PowerEdge T110 II

Technical Guide

Ideal for collaboration, file sharing, and data protection, the T110 II is an ideal first server for small businesses.

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1 Product Comparison

1.1 Overview

The Dell™ PowerEdge™ T110 II is a powerful and reliable server in a tower form factor that is designed to deliver the right combination of performance, data protection and value. It is an ideal first server for small businesses considering or implementing desktop consolidation, file sharing, printer sharing or wishing to reduce software licensing charges. The T110 II delivers continuity and confidence, allowing you to focus on running your business instead of running your computers.

1.2 Business Value

The PowerEdge T110 II is designed to meet the needs of your small business environment, both now and as it grows into the future. It has sizeable performance headroom and its data-storage capability can be expanded by adding more hard drives or higher-capacity hard drives. Your data can be secured using RAID options for added data protection. The T110 II also provides straightforward systems management for easy deployment, monitoring and ongoing administration.

1.3 Easy Access

Run applications, share information or access your data from any workstation in the office and let employees work collaboratively by moving to a server-based network.

Adding a server to your business gives you the ability to connect with collaboration suites to meet and share documents or desktops over the Internet, deliver instant messages, make calls over the Internet and share desktops during conference calls—all without adding an IT staff.

The PowerEdge T110 II is ideally suited to give your business the flexibility and access you and your employees need to get more done.

1.4 Secure Technology

Keep data secure and control file access with built-in encryption, security and data protection options. When coupled with the latest version of Microsoft® Windows® Small Business Server 2011 (SBS 2011), the PowerEdge T110 II delivers an integrated solution that can further protect your data by providing automatic backup and restore functionality, as well as email, remote access and collaboration to help take your business to the next level.

With the PowerEdge T110 II, you can:

- Avoid costly business interruptions and potentially catastrophic security breaches with hardware-enabled advanced security and encryption features.
- Configure your system with an optional RAID controller to make copies of data automatically, preventing downtime in the event of a hard drive failure.
- Protect your files with the Microsoft® Windows Small Business Server 2011 standard backup features that let you restore files and recover data, including automatic backups on PowerEdge servers.

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1.5 Business Friendly

Easy to install, tailorable to your specific requirements and offering room for growth, the PowerEdge T110 II is the ideal server for small businesses and for remote offices of larger organizations.

- Get the processing power your business demands with options from the Intel® Xeon® processor E3-1200 product family or the Intel Core™ i3-2100 product family.
- Choose processor options and memory configurations that are balanced to run typical business applications, including Microsoft Windows Small Business Server, SQL Server® Workgroup/Standard, Active Directory®, SharePoint® Server and file and print.
- Meet the needs of noise-sensitive environments, thanks to a design that gives you business-class performance with similar sound levels as a standard desktop computer.

1.6 Comparison

Table 1.   Comparison of PowerEdge T110 II to T110 and T310

Feature	T110 (Predecessor)	T110 II	T310
Processor	Quad-core Intel® Xeon® processor 3400 series Dual-core Intel Celeron® G1101 Dual-core Intel Pentium® G6950 Dual-core Intel Core™ i3 530 processors Dual-core Intel Core i3 540 processors Dual-core Intel Core i3 550 processors	Intel® Xeon® processor E3-1200 product family Intel Core™ i3-2100 product family Intel Pentium® processors (when available)	Quad-core Intel® Xeon® processor 3400 series Dual-core Intel Celeron® G1101 Dual-core Intel Pentium® G6950 Dual-core Intel Core™ i3 530 processors Dual-core Intel Core i3 540 processors Dual-core Intel Core i3 550 processors
Front Side Bus	DMI	DMI II	DMI
Sockets	1	1	1
Cores	2 or 4	2 or 4	2 or 4
L2/L3 Cache	4MB or 8MB	3MB or 8MB	4MB or 8MB
Chipset	Intel 3420	Intel C202	Intel 3420
DIMMs	4 DDR3 Unbuffered with ECC 1333/1066MHz	4 DDR3 Unbuffered with ECC 1333/1066MHz	6 DDR3 Unbuffered with ECC 1333/1066MHz
Min/Max RAM	1GB/16GB	1GB/32GB	1GB/32GB
Hard Drive Bays	4 x 3.5"	4 x 3.5" or 6 x 2.5" (available Q2 2011)	4 x 3.5" Optional hot-plug Support 2.5" hard drives with hot-plug tray
Hard Drive Types	Default SATA Optional SAS with add-in controller	Default SATA Optional SAS with add-in controller	Default SATA Optional SAS and SSD with add-in controller
External Drive Bays	2 x 5.25"	2 x 5.25"	2 x 5.25"

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Feature	T110 (Predecessor)	T110 II	T310
Embedded Hard Drive Controller	Chipset-based SATA PERC S100 (Embedded SW RAID)	Chipset-based SATA PERC S100 (Embedded SW RAID)	Chipset-based SATA PERC S100 (Embedded SW RAID)
Optional Storage Controller	**Non-RAID:** SAS 5/E LSI 2032 (for tape backup unit only) **RAID:** SAS 6/iR Adapter PERC S300 PERC H200	**Non-RAID:** 6GB SAS HBA **RAID:** PERC S300 PERC H200	**Non-RAID:** SAS 5/E LSI 2032 (for tape backup unit only) **RAID:** SAS 6/iR PERC S300 PERC H200 PERC 6/i PERC 6/E
Availability	ECC memory, add-in RAID, TPM/CTPM	ECC memory, add-in RAID, TPM/CTPM	Hot-plug hard drives Redundant power Quad-pack LED or LCD diagnostic with hot-plug hard drive chassis
Server Management	Baseboard Management Controller (BMC), IPMI 2.0 compliant	Baseboard Management Controller (BMC), IPMI 2.0 compliant	Baseboard Management Controller (BMC), IPMI 2.0 compliant, Full Dell OpenManage™ suite Optional: iDRAC6 Express, iDRAC6 Enterprise, vFlash media
I/O Slots	1 PCIe x16 (x8 routing) (under 25W only) 1 PCIe x8 (x8 routing) 1 PCIe x8 (x4 routing) 1 PCIe x1 (x1 routing)	1 PCIe x16 (x8 routing) (under 25W only) 1 PCIe x8 1 PCIe x8 (x4 routing) 1 PCIe x1	1 PCIe x16 (x8 routing) 1 PCIe x8 (x8 routing) 1 PCIe x8 (x4 routing) 2 PCIe x1 (x1 routing)
NIC/LOM	1 x GbE LOM Optional: various NICs available	1 x GbE LOM Optional: various NICs available	2 x GbE LOM Optional: various NICs available
USB	2 front, 4 back, 2 internal	2 front, 4 back, 2 internal	2 front, 4 back, 2 internal
Power Supplies	Non-redundant, 305W	Non-redundant, auto-sensing, 305W (80+)	Non-redundant, 375W (80+ SILVER) Optional redundant, 400W (80+ GOLD) Auto-ranging (100V~240V)
Fans	Non-redundant, non-hot pluggable	Non-redundant, non-hot pluggable	Non-redundant, non-hot pluggable

2 New Technologies

2.1 Overview

The PowerEdge T110 II uses the latest Intel® C202 chipset and supports the Intel Xeon® processor E3-1200 product family and the Intel Core™ i3-2100 product family.

New technologies include the following:

- Significant performance improvement (up to 25%) over previous generation
- Twice the memory footprint at 32GB
- Direct Media Interface (DMI) Gen 2
- Support for up to four 3.5" SAS, nearline SAS, or SATA drives; support for up to six 2.5" SAS or SSD hard drives (six 2.5" hard drive support available Q2 2011)

2.2 Processor Features

The Intel Xeon processor E3-1200 product family features:

- New micro architecture on 32 nm processor provides higher performance and lower power
- Next generation Intel® Turbo Boost Technology
- Dynamic Turbo
- Dual-core and quad-core processing
- New Advanced Encryption Standard (AES) for improved encryption and decryption performance

3   System Information

3.1 Overview

Table 2 summarizes the features for the PowerEdge T110 II. For the latest information on supported features, visit Dell.com.

Table 2.   Product Features Summary

Feature	Technical Specification	
Form Factor	Tower	
Processors	Quad-core Intel® Xeon® processor E3-1200 product family Dual-core Intel Core™ i3-2100 product family	
Processor Sockets	1	
Front Side Bus or HyperTransport	DMI II (Direct Media Interface)	
Cache	8MB	
Chipset	Intel C202	
Memory[1]	Up to 32GB (4 DIMMs): 1GB/2GB/4GB/8GB DDR3 up to 1333MHz	
I/O Slots	4 PCIe slots: Two x8 slots (one with x16 connector) One x4 slot (with x8 connector) One x1 slot	
RAID Controller	Internal: PERC H200 PERC S100 (software based) PERC S300 (software based)	External: 6GB/s SAS HBA
Drive Bays	Up to four 3.5" cabled SAS, nearline SAS, or SATA drives or Up to six 2.5" cabled SSD or SAS drives (available Q2 2011)	
Maximum Internal Storage	Up to 8TB	
Hard Drives	3.5" SAS (15K), nearline SAS (7.2K), SATA (7.2K, 5.4K) 2.5" SAS SSD, SAS (10K)	
Embedded LOM/ NIC	Integrated Broadcom® BCM5722 Gigabit Ethernet Controller	

Feature	Technical Specification
Communications	**Optional add-in NICs :** Broadcom NetXtreme® II 5722 Single Port Ethernet PCI-Express Network Interface Card Broadcom NetXtreme II 5709 Dual Port Ethernet PCIe Card with TOE Broadcom NetXtreme II 5709 Dual Port Ethernet PCIe Card with TOE and iSCSI Offload Intel PRO/1000 PT Server Adapter Intel Gigabit ET Dual Port Server Adapter
Power Supply	Single cabled power supply (305W)
Availability	Quad-pack LED diagnostics, ECC memory, add-in RAID, TPM/TCM
Video	Matrox® G200eW with 8MB memory
Remote Management	N/A
Systems Management	BMC, IPMI 2.0 compliant Dell™ OpenManage™ featuring Dell Management Console (DMC) Unified Server Configurator
Operating Systems	Microsoft® Windows® Small Business Server 2011 Microsoft Windows Server® 2008 R2 Foundation SP1[2] Microsoft Windows Server 2008 SP2, x86/x64 (x64 includes Hyper-V™) Microsoft Windows Server 2008 R2 SP1, x64 (includes Hyper-V™ v2) Novell® SUSE® Linux® Enterprise Server Red Hat® Enterprise Linux® For more information on the specific versions and additions, visit www.dell.com/OSsupport.
Featured Database Applications	Microsoft® SQL Server® solutions (see Dell.com/SQL)

[1]GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.

[2]Windows Server 2008 R2 Foundation SP1 allows only 15 user accounts and requires certain Active Directory (AD) configurations. If not configured according to the product documentation, the software will generate warnings to correct the configuration. After a certain amount of time, the software will only run for one hour at a time until the configuration is corrected. For more information about these features review the product documentation located at http://go.microsoft.com/fwlink/?LinkId=143551

4 Mechanical

4.1 Chassis Description

The PowerEdge T110 II is a tower chassis design that supports the following features:

- Four 3.5" cabled hard drives or six 2.5" cabled hard drives (available Q2 2011)
- Single non-redundant power supply
- Diagnostic LED panel

4.2 Dimensions and Weight
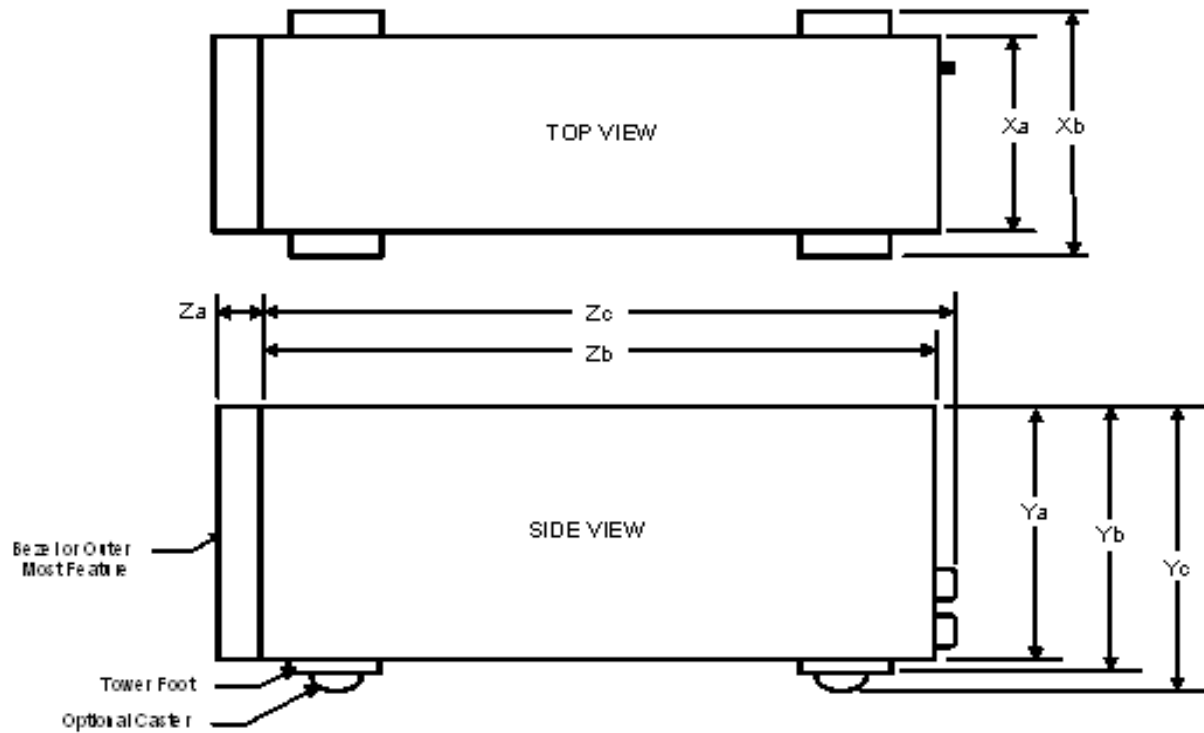
*Note: Zb goes to the nominal rear wall external surface where the motherboard I/O connectors reside.

Xa	Xb	Ya	Yb	Yc	Za (with bezel)	Za (without bezel)	Zb*	Zc	Max Weight
189.35	N/A	417.90	420.3	N/A	37.50	N/A	407.20	426.22	15.50

Figure 1.   Dimensions (mm) and Weight (kg)

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4.3 Front-Panel View and Features

Figure 2 shows the front-panel view of the PowerEdge T110 II.

Figure 2.   Front-Panel View

See the Front-Panel Features and Indicators section in the About Your System chapter of the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com for more information on features.

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4.4 Back-Panel View and Features

Figure 3 shows the back-panel view of the PowerEdge T110 II.

Figure 3.   Back-Panel View

See the Back-Panel Features and Indicators section in the About Your System chapter of the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com for more information on features.

4.5 Internal-Chassis View

Figure 4 shows the internal-chassis view of the PowerEdge T110 II.
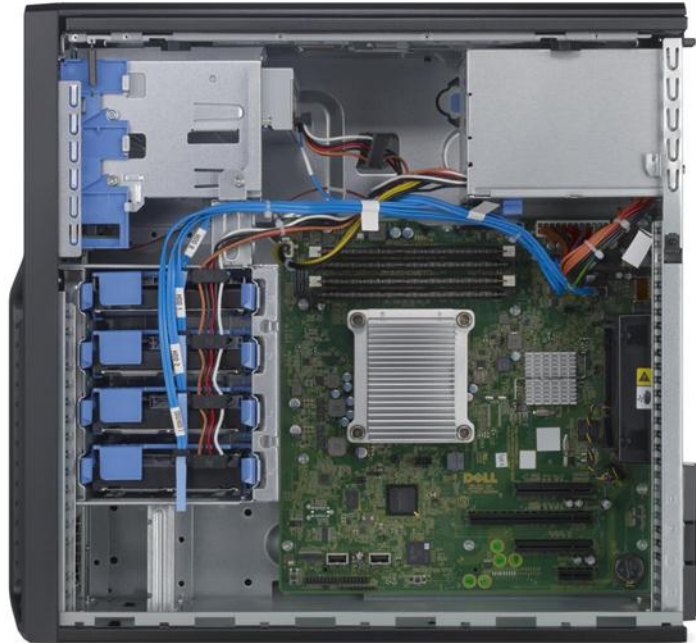
Figure 4.　Internal-Chassis View

4.6 Power Indicator

All Dell PowerEdge servers have a green LED integrated in the power button which indicates the system's power state. Figure 5 shows the power button.

Figure 5.　Power Button

4.7 NIC Indicators

See the NIC Indicator Codes section in the About Your System chapter of the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com for more information.

4.8 Rails and Cable Management

The PowerEdge T110 II is not a rackable system and does not have a rack kit. However, the T110 II can be stored in a rack using a third-party rack tray.

4.9 Fans

There is one cabled system fan located at back of the system. It is not hot-pluggable.

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4.10 LED Control Panel

Figure 6 shows the LED control panel located on the front of the T110 II system.

Figure 6.   LED Control Panel

For a complete description of LED indicators, their causes, and possible courses of action to take to resolve an error, see the Diagnostic Lights (Optional) section in the About Your System chapter in the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com.

4.11 Security

For additional information regarding the following security features, see the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com.

4.11.1 Cover Latch

The PowerEdge RT10 II comes with a lockable entry latch on the side cover of the unit and provides security for the entire system. The latch provides for toolless access to the chassis.

4.11.2 Bezel

The bezel is a one piece plastic bezel that cannot be removed from the front of the chassis.

4.11.3 Hard Drive

The hard drives are secured by the lockable cover latch on the side of the system.

4.11.4 TPM

The Trusted Platform Module (TPM) is used to generate and store keys, protect and authenticate passwords, and create and store digital certificates. The TPM can also be used to store Microsoft® BitLocker™ keys for hard drive encryption features in Microsoft Windows Server® 2008. TPM is enabled through a BIOS option.

4.11.5 Power Off Security

There is a setting in the CMOS setup that disables the power button function.

4.11.6 Intrusion Alert

A switch mounted on the inside of the chassis detects chassis intrusion. When the cover is opened, the switch circuit closes to indicate intrusion.

4.11.7 Secure Mode

BIOS has the ability to enter a secure boot mode through Setup. This mode includes the option to lock out the power or set up a system password.

For more information, see System and Setup Password Features section in the About Your System chapter in the *PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com.

4.12 USB Key

The PowerEdge T110 II has two internal USB keys.

4.13 Battery

A replaceable coin cell CR2032 3V battery is mounted on the planar provides backup power for the Real-Time Clock and CMOS RAM on the PCH C202 chip.

4.14 Field Replaceable Units (FRU)

The planar contains a 32K bit serial EEPROM to store FRU information including Dell part number, part revision level, and serial number. This part will also be used as SEL (system event log) especially to be used by the baseboard management controller (BMC).

4.15 User Accessible Jumpers, Sockets, and Connectors

See the Jumpers and Connectors chapter in the *PowerEdge T110 II Hardware Owner's Manual* on Support.Dell.com.

5 Power, Thermal, Acoustic

5.1 Power Supplies

The base PowerEdge T110 II system includes a single 305W power supply. This unit provides power to the planar, the internal hard drive bays, and the two 5.25" internal drive bays. Power is soft-switched, allowing power cycling using 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.

5.2 Power Supply Specifications

Table 3.   Power Supply Specifications

Feature	Non-redundant Power Supply
Dimensions	L-140mm x W-150mm x H-98mm
Status Indicators	N/A
Integrated Fans	Yes
Fixed Input Plug	Yes
AC Cord Rating	15A @ 120 VAC, 10A @ 240 VAC
Input Voltage	90–264 VAC
Auto-ranging	Yes
Line Frequency	47Hz–63Hz
Maximum Inrush Current	58A for 10 ms or less
Hot-Swap Capability	No
Output Power	305 Watts
Maximum Heat Dissipation	1300 BTU per hour
Efficiency (20% - 100% Load)	80% @ 115 VAC

5.3 Heat Dissipation

The heat dissipation for the T110 II power supply is measured at 1300 BTU/hr (maximum).

5.4 Environmental Specifications

Table 4 summarizes the environmental specifications for the PowerEdge T110 II.

Table 4.   Environmental Specifications

Specification		Operating Requirements	Non-Operating Requirements
Temperature Ranges (For altitude ≤ 900m or 2952.75ft)		10˚C to 35˚C (50˚F to 95˚F)	-40˚C to 65˚C (-40˚F to 149˚F)
Temperature Ranges (For altitude > 900m or 2952.75ft)		10˚C to T^1˚C (50˚F to T^1˚F)	
Temperature Gradient (maximum per 60 minutes)		10˚C	20˚C
Humidity Percent Ranges (noncondensing)		20% to 80% (maximum wet bulb temperature = 29˚C)	5% to 95% (maximum wet bulb temperature = 38˚C)
Humidity Gradient (maximum per 60 minutes)		10%	10%
Altitude Ranges	Low Limits	-50ft (-15.2m)	-50ft (-15.2m)
	High Limits	10,000ft (3048m)	35,000ft (10,668m)

[1]Use the formulas in Table 5 to calculate the maximum operating temperature, T (˚C or ˚F), for the given altitude (in meters or feet).

Table 5.   Formulas for Maximum Operating Temperature at Given Altitude

Temperature Scale	Formula	
	Altitude in Meters	Altitude in Feet
Celsius	$35 - \dfrac{\text{Maximum Altitude (meters) - 900}}{300}$ ˚C	$35 - \dfrac{\text{Maximum Altitude (feet) - 2952.75}}{984.25}$ ˚C
Fahrenheit	$95 - \dfrac{(\text{Maximum Altitude (meters) - 900}) \times 1.8}{300}$ ˚F	$95 - \dfrac{(\text{Maximum Altitude (feet) - 2952.75}) \times 1.8}{984.25}$ ˚F

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Table 6 shows the shock and vibration specifications for the PowerEdge T110 II.

Table 6.   Shock and Vibration Specifications

Maximum Vibration	
Operating	0.26Grms at 5–350Hz for 15 minutes
Storage	1.88Grms at 10–500Hz for 15 minutes
Maximum Shock	
Operating	One shock pulse in the positive z axis (one pulse on each side of the system) of 31G for 2.6ms 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 71G for up to 2ms. Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of Half-sine shock 71G for up to 2ms and square-wave shock 32G, 270 in/sec.

5.5 Maximum Input Amps

Maximum input current (high-output power supply):

- 9A @ 90 VAC
- 4.5A @ 180 VAC

5.6 Thermal

The thermal design of the PowerEdge T110 II reflects the following:

- **Closed-loop thermal fan speed control:** The closed-loop thermal control method uses feedback temperatures to dynamically determine proper fan speeds.
- **Comprehensive thermal management:** The PowerEdge T110 II controls system cooling fan speed based on several different responses from critical component sensors, such as processor temperature, inlet ambient temperature, and system configurations. The thermal management adjusts proper cooling for the system according to what the system really needs.
- **Optimized Ventilation:** The T110 II chassis has a custom ventilation design for optimized air flow path. Each component and peripheral is ensured sufficient air for cooling.
- **Environmental Specifications**: The optimized thermal management makes the T110 II reliable under a wide range of operating environments.

5.7 Acoustics

The acoustical design of the PowerEdge T110 II reflects the following:

- **Adherence to Dell's high standards for sound quality:** 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 and hums. One of the sound quality metrics in the Dell specification is prominence ratio of a tone, which is listed in Table 7.

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- **Hardware configurations affect system noise levels:** Dell's thermal control provides for cooling flexible to varying hardware configurations. Acoustical performances associated with two common configurations are listed in Table 7.
- **Quiet office acoustics:** Compare the values for LpA in Table 6 and note that they are lower than ambient measurements of typical office environments. The minimal configuration of the T110 II shown in Table 6 (LpA ~27 dBA, which is similar to a quiet bedroom) would be inaudible in most environments.
- **Noise ramp and descent at Boot-up:** Fan speeds (hence noise levels) ramp up during the boot process to add a layer of protection for component cooling (in the case that the system does not boot properly).

<div align="center">Table 7.   **Acoustical Specifications**</div>

Minimum Configuration @ 23°C Ambient						Operating Mode	LwA-UL (bels)	LpA (dBA)	Prominent Tones
Processor	Hard Drives	Power Supply	Tape Drives	PCI Cards	RAID				
Intel® Core™ i3-2100 (65W)	2 x 3.5" SATA (7.2K) 500GB	1 x 305W	None	None	None	Standby	2.7	16	None
						Idle	4.2	27	None
						Active hard drives	4.2	27	None
						Stressed processor	4.2	27	None
Typical Configuration @ 23°C Ambient						Operating Mode	LwA-UL (bels)	LpA (dBA)	Prominent Tones
Processor	Hard Drives	Power Supply	Tape Drives	PCI Cards	RAID				
Intel® Xeon® E3-1200 product family (80W)	4 x 3.5" SATA (7.2K) 1TB	1 x 250W	1 x Dell™ PowerVault™ RD1000	1 x dual-port NIC	PERC H200	Standby	2.7	16	None
						Idle	4.9	34	None
						Active hard drives	4.9	34	None
						Stressed processor	4.9	34	None

Definitions

Standby: AC Power is connected to power supplies but the system is not turned on.

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

Active Hard Drives: An operating mode per ISO7779 (1999) definition 3.1.6; Section C.9 of ECMA-74 9th ed. (2005) is followed in exercising the hard disk drives.

Stressed Processor: An operating mode per ISO7779 (1999) definition 3.1.6; SPECPower set to 50% loading is used.

LwA-UL: The upper limit sound power level (LwA) calculated per section 4.4.2 of ISO 9296 (1988) and measured in accordance to ISO 7779 (1999).

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LpA-Op: A-Weighted sound pressure level. The system is placed in center of ISO7779 table, while the acoustic transducer is located 150 cm above the floor and 50 cm in front of the equipment.

Prominent tones: Criteria of D.6 and D.11 of ECMA-74 11th ed. (2010) are followed to determine if discrete tones are prominent. The system is placed in a rack with its bottom at 75-cm from the floor. The acoustic transducer is at front bystander position, ref ISO7779 3rd (2010), Section 8.6.2.

6 Processors

6.1 Overview

The Dell™ PowerEdge™ T110 II system is a 1-socket entry-level server, supporting the Intel® Xeon® processor E3-1200 product family and the Intel Core™ i3-2100 product family.

6.2 Processor Features

Key features of the T110 II processors include:

- New micro architecture with 32 nm process provides higher performance and lower power
- Intel Advanced Vector Extensions (AVX) accelerate FP-intensive applications
- Next generation Intel Turbo Boost Technology
- New Advanced Encryption Standard (AES) improves encryption and decryption performance
- Dynamic Turbo
- Dual-core and quad-core

6.3 Supported Processors

Processors supported on the T110 II are listed in Table 6. For the most up-to-date listings, see Dell.com.

Table 8.   Supported Processors

Model	Speed	Power	Cache	Cores
Intel Xeon E3-1270	3.40GHz	80W	8M	4
Intel Xeon E3-1240	3.30GHz	80W	8M	4
Intel Xeon E3-1230	3.20GHz	80W	8M	4
Intel Xeon E3-1220	3.10GHz	80W	8M	4
Intel Core™ i3-2100	3.10GHz	65W	3M	2
Intel Pentium® G850	2.90GHz	65W	3M	2
Intel Pentium G620	2.60GHz	65W	3M	2

6.4 Processor Configurations

The PowerEdge T110 II operates with a single processor only. The memory controller is embedded in the processor.

6.5 Processor Installation

Refer to the Processors section in the Installing System Components chapter of the *Dell PowerEdge T110 II Systems Owner's Manual* on Support.dell.com for processor installation and removal instructions.

7 Memory

7.1 Overview

The PowerEdge T110 II supports DDR3 memory, providing a high performance, high-speed memory interface capable of low latency response and high throughput. The T110 II supports Unbuffered ECC DDR3 DIMMs (UDIMM).

Key features of the T110 II memory system include:

- 2 channels per processor
- Support for Unbuffered (UDIMM) ECC DDR3 DIMMs
- DDR3 speeds of 1066/1333 MHz
- 4 DIMM sockets (32 GB maximum capacity)
- Support for single-rank and dual-rank DIMMs

7.2 DIMMs Supported

The T110 II supports the following DIMM types:

- 1 GB, DDR3 UDIMM, 1333 with ECC
- 2 GB, DDR3 UDIMM, 1333 with ECC
- 4 GB, DDR3 UDIMM, 1333 with ECC
- 8 GB, DDR3 UDIMM, 1333 with ECC

7.3 DIMM Slots

The PowerEdge T110 II has four 72-bit (240-pin) DIMM slots for memory, supporting up to 2 DIMMs per channel. The modules are configured as 72 bits wide to provide for ECC. The memory controller in the CPU performs the ECC.

7.4 Speed

The PowerEdge T110 II supports 1066 MHz and 1333 MHz DDR3 memory.

7.5 Sparing

Memory sparing is not supported.

7.6 Mirroring

Memory mirroring is not supported.

7.7 RAID

Memory RAID is not supported.

7.8 Supported Configurations

Supported memory configurations for the T110 II are listed in Table 9. For the latest information on memory options, visit Dell.com.

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Table 9. Supported Memory Configurations

System Capacity (GB)	DIMM B1 (2)	DIMM B2 (4)	DIMM A1 (1)	DIMM A2 (3)
	DIMM Slot			
1	—	—	1GB	—
2	1GB	—	1GB	—
2	—	—	2GB	—
4	1GB	1GB	1GB	1GB
4	2GB	—	2GB	—
4	—	—	4GB	—
8	2GB	2GB	2GB	2GB
8	4GB	—	4GB	—
16	4GB	4GB	4GB	4GB
16	8GB	—	8GB	—
32	8GB	8GB	8GB	8GB

8 Chipset

8.1 Overview

The PowerEdge T110 II planar incorporates the Intel® C200 Series PCH chipset. The features listed below are part of the chipset.

8.2 Direct Media Interface

Direct Media Interface (DMI) is the chip-to-chip connection between the processor and C200 series 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 C200 series chipset provides up to 8 PCI Express root ports, supporting bandwidths of 2.5 GT/s and 5 GT/s. PCI Express Root Ports 1-4 can be statically configured as four x1 ports or ganged together to form one x4 port. Ports 5 and 6 can only be used as two x1 ports.

8.4 SATA interface:

The chipset supports up to six Serial ATA (SATA) ports capable of independent DMA operation. The SATA controllers are completely software transparent with an IDE interface, providing a lower pin count and higher performance. PCH SATA interface supports data transfer rates up to 3 Gb/s (300 MB/s) per port. The SATA controller contains two modes of operation— a legacy mode using I/O space and an AHCI mode using memory space.

The chipset supports the Serial ATA Specification, Revision 3.0. Additionally, the chipset is capable of supporting data transfer rates up to 3 Gb/s (300 MB/s) external SATA (eSATA) to ease the addition of external high performance storage devices.

8.5 AHCI:

The C200 series chipset 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 having 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-plugging. AHCI requires appropriate software support (an AHCI driver) and for some features, it requires hardware support in the SATA device or additional platform hardware.

8.6 PCI Interface:

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

8.7 Low Pin Count (LPC) Interface:

The C200 series chipset implements an LPC Interface as described in the LPC 1.1 Specification. The Low Pin Count (LPC) bridge function of the chipset 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.

8.8 Serial Peripheral Interface (SPI):

The chipset implements an SPI Interface as an alternative interface for the BIOS flash device. The chipset supports up to two SPI flash devices with speeds up to 20 MHz, 33 MHz utilizing two chip select pins.

8.9 Compatibility Module

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 chipset supports LPC DMA, which is similar to ISA DMA, through the 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 chipset 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 chipset 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.

8.10 Advanced Programmable Interrupt Controller (APIC):

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

8.11 USB interface:

The C200 series Essential supports twelve USB 2.0 ports that support high-speed, full-speed, and low-speed USB devices. The PCH has two EHCI Host Controllers: EHCI#1 with 8 ports, and EHCI#2 with 6 ports. Each EHCI has an integrated USB 2.0 Rate Matching Hub (RMH). The RMHs replace the functionality of the UHCI controllers by converting high-speed traffic into low- and full-speed traffic. When the RMHs are enabled the UHCI controllers are disabled.

8.12 RTC:

The chipset contains a Motorola MC146818A-compatible real-time clock 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 only 24 hours in advance.

8.13 GPIO:

Various general purpose inputs and outputs are provided for custom system design. The number of inputs and outputs varies depending on C200 series configuration.

8.14 Enhanced Power Management

The C200 series power management functions include enhanced clock control and various low-power (suspend) states (for example, Suspend-to-RAM and Suspend-to-Disk). A hardware-based thermal management circuit permits software-independent entrance to low-power states. The chipset contains full support for the Advanced Configuration and Power Interface (ACPI) Specification, Revision 3.0a.

8.15 System Management Features

The C200 series chipset 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.

8.15.1   TCO Timer

The chipset'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.

8.15.2   Processor Present Indicator

The chipset looks for the processor to fetch the first instruction after reset. If the processor does not fetch the first instruction, the chipset will reboot the system.

8.15.3   Error Code Correction (ECC) Reporting

When detecting an ECC error, the host controller has the ability to send one of several messages to the chipset. The host controller can instruct the chipset to generate an SMI#, NMI, SERR#, or TCO interrupt.

8.15.4   Function Disable

The chipset 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.

8.16 System Management Bus (SMBus 2.0)

The chipset 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 chipset's SMBus host controller provides a mechanism for the processor to initiate communications with SMBus peripherals (slaves). Also, the chipset supports slave functionality, including the Host Notify protocol. Hence, the host controller supports eight command protocols of the SMBus interface: Quick Command, Send Byte, Receive Byte, Write Byte/Word, Read Byte/Word, Process Call, Block Read/Write, and Host Notify.

8.17 Intel Virtualization Technology for Directed I/O

The chipset 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.

9 BIOS

9.1 Overview

The PowerEdge T110 II BIOS supports ACPI and power management features.

9.2 Supported ACPI States

The PowerEdge T110 II BIOS is compliant with ACPI version 2.0a.

9.2.1   Power Management

Power management features come in two types: 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 10 summarizes the power management features on this system:

Table 10.   **Power Management Features**

Feature	Type	Enable/Status/ Ctrl bit location	Description
ACPI Mode Switch	Fixed	PCH	The OS uses the SCI_EN bit in PCH to switch from legacy mode to ACPI mode.
Sleep States	Fixed	PCH	Supported states: S0 (Working), S4-OS ('Hibernation'), and S5 (Soft-off). S1 (also called standby or suspend) and S3 are not 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	PCH 32-bit power management timer is used
Power Mgmt. Event (PME)	Generic	PCH	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.

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Feature	Type	Enable/Status/ Ctrl bit location	Description
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 handles P state transition under Windows.
C State Support	N/A	Processor and PCH registers	This feature allows multiple C-state support for the processor. This feature will work under Windows and an ACPI OS that understands C states.
Power Profile Support	N/A	Processor and PCH chipset registers	In addition to P, C, and T states, the BIOS will expose the Power Profiles to the OS. Each Power profile will have a specific settings and it will fine tune the processor and South Bridge.

10 Embedded NICs/LAN on Motherboard (LOM)

10.1 Overview

The PowerEdge T110 II has an embedded dual-port Gigabit Ethernet controller. The embedded Broadcom® 5722 LAN controller is on the T110 II planar as an independent Gigabit Ethernet interface device. There is one RJ-45 connector on the back of the system. The firmware for the LOM chip resides in a flash part. The PowerEdge T110 II supports Wake-On-LAN (WOL) from either port. The Broadcom 5722 chip supports IPv6.

10.2 NICs

The following add-on NICs are supported on the T110 II:

- Broadcom® NetXtreme® II 5722 Single Port Ethernet PCI-Express Network Interface Card
- Broadcom NetXtreme II 5709 Dual Port Ethernet PCIe Card with TOE
- Broadcom NetXtreme II 5709 Dual Port Ethernet PCIe Card with TOE and iSCSI Offload
- Intel® PRO/1000 PT Server Adapter
- Intel Gigabit ET Dual Port Server Adapter

For the latest information on NIC offerings for the T110 II, see Dell.com.

11 PCI Slots

11.1 Overview

The PowerEdge T110 II planar provides four PCI Express expansion slots as follows:

- Two x8 PCIe Gen2 slots for full-height cards, connected to the CPU
- One x4 PCIe Gen2 slot for a full-height card, connected to the PCH
- One x1 PCIe Gen2 slot for a full-height card, connected to the PCH

The system supports 25 W maximum power for all four PCIe cards.

11.2 Quantities and Priorities

For information on expansion-card quantities and priorities, see the Expansion Cards section in the Installing System Components chapter of the *Dell PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com.

11.3 PCI Card Dimensions

For information about PCIe slots and card dimensions, see the Expansion Cards section in the Installing System Components chapter in the *Dell PowerEdge T110 II Systems Owner's Manual* on Support.Dell.com.

12 Storage

12.1 Overview

The PowerEdge T110 II supports up to four 3.5" internal hard drives or up to six 2.5" internal hard drives (available Q2 2011). The following drive configurations are supported:

- 4 x 3.5" cabled SATA from motherboard SATA connector
- 4 x 3.5" cabled SAS or SATA with add-on storage controller
- 6 x 2.5" cabled SAS with add-on storage controller (available Q2 2011)

12.2 Hard Drives

Table 9 lists the supported hard drives for the PowerEdge T110 II. For the latest information on supported hard drives, visit Dell.com.

Table 11. Supported Hard Drives

Form Factor	Capacity	Speed	Type
3.5"	250GB, 500GB, 1TB, 2TB	7.2K	SATA
3.5"	2TB	5.4 K	SATA
3.5"	500GB, 1TB, 2TB	7.2 K	NL SAS
3.5"	146GB, 300GB, 450GB, 600GB	15 K	SAS
2.5"[1]	200GB, 400GB	NA	SAS SSD
2.5"	146GB, 300GB, 600GB, 900GB	10 K	SAS

[1]2.5" drives available Q2 2011.

12.3 RAID Configurations

Table 12 details the factory RAID configurations for the PowerEdge T110 II.

Table 12. Factory RAID Configurations

Factory Configuration			Non Mixed drives, all SATA or all SAS	
Configuration Type	Configuration	Description	Min HDD	Max HDD
No Hard drive	0	NCZCBL	No controller/No hard drive	0	0
SATA—No RAID	1	MSTCBL	On-board SATA Controller	1	4
SATA RAID	2a	MSTR0CBL	Embedded SATA SW RAID—RAID 0 with 2 hard drives	2	2
	2b	MSTR0CBL	Embedded SATA SW RAID—RAID 0 with above 2 hard drives	3	4
	3	MSTR1CBL	Embedded SATA SW RAID—RAID 1	2	2
	4	MSTR5CBL	Embedded SATA SW RAID—RAID 5	3	4

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Factory Configuration			Non Mixed drives, all SATA or all SAS	
Configuration Type	Configuration	Description	Min HDD	Max HDD
	5	MSTR10CBL	Embedded SATA SW RAID—RAID 10	4	4
SAS/SATA RAID	6a	ASSCBL	Add-in SAS/SATA RAID card, No RAID (PERC S300) with 1 hard drive	1	1
	6b	ASSCBL	Add-in SAS/SATA RAID card, No RAID (PERC S300) with 2 hard drives	2	2
	6c	ASSCBL	Add-in SAS/SATA RAID card, No RAID (PERC S300) with above 2 hard drives	3	6
	7a	ASSR0CBL	Add-in SAS/SATA RAID card, RAID 0 (PERC S300) with 2 hard drives	2	2
	7b	ASSR0CBL	Add-in SAS/SATA RAID card, RAID 0 (PERC S300) with above 2 hard drives	3	6
	8	ASSR1CBL	Add-in SAS/SATA RAID card, RAID 1 (PERC S300)	2	2
	9	ASSR5CBL	Add-in SAS/SATA RAID card, RAID 5 (PERC S300)	3	6
	10	ASSR10CBL	Add-in SAS/SATA RAID card, RAID 10 (PERC S300)	4	6
	11	ASSCBL	Add-in SAS/SATA RAID card, No RAID (PERC H200)	1	6
	12	ASSR0CBL	Add-in SAS/SATA RAID card, RAID 0 (PERC H200)	2	6
	13	ASSR1CBL	Add-in SAS/SATA RAID card, RAID 1 (PERC H200)	2	2
	14	ASSR10CBL	Add-in SAS/SATA RAID card, RAID 10 (PERC H200)	4	6
No hard drive	15	NCZCBL	No controller/No hard drive	0	0

Additional restrictions for RAID configurations are as follows:

- Configurations 0 to 5 are for 3.5" hard drives only
- Configurations 6 to 14 are for 2.5" or 3.5" hard drives (2.5" drives available Q2 2011)

12.4 Storage Controllers

T110 II supports software RAID (PERC S100, PERC S300) and hardware RAID (PERC H200) for internal storage.

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12.5 Optical Drives

The PowerEdge T110 II supports two internal optical drives and an optional external USB DVD-ROM. The T110 II is able to boot from any internal optical drive. The following internal optical drives configurations are available on the PowerEdge T110 II:

- No optical drive configuration
- DVD-ROM (SATA)
- DVD+RW (SATA)

12.6 Tape Drives

Internal and external tape drives and tape libraries are supported. For more information on supported tape drives and tape libraries, see Dell.com/Storage.

13 Video

The PowerEdge T110 II includes a Matrox® G200eW with 8 MB memory integrated in Winbond® WPCM450 (BMC controller).

Supported resolutions are listed in Table 13.

Table 13. Graphics Video Modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	60, 72, 75, 85	8, 16, 32
1024 x 768	60, 70, 75, 85	8, 16
1280 x 1024[1]	60	32
1280 x 1024[2]	60, 75, 85	8, 16
[1]32 bit color only supported at 60Hz for this resolution. [2]85Hz for KVM and 1600x1200 at 60Hz for video out.		

14 Rack Information

Dell does not provide rack support for the PowerEdge T110 II. However, the system can be placed in a rack enclosure using a 3rd party tray.

15 Operating Systems

For detailed information, see the following:

- Operating System Support Matrix for Dell PowerEdge Systems on www.Dell.com
- *Dell PowerEdge T110 II Systems Getting Started Guide* on Support.Dell.com

16 Systems Management

16.1 Overview

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

- Monitoring of server and storage health and maintenance
- Update of system, operating system, and application software

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

16.2 Server Management

A Dell Systems Management and Documentation DVD and a Dell Management Console DVD are included with the product. ISO images are also available. A brief description of available content:

- Dell Systems Build and Update Utility (SBUU): Dell Systems Build and Update Utility assists in OS install and pre-OS hardware configuration and updates.
- Server Update Utility (SUU): This DVD has an inventory tool for managing updates to firmware, BIOS, and drivers for either Linux or Windows varieties.
- OpenManage Server Administrator (OMSA): The OpenManage Server Administrator tool provides a comprehensive, one-to-one (one console to one server) systems management solution, designed for system administrators to manage systems locally and remotely over a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
- Management Console: Dell IT Assistant (ITA) is also included as a one-to-many monitoring solution, providing at-a-glance health status for multiple servers. ITA also includes tools to allow access to the Baseboard Management Controller (BMC) Utility.
- Dell Management Console (DMC): The Dell Management Console is a systems management console that enables systems administrators to discover and inventory devices on your network. It provides functions such as health and performance monitoring of networked devices and patch management capabilities for Dell systems. Similar to the IT Assistant management console (ITA) described above, DMC is a one-to-many system monitoring solution. Both ITA and DMC provide at-a-glance health status for servers. DMC differs from the ITA in that with DMC, value-add plug-ins that enable advanced functionality can be purchased and added to the base DMC product.
- 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: The section includes PDF files for PowerEdge systems, storage peripherals, and Dell OpenManage™ software.

16.3 Embedded Server Management

Embedded management for the PowerEdge T110 II includes the Unified Server Configurator (USC), along with base management functionality features.

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16.3.1 Unified Server Configurator

The Unified Server Configurator (USC) is a graphical user interface (GUI) that aids in local server provisioning in a pre-OS environment. To access the Unified Server Configurator, press the <F10> key within 10 seconds of the Dell logo appearance during the system boot process. Table 14 details current functionality enabled by the USC.

Table 14.   **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, 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 BIOS and NIC/LOM.

16.3.2 Base Management Functionality

The following base management features are supported on the PowerEdge T110 II:

- IPMI v2.0 support
- Conductivity:
  - Shared/failover network modes
  - IPv4
  - VLAN tagging
  - Dynamic DNS
- Security and authentication:
  - Role-based authority
  - Local users
- Remote management and remediation:
  - Server power control
  - Serial-over-LAN (with proxy)
- Monitoring:
  - Sensor monitoring and alerting
  - Real-time power monitoring
  - Real-time power graphing
  - Historical power counters
- System Event Log

17 Peripherals

The PowerEdge T110 II supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

Appendix A. Statement of Volatility

The Dell PowerEdge T110 II contains both volatile and non-volatile (NV) components. Volatile components lose their data immediately upon removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component. Components chosen as user-definable configuration options (those not soldered to the motherboard) are not included in the Statement of Volatility. Configuration option information (pertinent to options such as microprocessors, system memory, remote access controllers, and storage controllers) is available by component separately. The NV components detailed in Table 15 are present in the PowerEdge T110 II server.

Table 15.   **Volatility Table**

Server BIOS Memory	Details
Size:	64 Mbit
Type [Flash PROM, EEPROM]:	Flash EEPROM
Can user programs or operating system write data to it during normal operation?	No
Purpose? [boot code]	Boot Code and Configuration Information
How is data input to this memory?	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 with arbitrary data in firmware memory would not operate.
How is this memory write protected?	Software write protected
Remarks	
Server CMOS (Complementary Metal-Oxide Semiconductor) Memory	**Details**
Size:	512 Bytes
Type [Flash PROM, EEPROM]:	Battery-backed NVRAM
Can user programs or operating system write data to it during normal operation?	No
Purpose? [boot code]	RTC and Configuration settings
How is data input to this memory?	F2 Setup Menu during POST
How is this memory write protected?	N/A

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LOM (LAN [Network Interface] on Motherboard) Memory	Details:
Size:	4Mb (512KB)
Type [Flash PROM, EEPROM]:	Flash
Can user programs or operating system write data to it during normal operation?	Yes, under software control.
Purpose? [boot code]	Contains LOM boot code and config data
How is data input to this memory?	Requires vendor provided firmware file and loader program used during factory assembly or possible field update. A system loaded with arbitrary data in firmware memory would not operate.
How is this memory write protected?	Software control.
Remarks:	
Server System Event Log Memory/FRU	**Details**
Size:	4 KB
Type [Flash PROM, EEPROM]:	SEEPROM
Can user programs or operating system write data to it during normal operation?	No
Purpose? [boot code]	Store System Events
How is data input to this memory?	BMC controller write
How is this memory write protected?	Not write protected
Remarks	
TPM (Trusted Platform Module; For boards shipped outside of China; Boards sold to destinations in China do not have TPM at this time)	**Details:**
Size:	Unspecified size of user ROM, RAM, EEPROM; 128 bytes of OTP memory included
Type [Flash PROM, EEPROM]:	ROM, RAM, EEPROM
Can user programs or operating system write data to it during normal operation?	Yes, OS and applications that conform to the TCG standard can write data to the TPM during normal operation. Access to the NV Storage is controlled by the TPM owner.
Purpose? [boot code]	Trusted Platform Module NV storage. May be used to securely storage of encryption keys.
How is data input to this memory?	TCG TPM Specification defined command interface or Using TPM Enabled operating systems
How is this memory write protected?	As defined by the TCG TPM Specification, protection of this NV memory area is configurable by the TPM owner.
Remarks	

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Server BMC (Baseboard Management Controller) Firmware Flash Memory	Details
Size:	16MB Flash
Type [Flash PROM, EEPROM]:	SPI Flash
Can user programs or operating system write data to it during normal operation?	No
Purpose? [boot code]	Stores the BMC Firmware
How is data input to this memory?	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 with arbitrary data in firmware memory would not operate.
How is this memory write protected?	Software write protected
Remarks	

To obtain optional component information, please refer to the Dell Statement of Volatility for the individual components. Please direct any questions to your Dell Marketing contact.

Appendix B. Certifications

B 1. Regulatory Certifications

Regulatory compliance certificates can be located at the following sites:

- http://ausreactorprd01/reactor/xCertSearch.asp
- http://www.dell.com/content/topics/global.aspx/about_dell/values/regulatory_compliance/dec_conform?c=us&l=en&s=corp

B 2. Product Safety Certifications

The product has been certified and bears the Mark, as applicable, of the Product Safety authorities as indicated in Table 16.

Table 16.   Product Safety Certifications

Country/Region	Authority or Mark
Argentina	IRAM
Belarus	BELLIS
Canada	SCC
China	CNCA or CCC
Croatia	KONCAR
European Union	CE
Germany	TUV
IECEE	IECEE CB
Israel	SII
Kazakhstan	OTAN – CKT
Kenya	KEBS
Kuwait	KUCAS
Mexico	NYCE or NOM
Moldova	INSM
Nigeria	SONCAP
Norway	NEMKO
Russia	GOST
Saudi Arabia	KSA ICCP
South Africa	NRCS
Taiwan	BSMI
Ukraine	UKRTEST or UKRSERTCOMPUTER
United States	NRTL
Uzbekistan	STZ

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B 3. Electromagnetic Compatibility

The product has been certified and bears the Mark, as applicable, of the EMC authorities as indicated in Table 17.

Table 17.   Electromagnetic Compatibility Certifications

Country/Region	Authority or Mark	Class
Australia/New Zealand	ACMA or C-Tick	Class B
Belarus	BELLIS	Class B
Bosnia & Herzegovina, Montenegro, Serbia	KVALITET	Class B
Canada	ICES	Class B
China	CNCA or CCC	Class B
Croatia	KONCAR	Class B
European Union	CE	Class B
Israel	SII	Class B
Japan	VCCI	Class B
Kazakhstan	OTAN – CKT	Class B
Moldova	INSM	Class B
Norway	NEMKO	Class B
Russia	GOST	Class B
South Africa	SABS	Class B
South Korea	KCC	Class B
Taiwan	BSMI	Class B
Ukraine	UKRTEST or UKRSERTCOMPUTER	Class B
United States	FCC	Class B
Uzbekistan	STZ	Class B
Vietnam	ICT	Class B

B 4. Ergonomics, Acoustics and Hygienics

The product has been certified and bears the Mark, as applicable, of the Ergonomics, Acoustics and Hygienics authorities as indicated in Table 18.

Table 18.   Ergonomics, Acoustics and Hygienics

Country/Region	Authority or Mark
Belarus	BELLIS
Germany	GS
Russia	GOST

Appendix C.   Industry Standards

The PowerEdge T110 II system conforms to the industry standards detailed in Table 19.

Table 19.   Industry Standards

Standard	URL for Information and Specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	http://www.acpi.info/
Energy Star EPA Version 1.0 of the Computer Server specification	http://www.energystar.gov/index.cfm?c=archives.enterprise_servers
Ethernet IEEE 802.3-2005	http://standards.ieee.org/getieee802/802.3.html
IPMI Intelligent Platform Management Interface, v2.0	http://www.intel.com/design/servers/ipmi/
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	http://www.jedec.org/download/search/JESD79-3A.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	http://developer.AMD.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0	http://www.pcisig.com/specifications/pciexpress/
PMBus Power System Management Protocol Specification, v1.1	http://pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	http://www.t10.org/cgi-bin/ac.pl?t=f&f=sas1r10.pdf
SATA Serial ATA Rev. 2.6; SATA II, Extensions to SATA 1.0a, Rev. 1.2	http://sata-io.org/
SMBIOS System Management BIOS Reference Specification, v2.6	http://www.dmtf.org/standards/smbios/
TPM Trusted Platform Module Specification, v1.2	http://www.trustedcomputinggroup.org/resources/tpm_main_specification
UEFI Unified Extensible Firmware Interface Specification, v2.1	http://www.uefi.org/specs/

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Standard	URL for Information and Specifications
USB Universal Serial Bus Specification, Rev. 2.0	http://www.usb.org/developers/docs/
Windows Logo Windows Logo Program System and Device Requirements, v3.10	http://www.microsoft.com/whdc/winlogo/hwrequirements. mspx

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