

Veritas Access 3340 Appliance Product Description

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Last updated: 2024-02-19

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https://sort.veritas.com/data/support/SORT_Data_Sheet.pdf

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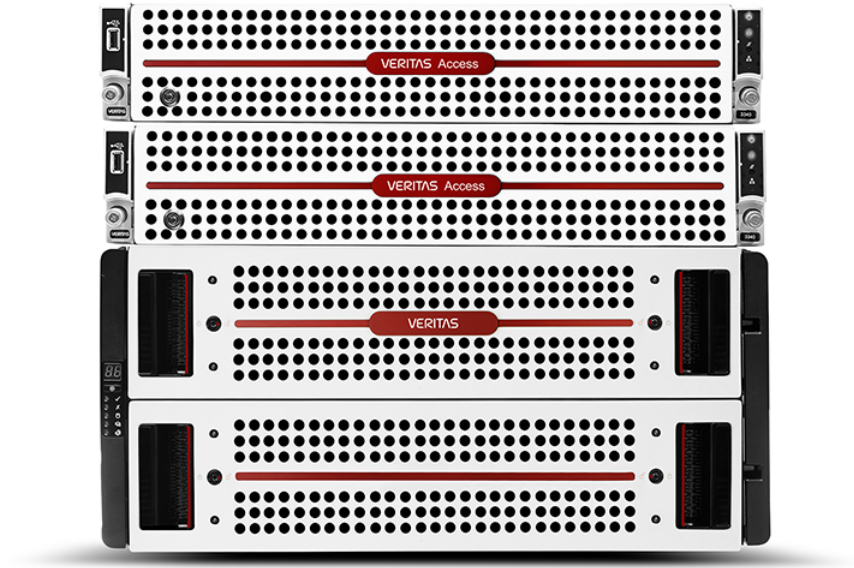
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About the Access 3340 Appliance

This chapter includes the following topics:

- [About the Veritas Access 3340 Appliance](#)
- [Features and components of the appliance](#)
- [Locating the appliance serial number](#)
- [About 3340 compute node disk drive configurations](#)
- [About the compute node front panel USB port](#)
- [About the compute node control panel](#)
- [About the compute node rear panel](#)
- [Standard 3340 Appliance PCIe-based I/O configuration](#)

About the Veritas Access 3340 Appliance



The Veritas Access 3340 Appliance is a highly available hardware and software storage system that can scale up to a total of 2544 TiB (2800 TB) of usable backup capacity depending on the storage configuration you purchase. It consists of two 2U 3340 Appliance compute nodes and at least one required externally attached 5U84 Primary Storage Shelf, which is used for data storage purposes. 3340 Appliance compute nodes do not provide internal disk space for data storage. You can add additional storage shelves if you require additional usable data storage space.

Note: Total usable backup capacity depends on the hardware configuration you purchase.

See [“Available appliance storage options”](#) on page 33.

SAS-3 cables connect the 3340 Appliance compute nodes to 5U84 Primary Storage Shelf RAID controllers. SAS-3 cables also connect 5U84 Primary Storage Shelves to the optional 5U84 Expansion Storage Shelves.

See See [“About Veritas Access 3340 Appliance storage shelves”](#) on page 31.

Features and components of the appliance

This section describes the features and components of the Veritas Access 3340 Appliance.

Table 1-1 Access 3340 Appliance system specifications

Technical Specification	Access 3340 Appliance system
Number of compute nodes per 3340 Appliance system	2
Processor model (each compute node)	<ul style="list-style-type: none"> ■ Dual Intel® Xeon® Scalable Processors ■ Supports high-performance processors with low-power consumption ■ Provides high efficiency and performance
CPU speed	1.8GHz (Turbo: 3.0GHz)
Cores (each compute node)	16 (8 per processor)
Smart Cache (each compute node)	11 MB
System memory (per compute node)	Base memory capacity: 384GB Memory type: DDR4 LRDIMM Configuration: 6 x 64GB LRDIMM modules Operating voltage: 1.2V Configured clock speed: 2400MHz Maximum clock speed: up to 2666MHz
Usable AdvancedDisk storage capacity (TB)	Usable AdvancedDisk storage capacity: up to 2544 TiB (2800 TB) See “Available appliance storage options” on page 33.
SAS RAID mezzanine card	Yes

Table 1-1 Access 3340 Appliance system specifications (*continued*)

Technical Specification	Access 3340 Appliance system	
SAS RAID PCIe card installed in a appliance compute node PCIe riser assembly	No	
RAID levels	<p>RAID1 (mirroring) and RAID6 (block level striping with double distributed parity) are used as follows:</p> <ul style="list-style-type: none"> ■ RAID1: 3340 Appliance compute node system disks ■ RAID6: 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf data storage disks <p>Note: RAID levels are generated using an onboard Intel RSMHC080 RAID controller that is installed in each 3340 Appliance compute node.</p>	
Maximum number of storage shelves	<p>4</p> <p>Note: Depending on the storage configuration purchased, the maximum number of storage shelves consists of one required 5U84 Primary Storage Shelves and up to three optional 5U84 Expansion Storage Shelves.</p> <p>See “Available appliance storage options” on page 33.</p>	
I/O Ports See “Standard 3340 Appliance PCIe-based I/O configuration” on page 23. See “Total 3340 Appliance on-board and PCIe-based I/O ports” on page 24.	Two 12Gb SAS3 host bus adapters (PCIe-based)	Used to connect both of the Access 3340 Appliance compute nodes to the 5U84 Primary Storage Shelf
	10Gb Ethernet PCIe-based network interface card	Two ports
	1Gb Ethernet ports	Four on-board ports
Rack information	19" EIA standard	

Table 1-1 Access 3340 Appliance system specifications (*continued*)

Technical Specification	Access 3340 Appliance system
Dimensions (IEC rack compliant)	<p>Each Appliance compute node</p> <ul style="list-style-type: none"> ■ Height: 8.89cm (3.5") (approximately 2U) ■ Width: 48.35cm (19") ■ Depth: 79.38cm (31.25") <p>See "3340 Appliance compute node technical specifications" on page 68.</p> <p>5U84 Primary Storage Shelf / 5U84 Expansion Storage Shelf</p> <ul style="list-style-type: none"> ■ Height: 21.97cm (8.65") (approximately 5U - shelf, overall) ■ Width: 48.26cm (19") (across the mounting flange) ■ Length/depth: 93.35cm (36.75") (from rear of the front flanges to the rear extremity of the chassis) <p>Note: The Veritas 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf are longer than what a standard IEC-compliant rack normally supports. Due to the additional length, the rack-based PDU hardware may need to be installed on the outside of the rack to accommodate the storage shelves.</p> <p>See "Veritas 5U84 Storage Shelf technical specifications" on page 71.</p>
Maximum weight	<p>Each Appliance compute node: 23.26 kg (51.28 lbs)</p> <p>5U84 Primary Storage Shelf: 128 kg (282 lbs) with drives and rail kit</p> <p>5U84 Expansion Storage Shelf: 128 kg (282 lbs) with drives and rail kit</p>
Typical power consumption	<p>Each Appliance compute node</p> <ul style="list-style-type: none"> ■ 260 watts <p>Each storage shelf</p> <ul style="list-style-type: none"> ■ 1000 watts
Maximum power consumption	<p>Each Appliance compute node</p> <ul style="list-style-type: none"> ■ 500 watts <p>Each storage shelf</p> <ul style="list-style-type: none"> ■ 1300 watts

Table 1-1 Access 3340 Appliance system specifications (*continued*)

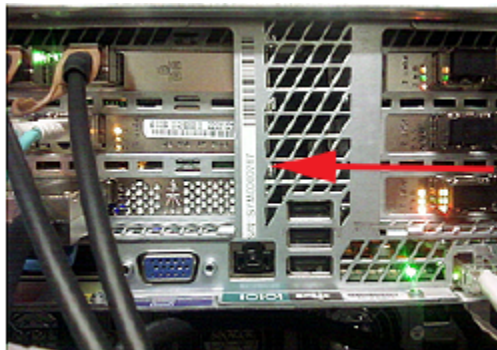
Technical Specification	Access 3340 Appliance system
Typical power consumption with a maximum of four external storage shelves	4,200 watts (two servers per cluster)
Maximum power consumption with a maximum of four external storage shelves	6,200 watts (two servers per cluster) (500 watts maximum per server)
AC power requirements	<p>Each compute node:</p> <ul style="list-style-type: none"> ■ 110 VAC - 220 VAC at 2.6 A <p>Each storage shelf:</p> <ul style="list-style-type: none"> ■ 200 - 240 VAC at 6.67 A
AC power cable	<p>Each compute node:</p> <ul style="list-style-type: none"> ■ Specification: IEC-60320-C14 to IEC-60320-C13, 15A/250V, Black, 4ft The IEC-60320-C14 plugs into a Power Distribution Unit. The IEC-60320-C13 plugs into an appliance or storage shelf power supply. <p>Note: If your power distribution unit is not compatible with the IEC-60320-C14 plug, Veritas recommends that you purchase your power cable locally. Make sure the power cable meets the indicated power rating.</p> <p>See "Power cables" on page 60.</p> <p>Storage shelf:</p> <ul style="list-style-type: none"> ■ Specification: IEC-60320-C20 to IEC-60320-C19, 20A/250V, Black, 4ft The IEC-60320-C20 plugs into a Power Distribution Unit (PDU) on a rack. The IEC-60320-C19 plugs into an appliance or a storage shelf power supply. <p>Note: If your power distribution unit is not compatible with the IEC-60320-C20 plug, Veritas recommends that you purchase your power cable locally. Make sure the power cable meets the indicated power rating.</p> <p>See "Power cables" on page 60.</p>

Table 1-1 Access 3340 Appliance system specifications (*continued*)

Technical Specification	Access 3340 Appliance system
Power Factor	> 90%
System cooling requirement (heat dissipation) (Appliance with maximum storage shelves attached)	Typical <ul style="list-style-type: none"> ■ 14,971 BTU/hour Maximum <ul style="list-style-type: none"> ■ 20,291 BTU/hour
Operating voltage	200 – 240 VAC
AC Frequency range	50/60 Hz
Power conversion efficiency	Each Appliance compute node: 90% + 5U84 Primary/Expansion Storage Shelf: 89% +
Acoustic noise	Each Appliance compute node <ul style="list-style-type: none"> ■ 70 dBA 5U84 Primary/Expansion Storage Shelf <ul style="list-style-type: none"> ■ Sound Power Operating ≤ 8.0 Bels LWAd @ 23°

Locating the appliance serial number

A vertical bar on the rear panel of the appliance compute node contains the serial number.



About 3340 compute node disk drive configurations

The Veritas Access 3340 Appliance compute node contains three 2 TB SAS hard disk drives. Each disk drive is accessible from the compute node's front panel. An embedded RAID controller on the compute node's mainboard configures two of the three disk drives into a mirrored RAID1 volume.

The RAID1 volume is labeled Volume 0. The disk drives that are located in slot 0 and slot 1 are configured as the RAID1, VOLUME0 device. These disk drives contain the appliance operating system, the operating system swap file, and the Veritas Access application. You can hot-swap one of these disk drives at a time if a drive becomes problematic. However, you cannot operate the appliance if both disk drives are removed.

The appliance uses the disk drive that is located in slot 2 as a hot-spare disk. If a disk drive in RAID Volume0 experiences a hardware error, the appliance automatically initiates a RAID rebuild operation. During the rebuild operation, the appliance dynamically accesses the hot-spare disk from slot 2 and uses it to rebuild the RAID volume.

Figure 1-1 Veritas Access 3340 Appliance compute node front panel disk slot assignments



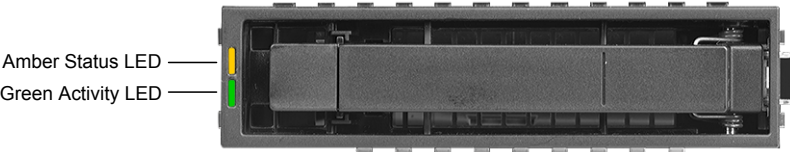
Table 1-2 Veritas Access 3340 Appliance compute node front panel disk drive configurations

Slot	RAID level	Disk drive size (TB)	Disk drive role
0, 1	RAID1	2 TB	Appliance operating system boot volume / operating system swap file / Veritas Access application
2		2 TB	Hot spare
3 - 11	No disk drives installed		

About the compute node disk drive LEDs

Each 3340 Appliance compute node disk drive module contains two LEDs on the left side of each module.

Figure 1-2 3340 Appliance compute node disk drive module LEDs



The LED Status descriptions are described in the following table.

Table 1-3 3340 Appliance compute node disk drive LED Status descriptions

Number	Description	LED behavior	Condition
1	Amber Status LED	Off	No disk drive access and no disk drive faults
		Solid amber	A disk drive fault has occurred
		Blinking amber	A RAID rebuild is in progress (1Hz blink) Locating / identifying the disk drive (4Hz blink)
2	Green Activity LED	Off	Power on - the disk drive has spun down
		Solid green	Power on - no disk drive activity
		Blinking green	Power on - the disk drive is processing a command or Power on - the disk drive is spinning up

Note: Disk drive modules that do not contain disk drives also have LEDs. Although there may not be disk drive activity, some colored lights may still be seen through the disk modules.

About the compute node front panel USB port

The 3340 Appliance compute node front panel includes a USB 2.0-compliant port that supports a data transfer rate of up to 480 Mb/second.



About the compute node control panel

The 3340 Appliance compute node includes a control panel on the right side of the front panel. System information is shown on this control panel.

Figure 1-3 Control panel

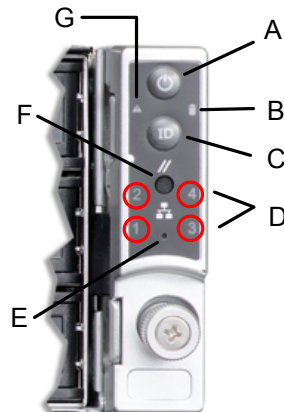


Table 1-4 Control panel system LED descriptions

Label	LED	System information
A	Power button with integrated LED	The Power button toggles the system on and off. See “About the Power button LED states” on page 20.
C	System ID button with integrated LED	The System ID button toggles the integrated ID LED and the blue server board LED on and off. The system ID LED identifies the system for maintenance when it is racked with similar server systems.
D	Network Activity LEDs	The front control panel includes four activity LED indicators for each on-board network interface controller (NIC). <ul style="list-style-type: none"> ■ NIC-1 represents network interface controller 1 ■ NIC-2 represents network interface controller 2 When network links are detected on the controllers, the LEDs are activated and remain on. The LEDs blink when network activity occurs, and the rate at which they blink is determined by the amount of network activity that occurs.
E	NMI button (recessed, tool required for use)	When it is depressed, the NMI button puts the appliance in a halt state, issues a non-maskable interrupt (NMI), and then triggers the non-maskable interrupt. All server data can be lost. Veritas recommends that you do not enable NMI by pressing the NMI button.
F	System Cold Reset Button (recessed, tool required for use on non-storage models)	When depressed, the System Cold Reset button re-boots and re-initializes the appliance.

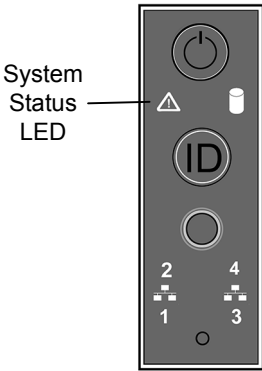
Table 1-4 Control panel system LED descriptions (continued)

Label	LED	System information
G	System Status LED	<p>The System Status LED is bi-color indicator that uses the colors green and amber to display the current health of the appliance.</p> <p>Two locations are provided for you to monitor the health of the system. You can find the first location on the front control panel, while the second location is located on the back edge of the server board. It is viewable from the rear of the appliance. Both LEDs show the same state of health.</p> <p>See “About the System Status LED states” on page 17.</p>

About the System Status LED states

The System Status LED is a bi-color (Green/Amber) indicator that shows the current health of the system. The appliance provides two locations for this feature. The first location is on the Front Control Panel, while the second location is on the back edge of the server board.

Figure 1-4 System Status LED control panel location



The following table provides a description of each LED state.

Table 1-5 System Status LED states

Color	State	Criticality	Description
No color	Off - The system is not operating.	Not ready	<ul style="list-style-type: none"> System power is off (AC and/or DC) System is in EuP Lot6 Off Mode System is in S5 Soft-Off State
Green	Solid on (SO)	Healthy	Indicates that the system is running (in S0 State) and its status is "Healthy". The system is not exhibiting any errors. AC power is present and BMC has booted and manageability functionality is up and running.
Green	~1 Hz blink	Degraded The system is operating in a degraded state although still functional. or The system is operating in a redundant state but with an impending failure warning.	System degraded: <ul style="list-style-type: none"> Redundant loss, such as power supply or fan. Applies only if the associated platform sub-system has redundancy capabilities. Fan warning or failure when the number of fully operational fans is more than minimum number needed to cool the system. Non-critical threshold crossed: Temperature (including HSBP temp), voltage, input power to power supply, output current for main power rail from power supply and Processor Thermal Control (Therm Ctrl) sensors. Power supply predictive failure occurred while redundant power supply configuration was present. Unable to use all of the installed memory (one or more DIMMs failed/disabled but functional memory remains available). Battery failure BMC executing in uBoot. (Indicated by Chassis ID blinking at 3Hz). System in degraded state (no manageability). BMC uBoot is running but has not transferred control to the BMC Linux. Server will be in this state 6-8 seconds after BMC reset while it pulls the Linux image into flash.

Table 1-5 System Status LED states (*continued*)

Color	State	Criticality	Description
Green	~1 Hz blink	Degraded (continued)	<p>System degraded (continued):</p> <ul style="list-style-type: none"> ■ BMC booting Linux. (Indicated by Chassis ID solid ON). System in degraded state (no manageability). Control has been passed from BMC uBoot to BMC Linux itself. It will be in this state for 10-20 seconds. ■ BMC Watchdog has reset the BMC. ■ Power unit sensor offset for configuration error is asserted. ■ Hard disk drive HSC is off-line or degraded.
Amber	~1 Hz blink	<p>Non-critical</p> <p>The system is operating in a degraded state with an impending failure warning. However, the system is still functioning.</p>	<p>Non-fatal, although the system is likely to fail due to the following issues:</p> <ul style="list-style-type: none"> ■ Critical threshold crossed – Voltage, temperature (including HSBP temp), input power to power supply, output current for main power rail from power supply and PROCHOT (Therm Ctrl) sensors. ■ VRD Hot asserted ■ Minimum number of fans to cool the system not present or failed ■ Hard drive fault ■ Power Unit Redundancy sensor – Insufficient resources offset (indicates not enough power supplies present) ■ Correctable memory error threshold has been reached for a failing DIMM when the system is operating in a non-redundant mode.

Table 1-5 System Status LED states (*continued*)

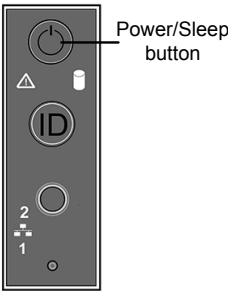
Color	State	Criticality	Description
Amber	Solid on	Critical, non-recoverable – System is halted	<p>Fatal alarm – system has failed or shutdown:</p> <ul style="list-style-type: none"> ■ CPU CATERR signal asserted ■ MSID mismatch detected (CATERR also asserts for this case) ■ CPU1 is missing ■ CPU Thermal Trip ■ No power – power fault ■ DIMM failure when there is only one DIMM present; no other good DIMM memory present ■ Runtime memory uncorrectable error in non-redundant mode.
Amber	Solid on	Critical, non-recoverable – System is halted	<ul style="list-style-type: none"> ■ Uncorrectable Runtime memory error in non-redundant mode ■ DIMM Thermal Trip or equivalent ■ CPU ERR2 signal is asserted ■ BMC/Video memory test failed (Chassis ID shows blue/solid-on for this condition) ■ SBB Thermal Trip or equivalent ■ 240VA fault ■ Both uBoot BMC FW images are bad (Chassis ID shows blue/solid-on for this condition) ■ Fatal Error in processor initialization: <ul style="list-style-type: none"> ■ Processor family not identical ■ Processor model not identical ■ Processor core/thread counts not identical ■ Processor cache size not identical ■ Unable to synchronize processor frequency ■ Unable to synchronize QPI link frequency

About the Power button LED states

The Power button is located on the Access 3340 Appliance control panel. It is used to turn the appliance on and off.

Figure 1-5

Power button control panel location



About the compute node rear panel

The rear panel of the appliance compute node has several access ports and other features, which are displayed in the following figures.

Figure 1-6

Access 3340 Appliance compute node rear panel overview

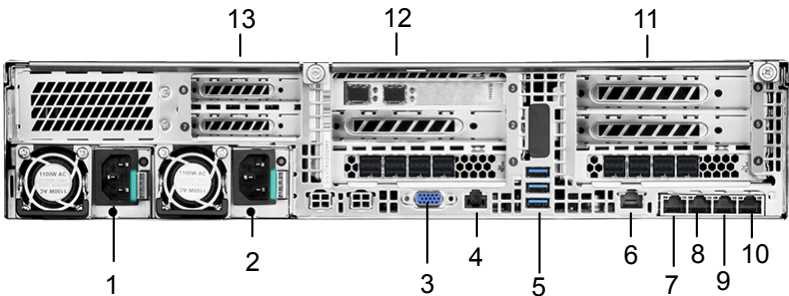


Table 1-6

Compute node rear panel features and connectors

Number	Function
1,2	Power Supply 1 and Power Supply 2 - Dual, redundant, and hot-swappable power supply modules
3	DB-15 VGA monitor connector
4	Serial port - Serial connection for Veritas Technical Support use only
5	Three stacked USB 3.0 Type A serial ports for general use
6	IPMI port - An external RJ45 port used for appliance remote management purposes

Table 1-6 Compute node rear panel features and connectors (*continued*)

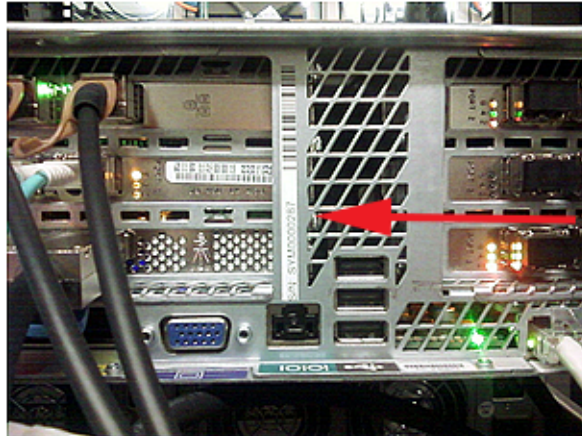
Number	Function
7	eth0/NIC1 A 1-GbE port copper connector that is reserved for use during the initial configuration of the 3340 Appliance Note: Veritas does not support forming a NIC bond using eth0/NIC1 with other eth/NIC ports.
8	eth1/NIC2
9	eth2/NIC3 A 1-GbE port copper connector The eth2 ports on each of the 3340 Appliance compute nodes attach to each other using straight through or cross-over cables. For example, eth2 on first compute node connects to eth2 of the second compute node.
10	eth3/NIC4 A 1-GbE port copper connector The eth3 ports on each of the 3340 Appliance compute nodes attach to each other using straight through or cross-over cables. For example, eth3 on first compute node connects to eth3 of the second compute node.
11	PCIe riser assembly 1
12	PCIe riser assembly 2
13	PCIe riser assembly 3 * (empty)

* 3340 Appliance compute nodes do not contain PCIe riser cards in PCI riser assembly 3.

Veritas appliances may include grounding studs in case your lab environment has such a requirement. The studs are located on the rear panel of the appliance. You can use standard grounding practices to connect grounding wires to the studs.

The serial number is located on a vertical bar on the rear panel of the appliance.

Figure 1-7 Serial number location



The ports on the rear panel are color-coded for easy identification.

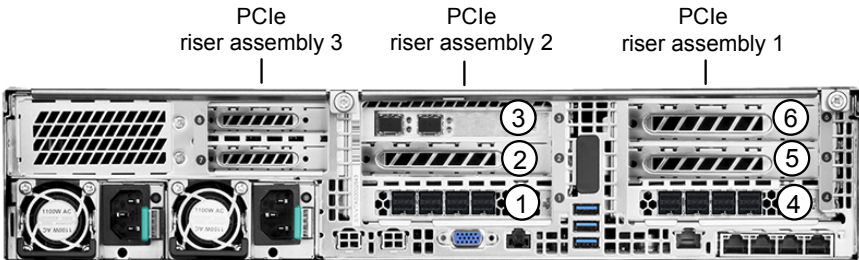
Figure 1-8 3340 Appliance rear port color codes



Standard 3340 Appliance PCIe-based I/O configuration

The rear panel of the Veritas Access 3340 Appliance contains three PCIe riser card assemblies. PCIe riser card assemblies 1 and 2 each support three standard PCIe cards, while PCIe riser card assembly 3 is not utilized. The slots are labeled 1 to 6. Slots 1, 2, and 3 are located in PCIe riser card assembly 2. Slots 4, 5, and 6 are located in PCIe riser card assembly 1.

Figure 1-9 3340 Appliance rear panel riser assembly locations



The following table describes the 3340 Appliance's standard PCIe-based I/O configuration.

Table 1-7 3340 Appliance standard PCIe-based I/O configuration

I/O configuration option	Slot 1 *	Slot 2	Slot 3	Slot 4 *	Slot 5	Slot 6
Standard	Intel RSP3GD016J 12Gb SAS HBA ²	Empty	QLogic QLE8442 10GbE NIC ¹	Intel RSP3GD016J 12Gb SAS HBA ²	Empty	Empty

* The 12Gb SAS HBA ports in slots 1 and 4 are used to connect the 3340 Appliance compute node to the Veritas 5U84 Primary Storage Shelf.

PCIe card cable connection types:

¹ Direct-Attach copper cable (also called a Twinaxial cable or Twinax)

² Standard copper

See [“Total 3340 Appliance on-board and PCIe-based I/O ports”](#) on page 24.

Total 3340 Appliance on-board and PCIe-based I/O ports

The following table shows the total number of I/O ports that are available with the 3340 Appliance.

Table 1-8

Total number of available 3340 Appliance on-board and PCIe-based I/O ports

I/O Configuration option	12Gb SAS HBA PCIe ports (copper)	10Gb Ethernet PCIe ports (optical)	1Gb Ethernet NIC on-board ports (copper)
Standard	4 per SAS HBA card, of which two are not usable See “SAS3 host bus adapter connector locations and labels” on page 27.	2	4

Intel RSP3GD016J SAS3 RAID PCIe host bus adapter

Two Intel RSP3GD016J SAS3 12Gb RAID PCIe host bus adapters provide a data path from the 3340 Appliance compute nodes to the 5U84 Primary Storage Shelf. SAS3 cables connect the SAS3 RAID PCIe host bus adapters to the 5U84 Primary Storage Shelf RAID controllers.

See [“SAS3 host bus adapter connector locations and labels”](#) on page 27.

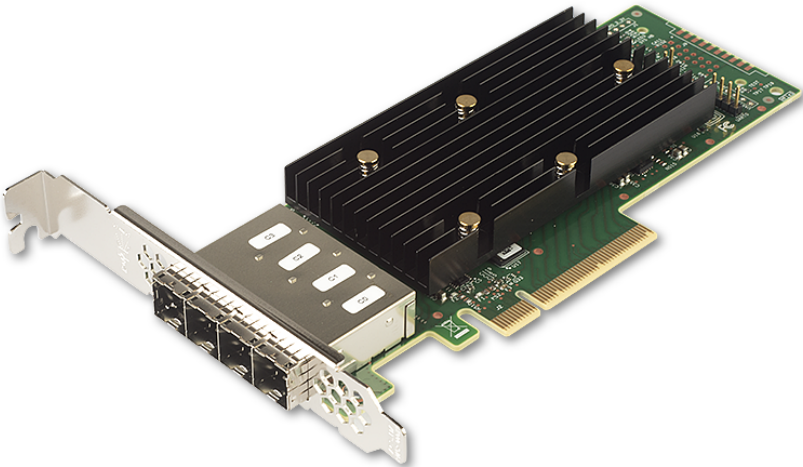


Table 1-9 Intel RSP3GD016J SAS3 RAID PCIe HBA specifications

Item	Specification	
Bracket height	Full height	
System interface type	PCIe 3.0	
Speed and slot width	8.0 GT/s, 8-lane	
I/O processor module	Avago SAS3416	
Output type	16x SAS 12Gbps	
Air flow (minimum)	0 LFM	
Operating temperature	10 to 55 C (50 to 131 F)	
Storage temperature	-40 to 70 C (-40 to 158 F)	
Storage humidity	Relative (non condensing): 20% - 80%; Storage: 5% - 95%	
Power consumption	State 1 (Watts) 18.56	State 2 (Watts) 11.18

Access 3340 12Gb SAS3 RAID host bus adapter

SKU Number	Description
21077	HBA PCIE RSP3GD016J CONTROLLER CARD FRU HARDWARE

3340 Appliance network interface card port assignments

The following section describes the on-board 1Gb network interface card (NIC) port assignments and the PCIe-based 10Gb NIC port assignments for the 3340 Appliance.

Figure 1-10 3340 Appliance compute node on-board NIC port assignments

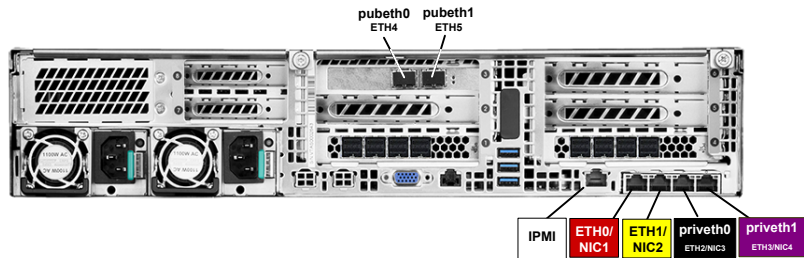


Table 1-10 Appliance compute node network interface port information

Port	Function
eth0/NIC1 (copper/RJ45 connector)	Used for management functions of the appliance. You can connect NIC1 (eth0) to an administrative network that does not provide any backup data transfer.
eth1/NIC2 (copper/RJ45 connector)	A 1-GbE port that can be configured as an administrative network port that does not provide any backup data transfer.
priveth0 (eth2/NIC3) (copper/RJ45 connector)	A 1-GbE private network port that is used for connections between the two appliance compute nodes
priveth1 (eth3/NIC4) (copper/RJ45 connector)	A 1-GbE private network port that is used for connections between the two appliance compute nodes.
IPMI port (copper/RJ45 connector)	A 1-GbE port that is used for appliance remote management purposes.
pubeth0 (eth4) *	A 10-GbE port that is used for general network uses.
pubeth1 (eth5) *	A 10-GbE port that is used for general network uses.

SAS3 host bus adapter connector locations and labels

The 3340 Appliance uses two 12Gb SAS3 host bus adapters through which data is transferred from each of the 3340 Appliance compute nodes to the 5U84 Primary Storage Shelf. Each SAS3 host bus adapter connects to the 5U84 Primary Storage Shelf using mini-SAS cables. One of the SAS3 host bus adapters is installed in PCIe slot 1 of PCIe riser assembly 2. The other host bus adapter is installed in slot 4 of PCIe riser assembly 1.

The following picture and table provides more information about the SAS connectors.

Figure 1-11 SAS3 host bus adapter connector numbers and locations

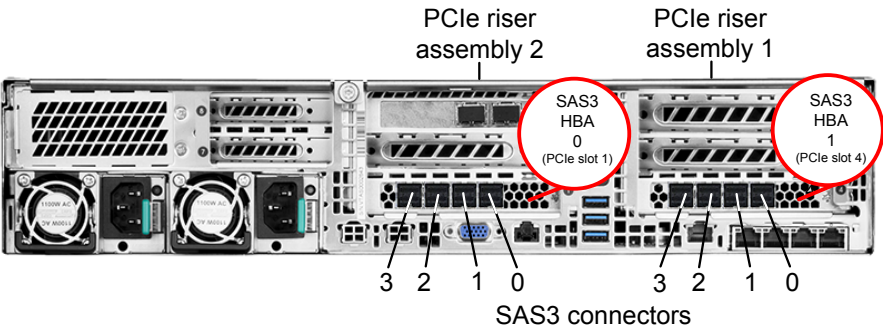


Table 1-11 SAS3 host bus adapter connector numbers and locations

Connector number	Connector location
Connector3 <i>(used for connections to the 5U84 Primary Storage Shelf)</i>	SAS3 host bus adapter 0 (PCIe slot 1)
Connector2 <i>(used for connections to the 5U84 Primary Storage Shelf)</i>	SAS3 host bus adapter 0 (PCIe slot 1)
Connector1 <i>(not used)</i>	SAS3 host bus adapter 0 (PCIe slot 1)
Connector0 <i>(not used)</i>	SAS3 host bus adapter 0 (PCIe slot 1)
Connector3 <i>(used for connections to the 5U84 Primary Storage Shelf)</i>	SAS3 host bus adapter 1 (PCIe slot 4)
Connector2 <i>(used for connections to the 5U84 Primary Storage Shelf)</i>	SAS3 host bus adapter 1 (PCIe slot 4)
Connector1 <i>(not used)</i>	SAS3 host bus adapter 1 (PCIe slot 4)

Table 1-11 SAS3 host bus adapter connector numbers and locations
(continued)

Connector number	Connector location
Connector0 <i>(not used)</i>	SAS3 host bus adapter 1 (PCIe slot 4)

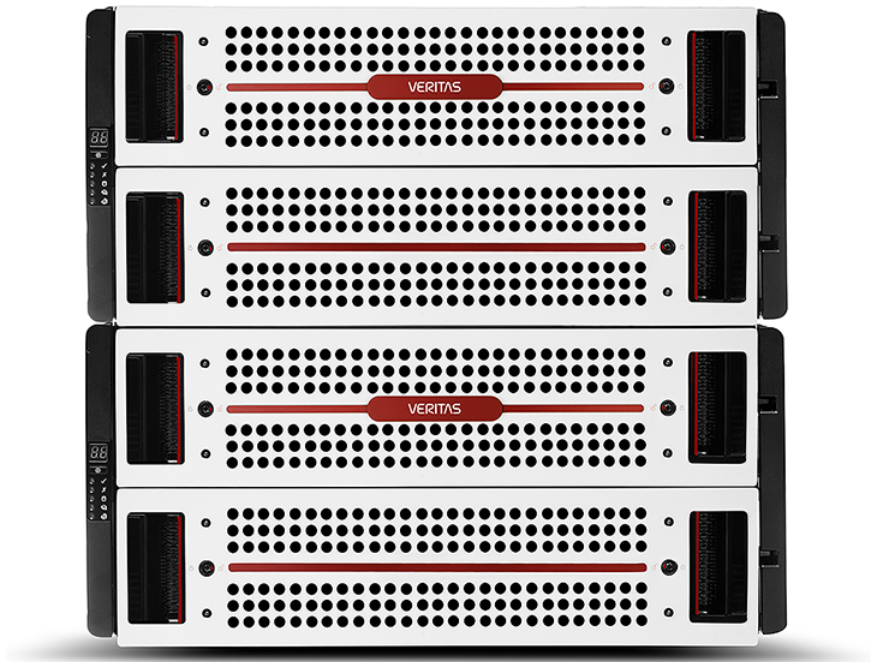
See [“Intel RSP3GD016J SAS3 RAID PCIe host bus adapter”](#) on page 25.

About the Veritas 5U84 Storage Shelves

This chapter includes the following topics:

- [About Veritas Access 3340 Appliance storage shelves](#)
- [About the 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf rear components](#)

About Veritas Access 3340 Appliance storage shelves



Veritas offers two external storage shelf models for the Veritas Access 3340 Appliance.

These include the:

- Veritas 5U84 Primary Storage Shelf (required)
- Veritas 5U84 Expansion Storage Shelf (optional)

Both of the 5U84 Storage Shelf chassis include a set of common internal core components, along with a set of plug-in modules.

The core components include:

- Two sliding disk drawers that contain Disk Drive In Carrier (DDIC) modules
- A front operations panel
- A front bezel

- Mid-plane printed circuit boards (PCB) that interface with controllers on the 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf.

In addition to the core components, the storage shelves also incorporate the following plug-in modules:

- Two 12Gb SAS-3 RAID controller modules (*5U84 Primary Storage Shelf only*)
- Two Storage Bay Bridge 2.1-compliant Expansion I/O controller modules (*5U84 Expansion Storage Shelf only*)
- Two power supply units (PSUs)
- Five fan modules
- 82 Disk Drive In Carrier (DDIC) modules with disk drives installed
- Two blank Disk Drive in Carrier (DDIC) modules
- A rail kit for rack mounting

The 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf each use a 5U chassis. Each chassis contains two sliding disk drive drawers that are located in the front of the storage shelf. Each drawer holds 41 Disk Drive In Carrier (DDIC) modules. The DDIC modules are installed in the drive drawer slots, which hold a total of 82 disk drives. Each DDIC module holds a 7200 rpm SAS-3-based disk drive with a capacity to hold either 4 TB or 10 TB of data. The disk drives and the DDIC modules are hot-swappable and can be replaced on-site while the storage shelf is operational.

Note: Each storage shelf drawer must be populated with disk drives of the same capacities. A mix of storage shelves, with different capacities in separate storage shelves is not supported.

In each storage shelf, two of the disk drives are used as global hot spares. Using 10-TB disk drives, a storage shelf provides 636.3TiB (700 TB) of usable data storage capacity. Using 4-TB disk drives, a storage shelf provides 254.4TiB (280 TB) of usable data storage capacity. The storage shelf disk drives are arranged in five RAID 6 sets, each comprised of 16 disk drives. These disks are used for AdvancedDisk data storage purposes. Depending on the storage configuration you purchase, the Access 3340 Appliance storage system supports up to 2.8PB of usable data storage space.

See [“Available appliance storage options”](#) on page 33.

Available appliance storage options

The Veritas Access 3340 Appliance compute nodes do not contain internal disk space on which to store data. Instead, the 3340 Appliance system uses one required Veritas 5U84 Primary Storage Shelf and up to three optional 5U84 Expansion Storage Shelves as the main data storage devices. The 5U84 Primary Storage Shelves connect to 3340 Appliance compute nodes and use RAID 6 drive sets to protect the stored data.

Note: RAID 6 is also known as double-parity RAID. It uses two parity stripes on each disk to protect data. RAID 6 allows for two hard disk failures within the RAID disk array before any data is lost.

Refer to the following table for available storage capacity for the 3340 Appliance using 4-TB and 10-TB disk capacities.

Note: Each storage shelf must contain disk drives of the same capacity. Veritas does not support mixing 4-TB and 10-TB disk drives within a storage shelf.

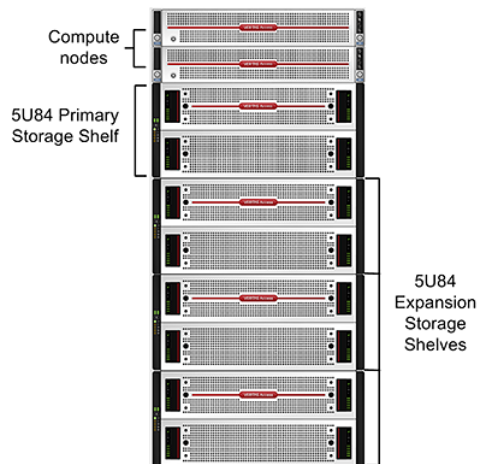
Table 2-1 Available usable storage capacities for a 3340 Appliance system using 4-TB and 10-TB disk drives

Drive size	Storage Shelf usable storage capacity	One storage shelf (one Primary Shelf)	Two storage shelves (one Primary shelf; one Expansion shelf)	Three storage shelves (one Primary shelf; two Expansion shelves)	Four storage shelves (one Primary shelf; three Expansion shelves)
4 TB	254.4 TiB (280 TB)	254.4 TiB (280 TB)	4-TB drive expansion: 510 TiB (560 TB) 10-TB drive expansion: 891 TiB (980 TB)	4-TB drive expansion: 764 TiB (840 TB) 10-TB drive expansion: 1528 TiB (1680 TB)	4-TB drive expansion: 1018.6 TiB (1120 TB) 10-TB drive expansion: 2165 TiB (2380 TB)

Table 2-1 Available usable storage capacities for a 3340 Appliance system using 4-TB and 10-TB disk drives (*continued*)

Drive size	Storage Shelf usable storage capacity	One storage shelf (one Primary Shelf)	Two storage shelves (one Primary shelf; one Expansion shelf)	Three storage shelves (one Primary shelf; two Expansion shelves)	Four storage shelves (one Primary shelf; three Expansion shelves)
10 TB	636 TiB (700 TB)	636 TiB (700 TB)	4-TB drive expansion: 891 TiB (980 TB) 10-TB drive expansion: 1272 TiB (1400 TB)	4-TB drive expansion: 1146 TiB (1260 TB) 10-TB drive expansion: 1908 TiB (2100 TB)	4-TB drive expansion: 1401 TiB (1540 TB) 10-TB drive expansion: 2544 TiB (2800 TB)

Note: 3340 Appliance systems that use up to four storage shelves for increased storage capacity can be installed in a single hardware rack.



See the *Veritas Access 3340 Appliance Hardware Installation Guide* for more information.

To determine the hardware configuration for the storage capacities that your environment requires, contact your Veritas sales representative, or your Veritas Partner representative.

About the Veritas 5U84 Storage Shelf disk drive drawers

This section discusses the 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf disk drive drawers and the components that comprise the drawers.

Disk drive drawers

Figure 2-1 5U84 Primary Storage Shelf/5U84 Expansion Storage Shelf disk drive drawer



The 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf each use a 5U chassis. Each chassis contains two sliding drawers that are accessible from the front of the storage shelves. Each drawer can hold 42 Disk Drive In Carrier (DDIC) modules. The DDIC modules are installed in each of the drive drawer slots, which can hold a total of 84 disk drives. Each DDIC module holds one 3.5" SAS-3, 7200 rpm hard disk drive, in either 4-TB or 10-TB capacities. The disk drives and the DDIC modules are hot-swappable and can be replaced on-site while the storage shelf is operational.

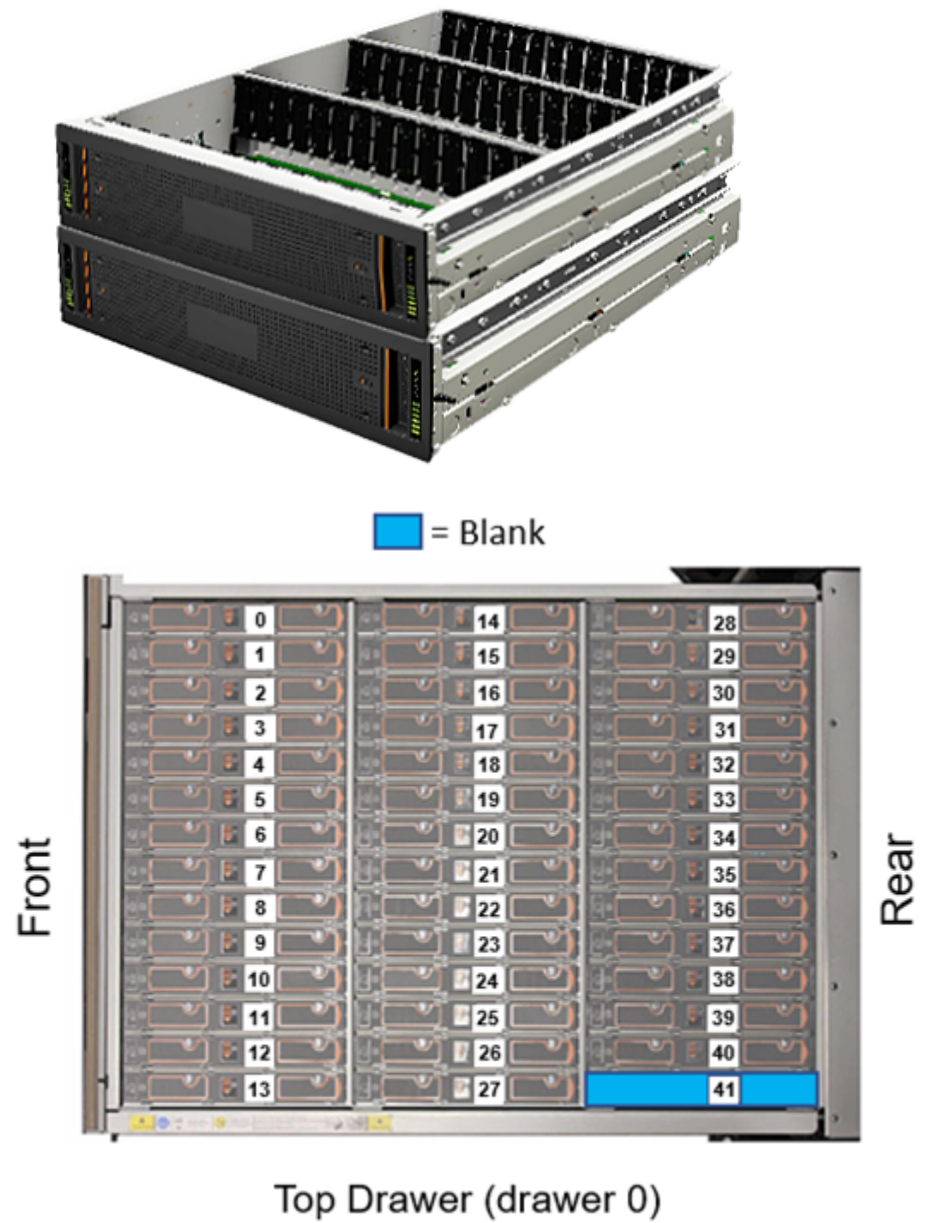
Disk drive slot numbering

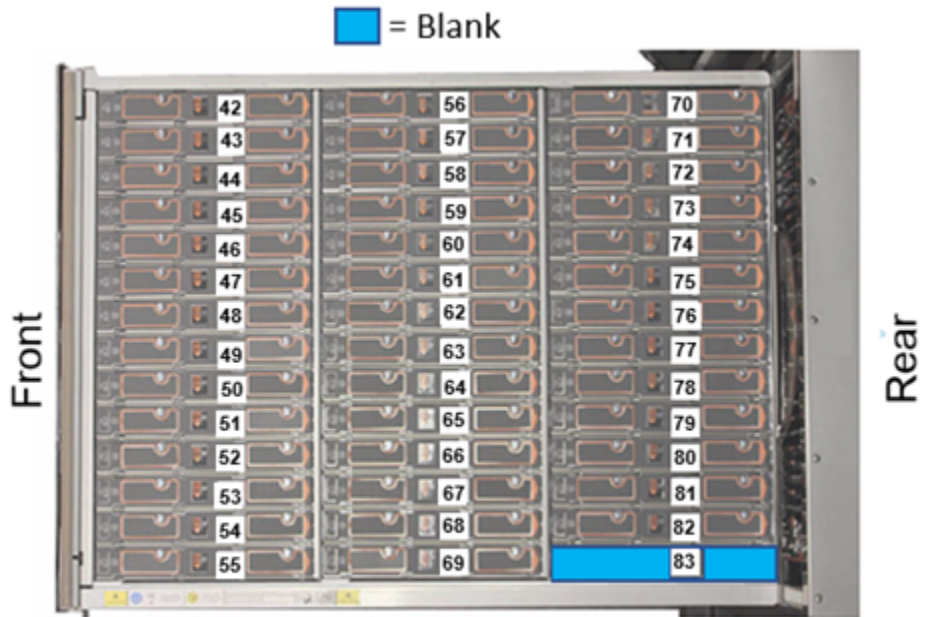
Each disk drive drawer in a 5U84 storage shelf is divided into three compartments. The compartments contain the individual drive slots that hold the DDIC modules and the disk drives.

In the top drive drawer, the drive slots are numbered from left to right, beginning with the first compartment that is closest to the front panel. The drive slots in this compartment are numbered 0 to 13. The drive slots in the second compartment are in the middle of the drive drawer. These slots are numbered 14 to 27. The drive slots in third compartment are closest to the rear of the shelf. These slots are numbered 28 to 41.

In the bottom drive drawer, the drive slots are numbered from left to right, beginning with the first compartment that is closest to the front panel. The drive slots in this compartment are numbered 42 to 55. The drive slots in the second compartment are in the middle of the drive drawer. These slots are numbered 56 to 69. The drive slots in third compartment are closest to the rear of the shelf. These slots are numbered 70 to 83.

Figure 2-2





Bottom Drawer (drawer 1)

All storage shelf hard disk drives are housed in DDIC modules. Each disk drive drawer accepts a Disk Drive In Carrier (DDIC) module for each disk drive slot in the drawer. DDIC modules enable disk drives to be quickly inserted and removed without turning off the 5U84 storage shelves. In addition, each DDIC prevents mis-alignment and damage to the disk drive connectors during the disk drive insertion and removal process.

For troubleshooting purposes, DDIC modules provide one amber drive fault LED indicator per disk drive. The fault indicator enables you to easily identify a failed drive carrier in the drive drawer. You can see drive fault LED indicator when the disk drive drawer is open.

Figure 2-3 Disk Drive In Carrier (DDIC) module



Figure 2-4 Disk Drive In Carrier (DDIC) module components and locations

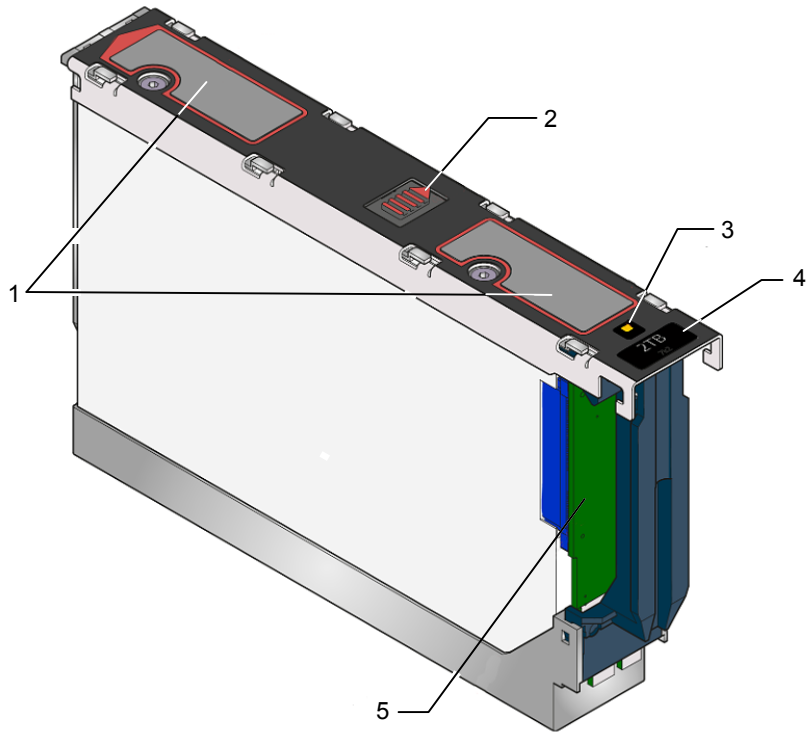


Table 2-2 5U84 Storage Shelf DDIC component locations

Number	Component
1	Touch points Note: Touch points are used to facilitate the removal of the DDIC module from the storage shelf drawer.
2	Latch button
3	Drive Fault LED
4	Disk drive capacity label
5	Dongle

Disk Drive Drawer printed circuit board (PCB) assemblies

Each disk drive drawer in a 5U84 storage shelf uses a printed circuit board (PCB) assembly to provide the electrical connectivity to the drawer's disk drives.

Along with providing the electrical connectivity to the disk drives, PCB assemblies also provide:

- Mounting platforms for the drawer cabling system
- Redundant power paths to each disk drive
- Redundant 12Gb/s SAS signal paths to each disk drive
- Provide technical feedback to the system when a drawer is opened or closed.

PCB assemblies include the following components:

- Three drawer Baseplane cards
- One right side Drawer Sideplane card
- One left side Drawer Sideplane card

Figure 2-5 Disk Drive Drawer PCB assembly

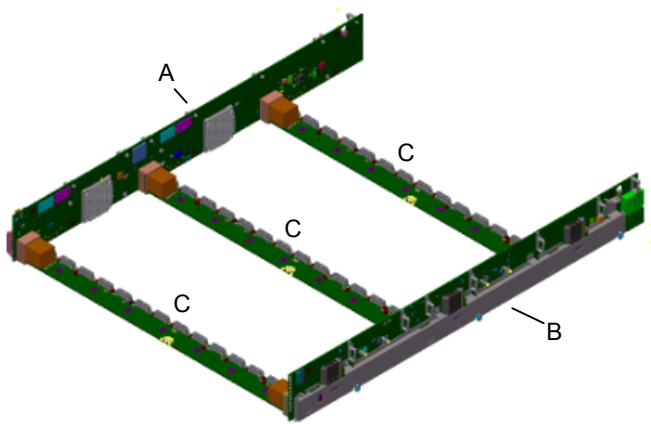


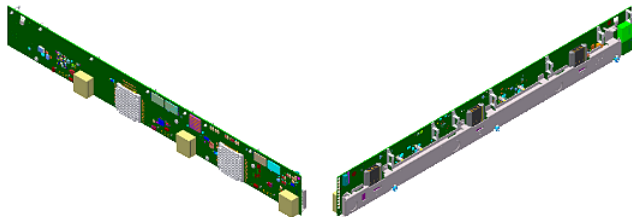
Table 2-3 Disk drive drawer PCB assembly components

Label	Item
A	Drawer Sideplane card (left)
B	Drawer Sideplane card (right)
C	Baseplane card

Each PCB assembly contains two Drawer Sideplane cards. One Sideplane card mounts on the right side of the disk drawer, while the other card mounts on the left side of the drawer.

Drawer Sideplane cards provide power paths to the drawer Baseplanes and the DDICs and their installed disk drives. Sideplane cards also provide 12Gb/s SAS connections.

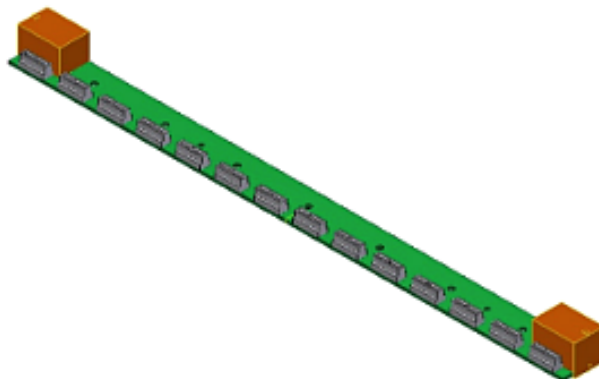
Figure 2-6 Inside and outside views of a right side Sideplane card



Three Drawer Baseplanes comprise each PCB assembly. Drawer Baseplanes provide a dual path for 12Gb/s SAS connectivity between the Drawer Sideplane cards and the DDICs. They also provide power to the DDICs from either the right or the left Drawer Sideplane cards.

The Drawer Baseplanes also provide four remote temperature sensing diodes that monitor disk drive temperatures within the disk drive drawers.

Figure 2-7 Drawer Baseplane example



Drawer Sideplane Status panels

Drawer Sideplane Status panels are located on the front of the 5U84 storage shelves. These panels provide status and the activity information about the Sideplane card.

Figure 2-8 Drawer Sideplane Status panel locations



Figure 2-9 5U84 Primary Storage Shelf / 5U84 Expansion Storage Shelf
Drawer Sideplane Status panel

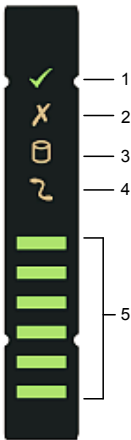


Table 2-4 Drawer Sideplane Status panel descriptions

Number	Item
1	Sideplane card OK / Power good

Table 2-4 Drawer Sideplane Status panel descriptions (*continued*)

Number	Item
2	Sideplane card Fault
3	Logical Fault
4	Cable Fault
5	Activity Bar Graph

The following table describes the Drawer Sideplane LED statuses.

Table 2-5 Drawer Sideplane LED statuses

Status	Power (Green)	Drawer Fault (Amber)	Cable Fault (Amber)	Logical Fault (Amber)	Activity Bar Graph (Green)
Drawer Sideplane card OK / Power Good	On	Off	Off	Off	X
Drawer Sideplane card Fault	Off	On	X	X	Off
Drive failure has occurred causing loss of availability or redundancy	On	On	X	X	X
Array in impacted state (SES) Indicated	On	X	X	Flashing	X
Cable Fault	Off	X	On	X	Off
Drive Activity	On	Off	Off	Off	On *

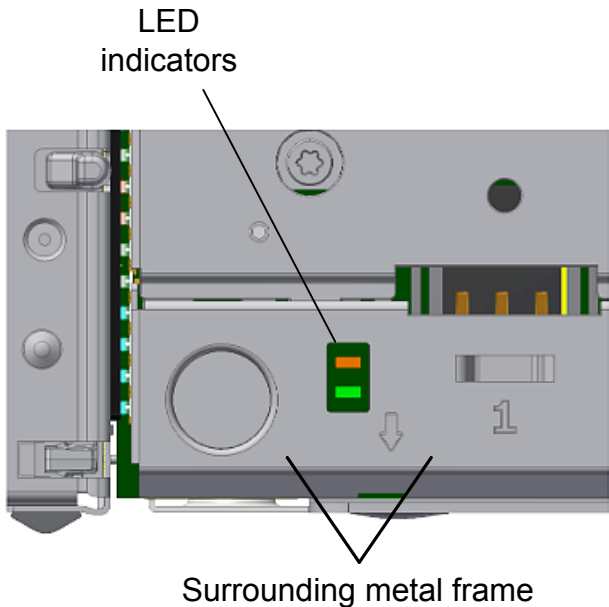
X = Disregard

* The Activity Bar Graph is a six-segment indicator that shows activity of the SAS disk drive interface to the Sideplane. If none of the segments are lit, then there is no SAS disk drive activity occurring. Increasing disk drive activity is measured upward, starting with the bottom segment. When full disk drive activity occurs, all six segments are lit.

Drawer Sideplane hot swap LED indicators

Drawer Sideplane hot-swap LED indicator lights are mounted on each drawer's Sideplane printed circuit board assembly. They are visible through each Sideplane's metal frame when the drawer is open.

Figure 2-10 Drawer Sideplane hot-swap LED location



The following table describes the Drawer hot-swap Sideplane LED indicator statuses.

Table 2-6 Drawer Sideplane Hot-swap LED indicator statuses

Status	12V Power LED (Green)	Power disabled LED (Amber)
Sideplane 12V power present (DO NOT hot-swap the sideplane)	On	X
Sideplane 12V is disabled (OK to hot-swap the Sideplane)	Off	On

X = Disregard

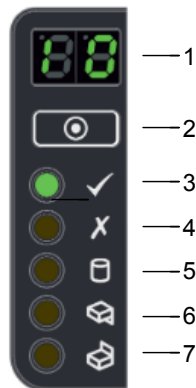
5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf control panel

The control panel is installed on the left side of both the 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf. It is functionally the same for both systems.

Figure 2-11 Control panel location



Figure 2-12 Control panel



The following table describes the control panel functions.

Table 2-7 Control panel functions and descriptions

Number	Function	Description
1	Unit Identification Display	The Unit Identification Display is a dual digit display that provides information about the storage shelf. Its primary function is to assist in the configuration of multiple storage shelves that are connected to the appliance.
2	Input button	The Input button enables you to set the Unit Identification display number.
3	Power On / Standby LED (Green or Amber)	The Power On/Standby LED shows Amber when only standby power is available. Otherwise, the LED shows Green when system power is available.
4	Module Fault LED (Power Cooling Module, I/O module status) (Amber)	The Module Fault LED illuminates when there is a system hardware fault. The system hardware fault may be associated with a fault LED on a Power Cooling Module (PCM) or on an I/O module.
5	Logical Fault LED (Amber)	The Logical Status LED shows a change of status or a fault. Typically these changes of status or faults are associated with the shelf's disk drives. However, the Logical Status LED can also indicate an issue with an internal RAID controller or external RAID controller, or with a host bus adapter.
6	Top Drawer Fault (Amber)	The Top Drawer Fault LED (drawer 1) shows a change of status or a fault with the top disk drive drawer in the storage shelf.
7	Bottom Drawer Fault (Amber)	The Bottom Drawer Fault LED (drawer 2) shows a change of status or a fault with the bottom disk drive drawer in the storage shelf.

About the 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf rear components

This section describes the rear components of the 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf.

The 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf contain the following removable rear components:

- SAS-3 RAID Controllers *(5U84 Primary Storage Shelf only)*
- Expansion I/O modules *(5U84 Expansion Storage Shelf only)*

- Fan modules
- Power Supply Units (PSUs)

Figure 2-13 5U84 Primary Storage Shelf rear components

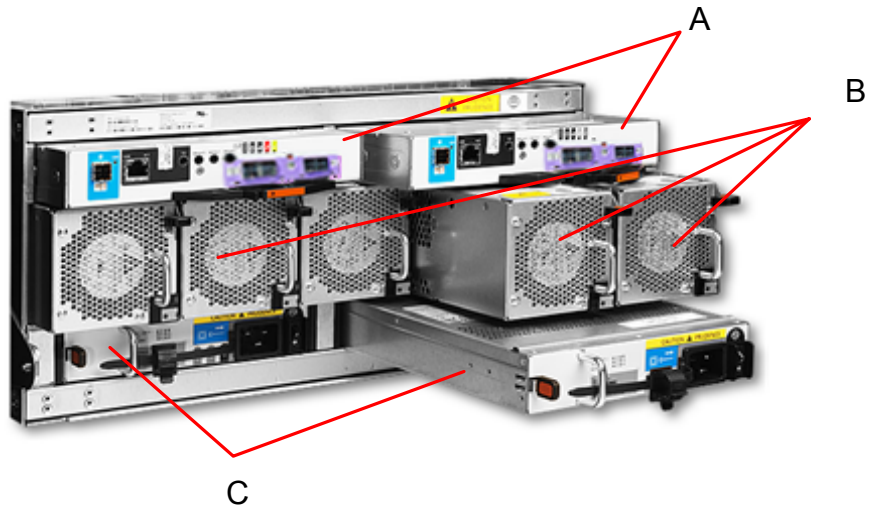


Table 2-8 5U84 Primary Storage Shelf rear component locations

Letter	Item
A	RAID Controllers (from left to right) RAID Controller A, RAID Controller B
B	Fan modules (from left to right) Fan Module 0, Fan Module 1, Fan Module 2, Fan Module 3, and Fan Module 4
C	Power Supply Units (from left to right) PSU 0, PSU 1

Figure 2-14 5U84 Expansion Storage Shelf rear components

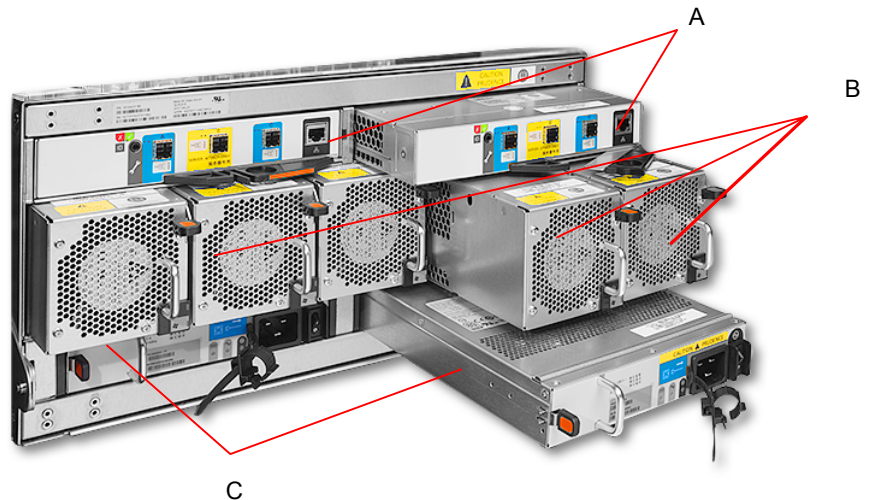


Table 2-9 5U84 Expansion Storage Shelf rear component locations

Letter	Item
A	Expansion I/O modules (from left to right) Expansion I/O Module A, Expansion I/O Module B
B	Fan modules (from left to right) Fan Module 0, Fan Module 1, Fan Module 2, Fan Module 3, and Fan Module 4
C	Power Supply Units (from left to right) PSU 0, PSU 1

5U84 Primary Storage Shelf

The 5U84 Primary Storage Shelf uses two SAS-3 RAID controllers, which are located in the top two slots of the back panel. The RAID controllers provide RAID data protection technology for the data that is stored on the 5U84 Primary Storage Shelf disk drives. The RAID controllers also provide RAID data protection technology for the optional 5U84 Expansion Storage Shelves that you connect to the 5U84 Primary Storage Shelf.

SAS-3 copper cables connect the 3340 Appliance compute nodes to the 5U84 Primary Storage Shelf through the storage shelf's RAID controllers.

Five high performance fan modules connect to the storage shelf's midplane connector through the middle slots. Each fan module contains two contra-rotating high performance fans, along with separate power and control circuits for each internal fan.

Two redundant Power Supply Units (PSUs) are located in slots beneath the fan modules.

To operate, the 5U84 Primary Storage Shelf must have at least one functioning RAID controller, one functioning power supply unit, and four functioning fan modules.

5U84 Expansion Storage Shelf

The 5U84 Expansion Storage Shelf uses two Expansion I/O modules, which are located in the top two slots of the back panel. The Expansion I/O modules provide SAS-3 I/O data transfers between the 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf. The Expansion I/O modules also provide I/O data transfers between the first 5U84 Expansion Storage Shelf and up to two additional 5U84 Expansion Storage Shelves.

SAS-3 cables connect the 5U84 Expansion Storage Shelf to the 5U84 Primary Storage Shelf through the 5U84 Expansion Storage Shelf's Expansion I/O modules. SAS-3 cables are also used to daisy chain up to two additional 5U84 Expansion Storage Shelves to the first 5U84 Expansion Storage Shelf.

Five high performance fan modules connect to the storage shelf's midplane connector through the middle slots. Each fan module contains two contra-rotating, high performance fans, along with separate power and control circuits for each internal fan. The device must have at least one functioning RAID controller, one functioning power supply module, and one functioning fan module.

Two redundant Power Supply Units (PSUs) are located in slots beneath the fan modules.

To operate, the 5U84 Expansion Storage Shelf must have at least one functioning Expansion I/O module, one functioning PSU, and four functioning fan modules.

See ["Veritas 5U84 Expansion Storage Shelf Expansion I/O modules"](#) on page 54.

Veritas 5U84 Primary Storage Shelf RAID controllers

The Veritas 5U84 Primary Storage Shelf uses dual, hot swappable SAS-3 RAID controllers. These controllers create and manage the 5U84 Primary Storage Shelf disk drive RAID sets that contain backed up data. They also create and manage the RAID sets on 5U84 Expansion Storage Shelves when those are attached to the 5U84 Primary Storage Shelf.

The SAS-3 RAID controllers run RAID level 6 on the storage shelf. RAID 6 offers the highest level of data protection. It allows simultaneous write operations, while

also allocating two sets of parity data across the drives that comprise the RAID 6 array.

The SAS-3 RAID controllers also provides an additional SAS-3 port. The SAS-3 port enables data to flow at SAS-3 data transfer rates between the 5U84 Primary Storage Shelf and the first optional 5U84 Expansion Storage Shelf.

Figure 2-15 Veritas 5U84 Primary Storage Shelf SAS-3 RAID controllers



The following figure and table provides component details for the Veritas 5U84 Primary Storage Shelf SAS-3 RAID controller modules.

Figure 2-16 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller components and locations

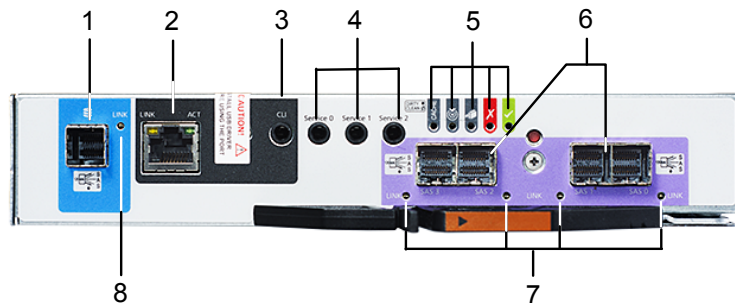


Table 2-10 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller components

Number	Component
1	Expansion SAS port
2	Ethernet port Note: Veritas does not use or support the Ethernet port.
3	USB port
4	Serial ports (Service only)
5	Indicator LEDs
6	SAS-3 RAID ports - connects to the 3340 Appliance compute nodes
7	Activity LEDs
8	Expansion SAS port Status

Figure 2-17 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller indicator LED details

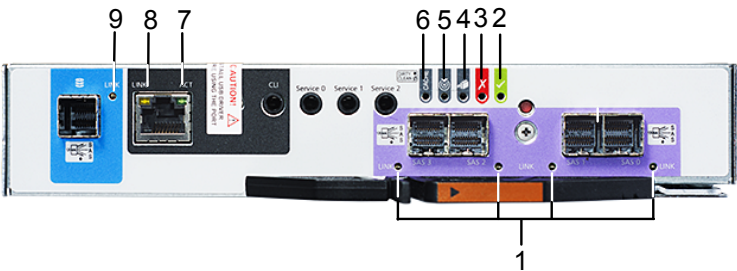


Table 2-11 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller indicator LED details

LED	Description	Definition
1	Host 12Gb SAS-3 Link Status/Link Activity	Off - No link detected. Green- The port is connected and the link is up. Amber - Partial link exists (one or more lanes are down) Blinking green or amber- The link has I/O activity.

Table 2-11 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller indicator LED details (*continued*)

LED	Description	Definition
2	OK	Off - A controller issue has been detected, or the controller is turned off. Blinking green - The system is starting. Green - The controller is operating normally.
3	Fault	Off - The controller is operating normally. Amber - A controller fault has been detected or a service action is required. Blinking amber - Hardware-controller power on error, or a cache flush or restore error.
4	OK to Remove	Off - The controller is not prepared for removal. Blue - The controller is prepared for removal.
5	Identify	White - The controller is being identified.
6	Cache Status	Off - In a working controller, the cache is clean (contains no unwritten data). This is an occasional condition that occurs while the system is booting. Green - The cache is dirty (contains unwritten data) and the operation is normal. The unwritten information can be the log data or the debug data that remains in the cache. By itself, a Green cache status LED does not indicate that any user data is at risk or that any action is necessary. Blinking Green - A Compact Flash flush or a cache self-refresh is in progress, indicating cache activity.
7	Network Port Link Activity Status *	Off - The Ethernet link is not established, or the link is down. Green - The Ethernet link is up (applies to all negotiated link speeds).
8	Network Port Link Speed *	Off - The link is up at 10/100base-T negotiated speeds. Amber - The link is up and negotiated at 1000base-T speed.
9	SAS-3 Expansion Port Status	Off - The port is empty or the link is down. Green - The port is connected and the link is up.

Table 2-11 Veritas 5U84 Primary Storage Shelf SAS-3 RAID Controller indicator LED details *(continued)*

LED	Description	Definition
* When port is down, both LEDs are off		

Veritas 5U84 Expansion Storage Shelf Expansion I/O modules

Veritas 5U84 Expansion Storage Shelf Expansion I/O modules provide SAS-3 data throughput and communications between one or more 5U84 Expansion Storage Shelves.

Figure 2-18 Veritas 5U84 Expansion Storage Shelf Expansion I/O module



Figure 2-19 Veritas 5U84 Expansion Storage Shelf Expansion I/O module

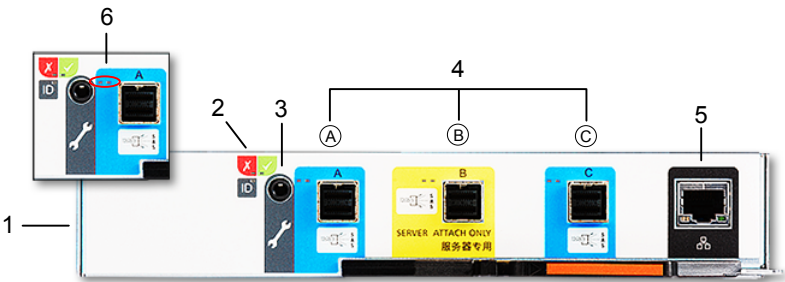


Table 2-12 Expansion I/O module components and locations

Number	Component
1	Expansion I/O module
2	Expansion I/O module Status LEDs
3	RS232 jack (debugging purposes only)
4	SAS-3 ports - A, B, and C
5	Ethernet port Note: Veritas does not use or support the Ethernet port.
6	SAS Activity LEDs

Expansion I/O module Status LED location and conditions

This section discusses the location of the Status LEDs on the Expansion I/O modules and the Status LED conditions.

Figure 2-20 Expansion I/O module Status indicator LED location

I/O module Status LED location

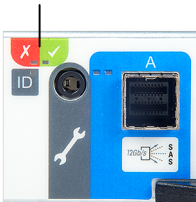


Table 2-13 Expansion I/O module icon and Status LED conditions




Condition	Activity LED (green)	Fault LED (amber)
 Module Fault (amber)	On Off	The Expansion I/O module has encountered a fault condition. The Expansion I/O module is operating normally.

Table 2-13
Expansion I/O module icon and Status LED conditions *(continued)*

Condition	Activity LED (green)	Fault LED (amber)
 Power (green)	On Off	The Expansion I/O module is on. The Expansion I/O module is off.
 ID (blue)	On	The Expansion I/O module is being identified.

Expansion I/O module SAS Activity LED location and conditions

This section discusses the location of the SAS Activity LEDs on the Expansion I/O modules and the SAS Activity LED conditions.

Figure 2-21
Expansion I/O module SAS Activity LED location

SAS Activity LED location

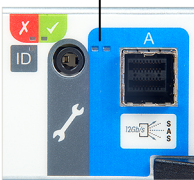


Table 2-14
Expansion I/O module SAS Activity LED conditions

Condition	Activity LED (green)	Fault LED (amber)
No Cable Present	Off	Off
Cable Present All links up, no activity.	On	Off
Cable Present All links up.	Flash with aggregate port activity	Off

Table 2-14 Expansion I/O module SAS Activity LED conditions *(continued)*

Condition	Activity LED (green)	Fault LED (amber)
<p>Critical Fault</p> <ul style="list-style-type: none"> Any fault which causes operation of the cable to cease or fail to start For example, an OVERCURRENT trip. No connection detected at the opposite end of the SAS cable 	Off	On
<p>Non-Critical Fault</p> <p>Any fault which does not cause the connection to cease operation.</p> <p>For example, not all links established; OVERTEMPERATURE condition detected.</p>	Flash with aggregate port activity	Flashing - One second on; one second off

Veritas 5U84 Storage Shelf cooling modules

The Veritas 5U84 Storage Shelves include five cooling modules. The cooling modules provide cooling to the entire unit, which is suitable to maintain the internal component temperatures below each components maximum temperature limits.

Figure 2-22 Veritas 5U84 Storage Shelf cooling module components

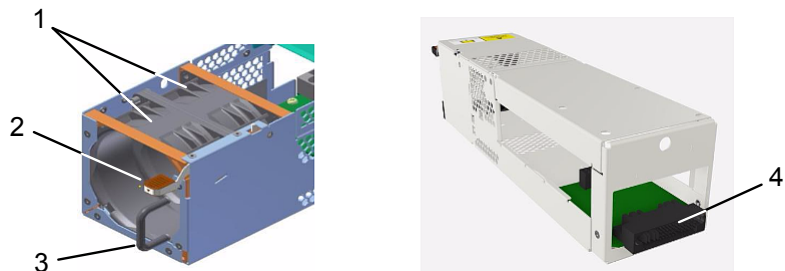


Table 2-15 Veritas 5U84 Storage Shelf cooling module component locations

Number	Component
1	High performance, contra-rotating cooling fans
2	Release latch
3	Handle
4	Mid-plane connector

Cooling modules provide the following features:

- Fast removal and replacement times without the need to turn off the storage shelf.
- Electronic fan speed control to the fans.
- Redundant serial interface connections to the rest of the storage shelf system.
- Cooling module redundancy
- Redundancy includes:
 - Maintaining the cooling function of the cooling module in the event of a single fan rotor failure.
 - Maintaining the normal operation of the cooling module if one cooling control or fan controller module fails.
 - Automatically switching fan speeds to Full/High mode if the cooling module control unit fails.
 - Maintaining the normal operation of the storage shelf for two minutes when a cooling module is swapped out due to a failure.

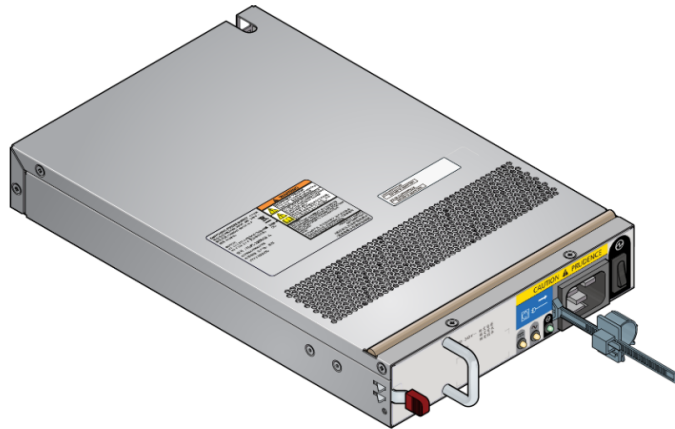
5U84 Storage Shelf Power Supply Units

Veritas 5U84 Storage Shelves includes dual Power Supply Units (PSU) that provide redundant power to the storage shelves. If one PSU fails, the storage shelves continue to operate as the second PSU continues to supply the storage shelf with power.

PSUs are hot-swappable. You can replace a faulty PSU while the storage shelf is running. However, you must complete the PSU replacement procedure within **two minutes** after you remove the faulty PSU.

Veritas 5U84 Storage Shelf chassis are keyed to prevent PSUs from being inserted upside down.

Figure 2-23 5U84 Storage Shelf Power Supply Unit



The rear panel of the PSU includes a power switch, three status LEDs, and an AC socket for the power cord. The rear panel also includes a handle that you use during the PSU insertion and removal process.

Figure 2-24 5U84 Storage Shelf Power Supply Unit

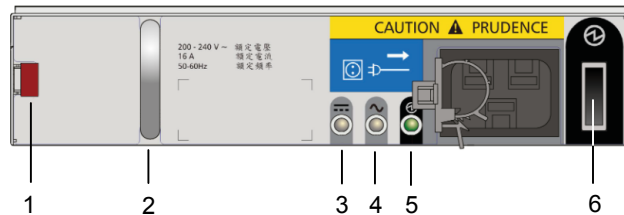


Table 2-16 5U84 Storage Shelf Power Supply Unit component locations

Number	Component
1	Release latch
2	Handle
3	PSU Fail LED
4	AC Fail LED
5	Power OK LED
6	Power switch

Access 3340 Appliance and 5U84 Storage Shelf cables

This chapter includes the following topics:

- [Power cables](#)
- [Network cable](#)
- [Multi-mode fiber optic cable](#)
- [SAS-3 cable](#)
- [Twinaxial copper cables](#)

Power cables

Each of the AC power modules in both the Veritas Access 3340 Appliance and the required Veritas 5U84 Primary Storage Shelf accept one AC power cable. The optional 5U84 Expansion Storage Shelf also uses one AC power cord in each of its AC power modules. One end of the AC power cable connects to the power supply on the appliance or the storage device. The other end of the cable connects to an external Power Distribution Unit (PDU) on the rack.

Power cables include a live line, a neutral line, and a grounding line.

Veritas Access 3340 Appliance AC power cable

Figure 3-1 AC power cable - Veritas Access 3340 Appliance Appliance



- A AC power connector (IEC-60320-C14) to an external power supply such as a Power Distribution Unit (PDU) on a rack.
- B AC power connector (IEC-60320-C13) to an appliance.

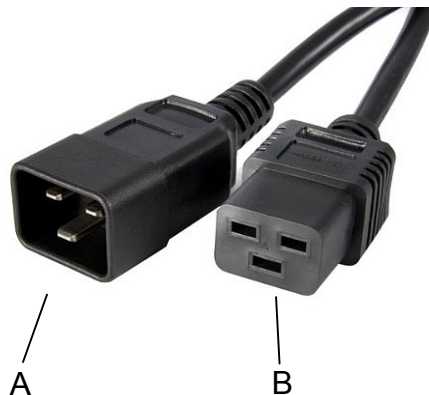
Cable rating: 15A 250V

Note: If your power distribution unit is not compatible with the IEC-60320-C14 plug, Veritas recommends that you purchase your power cable locally. Make sure that the power cable meets or exceeds the indicated power rating.

See “[3340 Appliance compute node technical specifications](#)” on page 68.

Veritas 5U84 Primary Storage Shelf / Expansion Storage Shelf AC power cable

Figure 3-2 AC power cable - Veritas 5U84 Primary Storage Shelf / Expansion Storage Shelf



- A AC power connector (IEC-60320-C20) to an external power supply such as a Power Distribution Unit (PDU) on a rack.
- B AC power connector (IEC-60320-C19) to storage shelf.

Cable rating: 20A 250V

Note: If your power distribution unit is not compatible with the IEC-60320-C20 plug, Veritas recommends that you purchase your power cable locally. Make sure that the power cable meets or exceeds the indicated power rating.

See “[Veritas 5U84 Storage Shelf technical specifications](#)” on page 71.

See “[Network cable](#)” on page 63.

See “[Multi-mode fiber optic cable](#)” on page 63.

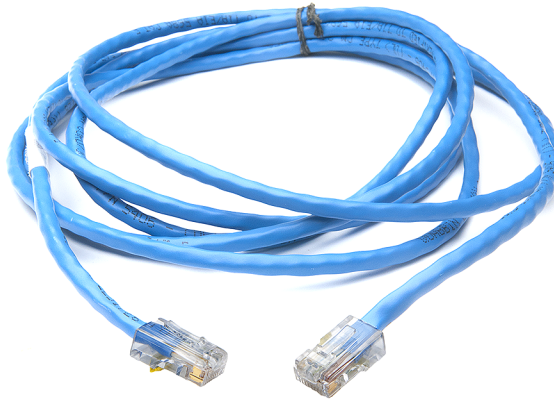
See “[SAS-3 cable](#)” on page 64.

See “[Twinaxial copper cables](#)” on page 66.

Network cable

The appliance communicates with the Ethernet networks through an Ethernet network cable. One end of the network cable connects to the management network port or service network port of the appliance. The other end of the cable connects to the network switch or an external gateway. Both ends of the cable are RJ45 connectors.

Figure 3-3 Network cable



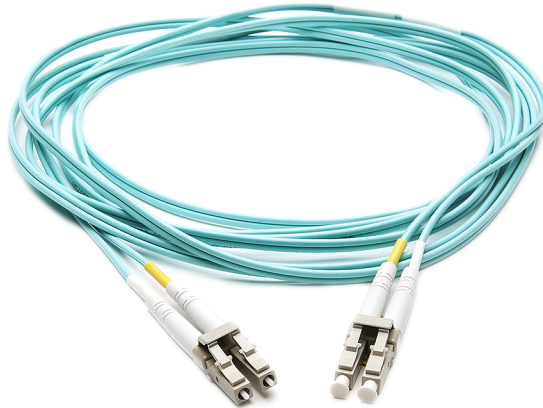
See [“Power cables”](#) on page 60.

See [“SAS-3 cable”](#) on page 64.

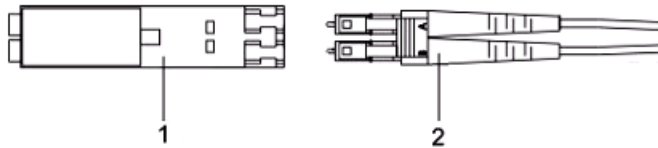
See [“Twinaxial copper cables”](#) on page 66.

Multi-mode fiber optic cable

A Veritas &aModel; Appliance compute node communicates with the required 5U84 Primary Storage Shelf through multi-mode fiber optic cables. One end of each fiber optic cable connects to PCIe-based 16Gb Fibre Channel host bus adapters that are installed in the compute node. The other end of the fiber optic cable connects to the 5U84 Primary Storage Shelf's Fibre Channel RAID controller. Both ends of the fiber optic cable use LC connectors.

Figure 3-4 Multi-Mode fiber cable

Fiber optic cables require Small Form-factor Pluggable (SFP+) transceivers, which are provided with each device having Fibre Channel ports. The diagram shows the SFP, labeled 1, and the fiber optic cable which is attached to it, labeled 2.



Supported SFPs are listed:

- Finisar
- JDSU

See [“Power cables”](#) on page 60.

See [“Network cable”](#) on page 63.

See [“SAS-3 cable”](#) on page 64.

See [“Twinaxial copper cables”](#) on page 66.

SAS-3 cable

SAS-3 data cables are used to connect the Veritas 5U84 Primary Storage Shelf to the 3340 Appliance compute nodes. SAS-3 cables also connect multiple 5U84 Expansion Storage Shelves to each other. SAS-3 cables have SAS-3 connectors

on both ends. SAS-3 cables ship with each Veritas Appliance, and with each Veritas 5U84 Expansion Storage Shelf.

Figure 3-5

SAS-3 cable



See [“Power cables”](#) on page 60.

See [“Network cable”](#) on page 63.

See [“Twinaxial copper cables”](#) on page 66.

Twinaxial copper cables



See [“Power cables”](#) on page 60.

See [“Network cable”](#) on page 63.

See [“Multi-mode fiber optic cable”](#) on page 63.

See [“SAS-3 cable”](#) on page 64.

Technical specifications, Environmental/Protocol standards, and Compliance standards

This appendix includes the following topics:

- [3340 Appliance compute node technical specifications](#)
- [Veritas 5U84 Storage Shelf technical specifications](#)
- [Environmental specifications](#)
- [Protocol standards](#)
- [Regulatory, compliance, and certification information](#)

3340 Appliance compute node technical specifications

Table A-1 3340 Appliance compute node technical specifications

Technical Specification	3340 Appliance compute node
Rack information	<p>19" EIA standard</p> <p>The rack rails that are provided for the 3340 Appliance compute nodes are extensible to 32" (813 mm). This distance is the maximum depth that is allowed between rack posts. If the distance between rack posts is longer than 32" (813 mm) the rails and the appliance cannot be properly installed.</p>
Processor	Two Xeon 4108 CPUs
CPU speed	1.8GHz (Turbo: 3.0 GHz)
Cores (each compute node)	16 (8 per processor)
Smart Cache	11MB Cache L3
System memory (per compute node)	<p>Base memory capacity: 384GB</p> <p>Memory type: DDR4 LRDIMM</p> <p>Configuration: 6 x 64GB LRDIMM modules</p> <p>Operating voltage: 1.2V</p> <p>Configured clock speed: 2400MHz</p> <p>Maximum clock speed: up to 2666MHz</p>
SAS RAID mezzanine card	Yes
SAS RAID PCIe card installed in a appliance compute node PCIe riser assembly	No
RAID levels	<p>RAID1: 3340 Appliance compute node system disks</p> <p>Note: The RAID level is generated using an onboard Intel RSMHC080 RAID controller that is installed in each of the 3340 Appliance compute nodes.</p>
Usable AdvancedDisk storage capacity (TB)	<p>Usable AdvancedDisk storage capacity: up to 2544 TiB (2800 TB)</p> <p>See "Available appliance storage options" on page 33.</p>

Table A-1 3340 Appliance compute node technical specifications (*continued*)

Technical Specification	3340 Appliance compute node	
Maximum number of storage shelves	4 One Veritas 5U84 Primary Storage Shelf; three Veritas 5U84 Expansion Storage Shelves	
I/O ports	12Gb SAS3 ports (PCIe-based)	8 total ports; four are used Used to connect the 3340 Appliance compute nodes to the 5U84 Primary Storage Shelf
	10Gb Ethernet PCIe card-based network interface card	2 ports
	1Gb Ethernet ports	Four on-board ports
Dimensions (IEC rack compliant)	<p>Appliance compute node:</p> <ul style="list-style-type: none"> ■ Height: 8.89cm (3.5") (approximately 2U) ■ Width: 48.26cm (19") ■ Depth: 79.38cm (31.25") <p>5U84 Primary and 5U84 Expansion Storage Shelves:</p> <ul style="list-style-type: none"> ■ Height: 21.97cm (8.65") (approximately 5U - shelf, overall) ■ Width: 48.26cm (19") (across the mounting flange) ■ Length/depth: 93.35cm (36.75") (from rear of the front flanges to the rear extremity of the chassis) <p>Note: The Veritas 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf are longer than what a standard IEC-compliant rack normally supports. Due to the additional length, the rack-based PDU hardware may need to be installed on the outside of the rack to accommodate the storage shelves.</p>	
Maximum weight	Appliance compute node: 23.26 kg (51.28 lbs)	
AC power requirements	Appliance compute node: 110 VAC - 220 VAC at 2.6 A	
Power factor	> 90%	

Table A-1 3340 Appliance compute node technical specifications (*continued*)

Technical Specification	3340 Appliance compute node
AC power cable	<p>Specification: IEC-60320-C14 to IEC-60320-C13, 10A/250V, Black, 4 ft</p> <p>The IEC-60320-C14 plugs into a Power Distribution Unit. The IEC-60320-C13 plugs into an appliance or storage shelf power supply.</p> <p>Note: If your power distribution unit is not compatible with the IEC-60320-C14 plug, then Veritas recommends that you purchase your power cable locally. Make sure the power cable meets or exceeds the indicated power rating.</p>
AC Frequency range	50/60Hz
Typical power consumption	260 watts
Maximum power consumption	500 watts
Typical power consumption with a maximum of four external storage shelves	4,520 watts (two servers per cluster)
Maximum power consumption with a maximum of four external storage shelves	6,200 watts (two servers per cluster) (500 watts maximum per server)
System cooling requirement (heat dissipation) (Appliance with maximum storage shelves attached)	<p>Typical:</p> <ul style="list-style-type: none"> ■ 14,971 BTU/hour <p>Maximum:</p> <ul style="list-style-type: none"> ■ 20,291 BTU/hour
Operating voltage	<p>100 VAC - 127 VAC</p> <p>200 VAC - 240 VAC</p>
Power conversion efficiency	90% +
Acoustic noise	70 dBA

See “[Veritas 5U84 Storage Shelf technical specifications](#)” on page 71.

See “[Environmental specifications](#)” on page 74.

See “[Protocol standards](#)” on page 74.

See “[Regulatory, compliance, and certification information](#)” on page 75.

Veritas 5U84 Storage Shelf technical specifications

The following table provides technical specifications for both the Veritas 5U84 Primary Storage Shelf and the Veritas 5U84 Expansion Storage Shelf.

Table A-2 Veritas 5U84 Primary Storage Shelf / 5U84 Expansion Storage Shelf technical specifications

Technical specification	Description
Rack information	The rack installation height is the space occupied by a storage shelf in a rack cabinet. The shelf fits into a 5U rack space. Install the storage shelf in a rack cabinet that is 19 inches (483mm) wide.
Dimensions (IEC rack compliant)	<p>5U84 Primary and 5U84 Expansion Storage Shelves</p> <ul style="list-style-type: none"> ■ Height: 21.97cm (8.65") (approximately 5U - shelf, overall) ■ Width: 48.26cm (19") (across the mounting flange) ■ Length/depth: 93.35cm (36.75") (from rear of the front flanges to the rear extremity of the chassis) <p>For more information on rack installation, refer to the <i>Dimensions and determining rack locations</i> section in the <i>Veritas 3340 Hardware Installation Guide</i>.</p> <p>Note: The Veritas 5U84 Primary Storage Shelf and the 5U84 Expansion Storage Shelf are longer than what a standard IEC-compliant rack normally supports. Due to the additional length, the rack-based PDU hardware may need to be installed on the outside of the rack to accommodate the storage shelves.</p>
Hot swappable components	Disk drives, power supply units (PSUs), cooling modules, SAS Controllers, Expansion I/O modules
Usable storage capacity	<p>Up to 2,544TiB (2,800TB), depending on the hardware configuration you purchase</p> <p>See "Available appliance storage options" on page 33.</p>
Maximum weight	<p>5U84 Primary Storage Shelf: 135 kg (298 lbs) with drives; no rail kit</p> <p>5U84 Expansion Storage Shelf: 135 kg (298 lbs) with drives; no rail kit</p>
Device types supported	Dual ported 12Gb/s SAS

Table A-2 Veritas 5U84 Primary Storage Shelf / 5U84 Expansion Storage Shelf technical specifications (*continued*)

Technical specification	Description
Maximum drives per storage shelf	82
Typical power consumption	1000 watts per storage shelf Note: You can connect a maximum of four storage shelves to the 3340 Appliance compute nodes.
Maximum power consumption	1300 watts per storage shelf
Supported RAID level	RAID6: 5U84 Primary Storage Shelf and 5U84 Expansion Storage Shelf data storage disks
Controllers	5U84 Primary Storage Shelf: Dual RealStor 5005 12Gb SAS RAID controllers per storage shelf 5U84 Expansion Storage Shelf: Dual Storage Bridge Bay (SBB) 2.1 compatible Expansion I/O modules per storage shelf
Host/Expansion Interface	Three universal x4 12Gb mini-SAS connectors (SFF-8644) per Expansion I/O module
Maximum output power	1300 watts maximum continuous output power at high line voltage You can connect up to four storage shelves to the 3340 Appliance compute nodes.
AC power requirements	200 - 240 VAC @ 6.67 A
Operating voltage	200V - 240 VAC
AC power cable	Specification: IEC-60320-C20 to IEC-60320-C19, 20A/250V, Black, 4ft The IEC-60320-C20 plugs into a Power Distribution Unit (PDU) on a rack. The IEC-60320-C19 plugs into an appliance or a storage shelf power supply. Note: If your power distribution unit is not compatible with the IEC-60320-C20 plug, Veritas recommends that you purchase your power cable locally. Make sure the power cable meets or exceed the indicated power rating.
AC Frequency range	50/60Hz

Table A-2 Veritas 5U84 Primary Storage Shelf / 5U84 Expansion Storage Shelf technical specifications (*continued*)

Technical specification	Description
Power conversion efficiency	81% @ 10% load 89% @ 20% load 93% @ 50% load 90% @ 100% load
Temperature range	Operating: 5° to 35°C (de-rate 5°C above 2,133m (7,000')) (41°F TO 95°F) Non-operating: -40°C to 70°C (-40°F TO 158°F)
Relative humidity	Operating: 20%rh to 80%rh non-condensing Non-operating: 5%rh to 100%rh non-condensing
Acoustic noise	82 dBA Sound Power Operating ≤ 8.0 Bels LWAd @ 23°
Operating altitude	-30 to 3048m (-100 to 10000ft) De-rate 5°C above 2134m (7000ft)
Non-operating altitude	-305 to 12192m (-1000 to 40000ft)
Operational vibration	0.21gRMS 5-500Hz Random
Operational shock	5g10ms ½ Sine
Relocation vibration (Non-operational)	0.3g2-200-2Hz Swept Sine.
Non-operational vibration	1.04 gRMS 2-200Hz Random.
Non-operational shock	30g10ms ½ Sine (Z-axis) 20g10ms ½ Sine(X-and Y-axes)

See “[3340 Appliance compute node technical specifications](#)” on page 68.

See “[Environmental specifications](#)” on page 74.

See “[Protocol standards](#)” on page 74.

See “[Regulatory, compliance, and certification information](#)” on page 75.

Environmental specifications

Veritas Appliance compute node environmental specifications

Table A-3 Veritas Appliance compute node environmental specifications

Specification	Appliance compute node
Operating temperature	ASHRAE A2 (10°C to 35°C) (50°F to 95°F)
Non-operating temperature	<p>-25°C to 70°C (-14°F to 158°F)</p> <p>The non-operating temperature is defined as the temperature of the system when the system is turned off. It is also referred to as the storage temperature.</p> <p>Veritas recommends that you do not store the system in an environment where the temperatures fall outside of the listed temperature range.</p>
Operating humidity (RH)	20% RH to 80% RH
Non-operating humidity	8% RH to 90% RH
Operating altitude (feet)	-30 to 3000 m with ASHRAE A2 class derating (0 to 10,000 ft)
Temperature gradient (per hour)	10°C/h (50°F/h)

See “ [3340 Appliance compute node technical specifications](#)” on page 68.

See “ [Veritas 5U84 Storage Shelf technical specifications](#)” on page 71.

See “[Protocol standards](#)” on page 74.

See “[Regulatory, compliance, and certification information](#)” on page 75.

Protocol standards

The following table provides standards with which the Veritas 3340 Appliance and the Veritas 5U84 Primary/Expansion Storage Shelf comply.

Table A-4 Veritas Appliance / Veritas 5U84 Primary/Expansion Storage Shelf standards compliance

Standard	Version
IPMI 2.0	Intelligent Platform Management Interface Specification Second Generation v2.0, Document Revision 1.0
SMBIOS	System Management BIOS (SMBIOS) Reference Specification, Version 2.5
SAS	SAS-3
ACPI	Advanced Configuration and Power Interface Specification, Revision 3.0, September 2
IP	RFC0791: Internet Protocol
PCIe	PCIe 3.0

See “[3340 Appliance compute node technical specifications](#)” on page 68.

See “[Veritas 5U84 Storage Shelf technical specifications](#)” on page 71.

See “[Environmental specifications](#)” on page 74.

See “[Regulatory, compliance, and certification information](#)” on page 75.

Regulatory, compliance, and certification information

The following sections give information about the product regulations and compliance.



WARNING

To ensure regulatory compliance, you must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components that are specified in this guide. Use of other products or components may void the regulatory approvals of the product. The result is noncompliance with product regulations in the region in which the product is sold.

Before computer integration, ensure that the power supply and other modules and devices have passed appropriate regulatory compliance testing and certification. This process helps to ensure compliance with your local regional rules and regulations. The final configuration of your appliance product may require additional compliance testing.

This product is an FCC Class A device. Integration of it into a Class B system does not result in a Class B device.

Product regulatory compliance

The Access Appliance appliance, when correctly integrated per this guide, complies with the following safety and electromagnetic compatibility (EMC) regulations.

Intended Application - This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments, other than an ITE application, may require further evaluation. Other product categories and environments may include medical, industrial, telecommunications, NEBS, residential, alarm systems, and test equipment.

Product safety compliance

The following is a list of product safety compliance norms for different countries:

- UL60950 - CSA 60950 (USA / Canada)
- EN60950 (Europe)
- IEC60950 (International)
- CB Certificate & Report, IEC60950 (report to include all country national deviations)
- GS Certification (Germany)
- GOST R 50377-92 - Certification (Russia)
- Belarus Certification (Belarus)
- Ukraine Certification (Ukraine)
- CE - Low Voltage Directive 73/23/EEE (Europe)
- IRAM Certification (Argentina)
- GB4943- CNCA Certification (China)

Product EMC Compliance - Class A Compliance

The following is a list of EMC compliance norms for different countries:

- FCC /ICES-003 - Emissions (USA/Canada) Verification
- CISPR 22 - Emissions (International)
- EN55022 - Emissions (Europe)
- EN55024 - Immunity (Europe)
- EN61000-3-2 - Harmonics (Europe)
- EN61000-3-3 - Voltage Flicker (Europe)
- CE - EMC Directive 89/336/EEC (Europe)
- VCCI Emissions (Japan)
- AS/NZS 3548 Emissions (Australia / New Zealand)
- BSMI CNS13438 Emissions (Taiwan)
- GOST R 29216-91 Emissions (Russia)
- GOST R 50628-95 Immunity (Russia)
- Belarus Certification (Belarus)
- Ukraine Certification (Ukraine)
- GB 9254 - CNCA Certification (China)
- GB 17625 - (Harmonics) CNCA Certification (China)

Product ecology compliance

Use of banned substances are restricted in accordance with world-wide regulatory requirements. A Material Declaration Data Sheet is available.

Restrictions include quantity limitations on the following:

- Quantity limit of 0.1% by mass (1000 PPM) for: Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls Diphenyl-Ethers (PBB/PBDE)
- Quantity limit of 0.01% by mass (100 PPM) for: Cadmium
- California Code of Regulations, Title 22, Division 4.5, Chapter 33: Best Management Practices for Perchlorate Materials
- China - Restriction of Hazardous Substances (China RoHS)
- WEEE Directive (Europe)
- Packaging Directive (Europe)

Certifications / Registrations / Declarations

The following is a list of the required certifications, registrations, and declarations:

- NRTL Certification (US/Canada)
- CE Declaration of Conformity (CENELEC Europe)
- FCC/ICES-003 Class A Attestation (USA/Canada)
- VCCI Certification (Japan)
- C-Tick Declaration of Conformity (Australia)
- MED Declaration of Conformity (New Zealand)
- BSMI Certification (Taiwan)
- GOST R Certification / Certification (Russia)
- Belarus Certification / Certification (Belarus)
- IRAM Certification (Argentina)
- CNCA CCC Certification (China)
- Ecology Declaration (International)
- China RoHS Environmental Friendly Use Period
- Packaging & Product Recycling Marks

Electromagnetic compatibility notices

The following sections list the compatibility notices for USA, Canada, Europe, Japan, and Taiwan.

FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to a radio or a television reception (can be

determined by turning the equipment off and on), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the grantee of this device can void the user's authority to operate the equipment. The customer is responsible to ensure compliance of the modified product. Only peripherals (computer input or output devices, terminals, printers, etc.) that comply with FCC Class A or B limits may be attached to this product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception. All cables that are used to connect to peripherals must be shielded and grounded. Operation with regulatory and compliance information 65 Electromagnetic compatibility notices the cables that are connected to peripherals that are not shielded and grounded may result in interference to radio and TV reception.

ICES-003 (Canada)

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadien des Communications.

English translation of the notice above:

This digital apparatus does not exceed the Class A limits for radio noise emissions from the digital apparatus that is set out in the interference-causing equipment standard entitled: "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

CE Declaration of Conformity (Europe)

This product has been tested in accordance to, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

VCCI (Japan)

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment. If the product is

used near a radio or a television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

BSMI (Taiwan)

The BSMI Certification Marking and EMC warning label is located on the outside rear area of the product.

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