

Veritas 5150 Appliance Product Description Guide

VERITAS™

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About the Veritas 5150 Appliance

This chapter includes the following topics:

- [About the appliance](#)
- [Features and components of the Veritas 5150 Appliance](#)
- [Locating the appliance serial number](#)
- [Appliance disk drives](#)
- [Appliance control panel](#)
- [Appliance rear panel](#)
- [Appliance front panel USB port](#)
- [Appliance I/O configuration options](#)

About the appliance

The Veritas 5150 Appliance is a hardware and software storage system that can scale to 14 TB of usable capacity.

Figure 1-1 Veritas 5150 Appliance



The Veritas 5150 Appliance supports the following software: Flex version 1.3 and later.

Refer to the Veritas 5150 documentation at the following site for details about usable storage options.

[Appliance Documentation](#)

Features and components of the Veritas 5150 Appliance

This section describes the features and components of the Veritas 5150 Appliance.

Table 1-1 Veritas 5150 Appliance features

Feature	Description
Processor	One (1) Intel® 3106 1.7GHz 8-core processor.
Appliance software version	Flex - version 1.3 or higher
Performance and capacity	- Operates as a stand-alone solution or as an end point in a hub and spoke environment. - Acts as an integrated backup appliance that does both backup and deduplication. - Available internal storage capacities of 14TBs. The available capacity can be allocated either in part or in whole to a deduplication pool or to an AdvancedDisk pool (non-deduplicated storage).
Space reduction	The deduplication engine provides up to 100 times reduction in storage. The client-side plug-in provides similar levels of bandwidth reduction. The type of data can impact the amount of storage reduction that is performed.
Scalable architecture	Due to fingerprinting and RAID redundancy, the overall storage capabilities are not a simple multiplication of the disk size and the total number of disks.
High availability	Supports the redundant hot-swappable disks and power modules.

Table 1-1 Veritas 5150 Appliance features (*continued*)

Feature	Description
RAID levels	RAID 1 (standard mirroring) and RAID 10 (block level striping with double distributed parity) are implemented as follows: ■ Appliance system disks: RAID 1 ■ Appliance storage disks: RAID 10 Note: The disk drives in the appliance are pre-formatted before the appliance is shipped. These drives should not be moved into different slots or otherwise rearranged.
Rear panel ports	See "Appliance rear panel" on page 17.

Locating the appliance serial number

The serial number is located on the rear panel of the appliance and begins with the letters VTAS.



You can also find the serial number in the pull out tab on the front of the appliance. You have to remove the front bezel to access the pull out tab for the serial number.



Appliance disk drives

The front panel of the appliance contains two SSDs and four disk drives.

Figure 1-2 Disk drives



Slot designations are as follows. Do not rearrange the disk drives from the factory configuration.

Table 1-2 Veritas 5150 Appliance storage devices

Slot	RAID configuration	Device	Disk drive role
0,1	RAID 1	Intel 2280 M.2 SATA SSD 480GB	Boot/OS
4, 5, 6, 7	RAID 10	SEAGATE 8TB SAS 12G, 7.2K RPM, 3.5"	Internal storage
N/A	N/A	SMART 2280 M.2 SATA SSD 32GB	Certificate

Appliance control panel

The front panel of the Veritas 5150 Appliance includes a small panel that is attached to the right side of the device. The panel provides basic control of the system as well as LED status indicators such as the power button, ID button/LED, and system status.

Figure 1-3 Control panel system

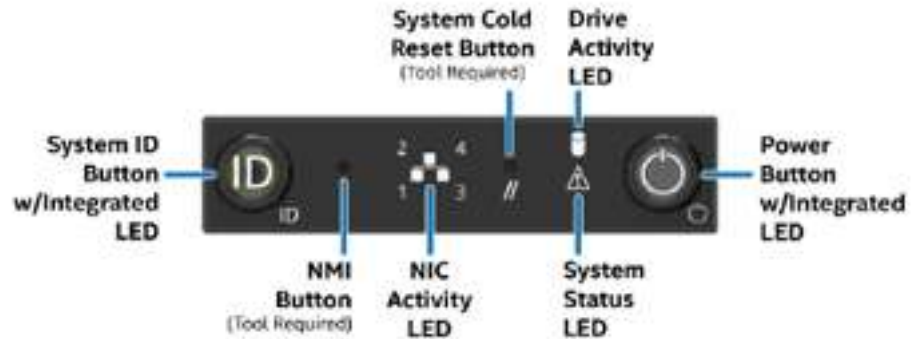


Table 1-3 Control panel system LED descriptions

LED	System information
Power button with integrated LED	The Power button toggles the system on and off. See “About the Power button LED states” on page 11.
Hard drive Activity LED	The drive activity LED on the front panel indicates drive activity from the on-board hard disk controllers.
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.
Network activity LEDs	The front control panel includes one LED for each of the 1 GB RJ45 port on the Quad Gigabit Ethernet OCP module. When network links are detected on the controllers, the LEDs are activated and remain solid green. The LEDs blink when network activity occurs, and the amount of network activity that occurs determines the rate at which they blink.

Table 1-3 Control panel system LED descriptions (*continued*)

LED	System information
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. It can only be accessed with a small sharp object such as a pin or paperclip. Veritas recommends that you do not enable NMI by pressing the NMI button.
System Cold Reset button (recessed, tool required for use on non-storage models)	When depressed, the System Cold Reset button restarts and re-initializes the appliance without shutting down gracefully. It can only be accessed with a small sharp object such as a pin or paperclip.
System Status LED	The System Status LED is bi-color indicator that uses the colors green and amber to display the current health of the appliance. 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. See “About the System Status LED states” on page 12.
Drive Carrier LED	The appliance has 4 internal 3.5" SAS HDD. Each drive carrier has 2 LEDs, a drive activity LED (green) and drive status LED (amber). See “About the Drive Carrier LED states” on page 15.
Power Supply LED	Each power supply has a bi-color indicator that uses the colors green and amber to represent its current status: See “About the Power Supply LED states” on page 16.

About the Power button LED states

The Power button is located on the Veritas 5150 Appliance control panel. It is used to turn the appliance on and off.

The following table provides a description of each power state.

Table 1-4 Power button LED states

State	Power Mode	LED	Description
Power - off	Non-ACPI	Off	The system power is off, and the BIOS has not initialized the chipset.
Power - on	Non-ACPI	On	The system power is on and the green Power button LED is active.

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.

Table 1-5 System Status LED states

Color	State	Criticality	Description
No color	Off - The system is not operating.	Not ready	■ 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 does not exhibit any errors. AC power is present and BMC has started and manageability functionality is up and running.

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

Color	State	Criticality	Description
Green	~1-Hz blinking	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: ■ 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 (more than one DIMM is installed). ■ Correctable errors over a threshold and migrating to a spare DIMM (memory sparing). This indicates that the system has no spared DIMMs (a redundancy lost condition). The corresponding DIMM LED also lights up.

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

Color	State	Criticality	Description
Green	~1-Hz blinking	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: (continued) ■ In mirrored configuration, when memory mirroring takes place and system loses memory redundancy. ■ 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. ■ 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 offline or degraded.
Amber	~1-Hz blinking	Non-critical The system is operating in a degraded state with an impending failure warning. However, the system is still functioning.	Non-fatal, although the system is likely to fail due to the following issues: ■ 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 when the system is operating in a non-sparing and non-mirroring mode.

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

Color	State	Criticality	Description
Amber	Solid on	Critical, non-recoverable – System is halted	Fatal alarm – system has failed or shutdown: ■ 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 ■ Run time memory uncorrectable error in non-redundant mode. ■ DIMM Thermal Trip or equivalent ■ SBB Thermal Trip or equivalent ■ CPU ERR2 signal is asserted ■ BMC/Video memory test failed (Chassis ID shows blue/solid-on for this condition) ■ Both uBoot BMC FW images are bad (Chassis ID shows blue/solid-on for this condition) ■ 240 VA fault ■ Fatal error in processor initialization: ■ 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 ■ Uncorrectable memory error in non-redundant mode

About the Drive Carrier LED states

Each drive carrier has 2 LEDs, a drive activity LED which is green in color, and a drive status LED which is amber in color.

The following tables provide a description of the drive carrier LEDs.

Table 1-6 Amber LED status

LED state	Drive status
Solid On (SO)	Hard drive fault
Off	No access and no fault
1-Hz blinking	RAID rebuild in progress
2-Hz blinking	Locate (identify)

Table 1-7 Green LED status

Condition	LED state
Power on with no drive activity	Solid On (SO)
Power on with drive activity	Blinks off when processing a command
Power on and drive spun down	Off
Power on with drive spinning up	Blinks

About the Power Supply LED states

The power supply module has a bi-color LED to represent the current status of the power supply.

The following table provides a description of each power supply state.

Table 1-8 Power supply LED states

LED	Power supply condition
Solid green	Output on and ok
Off	No AC power to all power supplies
1-Hz blinking (green)	AC is present but only 12 VSB or is in cold redundant state
Solid amber	■ AC cord is unplugged or AC power is lost but a second power supply with AC input power is present ■ Power supply critical event is causing a shutdown such as a failure, OCP, OVP or fan fail

Table 1-8 Power supply LED states (*continued*)

LED	Power supply condition
1-Hz blinking (amber)	Power supply warning events (such as, high temperature, high power, high current or slow fan) but the power supply continues to operate
2-Hz blinking (green)	Power supply FW updating

Both the SSDs also have a bi-color LED to represent the current status of the power supply.

The following table provides a description of the SSD LED states.

Table 1-9 SSD LED states

LED	Power supply condition
Solid green	SSD is receiving power
Off	No power to the SSD
Blinking (green)	Drive activities to the SSD are on-going

Appliance rear panel

The rear panel of the appliance contains several default ports that are embedded.

Figure 1-4 Rear panel



The following list describes the numbered ports.

1. VGA port
2. 3 USB ports
3. Veritas Remote Management Interface (remote management (IPMI) port)

4. Four copper, RJ45, 1Gb Ethernet* ports, host0, NIC0, NIC1, and NIC2, left to right
5. The middle slot is used for the external SAS tape-out functionality. This feature will be implemented in a future release.
6. The right PCIe is used for the add-on ethernet cards

Note: * The embedded Ethernet ports are copper. PCIe Ethernet ports can be either fibre or copper. You cannot bond the copper ports and the fibre ports to each other.

Appliance front panel USB port

The Veritas 5150 Appliance front panel includes two USB 3.0-compliant port that supports a data transfer rate of up to 5 Gb/second.

Figure 1-5 Veritas 5150 Appliance front USB port



Appliance I/O configuration options

The Veritas 5150 Appliance has one functional PCIe slot, with three PCIe card options:

- 2 x 10 GbT
- 2 x 10/25 GbE
- 4 x 1 GbT

Intel X540-T2 dual-port 10Gb Ethernet card

The Intel X540-T2 dual-port network interface card connects the appliance to the 10Gb network infrastructure over 10GBase-T technology.



Table 1-10 Intel X540-T2 dual-port 10Gb Ethernet card specifications

Item	Specification
Bracket height	Full Height
Power consumption	Typical: 17.4 watts @ 10Gbps
Operating temperature	0°C to 55°C
Storage temperature	-40°C to +70°C (-40°F to +158°F)
Storage humidity	90% non-condensing relative humidity @ 35 °C
System interface type	PCIe v2.1
Speed and slot width	5.0 GT/s (gigatransfers per second), 8-Lane
Data rate supported per port	100 Mbps, 1 Gbps, 10 Gbps
LED indicators	LINK (solid) and ACTIVITY (blinking) LINK SPEED (green=10Gbps; yellow=1Gbps)
Air Flow (minimum)	200 LFM (linear feet per minute)

Intel I350-T4 Quad-port 1Gb Ethernet card

The Intel I350-T4 adds 4 extra 1Gb RJ45 connections to the Veritas 5150 Appliance.



Table 1-11 Quad-port 1Gb Ethernet card with RJ45 connectors specifications

Item	Specification
Bracket height	Full Height
Power consumption	Typical: 5 watts @ 1Gbps Maximum: 6 watts @ 1Gbps
Operating temperature	0°C to 55°C (32 F to 131 F)
Storage temperature	-40°C to +70°C (-40°F to +158°F)
Storage humidity	90% non-condensing relative at 35°C
System interface type	PCIe v2.1
Speed and slot width	5.0 GT/s (gigatransfers per second), 4-Lane
Cabling Distances	1GBase-T: Cat 5e or higher 100Base-T: Cat 5 or higher 10Base-T: Cat 3 or higher

Table 1-11 Quad-port 1Gb Ethernet card with RJ45 connectors specifications
(continued)

Item	Specification
LED indicators	LINK GREEN (solid) and ACTIVITY (blinking) LINK SPEED (green=100Mbps; yellow=1Gbps; off=10Mbps)
Air Flow (minimum)	0 LFM (linear feet per minute)

Mellanox ConnectX -4 Lx EN MCX4121A-ACAT Ethernet card

The Mellanox ConnectX -4 Lx EN Ethernet card supports both optical (FCoE) and copper (twinax) traffic at 10Gbps Ethernet line rate speeds.



Table 1-12 Mellanox ConnectX-4 Lx EN MCX4121A-ACAT Ethernet card specifications

Item	Specification
Bracket height	Full Height
Power consumption	Typical: 9.6 watts Maximum: 15.0 watts
Operating temperature	0°C to 55°C (32 F to 131 F)

Table 1-12 Mellanox ConnectX-4 Lx EN MCX4121A-ACAT Ethernet card specifications (*continued*)

Item	Specification
Storage temperature	-40°C to +70°C (-40°F to +158°F)
Storage humidity	90% RH (operating, non-operating)
System interface type	PCIe v3.0
Speed and slot width	8.0 GT/s (gigatransfers per second), 8-Lane
Data rate supported per port	10
Air Flow (minimum)	300 LFM (linear feet per minute)

SAS tape-out adapter

The SAS tape-out adapter is used to connect external SAS devices to the Veritas 5150 Appliance. The adapter comes standard on all configurations of Veritas 5150 Appliance.

The SAS tape-out adapter assembly includes a port for external SAS-3 device connections and an attached internal SAS-3 cable. The adapter's internal SAS-3 cable connects to Connector 0 on the RMS3HC080 internal mezzanine RAID controller.

Figure 1-6 SAS tape-out adapter

Veritas 5150 Appliance cables

This chapter includes the following topics:

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

Power cables

Each of the AC power modules in the Veritas 5150 Appliance accepts one AC power cable. One end of the AC power cable is connected to the power supply on the appliance. The other end of the cable is connected to an external Power Distribution Unit (PDU) on the rack.

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

Note: If your power distribution unit is not compatible with the IEC-60320-C14 plug or the NEMA 5-15p plug, then Veritas recommends that you purchase your power cable locally. Make sure that the power cable meets or exceeds the indicated power rating.

See “[Veritas 5150 Appliance technical specifications](#)” on page 28.

AC power cable with the IEC-60320-C14 plug

Figure 2-1 IEC-60320-C14 plug



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

B AC power connector (IEC-60320-C13) to the appliance.

Cable rating: 15A 250V

AC power cable with the NEMA 5-15p plug

Figure 2-2 NEMA 5-15p plug



A AC power connector (NEMA 5-15p) to an external power supply Power Distribution Unit (PDU) on a rack.

B AC power connector (IEC-60320-C13) to the appliance.

Cable rating: 15A 125V

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 2-3 Network cable



See [“Power cables”](#) on page 23.

See [“Multi-mode fiber optic cable”](#) on page 25.

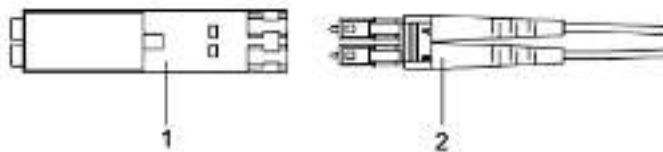
See [“Twinaxial copper cables”](#) on page 26.

Multi-mode fiber optic cable

The Veritas 5150 Appliance communicates with the Fibre Channel switch through a multi-mode fiber optic cable. One end of the multi-mode fiber optic cable connects to the 10GbE service network port. The other end of the cable connects to the Fibre Channel switch. The two ends of the multi-mode fiber optic cable are LC connectors.

Figure 2-4 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 23.

See [“Network cable”](#) on page 25.

See [“Twinaxial copper cables”](#) on page 26.

Twinaxial copper cables

The Veritas 5150 Appliance communicates with Ethernet networks through high speed Twinaxial copper cables. If you configure the appliance to communicate with 10 Gb Ethernet networks, these cables connect to the 10/25 Ethernet card in the appliance.

These cables are also known as Direct Attach copper cables (DAC), and are available in 1-meter, 3-meter, or 5-meter lengths.



Technical specifications and compliance standards

This appendix includes the following topics:

- [Veritas 5150 Appliance technical specifications](#)
- [Environmental specifications](#)
- [Protocol standards](#)
- [Regulatory, compliance, and certification information](#)
- [Product regulatory compliance](#)
- [Product safety compliance](#)
- [Product EMC Compliance - Class A Compliance](#)
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- [BSMI \(Taiwan\)](#)

Veritas 5150 Appliance technical specifications

The following table provides technical specifications for the Veritas 5150 Appliance.

Table A-1 Veritas 5150 Appliance technical specifications

Technical Specification	Veritas 5150 Appliance
Rack information	19" EIA standard The rack rails that are provided for the Veritas 5150 Appliance are extensible to 36" (914mm). This distance is the maximum depth that is allowed between rack posts. If the distance between rack posts is longer than 36" (914mm) the rails and the appliance cannot be properly installed.
Processor	One (1) Intel® 3106 1.7GHz 8-core processor.
CPU speed	1.7GHz
Cores	8
System memory (currently supported)	64 GB
Memory type and configuration (DIMMs)	DDR4 RDIMM 32 GB x 2
SAS RAID card installed in a PCIe riser assembly (Y/N)	Mezzanine card: Yes
Usable MSDP and AdvancedDisk storage capacity (TB)	14.5 TB
1 Gb Ethernet ports	Up to 8 maximum
10 Gb Ethernet ports	Up to 2 maximum
Dimensions (IEC rack compliant)	■ Height: 4.32cm (1.7") (approximately 1U) ■ Width: 48.26cm (19") ■ Depth: 79.38cm (31.25")
Maximum weight	17.69 kg (39 lbs)
AC power requirements	■ 110 VAC at 3.64 A ■ 220 VAC at 1.82 A

Table A-1 Veritas 5150 Appliance technical specifications (*continued*)

Technical Specification	Veritas 5150 Appliance
AC power cable	Specification: IEC-60320-C14 to IEC-60320-C13, 10A/250V, Black, 4 ft The IEC-60320-C14 plugs into a Power Distribution Unit. The IEC-60320-C13 plugs into an appliance power supply. 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 exceed the indicated power rating. See “Power cables” on page 23.
AC Frequency range	50/60Hz
Typical power consumption	180 watts
Maximum power consumption	400 watts
System cooling requirement (heat dissipation)	180 watts (typical) - 614 BTU/hr 400 watts (maximum) - 1365 BTU/hr
Operating voltage	100 - 127 VAC 200 - 240 VAC
Power conversion efficiency	90% +
Acoustic noise	70 dBA

See “[Environmental specifications](#)” on page 30.

Environmental specifications

The following table lists the environmental specifications for the Veritas 5150 Appliance.

Table A-2 Veritas 5150 Appliance environmental specifications

Specification	Veritas 5150 Appliance
Operating temperature	ASHRAE A2 - from 10°C to 35°C with the maximum rate of change not to exceed 10°C per hour ASHRAE A3 - up to 40°C for up to 900 hours per year ASHRAE A4 - up to 45°C for 90 hours per year

Table A-2 Veritas 5150 Appliance environmental specifications (*continued*)

Specification	Veritas 5150 Appliance
Non-operating temperature	-40°C to 70°C (-40°F to 158°F) 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. Veritas recommends that you do not store the system in an environment where the temperatures fall outside of the listed temperature range.
Non-operating humidity	50% to 90%
Operating altitude	up to 3050m with ASHRAE class de-ratings
Temperature gradient	10°C/hour (50°F/hour)

See “[Veritas 5150 Appliance technical specifications](#)” on page 28.

See “[Protocol standards](#)” on page 31.

Protocol standards

The following table provides standards with which the Veritas 5150 Appliance complies.

Table A-3 Veritas 5150 Appliance 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 - 3.0
ACPI	Advanced Configuration and Power Interface Specification, Revision 3.0, September 2
IP	RFC0791: Internet Protocol
PCIe Express	PCIe 3.0

See “[Veritas 5150 Appliance technical specifications](#)” on page 28.

See [“Environmental specifications”](#) on page 30.

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 NetBackup 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)
- CB Certificate & Report, IEC60950 (report to include all country national deviations)
- EACU Certification
- CE - European Union
- IRAM Certification (Argentina)
- CCC 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 & CISPR 32 - Emissions (International)
- EN55022 & EN55032 - Emissions (Europe)
- EN55024 & EN55035 - Immunity (Europe)
- EN61000-3-2 - Harmonics (Europe)
- EN61000-3-3 - Voltage Flicker (Europe)
- CE - European Union
- VCCI Emissions (Japan)
- BSMI CNS13438 Emissions (Taiwan)
- CCC 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)

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)

CAN ICES-3(A) / NMB-3(A)

CE Declaration of Conformity (Europe)

This product has been tested in accordance to, and complies with the Low Voltage Directive (2014/35/EU) and EMC Directive (2014/30/EU). The product has been marked with the CE Mark to illustrate its compliance.

VCCI (Japan)

This is a Class A equipment. Operation of this equipment in a residential environment could cause radio interference. In such a case, the user may be required to take corrective actions. VCCI-A

BSMI (Taiwan)

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

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