

DELL™

# POWEREDGE™ T310

TECHNICAL GUIDEBOOK



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# 1 Overview

## 1.1 Product Description

Dell's robust and reliable, 1-socket PowerEdge™ T310 tower server offers the performance of Intel® processors, DDR3 memory, advanced systems management options and the availability of up to four hard drives (3.5" or 2.5") in a compact tower chassis.

The Dell PowerEdge T310 server delivers enterprise-level performance, redundancy, and comprehensive right-sized manageability options in a 1-socket tower that is simple to own, deploy, and manage.

The Dell PowerEdge T310 was designed to meet the needs of the growing small business or remote office by offering more features and performance than a basic, entry-level server. Customizable with optional advanced systems management capabilities including remote management, a short 20.5 inch chassis, redundancy features and cost-effective RAID options, the T310 is the ideal robust and reliable 1-socket tower server.

Dell aims to add value to your business by providing the features you need. Our goal is to deliver value through tailored solutions based on industry standards, as well as purposeful, innovative design.

The PowerEdge T310, part of the 11th Generation PowerEdge server portfolio, is built with system design commonality and reliability. All 11th Generation servers are built with user ease in mind. All external ports, power supplies, LED lights, and LCD screens are kept in the same location for familiar user experience and easy installation and deployment.

Robust, metal hard drive carriers and organized cabling are designed to improve component access and airflow across the server. The PowerEdge T310's purposeful design provides quiet acoustics and an optional interactive LCD screen positioned on the front by the bezel for ease of monitoring. With a chassis depth of 20.5", the PowerEdge T310's chassis is ideal for use in a back office, retail, or small office settings where small chassis and quiet acoustics matter.

Energy Smart technologies are at the core system level on the PowerEdge T310. These energy-optimized technologies are designed to increase energy efficiency within the server while continuing to deliver the performance your business requires. Built with lower wattage power supplies than its predecessor, the PowerEdge T310 offers highly efficient cabled or redundant power supply options. Also included in the T310 are low-flow fans, designed to spin faster in accordance with server workload demands and help reduce unnecessary noise when possible. In addition, the logical component layout aids with air flow direction, helping to keep the server cool. The T310 also includes Energy Smart power management features including power capping, power inventory, and power budgeting to best manage power in your specific environment.

The Lifecycle Controller is the engine for advanced embedded management and is delivered as part of the optional iDRAC Express or iDRAC Enterprise in the PowerEdge T310. The Lifecycle Controller helps to deliver faster server deployment and update capabilities from a bare-metal, pre-operating system environment. With a single access point via the Unified Server Configurator (USC) interface, the USC tool provides a one stop shop to enable efficient operating system deployment with built-in driver installations, firmware updates, hardware configuration, and diagnostics for the system. Servers selected with hot pluggable hard drives will also get the benefit of an interactive LCD which can be accessed remotely via optional iDRAC Express or iDRAC Enterprise for system alerts and power usage as well as select boot-up options.

Also part of Dell's OpenManage™ portfolio is the Dell Management Console, included with every Dell server, which provides IT administrators with a consolidated view of their IT infrastructure.

## 1.2 Product Comparison

Table 1 shows a product comparison for the PowerEdge T310, PowerEdge T300, and PowerEdge T410 servers.

**Table 1. Comparison for PowerEdge Servers**

Feature/Spec	PowerEdge T310	PowerEdge T300 (Predecessor)	PowerEdge T410 ( Next level up)
<b>Processor</b>	Intel® Xeon® 3400 series Intel® desktop processors: Intel Core i3 540 Intel® Core i3 530 Intel® Pentium G6950 Intel® Celeron G1101	Quad-Core Intel® Xeon® Processor 5400 Series	2S Intel® Xeon® Processor 5500 series
<b>Front Side Bus</b>	DMI	1333	QPI @ 6.4 GT/s
<b># Processors</b>	1	1	1 to 2
<b># Cores</b>	Intel® Xeon®: Quad and Dual Desktop processor: Dual	Dual or Quad	Dual or Quad
<b>L2/L3 Cache</b>	Intel® Xeon®: 8M Desktop proc: 4, 3 or 2M	Intel® 12M Advanced Smart Cache (shared cache which features 6MB Smart Cache per core pair)	4MB or 8MB
<b>Chipset</b>	Intel® 3420	Intel® Chipset for LV and ULV dual core Xeons + ICH9R	Intel® 5520
<b>DIMMs</b>	6 R-DIMMs or 4 U-DIMMs	6 R-DIMMs	4+4 DDR3 Unbuffered w/ECC or Registered w/ECC 1333/1066/800MHz
<b>Min/Max RAM</b>	1GB/32GB	512MB/24GB	1GB/64GB
<b>HD Bays</b>	4 x 3.5" Optional hot-swap Or 2.5" SAS/ SSD via hot-swap chassis	4 x 3.5" Optional hot-swap	6 x 3.5" Optional hot-swap support 2.5" HDDs via hot-swap tray
<b>HD Types</b>	SATA/SAS/SSD	SATA/SAS	Default SATA; Optional SAS and SSD via add-in controller
<b>Ext Drive Bay(s)</b>	2 x 5.25" bay	2 x 5.25" bay	2 x 5.25" bay
<b>Int. HD Controller</b>	Intel® 3420  PERC S100 (Embedded SW RAID)	ICH9R	Chipset-based SATA
<b>Opt. HD Controller</b>	NON-RAID: SAS 5/E	NON-RAID: SAS 5/E	NON-RAID: SAS 5/E

Feature/Spec	PowerEdge T310	PowerEdge T300 (Predecessor)	PowerEdge T410 ( Next level up)
	SAS 5/iR (For TBU) LSI2032 (For TBU) PERC H800  RAID: SAS 6/iR PERC S300 PERC 6/i PERC 6/E PERC H200 PERC H700	LSI2032 (For TBU)  RAID: SAS 5/E SAS 6/iR PERC 6/i PERC 6/E	LSI 2032 (For TBU only) SAS 6/E  RAID: SAS 6/iR Adapter PERC 6/i PERC 6/E
Availability	Hot-swap HDD; Redundant PSU; Quad-pack LED diagnostic/LCD with Hot-swap HDD chassis	Hot-swap HDD; Redundant PSU; Quad-pack LED diagnostic/LCD with Hot-swap HDD chassis	Hot-swap HDD; Redundant PSU; Quad-pack LED diagnostic/LCD with Hot-swap HDD chassis; Memory mirroring
Server Mgt.	BMC, IPMI 2.0 compliant; Full OpenManage™ suite Optional; iDRAC6 Express, iDRAC6 Enterprise, vFlash	TPM; IPMI 2.0 Full OpenManage™ suite Optional DRAC5	BMC, IPMI 2.0 compliant; Full OpenManage™ suite Optional; iDRAC6 Express, iDRAC6 Enterprise, VFlash
I/O Slots	Slot 1: PCIe x8 (x8 routing) Slot 2: PCIe x16 (x8 routing) Slot 3: PCIe x8 (x4 routing) Slot 4: PCIe x1 Slot 5: PCIe x1	Two PCIe x8 Two PCIe x4 One PCI-X 64/133	Slot 1: PCI-E x8 connector(x4 routing, half length → Gen 2.) Slot 2: PCI-E x8 connector(x4 routing, full length → Gen 2.) Slot 3: PCI-E x8 connector(x4 routing, full length → Gen 1.) Slot 4: PCI-E x8 connector(x4 routing, half length → Gen 2.) Slot 5: PCI-E x16 connector(x8 routing, half length → Gen 2.)
RAID	PERC S100: RAID 0, 1, 5, 10 (SATA only) PERC S300: RAID 5, 10	0,1, 5, 6, 10	0, 1, 5, 6, 10

Feature/Spec	PowerEdge T310	PowerEdge T300 (Predecessor)	PowerEdge T410 ( Next level up)
	(SATA & SAS) SAS 6i/R: RAID 0, 1 (SATA & SAS) PERC 6/i: RAID 0, 1, 5, 6, 10 (SATA, SAS & SSD) PERC H200: RAID 0, 1, 10 (SATA, SAS & SSD) PERC H700: RAID 0, 1, 5, 6, 10 (SATA, SAS & SSD)		
<b>NIC/LOM</b>	2x GbE LOM	2x GbE LOM	2x GbE LOM Optional: various NIC available
<b>USB</b>	4rear/2front/2internal	2rear/2front/1internal	2 front/4 rear/2 internal
<b>Power Supplies</b>	Non-Redundant, 375W (80+ Bronze)  Optional Redundant, 400W (80+ Silver)	Non-Redundant = 490W Redundant PSU Option = 528W	Non-Redundant, 525W (80+ SILVER) Optional Redundant, 580W (80+ GOLD) Auto Ranging (100V~240V)
<b>Fan</b>	Non-redundant, non-hot swappable	Non-redundant, non-hot swappable	Non-redundant, non-hot swappable
<b>Chassis</b>	Tower	Tower	Tower
<b>Dimensions</b>	440 x 218 x 521 (mm) (w/ foot, bezel) =17.3 x 8.6 x 20.5 (in)	444x 210x 610 (mm) =17.48 x 8.27 x 24.01 (in)	444.9 x 217.9 x 616.8 (mm) (w/ foot, bezel) 17.52 x 8.58 x 24.28 (in)
<b>Weight</b>	Max: 23.5kg	25.4kg	Max: 62.61lbs (28.4Kg)

## 2 New Technologies

### 2.1 Overview

A number of new technologies are used in the PowerEdge T310, including:

- New Intel 1-Socket platform (Xeon 3400 series processor/Intel desktop processor + Intel 3420 chipset)
- Intel desktop processors:
  - Intel Core i3 540 3.06GHz/2C/4M
  - Intel Core i3 530 2.93GHz/2C/4M
  - Intel Pentium G6950 2.8 GHz/2C/3M
  - Intel Celeron G1101 2.26GHz/2C/2M
- iDRAC6 (new Dell server remote management controller)
- SSD advantage (support SSD drives)
- Software RAID PERC S100 and PERC S300

### 2.2 Detailed Information

#### 2.2.1 Platform Features

The PowerEdge T310 features a highly integrated two-chip solution (Intel Processor + Intel Chipset 3420).

#### 2.2.2 Processors

The PowerEdge T310 supports the following

- Intel 3420 Chipset
- Socket: LGA1156 (compatible with 2-core desktop processors)
- Intel Turbo Boost Technology for dynamic frequency scaling
- Intel Hyper-Threading technology for up to 8 thread processing with quad core performance
- 8MB of Intel Smart Cache (Xeon)
- Integrated memory controller (IMC)
  - DDR 3 1066/1333 UDIMM, 800/1066/1333 RDIMM (Xeon only)
  - Support 2 channels DDR3
  - Up to 2 UDIMMs or 3 RDIMMs per channel
  - 32GB max at lunch with RDIMMs
  - 16GB max at with UDIMMs
  - Up to 4 U-DIMMs, up to 1333 MHz
  - Up to 6 R-DIMMs, up to 1333 MHz (6 DIMMs at 800 MHz)

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## 2.2.3 Software RAID

Dell Software RAID is a chipset RAID-enhanced version based on Intel chipset 3420. PERC S100 is purely a chipset firmware/driver upgrade. PERC S300 contains the same chipset firmware/driver upgrade as the PERC S100 and, in addition, adds a RAID chip on the card. While both the PERC S100 and PERC S300 support RAID type 0, 1, 5, and 10, RAID features vary by platform. PERC S100 and S300 have the following limitations:

- Microsoft OS only; no support for Linux OS
- No support for Virtualization Solutions, such as VMware®

## 2.2.4 Hardware RAID

Internal Controllers include:

- SAS 6/iR
- PERC 6/i
- PERC H200
- PERC H700
- PERC S100 (software-based)
- PERC S300 (software-based)
- External Controllers:
- PERC 6/E with 256MB or 512MB of battery-backed cache
- SAS 5/E
- PERC H800
- LSI2032 PCIe SCSI HBA

See Section 8.6 for more information.

### 3 Systems Overview

**Table 2. Product Features Summary**

FEATURES	PowerEdge T310
<b>Form Factor</b>	Tower
<b>Processors</b>	One Quad-core Intel® Xeon® 3400 series processors One Dual-core Intel® Core i3 540, Intel® Core i3 530, Intel® Pentium® G6950 or, Intel® Celeron® G1101
<b>Processor Sockets</b>	1
<b>Front Side Bus or HyperTransport</b>	DMI (Direct Media Interface)
<b>Cache</b>	Xeon®: 8M Desktop proc: 4, 3, or 2M
<b>Chipset</b>	Intel® 3420 chipset
<b>Memory</b>	Up to 32GB (R-DIMM only): Support 6 R-DIMMs or 4 U-DIMMs, 1GB/2GB/4GB/8GB DDR3 800MHz, 1066MHz or 1333MHz
<b>I/O Slots</b>	5 PCIe G2 slots: Two x8 slot, (one with x16 connector) One x4 slot (with x8 connector) Two x1 slots
<b>RAID Controllers</b>	Internal Controllers: SAS 6/iR PERC 6/i PERC H200 PERC H700 PERC S100 (software-based) PERC S300 (software-based) External Controllers: PERC 6/E with 256MB or 512MB of battery-backed cache SAS 5/E PERC H800 LSI2032 PCIe SCSI HBA
<b>Drive Bays</b>	Cabled HD options: Up to four 3.5" SAS or SATA drives Hot-Swap HD options: Up to four 3.5" SAS or SATA, or 2.5" SAS or SSD drives
<b>Maximum Internal Storage</b>	8TB
<b>Hard Drives</b>	3.5" SATA (7.2K RPM): 160GB, 250GB, 500GB, 1TB, 2TB 3.5" Near Line SAS (7.2K RPM) 500GB or 1TB 3.5" SAS (10K RPM): 600GB 3.5" SAS (15K RPM): 146GB, 300GB, 450GB

	2.5" SAS (10K RPM): 146GB or 300GB 2.5" SATA SSD 25GB, 50GB
<b>Network Interface Cards</b>	Broadcom® NetXtreme™ 5709 Dual Port Gigabit Ethernet NIC, Copper, w/TOE PCIe x4 Broadcom® NetXtreme™ 5709 Dual Port Gigabit Ethernet NIC, Copper, TOE/iSCSI PCIe x4 Intel® PRO/1000 PT Single Port Adapter, Gigabit Ethernet NIC, PCIe x 1 Intel® Gigabit ET Dual Port Adapter, Gigabit Ethernet NIC, PCIe x4 Intel® Gigabit ET Quad Port Adapter, Gigabit Ethernet NIC, PCIe x4
<b>Power Supply</b>	Single-cabled power supply (375W)/Optional redundant power supply (400W)
<b>Availability</b>	Quad-pack LED diagnostic, Interactive LCD with hot-swap HDD chassis, hot-swap HDD, Redundant PSU
<b>Video</b>	Matrox® G200eW w/ 8MB memory
<b>Remote Management</b>	iDRAC6
<b>Systems Management</b>	BMC, IPMI 2.0 compliant Dell™ OpenManage™ featuring Dell Management Console Unified Server Configurator Lifecycle Controller enabled via optional iDRAC6 Express, iDRAC6 Enterprise, and vFlash
<b>Rack Support</b>	N/A
<b>Operating Systems</b>	<b>Factory Installed OS Options:</b> Microsoft® Windows® Small Business Server 2008, 64-bit Standard and Premium Edition Microsoft® Windows Server® 2003 R2 with SP2 32-bit Standard and Enterprise Edition Microsoft® Windows Server® 2003 R2 with SP2 64-bit Standard and Enterprise Edition Microsoft® Windows Server® 2008 32-bit, Standard and Enterprise Edition Microsoft® Windows Server® 2008 64-bit, Standard and Enterprise Edition Microsoft® Windows Server® 2008 SP2 32-bit, Standard and Enterprise Edition Microsoft® Windows Server® 2008 SP2 64-bit, Standard and Enterprise Edition <b>Microsoft Non-Factory Installed OS Options:</b> Microsoft Windows® Essential Business Server 2008 64-bit Standard and Premium Edition <b>Factory Installed Linux® OS Options:</b> Novell® SUSE® Linux® Enterprise Server 11 Red Hat® Enterprise Linux® 5.3 <b>Virtualization OS Options:</b> Microsoft® Windows Server® 2008 with Hyper-V™

## 4 Mechanical

### 4.1 Chassis Description

The PowerEdge T310 chassis design provides capability for hardware redundancy. This new chassis design offers cabled HDD with flexible PSU (redundant PSU or non-redundant PSU) and Hot-Plug HDD with flexible PSU (redundant PSU or non-redundant PSU). Various configurations are available. However, customers cannot upgrade from a Cabled, non-redundant chassis to a Hot-Plug, Redundant PSU version.

The PowerEdge T310 chassis is user friendly. Many of the T310 component devices are tool-less, for example, HDDs (cabled and hot-plug), fans, extension cards, planar, backplane, and redundant PSUs. The non-redundant PSU uses only three screws to reduce the assembly and service time.

### 4.2 Dimensions and Weight



Figure 1. PowerEdge T310 Dimensions

Table 3. Dimensions and Weight

<b>Height</b>	44 cm (17.3 inch)
<b>Width</b>	21.8 cm (8.58 inch)
<b>Depth</b>	52.1 cm (20.5 inch)
<b>Weight (maximum configuration)</b>	23.5 kg (51.8 lb)

### 4.3 Front Panel View and Features

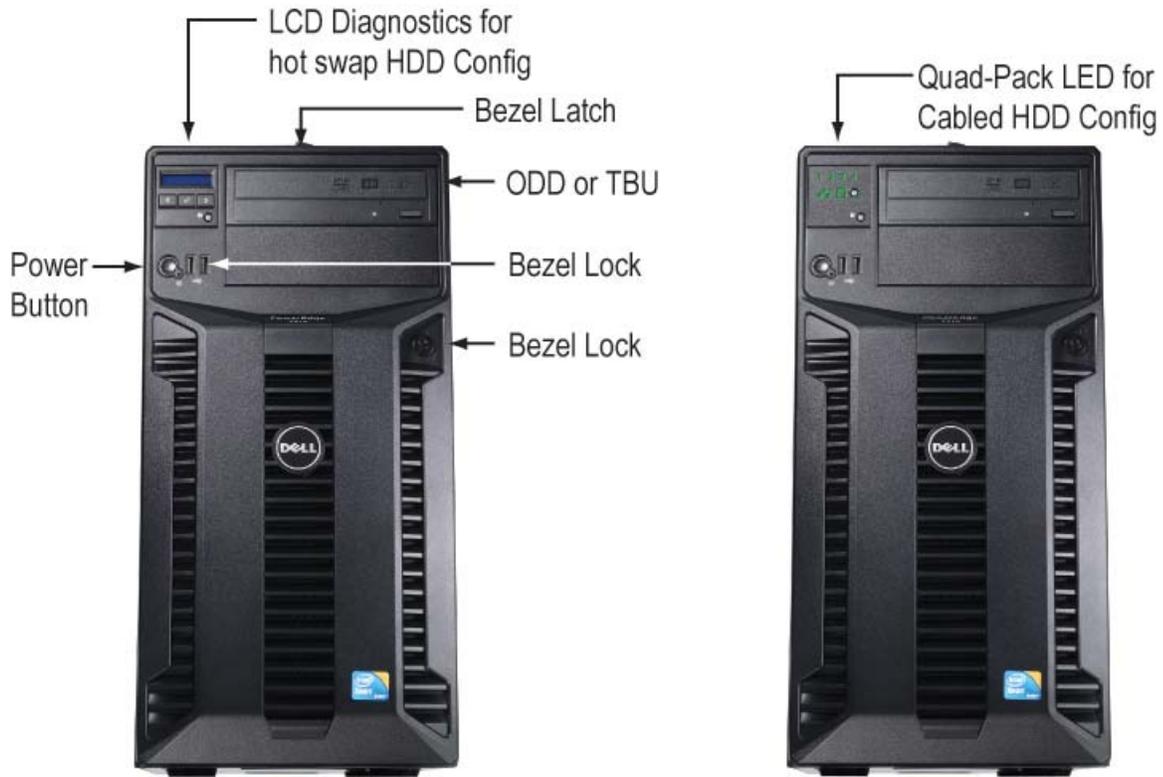


Figure 2. Front Panel Views and Features

## 4.4 Back Panel View and Features

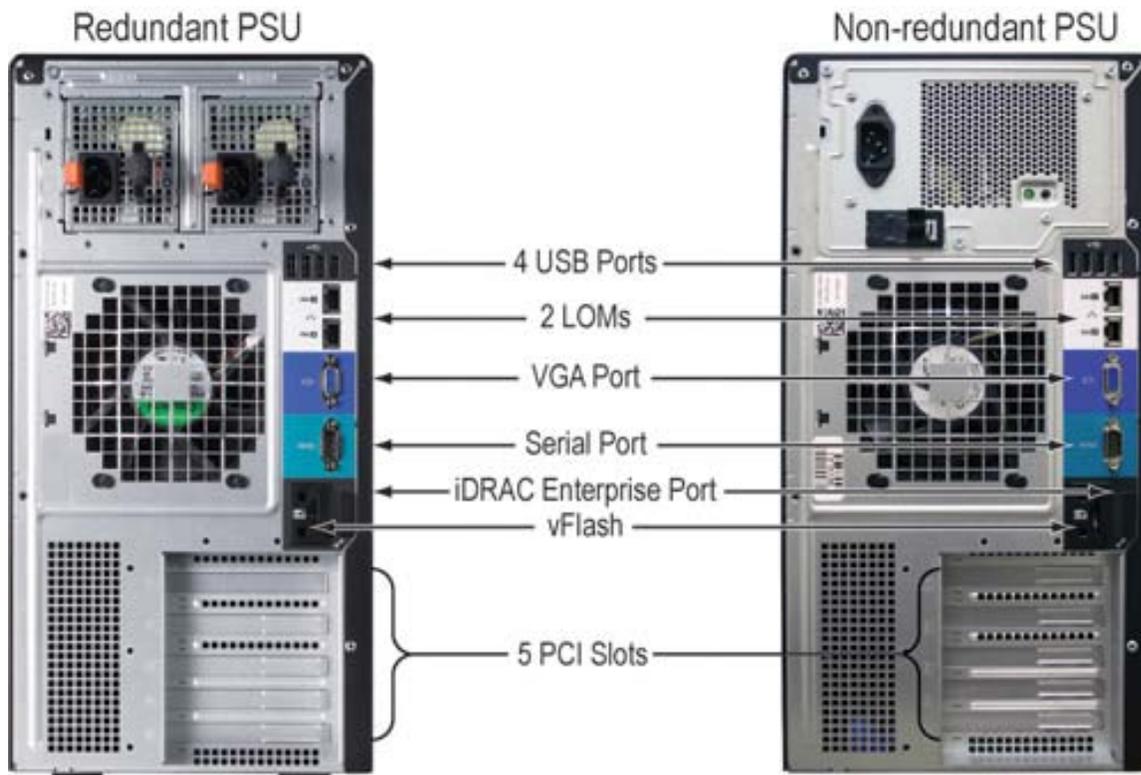
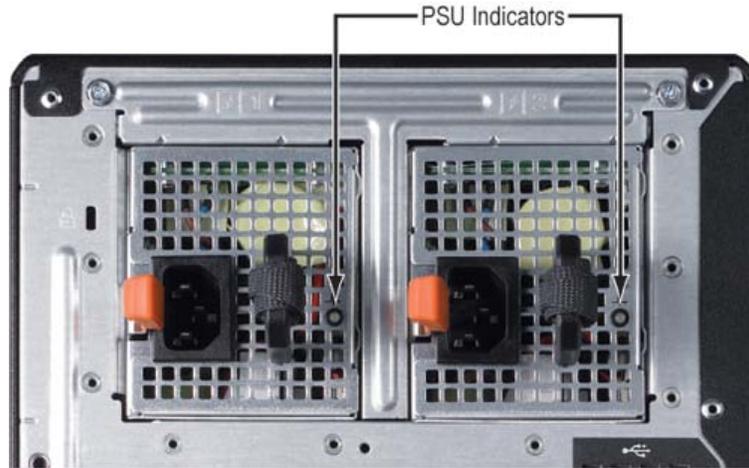


Figure 3. Back Panel View and Features

## 4.5 Power Supply Indicators



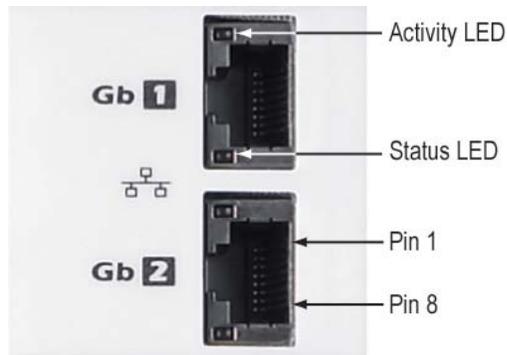
**Figure 4. Power Supply Indicators for Redundant PSU Only**

**Not lit**—AC power is not connected.

**Green**—In standby mode, a green light indicates that a valid AC source is connected to the power supply and that the power supply is operational. When the system is on, a green light also indicates that the power supply is providing DC power to the system.

**Amber**— Indicates a problem with the power supply.

## 4.6 NIC Indicators



**Figure 5. NIC Indicators**

**Table 4. NIC LED Activity**

State		LINK LED (Green/Yellow)	ACTIVITY LED (Green)
No link		Off	Off
D0 initialized (Out of box), D3 cold, S4 (Hibernation)	Wake on LAN (WOL) disabled	Off	Off
	WOL enabled, Link, No Activity	Green if the port is operating at maximum port speed; Yellow otherwise	Off
	WOL enabled, Link, Activity		On (blinking at speed related to packet density)
Pre-OS POST or OS w/o driver	Off		
Pre-OS POST or OS w/o driver	Link, No Activity	Green if the port is operating at maximum port speed; Yellow otherwise	On (blinking at speed related to packet density)
	Link, Activity		Off
OS w/ driver	Link, No Activity		Off
	Link, Activity		On (blinking at speed related to packet density)

## 4.7 Side View



Figure 6. Side View

## 4.8 Internal Chassis Views

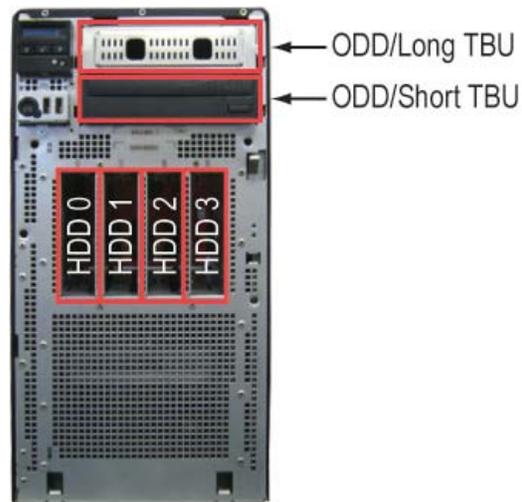
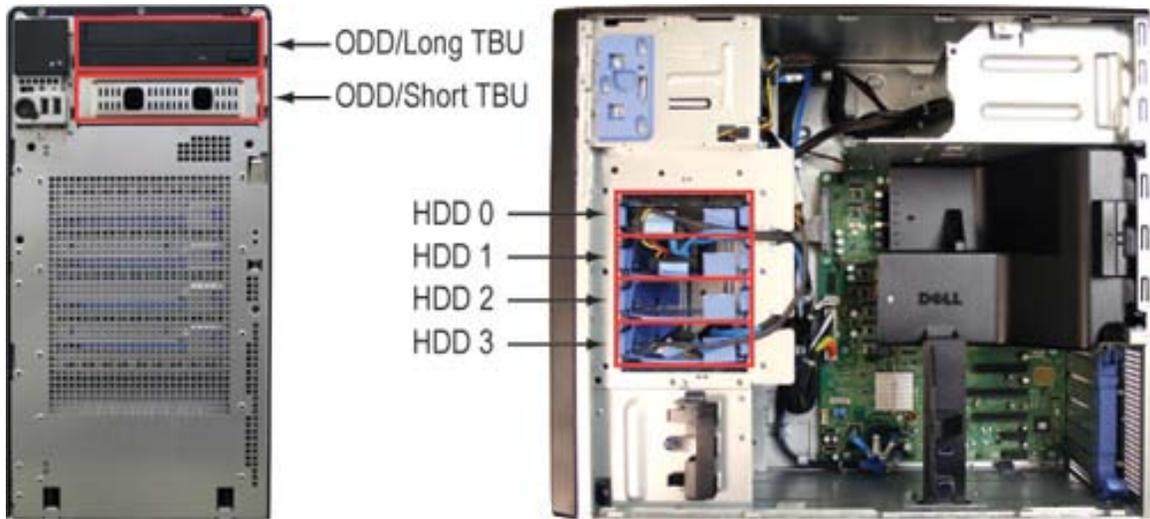


Figure 7. Hot-Swap HDD Chassis

Dell



**Figure 8. Cabled HDD Chassis**

## 4.9 Fan

There is one system fan located at rear of the system.



**Figure 9. Rear and Internal Views of Fan**

Dell

## 4.10 Control Panel/LCD

Front control panel features include:

- 2x USB
- Diagnostic indicator (11G LCD module)
- NMI button
- Power button
- HDD activity LED
- System ID button

For information on LCD panel features, see the [Hardware Owner's Manual](#).



**Figure 10. LCD-Front Panel (Hot-Swap HDD Configuration)**



**Figure 11. LED Front Panel (Cabled HDD Configuration)**

## 4.11 Security

### 4.11.1 Cover Latch

The system coin lock located on the front of the right side cover provides security for the entire system, with tool-less operation for opening and closing the cover.



**Figure 12. System Coin Lock under Cover Latch**

The bezel lock secures both the bezel and cover latch.



**Figure 13. Bezel Lock in Front Bezel**

The bezel lock located on the front of the chassis bezel provides security for the system by preventing access to the Optical Disk Drive (ODD), Tape Back-up Unit (TBU), and Hot-Plug HDD.

The bezel lock secures both the bezel and cover latch. Therefore, the bezel lock must be unlocked to unlatch the cover.

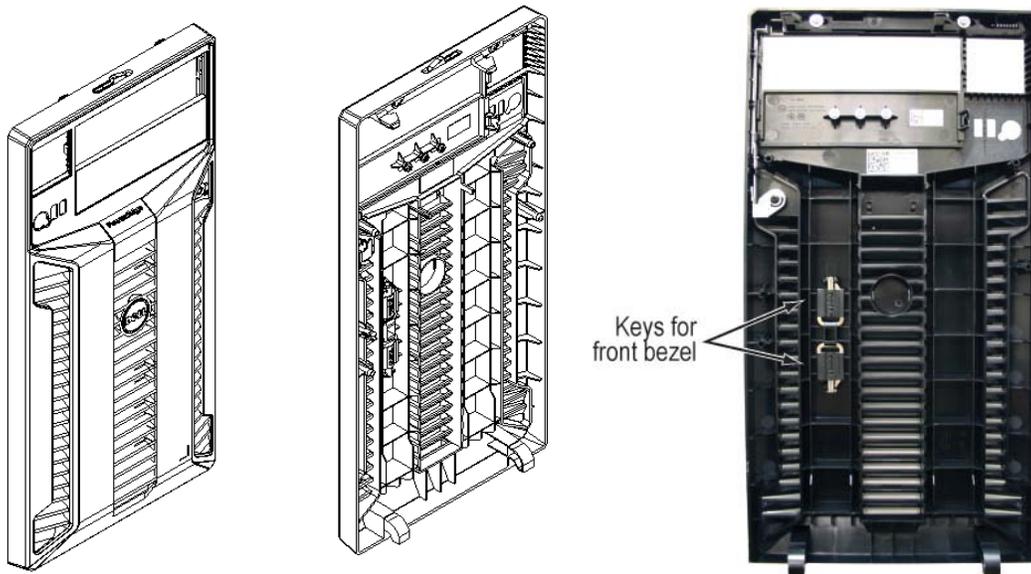


**Figure 14. Lock Port on Back of Chassis**

A lock port located on the back of the chassis provides security for the entire system.

### 4.11.2 Bezel

Keys for the PowerEdge T310 are stored on the inside of the bezel.



**Figure 15. Bezel and Key Storage**

### 4.11.3 Hard Drive Access

Hot-Plug hard drives are only accessible by opening the bezel, thus locking the bezel secures the hard drives.

Cabled hard drives are only accessible by opening the side cover.

Dell

#### 4.11.4 Trusted Platform Module (TPM)

TPM is available worldwide with the exception of China, where Trusted Computing Model (TCM) is the standard.

The PowerEdge T310 offers a TPM 1.2 compliant encryption chip solution on system board with BIOS support.

TPM 1.2 chip was validated/supported with Windows Server 2008 OS in the following usages:

- Microsoft Storage Encryption solution (“Bitlocker”) w/ full drive encryption
- Secure Boot, integrity checking of boot components

BIOS will provide the support for the configuration and enable/disable functions.

TPM is disabled by default, but can be activated using the BIOS tool.

#### 4.11.5 Power Switch Security

The LCD control panel and LED control panel are designed so the power switch cannot be accidentally turned on or off. In addition, in BIOS there is an optional setting in the CMOS setup to disable the power switch.

#### 4.11.6 Intrusion Alert

The intrusion switch snaps into the Optical Disk Drive (ODD) Cage located on the side of the chassis under the cover. The intrusion switch detects and alerts the user that the side cover is open.

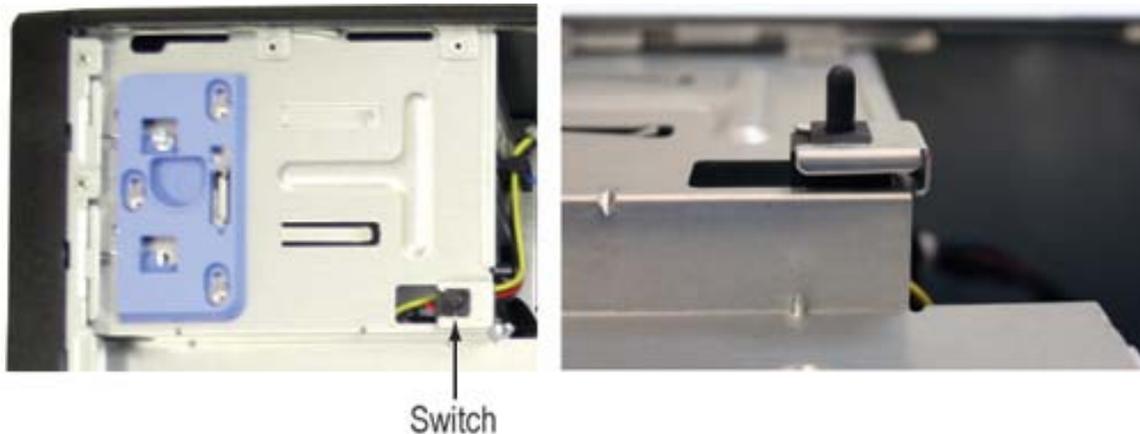


Figure 16. Intrusion Switch

#### 4.11.7 Secure Mode

BIOS can enter a secure boot mode via Setup. This mode includes the option to lock the power and NMI switches on the control panel or set up a system password. See the BIOS specification in the [Hardware Owner's Manual](#).

#### 4.12 USB Key

The PowerEdge T310 has two internal USB connectors.

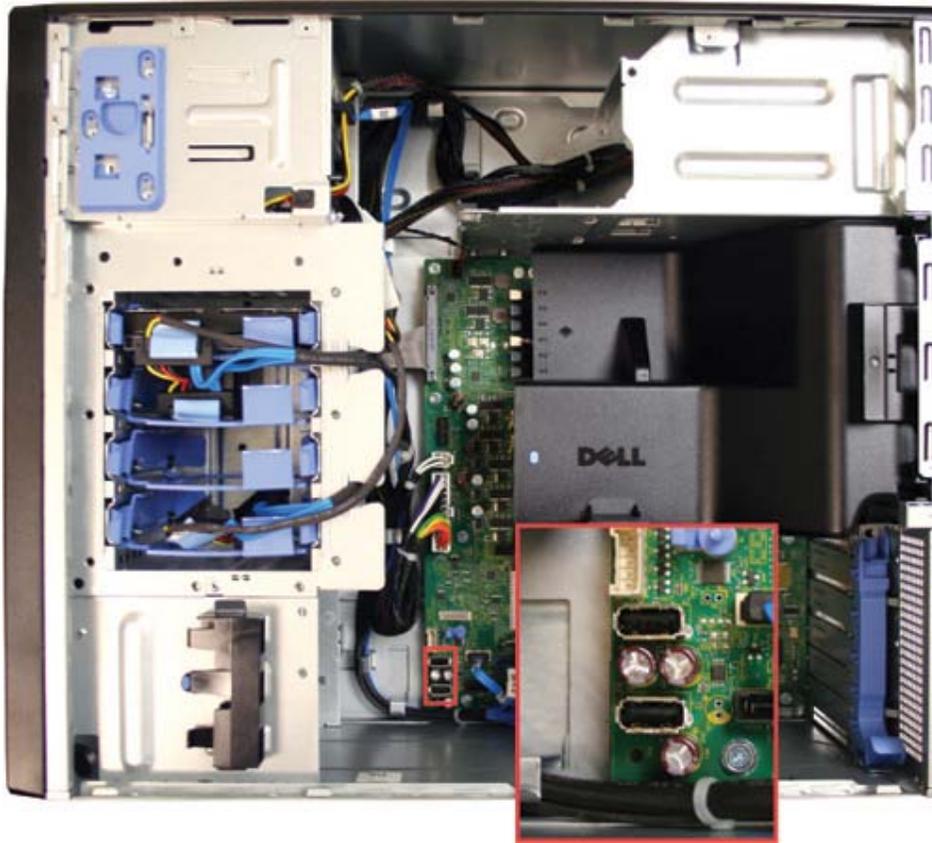


Figure 17. Internal USB Connectors

### 4.13 Battery

Battery placement on the motherboard is shown in Figure 18, and the battery holder for the PERC card is shown in Figure 19.

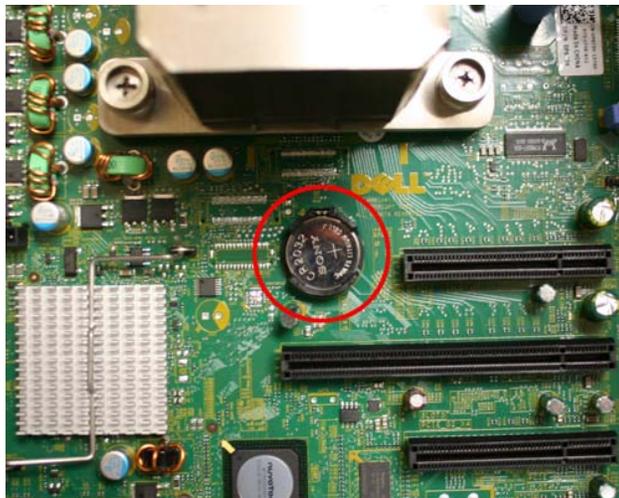
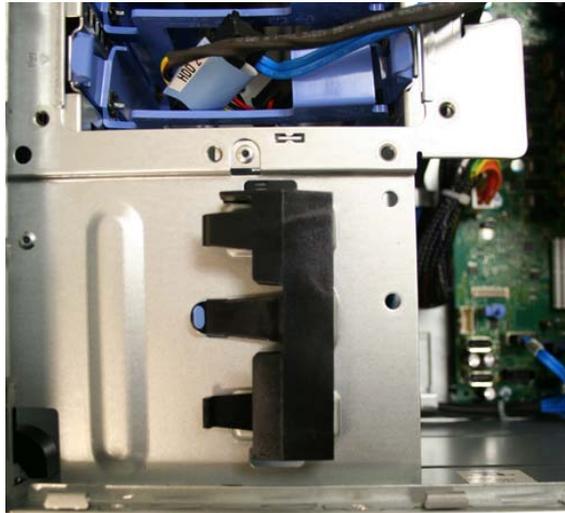


Figure 18. Motherboard Battery (CR2032)



**Figure 19. Battery Holder for PERC Card: Located Under the HDD Cage**

## **4.14 Field Replaceable Units (FRU)**

Parts available for field replacement include:

- Motherboard
- Backplane
- Power Distribution board
- Processor
- Controller Card (SAS card, PERC card)
- Power Source

## **4.15 User Accessible Jumpers, Sockets, and Connectors**

Refer to the [Hardware Owner's Manual](#) for more information.

## 5 Power, Thermal, Acoustic

### 5.1 Power Supplies

The base system includes one 375W power supply. This unit provides power to the PowerEdge T310 planar, four internal hard drive bays, and two 5.25" external drive bays. Power is "soft-switched" (allowing power cycling through a switch on the front of the system enclosure or through software control server management functions). The power system is compatible with industry standards, such as ACPI and Server 2000.

Customers can also choose the PowerEdge T310 in a chassis which offers redundant power supplies. These power supplies are each 375W and the chassis includes a power distribution board (PDB).

To supply power to the processors, standard VRD modules conform to VRD11.1 specification. This reduces the board layout complexity while offering design modularity. As processor speeds increase, a newer VRD can be used to accommodate the power increase with no need to re-spin the board. The VRD is integrated onto the planar and is not field-upgradeable.

### 5.2 Thermal

The thermal design of the PowerEdge T310 reflects the following:

- **Closed loop thermal fan speed control.** Closed loop thermal control method uses feedback temperatures to dynamically determine proper fan speeds.
- **Comprehensive thermal management.** The PowerEdge T310 controls system cooling fan speed based on several different responses from critical components' sensors, such as CPU temperature, DIMM temperature, inlet ambient temperature, and system configurations. The thermal management adjusts proper cooling ability for the system according to what the system really needs.
- **Optimized Ventilation.** T310 chassis has a custom ventilation design for optimized air flow path. Each component and peripheral is ensured sufficient air to cool.
- **Environmental Specifications.** The optimized thermal management makes the PowerEdge T310 reliable under a wide range of operating environments as shown in Table 5.

**Table 5. Environmental Specifications and Operating Requirements**

Environment		Operating Requirements	Non-Operating Requirements
Temperature Ranges (For Altitude ≤900 m or 2952.75 ft)		10 to 35 °C (50 to 95 °F)	-40 to 65 °C (-40 to 149 °F)
Temperature Ranges (For Altitude > 900 m or 2952.75 ft)		10 to xxx °C (where xxx is calculated as show in Note <sup>1</sup> ) 50 to xxx °F (where xxx is calculated as shown in Note <sup>2</sup> )	
Temperature Gradient Maximum per 60 Min.		10 °C	20 °C
Humidity Percent Ranges Noncondensing		20 to 80 %* (*Max Wet bulb temperature= 29 °C)	5 to 95 %* (*Max Wet bulb temperature= 38 °C)
Humidity Gradient Maximum per 60 Min.		10 %	10 %
Altitude Ranges	Low Limits	-50 feet (-15.2 meters)	-50 feet (-15.2 meters)
	High Limits	10,000 feet (3048 meters)	35,000 feet (10,668 meters)

Note<sup>1</sup>: Using following formulas to calculate the maximum operating temperature (in °C) for a given altitude. Use the first formula if the altitude is stated in meters and the second formula if the altitude is stated in feet.

$$35 - \frac{\text{Maximum Altitude(in meters)} - 900}{300} \text{ °C or } 35 - \frac{\text{Maximum Altitude(in ft)} - 2952.75}{984.25} \text{ °C}$$

Note<sup>2</sup>: Using following formulas to calculate the maximum operating temperature (in °F) for a given altitude. Use the first formula if the altitude is stated in meters and the second formula if the altitude is stated in feet.

$$95 - \left( \frac{(\text{Maximum Altitude(in meters)} - 900) \times 1.8}{300} \right) \text{ °F or } 95 - \left( \frac{(\text{Maximum Altitude(in ft)} - 2952.75) \times 1.8}{984.25} \right) \text{ °F}$$

## 5.3 Acoustics

The acoustical design of the PowerEdge T310 reflects the following:

- **Adherence to Dell's high sound quality standards.** Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles, hums, etc. One of the sound quality metrics in the Dell specification is prominence ratio of a tone, and this is listed in the table below.
- **Office environment acoustics.** Compare the values for LpA in the table below and note that they are lower than ambient measurements of typical office environments. (Typical office environment placement of tower servers is under a desk, not at the desktop level.)
- **Noise ramp and descent at bootup.** Fan speeds hence noise levels ramp during the boot process in order to add a layer of protection for component cooling in the case that the system were not to boot properly.
- **Noise levels vs. configurations.** As shown in the table below, the noise level may slightly differ from 41 dBA to 45 dBA when the PowerEdgeT310 is configured with different types or quantities of DIMMs, hard drives, RAID cards, and power supplies.

Acoustical specifications are shown in Table 6.

**Table 6. Acoustical Specifications**

CPU: Intel Xeon 3450 2.66 GHz Configurations @ 23 ± 2 °C				Operating Mode	L <sub>WA</sub> -UL (Bels)	L <sub>pA</sub> (dBA)	PROMINENT TONES	Remarks
DIMM	PSU	HDD	RAID Card					
4 x 1GB	1 x 375W cabled PSU	2 x 3.5" SATA (500 GB/ 7200 RPM)	None	Idle	5.5	41	None	Typical configuration
				Stressed Processor	5.5	41	None	
4 x 1GB	1 x 375W cabled PSU	4 x 3.5" SAS (450 GB/ 15600 RPM)	None	Idle	5.6	42	None	
				Stressed Processor	5.6	42	None	
4 x 1GB	1 x 375W cabled PSU	4 x 3.5" SAS (450 GB/ 15600 RPM)	PERC 6i	Idle	5.8	43	None	
				Stressed Processor	5.8	43	None	
4 x 1GB	2 x 400W Redundant PSU	2 x 3.5" SATA (500 GB/ 7200 RPM)	None	Idle	5.6	42	None	
				Stressed Processor	5.6	42	None	
4 x 4GB	2 x 400W Redundant PSU	4 x 3.5" SAS (450 GB/ 15600 RPM)	PERC 6i	Idle	6.0	45	None	Maximum configuration
				Stressed Processor	6.0	45	None	
				Standby	1.6	17	None	Not dependent upon configuration.

**Definitions**

**Standby:** AC Power is connected to Power Supply Units but system is not turned on.

**Idle:** Reference ISO7779 (1999) definition 3.1.7; system is running in its OS but no other specific activity.

**Stressed Processor:** An operating mode per ISO7779 (1999) definition 3.1.6. The software MemBW4 is activated to stress the processors.

**L<sub>WA</sub>-UL:** The upper limit sound power levels (L<sub>WA</sub>) calculated per section 4.4.1 of ISO 9296 (1988) and measured in accordance to ISO 7779 (1999).

**L<sub>pA</sub>:** A weighted sound pressure level. The system is placed in center of ISO7779 table and acoustic transducer is at front operator position, ref ISO7779 (1999) Section 8.6.1, Position P4.

**Prominent tone:** Criteria of D.5 and D.8 of ECMA-74 9th ed. (2005) are followed to determine if discrete tones are prominent. The system is placed in center of ISO7779 table and acoustic transducer is at front operator position, ref ISO7779 (1999) Section 8.6.1, Position P4.

## 5.4 Other Environmental Requirements

### 5.4.1 Maximum Vibration

Operating: 0.26 G at 5–500 Hz for 15 min

Storage: 1.54 G at 10–250 Hz for 15 min

### 5.4.2 Maximum Shock

Operating: One shock pulse in the positive z axis (one pulse on each side of the system) of 31 G for 2.6 ms in the operational orientation.

Storage: Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms.

### 5.4.3 Airborne Contaminant Level

Class: G2 or lower as defined by ISA-S71.04-1985

## 5.5 Maximum Input Amps

Under typical line conditions and over the entire system ambient operating range, the inrush current may reach 25A (redundant power supply) and 35A (non-redundant power supply) per power supply for 10 ms or less.

## 5.6 Energy Star Compliance

See the [Energy Star Compliance results](#) on Dell.com.

## 6 Processors

Processors supported on the PowerEdge T310 server are shown in Table 7.

**Table 7. Supported Processors**

Model	Speed	Power	Cache	Cores	Threads	Turbo	Memory	Process
X3470	2.93G Hz	95W	8M	4	8	T	DDR3 1333	45nm
X3460	2.80G Hz	95W	8M	4	8	T	DDR3 1333	45nm
X3450	2.67G Hz	95W	8M	4	8	T	DDR3 1333	45nm
X3440	2.53G Hz	95W	8M	4	8	T	DDR3 1333	45nm
X3430	2.40G Hz	95W	8M	4	4	T	DDR3 1333	45nm
Core i3-540	3.06G Hz	73W	4M	2	4	NA	DDR3 1333	32nm
Core i3-530	2.93G Hz	73W	4M	2	4	NA	DDR3 1333	32nm
Pentium G6950	2.80G Hz	73W	3M	2	2	NA	DDR3 1066	32nm
Celeron G1101	2.26G Hz	73W	2M	2	1	NA	DDR3 1066	32nm

For additional processor information, refer to the [Hardware Owner's Manual](#).

## 7 Memory

### 7.1 Overview

The PowerEdge T310 planar provides six 72-bit (240-pin) sockets for DIMM memory modules. These modules are DDR3-800/1066/1333 Registered/Unbuffered DDR SDRAM DIMMs. The modules are configured as 72 bits wide to provide for error-correcting code (ECC). The memory controller in the CPU performs the ECC.

The system supports a minimum of 1GB upgradeable to 32GB of RAM, using the following DIMM sizes:

- 1GB, DIMM Module
- 2GB, DIMM Module
- 4GB, DIMM Module
- 8GB, DIMM Module

### 7.2 DIMMs Supported

The following DIMMs are supported:

- Unbuffered, DDR3 1066 1GB DIMM, Single Rank
- Unbuffered, DDR3 1333 1GB DIMM, Single Rank
- Unbuffered, DDR3 1066 2GB DIMM, Dual Rank
- Unbuffered, DDR3 1333 2GB DIMM, Dual Rank
- Unbuffered, DDR3 1066 4GB DIMM, Dual Rank
- Unbuffered, DDR3 1333 4GB DIMM, Dual Rank
- Registered, DDR3 1066 1GB DIMM, Single Rank
- Registered, DDR3 1333 1GB DIMM, Single Rank
- Registered, DDR3 1066 2GB DIMM, Dual Rank
- Registered, DDR3 1333 2GB DIMM, Dual Rank
- Registered, DDR3 1066 4GB DIMM, Quad Rank
- Registered, DDR3 1066 8GB DIMM, Quad Rank

Registered, DDR3 1333 4GB DIMM, Dual Rank will be available Summer 2010.

Memory support for U-DIMMs is shown in Table 8 and support for R-DIMMS is shown in Table 9.

**Table 8. Memory Support: U-DIMM**

<b>U-DIMM DDR3 ECC</b>				
<b>System Capacity</b>	<b>DIMM Speed</b>	<b>DIMM Capacity</b>	<b># of DIMMs</b>	<b>System Speed</b>
1G	1066	1G	x1	1066
1G	1333	1G	x1	1333
2G	1066	1G	x2	1066
2G	1333	1G	x2	1333
4G	1066	2G	x2	1066
4G	1333	2G	x2	1333
4G	1066	1G	x4	1066
4G	1333	1G	x4	1333
8G	1066	2G	x4	1066
8G	1333	2G	x4	1333
8G	1066	4G	x2	1066
8G	1333	4G	x2	1333
16G	1066	4G	x4	1066
16G	1333	4G	x4	1333

**Table 9. Memory Support: R-DIMM**

<b>R-DIMM DDR3 ECC</b>				
<b>System Capacity</b>	<b>DIMM Speed</b>	<b>DIMM Capacity</b>	<b># of DIMMs</b>	<b>System Speed</b>
1G	1066	1G	x1	1066
1G	1333	1G	x1	1333
2G	1066	1G	x2	1066
2G	1333	1G	x2	1333
2G	1066	2G	x1	1066
2G	1333	2G	x1	1333
4G	1066	2G	x2	1066
4G	1333	2G	x2	1333
4G	1066	1G	x4	1066
4G	1333	1G	x4	1333
6G	1066	1G	x6	800
6G	1333	1G	x6	800
8G	1066	2G	x4	1066
8G	1066	4G	x2	1066
8G	1333	2G	x4	1333
8G	1333	4G	x2	1333
12G	1066	2G	x6	800
12G	1333	2G	x6	800
16G	1066	4G	x4	800
16G	1333	4G	x4	800
32G	1066	8G	x4	800

### 7.3 Slots/Risers

- PowerEdge T310 supports DDR3 1066/1333 UDIMM or RDIMM (Xeon only)
- 2 channels/up to 2 U-DIMM or 3 R-DIMM per channel

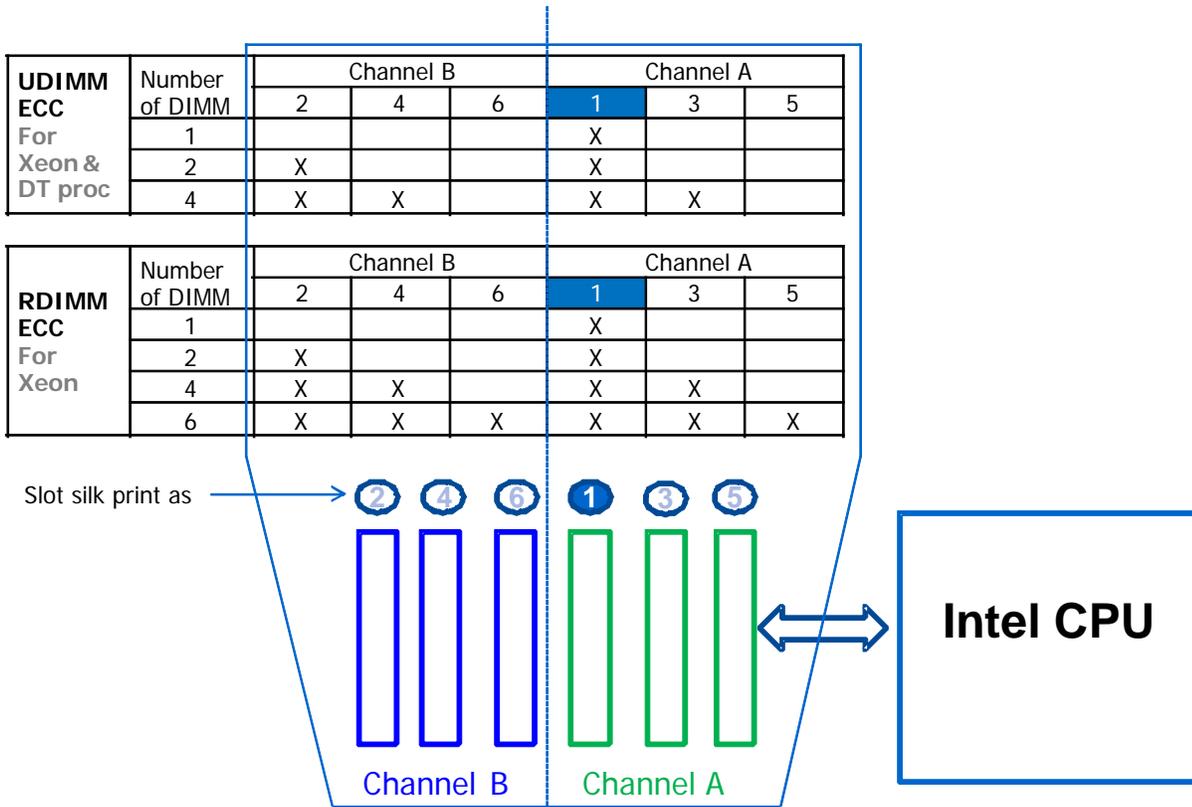


Figure 20. Slots and Risers

## 7.4 Speed

The PowerEdge T310 supports up to 4 UDIMMs (unbuffered DDR3 ECC) as shown in Table 10 and Table 11.

Table 10. 4 DIMM Information

DIMM Slots per Channel	DIMMs Populated per Channel	POR Speeds	Ranks per DIMM
2	1	1066,1333	SR, DR
2	1	1066,1033	SR, DR

Table 11. 4 DIMM MAX Memory and DRAM Technology

MAX Memory	1Gb DRAM Technology	2Gb DRAM Technology
Single Rank UDIMM	4GB (4x1GB DIMM)	8GB (4x4GB DIMMs)
Dual Rank DIMMs	8GB (4x2GB DIMM)	16 GB (4x4GB DIMMs)

### Notes

- T310 supports x8 (data width) and does not support x4 DRAM on UDIMM
- T310 does not support Quad Rank UDIMM
- All channels in a system will run at the fastest common frequency
- No mixing of registered and unbuffered DIMMs
- Non-ECC UDIMMs are not supported on T310
- Mixing ECC and non-ECC UDIMMs anywhere on the platform will prevent the system from booting and functioning correctly

T310 supports up to 6 RDIMM (Registered DDR3 ECC), Xeon only.

**Table 12. 6 RDIMM (Registered DDR3 ECC)—Xeon only**

DIMM Slots per Channel	DIMMs Populated per Channel	POR Speeds	Ranks per DIMM
3	1	1066,1333	SR, DR
3	2	1066,1333	SR, DR
3	2	800	QR*
3	3	800	SR, DR*

\*Only in 16GB and 32GB configurations.

**Table 13. 6 DIMM MAX Memory and DRAM Technology**

MAX Memory	1Gb DRAM Technology	2Gb DRAM Technology
Single Rack UDIMM	6GB (6x1GB DIMM)	12GB (6x2GB DIMMs)
Dual Rank DIMMs	12GB (6x2GB DIMM)	24GB (6x4GB DIMMs) <sup>1</sup>
Quad Rank DIMMs	16GB (4x4GB DIMM)	32GB (4x8GB DIMMs)

### Notes

- <sup>1</sup> 24GB (6x4GB DIMMs) projected availability Summer 2010
- T310 supports x8 (data width) and does not support x4 and x16 DRAM on RDIMM
- All channels in a system will run at the fastest common frequency
- No mixing of registered and unbuffered DIMMs

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## 7.5 Sparing

Not supported.

## 7.6 Mirroring

Not supported.

## 7.7 RAID

The PowerEdge T310 has no specific memory rules in supporting RAID.

## 7.8 Supported Configurations

Table 14. Supported Memory Configurations

System Capacity	System Memory Speed	DIMM TYPE	DIMM Capacity	NUM DIMM
1 GB	1066	U	1GB	1
1 GB	1333	U	1GB	1
1 GB	1066	R	1GB	1
1 GB	1333	R	1GB	1
2 GB	1066	U	1GB	2
2 GB	1333	U	1GB	2
2 GB	1066	R	1GB	2
2 GB	1333	R	1GB	2
2 GB	1066	R	2GB	1
2 GB	1333	R	2GB	1
4 GB	1066	U	1GB	4
4 GB	1333	U	1GB	4
4 GB	1066	U	2GB	2
4 GB	1333	U	2GB	2
4 GB	1066	U	4GB	1
4 GB	1333	U	4GB	1
4 GB	1066	R	1GB	4
4 GB	1333	R	1GB	4
4 GB	1066	R	2GB	2
4 GB	1333	R	2GB	2
6 GB	800	R	1GB	6
6 GB	800	R	1GB	6
8 GB	1066	U	4GB	2

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System Capacity	System Memory Speed	DIMM TYPE	DIMM Capacity	NUM DIMM
8 GB	1333	U	4GB	2
8 GB	1066	U	2GB	4
8 GB	1333	U	2GB	4
8 GB	1066	R	2GB	4
8 GB	1066	R	4GB	2
8 GB	1333	R	2GB	4
12GB	800	R	2GB	6
12GB	800	R	2GB	6
16 GB	1066	U	4GB	4
16 GB	1333	U	4GB	4
16 GB	800	R	4GB	4
32 GB	800	R	8GB	4

DT processor supports U-DIMM only.

## 8 Chipset

### 8.1 Overview

The PowerEdge T310 planar incorporates the Intel 3420 chipset and the Intel 3420 or Platform Controller Hub (PCH), a highly integrated I/O controller.

A number of high-level features are supported by the chipset on PowerEdge T310, as detailed in the following sections.

### 8.2 Direct Media Interface (DMI)

Direct Media Interface (DMI) is the chip-to-chip connection between the processor and Intel 3420 chipset. This high-speed interface integrates advanced priority-based servicing allowing for concurrent traffic and true isochronous transfer capabilities. Base functionality is completely software-transparent, permitting current and legacy software to operate normally.

### 8.3 PCI Express Interface

The Intel 3420 provides up to 8 PCI Express Root Ports, supporting the PCI Express Base Specification, Revision 2.0. Each Root Port supports 2.5 GB/s bandwidth in each direction (5 GB/s concurrent). PCI Express Root Ports 1-4 can be statically configured as four x1 Ports or grouped together to form one x4 port. Ports 5 and 6 can only be used as two x1 ports.

### 8.4 SATA Interface

The Intel 3420 has two integrated SATA host controllers that support independent DMA operation on up to six ports and supports data transfer rates of up to 3.0 Gb/s (300MB/s). The SATA controller contains two modes of operation—a legacy mode using I/O space, and an AHCI mode using memory space. Software that uses legacy mode will not have AHCI capabilities.

The Intel 3420 supports the Serial ATA Specification, Revision 1.0a. The Intel 3420 also supports several optional sections of the Serial ATA II: Extensions to Serial ATA 1.0 Specification, Revision 1.0 (AHCI support is required for some elements).

### 8.5 Advanced Host Controller Interface (AHCI)

The Intel 3420 provides hardware support for Advanced Host Controller Interface (AHCI), a new programming interface for SATA host controllers. Platforms supporting AHCI may take advantage of performance features such as no master/slave designation for SATA devices—each device is treated as a master—and hardware-assisted native command queuing. AHCI also provides usability enhancements such as Hot-Plug. AHCI requires appropriate software support (e.g., an AHCI driver) and for some features, hardware support in the SATA device or additional platform hardware.

### 8.6 Intel Rapid Storage Technology

The Intel 3420 provides support for Intel Rapid Storage Technology, providing both AHCI (see above for details on AHCI) and integrated RAID functionality. The industry-leading RAID capability provides high-performance RAID 0, 1, 5, and 10 functionality on up to 6 SATA ports of Intel 3420. Matrix RAID support is provided to allow multiple RAID levels to be combined on a single set of hard drives, such as RAID 0 and RAID 1 on two disks. Other RAID features include hot spare support, SMART alerting, and RAID 0 auto replace. Software components include an Option ROM for pre-boot configuration and boot functionality, a Microsoft Windows compatible driver, and a user interface for configuration and management of the RAID capability of Intel 3420.

## 8.7 PCI Interface

The Intel 3420 PCI interface provides a 33 MHz, Revision 2.3 implementation. The Intel 3420 integrates a PCI arbiter that supports up to four external PCI bus masters in addition to the internal Intel 3420 requests. This allows for combinations of up to four PCI down devices and PCI slots.

## 8.8 Low Pin Count (LPC) Interface

The Intel 3420 implements an LPC Interface as described in the LPC 1.1 Specification. The Low Pin Count (LPC) bridge function of the Intel 3420 resides in PCI Device 31:Function 0. In addition to the LPC bridge interface function, D31:F0 contains other functional units including DMA, interrupt controllers, timers, power management, system management, GPIO, and RTC.

## 8.9 Serial Peripheral Interface (SPI)

The Intel 3420 implements an SPI Interface as an alternative interface for the BIOS flash device. An SPI flash device can be used as a replacement for the FWH, and is required to support Gigabit Ethernet, Intel Active Management Technology and integrated Intel Quiet System Technology. The Intel 3420 supports up to two SPI flash devices with speed up to 50 MHz utilizing two chip select pins.

## 8.10 Compatibility Module (DMA Controller, Timer/Counters, Interrupt Controller)

The DMA controller incorporates the logic of two 82C37 DMA controllers, with seven independently programmable channels. Channels 0–3 are hardwired to 8-bit, count-by-byte transfers, and channels 5–7 are hardwired to 16-bit, count-by-word transfers. Any two of the seven DMA channels can be programmed to support fast Type-F transfers.

Channel 4 is reserved as a generic bus master request.

The Intel 3420 supports LPC DMA, which is similar to ISA DMA, through the Intel 3420's DMA controller. LPC DMA is handled through the use of the LDRQ# lines from peripherals and special encoding on LAD[3:0] from the host. Single, Demand, Verify, and Increment modes are supported on the LPC interface.

The timer/counter block contains three counters that are equivalent in function to those found in one 82C54 programmable interval timer. These three counters are combined to provide the system timer function, and speaker tone. The 14.31818 MHz oscillator input provides the clock source for these three counters.

The Intel 3420 provides an ISA-Compatible Programmable Interrupt Controller (PIC) that incorporates the functionality of two, 82C59 interrupt controllers. The two interrupt controllers are cascaded so that 14 external and two internal interrupts are possible. In addition, the Intel 3420 supports a serial interrupt scheme.

All of the registers in these modules can be read and restored. This is required to save and restore system state after power has been removed and restored to the platform.

## 8.11 Advanced Programmable Interrupt Controller (APIC)

In addition to the standard ISA compatible Programmable Interrupt Controller (PIC) described in the previous section, the Intel 3420 incorporates the Advanced Programmable Interrupt Controller (APIC).

## 8.12 Universal Serial Bus (USB) Controllers

The Intel 3420 contains up to two Enhanced Host Controller Interface (EHCI) host controllers that support USB high-speed signaling. High-speed USB 2.0 allows data transfers up to 480 Mb/s. The PCH also contains two Rate Matching Hubs (RMH) that support USB full-speed and low-speed signaling.

The Intel 3420 supports up to fourteen USB 2.0 ports. All fourteen ports are high-speed, full-speed, and low-speed capable.

## 8.13 Real-Time Clock (RTC)

The Intel 3420 contains a real-time clock (RTC) with 256 bytes of battery-backed RAM. The real-time clock performs two key functions: keeping track of the time of day and storing system data, even when the system is powered down. The RTC operates on a 32.768 KHz crystal and a 3 V battery.

The RTC also supports two lockable memory ranges. By setting bits in the configuration space, two 8-byte ranges can be locked to read and write accesses. This prevents unauthorized reading of passwords or other system security information. The RTC also supports a date alarm that allows for scheduling a wake-up event up to 30 days in advance, rather than just 24-hours in advance.

## 8.14 General Purpose Inputs and Outputs (GPIO)

Various general purpose inputs and outputs (GPIO) are provided for custom system design. The number of inputs and outputs varies depending on Intel 3420 configuration.

## 8.15 Enhanced Power Management

The Intel 3420's power management functions include enhanced clock control and various low-power (suspend) states (e.g., Suspend-to-RAM and Suspend-to-Disk). A hardware-based thermal management circuit permits software-independent entrance to low-power states. The Intel 3420 contains full support for the Advanced Configuration and Power Interface (ACPI) Specification, Revision 3.0a.

## 8.16 Chipset Management

In addition to Intel Active Management Technology, the Intel 3420 integrates several functions designed to manage the system and lower the total cost of ownership (TCO) of the system. These system management functions are designed to report errors, diagnose the system, and recover from system lockups without the aid of an external microcontroller.

- **TCO Timer.** The Intel 3420's integrated programmable TCO timer is used to detect system locks. The first expiration of the timer generates an SMI# that the system can use to recover from a software lock. The second expiration of the timer causes a system reset to recover from a hardware lock.
- **Processor Present Indicator.** The Intel 3420 looks for the processor to fetch the first instruction after reset. If the processor does not fetch the first instruction, the Intel 3420 will reboot the system.
- **ECC Error Reporting.** When detecting an ECC error, the host controller has the ability to send one of several messages to the Intel 3420. The host controller can instruct the Intel 3420 to generate an SMI#, NMI, SERR#, or TCO interrupt.
- **Function Disable.** The Intel 3420 provides the ability to disable the following integrated functions: LAN, USB, LPC, Intel HD Audio, SATA, PCI Express or SMBus. Once disabled, these functions no longer decode I/O, memory, or PCI configuration space. Also, no interrupts or power management events are generated from the disabled functions.

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- **Intruder Detect.** The Intel 3420 provides an input signal (INTRUDER#) that can be attached to a switch that is activated by the system case being opened. The Intel 3420 can be programmed to generate an SMI# or TCO interrupt due to an active INTRUDER# signal.

## 8.17 System Management Bus (SMBus 2.0)

The Intel 3420 contains an SMBus Host interface that allows the processor to communicate with SMBus slaves. This interface is compatible with most I2C devices. Special I2C commands are implemented.

The Intel 3420's SMBus host controller provides a mechanism for the processor to initiate communications with SMBus peripherals (slaves). Also, the Intel 3420 supports slave functionality, including the Host Notify protocol. Hence, the host controller supports eight command protocols of the SMBus interface (see System Management Bus

(SMBus) Specification, Version 2.0): Quick Command, Send Byte, Receive Byte, Write Byte/Word, Read Byte/Word, Process Call, Block Read/Write, and Host Notify.

Intel 3420's SMBus also implements hardware-based Packet Error Checking for data robustness and the Address Resolution Protocol (ARP) to dynamically provide address to all SMBus devices.

## 8.18 Intel Anti-Theft Technology

The Intel 3420 introduces a new hardware-based security technology which encrypts data stored on any SATA compliant HDD in AHCI Mode. This feature gives the end-user the ability to restrict access to HDD data by unknown parties. Intel® Anti-Theft Technology can be used alone or can be combined with software encryption applications to add protection against data theft.

Intel® Anti-Theft Technology functionality requires a correctly configured system, including an appropriate processor, Intel Management Engine firmware, and system BIOS support.

## 8.19 Intel Virtualization Technology for Directed I/O

The Intel 3420 provides hardware support for implementation of Intel® Virtualization Technology with Directed I/O (Intel VT-d). Intel VT-d Technology consists of technology components that support the virtualization of platforms based on Intel Architecture Processors. Intel VT-d Technology enables multiple operating systems and applications to run in independent partitions. A partition behaves like a virtual machine (VM) and provides isolation and protection across partitions. Each partition is allocated its own subset of host physical memory.

## 8.20 JTAG Boundary-Scan

Intel 3420 adds the industry standard JTAG interface and enables Boundary-Scan in place of the XOR chains used in previous generations of the Intel 3420. Boundary-Scan can be used to ensure device connectivity during the board manufacturing process. The JTAG interface allows system manufacturers to improve efficiency by using industry available tools to test the Intel 3420 on an assembled board. Since JTAG is a serial interface, it eliminates the need to create probe points for every pin in an XOR chain. This eases pin breakout and trace routing and simplifies the interface between the system and a bed-of-nails tester.

## 9 BIOS

### 9.1 Overview

The T310 BIOS is based on the Dell BIOS core, and supports the following features:

- 1S Support
- Simultaneous Multi-Threading (SMT) support
- CPU Turbo Mode support
- PCI 2.3 compliant
- Plug n' Play 1.0a compliant
- MP (Multiprocessor) 1.4 compliant
- Boot from hard drive, optical drive, iSCSI drive, and USB key
- ACPI support
- Direct Media Interface (DMI) support
- PXE and WOL support for on-board NICs
- SETUP access through <F2> key at end of POST
- USB 2.0 (USB boot code is 1.1 compliant)
- F1/F2 error logging in CMOS
- Virtual KVM, CD, and floppy support (up-sell for iDRAC6)
- Unified Server Configurator (USC) support
- Power management support including DBS, Power Inventory and multiple Power Profiles
- UEFI support

The T310 BIOS does **not** support the following:

- Embedded Diagnostics (embedded in iDRAC6)
- BIOS language localization
- BIOS recovery after bad flash (however, can be recovered from iDRAC6 Express)

### 9.2 Supported ACPI States

ACPI compliance: S0, S4, and S5 are supported. No S1, S2, S3 (STR) support is available.

**Table 15. ACPI Wake Up Events and States**

Wake Up Events	States Can Wake From
RTC	OS-S4
Power Button	S5
RI#	Not supported
PME#	S5
KB	Not supported
MOUSE	Not supported
USB	Not supported
WOL	OS-S4

## 9.3 Power Management

Power management features come in two flavors: **fixed** or **generic**. Fixed features use bits defined in the ACPI specification for specific capabilities. The **fixed** feature bits give the OS complete control over the power management of a device since the location of the bits is given to the OS in the FACP table. Thus, a driver can directly access bits to control a device's power management. **Generic** features have defined enable and status bits, but the functionality is not fully visible to the OS. Dell provides ASL code to handle the details of generic features, allowing the OS to intelligently communicate with system-specific hardware.

**Table 16. Power Management Features**

Feature	Type	Enable/Status/ Ctrl bit location	Description
ACPI mode switch	Fixed	PCH	The OS uses the SCI_EN bit to switch from legacy mode to ACPI mode.
Sleep states	Fixed	PCH	Supported states: S0 (Working), S4-OS ('Hibernation' in W2K), and S5 (Soft-off). S1 (also called 'standby' or 'suspend') and S3 are <b>not</b> supported.
Power Button	Fixed	PCH	In ACPI mode, OS has control of the power button. In non-ACPI mode, SMI handler owns power button events.
Real-Time Clock	Fixed	PCH	The OS is able to configure the system to wake on the RTC alarm.
Power Mgmt. Timer	Fixed	PCH	24-bit power management timer is used.
Power Mgmt. Event (PME)	Generic	PCH	Each host bus's PME# signal is routed to a separate general-purpose event pin in the chipset. When a device signals PME#, the system wakes (if necessary), the OS detects the event, and a Dell-defined ASL routine handles the event. Wake-on-LAN is one example of a PME.
USB wake	Generic	N/A	This feature is not supported on this system since the S1 state is not supported.
DBS	N/A	Processor MSRs	This feature does P state transition under Windows
C State Support	N/A	Processor and PCH registers	This feature allows multiple C state support for Processor. This feature will work under Windows and ACPI OS that understand C states.

Feature	Type	Enable/Status/ Ctrl bit location	Description
Power Profile support	N/A	Processor/IMC and PCH chipset registers.	11G Servers will be the most energy smart servers that Dell will ship. In addition to P, C, and T states, BIOS will expose the Power Profiles to the OS. Each Power profile will have a specific settings and it will fine tune processor, MCH, IOH and South Bridge

**Table 17. Current Power Profiles that 11G BIOS will Expose in BIOS Setup**

<b>Static MAX Performance</b>	<p>DBPM Disabled ( BIOS will set P-State to MAX)</p> <p>Memory frequency = MAX</p> <p>Fan algorithm = performance (UI)</p>
<b>OS /Hypervisor DBPM Control</b>	<p>Enable OS DBPM Control (BIOS will expose all possible P states to OS)</p> <p>Memory frequency = MAX</p> <p>Fan algorithm = power</p>
<b>Active Power Controller</b>	<p>Enable Dell System DBPM (BIOS will not make all P states available to OS)</p> <p>Memory frequency = MAX</p> <p>Fan algorithm = power</p>
<b>Custom</b>	<p><b>CPU Power and Performance Management:</b></p> <p>Maximum Performance   Minimum Power   OS DBPM   System DBPM</p> <p><b>Memory Power and Performance Management:</b></p> <p>Maximum Performance  1333Mhz  1067Mhz  800Mhz  Minimum Power</p> <p><b>Fan Algorithm</b></p> <p>Performance   Power</p>

## 10 I/O Slots

### 10.1 Overview

**Table 18. PCIe Slot Specification**

Slot	Slot Connector	Routing Lanes	Technology	Silkscreen
1	X8	X8	PCIe 2.0 (5GT/s)	SLOT1 PCIE_G2_x8
2	X16	X8	PCIe 2.0 (5GT/s)	SLOT2 PCIE_G2_x8
3	X8	X4	PCIe 2.0 (2.5GT/s)	SLOT3 PCIE_G2_x4
4	X1	X1	PCIe 2.0 (2.5GT/s)	SLOT4 PCIE_G2_x1
5	X1	X1	PCIe 2.0 (2.5GT/s)	SLOT5 PCIE_G2_x1

All slots are full height and half length.

**Table 19. Quantities and Priorities**

Category	Description	Bandwidth	Max Qty	Slot Priority
Internal Controllers (Only one internal controller can be installed in a T310 system.)	PERC H700	x8	1	Slot 1
	PERC H700 NV (available March 2010)	x8	1	Slot 1
	PERC 6/I Adapter	x8	1	Slot 1
	PERC H200	x8	1	Slot 1,2
	SAS 6/iR	x8	1	Slot 1,2
	PERC S300 adapter	x8	1	Slot 1,2
	SAS 5/iR (For TBU)	x4	1	Slot 3,1
External Controllers	PERC H800-512M	x8	2	Slot 1,2,3
	PERC H800-512M NV (available March 2010)	x8	2	Slot 1,2,3
	PERC 6/E 256MB	x8	2	Slot 1,2,3
	PERC 6/E 512MB	x8	2	Slot 1,2,3
	6Gbps SAS HBA (For RBOD or TBU)	x8	1	Slot 1,2,3
	SAS 5/E (For RBOD or TBU)	x8	2	Slot 1,2,3
NICs	Intel Gigabit ET Quad Port Server Adapter	x4	3	Slot 3,1,2
	Intel Gigabit ET Dual Port Server Adapter	x4	3	Slot 3,1,2
	Broadcom NetExtreme II 5709 Dual-Port Gb Ethernet TOE Server Adapter	x4	3	Slot 3,1,2
	Broadcom NetExtreme II 5709 Dual-Port Gb Ethernet TOE/iSCSI Offload Server Adapter	x4	3	Slot 3,1,2
	Intel PRO/1000 PT Server Adapter	x1	3	Slot 4, 5, 3

## Notes

- RBOD is RAID Bunch of Disks
- The cards must be installed in the order they are listed (top to bottom)
- If multiple adapter part numbers are on one line, install in order shown
- The adapter should be installed by Slot Priority in the first available slot (L to R)
- Placement of card(s) should be consistent for all orders

## 10.2 External Controller Cards

Table 20. External Controller Cards

Category	Description	Bandwidth	Max Qty	Slot Priority	Note
External Controllers	PERC H800	X8	2	Slot 1, 2,3	
	PERC H800 NV	X8	2	Slot 1,2,3	March 2010
	PERC 6/E 256MB	x8	2	Slot 1,2,3	
	PERC 6/E 512MB	x8	2	Slot 1,2,3	
	6Gbs SAS HBA	X8	2	Slot 1, 2, 3	For RBOD or TBU
	SAS 5/E	x8	2	Slot 1,2,3	For MD3000 or SAS TBU

## 10.3 PCI Card Dimensions

Table 21. PCI Card Dimensions

	Link Width	Height	Length
x1	Standard-height, half-length card	111.15 mm (4.376 inches) max	167.65 mm (6.6 inches) max
x1, x4, x8, x16	Standard-height, half-length card	111.15 mm (4.376 inches) max	312 mm (12.283 inches) max
	Low-profile cards	68.90 mm (2.731 inches) max	167.65 mm (6.6 inches) max

## 11 Storage

### 11.1 Overview

T310 supports up to 4 HDDs, using one of the following options:

- 4x 3.5" cabled SATA from motherboard SATA connector
- 4x 3.5" cabled SAS or SATA via add-on storage controller
- 4x 3.5" hot-swap SAS or SATA via add-on storage controller
- 4x 2.5" hot-swap SAS or SATA or SSD via add-on storage controller

The 2.5" HDD requires hot-swap configuration with the 3.5" hard drive carrier tray and the retention kit.

Cabled configuration or hot-swap configuration must be selected at point of purchase as this is not an upgrade option.

### 11.2 Drives

**Table 22. PowerEdge T310 Drives**

Form Factor	Capacity	Speed	Type	Notes
3.5"	160GB	7.2K	SATA	
3.5"	250GB	7.2K	SATA	
3.5"	500GB	7.2K	SATA	
3.5"	1000GB	7.2K	SATA	
3.5"	2000GB	7.2K	SATA	
3.5"	500GB	7.2K	NL SAS	
3.5"	1000GB	7.2K	NL SAS	
3.5"	146GB	15K	SAS	
3.5"	300GB	15K	SAS	
3.5"	450GB	15K	SAS	
3.5"	600GB	10K	SAS	
2.5"	146GB	10K	SAS	Hot-swap only (through Hard drive carrier)
2.5"	300GB	10K	SAS	Hot-swap only (through Hard drive carrier)
2.5"	25GB	N/A	SSD	Hot-swap only (through Hard drive carrier)
2.5"	50GB	N/A	SSD	Hot-swap only (through Hard drive carrier)

## 11.3 RAID Configurations

**Table 23. Raid Configurations**

Cabled/ Hot Swap	Config Type	Configs		Description	Min HDD	Max HDD
Cabled	NO HDD	C0A	NCZCBL	No HDD, Cabled HDD Chassis	0	0
Hot-Swap	NO HDD	C0B	NCZ	No HDD, Hot-Swap HDD Chassis (SAS 6/iR, H200, PERC 6/i or H700)	0	0
Cabled	Embedde d SATA - NO RAID	C1	MSTCBL	On-board SATA Controller – No RAID	1	4
Cabled	SATA - RAID0	C2A	MSTR0C BL	Embedded SATA SW RAID – RAID0	2	2
				(PERC S100 )		
Cabled	SATA - RAID0	C2B	MSTR0C BL	Embedded SATA SW RAID – RAID0	3	4
				(PERC S100 )		
Cabled	SATA - RAID1	C3	MSTR1C BL	Embedded SATA SW RAID – RAID1	2	2
				(PERC S100)		
Cabled	SATA - RAID5	C4	MSTR5C BL	Embedded SATA SW RAID – RAID5	3	4
				(PERC S100)		
Cabled	SATA - RAID10	C5	MSTR10 CBL	Embedded SATA SW RAID – RAID10	4	4
				(PERC S100 )		
Cabled	SAS/SAT A – RAID5	C6	ASSR5C BL	Add-in SAS/SATA RAID card, RAID 5	3	4
				(PERC S300)		
Cabled	SAS/SAT A – RAID10	C7	ASSR10 CBL	Add-in SAS/SATA RAID card, RAID 10	4	4
				(PERC S300)		
Cabled	SAS/SAT A – NO	C8	ASSCBL	Add-in SAS/SATA RAID card, No RAID	1	4

Cabled/ Hot Swap	Config Type	Configs		Description	Min HDD	Max HDD
	RAID			(SAS 6/iR or H200)		
Cabled	SAS/SAT A – RAID0	C9	ASSR0C BL	Add-in SAS/SATA RAID card, RAID 0	2	4
				(SAS 6/iR, H200, PERC 6/i, or H700)		
Cabled	SAS/SAT A – RAID1	C10	ASSR1C BL	Add-in SAS/SATA RAID card, RAID 1	2	2
				(SAS 6/iR, H200, PERC 6/i or H700)		
Cabled	SAS/SAT A – RAID5	C11	ASSR5C BL	Add-in SAS/SATA RAID card, RAID 5	3	4
				(PERC 6/i or H700)		
Cabled	SAS/SAT A – RAID6	C12	ASSR6C BL	Add-in SAS/SATA RAID card, RAID 6	4	4
				(PERC 6/i or H700)		
Cabled	SAS/SAT A – RAID10	C13	ASSR10 CBL	Add-in SAS/SATA RAID card, RAID 10	4	4
				(PERC 6/i, H200 or H700)		

**Notes**

- Must be all 3.5” HDD or 2.5” HDD.
- Must be all SAS or all SATA or all SSD. No Mixed HDD allowed.
- SSD support requires PERC 6/i, H200, or H700.
- PERC S100 and PERC S300 do not support Linux OS or VMWare, or the Virtualization solutions shown in Table 24.

**Table 24. OS Editions Not Supported by PERC S100 and S300**

OS	Edition
Microsoft Hyper-V server 2008	X64 (download from web)
Windows Server 2008	x64 (hyper-V role enabled)
Windows Server 2008 SP2	X64 (hyper-V role enabled)
Windows Server 2008 R2 (Win7 includes SP2 bits)	X64 (hyper-V role enabled)

### **11.3.1 Back-Up Drives (Tape)**

Tape drives are optional and connect to the planar via SATA/SCSI controller card/SAS controller card. IDE tape drive is no longer supported. The following tape drives are available for usage on the PowerEdge T710:

- Internal SATA, SCSI, and SAS drives
- External SCSI and SAS drives

If the tape drive is not ordered with the system, a blank is installed in its place.

The PowerEdge T310 supports a number of internal tape backup options, plus the RD1000 disk backup unit. Only half-height backup options are supported.

## 12 Video

Matrox G200eW w/ 8MB memory integrated in Nuvoton® WPCM450 (BMC controller) is included with the PowerEdge T310. Features include:

- 1280x1024@85Hz for KVM and 1600x1200@60Hz for video out
- 640x480 (60/72/75/85 Hz; 8/16/32-bit color)
- 800x600 (60/72/75/85 Hz; 8/16/32-bit color)
- 1024x768 (60/72/75/85 Hz; 8/16/32-bit color)
- 1152x864 (75 Hz; 8/16/32-bit color)
- 1280x1024 (60/75/85 Hz; 8/16-bit color)
- 1280x1024 (60 Hz, 32-bit color) (note 32-bit color is only supported at 60 Hz for this resolution)

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## 13 Rack Information

Dell does not provide a rack for the T310. However, there are 3<sup>rd</sup> party trays available.

## 14 Operating Systems

**Table 25. Microsoft OS Support**

Operating Systems	x86 or x64	Installation	Factory Install	Logo/Cert
<b>Windows® Small Business Server 2008</b>	x64	Standard	FI	N/A
		Premium	FI or DIB	
<b>Windows® Essential Business Server 2008</b>	x64	Standard, x64	DIB	N/A
		Premium (4 <sup>th</sup> Server) x86 or x64		
<b>Windows® Hyper-V™ Server 2008</b>	x64	Standard	Download from Web	N/A
<b>Windows Server® 2003 R2</b>	x86	Standard	FI (SP2 only)	WHQL
		Enterprise		
	x64	Standard	FI (SP2 only)	WHQL
		Enterprise		
<b>Windows Server® 2008</b>	x86	Standard	FI	WHQL
		Enterprise		
	x64 (with Hyper-V™ role enabled)	Standard	FI	WHQL
		Enterprise		
<b>Windows Server® 2008 SP2</b>	X86	Standard	FI	WHQL
		Enterprise		
	X64 (with Hyper-V™ role enabled)	Standard	FI	
		Enterprise		
<b>Windows Server® 2008 R2 (Win7 includes SP2 bits)</b>	X64 (with Hyper-V™ role enabled)	Standard	FI	WHQL
		Enterprise		

**Table 26. Linux OS Support**

<b>Operating Systems</b>	<b>Installation</b>	<b>Factory Install</b>	<b>Logo/ Certification</b>
<b>Red Hat® Enterprise Linux® 4.8</b>	ES APx86-64	DIB, NFI	Yes
	ES APx86	DIB, NFI	Yes
<b>Red Hat® Enterprise Linux® 5.3</b>	x86-64	FI	Yes
	x86	DIB, NFI	Yes
<b>SLES11</b>	X86-64	FI	Yes
<b>SLES10 SP3</b>	x86-64	DIB, NFI	Yes

## 15 Virtualization

**Table 27. Supported Virtualization OS**

<b>PowerEdge T310</b>	
VMWare ESX 4.0.1	Supported; offered by drop-in-the-box (DIB); no factory install
VMWare ESXi 4.0.1	Supported; not offered through Dell (No FI nor DIB)
VMWare ESX 3.5.1	Supported; not offered through Dell (No FI nor DIB)
VMWare ESXi 3.5.1	Supported; not offered through Dell (No FI nor DIB)
Microsoft Windows Server 2008 R2 w/ Hyper-V enabled	Supported (customer enablement only)

The PowerEdge T310 does not support Hypervisor.

## 16 Systems Management

### 16.1 Overview

Dell delivers open, flexible, and integrated solutions that help you reduce the complexity of managing disparate IT assets by building comprehensive IT management solutions. Combining Dell PowerEdge Servers with a wide selection of Dell-developed management solutions gives you choice and flexibility, so you can simplify and save in environments of any size. To help you meet your server performance demands, Dell offers Dell OpenManage™ systems management solutions for:

- Deployment of one or many servers from a single management console
- Monitoring of server and storage health and maintenance
- System update, configuration change, and maintenance

Dell offers IT management solutions for organizations of all sizes—right priced, sized, and supported.

### 16.2 Server Management

A Dell Systems Management and Documentation DVD and a Dell Management Console DVD are included with the product. Content includes:

- **Dell Systems Build and Update Utility:** Dell Systems Build and Update Utility assists in OS install and pre-OS hardware configuration and updates.
- **OpenManage Server Administrator:** The OpenManage Server Administrator (OMSA) tool provides a comprehensive, one-to-one systems management solution, designed for system administrators to manage systems locally and remotely on a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
- **Management Console:** Our legacy IT Assistant console is also included, as well as tools to allow access to our remote management products. These tools are Remote Access Service for iDRAC and the BMC Management Utility.
- **Active Directory Snap-in Utility:** The Active Directory Snap-in Utility provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD.
- **Dell Systems Service Diagnostics Tools:** Dell Systems Service and Diagnostics tools deliver the latest Dell optimized drivers, utilities, and operating system-based diagnostics that you can use to update your system.
- **eDocs:** This section includes PDF files for PowerEdge systems, storage peripheral, and OpenManage software.
- **Dell Management Console DVD:** The Dell Management Console is a Web-based systems management software that enables you to discover and inventory devices on your network. It also provides advanced functions, such as health and performance monitoring of networked devices and patch management capabilities for Dell systems.
- **Server Update Utility:** In addition to the Systems Management Tools and Documentation and Dell Management Console DVDs, customers have the option to obtain Server Update Utility DVD. This DVD has an inventory tool for managing updates to firmware, BIOS, and drivers for either Linux or Windows operating systems.

## 16.3 Embedded Server Management

The PowerEdge T310 implements circuitry for the next generation of Embedded Server Management. It is Intelligent Platform Management Interface (IPMI) v2.0 compliant. The optional iDRAC (Integrated Dell Remote Access Controller) is responsible for acting as an interface between the host system and its management software and the periphery devices. These periphery devices consist of the PSUs, the storage backplane, integrated SAS HBA or PERC 6/I, and control panel with display.

The optional upgrade to iDRAC6 provides features for managing the server remotely or in data center lights-out environments.

Advanced iDRAC features require the installation of the optional iDRAC6 Enterprise card.

## 16.4 Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of four key components:

- Dell Lifecycle Controller
- Dell Unified Server Configurator
- iDRAC6 (Integrated Dell Remote Access Controller)
- vFlash (virtual flash media)

Lifecycle controller powers the embedded management features. It is integrated and tamperproof storage for system-management tools and enablement utilities (firmware, drivers, etc.).

Dell Unified Server Configurator (USC) is a local 1:1 graphical user interface embedded on Lifecycle Controller that aids in local server provisioning in a pre-OS environment. For servers with iDRAC Express, the Lifecycle Controller offers OS install, platform updates, platform configuration, and diagnostics capabilities. For servers without iDRAC6 Express, this utility has limited functionality and offers OS install and diagnostics capabilities only.

To access the Unified Server Configurator, press the <F10> key within 10 seconds of the Dell logo's appearance during the system boot process. Current functionality enabled by the Unified Server Configurator is detailed in the following table.

**Table 28. Unified Server Configurator Features and Description**

Feature	Description
Faster O/S Installation	Drivers and the installation utility are embedded on system, so no need to scour DELL.COM.
Faster System Updates	Integration with Dell support automatically directed to latest versions of the Unified Server Configurator, iDRAC, RAID, BIOS, NIC, and Power Supply.
Update Rollback	Ability to recover to previous known good state for all updatable components.
More Comprehensive Diagnostics	Diagnostic utilities are embedded on system.
Simplified Hardware Configuration	Detects RAID controller and allows user to configure virtual disk and choose virtual disk as boot device, eliminating the need to launch a separate utility. Also provides configuration for iDRAC, BIOS, and NIC/LOM.

## 16.5 iDRAC6 Express

The optional iDRAC6 Express is the first tier of iDRAC6 upgrades. In addition to upgrading the system with a Lifecycle Controller, the iDRAC6 Express offers the following key features:

- Graphical web interface
- Standard-based interfaces
- Server Sensor monitoring and fault alerting
- Secure operation of remote access functions including authentication, authorization, and encryption
- Power control and management with the ability to limit server power consumption and remotely control server power states
- Advanced troubleshooting capabilities

For more information on iDRAC6 Express features see table below.

## 16.6 iDRAC6 Enterprise

The optional iDRAC6 Enterprise card provides access to advanced iDRAC6 features. The iDRAC6 Enterprise connects directly to the T310 planar and is mounted parallel to the planar with stand-offs.

Key features for the iDRAC6 Enterprise include:

- Scripting capability with Dell's Racadm command-line
- Remote video, keyboard, and mouse control with Virtual Console
- Remote media access with Virtual Media
- Dedicated network interface

Additionally, the iDRAC6 Enterprise can be upgraded by adding the vFlash Media card. This is a 1 GB Dell branded SD card that enables a persistent 256 or 512 MB virtual flash partition. A more detailed feature list for iDRAC6 Enterprise and vFlash is included in the following table.

**Table 29. Features List for BMC, iDRAC6, and vFlash**

Feature	BMC	iDRAC6 Express	iDRAC6 Enterprise	vFlash Media
<b>Interface and Standards Support</b>				
IPMI 2.0	✓	✓	✓	✓
Web-based GUI		✓	✓	✓
SNMP		✓	✓	✓
WSMAN		✓	✓	✓
SMASH-CLP		✓	✓	✓
Racadm command-line			✓	✓
<b>Conductivity</b>				
Shared/Failover Network Modes	✓	✓	✓	✓
IPv4	✓	✓	✓	✓
VLAN Tagging	✓	✓	✓	✓
IPv6		✓	✓	✓

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Feature	BMC	iDRAC6 Express	iDRAC6 Enterprise	vFlash Media
Dynamic DNS	✓	✓	✓	✓
Dedicated NIC			✓	✓
<b>Security and Authentication</b>				
Role-based Authority	✓	✓	✓	✓
Local Users	✓	✓	✓	✓
Active Directory		✓	✓	✓
SSL Encryption		✓	✓	✓
<b>Remote Management and Remediation</b>				
Remote Firmware Update	✓	✓	✓	✓
Server power control	✓	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓	✓
Serial-over-LAN (no proxy)		✓	✓	✓
Power capping		✓	✓	✓
Last crash screen capture		✓	✓	✓
Boot capture		✓	✓	✓
Serial-over-LAN		✓	✓	✓
Virtual media			✓	✓
Virtual console			✓	✓
Virtual console sharing			✓	✓
Virtual flash				✓
<b>Monitoring</b>				
Sensor Monitoring and Alerting	✓	✓	✓	✓
Real-time Power Monitoring*	✓	✓	✓	✓
Real-time Power Graphing*	✓	✓	✓	✓
Historical Power Counters*	✓	✓	✓	✓
<b>Logging Features</b>				
System Event Log	✓	✓	✓	✓
RAC Log		✓	✓	✓
Trace Log			✓	✓

\* BMC availability through OpenManage

## 17 Peripherals

### 17.1 USB Peripherals

Optional USB 1.44MB floppy drive

Optional USB DVD-ROM

Optional internal USB

### 17.2 External Storage

The following external storage options are available:

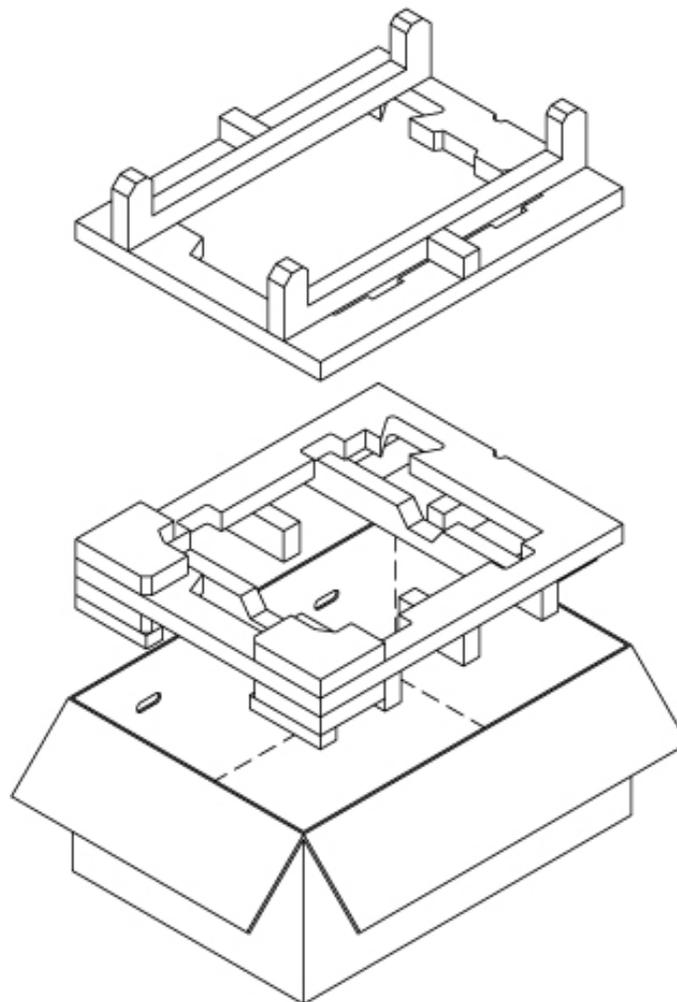
- PV NAX
  - PV NX1950
- PV DAS
  - MD1000 JBOD
  - MD3000 RBOD
  - MD1120 JBOD
- PV SAN
  - MD3000i iSCSI RAID array

## 18 Packaging Options

PowerEdge T310 is single pack only.

**Table 30. Dimensions and Weight**

INSIDE DIMENSIONS	OUTSIDE DIMENSIONS	WEIGHT
<b>Length:</b> 74.6cm (29.38") <b>Width:</b> 60.3cm (23.75") <b>Depth:</b> 42.2cm (16.63")	<b>Length:</b> 76.2cm (30.0") <b>Width:</b> 61.9cm (24.38") <b>Depth:</b> 45.4cm (17.88")	<b>System packed out weight:</b> <b>PowerEdge T310:</b> 23.5kg (51.8lbs) <b>Cushion:</b> 0.82kg (1.8lbs) <b>Corrugated Box:</b> 4.26kg (9.4lbs) <b>Total Weight:</b> 28.58kg (63.0 lbs)



**Figure 21. Packaging Diagram**

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## Appendix A. Regulatory Certifications

The PowerEdge T310 meets the requirements outlined in the EMC, Product Safety and Environmental parts of Dell Compliance Design Standard (Dell P/N: ENG0002520).

**Regulatory Model: E09S**

**Regulatory Type: E09S001**

### **ENVIRONMENTAL**

Product Safety, EMC and Environmental Datasheet are available at:

[http://www.dell.com/content/topics/global.aspx/about\\_dell/values/regulatory\\_compliance/dec\\_conform?c=us&l=en&s=corp](http://www.dell.com/content/topics/global.aspx/about_dell/values/regulatory_compliance/dec_conform?c=us&l=en&s=corp)

## Appendix B. PowerEdge T310 Volatility Tables

The tables that follow provide detailed information regarding PowerEdge T310 volatility.

**Table 31. PowerEdge T310 Volatility**

Planar	Non-Volatile	Volatile RAM	Reference Designator	Qty	Size	Type
System BIOS SPI Flash	Y		U15	1	4MB	Flash EEPROM (SPI interface)
LOM Configuration Data	Y		U21	1	512KB	FLASH (NOR)
iDRAC6 Controller ROM	Y		U_IBMC	1	4KB	ROM
iDRAC6 Controller RAM		Y	U_IBMC	1	8KB	RAM
System CPLD	Y		U_CPLD	1	1200 Macro cells	Internal Flash EEPROM
System CPLD		Y	U_CPLD	1	1KB	RAM
iDRAC6 Express Internal Flash	Y		U_EMMC	1	1GB	NAND FLASH
System RAM		Y	DIMM1, DIMM2, DIMM3, DIMM4, DIMM5, DIMM6	6	up to 6 DIMMs *8GB	RAM
TPM ID EEPROM (Plug-in module only)	Y		U_SEEPROM	1	256B	EEPROM
TPM Binding EEPROM (on China planar only)	Y		U1H1	1	256B	EEPROM
iDRAC6 SDRAM		Y	U_IBMC_MEM	1	128MB	DDR2 RAM
iDRAC6 FRU	Y		U_IBMC_FRU	1	4KB	EEPROM
iDRAC6 Boot Block Flash	Y		U_IBMC_SPI	1	2MB	FLASH (NOR)

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	Non-Volatile	Volatile RAM	Reference Designator	Qty	Size	Type
Trusted Platform Module	Y	N	U_TPM	1	128 bytes	EEPROM
<b>Chipset</b>						
CMOS	Y		U_IBX	1	256B	Battery-backed RAM
<b>2.5" Backplane or 3.5" Backplane</b>						
Storage Controller Processor	Y		U_SEP	1	32KB	Embedded Microcontroller Flash
<b>Control Panel</b>						
Internal USB	Y		J_USBKEY (connector)	1	User selectable	License key hard set ROM or user choice
Internal SD Module	Y		J_SDCARD (Connector)	1	User selectable - 1GB shipped	Secure Digital NAND Flash
<b>Power Supply</b>						
PSU Microcontroller	Y		Varies by part number	Up to 2	Maximum supported = 2MB per PSU	Embedded microcontroller flash
<b>iDRAC6 Enterprise</b>						
vFlash	Y		J_SD (connector)	1	1GB	Secure Digital NAND Flash

**Table 32. Volatility: Data Writing and Purpose**

	<b>Can user programs or operating system write data to it during normal operation?</b>	<b>Purpose?</b>
<b>Planar</b>		
System BIOS SPI Flash	No	Boot Code, System Configuration Information, EEFI environment
LOM Configuration Data	No	LAN on Motherboard configuration and firmware
iDRAC6 Controller ROM	No	Not used
iDRAC6 controller RAM	No	iDRAC internal RAM
System CPLD	No	System specific Hardware Logic
System CPLD	No	Not used
iDRAC6 Express Internal Flash	No for iDRAC Operating System. Yes for Managed System Services Repository	iDRAC Operating System plus Managed System Services Repository (i.e., Unified Server Configurator, OS drivers, diagnostics, rollback versions of various programmables)
System RAM	Yes	System OS RAM
TPM ID EEPROM (Plug in module only)	No	BIOS Identification of TPM module
TPM Binding EEPROM (China only)	No	BIOS binding of plug-in module to a particular planar.
iDRAC6 SDRAM	No	BMC OS + VGA frame buffer
iDRAC6 FRU	No	Motherboard electronic product identifier
iDRAC6 Boot Block Flash	No	iDRAC boot loader and configuration (i.e., MAC address) Lifecycle log and system event log.
Trusted Platform Module	Yes	Storage of encryption keys
<b>Chipset</b>		
CMOS	No	BIOS settings

Can user programs or operating system write data to it during normal operation?		Purpose?
<b>2.5" Backplane or 3.5" Backplane</b>		
Storage Controller Processor	No	Backplane firmware (HDD status, etc.)
<b>Control Panel</b>		
Internal USB	Yes as allowed by OS	Normal usage is read only software license key, but not limited
Internal SD Module	Yes as allowed by OS	Normal usage is embedded hypervisor OS but not limited.
<b>Power Supply</b>		
PSU Microcontroller	No	Power supply operation, power telemetry data, and fault behaviors
<b>iDRAC6 Enterprise</b>		
vFlash	Yes when enabled, installed, and the media does not have the write-protect switch applied	Storage of logs, user images like files, drivers, OS's, etc.

**Table 33. Methodology for Data Input to Memory**

How is data input to this memory?	
<b>Planar</b>	
System BIOS SPI Flash	Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable containing the firmware file and the loader. A system loaded with arbitrary data in firmware memory will not operate.
LOM Configuration Data	Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable containing the firmware file and the loader. LOMs loaded with arbitrary data in firmware memory would not operate.
iDRAC6 Controller ROM	N/A
iDRAC6 controller RAM	iDRAC embedded system
System CPLD	Loading flash memory requires a vendor provided firmware file and loader program which is executed by booting up the system from a floppy or OS based executable (currently only DRMK utility support) containing the firmware file and the loader. System loaded with arbitrary data in CPLD memory would not operate.
System CPLD	Not used

How is data input to this memory?	
iDRAC6 Express Internal Flash	iDRAC OS: Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable containing the firmware file and the loader. System loaded without a good iDRAC firmware image yields a non-functional iDRAC. Managed Services Repository: Various partitions are loaded via vendor provided firmware file and loader program just like iDRAC OS.
System RAM	System OS
TPM ID EEPROM (Plug in module only)	Factory load only.
TPM Binding EEPROM (on China planar only)	BIOS only
iDRAC6 SDRAM	Embedded iDRAC OS for 108MB and 8MB for VGA frame buffer
iDRAC6 FRU	Factory and iDRAC embedded OS
iDRAC6 Boot Block Flash	Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable or out-of-band firmware updates across the management network. Bad contents yield the iDRAC inoperable and are unrecoverable in the customer environment. Note the lifecycle log is automatically updated by the iDRAC as various system components FW, HW and SW versions are changed.
Trusted Platform Module	Using TPM Enabled operating systems
Chipset	
CMOS	BIOS control only via input such as BIOS F2 menu user configuration settings (such as boot order)
2.5" Backplane or 3.5" Backplane	
Storage Controller Processor	Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable (DRMK, USC, OS DUPs utility support) containing the firmware file and the loader. Backplane loaded with bad firmware will not provide backplane and HDD status.
Control Panel	
Internal USB	Either read-only license key or OS-controlled copies
Internal SD Module	Factory load, OS run time usage and OS updates and configuration changes.

How is data input to this memory?	
<b>Power Supply</b>	
PSU Microcontroller	Loading flash memory requires a vendor-provided firmware file and loader program which is executed by booting up the system from a floppy or OS-based executable (Unified Server Configurator) containing the firmware file and the loader. PSUs loaded with bad firmware will not provide PSU functional behavior and result in PSU system faults.
<b>iDRAC6 Enterprise</b>	
vFlash	Preloaded media before installation, or remote out-of-band upload of user data (i.e., ISO images, files) or local server read/write capability to use like a hard disk.

**Table 34. Methodology for Memory Protection and Clearing**

	How is this memory write protected?	How is the memory cleared?
<b>Planar</b>		
System BIOS SPI Flash	Software write protected	Not possible with any utilities or applications and system is not functional if corrupted/removed.
LOM Configuration Data	Not explicitly protected but special applications are needed to communicate through the LOMs to reprogram this ROM	Not user clearable
iDRAC6 Controller ROM	Protected permanently by hardware	Not clearable
iDRAC6 controller RAM	n/a	iDRAC reset
System CPLD	Requires special system specific utility	Not possible with any utilities or applications and system is not functional if corrupted/removed.
System CPLD	Not accessible	Not clearable
iDRAC6 Express Internal Flash	Writes are proxied through a temporary iDRAC scratchpad RAM and not directly made from an OS or OS application.	Not user clearable
System RAM	OS control	Reboot or power down system
TPM ID EEPROM (Plug in module only)	HW read only	Not - read only

	How is this memory write protected?	How is the memory cleared?
TPM Binding EEPROM (on China planar only)	Locked by BIOS from physical access by anyone after boot	N/A - BIOS control only
iDRAC6 SDRAM	n/a	AC cycle for BMC OS and reset / power off server for VGA frame buffer
iDRAC6 FRU	writes controlled by iDRAC embedded OS	EPPID is not clearable
iDRAC6 Boot Block Flash	iDRAC embedded OS control of the write protection.	Not possible with any utilities or applications and iDRAC does not function as expected if corrupted/removed; Lifecycle log is clearable only in a factory environment; SEL is user clearable
Trusted Platform Module	SW write protected	F2 Setup option
	How is this memory write protected?	How is the memory cleared?
Chipset		
CMOS	N/A - BIOS only control	Planar NVRAM_CLR jumper or battery removal and replacement. F2 system setup option to restore defaults
<b>2.5" Backplane or 3.5" Backplane</b>		
Storage Controller Processor	Embedded firmware only writeable through controlled iDRAC methods	Not possible with any utilities or applications and backplane does not function as expected if corrupted/removed
<b>Control Panel</b>		
Internal USB	OS control	OS control format
Internal SD Module	Only by SD card Write protect switch.	OS control format
<b>Power Supply</b>		
PSU Microcontroller	Protected by the embedded microcontroller. Special keys are used by special vendor-provided utilities to unlock the ROM with various CRC checks during load.	N/A - not in system clearable
<b>iDRAC6 Enterprise</b>		
vFlash	Media write protection switch or OS control	iDRAC-based format, local OS format, deleted, or card removed and formatted on a client