successful use of both Telnet and TACACS+.
	• **Domain Name**
	  Supply the domain name for the node (for example, mycompany.com).

Enable IPv6?	You can enable the use of IPv6 for the management port. IPv6 is used in addition to IPv4 if you enable this option. If you enable the IPv6 you have the option of enabling IPv6 auto-configuration or specifying a static address.
Security Settings	Enable the following security settings: • **secure cryptography mode** • **secure passwords mode** • **minimum password length** Refer to the *GigaVUE-OS CLI Reference Guide* for information on security.

Admin Password	The password for the **admin** account must be changed to a non-default password.
Cluster Enable?	Enable cluster support if this node will be a part of a cluster of connected GigaVUE nodes. If you enable cluster support, the jump-start script prompts you to supply the **Cluster ID**, **Cluster Name**, and **Cluster Mgmt Virtual IP Address**. You can join an existing cluster by supplying values that match existing settings. **NOTE:** For clustered nodes configured to use the eth1 port on a control card as both the Mgmt and Cluster Management port, keep in mind that NTP is also used over the eth0 Mgmt port on the GigaVUE H Series node. In a case like this, you can only use one or the other. If clustering is enabled, you will not be prompted for a box ID in the next step. Refer to the *GigaVUE-OS CLI Reference Guide* for information on setting up a cluster.
Box ID for the Node	Supply a numerical box ID for the node. This box ID is used to identify network/tool ports in the node – the format is box ID/ slot ID/port ID. You will be prompted for a box ID only if clustering was not enabled in the previous step.

4. Review your settings. You can change a setting by specifying its listed line number and re-entering the setting.

5. When you are satisfied with your settings, exit the script as prompted. GigaVUE automatically saves your settings.

6. Restart the node with the **reload** command.

Need to Change Any Settings?

If you need to change any of the settings you made in the jump-start script, you can either run the script again or change individual settings using the following commands in the Configure command mode:

- Use the **hostname** command to change the node's hostname.

- Use the **interface eth0** command to reconfigure or fine-tune Mgmt port settings, including basic IP settings (DHCP or static address and subnet mask) and physical parameters (duplex, MTU, and speed).

- Use the **ip** command to change the default gateway, DNS server, and domain name.

- You can also use the **username admin password <password>** command to change the **admin** user's password. Refer to *Changing the admin Account Password* on page 56.

Refer to *The Basic Commands* on page 49 for a quick summary of the available GigaVUE H Series commands.

Configure Modules and Enable Ports

Modules must be configured and ports enabled before they can be used on the GigaVUE-HC1. Use the following procedure to bring up all modules and enable ports before starting to issue commands in the CLI:

1. Connect to console port as described in the previous section.

2. Wait at least two minutes after the system prompt appears for the modules to be initialized and then switch to **Configure** mode.

   The GigaVUE H Series provides three command entry modes, each with increasingly powerful rights – **Standard**, **Enable**, and **Configure**. The jump-start script is only available in Configure mode:

   a. Type **en <Enter>** to switch to Enable mode.

   The system prompt changes from *[hostname] >* to *[hostname] #*.

   b. Type **config t <Enter>** to switch to Configure mode.

   The system prompt changes from *[hostname] #* to *[hostname]* **(config) #**.

3. Reset the terminal settings to match the current window with the following command:

   (Config) # terminal resize

4. Use the following command to check module status:

   (Config) # show cards

5. Verify the following in the **show cards** output:

   - **Box ID** is not empty.

   - **Config** shows **yes** for all cards.

   - **Oper Status** shows **up** (or **inserted**) for all modules.

6. If **Config** does not show **yes** for all modules after two minutes, take the action corresponding to your **show cards** output, as follows:

show cards Output:	Corrective Action
Config does not show **yes** for any modules (including base chassis)	(config) # chassis box-id <integer> (config) # card all
Config shows **yes** for base chassis but not one or more modules	(config) # card all

The **card all** command configures the node for all currently unconfigured modules. However, it can only be used after the node's box ID has been configured as reported at the top of the **show cards** command output.

7. Use the **show cards** command again to verify the following:

   - **Box ID** is not empty.

   - **Config** shows **yes** for all modules.

   - **Oper Status** shows **up** (or **inserted**) for all modules.

The **show cards** command output for a GigaVUE-HC1 displays the properly configured modules.

HC1(config)# show cards

```
Box ID: 1
Slot  Config    Oper Status       HW Type       Product Code  Serial Num  HW Rev
-------------------------------------------------------------------------------
cc1   yes       up                HC1-Main-Board  132-00D6      1D60-1122   2.0-23
1     yes       up                HC1-X12G4       132-00D7      1D60-1122   2.0-23
2     yes       up                TAP-HC1-G10040  132-00D8      1D80-000B   2.0-78
3     yes       up                TAP-HC1-G10040  132-00D8      1D80-002B   2.0-78
```

8. Issue a **show port** command to determine the port numbers that need to be enabled.

9. Use the **port** command with the **admin** argument to enable ports on modules as well as ports on the base chassis. For example, the following command enables all ports on the 10Gb ports on the base chassis:

    (config) # port 1/1/x1..x12 params admin enable

10. Save your changes so that the cards and ports come up automatically at the next reboot:

(config) # write memory

Command-Line Basics

This section provides a quick orientation to the GigaVUE-OS command-line interface – how to enter commands, how to get help, and so on.

Command-Line Modes

The GigaVUE-OS can operate in one of three modes, each with its own set of available commands – Standard, Enable, and Configure. When you first launch the CLI, you start in Standard mode with access to a limited amount of commands used to review node status. As you move from **Standard** mode to **Enable** mode to **Configure** mode, both the power and the number of commands available increase, as summarized in .

Differences in Commands for admin and default Level Users

The commands available in the GigaVUE-OS are also different depending on whether you are logged in as **admin** or **default** level user. Commands listed in bold in are only available to **admin** level users.

Standard Mode

Standard mode is the first mode you enter upon logging into the CLI. It is the most restrictive command mode, only allowing access to a small set of read-only commands.

In **Standard** mode, the command prompt appears with an angle bracket (>). For example:

    Giga VUE-HD >

This mode is available to both **default** and **admin** level users. Press **?** to see the list of commands available to the currently logged-in user.

cli	ping
enable	ping6
exit	show
help	terminal
no	traceroute

Enable Mode

enable (ena) →

Enter Enable mode from Standard mode by typing **enable**. As with all H Series commands, you can abbreviate the command so long as you supply enough characters to distinguish the command from any others. So, for example, typing just **ena** is enough to enter Enable mode.

In Enable mode, the command prompt appears with a hash mark (#). For example:

    Giga VUE-HD #

Return to **Standard** mode from **Enable** mode with the **disable** command.

Enable mode is available to both **default** and **admin** level users. However, commands listed in bold in the list below are only available to **admin** level users. Press **?** to see the list of commands available to the currently logged-in user.

aaa	logging
boot	no
clear	**ntpdate**
cli	ping
cluster	ping6
configure	**reload**
debug	show
disable	sleep
email	ssh
exit	**system**
file	terminal
help	traceroute
image	web
interface	write
job	

← **disable (dis)**

Configure Mode

configure terminal (co t) →

Enter **Configure** mode from **Enable** mode by typing **configure terminal**. You can abbreviate the command to just **co t**.

In **Configure** mode, the command prompt appears with a the word **config** in parentheses. For example:

    Giga VUE-HD (config)#

Return to **Enable** mode from **Configure** mode with the **exit** command.

Configure mode is the most powerful mode, allowing you to change any system setting. It also includes all commands from the other modes. **Configure** mode is available to both **default** and **admin** level users. However, commands listed in bold in the list below are only available to **admin** level users. Press **?** to see the list of commands available to the currently logged-in user.

aaa	map
apps	map-group
banner	map-passall
bond	map-scollector
boot	map-template
card	nhb-profile
chassis	no
clear	notifications
cli	ntp
clock	ntpdate
cluster	ping
configuration	ping6
coreboot	pld
crypto	policy
debug	port
email	port-group
exit	port-pair
file	**ptp**
filter-template	**radius-server**
gigasmart	**redundancy-profile**
gigastream	**reload**
gsgroup	**reset**
gsop	serial
gsparams	show
halt	sleep
hb-profile	**snmp-server**
help	spine-link
hostname	ssh
image	stack-link
inline-network	sync
inline-network-group	**system**
inline-serial	system-health
inline-tool	**tacacs-server**
inline-tool-group	telnet-server
interface	terminal
ip	timestamp
ipv6	tool-mirror
job	traceroute
ldap	tunnel-endpoint
license	tunneled-port
logging	**uboot**
	username
	vport
	web
	write

← **exit**

Figure 4-6: GigaVUE-OS Command-Line Modes

NOTE: If you are working simultaneously with multiple GigaVUE nodes, you may want to assign each a separate hostname so its easy to identify separate terminal sessions from the system prompt. Admin users can do this in Configure mode with the **hostname <name>** command; refer to *Configuring the GigaVUE H Series Host Name on page 58*.

Entering Commands in the CLI

The GigaVUE-OS provides several conventions that make it easy to identify available commands and enter them quickly:

Technique	Description
Context-Sensitive Help	The **?** symbol is the key to receiving help wherever you are in the CLI: • Type **?** by itself to see a list of all available commands. • **Word Help** – Type a partial word with **?** mark immediately following the partially-typed word to see a list of all possible commands using the word entered so far. For example, if you typed **r?** in Configure mode, the CLI would return the following possible commands based on what you have entered so far: **radius-server Configure RADIUS server settings** **reload Reboot or shut down the system** **reset Reset this system to its factory state** • **Command Help** – Type a command followed by a question mark to see all possible arguments for the command as entered. If the node returns **<cr>**, that means the command can be entered as-is. For example, if you entered **gigastream ?**, you would see **alias**. You can build your way through the entire command tree by entering **?** after each new argument. For example, after entering **gigastream alias myalias ?**, you would see the next valid argument – **port-list**. **NOTE:** Typing **?** accesses the help system immediately – you do not need to press **<Enter>**.
Partial Command Entry	For all GigaVUE H Series commands and arguments, you only need to enter enough characters to distinguish the command from all other available commands. So, for example, you do not have to enter the full command **debug** – there is only one command starting with the letter **d**, so you only have to enter **d**.
Command Completion	If you have partially typed a command, you can press **Tab** and the CLI will attempt to complete the command for you based on what has been entered so far. Use the command completion feature together with partial command entry – you can press Tab while entering a command to see a list of all available commands matching what you have entered so far. For example, you can press **p<Tab>** and the node will return: **ping ping6 port port-group port-pair ptp** Based on this information, you know that you only need to enter **pt** to distinguish the **ptp** command from the other commands beginning with the letter **p.**

Command-Line Syntax – Entering Commands

You enter all configuration commands for the GigaVUE-OS in the command-line interface. Enter commands by typing enough characters to uniquely identify the command and pressing **<Enter>**.

When entering commands, keep in mind the following rules:

- Successful commands return no response in the CLI; commands with errors return an error response beginning with **%**, followed by a short error description.
- All commands are case-sensitive.
- Aliases are case-sensitive and accept both lower and upper case – for example, **my_alias** and **My_Alias** refer to two separate maps.
- The **no** command is used to remove configuration settings. For example **no connect alias myconnect** deletes the named **myconnect**.
- Port numbers are entered in **<chassis-id>/<slot-num>/<port-num>** format. For example, **1/1/x1** identifies the 10Gb/1Gb port x1 in slot 1 on box 1.
- Strings must consist entirely of alphanumeric characters with no spaces. The only exceptions are the underscore (**_**) and hyphen (**-**) characters. Those are allowed.

  For example, in Configure mode, **port 1/1/g1 alias My_Alias** is legal, but **port 1/1/g1 alias My Alias** is not.

  NOTE: Some string fields do accept spaces provided the input is made inside quotation marks (for example, the **banner login** command described in *Using a Custom Banner* on page 61).

Configure Mode Syntax

Users of GigaVUE nodes may be accustomed to entering the word **config** before many commands – **config map**, **config port-filter**, and so on. When using the GigaVUE-OS, the "config" part of the command is implied whenever you are working in Configure mode. The system prompt helps you remember this by including the word **(config)** in parentheses. For example:

    (config) #

So, instead of entering **config gigastream** to set up a GigaStream consisting of multiple ports, you just enter **gigastream** followed by the necessary arguments. The **config** part is implied because you are already working in the Configure mode. For example:
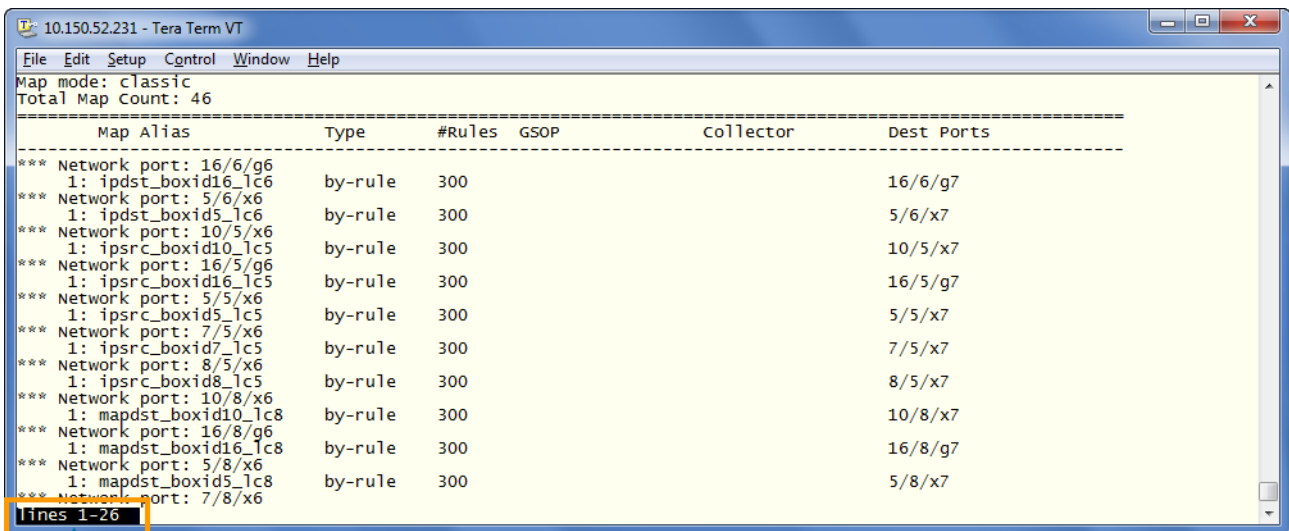
    (config) # gigastream alias mystream port-list 1/1/x1..x4

Paging through CLI Output

By default, the CLI returns output exceeding the configured terminal length in pages. The CLI provides the same features for working through the paged output as the Linux programs **less** and **more**. Press the **h** key when presented with the paging prompt at the base of the display to see paging options – provides an example of how to do this.

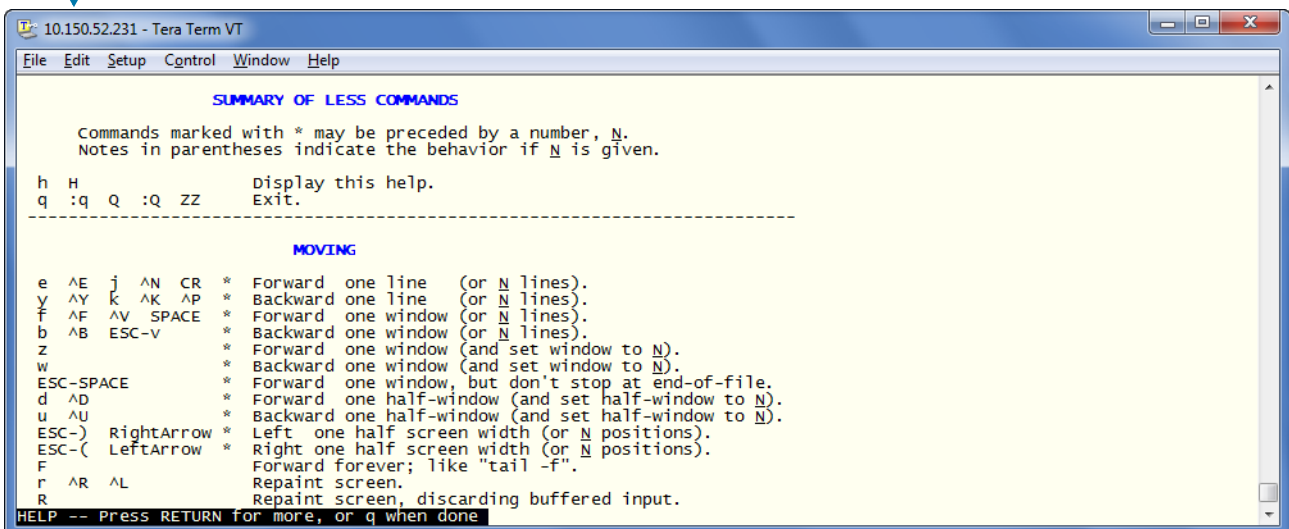If you prefer, you can disable paging either for the current session or by default:

- **Disable for Current Session**
  (config) # no cli session paging enable

- **Disable for All Sessions (Default)**
  (config) # no cli default paging enable

When you see the paging prompt at the base of the CLI display, you can press the **h** key to see a summary of the available options.

Figure 4-7: Viewing Paging Options

The Basic Commands

The following table lists each of the top level commands for the GigaVUE-OS in Configure mode. As described in *Entering Commands in the CLI* on page 44, the commands available in Configure mode are a superset of those available in Standard and Enable modes.

Most commands have multiple supported arguments. You can see the exact arguments available at any point of command entry by typing it into the CLI followed by **?**.

Table 4-1: CLI Commands

Command	Description
aaa	Configures authentication, authorization, and accounting settings.
apps	Enables access to Gigamon Applications, such as Application Session Filtering (ASF), GTP backup, GTP whitelisting, inline SSL decryption, keystore, NetFlow, SIP whitelisting, and out-of-band SSL decryption. GigaSMART applications are not supported on GigaVUE TA Series.
banner	Sets a node login banner.
bond	Configures bonded interface settings.
boot	Configures node boot parameters.
card	Configures a line card or module.
chassis	Configures the GigaVUE H Series chassis.
clear	Resets statistics or clears caches.
cli	Configures CLI shell options.
clock	Sets the node clock or timezone.
cluster	Configures a cluster of connected GigaVUE-OS nodes.
configuration	Manages configuration files.
configure	Enters Configure mode.
coreboot	Upgrades the BIOS image on GigaVUE-TA100 and GigaVUE-HC1.
crypto	Manages X.509 certificates for the GigaVUE H Series node's Web server.
debug	Generates a dump file for use in debugging issues with Gigamon Technical Support.
disable	Exits Enable mode and returns to Standard mode.
email	Configures email and event notification via email.
enable	Enters Enable mode.
exit	Exits Configure mode and returns to Enable mode or logs out of the CLI.
file	Manages TCP and debug dump files on disk.
filter-template	Configures flexible filter templates on GigaVUE-HC3 and GigaVUE-TA100.
gigasmart	Configures an interface address to a GigaSMART card or module.
gigastream	Configures a GigaStream—a group of ports acting as a single addressable tool port destination or stack-link.
gsgroup	Configures a GigaSMART group consisting of one or more internal GigaSMART ports.

Table 4-1: CLI Commands

Command	Description
gsop	Configures a GigaSMART operation consisting of one or more advanced processing applications.
gsparams	Configures GigaSMART parameters.
halt	Shuts down the node without powering it off.
hb-profile	Configures a heartbeat profile on GigaVUE HC Series nodes.
help	Views a description of the interactive help system.
hostname	Specifies the node's hostname. The hostname appears in the system prompt and in SNMP traps.
ib-pathway	Reserved for future use.
image	Manages node software images.
inline-network	Configures an inline network on GigaVUE HC Series nodes.
inline-network-group	Configures an inline network group on GigaVUE HC Series nodes.
inline-serial	Configures an inline tool series on GigaVUE HC Series nodes.
inline-tool	Configures an inline tool on GigaVUE HC Series nodes.
inline-tool-group	Configures an inline tool group on GigaVUE HC Series nodes.
interface	Configures network interfaces.
ip	Configures IP settings for the eth0 Mgmt port.
ipv6	Configures IPv6 settings for the eth0 Mgmt port.
job	Configures scheduled jobs.
ldap	Configures LDAP server settings for authentication.
license	Activates features using license keys. Licensing is used for GigaSMART, Port, or Advanced Features License.
logging	Configures event logging.
map	Configures maps and map rules to manage GigaVUE traffic distribution.
map-group	Configures map groups for GTP whitelisting and GTP flow sampling.
map-passall	Creates a pass-all map to send all traffic on a network port to a tool port irrespective of the other packet distribution in place on the port.
map-scollector	Configures shared collector map parameters.
map-template	Configures a map template.
nhb-profile	Configures a negative heartbeat on GigaVUE HC Series nodes.
no	Deletes or clears certain configuration options.
notifications	Configures notification settings.
ntp	Enables and disables the use of NTP, as well as adds NTP servers.
ntpdate	Sets node clock once from a remote server using NTP.
pcap	Configures packet capture.
ping	Sends ICMP echo requests to a specified host.

Table 4-1: CLI Commands

Command	Description
ping6	Sends IPMPv6 echo requests to a specified IPv6 host.
pld	Upgrades programmable logic devices (PLDs) on GigaVUE-HC3 nodes.
policy	Configures an active visibility policy.
port	Configures port type, parameters, and filters.
port-group	Creates a group of ports.
port-pair	Configures a port-pair on a pair of network ports within the same GigaVUE H Series node. A port-pair is a bidirectional connection in which traffic arriving on one port in the pair is transmitted out the other (and vice-versa) as a pass-through TAP.
ptp	Enables and disables the use of PTP.
radius-server	Configures RADIUS server settings for authentication.
redundancy-profile	Configures an inline redundancy profile on GigaVUE HC Series nodes.
reload (reboot)	Reboots or shuts down the node.
reset	Resets specified portions of the node configuration to their factory states.
serial	Sets options for the serial console port.
sfp	Reserved for future use.
show	Displays configuration and status information for GigaVUE H Series settings and entities.
sleep	Sleeps for a specified number of seconds.
snmp-server	Configures SNMP settings, including the local SNMP server, notification events, and notification destinations.
spine-link	Configures spine links in a cluster with a leaf and spine architecture.
ssh	Enables and disables SSH access, as well as manages settings.
stack-link	Configures a stack-link between two GigaVUE H Series nodes in a cluster. Stack-links are used to carry data traffic between nodes in a GigaVUE H Series cluster.
sync	Enables dynamic control card synchronization for a GigaVUE-HD8 node.
system	Changes system settings.
system-health	Configures system health behaviors.
tacacs-server	Configures TACACS+ server settings for authentication.
telnet-server	Enables or disables Telnet access.
terminal	Sets terminal parameters, including width and length.
timestamp	Configures the timestamp source.
tool-mirror	Configures a tool-mirror connection between two tool ports. A tool-mirror connection sends all packets arriving on one tool port to a second tool port on the same node.
traceroute	Traces the route packets take to a destination.
tunnel	Reserved for future use.
tunnel-endpoint	Configures a tunnel endpoint, which is a destination for load balanced traffic from a L2GRE encapsulation tunnel.

Table 4-1: CLI Commands

Command	Description
tunneled-port	Configures a tunnel port to be used for GigaSMART encapsulation/decapsulation operations.
uboot	Installs new uboot software.
username	Manages user accounts.
vport	Configures a virtual port.
web	Configures the Web server used for H-VUE GUI support on the GigaVUE H Series node.
write	Saves the running configuration to persistent storage.

Completing the Initial GigaVUE H Series Setup

At this point, you have logged in to the GigaVUE-OS command-line interface using the **admin** account, configured the **Mgmt** port's network properties for Telnet or SSH access, and have explored the command-line interface structure.

There are a few more steps you should perform to complete the initial configuration before you get to the fun stuff – setting up network ports, tool ports, and mapping traffic. These tasks include:

- Switch to the Configure mode.
  Refer to *Enter the Configure Command-Line Mode* on page 51.

- Configure Telnet and SSH access to the node.
  Refer to *SSH, Telnet, or Both?* on page 52.

- Enable the GigaVUE Web server for Web-based GUI access.
  Refer to *Enabling the GigaVUE H Series Web Server* on page 54.

- Configure some basic user accounts.
  Refer to *Initial User Account Configuration* on page 56.

- Configure the GigaVUE name.
  Refer to *Configuring the GigaVUE H Series Host Name* on page 58.

- Configure the GigaVUE time and date options.
  Refer to *Configuring GigaVUE H Series Time Options* on page 58.

- Configure automatic email notifications for node events.
  Refer to *Configuring Automatic Email Notifications* on page 60.

- Configure a custom login banner.
  Refer to *Using a Custom Banner* on page 61.

- Save your changes!
  Refer to *Saving Changes* on page 62.

Enter the Configure Command-Line Mode

Keep in mind that the GigaVUE-OS has three different command modes for the CLI – **Standard**, **Enable**, and **Configure**. The commands described in the following sections are all only available in Configure mode. Switch to Configure mode as follows:

Command	Notes
> enable	You only need to supply enough of each command to positively identify it among the other available commands. So, in this example, you could just type **ena** and press Enter.
# configure terminal	Similarly, this command can be entered as **co t**.
(config) #	Notice how the system prompt changes with each command mode. Command modes offer greater control over the node as you ascend from **Standard** to **Enable** to **Configure**.

SSH, Telnet, or Both?

Both Telnet and SSH2 are available for remote connections to the GigaVUE-HC1's **Mgmt** port. By default, SSH2 is enabled and Telnet is disabled. Use the **ssh** and **telnet-server** commands in Configure mode to enable or disable the corresponding connections. To disable the corresponding connection, you include **no** before the command, as demonstrated in the following table. For example:

Command	Notes
Enable: (config) # ssh server enable **Disable:** (config) # no ssh server enable	When SSH2 is enabled, use any compliant SSH2 client to connect to the command-line interface remotely. For example, to connect using the popular SSH2 client, PuTTY: a. Start PuTTY and enter the GigaVUE H Series node's IP address in the Host Name field. b. Click the **SSH** protocol radio button. c. Click **Open** to open a connection. If this is your first connection PuTTY warns you that the host key presented by the GigaVUE H Series node is not in your cache. You can add the key, connect without adding the key, or cancel the connection. Refer to *Verifying Host Keys During Connection* on page 53 for information on how to verify that the host key shown is the correct one. d. Log in with GigaVUE credentials.
Enable: (config) # telnet-server enable **Disable:** (config) # no telnet-server enable	When Telnet is enabled, use any compliant Telnet client to connect to the command-line interface remotely. For example, to connect using the Telnet client provided with Microsoft Windows: a. Open a command prompt window and type **Telnet**. b. Type **open <Mgmt Port IP Address>**. c. Log in with GigaVUE credentials.

Advantages of SSH2

SSH2 is a more secure choice for remote connections than Telnet, providing an encrypted channel instead of relying on clear text. It also provides stronger user authentication capabilities, including the use of a public *host key*. Host keys uniquely identify a server, helping guarantee that the server you are connecting to is the server you think it is.

GigaVUE includes default RSA v1/v2 and DSAv2-encrypted public host keys (SSH2 supports both RSA and DSA encryption algorithms). The first time you connect to GigaVUE with an SSH2 client, the client will warn you that the host keys are not in your local cache and show you the actual host key presented by the GigaVUE-HC1. Your client will most likely give you the option of trusting the key, adding it to your local cache. Once you have trusted the key, your client will alert you during connection if a different key is presented.

Verifying Host Keys During Connection

To verify that the host key presented during an SSH2 connection is in fact the GigaVUE node's, you can connect over the console port (refer to *Access the Command-Line Interface over the Console Port* on page 37) and use the **show ssh server host-keys** command to see the current public host keys and fingerprints for the GigaVUE-HC1. Paste these in a file and keep them nearby when you connect via SSH2 the first time. This way, you will be able to compare the actual host key to what your SSH2 client says is being presented. Once you have verified that they are the same, you can choose to trust the host key, allowing future connections to take place seamlessly.

Changing Host Keys

Use the **ssh server host-key generate** command to change the default host keys provided with the GigaVUE-HC1. The command has the following syntax:

ssh server host-key <rsa1 | rsa2 |dsa2> <private-key | public-key> generate

For example, to configure a new RSAv1 public hostkey, you could use the following command:

(config) # ssh server host-key rsa1 public-key generate

Enabling the GigaVUE H Series Web Server

H-VUE is Gigamon's Web-based management interface for the GigaVUE H Series. Use H-VUE or GigaVUE-FM for many node configuration, management, and operations tasks.

To use H-VUE with a GigaVUE H Series node, you must enable its Web server with the **web enable** command. For example:

> **(config) # web enable**

Check the status of the Web server using the **show web** command. Make sure that **Web-based management console enabled:** is set to **yes**, indicating that the Web server is enabled. For example:

```
(config) # show web
Web-based management console enabled: yes

   HTTP enabled:                    yes
   HTTP port:                       80
   HTTP redirect to HTTPS:          yes
   HTTPS enabled:                   yes
   HTTPS port:                      443
   Require certificates from DoD CA: no
   HTTPS certificate name:          default-cert
   Listen enabled:                  yes
   No Listen Interfaces.

   Inactivity timeout:              15 min
   Session autologout:              2 hr 30 min
   Session renewal:                 30 min

Web client (for file transfers)
   Proxy enabled: no
   HTTPS server cert verify: yes
   HTTPS supplemental CA list: default-ca-list
```

Once the Web server is enabled, you can use H-VUE for GigaVUE H Series connections, as described in *Connecting to the GigaVUE H Series Node from H-VUE on page 54*. Refer to the *GigaVUE-OS CLI Reference Guide* for information on other Web server settings you can configure.

Connecting to the GigaVUE H Series Node from H-VUE

After you enable the Web server on the GigaVUE H Series node, it automatically listens for connections from H-VUE using either HTTP on port 80 or HTTPS on port 443. Use the following procedure to connect to a GigaVUE H Series node using H-VUE.

NOTE: You can configure whether the GigaVUE H Series node redirects all incoming HTTP connections to the HTTPS port with the **web http redirect** command.

1. Open a supported browser. Refer to the *GigaVUE-OS H-VUE User's Guide*.

2. Enter one of the following URLs:

> **https://<GigaVUE Node IP Address>**
> **http://<GigaVUE Node IP Address>**

3. The first time you connect to H-VUE, your browser will prompt you regarding an invalid security certificate. Depending on the browser you are using, you can avoid these warnings either by installing a certificate or adding an exception. The following table has the details:

Browser	Add Exception?	Install Certificate?
Mozilla Firefox	Y	Y
Windows Internet Explorer	N	Y

NOTE: Gigamon provides the GigaVUE H Series with self-signed certificates for use with H-VUE; you can also create and install a third-party certificate on these nodes.

Add an exception in Firefox as follows:

a. Click the **Or you can add an exception** link.

b. Click the **Add Exception** button.

c. Click the **Get Certificate** button.

d. Click the **Confirm Security Exception** button.

The H-VUE login page appears.

4. Enter a valid user name and password and click **Login**.

Configuring Internet Explorer for Use with H-VUE

H-VUE works best in Internet Explorer when the browser is configured to check for newer versions of stored pages every time pages are visited. Enable this option as follows:

1. Open Internet Explorer.

2. Select the **Tools > Internet Options** command.

3. In the **General** tab, locate the **Browsing history** section and click its **Settings** button.

4. Set the **Check for newer version of stored pages:** option to **Every time I visit the webpage**.

5. Click **OK** on the Temporary Internet Files and History Settings dialog.

6. Click **OK** on the Internet Options dialog.

Next Steps?

Refer to the online help for details on configuring and operating the GigaVUE-HC1 from the H-VUE interface. Keep in mind that each of the initial configuration settings described in the rest of this chapter can also be set in H-VUE.

Initial User Account Configuration

Before you start mapping traffic, you must change the password for the **admin** account and add a few other accounts for use by different level users. (You may have already used the jump-start script to change the password for the **admin** account.)

Changing the admin Account Password

1. To change the password for the **admin** account using the **username** command, refer to the following:

    (config) # username admin password <password>

    Passwords must meet the following standards:

    *   Include 8-30 characters.
    *   Include at least one numeral
    *   Include at least one capital letter
    *   Include at least one special character (for example, **!**, **@**, **#**, **$**, **%**, **^**, **&**, or ***** – ASCII 0x21, 0x2F, 0x3A, 0x40, 0x5B, 0x5F, 0x7B, 0x7E).

    Enter a new password that meets the standards and confirm the password.

Setting Up Some Basic Accounts

1. Next, you will probably want to set a few user accounts with different access levels.

    The GigaVUE H Series node has a local account database that can optionally integrate with an LDAP, RADIUS, or TACACS+ server for authentication. Any account you want to authenticate using an external AAA server must have a matching account name in the local database.

    Authentication, user levels, and roles are discussed in detail in the *GigaVUE-OS CLI Reference Guide*. For now, however, it is easiest to simply create a few basic user accounts with different privilege levels. In general, user privileges are as follows:

    *   **Admin** users have access to all command modes, including Standard, Enable, and Configure. They also have full permissions for all network, tool, and stack ports.
    *   **Operator** users have access to all command modes, including Standard, Enable, and Configure. However, they only have access to the network and tool ports associated with their user group.

        New users are created with the operator role by default. You can add additional roles with the **username <username> roles add <roles>** command.
    *   **Monitor** users have access to the Standard and Enable command modes. They cannot configure packet distribution (or any other global GigaVUE H Series node options), but they can use the **show** command to review many of the settings in place on the node.

The following **username** commands create a new **admin** user and a new **operator** user:

Command	Comments
(config) # username psandoval password Nine9.Eight8! (config) # username psandoval roles add admin	Creates a new account named **psandoval** with a password, and grants it admin privileges.
(config) # username bcrawford password Seven7.Six6!	Creates a new account named **bcrawford** with a password. New users are automatically created with default operator level privileges, so there is no need to grant an additional role.

2. Once you have configured these basic user accounts, use the **show usernames** and **show roles** commands to review your settings.

Configuring the GigaVUE H Series Host Name

It is generally a good idea to configure the GigaVUE H Series node's name, date, and time as part of your initial configuration. The following command shows how to set the node name. Refer to *Configuring GigaVUE H Series Time Options* on page 58 for information on setting options related to time and date.

Setting the Node Name

1. Use the **hostname** command to specify the node name. For example:

   (config) # hostname GigaVUE-QA

Configuring GigaVUE H Series Time Options

The GigaVUE H Series node includes a variety of features for setting the time, including:

Method	CLI Command	For more information:
System Clock	**clock set hh:mm:ss yyyy/mm/dd**	*Setting Time Manually* on page 59
One-Time NTP Synchronization	**ntpdate <ntpserver address>**	*Performing One-Time NTP Server Synchronization* on page 60
Persistent NTP Synchronization	Add server using **ntp server** command. Enable use of ntp with **ntp enable** command.	*Using NTP Time Server for Clock Synchronization* on page 60
PTP Synchronization	Enable PTP with **ptp enable** command.	*Refer to the GigaVUE-OS CLI Reference Guide (Reserved for future use)*

Setting Time Manually

The easiest way to set the GigaVUE H Series node's time is manually with the **clock set** command. For example:

   (config) # clock set 05:18:38 2015/01/06

NOTE: Even if you are using NTP, configure time manually as well. The GigaVUE H Series node will automatically fall back to the manual time setting if it is unable to synchronize with the specified time server.

The **show ntp** command shows the current state of the NTP server in use; the **show clock** command shows the current GigaVUE H Series node's time.

Performing One-Time NTP Server Synchronization

You can perform a one-time synchronization with an NTP server using the **ntpdate** command. For example:

   (config) # ntpdate time.nist.gov

NOTE: This method does not provide updates to correct clock drift over time. It is generally preferable to use persistent NTP synchronization with the **ntp** commands.

Using NTP Time Server for Clock Synchronization

The GigaVUE H Series node can optionally use one or more NTP servers for its time setting. Use the following procedure to add an NTP server to the GigaVUE H Series node's list and enable the use of NTP.

1. Specify the address of the time server. For example, if the time server is on 192.168.1.10, you would use the following command:

    (config) # ntp server 192.168.1.10

    NOTE: There are many public NTP servers available on the Internet.

2. Turn on NTP with the following command:

    (config) # ntp enable

3. The GigaVUE H Series node connects to the specified NTP server and synchronizes to its time.

4. NTP reports times in UTC. Because of this, it is a good idea to specify the GigaVUE H Series node's timezone so that UTC can be converted to the local timezone.

    You specify the timezone either in terms of the offset from UTC (either plus or minus) or with a particular location's name, depending on the argument you choose for the **clock timezone** command:

    • **Offset from UTC –** Set the timezone as an offset from UTC with the **UTC-offset** argument. For example, the following command sets the timezone as eight hours earlier than UTC:
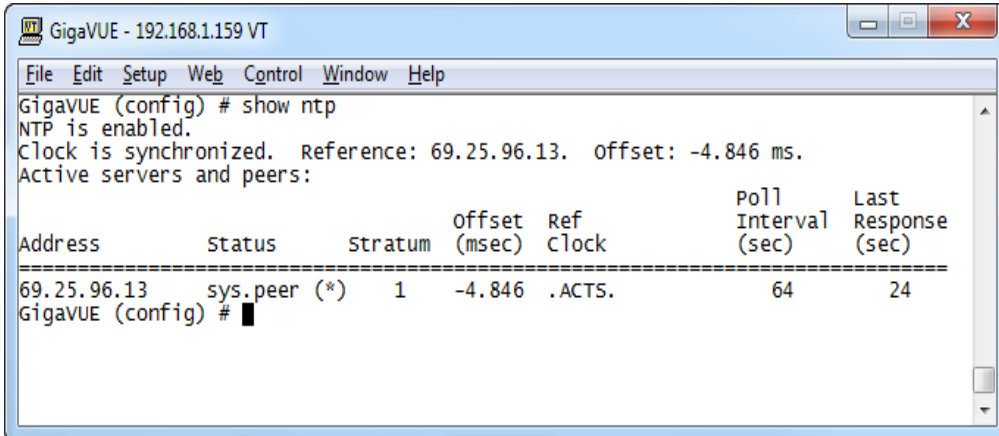
    (config) # clock UTC-offset UTC-8

    • **Location –** You can specify a particular location's timezone to use. The easiest way to do this is to build the available list of cities by adding a space and a question mark after each subsequent zone word. For example, enter **(config) # clock timezone ?** to see the list of available locations. Select a location and use the same question mark technique to see the next available zone words. This way, you can build out to the exact location you need. For example:

    (config) # clock timezone America North United_States Pacific
    (config) # clock timezone Asia Eastern Hong_Kong

Once you have finished configuring NTP options, use the **show ntp** command to check the status of clock synchronization (Figure 4-8).

Figure 4-8: Checking NTP Status and Configuration

Configuring Automatic Email Notifications

The GigaVUE H Series node provides powerful email notification capabilities, automatically sending emails to specified addresses when any of a wide variety of events take place on the node. Gigamon strongly recommends that you configure this feature so you have immediate visibility of events affecting node health.

You configure automatic email notifications with the **email** command and its arguments. Start by making sure the CLI is in Configure mode. If the **(config)** entry appears in the system prompt, you are in Configure mode. If not, use the **enable** and **configure terminal** commands sequentially to change to Configure mode. Then, configure email notifications as follows:

Description	Command
First, use the **email mailhub** command to specify the mail server to use for notification emails. In this example, we are using the email server named **smtp.emailsrvr.com**. You could also supply an IP address instead of a hostname.	**(config) # email mailhub smtp.emailsrvr.com**
Next, use the **email auth** command to supply the email account username and password. In this example, we are using **alerts@mycompany.com** with a password of **mypassword123**.	**(config) # email auth username alerts@mycompany.com** **(config) # email auth password mypassword123**
Now that we have set up the account to use, we will turn on email authentication.	**(config) # email auth enable**
Now that we have configured the settings that let the node send emails, set up who to send them to and when to send them. Use **email notify recipient** to configure the destinations for event notification emails. You can specify multiple destinations separated by commas with no spaces.	**(config) # email notify recipient cday@mycompany.com,mfelton@mycompany.com**
The **email notify event** command lets you configure which events will trigger automatic emails. There are quite a few events available – start by entering **email notify event ?** to see the list of available events. You can either enable individual events, or, use the **all** argument to enable them all. We are going to start with the **all** setting and tune settings as necessary later on.	**(config) # email notify event all**
It is a good idea to check your settings and make sure emails are sent successfully. You can do that with the **email send-test** command. If you do not receive the email, check the **show log** output to make sure the email was sent. Then, reconfigure email settings, if necessary.	**(config) # email send-test**
You may also want to configure and enable **autosupport** emails. Autosupport emails are sent directly to Gigamon's Technical Support department when specified events take place, enabling proactive problem resolution. The GigaVUE H Series node is preconfigured with the correct destination address – you just need to enable the feature with the following command. Use show email events to see the list of events for which autosupport emails will be sent. You can change the list with the **(no) email autosupport event** command.	**(config) email autosupport enable**

Description	Command

Emails will now be sent automatically to the configured addresses when any of the selected events take place.

There are many other options for fine-tuning automatic email settings, including how to handle "dead letters" (emails that did not reach their recipient), how the email address of the GigaVUE H Series node should appear, the port for the email server, the reply-to address, and so on. Refer to the *GigaVUE-OS CLI Reference Guide* for details.

Using a Custom Banner

The GigaVUE H Series node can display a customizable text banner at node startup before a user logs in. This way, users connecting to the node see the banner before they log in, giving them an idea of which node they are logging in to. The banner also appears after a user logs outs.

Use the **banner login "<string>"** command to configure the login banner. For example:

> **(config) # banner login "Pacific Call Center"**

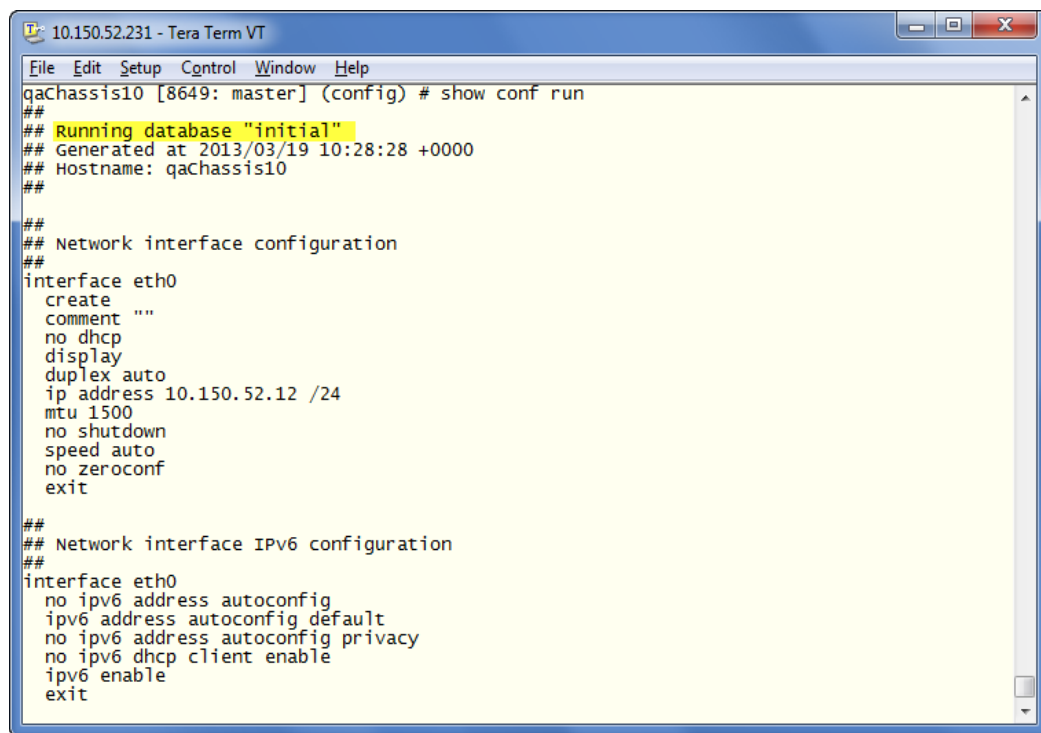NOTE: You only need to use quotation marks for the <string> if it includes spaces.

The next time you log in or out of the GigaVUE H Series node, you will see the customizable banner.

Saving Changes

It is a good idea to use the **write memory** command to save changes as you make them. Later on, when you start setting up packet distribution with connections and maps, your changes will added to the active configuration right away but will not be saved across a node reboot unless you use the **write memory** command to save your changes to flash.

NOTE: The name of the factory-provided configuration file is **initial**. You can see the name of the most recently booted configuration file by using the **show running-configuration** command (or **show configuration**) and look for the **## Running database** entry. In Figure 4-9, you can tell that the GigaVUE H Series node is currently operating with the **initial** configuration file.

Refer to the *GigaVUE-OS CLI Reference Guide* for details on using configuration files.

Figure 4-9: Showing the Current Configuration File

Chapter 5

Connecting GigaVUE-HC1 Ports

This chapter describes transceivers and port connections. In general, connecting GigaVUE-HC1 module ports to the network is as simple as installing a transceiver and connecting the correct cable to data sources or destinations. Refer to the following sections for details:

GigaVUE-HC1 Transceiver Information

Gigamon provides the following transceivers for use with the 10Gb/1Gb ports in the GigaVUE-HC1 modules.

Transceiver Type	Part Number	Description
SFP (1Gb)	SFP-501	1Gb SFP, Copper, UTP with RJ45 interface
	SFP-502	1Gb SFP, Multimode 850 SR
	SFP-503	1Gb SFP, Singlemode 1310 LR
SFP+ (10Gb)	SFP-531	10Gb SFP+, Copper
	SFP-532	10Gb SFP+, Multimode 850nm SR
	SFP-533	10Gb SFP+, Singlemode 1310nm LR
	SFP-534	10Gb SFP+, Singlemode 1550 nm ER (Special Order)
	SFP-535	10Gb SFP+, Multimode 1310nm LRM (Special Order)
Cable	CBL-205	SFP+ to SFP+ Direct Attach Copper cable, 5m
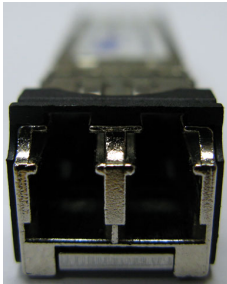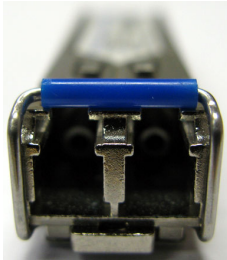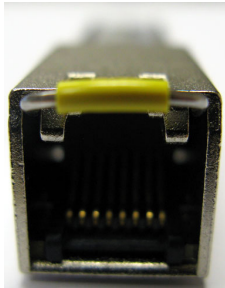
IMPORTANT: Always use transceivers purchased from Gigamon to ensure interoperability and performance. Gigamon does not support transceivers purchased from other vendors.
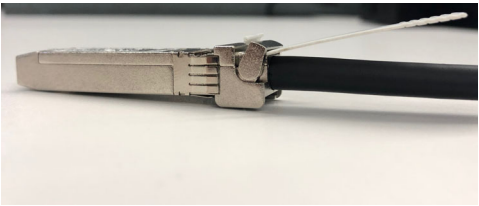
After removing an optical transceiver, the best practice is to wait ten (10) or more seconds before re-inserting the same or different optical transceiver.

It is not always easy to tell the difference between various SFP+/SFP transceivers. Use the following tips to keep track of your transceivers:

- SFP+ transceivers use **metal** bail and latch assemblies. The color of the metal bail corresponds to the SFP+ type, as summarized in the following table.

- 1Gb SFP transceivers use either bail and latch assemblies with a colored plastic sheath around the bail or assemblies made entirely of plastic (SX SFP). The color of the plastic sheath corresponds to the SFP type, as summarized in the following table.

Media/Transceiver	Description
SFP-531 **10Gb T SFP+**	**Metal Bail**
SFP-532 **10Gb SR SFP+**	**Silver Metal Bail**
SFP-533 **10Gb LR SFP+**	**Blue Metal Bail**
SFP-534 **10Gb ER SFP+**	**Metal Bail**

Media/Transceiver	Description
SFP-535 **10Gb LRM SFP+**	**Orange Metal Bail**
SFP-502 **1Gb SX SFP**	**Black Plastic Bail**
SFP-503 **1Gb LX SFP**	**Blue Plastic Sheath over Metal Bail**
SFP-501 **1Gb Copper SFP**	**Yellow Plastic Sheath over Metal Bail**

Media/Transceiver	Description
CBL-205 **10Gb Direct Attach** **Copper Cable (DAC)**	**White Pull Tab**

Transceiver Notes

- Use the **show port params all** command to see transceiver type information for each of the network/tool ports in the GigaVUE-HC1 node. Check the value of the **SFP type** field for the ports in question.

Supported Transceivers by GigaVUE-HC1 Port Type

Table 5-1 on page 67 lists the copper transceivers supported by individual ports in the GigaVUE-HC1 node.

Keep in mind the following rule of thumb for GigaVUE-HC1 node port numbers:

- Port numbers starting with x (for example, x10) are 10Gb or 1Gb depending on the transceiver installed.

Transceiver Support by GigaVUE-HC1 Port Type

Table 5-1: Transceiver Support by GigaVUE-HC1 Port Type

GigaVUE-HC1 Port	Supported Transceivers	Speeds
Ports x<number> **NOTE:** Transceiver type determines port speed.	SFP (SX, LX)	1Gb
	SFP (RJ45)	1000BASE-T
	SFP+ (ER, LRM)	10Gb
	SFP+ 10GBASE-SR	10Gb
	SFP+ 10GBASE-LR	10Gb
	SFP+ (RJ45)	10Gb BASE-T

Transceiver Installation Instructions

Gigamon transceivers are keyed and can only be installed in one direction. Transceivers are hot-swappable – they can be installed or removed with the power on or off. Use the following procedures to install and remove SFPs from GigaVUE modules.

IMPORTANT: Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact when installing or removing SFP/SFP+ transceivers. The strap can be connected to one of the following:

- ESD wrist strap connector.
- Captive installation screws on an installed module or power supply module.
- Any unpainted surface on the chassis.

Installing Transceivers

1. Remove the dust cap from the port and set it aside for future use.
2. Orient the transceiver with the opening in the module and insert it into the slot.
3. Push gently but firmly until the transceiver is seated in the slot.
4. Close the latch on the SFP to lock it into the slot.

Removing Transceivers

1. Disconnect the cable (if any) from the transceiver.
2. If you are removing a fiber-optic transceiver, install dust caps in the transceiver to protect the optical interfaces.
3. Open the latch on the transceiver and gently remove it from the slot.
4. If you are not installing a new transceiver, install a dust cap in the open slot on the module.

Transceiver Specifications

Table 5-2 on page 69 provides specifications on the transceivers used by the GigaVUE-HC1 node. Keep in mind the following important notes regarding the information in Table 5-2 on page 69:

Note 1	Launch power and sensitivity values provided here are for reference only.
Note 2	Multimode distance shown in the following tables is dependent on the cable's modal bandwidth. Refer to your cable manufacturer's specifications for detailed information.
Note 3	Multimode fibers can be 62.5/125µm or 50/125µm. Mixing different fiber types can cause link distance to degrade.

Table 5-2: External Transceiver Specifications

Type	Operating Wavelength (nm)	Link Distance (Refer to Note 2)	Cable Type (Refer to Note 3)	Connector Type	Average Launch Power (dBm)	Receive Sensitivity (dBm)	Comments
SFP	850	200-550m	Multimode fiber	LC	-9.5	-17	
	1310	10km	Singlemode fiber	LC	-9.5	-19	
	CAT5e copper cable 10/100/ 1000BASE-T	100m	UTP CAT5e or better	RJ45	N/A	N/A	
SFP+	850	300m	Multimode fiber	LC	-7.3	-11.1	
	1310	10km	Singlemode fiber	LC	-5.2 (OMA)	-12.6 (OMA)	
	1310 (LRM)	220m	Multimode fiber	LC	-4.5	-6.5	1310nm on multimode Special order
	1550	40km	Singlemode fiber	LC	-1.7	-11.3	Special order
	CAT6e copper cable 10Gb	30m	UTP CAT6e or better	RJ45	N/A	N/A	

Copper TAP Specifications

Refer to Table 5-3 for specifications for copper TAPs.

Table 5-3: Internal Transceiver Specifications for Copper TAPs

Module Type	Transceiver Type	Speed	Auto Negotiation	Duplex
TAP-HC1-G10040 Copper (RJ-45) 4 TAP Module	N/A	10/100/1000Mb	Always ON	Full

Bypass Combo Module Specifications

Refer to Table 5-4 and Table 5-5 for internal transceiver specifications and loss summaries for bypass combo modules.

Table 5-4: Internal Transceiver Specifications for Bypass Combo Modules

Module Type	Transceiver Type	Speed	Auto Negotiation	Duplex
BPS-HC1-D25A24 SX/SR 50/125	SFP+ 1Gb/10Gb Dual Rate 850nm MM	10000Mbps (10Gbps)/ 1000Mbps (1Gbps)	Always OFF	Full

Table 5-5: Loss Summary per Bypass Combo Modules

Type	@	Operating Wavelength (nm)			Cable Type	Max Fiber Length	Max Receiver Sensitivity	Insertion Loss
		Min	Typical	Max				LC to LC (dB)
BPS-HC1-D25A24 SX/SR 50/125	**1Gb**	840	850	860	LC	550m	-17	1.2
	10Gb	840	850	860	LC	82m	-11.1	1.2

Connecting GigaVUE-HC1 Ports

Connecting network and tool ports on GigaVUE-HC1 base chassis ports and modules is generally as simple as connecting a cable between the source/destination device and the GigaVUE-HC1 port. You just need to make sure that the modules and ports on the GigaVUE-HC1 node are enabled and their parameters are configured correctly. Refer to the following sections for details:

- *Enabling Modules and Ports* on page 77 – Make sure that the modules and ports you want to use are enabled. Newly installed modules must be configured with the **card** command and their ports enabled with **port <port-list> params admin enable**.

- *Setting Port Parameters Manually* on page 79 – If both ends of the connection are using autonegotiation, no manual configuration is typically necessary. However, if autonegotiation is not used (or is not successful), you can use these instructions to configure port parameters manually.

Enabling Modules and Ports

Use the following procedure to ensure that all modules are configured and ports enabled:

1. Connect to console port as described in *Access the Command-Line Interface over the Console Port* on page 69.

2. Wait at least two minutes after the system prompt appears and then switch to **Configure** mode.

The GigaVUE-HC1 node provides three command entry modes, each with increasingly powerful rights – **Standard**, **Enable**, and **Configure**. Module and port configuration commands are only available in Configure mode:

    a. Type **en <Enter>** to switch to Enable mode.

       The system prompt changes from *[hostname] >* to *[hostname] #*.

    b. Type **config t <Enter>** to switch to Configure mode.

       The system prompt changes from *[hostname] #* to *[hostname]* **(config) #**.

3. Use the following command to check module status:

   (config) # show cards

4. Check the values in the **Config Status** and **Oper Status** columns for all modules and verify that they read **Yes** for configured and **Up** for inserted. This is your indication that the node is ready for further configuration.

5. If the **Config Status** does not show **Configured** for all modules after two minutes, take the action corresponding to your **show cards** output, as follows:

show cards Output:	Corrective Action
Config Status does not show **Configured** for any cards (including base chassis)	**(config) # chassis box-id <integer>** **(config) # card all**
Config Status shows **Configured** for base chassis but not one or more modules	**(config) # card slot *x*** **NOTE:** If all modules are unconfigured, you can also use the **card all** command. If some cards are already configured, however (for example, because you just installed a new card), it is better to use **slot *x*** for the unconfigured cards.

The **card** command initializes unconfigured module. However, it can only be used after the node's box ID has been configured, as reported at the top of the **show cards** output (shown below).

6. Use the **show cards** command again to verify the following:

   • **Box ID** is not empty.

   • **Config Status** shows **configured** for all modules.

   • **Oper Status** shows **up** for all modules.

   The **show cards** command output for a GigaVUE-HC1 displays the properly configured modules.

HC1(config)# show cards

```
Box ID: 1
Slot   Config     Oper Status         HW Type       Product Code  Serial Num  HW Rev
-----------------------------------------------------------------------------
cc1    yes        up                  HC1-Main-Board 132-00D6      1D60-1122   2.0-23
1      yes        up                  HC1-X12G4      132-00D7      1D60-1122   2.0-23
2      yes        up                  TAP-HC1-G10040 132-00D8      1D80-000B   2.0-78
3      yes        up                  TAP-HC1-G10040 132-00D8      1D80-002B   2.0-78
```

7. Use the **port** command with the **admin** argument to enable the ports on the module. For example, the following two commands enable all ports on a TAP-HC1-G10040 module:

   (config) # port 1/1/x1..x12 params admin enable

8. Save your changes so that the modules and ports come up automatically at the next reboot:

   (config) # write memory

Setting Port Parameters Manually

If autonegotiation is not enabled on the other end of the connection, you must manually configure the **port params** of the GigaVUE-HC1 module port to match, followed by a **write** to save the current settings.

The **port params** commands are available in the Configure mode. The syntax is as follows:

```
port <port-list> params
   admin <disable | enable>
   autoneg <disable | enable>
   discovery <cdp | lldp | all | disable>
   duplex <full>
   forcelinkup <disable | enable>
   speed <10 | 100 | 1000 | 10000>
   taptx <active | passive>
```

The following table summarizes these options:

Argument	Description
**admin <disable	enable>**	Enables/disables ports administratively. Use the **show port params** command to see which ports are enabled and disabled. Refer to *Forcelinkup and Enabling/Disabling Ports* on page 80 for a summary of how this argument interacts with the **admin** argument.
**autoneg <disable	enable>**	Enables and disables autonegotiation for a port. When autonegotiation is enabled, duplex and speed settings are ignored (they are set via autonegotiation). Refer to *Forcelinkup and Enabling/Disabling Ports* on page 80 for a summary of how this argument interacts with the **admin** argument. **NOTE:** Autonegotiation is always disabled for 10Gb ports. **NOTE:** For 1Gb speeds over copper, autonegotiation must be enabled, per the IEEE 802.3 specification. Gb optical ports cannot enable autoneg.
**discovery <cdp	lldp	all	disable>**	Configures port discovery options, as follows: • cpd—Enables CDP port discovery. • lldp—Enables LLDP port discovery. • all—Enables all port discovery protocols (meaning both CDP and LLDP). • disable—Disables port discovery. Discovery is disabled by default. To enable discovery, configure one or more protocols.
duplex <full>	Specifies the port's duplex configuration. Only full duplex is supported. Starting in software version 5.2, half duplex support is removed from all GigaVUE nodes. If half duplex was configured in a previous software version, it will remain intact following the upgrade to 5.2 or higher release. Update to full duplex, if required.
**forcelinkup <disable	enable>**	Forces connection on an optical port. Use this option when an optical tool port is connected to a legacy optical tool that does not transmit light. Available as follows: • Optical 1Gb/10Gb tool ports • Not available for 10Gb-capable ports with a 1Gb SFP installed. 10Gb-capable optical tool ports only support **forcelinkup** when a 10Gb SFP+ is installed.
**speed <10	100	1000	10000>**	Sets the port speed in Mbps if autonegotiation is off.
**tapx <active	passive>**	Open or close the relays for the ports used to tap the link in the TAP-HC1-G10040 module. Once the relays are opened, verify that the green link LEDs for both ports in the pair have illuminated.

Forcelinkup and Enabling/Disabling Ports

The GigaVUE-HC1 node includes both **forcelinkup** and **admin** arguments for the **port params** command. The **forcelinkup** argument forces the link state on an optical tool port connected to a legacy tool that does not transmit the light required to bring the link up. The following table summarizes how traffic flows for different combinations of **port params admin** and **port params forcelinkup** applied to an optical tool port.

	forcelinkup = disable	forcelinkup = enable
admin = enable	No traffic passed if autonegotiation is not successful.	Traffic is passed.

admin = disable	No traffic passed.	Depends on sequence. Uses last setting made.
		
		Example 1:
		  a. **forcelinkup=enable**
		  b. **admin=disable**
		No traffic will be passed, but the **Link Status** will still show as **1** in **show port params** output.
		
		Example 2:
		  a. **admin=disable**
		  b. **forcelinkup=enable**
		Traffic is passed and the **Link Status** will show as **1** in the **show port params** output.

GigaVUE-HC1 Specifications

This appendix provides the physical specifications, power requirements, and environmental specifications for GigaVUE-HC1 nodes. Compliance for safety, emissions, and immunity are also provided.

Refer to the following sections for details:

- *Physical Dimensions and Weight* on page 75
- *Power Requirements* on page 76
- *Environmental Specifications* on page 76
- *Standards and Protocols* on page 76
- *Compliance* on page 76
- *Warranty* on page 79

Physical Dimensions and Weight

The following table summarizes the dimensions and weight for the GigaVUE-HC1 nodes and its modules:

Node	Height	Width	Depth	Weight
GigaVUE-HC1 (w/power supply modules, fans, base chassis)	1RU 1.75in (4.45cm)	Metal to Metal 17.26in (43.85cm)	Metal to Metal 19.5in (49.50cm)	20.88lb (9.47kg)
		With ears mounted 19.0in (48.35cm)	With PSU handle and card ejector 20.92in (53.18cm)	21.12lb (9.58kg)
TAP-HC1-G10040 Copper (RJ-45) 4 TAP Module	1.6in (4.10cm)	4.65in (11.80cm)	10.13in (24.98cm)	1.5lb (0.68kg)
BPS-HC1-D25A24 Bypass Combo Module	1.6in (4.10cm)	4.65in (11.80cm)	10.13in (24.98cm)	2.2lb (0.99kg)

Power Requirements

The following table summarizes the electrical characteristics of GigaVUE-HC1 nodes.

NOTE: Refer to Figure 4-2 on page 33 and Figure 4-4 on page 35 for instructions on how to connect AC and DC power supply modules.

Power Specification	Specification
Power Configuration	1 + 1 Power: 2 Power Supply Modules
Max Power Consumption/Heat Output	212 Watts/722.9 BTU/hr Fully populated system with all ports at 100% traffic load
AC Power Supply Modules	Min/Max Voltage: 100 to 127V AC, 200 to 240V AC, 50/60Hz Max PSM Input Current: 5.8A@100V, 2.9A@200V
DC Power Supply Modules	Min/Max Voltage: -40.5V to -60V DC Max PSM Input Current: 24A @ -40.5V

Environmental Specifications

The following table summarizes the environmental specifications for GigaVUE-HC1 nodes.

Specification	GigaVUE-HC1 Node
Operating Temperature	32ºF to 104ºF (0ºC to 40ºC)
Operating Relative Humidity	20% to 80%, non-condensing
Recommended Storage Temperature	-4ºF to 158ºF (-20ºC to 70ºC)
Recommended Storage Relative Humidity	15% to 85%, non-condensing
Altitude	Up to 10,000ft (3.05km)

Standards and Protocols

IEEE 802.3-2012, IEEE 802.1Q VLAN, IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3ab 1000BASE-T, IEEE 802.3z 1000BASE-X, IEEE 802.3ae 10000BASE-X, IEEE 802.3ba, RFC 783 TFTP, RFC 791 IP, RFC 793, TCP, RFC 826 ARP, RFC 854 Telnet, RFC 768 UDP, RFC 792 ICMP, SNMP v1/v2c, RFC 2131 DHCP client, RFC 1492 TACACS+, and support for IPv4 and IPv6.

Compliance

This section provides compliance information for GigaVUE-HC1.

Safety

GigaVUE-HC1 is compliant with the following safety regulations:

- UL 60950-1, 2nd Edition
- CAN/CSA C22.2 No. 60950-1-07, 2nd Edition
- EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013
- IEC 60950-1:2005 (2nd Edition) + Am 1:2009 + Am 2:2013

Emissions

GigaVUE-HC1 is compliant with the following emissions regulations:

- FCC Part 15, Class A
- VCCI Class A. Refer to *Class A Information Technology Equipment (ITE)* on page 77.
- EN55022/CISPR-22 Class A
- Australia/New Zealand AS/NZS CISPR-22 Class A:RCM
- EU:CE Mark EN 55022 Class A
- CCC China
- BSMI Taiwan
- KCC Korea
- EAC Russia

Class A Information Technology Equipment (ITE)

この装置は、クラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　　　　　　　　　　　　　　　　ＶＣＣＩ－Ａ

Translation of Statement for Class A VCCI-certified Equipment:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective action.

Class A Korea Caution

The following caution applies to Korea Class A Equipment.

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Translation of Caution Statement for Korea Class A Equipment:

This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home.

Immunity

GigaVUE-HC1 is compliant with the following immunity regulations:
- ETSI EN300 386 V1.6.1:2012
- EN61000-3-2
- EN61000-3-3
- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

Environmental

GigaVUE-HC1 is compliant with the following environmental regulations:
- EU RoHS 6, EU directive 2011/65/EU
- NEBS Level 3. Refer to *NEBS Level 3 Compliance* on page 83.

Security

- Common Criteria (Certification pending). Refer to "Common Criteria" in the *GigaVUE-OS CLI Reference Guide*.
- FIPS 140-2. Refer to "FIPS 140-2 Compliance" in the *GigaVUE-OS CLI Reference Guide*.

Warranty

Gigamon offers a range of premium support and extended services. For details regarding warranty, visit:
https://www.gigamon.com/support-and-services/warranty

Console Port Signaling and Cabling

This appendix provides the pin-outs for the RJ45-to-RJ45 rollover cable and RJ45-to-DB-9 adapter provided with the GigaVUE-HC1 node for connections from the node's console port to a PC's COM port.

The following figure shows how to connect the RJ45-to-RJ45 rollover cable from the GigaVUE-HC1 node's console port to a COM port on a PC using the RJ45-to-DB-9 adapter.
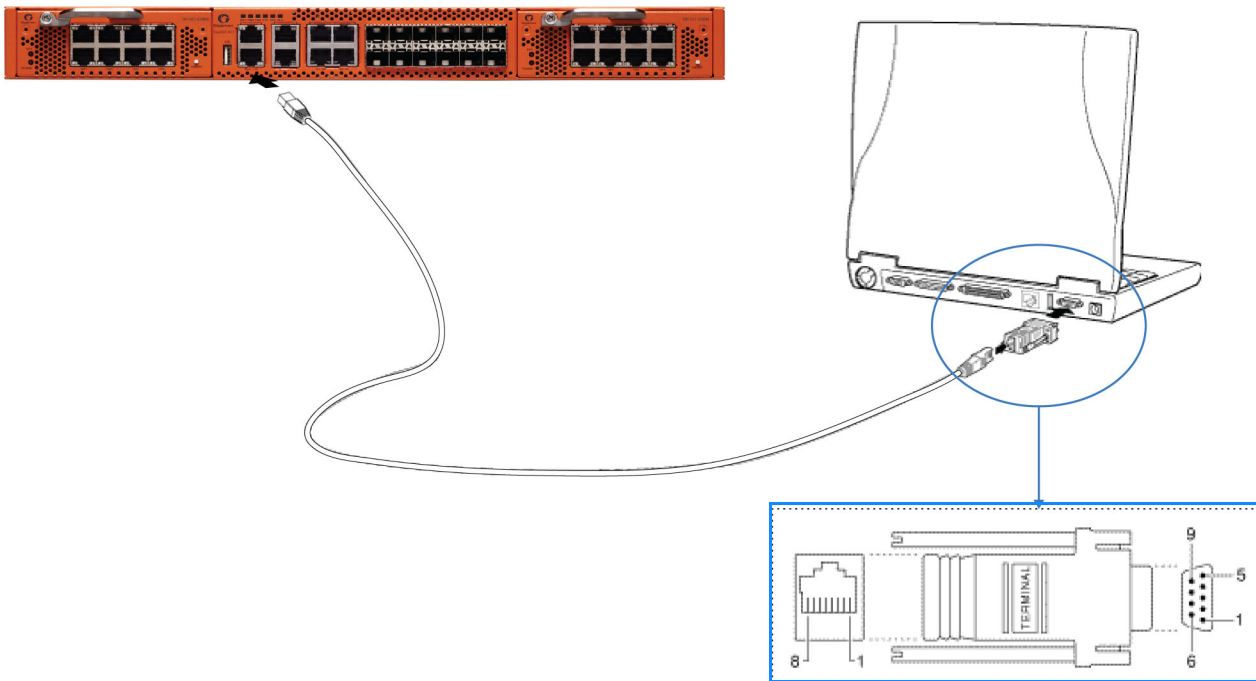
The following table lists the pinouts for this connection.

Console Port from GigaVUE-HC1 RJ45 Jack	RJ45-to-RJ45 Rollover Cable		RJ45-to-DB-9 Terminal Adapter	Console Device on PC
Signal	RJ45 Pin	RJ45 Pin	DB-9 Pin	Signal
N/A	1	8	8	N/A
N/A	2	7	6	N/A
TxD	3	6	2	RxD
GND	4	5	5	GND
GND	5	4	5	GND

Console Port from GigaVUE-HC1 RJ45 Jack	RJ45-to-RJ45 Rollover Cable		RJ45-to-DB-9 Terminal Adapter	Console Device on PC
Signal	RJ45 Pin	RJ45 Pin	DB-9 Pin	Signal
RxD	6	3	3	TxD
N/A	7	2	4	N/A
N/A	8	1	7	N/A

NEBS Level 3 Compliance

This appendix provides installation instructions for GigaVUE-HC1 Network Equipment-Building System (NEBS) Level 3 compliance. Refer to the following section for details:

Installation Instructions GigaVUE-HC1

The following sections detail installation instructions for GigaVUE-HC1.

Intrabuilding or Intra-connection

WARNING: The intra-building ports:

- BNC Coaxial PPS
- RJ45: PTP-1588, Management port, Console port, Stack port
- RJ45: 10/100/1000 ports: G1 - G4
- 1G/10G SFP+: X1 - X12
- TAP-HC1-G10040
    - TAP 1G Copper 4 pairs: G1 - G8
- BPS-HC1-D25A24
    - 1G/10G SFP/SFP+: X1 - X4
    - BPS SX/SR (50/125µm) 2 pairs: X5 - X8
- P/S port on rear of chassis: (Reserved for future use)

GigaVUE-HC1 equipment or subassembly are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 6) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

Intrabuilding Ports (RJ45)

WARNING: The intrabuilding ports (RJ45) shall be connected to shielded and grounded cables at both ends.

Class A2 Voltage Accessibility

The GigaVUE-HC1 shall be located in a restricted access location where only crafts personnel are allowed access.

Class B Voltage Accessibility

The GigaVUE-HC1 shall be located in a restricted access location where only crafts personnel are allowed access.

Equipment Grounding Systems

The GigaVUE-HC1 shall be installed and connected to the (CBN).

Communication Equipment Grounding

The GigaVUE-HC1 is suitable for connection to the (Central Office and CPE).

Bonding of Battery Return (BR) Input Terminals

The battery returns of the GigaVUE-HC1 shall be connected as (DC-I).

Connections

a. The GigaVUE-HC1 shall be grounded via a copper ground conductor #6 AWG for CPE installation.

b. All bare grounding connection points to the GigaVUE-HC1 shall be cleaned and coated with an antioxidant solution before connections are made.

c. All surfaces on the GigaVUE-HC1 that are unplated shall be brought to a bright finish and treated with an antioxidant solution before connections are made.

d. All non-conductive surfaces on the GigaVUE-HC1 shall be removed from all threads and connection points to ensure electrical continuity.

e. Multiple connectors shall not be secured by the same bolt assemblies.

f. Unplated connection surfaces that are to be intentionally joined to form a bonding or grounding path shall be brought to a bright finish and then coated with an antioxidant before they are joined (electrical connections).

g. Listing fasting hardware shall be compatible with materials being joined and shall preclude loosening deterioration, and electrochemical corrosion of the hardware and joined materials.

h. Non-conductive coatings (such as paint, lacquer, and enamel) on the equipment to be bonded or grounded shall be removed from threads and other contact surfaces to assure electrical continuity.

i. GigaVUE-HC1 utilizes a Spade width 0.32in/.81cm with a Standard Wire 14-16 (AWG) that utilizes 5in-lbs of torque to secure it to the frame and EUT. Only listed two-hole compression-type connectors shall be used in making connection to flat surfaces (such as bus bars, frames, racks, or cabinets). Torquing and bolts assembly requirements for securing the connector shall be as specified by the connector supplier.

Maintenance

CAUTION: Remove all power sources before servicing. (TO COMPLETELY REMOVE POWER FROM THE UNIT, FIRST TURN OFF THE POWER SWITCH AND REMOVE BOTH POWER CABLES).

Additional Sources of Information

This appendix provides additional sources of information. Refer to the following sections for details:

- *Documentation* on page 87
- *Documentation Feedback* on page 87
- *Contacting Technical Support* on page 88
- *Contacting Sales* on page 88
- *The Gigamon Community* on page 88

Documentation

Gigamon provides additional documentation for the GigaVUE H Series node on the *Gigamon Customer Portal*.

Document	Summary
GigaVUE-OS CLI Reference Guide	Describes how to configure and operate the GigaVUE-OS software from the command-line interface.
GigaVUE-OS H-VUE Administration Guide	Describes how to use the Web-based H-VUE interface to administer the GigaVUE H Series and GigaVUE TA Series software.
GigaVUE-OS H-VUE Online Help	Accessible through H-VUE, describes the Web-based GUI for the GigaVUE H Series.
GigaVUE-OS Upgrade Guide	Describes how to upgrade a GigaVUE H Series or a GigaVUE TA Series node to the latest release.
GigaVUE-FM User's Guide	Describes how to install, deploy, and operate the GigaVUE® Fabric Manager (GigaVUE-FM).
GigaVUE-OS Release Notes	Describes new features, fixed and known issues in the release.

Documentation Feedback

To send feedback and report issues in our documentation, complete the short survey at the following link:

https://www.surveymonkey.com/r/gigamondocumentationfeedback

Contacting Technical Support

Refer to http://www.gigamon.com/support-and-services/contact-support for Technical Support hours and contact information. You can also email Technical Support at support@gigamon.com.

Contacting Sales

Table i shows how to reach the Sales Department at Gigamon.

Table i: Sales Contact Information

Telephone	+1 408.831.4025
Sales	inside.sales@gigamon.com

The Gigamon Community

The Gigamon Community is a technical site where Gigamon users, partners, security and network professionals and Gigamon employees come together to share knowledge and expertise, ask questions, build their network and learn about best practices for Gigamon products.

Visit the Gigamon Community site to:

- Find knowledge base articles and documentation
- Ask and answer questions and learn best practices from other members.
- Join special-interest groups to have focused collaboration around a technology, use-case, vertical market or beta release
- Take online learning lessons and tutorials to broaden your knowledge of Gigamon products.
- Submit and vote on feature enhancements and share product feedback. (Customers only)
- Open support tickets (Customers only)
- Download the latest product updates and documentation (Customers only)

The Gigamon Community is a great way to get answers fast, learn from experts and collaborate directly with other members around your areas of interest.

Register today at community.gigamon.com

Questions? Contact our Community team at community.gigamon.com