

DELL™

POWEREDGE™ T710

TECHNICAL GUIDEBOOK
INSIDE THE POWEREDGE T710



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1 Product Comparison

1.1 Overview

The PowerEdge T710 is the flagship of the Dell tower servers positioned above the PowerEdge T610 and replacing the PowerEdge 2900III. [Table 1](#) shows a comparison between these versions.

Table 1. Comparison of T710 to PE2900-III and T610

Feature/Spec	PE2900-III (predecessor)	T710	T610
Processor	Quad-Core Intel® Xeon® Processor 5400 Series, Intel Xeon 5200 Series	Intel Xeon 5500 Series	Intel Xeon 5500 Series
Front Side Bus	1066/1333 MHz	QPI 4.8 – 6.4 GT/s	QPI 4.8 – 6.4 GT/s
# Processors	1 or 2	1 or 2	1 or 2
# Cores	2 or 4 per proc	2 or 4 per proc	2 or 4 per proc
L2/L3 Cache	2 X 3MB or 2 X 6MB shared L2	256K L2 per core/4MB or 8MB shared L3	256K L2 per core/4MB or 8MB shared L3
Chipset	Intel 5000X chipset	Intel 5520 chipset	Intel 5520 chipset
DIMMs	12	18	12
Min/Max RAM	1GB/48GB	1GB/144GB	1GB/96GB
HD Bays	8 or 10 X 3.5"	8 X 3.5" or 16 X 2.5"	8 X 3.5" or 2.5"
HD Types	SAS, SATA	SSD, SAS, SATA	SSD, SAS, SATA
Ext Drive Bay(s)	2 X HH Perhiperal Bays	2 X HH Perhiperal Bays	2 X HH Perhiperal Bays
Int. HD Controller	None	None	None
Opt. HD Controller	Perc 5/i, Perc 6/i, SAS 6/iR, SAS 5/i	Perc 6/i, SAS 6/iR	Perc 6/i, SAS 6/iR
Availability	Hot Swap HDD, Hot Swap Redundant Fans, Hot Swap Redundant PS	Hot Swap HDD, Hot Swap Redundant Fans, Hot Swap Redundant PS	Hot Swap HDD, Optional Hot Swap Redundant Fans, Hot Swap Redundant PS
Server Mgt.	BMC, Optional DRAC5	iDRAC6 Express, Optional iDRAC6 Enterprise, Optional VFlash	iDRAC6 Express, Optional iDRAC6 Enterprise, Optional VFlash
I/O Slots	6 + Storage Controller Slot	6 + Storage Controller Slot	5 + Storage Controller Slot
RAID	0, 1, 5, 6, 10	See RAID Configurations	0, 1, 5, 6, 10
NIC/LOM	2 X TOE/iSCSI	4 X TOE/iSCSI	2 X TOE/iSCSI
USB	2 Front, 4 Rear, 1 Internal	2 Front, 6 Rear, 1 Internal	2 Front, 6 Rear, 1 Internal
Power Supplies	930 W Redundant	1100 W Redundant	598 W Redundant
Fans	Hot plug Redundant	Hot plug Redundant	Cabled, Optional Hot plug Redundant
Chassis	5U Rackable Tower	5U Rackable Tower	5U Rackable Tower

Feature/Spec	PE2900-III (predecessor)	T710	T610
Unmanaged Internal Storage	Internal USB key	SD card for virtualization solutions	SD card for virtualization solutions

2 New Technologies

2.1 Overview/Description

The T710 utilizes the following new technologies common to other Dell 11G servers:

- Intel Xeon 5520 Series processors
 - New architecture with memory controller within each processor
 - Dual and quad core
 - Intel turbo mode allows increased processor speed
 - Hyperthreading technology
 - Quick Path Interconnect
- Intel 5520 chipset
 - Dual IOH for maximum I/O capability
- PCIe Generation 2
- DDR3 memory technology
- 16-drive active backplane with expander
- Next generation Broadcom 5709C LOMs
- Next generation Dell embedded server management
 - iDRAC express with Lifecycle Controller and Unified Server Configurator
 - Optional iDRAC enterprise
 - Optional v-flash

2.2 Detailed Information

2.2.1 Intel Xeon 5500 Series Processors

Intel Xeon 5500 series processors are the latest generation Intel processors for two-socket servers. They are based on a new 45nm die technology and utilize integrated memory controllers on the processor itself rather than a separate memory controller. QuickPath interconnect technology, the speed of which varies with the processor model, replaces the familiar front-side-bus.

QPI up to 25.6 GB/sec bandwidth per link

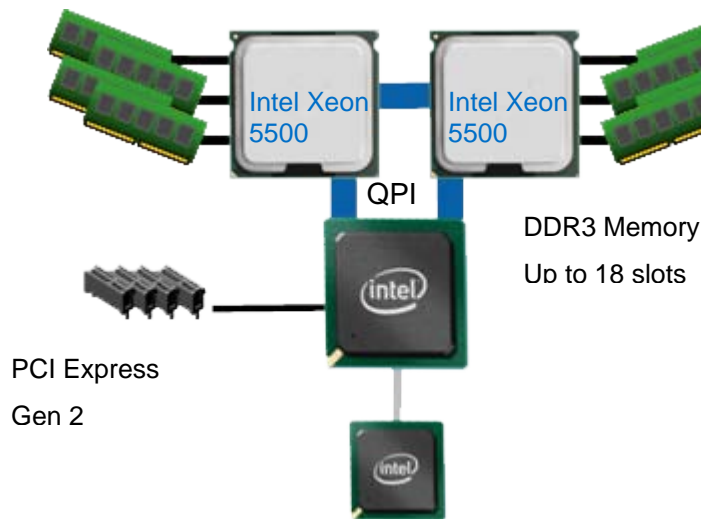


Figure 1. Intel Xeon 5500 Series Processors

- Intel Hyper-Threading Technology: enables more software threads to be running simultaneously
- Intel Intelligent Power Technologies: scales server power consumption to performance needs
- Intel Turbo Boost Technology: boosts frequency for active cores by up to 400 MHz for during peak demand periods

See [Section 8 “Processors”](#) for more detail.

2.2.2 Intel 5520 Chipset

The Intel 5520 chipset is the companion to the new Intel Xeon 5500 series processor. It supports the QuickPath interconnect technology and provides PCI Express Gen 2 capability for I/O. The T710 system is designed around dual Intel 5520 chipset I/O HUBs 36-D (IOH). See [Section 27 “Chipset”](#).

2.2.3 PCIe Generation 2

PCIe Gen 2 provides the next generation of I/O bandwidth to the system. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s.

2.2.4 DDR3 Memory Technology

Intel Xeon 5500 series processors support new DDR3 memory technology that replaces fully-buffered DIMMs in the new Intel architecture. Native DDR3 memory capability improves memory access speed, lowers latency, and allows more memory capacity (up to 18 DIMMs per two-socket platform). See [Section 9 “Memory”](#).

2.2.5 16-Drive Active Backplane

T710 includes an optional 16-drive active backplane that allows one controller to address all 16 drives. See [Section 14.3 “2.5” X16 HDD BACKPLANE”](#).

2.2.6 Next Generation Broadcom 5709C LOMs

The Broadcom 5709C LOMs are the latest 1GBe offering. Two dual-port devices provide a total of four LOM ports for the T710. They are TOE enabled, with iSCSI offload available as an option. See [Section 12 “Embedded NICs/LAN on Motherboard \(LOM\)”](#).

2.2.7 Next generation Dell Embedded Server Management

The chart below shows the components of the new embedded server management capability. As a 700-series enterprise product, T710 comes standard with BMC and iDRAC Express. The iDRAC Express hosts the Lifecycle Controller and Unified Server Configurator. Optional iDRAC Enterprise provides out-of-band management capabilities and enables the optional V-Flash.

See [Section 20.2 “Embedded Server Management”](#).

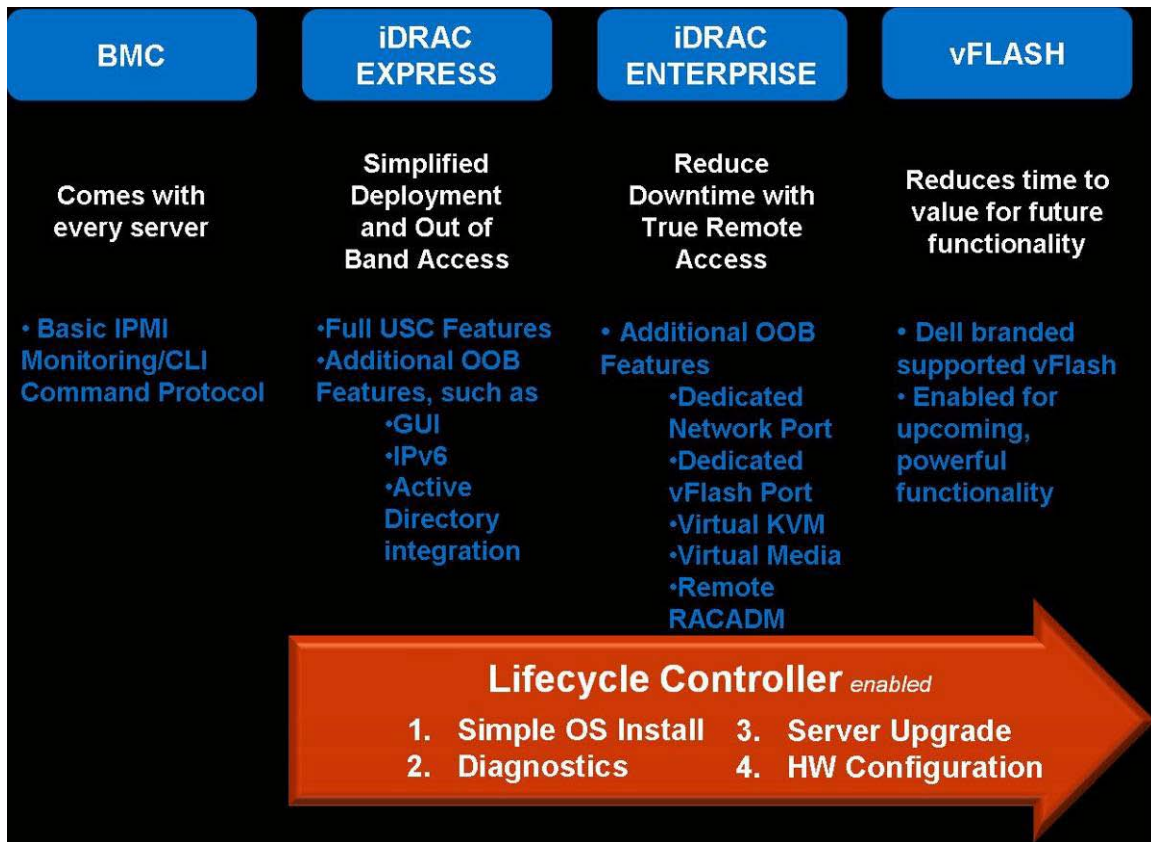


Figure 2. Embedded Server Management Capability

3 System Overview

3.1 Overview/Description

- Customer driven product priorities
 - Best performance and availability in a two-socket tower
 - Large Storage footprint, best I/O capability
- Product Positioning
 - Industry leading performance and availability in a two-socket tower
 - In direct competition with the HP ML370, IBM x3500

- Target Market
 - Corporate workgroups in remote sites running critical apps requiring 24 x 7 uptime
 - Supports applications across Data Access and Data Processing
 - Virtualization
 - Retail space, Digital signage, TV walls
- Key Features
 - Dual IOH, up to 16 drives in one volume, 18 DIMMS, 4x LOMs, all HA in base, 4 x 25 W PCI

3.2 T710 Product Features Summary

Table 2. PowerEdge T710 Features and Descriptions

Feature	Details
Processor	Intel Xeon 5500 Series, 1.86GHz – 2.93GHz, 60W, 80W, 95W, See Section 8.3 “Supported Processors” .
Front Side Bus	Intel Quick Path Interconnect (QPI) 4.8 – 6.4 GT/s
# Processors	1 or 2
# Cores	2 or 4
L2/L3 Cache	256 K per core L2, 4MB – 8MB shared L3
Chipset	Intel 5520 chipset
DIMMs/Speed	1, 2, 4, 8 GB UDIMM and RDIMM @ 1066 and 1333 MHz Certain memory configurations clock down to 800 MHz
Min/Max RAM	1GB/144 GB
HD Bays	8 X 3.5” or 16 X 2.5”, 3Gb SAS
HD Types	SSD, SAS, SATA are supported
Ext Drive Bay(s)	Two full height peripheral bays
Int. HD Controller	None
Opt. HD Controller	Perc 6/i or SAS 6/iR in dedicated storage slot
BIOS	Dell BIOS core 11G implementation. See Section 11 “BIOS” .
Video	Integrated Matrox G200 with iDRAC6
Availability	Hot swap HDD, hot swap redundant power supplies, hot swap redundant fans
Server Mgt.	iDRAC6 Express, Optional iDRAC6 Enterprise, Optional VFlash
I/O Slots	6 PCIe Gen 2 expansion slots + 1 dedicated controller slot
RAID	0, 1, 5, 10, 50, 60. See Section 14.6 “RAID Configurations” .
NIC/LOM	2 X Broadcom 5709 1GBe LOMs (4 ports total). TOE enabled, Optional iSCSI offload
USB	Two front, six rear, one internal
Power Supplies	Optional redundant 1100 W. Climate Saver Gold
Front Panel	Active LCD, rotates 90 degrees for rack mounting
System ID	System ID for PR T710:: 0x029B

Feature	Details
Fans	4 X hot swap redundant
Chassis	5U rackable tower

4 Mechanical

4.1 Chassis Description

The T710 system uses a tower or rack mount 5U chassis. It is classified by Dell as a rackable tower, meaning it is optimized for tower operation

4.2 Dimensions and Weight

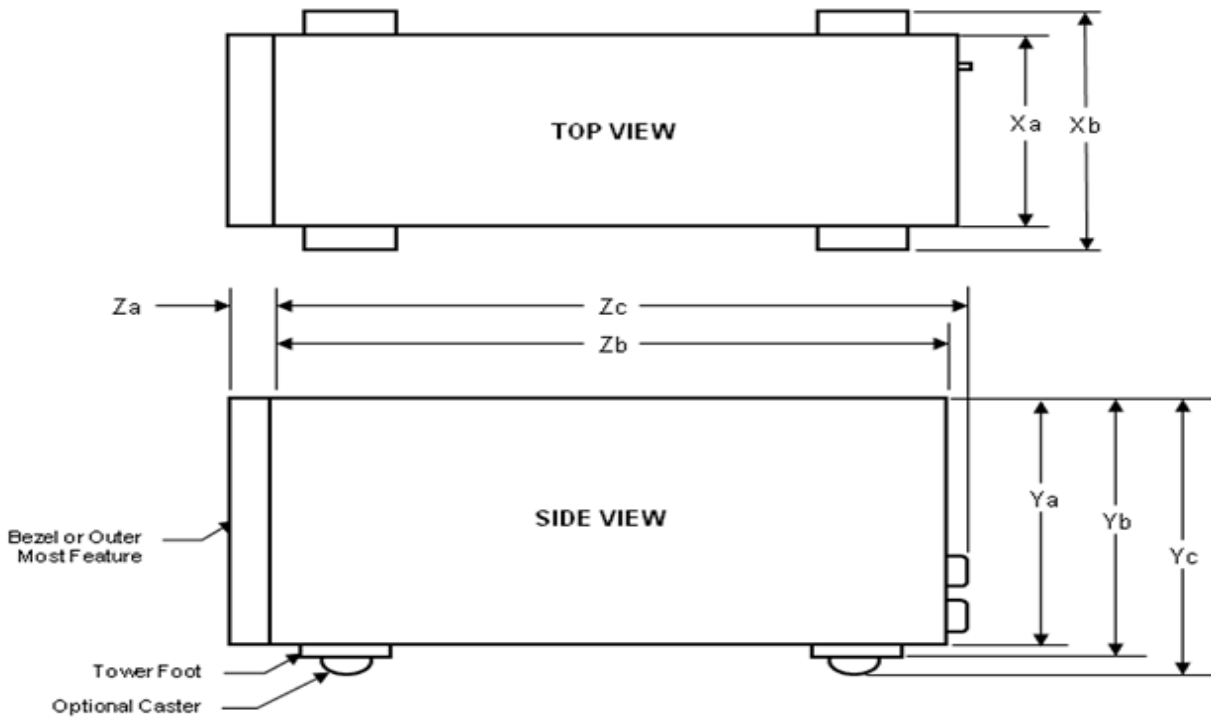


Figure 3. T710 Dimensions

Table 3. Detailed Dimensions

Xa	Xb	Ya	Yb	Yc	Za with bezel	Za without bezel	Zb	Zc
217.9 mm	304.4 mm	431.3 mm	466.3 mm	471.3 mm	37 mm	35 mm	659.6 mm	694.8 mm
8.6 in	12.0 in	17.0 in	18.4 in	18.6 in	1.5 in	1.4 in	26.0 in	27.4 in

Weight (maximum configuration) 35.3 kg (78 lb)

4.3 Front Panel View and Features

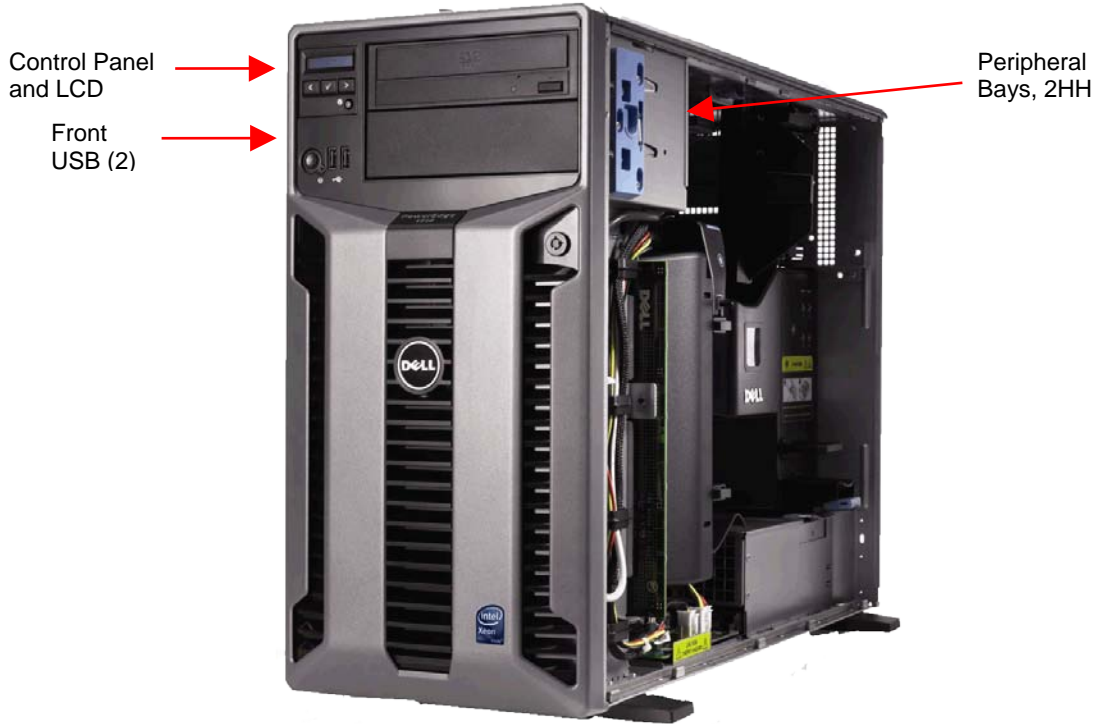


Figure 4. Front Panel View and Features

4.4 Back Panel View and Features

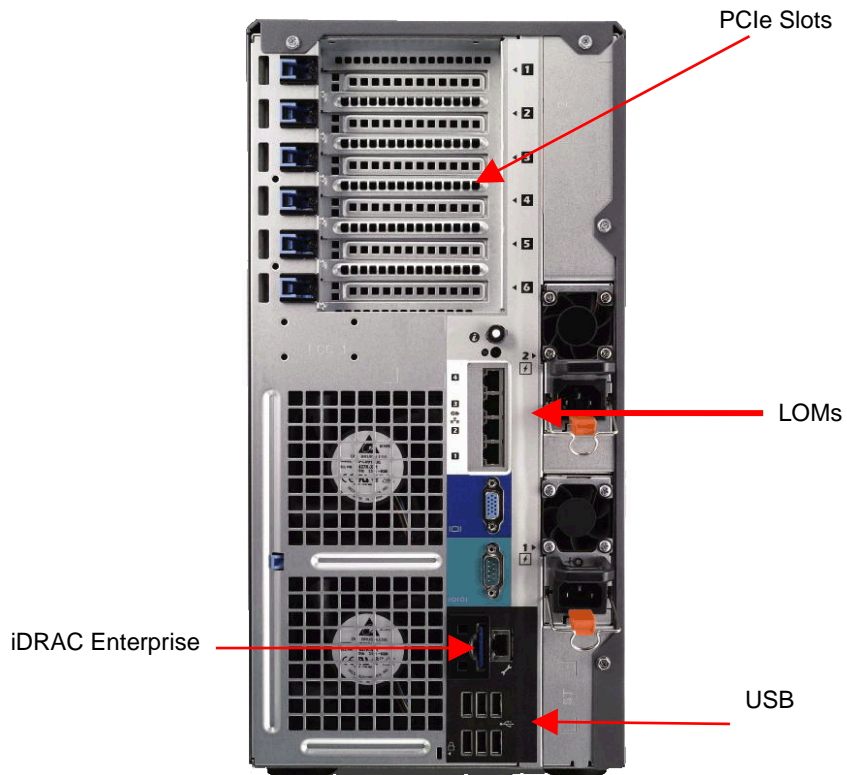


Figure 5. Back Panel View and Features

4.5 Power Supply Indicators

T710 power supplies have embedded cooling fans and one bi-colored status LED.

Status States:

- Off – LED is dark
- AC source applied – solid green LED
- Fault of any kind – solid amber LED
- DC enable applied – solid green LED (no change from AC applied)

4.6 Side Views and Features



Figure 6. Side Views and Features

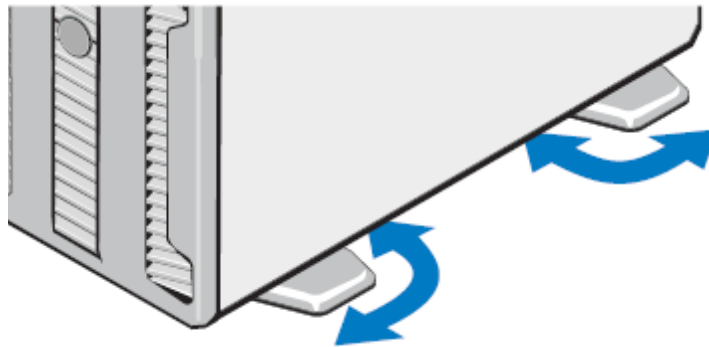


Figure 7. Fold-out Feet Add Additional Stability

4.7 Internal Chassis Views



Figure 8. Internal Chassis Overview

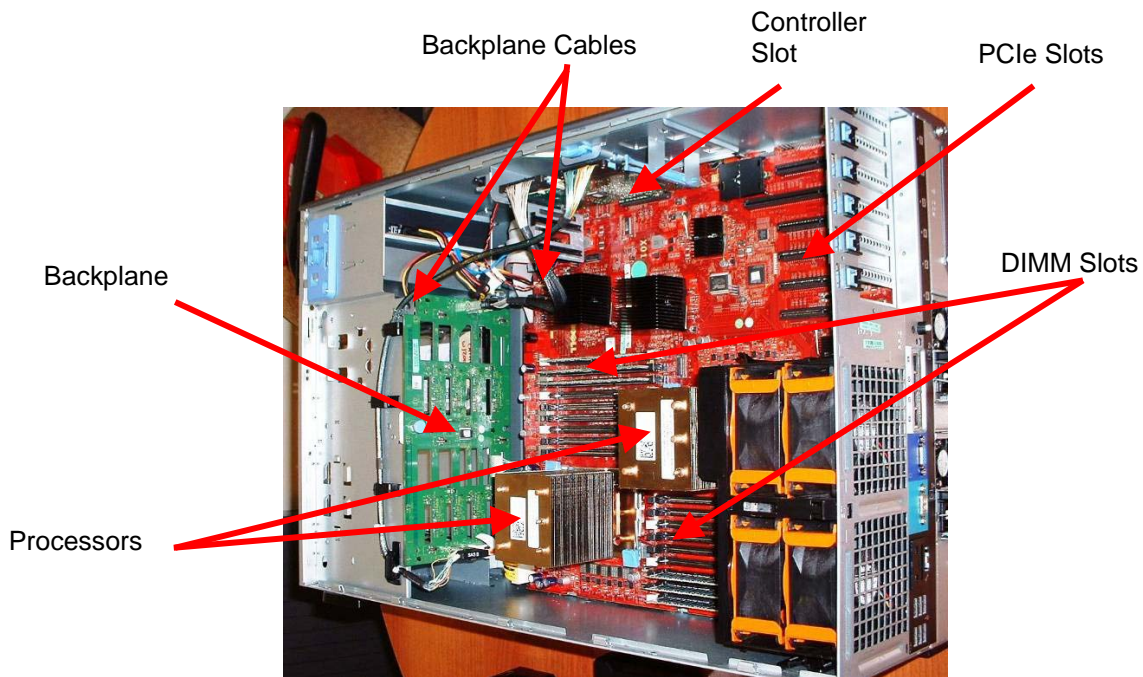


Figure 9. Internal Chassis Detailed View

4.8 Rails and Cable Management

The T710 Rack Kit has rack installation components, such as rails. The rack installation components consist of sliding rack mount rails with the latest generation Cable Management Arm (CMA). T710 features slam latches to offer easier removal from the rack.



Figure 10. New Cable Management Arm

- All steel construction – eliminates creep/sag
- More open area for air flow

When the system is installed in a rack, please observe the following guidelines:

- Nothing should be located within 12” of the front of the unit that could restrict the air flow into the system.
- Nothing should be mounted or placed behind the chassis that would restrict airflow from exiting the system. Only Dell approved CMAs can be placed behind the chassis. All other objects should be located at least 24” away from the rear of the chassis.
- When two systems are placed back-to-back, the separation between the units should be at least 24” if the exit airflow is equivalent for the two chassis. This allows exit air to escape without creating an extreme back pressure at the rear of one of the chassis.

4.9 Rack View



Figure 11. T710 Rack View

For more rack, rail, and CMA information see [Section 17 “Rack Information”](#).

4.10 Fans

Four 92mm single-rotor hot-pluggable fans are mounted in the rear of the cooling shroud. Each fan has a single-wire harness that plugs into the planar fan connectors (FAN1 through FAN4).

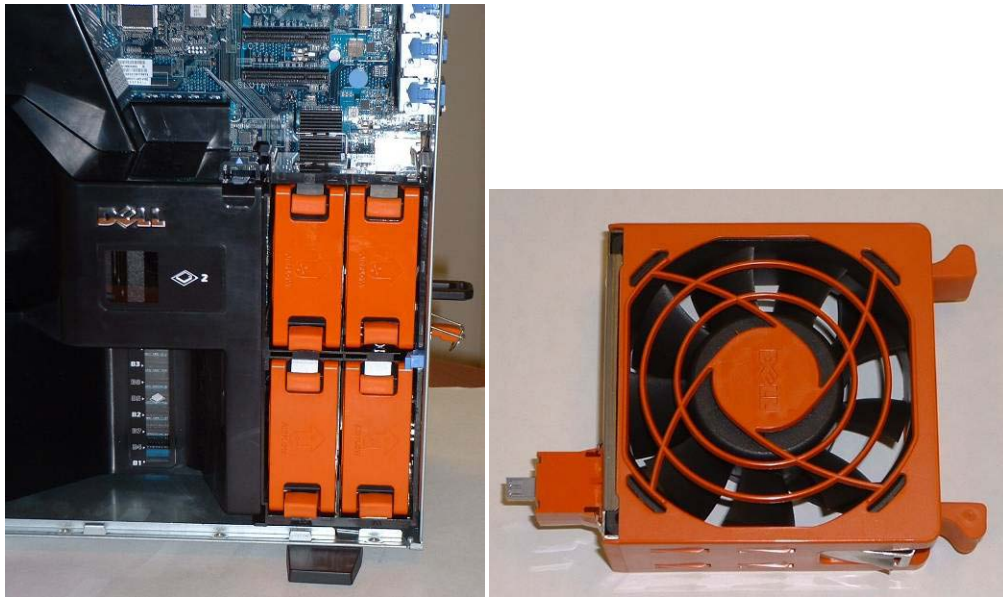


Figure 12. Fans

The Embedded Server Management logic in the system controls and monitors the speed of the fans. A fan speed fault or over-temperature condition results in a notification by ESM.

T710 Power Supply Units have integrated fans. The system requires a blank module in place of the empty power supply slot.

System fan speed is pulse-width modulated. Optional redundant cooling is supported with only one rotor failing at a time (system may throttle when a rotor fails).

Note

Do not place any physical obstructions in the front (at least 12”) or rear (at least 24”) of the T710 chassis. This may cause a decrease in airflow, resulting in an over-temperature condition.

Placement of non-redundant fans must be at the rearmost section of the shroud. Do not operate the system without the cooling shroud installed.

4.11 Control Panel/LCD

The system control panel is located on the front of the system chassis to provide user access to buttons, display, and I/O interfaces.



Figure 13. Control Panel/LCD View

Features of the system control panel include:

- 128x20 pixel LCD panel with controls
 - Two navigation buttons
 - One select button
 - One system ID button
- ACPI-compliant power button with an integrated green power LED
- Non-Maskable Interrupt (NMI) button (recessed)
- Ambient temperature sensor
- LCD panel can rotate 90 degrees for optional rack mounting of the server
- Two external USB 2.0 connectors

The LCD panel is a graphics display controlled by the iDRAC, unlike the 9G panel that had its own CPLD. Error codes can be sent to the display by either ESM or BIOS.

BIOS has the ability to enter a “Secure Mode” through setup, which locks the power and NMI buttons. When in this mode, pressing either button has no effect and does not mask other sources of NMI and power control.

4.11.1 Cover Latch

A tool-less latch is integrated in the side cover to secure it to the tower chassis. It is lockable.



Figure 14. Cover Latch

4.11.2 Bezel

A metal bezel is mounted to the chassis front to provide the Dell ID. A lock on the bezel prevents unauthorized access to system HDD(s). System status (via the LCD) is viewable when the bezel is installed.

The bezel is standard for the T710 system.



Figure 15. T710 Bezel

4.11.3 Hard Drive

The front bezel of the system contains a lock. A locked bezel secures the system hard drives.

4.11.4 Trusted Platform Management (TPM)

The TPM generates/stores keys, protects/authenticates passwords, and creates/stores digital certificates. TPM can also enable the BitLocker™ hard drive encryption feature in Windows Server 2008.

TPM is enabled through a BIOS option and uses HMAC-SHA1-160 for binding. There are different planar PWA part numbers to accommodate the different TPM solutions. The Rest of World (ROW) version has the TPM soldered onto the planar. The other version of the planar has a connector for a plug-in module (Factory Install Only).

China TPM (TCM) is a post-RTS feature. Until China TCM is available, T710 units shipped to customers in China contain a no TPM motherboard.

4.11.5 Power-Off Security

BIOS has the ability to disable the power button function.

4.11.6 Intrusion Alert

A switch mounted on the cooling shroud detects chassis intrusion. When the cover is opened, the switch circuit closes to indicate intrusion to ESM. When enabled, the software provides notification that the cover has been opened.

4.11.7 Secure Mode

BIOS has the ability to enter a secure boot mode via Setup. This mode includes the option to lock out the power and NMI switches on the control panel or set up a system password.

4.12 Persistent Storage

T710 offers two types of persistent storage: managed (iDRAC6 Express/iDRAC6 Enterprise) and unmanaged internal persistent storage.

One of the unmanaged ports is for an optional SD card and the other is for a USB key.

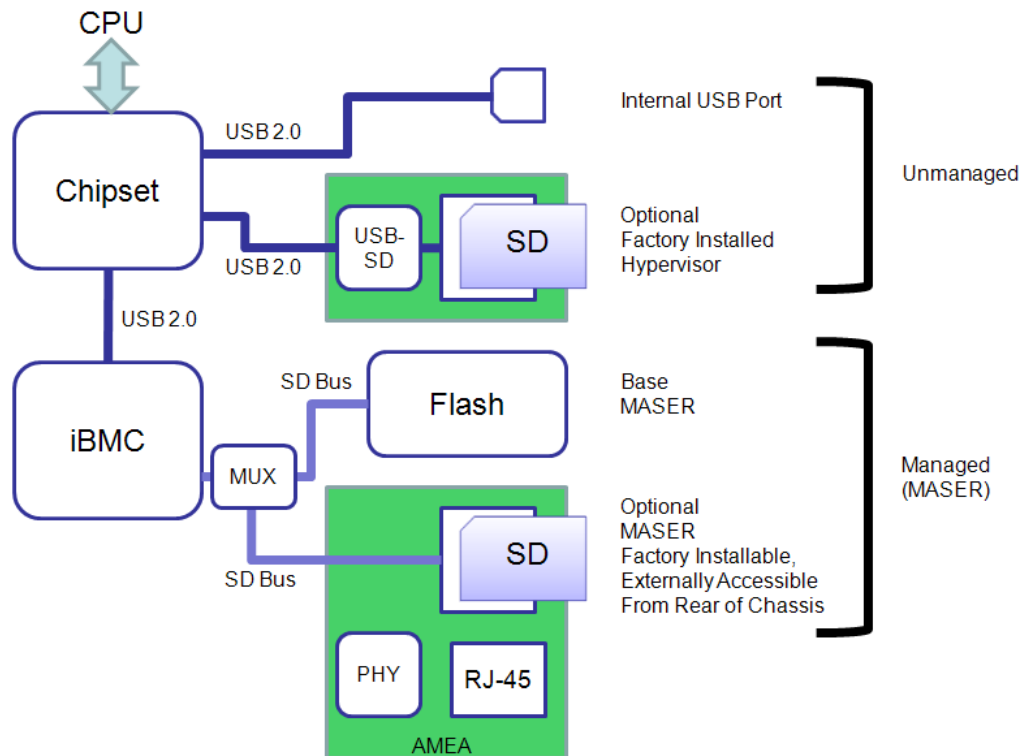


Figure 16. Persistent Storage Block Diagram

4.12.1 Managed Persistent Storage

iDRAC6 Express is a managed persistent storage space for server provisioning data. The base iDRAC6 express consists of 1 GB flash, and the optional Vflash is an external SD card on the optional iDRAC6 Enterprise. The optional vflash offers the hot-plug portability and increased storage capacity benefits of SD while managed by the system.

iDRAC6 is currently configured to support the following applications:

- Unified Server Configurator Browser and System Services Module (SSM) (25 MB): the UEFI browser provides a consistent graphical user interface for bare metal deployment and is ideal for one-to-one deployment. The SSM supports automatic one-to-N deployment.
- Service Diagnostics (15 MB): formerly on the hard drive as the Utility Partition, this is a bootable FAT16 partition for Service Diagnostics
- Deployment OS Embedded Linux (100 MB): storage space to hold Embedded Linux
- Online Diagnostics (35 MB): non-bootable FAT32 partition for Online Diagnostics.
- Deployment OS WinPE (200 MB): storage space to hold Windows Pre-installation Environment
- Driver Store (150 MB): holds all files required for OS deployment.
- iDRAC firmware (120 MB): holds the two most recent versions of iDRAC firmware

- **Firmware Images (160 MB):** holds the two most recent versions of BIOS, RAID, LOM, power supplies and hard drive firmware. This partition also holds the BIOS and option ROM configuration data.
- **Life Cycle Log (2 MB):** stores initial factory configuration as well as all detectable hardware and firmware changes to the server since its deployment. The Life Cycle Log is stored on the BMC SPI flash.

Approximately 20 percent of the flash space is reserved for wear leveling on the NAND flash. Wear leveling extends the life of the NAND flash by balancing the use cycles on the flash’s blocks.

4.12.2 SD Module (Unmanaged Internal Persistent Storage)

The optional Internal SD module is a dedicated port for an SD flash card for embedded Hypervisor for virtualization. The SD flash card contains a bootable OS image for virtualized platforms.

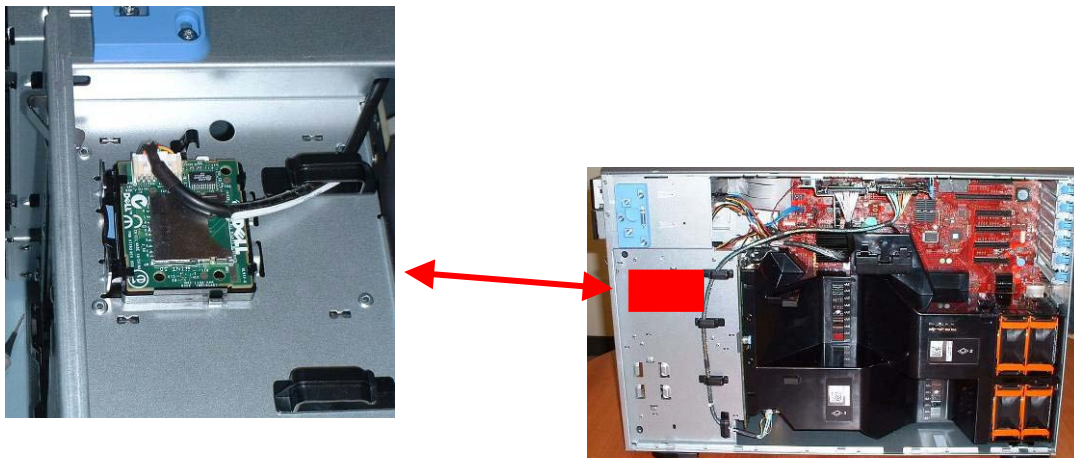
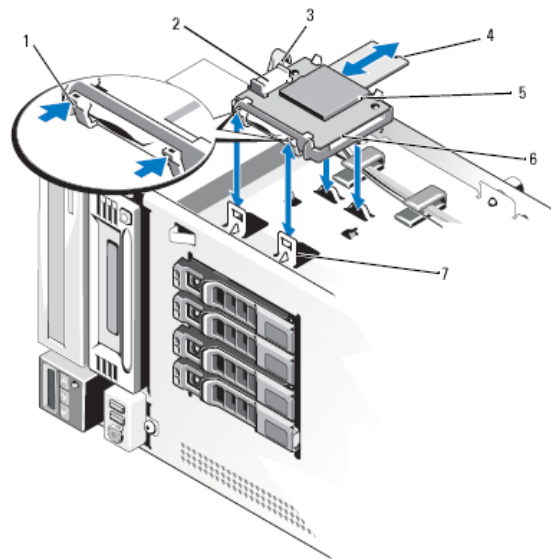


Figure 17. T710 SD Module



- | | | | |
|---|-----------------------------|---|------------------------------------|
| 1 | release tab | 2 | internal SD module cable connector |
| 3 | latch | 4 | SD flash card |
| 5 | SD card slot (SD connector) | 6 | internal SD module |
| 7 | hooks (2) | | |

Figure 18. SD Diagram

4.13 USB Key (Unmanaged Internal Persistent Storage)

T710 has one internal USB port on the motherboard for any USB key based security or license application.

Some possible applications of the USB key:

- User custom boot and pre-boot OS for ease of deployment or diskless environments
- USB license keys for software applications like eToken™ or Sentinel Hardware Keys
- Storage of custom logs or scratch pad for portable user defined information (not hot-pluggable)

4.14 Battery

A replaceable coin cell CR2032 3V battery mounted on the planar provides backup power for the Real-Time Clock and CMOS RAM on the ICH. The battery is located under the fan assembly at the rear of the motherboard, near the rear USB ports.

4.15 Field Replaceable Units (FRU)

Hot swap HDD and SSD, fans, and power supplies are the primary field replaceable units on T710.

The planar contains a serial EEPROM to store FRU information including Dell part number, part revision level, and serial number. The Advanced Management Enablement Adapter (AMEA) contains a FRU EEPROM. The backplane SEP and the power supply microcontroller are also used to store FRU data.

5 Electrical

5.1 Clock Circuitry

System clock circuitry is based on Intel CK410B+ synthesizer and DB1200/DB900 driver specification. A clock synthesizer device is a single chip solution. The CK410B+ synthesizes and distributes a multitude of clock outputs at various frequencies, timings and drive levels using a single 14.318 MHz crystal.

- PCI Express Gen2 support
- Host clock support (133 MHz)
- Spread spectrum support
- 33 MHz, 48 MHz, 100 MHz clock support
- 14.318 MHz clock support

5.2 Volatility

See your Dell Representative for the current T710 Statement of Volatility.

6 Power, Thermal, and Acoustic

6.1 Power Supplies

The power supply subsystem consists of one or two AC-DC power supplies (1+1 redundant configuration) connected to the planar through the PDB. The power supply only provides +12V and +12Vaux. There are several voltage regulators in the system to supply different voltage levels needed by different logic devices.

6.2 Power Supply Specifications

The T710 power supply is rated at 1100 W. It operates on input voltages ranging from 90 – 264 V, auto-switching to the sensed line level.

- EMC classification is Light Industry
- FCC classification is Class A

Table 4. Power Supply Specifications

	Minimum	Typical	Maximum
Vin (Voltage first range)	90 V	115/230	264 V
Vin (frequency)	47 Hz	50/60 Hz	63 Hz
Iin (90 VAC)	–	–	13.5 A
Iin(100 VAC)	–	–	12.0 A
Iin (180 VAC)	–	–	7.0 A
Initial In-rush Current	–	–	55 A
Secondary In-rush Current	–	–	35 A

The base redundant system consists of two hot-plug 1100 W power supplies in a 1+1 configuration.

The power supplies connect indirectly to the planar via the Power Distribution Board (PDB). Two power cables connect between the PDB and the backplane. Another multi-drop cable also connects the PDB to the optical and/or tape drives. The PS bay sheet metal prevents unsupported power supplies from being installed in a T710 system.

T710 power supplies have embedded cooling fans and one bi-colored status LED.

Status States:

- Off – No LED
- AC source applied – Solid Green LED
- Fault of any kind – Solid Amber LED
- DC enable applied – Solid Green LED (no change from AC applied)

Starting with 11G, the power supplies no longer have a FRU EEPROM; FRU data is now stored in the memory of the PSU Microcontroller. Additionally, the PSU Firmware can now be updated by iDRAC over the PMBus. Power is soft-switched, allowing power cycling via a switch on the front of the system enclosure or via software control (through server management functions). The power system is compatible with industry standards, such as ACPI and the Microsoft Windows Server H/W Design Guide.



Figure 19. T710 Power Supply

If using only one power supply, the single PSU should be installed in the PS1 bay and a PSU Close Out (metal cover) is installed in the PS2 bay. The use of the PS1 bay for the single PSU configuration is done for consistency only. Nothing prevents the use of the PS2 bay in a single PSU configuration.

6.3 Power Efficiency

Table 5. T710 Power Supply Efficiency

Efficiency at 115 V Input Voltage	
20% Loading	87%
50% Loading	90%
100% Loading	87%
Efficiency at 230 V Input Voltage	
10% Loading	80%
20% Loading	88%
50% Loading	92%
100% Loading	88%

One of the main features of the latest family of Dell servers is enhanced power efficiency. T710 achieves higher power efficiency by implementing the following features:

- User-selectable power cap (subsystems will throttle to maintain the specified power cap)
- Improved power budgeting
- Larger heat sinks for processors and IOH
- Accurate inlet temperature
- PSU/VR efficiency improvements
- Switching regulators instead of linear regulators
- Closed loop thermal throttling
- Increased rear venting/3D venting
- PWM fans with an increased number of fan zones and configuration-dependent fan speeds
- Use of DDR3 memory (lower voltage, UDIMM support)
- CPU VR dynamic phase shedding
- Memory VR static phase shedding

- Random time interval for system start
- Allows an entire rack to power on without exceeding the available power
- BIOS Power/Performance options page
- BIOS-based CPU P-state manager (power management in a virtualized environment)
- Ability to slow down or power down memory
- Ability to disable a CPU core
- Ability to turn off items not being used (i.e. USB ports, LOMs, PCIe slots, etc.)
- Option to run PCIe at Gen1 speeds instead of Gen2 (BIOS setup option)

6.4 Environmental Specifications

Table 6. Environmental Specifications

Temperature	
Operating	10° to 35°C (50° to 95°F) with a maximum temperature gradation of 10°C per hour Note: For altitudes above 2950 feet, the maximum operating temperature is de-rated 1°F/550 ft.
Storage	-40° to 65°C (-40° to 149°F) with a maximum temperature gradation of 20°C per hour
Relative Humidity	
Operating	20% to 80% (non-condensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (non-condensing) with a maximum humidity gradation of 10% per hour
Maximum Vibration	
Operating	0.26 Grms at 5 – 350 Hz in operational orientations
Storage	1.54 Grms at 10 – 250 Hz in all orientations
Maximum Shock	
Operating	Half-sine shock in all operational orientations of 31 G ± 5% with a pulse duration of 2.6 ms ± 10%
Storage	Half-sine shock on all six sides of 71 G ± 5% with a pulse duration of 2 ms ± 10% Square wave shock on all six sides of 27 G with velocity change @ 235 in/sec or greater
Altitude	
Operating	-16 to 3048 m (-50 to 10,000 ft) Note: For altitudes above 2950 feet, the maximum operating temperature is de-rated 1°F/550 ft.
Storage	-16 to 10,600 m (-50 to 35,000 ft)

6.6 Maximum Input Amps

The T710 system exhibits the following maximum current draw at the stated voltages:

- 13.7A maximum at 90 VAC
- 12.0A maximum at 100 VAC
- 10.4A maximum at 115 VAC
- 5.75A maximum at 208 VAC
- 5.45A maximum at 220 VAC
- 5.2A maximum at 230 VAC

6.7 EnergySmart Enablement

T710 does not support a separate EnergySmart configuration as was offered with certain 10 G servers. A 750 W EnergySmart power supply option is under investigation, but will not be available at RTS. Certain other EnergySmart options may be made available in the future.

6.8 Energy Star Compliance

The final Energy Star specification for servers was issued in mid-May, 2009. Work is underway to determine which configurations of T710 will be Energy Star compliant. This section will be updated accordingly.

6.9 Acoustics

The acoustical design of the PowerEdge T710 reflects:

- 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 [Table 7](#) to see that they are lower than ambient noise levels of typical office environments.
- Hardware configurations affect system noise levels. Dell' s advanced thermal control provides for optimized cooling with varying hardware configurations. Some of the perhaps less intuitive but potentially important decision-making configuration examples are listed below.
 - Most typical configurations perform as listed in [Table 7](#).
 - However, some less typical configurations and components can result in higher noise levels. Examples of acoustical performance for non-typical hardware configurations are shown in [Table 7](#).
 - The dBA values are not additive, e.g., incorporating a change for 2 dBA reduction and another change for 3 dBA does not generally produce a 5 dBA reduction.
- Noise ramp and descent at Boot-up. Fan speed noise levels ramp during the boot process to add a layer of protection for component cooling if the system does not boot properly.

Table 7. T710's Prominence Ratio to Tone

	Operating Mode	LwA-UL, bels	LpA, dBA	Tones
PowerEdge T710 3.5" HDD System Typical: 4x Y847J fans, 2x 80 W M399F CPUs, 5x GX198 146 GB 15 KRPM HDDs, 6x 2-GB D841D DIMMs, 2x 1100-W Y613G Power Supplies, PERC6/i YK838 card, 2x X3959 NIC PCI cards, 1x DVD Drive at 23° C	Standby	2.7	13	No prominent tones
	Idle	5.9	40	No prominent tones
	Active Hard Disk Drives	6.0	42	No prominent tones
	Stressed Processor, SPECPower at 50% loading	5.9	40	No prominent tones
Non-Typical Hardware Configurations; Same as Above Except with Following PCI cards	10 Gb NIC, Idle	6.0	42	No prominent tones
	PERC6/E, Idle	6.0	42	No prominent tones
	4+ PCI cards installed	6.2	44	No prominent tones
PowerEdge T710 2.5" HDD System Typical: 4x Y847J fans, 2x 80 W M399F CPUs, 5x 2.5" 73 GB 15 KRPM SAS HDDs, 6x 2-GB D841D DIMMs, 2x 1100-W Y613G Power Supplies, PERC6/i YK838 card, 2x X3959 NIC PCI cards, 1xDVD Drive at 23° C	Standby	2.7	13	No prominent tones
	Idle	5.7	38	No prominent tones
	Active Hard Disk Drives	5.7	39	No prominent tones
	Stressed Processor, SPECPower at 50% loading	5.7	38	No prominent tones

7 Block Diagram

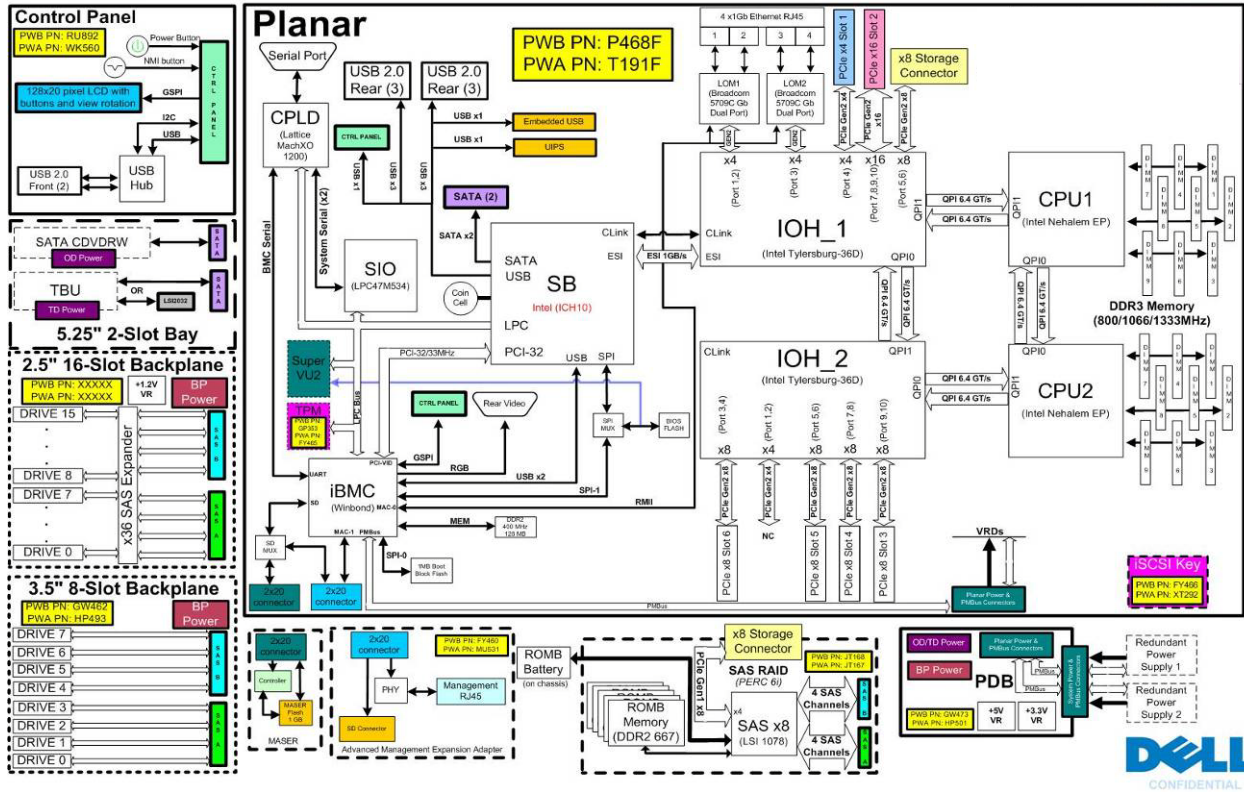


Figure 20. T710 Block Diagram

8 Processors

8.1 Overview

The Intel 5500 two-socket processor is the IA-32 microprocessor designed specifically for servers and workstation applications. The processor is based on new Core micro-architecture; however, it is 100 percent compatible with existing IA-32 software. Selective Intel Xeon 5500 series two-socket SKUs also support Turbo Mode. Turbo Mode is an OS-controlled operation that automatically allows the processor to run faster than the marked frequency if the CPU is operating below power, temperature, and current limits.

The Intel Xeon 5500 series two-socket processor utilizes a 1366-contact Flip-Chip Land Grid Array (FC-LGA) package that plugs into a surface mount socket.

Table 8. Intel Xeon 5500 Series Features

Intel Xeon 5500 series Two-Socket Processor	Features
Cache size	32 KB instruction 32 KB data 4 or 8 MB (shared)
Multi-processor support	1-2 CPUs
Package	LGA1366

8.2 Features

The Intel 5500 two-socket processor supports all Streaming SIMD Extensions (including SSE2, SSE3, and SSE4) and Intel 64 instructions.

Key features:

- Four or two cores per processor
- Two point-to-point QPI links at 6.4 GT/s
- 1366-land FC-LGA package
- No termination required for non-populated CPUs (must populate CPU socket 1 first)
- Integrated QuickPath DDR3 memory controller
- 64-byte cache line size
- RISC/CISC hybrid architecture
- Compatible with existing x86 code base
- Optimized for 32-bit code
- MMX support
- Execute Disable Bit
- Intel Wide Dynamic Execution
 - Executes up to four instructions per clock cycle
- Simultaneous Multi-Threading (SMT) capability
- Support for CPU Turbo Mode (on certain SKUs)
 - Increases CPU frequency if operating below thermal, power, and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Extension 4
- Intel 64 Technology
- Intel VT-x and VT-d Technology for virtualization support
- Enhanced Intel SpeedStep Technology
- Demand-based switching for active CPU power management as well as support for ACPI P-States, C-States, and T-States

8.3 Supported Processors

All processors are branded as Intel Xeon and a 256K L2 cache per core. Please go to Dell.com or contact your Dell representative for the most up-to-date offering.

Table 9. Supported Processors and Descriptions

Model	Speed	Power	QPI	L3 Cache	Features	Cores
X5570	2.93 GHz	95 W	6.4 GT/s	8 M	Turbo +3, HT	4
X5560	2.80 GHz	95 W	6.4 GT/s	8 M	Turbo +3, HT	4
X5550	2.66 GHz	95 W	6.4 GT/s	8 M	Turbo +3, HT	4
E5540	2.53 GHz	80 W	5.86 GT/s	8 M	Turbo +2, HT	4
E5530	2.40 GHz	80 W	5.86 GT/s	8 M	Turbo +2, HT	4
E5520	2.26 GHz	80 W	5.86 GT/s	8 M	Turbo +2, HT	4
L5520	2.26 GHz	60 W	5.86 GT/s	8 M	Turbo +2, HT	4
E5506	2.13 GHz	80 W	4.8 GT/s	4 M	–	4

Model	Speed	Power	QPI	L3 Cache	Features	Cores
E5504	2.00 GHz	80 W	4.8 GT/s	4 M	–	4
E5502	1.86 GHz	80 W	4.8 GT/s	4 M	–	2

8.4 Processor Configurations

T710 provides support for up to two Intel 5500 two-socket processors.

A single processor placed in the CPU1 socket functions normally; however, T710 systems require a CPU blank in the CPU2 socket for thermal reasons. The system is held in reset if a single processor is placed in the CPU2 socket.

8.5 Additional Processor Information

Voltage regulation to the Intel 5500 two-socket processor is provided by EVRD (Enterprise Voltage Regulator-Down). EVRDs are embedded on the planar. CPU core voltage is not shared between processors. EVRDs support static phase shedding and power management via the PMBus.

9 Memory

9.1 Overview

T710 utilizes DDR3 memory providing a high performance, high-speed memory interface capable of low-latency response and high throughput. T710 supports Registered ECC DDR3 DIMMs (RDIMM) or Unbuffered ECC DDR3 DIMMs (UDIMM).

The DDR3 memory interface consists of three channels. The maximum number of supported DIMMs is dependent on the type of DIMM used

Table 10. DIMM Configurations

DIMM Type	Maximum Configuration
Single or dual rank RDIMM	3 per channel per processor (18 total)
Quad rank RDIMM	2 per channel per processor (12 total)
Single or dual rank UDIMM	2 per channel per processor (12 total)

9.2 DIMMs Supported

T710's DDR3 interface supports 2, 4, 8, or 16 GB RDIMMs and 1 GB or 2 GB UDIMMs.

9.3 Memory Population Scenarios

The memory mode is dependent on how the memory is populated in the system.

- Three channels populated per CPU
 - Typically, the system runs in Independent Channel mode in this configuration. This mode offers the most DIMM population flexibility and system memory capacity, but offers the least number of RAS (reliability, availability, service) features.
 - All three channels must be populated identically.
 - Maximum memory bus speed is 800 MHz
- Two channels (CH 2 and CH 1) are populated identically per CPU; third channel is unused.

- When mirroring is enabled, the memory image in Channel 2 is maintained the same as Channel 1.
- Typically, two channels operate in Advanced ECC (Lockstep) mode with each other by having the cache line split across both channels. This mode provides improved RAS features (SDDC support for x8-based memory).
- For memory mirroring, the two channels operate as mirrors of each other – writes go to both channels and reads alternate between the two channels. The channels are no longer in lockstep mode.
- One channel is populated per CPU
 - This is a simple Memory Optimized (Independent) mode. Mirroring is not supported.

The T710 memory interface supports memory demand and patrol scrubbing, single-bit correction, and multi-bit error detection. Correction of a x4 or x8 device failure is also possible through the lockstep channel mode and the SDDC code. Additionally, correction of a x4 device failure is possible through the independent channel mode.

9.4 Slots/Risers

The T710 has 18 DIMM slots on the motherboard. No memory risers are utilized. Nine DIMM slots are associated with each processor. Both processors must be populated to utilize all 18 DIMM slots.

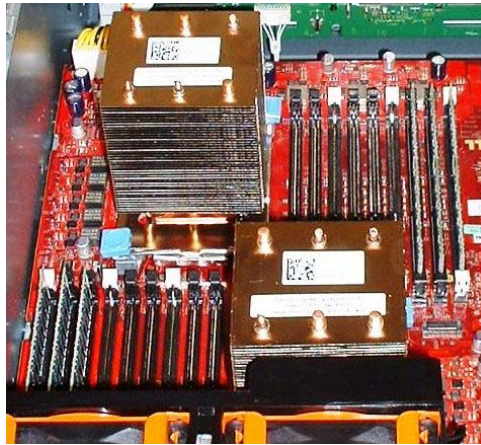


Figure 21. T710 Motherboard

9.5 Speed/Memory Features

Key features of the T710 memory system include:

- Registered (RDIMM) and Unbuffered (UDIMM) ECC DDR3 technology
- Each channel carries 64 data and eight ECC bits
- Support for up to 144 GB of RDIMM memory (with 18 x 8 GB RDIMMs)
- Support for up to 24 GB of UDIMM memory (with 12 x 2 GB UDIMMs)
- Support for 1066/1333 MHz single and dual rank DIMMs
- Support for 1066 MHz quad rank DIMMs
- 800 MHz DIMMs are only used in testing
- Single DIMM configuration only with 1 GB DIMM at socket DIMM A1
- Support ODT (On Die Termination)
- Clock gating (CKE) to conserve power when DIMMs are not accessed
- DIMMs enter a low power self-refresh mode

- I2C access to SPD EEPROM for access to RDIMM thermal sensors
- Single Bit Error Correction
- SDDC (Single Device Data Correction – x4 or x8 devices)
- Support for Closed Loop Thermal Management
- Multi Bit Error Detection
- Support for Memory Optimized Mode
- Support for Memory Mirroring
- Support for Independent channel mode

9.6 Memory Population

Across CPU sockets, DIMM populations can be different as long as the population rules for each socket are followed. Additionally, both CPU sockets operate in the same RAS mode and are set up with the same memory timing parameters.

- If DIMMs of different speeds are mixed, all channels operate at the fastest common frequency.
- RDIMMs and UDIMMs cannot be mixed.
- The first DIMM slot in each channel is color-coded with white ejection tabs for ease of identification.
- The first DIMM slot in each channel is color-coded with white ejection tabs for ease of installation.
- The DIMM sockets are placed 450 mils (11.43 mm) apart, center-to-center in order to provide enough space for sufficient airflow to cool stacked DIMMs.
- The T710 memory subsystem supports up to 18 DIMMs. DIMMs must be installed in each channel starting with the DIMM farthest from the processor. Population order will be identified by the silkscreen designator and the System Information Label (SIL) located on the chassis cover. See the figure below for DIMM naming and numbering.
 - Memory Optimized (Independent): {1, 2, 3}, {4, 5, 6}, {7, 8, 9}
 - Advanced ECC (Lockstep) or Mirrored: {2,3}, {5, 6}, {8, 9}
 - Quad Rank or UDIMM: {1, 2, 3}, {4, 5, 6}

9.7 Memory Speed Limitations

The memory frequency is determined by a variety of inputs:

- Speed of the DIMMs
- Speed supported by the CPU
- Configuration of the DIMMs

[Table 10](#) shows the memory populations and the maximum frequency achievable for that configuration.

Note

For Quad Rank DIMMs mixed with Single or Dual Rank DIMMs, the QR DIMM needs to be in the slot with the white ejection tabs (the first DIMM slot in each channel). There is no requirement for the order of SR and DR DIMMs.

Table 11. DIMM Population and Maximum Achievable Frequency

DIMM Type	DIMM 0	DIMM 1	DIMM 2	# of DIMMs	800	1066	1333
UDIMM	SR	–	–	1	✓	✓	✓
	DR	–	–	1	✓	✓	✓
	SR	SR	–	2	✓	✓	✗
	SR	DR	–	2	✓	✓	✗
	DR	DR	–	2	✓	✓	✗
RDIMM	SR	–	–	1	✓	✓	✓
	DR	–	–	1	✓	✓	✓
	QR	–	–	1	✓	✓	✗
	SR	SR	–	2	✓	✓	✗
	SR	DR	–	2	✓	✓	✗
	DR	DR	–	2	✓	✓	✗
	QR	SR	–	2	✓	✗	✗
	QR	DR	–	2	✓	✗	✗
	QR	QR	–	2	✓	✗	✗
	SR	SR	SR	3	✓	✗	✗
	SR	SR	DR	3	✓	✗	✗
	SR	DR	DR	3	✓	✗	✗
	DR	DR	DR	3	✓	✗	✗

9.8 Mirroring

Memory mirroring is supported on memory configurations 29 (64GB) and 35 (32GB).

10 Chipset

10.1 Overview

The T710 motherboard incorporates the Intel 5500-EP chipset for I/O and processor interfacing. The Intel 5500 chipset supports Intel’s 5500 two-socket processor family, QPI interconnect, DDR3 memory technology, and PCI Express Generation 2. The Intel 5500 chipset consists of the Intel-5500 36D Dual IOH and ICH9.

10.2 Intel 5500 Chipset Dual I/O Hub (IOH)

The T710 motherboard incorporates the Intel 5500 chipset 36D Dual IOH to provide a link between the Intel 5500 two-socket processors and I/O components. The main components of the IOH consist of two full-width QPI links (one to each processor), 72 lanes of PCIe Gen2, and a x4 ESI link to connect directly to the South Bridge.

The IOH supports a special mode to work with DP processors that allow two IOHs to appear as a single IOH to the processors in the system. This mode results in special behavior in the link and protocol

layers. Each IOH has a unique NodeID for communication between each other, but only the legacy IOH's NodeID are exposed to the CPU.

10.3 Intel Quickpath Architecture

The QuickPath Architecture consists of serial point-to-point interconnects for the processors and the IOH. T710 has a total of four QuickPath Interconnect (QPI) links including one link connecting the processors and links connecting both processors with the IOH and links connecting both IOHs. Each link consists of 20 lanes (full-width) in each direction with a link speed of 6.4 GT/s. An additional lane is reserved for a forwarded clock. Data is sent over the QPI links as packets.

The QuickPath Architecture implemented in the Intel 5500 chipset features four layers. The Physical layer consists of the actual connection between components. It supports Polarity Inversion and Lane Reversal for optimizing component placement and routing. The Link layer is responsible for flow control and the reliable transmission of data. The Routing layer is responsible for the routing of QPI data packets. Finally, the Protocol layer is responsible for high-level protocol communications, including the implementation of a MESIF (Modify, Exclusive, Shared, Invalid, Forward) cache coherence protocol.

10.4 PCI Express Generation 2

PCI Express is a serial point-to-point interconnects for I/O devices. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports are backwards-compatible with Gen1 transfer rates.

10.5 Intel Direct Media Interface (DMI)

The DMI (previously called the Enterprise Southbridge Interface) connects the Intel 5500 chipset IOH with the Intel I/O Controller Hub (ICH). The DMI is equivalent to a x4 PCIe Gen1 link with a transfer rate of 1 GB/s in each direction.

Intel controller Hub 9/10 is a highly integrated I/O controller, supporting the following functions:

- Six x1 PCIe Gen1 ports, with the capability of combining ports 1-4 as a x4 link
 - These ports are unused on T710
- PCI Bus 32-bit Interface Rev 2.3 running at 33 MHz
- Up to six Serial ATA (SATA) ports with transfer rates up to 300 MB/s
 - T710 features two SATA ports for optional internal optical drive or tape backup
- Six UHCI and two EHCI (High-Speed 2.0) USB host controllers, with up to twelve USB ports
 - T710 has eight external USB ports and two internal ports dedicated for UIPS and embedded storage
- Power management interface (ACPI 3.0b compliant)
- Platform Environmental Control Interface (PECI)
- Intel Dynamic Power Mode Manager
- I/O interrupt controller
- SMBus 2.0 controller
- Low-Pin Count (LPC) interface to Super I/O, Trusted Platform Module (TPM), and SuperVU
- Serial Peripheral Interface (SPI) support for up to two devices
 - T710 BIOS is connected to the ICH using SPI

10.6 Super I/O Controller

The T710 system planar incorporates a SMSC LPC47M534 Super I/O controller to provide support for the serial port and the keyboard controller.

The LPC47M534 is a plug and play compatible device that interfaces directly to the ICH through an embedded LPC bus.

11 BIOS

11.1 Overview

The T710 BIOS is based on the Dell BIOS core and supports:

- IA-32 Intel 5500 Two-Socket 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, USB key, and SD card
- ACPI support
- Direct Media Interface (DMI) support
- PXE and WOL support for on-board NICs
- Memory mirroring
- 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
- UEFI (Unified Extensible Firmware Interface) 2.1 support

The T710 BIOS does not support:

- Embedded diagnostics
- BIOS language localization
- BIOS recovery after bad flash (but can be recovered via iDRAC Express)

11.2 Supported ACPI States

PE T710 conforms to Advance Configuration and Power Interface Specification, v2.0c. and provides support for ACPI P-States, C-States, and T-States.

12 Embedded NICs/LAN on Motherboard (LOM)

12.1 Overview

Two dual-port LAN controllers with support circuitry are embedded on the T710 system board as independent Ethernet interface device. This provides four LOM ports at the rear of the server. Both controllers are TOE enabled, with optional iSCSI offload engine.

The device is Broadcom 5709C Gigabit Ethernet controller. The following information details the features of the LAN device:

- x4 PCI Express Gen2 capable interface
 - T710 operates dual-port controllers at Gen1 speed
- MAC and PHY integrated
- 3072x18 Byte context memory
- 64 KB receive buffer
- TOE (TCP Offload Engine)
- iSCSI controller (enabled through an optional hardware key)
- RDMA controller (RNIC) (enabled through an optional hardware key)
- NC-SI (Network Controller-Sideband Interface) connection
- Wake-On-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- Bare metal deployment support

13 I/O Slots

13.1 Overview

The T710 comes standard with six PCIe (gen 2) expansion slots on the motherboard. A separate dedicated slot is provided on the motherboard for the HDD controller. All PCIe slots are x8 connectors, except the x16 slot. Slot specifications are shown below. See the motherboard diagram for slot locations.

- Slot 1 = half length, full height PCIe x4 link
- Slot 2 = Full length, full height PCIe x16 link
- Slot 3 = Full length, full height PCIe x8 link
- Slot 4 = Half length, full height PCIe x8 link
- Slot 5 = Half length, full height PCIe x8 link
- Slot 6 = Half length, full height PCIe x8 link
- Storage slot = PCIe x8 link

13.2 X16 Express Card Specifications

T710 supports x16 cards that meet the following requirements:

- Standard height (4.376")
- Full length (12.283")
- Support for full bandwidth of x16 Gen2 link
- No support for hot-plug or hot-removal
- Maximum power of 25W
- T710 provides +12V, +3.3V, and +3.3Vaux in accordance with Power Supply Rail Requirements
- x16 slot is not compliant with the PCI Express x16 Graphics 150W-ATX Specification
- x16 cards must be compliant with the PCI Express Card Electromechanical Specification Rev 2.0

- x16 cards must only occupy the space of one slot. Cards that occupy the space of two slots are not supported
- x16 card is limited to 25 W initial start-up power until it is configured as a high-power device. If no value is set for the Slot Power Limit, the card is limited to 25 W. The card must then scale down to 25 W or disable operation per PCI Express Base Spec Rev 2.0
- x16 card must be able to support a maximum operating temperature of 55°C as defined in the Dell PCI Environmental Spec and the PCI Express Card Electromechanical Spec. T710 provides a minimum transverse air velocity of x LFM (linear feet per minute) to the x16 card.

13.3 Available PCIe Cards

T710 supports the following cards. Maximum supported and slot priorities shown.

Table 12. T710 Supported PCIe Cards and Descriptions¹

Category	Card Priority	Description	Width	Slot Priority ²	Maximum Cards
Internal Storage (Integrated Slot)	100	Dell PERC 6/i Integrated (No Sled)	x8 Gen1	Integrated	1
	200	Dell SAS 6/iR Integrated (No Sled)	x8 Gen1	Integrated	1
External Controllers	300	Dell SAS 5/E	x8 Gen1	Slot 6,4,2,5,3	2# ³
	400	Dell PERC 6/E 512	x8 Gen1	Slot 6,4,2,5,3	2# ³
	500	Dell PERC 6/E 256	x8 Gen1	Slot 6,4,2,5,3	2# ³
10 GB NICs	600	Intel 10G Base-DA SFP+ Dual Port Adapter	x8 Gen1	Slot 6,4,2,5,3	4
	700	Intel 10G Base-T Single Port NIC	x8 Gen1	Slot 6,4,2,5,3	4 ³
	800	Broadcom® NetXtreme II® 57710 Single Port 10G Base-T Ethernet PCI-Express Network Interface Card with TOE and iSCSI Offload	x8 Gen1	Slot 6,4,2,5,3	4 ³
	900	Intel 10G Base-SR Optical Single Port NIC	x8 Gen1	Slot 6,4,2,5,3	4
Internal Storage	1000	Dell SAS 5/iR	x8 Gen1	Slot 6,4,2,5,3	2# ³
FC8 HBA Single Port	1100	Qlogic QLE2562 8Gbps FC HBA, Dual Port	x8 Gen1/x4 Gen2	Slot 6,4,2,5,3	5
	1200	Emulex LPe12002 8Gbps FC HBA, Dual Port	x8 Gen1/x4 Gen2	Slot 6,4,2,5,3	5
	1300	Qlogic QLE2560 8Gbps FC HBA, Single Port	x8 Gen1/x4 Gen2	Slot 6,4,2,5,3	5

Category	Card Priority	Description	Width	Slot Priority ²	Maximum Cards
	1400	Emulex LPe12000 8Gbps FC HBA, Single Port	x8 Gen1/x4 Gen2	Slot 6,4,2,5,3	5
FC4 HBA	1500	Qlogic QLE2462 FC4 HBA, Dual Port	x4 Gen1	Slot 6,4,2,5,3	5
	1600	Qlogic QLE2460 FC4 HBA, Single Port	x4 Gen1	Slot 6,4,2,5,3	5
	1700	Qlogic QLE220 FC4 HBA, Single Port	x4 Gen1	Slot 6,4,2,5,3	5
	1800	Emulex LPe11002 FC4 HBA, Dual Port	x4 Gen1	Slot 6,4,2,5,3	5
	1900	Emulex LPe1150 FC4 HBA, Single Port	x4 Gen1	Slot 6,4,2,5,3	5
	SCSI HBA	2000	LSI2032 PCIe SCSI HBA	x4 Gen1	Slot 6,4,2,5,3
1 GB NICs	2100	Intel PRO/1000VT 1G Cu Quad Port NIC	x4 Gen1	Slot 6,4,2,5,3	5
	2200	Intel PRO/1000PT 1G Cu Dual Port NIC	x4 Gen1	Slot 6,4,2,5,3,1	6
	2300	Broadcom 5709 IPv6 1G CU Dual Port NIC TOE/iSOE	x4 Gen1	Slot 6,4,2,5,3,1	6
	2400	Broadcom 5709 IPv6 1G Cu Dual Port NIC TOE	x4 Gen1	Slot 6,4,2,5,3,1	6

1. For optimal performance, it is best to alternate slot population as Slot 6, 4, and 2, before starting Slot 5,3, and 1.
2. Slot 1 should be used for 1G NIC's only preferably.
3. T710 supports up to four 25 W maximum power each (excluding internal storage slot) and up to two 15 W for the remainder PCI-e cards regardless of which slots are populated. This restriction applies to any PCIe cards with a maximum power over 15 W.

13.4 Boot Order

System boot order is settable in the BIOS

14 Storage

14.1 Overview

T710 supports a 16-drive backplane for 2.5" drives and an eight-drive backplane for 3.5" drives. There are sixteen 2.5" or eight 3.5" hot-plug capable Serial Attached SCSI (SAS) or Serial ATA (SATA) slots with two LED indicators per slot, two Mini-SAS cable connectors for connecting the backplane to the integrated SAS 6/iR or PERC 6/i, a 10-pin planar signal connector, and an 8-pin PDB power connector. SAS 6/iR is only supported on the 3.5" HDD backplane.

14.2 3.5” X8 HDD Backplane

The 3.5” HDD backplane has:

- 3.5” HDD are supported in this configuration
- 2.5” SSD in 3.5” carrier. Also max of 2x 2.5” SAS HDD in 3.5” carrier for entry SAS HDD price point
- Two Mini-SAS cables are used to connect both channels of the integrated SAS 6/iR or PERC 6/i card to the eight-drive backplane.
- For SATA/SAS mixing, two SAS drives are supported. In this configuration, one pair of drives will be SAS and the remaining six drives will be SATA.

14.3 2.5” X16 HDD Backplane

The 2.5” HDD backplane has:

- Only 2.5” HDD are supported in this configuration
- One Mini-SAS cable is used to connect one channel of the integrated PERC 6/i (only) card to the sixteen-drive backplane.
- A SAS expander is used to map 16 HDD to the PERC (x4) controller
- For SATA/SAS mixing, two SAS drives are supported. In this configuration, one pair of drives will be SAS and the remaining fourteen drives will be SATA.

14.4 Storage Card Support Matrix

Table 13. Storage Card Support Matrix

	SKU Product	Usage	T710 Support	Slot	PCIe Con	PCI Bracket	I/O Con	RAID	BBU
PERC SAS/SATA	PERC 6/i Integrated	Internal Backplane Storage (HDD, SSD)	Yes – Max 1	Storage slot	x8	No	x4 int	0, 1, 5, 6, 10, 50, 60	BBU
	PERC 6/E Adapter	External SAS/SATA Storage	Yes – Max 2 (MD1000 Pompano and MD1020 Ridgeback)	PCIe slot	x8	Yes	x4 ext x4 ext	0, 1, 5, 6, 10, 50, 60	TBBU
	PERC 5/E Adapter	External Legacy Storage	Yes – Max 2 (MD1000 Pompano only)	PCIe slot	x8	Yes	x4 ext x4 ext	0, 1, 5, 10, 50	TBBU
SAS HBA SAS/SATA	SAS 6/iR Integrated	Internal Backplane Storage (No tape or SSD support)	Yes – Max 1	Storage slot	x8	No	x4 int x4 int	0, 1	No
	SAS 5/iR Adapter	Internal SAS Tape	Yes – Max 1	PCIe slot	x8	Yes	x4 int	N/A	No

	SKU Product	Usage	T710 Support	Slot	PCIe Con	PCI Bracket	I/O Con	RAID	BBU
	SAS 5/E Adapter	External SAS (DAS, Tape)	Yes – Max 2	PCIe slot	x8	Yes	x4 ext x4 ext	None	No
ICH SATA	On Planar via chipset	Internal SATA Optical and/or Tape (No HDD)	Yes - 2 ports for Optical and/or Tape	N/A	N/A	N/A	x1 int	N/A	N/A
LSI 2032 SCSI	LSI 2032 Adapter	Internal/External SCSI Tape or External legacy SCSI storage	Yes - Max 2	PCIe slot	x4	Yes	SCSI(int) SCSI(ext)	N/A	N/A

14.5 Available Drives

Table 14. T710 Available Drives and Descriptions

Form Factor	Capacity	Speed	Type
2.5"	25 GB	N/A	SATA SSD
2.5"	50 GB	N/A	SATA SSD
2.5"	100 GB	N/A	SATA SSD
2.5"	73 GB	15 k	SAS HDD
2.5"	146 GB	15 k	SAS HDD
2.5"	146 GB	10 k	SAS HDD
2.5"	300 GB	10 k	SAS HDD
2.5"	160 GB	7.2 k	SATA HDD
2.5"	250 GB	7.2 k	SATA HDD
2.5"	500 GB	7.2 k	NL SAS HDD
3.5"	146 GB	15 k	SAS HDD
3.5"	300 GB	15 k	SAS HDD
3.5"	450 GB	15 k	SAS HDD
3.5"	600 GB	10 k	SAS HDD
3.5"	160 GB	7.2 k	SATA HDD
3.5"	250 GB	7.2 k	SATA HDD
3.5"	500 GB	7.2 k	SATA HDD
3.5"	750 GB	7.2 k	SATA HDD
3.5"	1000 GB	7.2 k	SATA HDD
3.5"	500 GB	7.2 k	NL SAS HDD
3.5"	750 GB	7.2 k	NL SAS HDD
3.5"	1000 GB	7.2 k	NL SAS HDD

14.6 RAID Configurations

T710 offers a wide array of RAID configurations from the factory to support the large drive capacity and the mixing of SSD, SAS, and SATA drives. All configurations use the back plane connection type.

Table 15. T710 RAID Configurations

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SAS/SATA – No RAID	0	MSS	Integrated SAS/SATA No RAID (SAS 6/iR)	2.5" = <i>not valid</i> 3.5" = 1 2.5" SSD = <i>not valid</i>	2.5" = <i>not valid</i> 3.5" = 8 2.5" SSD = <i>not valid</i>	2.5" = <i>not valid</i> 2.5" = <i>not valid</i> 3.5" = 3 3.5" = 8 2.5" SSD = <i>not valid</i> 2.5" SSD = <i>not valid</i>	

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SAS/SATA - RAID	1	MSSR0	Integrated SSD/SAS/SATA RAID 0 (SAS 6/iR)	2.5" = not valid 3.5" = 2	2.5" = not valid 3.5" = 8	N/A	
			Integrated SSD/SAS/SATA RAID 0 (PERC6/i)	2.5" = 2 3.5" = 2	2.5" = 16/8 3.5" = 8		
SAS/SATA - RAID	2	MSSR1	Integrated SSD/SAS/SATA RAID 1 (SAS 6/iR)	2.5" = not valid 3.5" = 2	2.5" = not valid 3.5" = 2	N/A	
			Integrated SSD/SAS/SATA RAID 1 (PERC6/i)	2.5" = 2 3.5" = 2	2.5" = 2 3.5" = 2		
SAS/SATA - RAID	3	MSSR5	Integrated SSD/ SAS/SATA RAID 5 (PERC 6/i)	2.5" = 3 3.5" = 3	2.5" = 16/8 3.5" = 8	N/A	
SAS/SATA - RAID	4	MSSR6	Integrated SSD/SAS/SATA RAID 6 (PERC 6/i)	2.5" = 4 3.5" = 4	2.5" = 16/8 3.5" = 8	N/A	
SAS/SATA - RAID	5	MSSR10	Integrated SSD/SAS/SATA RAID 10 (PERC 6/i)	2.5" = 4 3.5" = 4	2.5" = 16/8 3.5" = 8	N/A	

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SAS/SATA - RAID	6	MSSR50	Integrated SSD/SAS/SATA RAID 50 (PERC 6/i)	2.5" = 6 3.5" = 6	2.5" = 16/8 3.5" = 8	N/A	
SAS/SATA - RAID	7	MSSR60	Integrated SSD/SAS/SATA RAID 60 (PERC 6/i)	2.5" = 8 3.5" = 8	2.5" = 16/8 3.5" = 8	N/A	
SAS/SATA - RAID	8	MSSR1R1	Integrated SSD/SAS/SATA RAID 1/RAID 1 (SAS 6/iR, PERC 6/i)	2.5" = 2+2 3.5" = 2+2	2.5" = 2+2 3.5" = 2+2	N/A	
SAS/SATA - RAID	9	MSSR1R5	Integrated SSD/SAS/SATA RAID 1/RAID 5 (PERC 6/i)	2.5" = 2 + 3 3.5" = 2 + 3	2.5" = 2+14/6 3.5" = 2+ 6	N/A	
SAS/SATA - RAID	13	MSSR1R6	Integrated SSD/SAS/SATA RAID 1/RAID 6 (PERC 6/i)	2.5" = 2 + 3 3.5" = 2 + 3	2.5" = 2+14/6 3.5" = 2+ 6	N/A	
SAS/SATA – No RAID	10	MSS-X	Integrated SAS/SATA No RAID (SAS 6/iR)	-	-	2.5" = not valid 3.5" = 3 2.5" = not valid 3.5" = 2+2	2.5"= not valid 3.5"=6

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SAS/SATA - RAID	11	MSSR1R1-X	Integrated SAS/SATA RAID 1/RAID 1 (SAS 6/iR) Integrated SAS/SATA RAID 1/RAID 1 (PERC 6/i)	–	–	–	2.5" = <i>not valid</i> 3.5" = 2+2 2.5" = 2+2 3.5" = 2+2
SAS/SATA - RAID	12	MSSR1R5-X	Integrated SAS/SATA RAID 1/RAID 5 (PERC 6/i)	–	–	–	2.5" = 2 + 14/6 3.5" = 2 + 6
SSD/SAS - RAID	14	MSSR0R1-X	Integrated SSD/SAS RAID 0/RAID 1 (PERC 6/i) RAID 0 set is SSD, RAID 1 set is SAS	–	–	2.5" = 1 + 2 2.5" = 14 + 2 3.5" = 1 + 2 3.5" = 6 + 2	
SSD/SAS - RAID	15	MSSR1R1-X	Integrated SSD/SAS RAID 1/RAID 1 (PERC 6/i) RAID 1 set is SSD, second RAID 1 set is SAS	–	–	2.5" = 2 + 2 2.5" = 2 + 2 3.5" = 2 + 2 3.5" = 2 + 2	

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SSD/SAS - RAID	16	MSSR1R5-X	Integrated SSD/SAS RAID 1/RAID 5 (PERC 6/i) RAID 1 set is SSD, RAID 5 set is SAS	-	-	2.5" = 2 + 3 2.5" = 2 + 14 3.5" = 2 + 3 3.5" = 2 + 6	
SSD/SAS - RAID	17	MSSR1R10-X	Integrated SSD/SAS RAID 1/RAID 10 (PERC 6/i) RAID 1 set is SSD, RAID 10 set is SAS	-	-	2.5" = 2 + 4 2.5" = 2 + 14 3.5" = 2 + 4 3.5" = 2 + 4	
SSD/SAS - RAID	18	MSSR1R50-X	Integrated SSD/SAS RAID 1/RAID 50 (PERC 6/i) RAID 1 set is SSD, RAID 50 set is SAS	-	-	2.5" = 2 + 6 2.5" = 2 + 14 3.5" = 2 + 6 3.5" = 2 + 6	
SSD/SAS - RAID	19	MSSR10R50-X	Integrated SSD/SAS RAID 10/RAID 50 (PERC 6/i) RAID 10 set is SSD, RAID 50 set is SAS	-	-	2.5" = 4 + 6 2.5" = 8 + 8 3.5" = not valid 3.5" = not valid	

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SSD/SAS/ SATA RAID	20	MSSR0R1R5-X	Integrated SSD/SAS/SATA RAID 0/RAID 1/RAID 5 (PERC 6/i) RAID 0 set is SSD, RAID 1 set is SAS, RAID 5 set is SATA	–	–	2.5" = 1 + 2 + 3 2.5" = 4 + 2 + 10 3.5" = 1 + 2 + 3 3.5" = 2 + 2 + 4	
SSD/SAS/ SATA RAID	21	MSSR1R1R5-X	Integrated SSD/SAS/SATA RAID 1/RAID 1/RAID 5 (PERC 6/i) RAID 1 set is SSD, second RAID 1 set is SAS, RAID 5 set is SATA	–	–	2.5" = 2 + 2 + 3 2.5" = 2 + 2 + 12 3.5" = 2 + 2 + 3 3.5" = 2 + 2 + 4	

Configuration Type	Configurations		Description	Non-Mixed drives, all SATA, or all SAS, or all SSD		Mixed SAS/ SATA Non-RAID mix of SSD with SAS/SATA not supported Min 2xSAS+1xSATA 2.5" (2.5" chassis): Max 2xSAS + 14xSATA 2.5" (3.5" chassis): Max 2xSAS + 6xSATA 3.5": Max 2xSAS + 6xSATA	
				Min HDD	Max HDD 2.5" chassis/3.5" chassis	Min HDD	Max HDD 2.5" chassis/ 3.5" chassis
SSD/SAS/ SATA RAID	22	MSSR10R1R5-X	Integrated SSD/SAS/SATA RAID 10/RAID 1/RAID 5 (PERC 6/i) RAID 10 set is SSD, RAID 1 set is SAS, RAID 5 set is SATA	–	–	2.5" = 4 + 2 + 3 2.5" = 8 + 2 + 6 or 2.5" = 4 + 2 + 10 3.5" = not valid 3.5" = not valid	

14.7 Internal Storage Controllers

T710 supports a choice of two internal 3GB SAS HDD controllers. The internal controller is placed in the dedicated storage slot on the motherboard.

14.8 LED Indicators

Each disk drive carrier has two LED indicators visible from the front of the system. One is a green LED for disk activity and the other is a bicolor (Green/Amber) LED for status information. The activity LED is driven by the disk drive during normal operation. The bicolor LED is controlled by the SEP device on the backplane. Both LEDs indicate certain conditions under direction of a storage controller.

14.9 Optical Drives

SATA optical drives are optional and connect to the planar via a SATA interface. IDE optical drives are no longer supported. The following optical drives are available on T710: DVD-ROM and DVD+RW.

If the optical drive is not ordered with the system, a blank is installed in its place. In the absence of tape drive, an optional second SATA optical drive is installed in the bay adjacent to the first optical drive.

14.10 Tape Drives

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 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.

T710 supports a number of internal tape backup options, plus the RD1000 disk backup unit. Only half-height backup options are supported.

15 Video

15.1 Overview

The T710 system Integrated Dell Remote Access Controller (iDRAC6) incorporates an integrated video subsystem, connected to the 32-bit PCI interface of the ICH. This logic is based on the Matrox G200. The device only supports 2D graphics.

The integrated video core shares its video memory with the iDRAC's 128 MB DDR2 application space memory. This memory is also used for the KVM buffer.

The T710 system supports the following 2D graphics video modes:

Table 16. Video Descriptions

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	56, 60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1152 x 864	75	8, 16, 32
1280 x 1024	60, 75, 85	8, 16
1280 x 1024	60	32

16 Audio

T710 does not support audio (sound card or speakers) as a system feature.

17 Rack Information

17.1 Overview

T710 shares the same rail kit and CMA as T610. The rails and CMA are 3U tall, but accommodate systems that are 3U or greater in height such as T710 and T610 (both 5U). The rack kit includes ears that bolt on the chassis and engage the rail latches.

17.2 Cable Management Arm (CMA)

The 3U CMA for T710 contains the following cables.

Table 17. Cable Types and Amount Containable

Cable Type	# of Cables
Power	2
SAS	10
CAT6	2
Status LED	1
KVM dongle	1
Total	16

See [Section 4.8 “Rails and Cable Management”](#) for a picture of the new CMA.

17.3 Rack Configuration

In the rack configuration, the top painted panel is removed and two ears are bolted to the chassis. The ears contain the slam latches that engage the rail latches.



Ears bolt to chassis for rack configuration

Ears Include slam latches to secure server in rack

Figure 22. T710 Rack Ears

17.4 Rails

Sliding ReadyRails™ for 4-post Racks:



Figure 23. T710 Sliding ReadyRails

- Support for tool-less installation in 19" CEA-310-E compliant square hole 4-post racks including:
- Support for Dell Clydesdale Racks (4220, 2420)
- Support for Dell R2K Racks (4210, 2410)
- Support for Dell Marconi Racks (4200, 2400)
- Support for HP/Compaq 9xxx and 10xxx series racks
- Support for HP/Compaq 7xxx series racks without the CMA
- Support for tool-less installation in 19" CEA-310-E compliant round hole 4-post racks

- Support for full extension of the system out of the rack to allow serviceability of key internal components
- Support for optional cable management arm (CMA)
- Rail depth without the CMA: 760 mm
- Rail depth with the CMA: 840 mm
- Square-hole rack adjustment range: 692-756 mm
- Round-hole rack adjustment range: 678-749 mm

18 Operating Systems

18.1 Overview

T710 supports all major enterprise server operating systems consistent with the Dell 11G server portfolio.

18.2 Operating Systems Supported

Table 18. Microsoft Operating System

Operating Systems	Installation		Factory Install	Logo/Certification	Schedule
Small Business Server 2008	X64	Standard Premium	FI FI	WHQL	RTS
Small Business Server 2003 R2	32-bit x86	Standard Premium	FI	WHQL	RTS
Windows Server® 2008 and Windows Server 2008 SP2	32-bit x86	Standard	FI	WHQL	RTS
		Enterprise	FI		RTS
	x64	Standard	FI	WHQL	RTS
		Enterprise Datacenter	FI FI		RTS RTS
Windows Server 2003	32-bit x86	Standard	No		WHQL
		Enterprise	No	RTS	
	x64	Standard	No	WHQL	RTS
		Enterprise	No		RTS
Windows Server 2003 R2	32-bit x86	Standard	FI	WHQL	RTS
		Enterprise	FI		RTS
	x64	Standard	FI	WHQL	RTS
		Enterprise	FI		RTS
		Datacenter	DIB		RTS

Table 19. Linux Operating System

Operating Systems	Installation	Factory Install	Logo/Certification	Schedule
Red Hat® Enterprise Linux® 4.7	ES/AS x86-64	DIB, NFI	Yes	RTS
				RTS
Red Hat Enterprise Linux 5.3	x86-64	FI	Yes	RTS
				RTS
	x86	DIB, NFI	Yes	RTS
				RTS
SUSE™ Linux Enterprise Server 10 x86-64 SP2	X86-64	FI (may change)	Yes	RTS
SUSE Linux Enterprise Server 11	x86-64	FI	Yes	RTS

Table 20. Solaris Operating System

Operating Systems	Installation	Factory Install	Logo/Certification	Schedule
Solaris 10 (latest update)	–	DIB, NFI	Yes	Post RTS

19 Virtualization

19.1 Overview

T710 has a primary mission as a virtualization platform for remote locations. Accordingly, the T710 supports all major virtualization options available from Dell, including VMware, Citrix XenServer and Microsoft Hyper-V Server. Embedded options are available for VMware and Citrix XenServer.

Embedded options require the optional SD card module to be installed.

19.2 Virtualization Options Supported

Table 21. Virtualization Options Supported

Operating Systems	Factory Install	Logo/Certification	Schedule
Support for VMware ESX™ 3.5 update 4 and ESX 4.0	FI	Yes	RTS
Support for Microsoft Hyper-V (Viridian)™	FI	Yes	RTS
Support for VMware ESXi™ 3.5 update 4 and ESXi 4.0 (embedded)	FI	Yes	RTS
Support for Citrix XenServer Enterprise® 5.x (embedded)	FI	Yes	RTS
Support for Microsoft Hyper-V server (VSKU) (standalone)	FI	Yes	RTS

20 Systems Management

20.1 Overview/Description

Dell aims on delivering 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 console
- 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, sized, and supported right.

20.2 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:** 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:** The section includes Acrobat 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 varieties.

20.3 Embedded Server Management

The PowerEdge T710 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.

20.4 Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of several interdependent pieces:

- Lifecycle Controller
- Unified Server Configurator
- iDRAC6
- vFlash

Lifecycle controller powers the embedded management features. It is integrated and tamperproof storage for system-management tools and enablement utilities (firmware, drivers, etc.). It is flash partitioned to support multiple, future-use cases.

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 iDRAC 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 includes:

Table 22. 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.

20.5 Optional iDRAC Express

The optional iDRAC 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.

20.6 iDRAC6 Enterprise

The optional iDRAC6 Enterprise card provides access to advanced iDRAC6 features. The iDRAC6 Enterprise connects directly to the T710 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 MB virtual flash partition. In the future, vFlash will be expanded to include additional features.

A more detailed feature list for iDRAC6 Enterprise and vFlash is included in the table below.

Table 23. Features List for BMC, iDrac, and vFlash

Feature	BMC	iDRAC 6 Express	iDRAC6 Enterprise	vFlash Media
Interface and Standards Support				
IPMI 2.0	✓	✓	✓	✓
Web-based GUI		✓	✓	✓
SNMP		✓	✓	✓
WSMAN		✓	✓	✓
SMASH-CLP		✓	✓	✓
Racadm command-line			✓	✓
Conductivity				
Shared/Failover Network Modes	✓	✓	✓	✓
IPv4	✓	✓	✓	✓
VLAN Tagging	✓	✓	✓	✓

Feature	BMC	iDRAC 6 Express	iDRAC6 Enterprise	vFlash Media
IPv6		✓	✓	✓
Dynamic DNS		✓	✓	✓
Dedicated NIC			✓	✓
Security and Authentication				
Role-based Authority	✓	✓	✓	✓
Local Users	✓	✓	✓	✓
Active Directory		✓	✓	✓
SSL Encryption		✓	✓	✓
Remote Management and Remediation				
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				✓
Monitoring				
Sensor Monitoring and Alerting	✓	✓	✓	✓
Real-time Power Monitoring		✓	✓	✓
Real-time Power Graphing		✓	✓	✓
Historical Power Counters		✓	✓	✓
Logging Features				
System Event Log	✓	✓	✓	✓

Feature	BMC	iDRAC 6 Express	iDRAC6 Enterprise	vFlash Media
RAC Log		✓	✓	✓
Trace Log			✓	✓

21 Peripherals

21.1 USB peripherals

The T710 system supports the following USB devices:

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

21.2 External Storage

22 Packaging Options

The T710 is only available in a single system package. Multipack options are not available.

Appendix A. T710 Volatility Table

Table 24. T710 Volatility Table

	Non-Volatile RAM	Volatile RAM	Reference Designator	Qty
Planar, PE T710				
System BIOS SPI Flash	Y		U55	1
Ethernet Controller Config Data	Y		TBD	2
ESM Firmware	Y		U18	1
System CPLD	Y		U53	1
MASER Daughtercard Internal Flash	Y		U_EMMC	1
MASER Daughtercard FRU	Y		U_FRU	1
TPM ID EEPROM (on TPM board)	Y		U_SEEPROM	1
TPM Binding EEPROM (on planar)	Y		U116	1
ESM SDRAM		Y	U13	1
ESM SEL/FRU	Y		U5	1
ESM Boot Flash	Y		U9	1
System RAM		Y	J40-48; J55-63	18
Control Panel				
System Identification EEPROM	Y		U_SYS_ID	1
Backplane 2.5"/3.5"				
PSOC Embedded Flash	Y		U_SEP	2/1
Power Supply				
PSU Microcontroller	Y		TBD	1
PERC 6/i Integrated				
ROMB NVSRAM Config Data	Y		U23	1
ROMB Firmware	Y		U24	1
ROMB Cache RAM		Y	U58-61	4
FRU	Y		U40	1
CPLD	Y		U_CPLD	1
SAS 6/iR Integrated				
SCSI Controller Configuration Data	Y		U3	1
FRU	Y		U4	1
Integrated Mirroring NVSRAM	Y		U1	1
AMEA				
SD Card	Y		J_SD	1
FRU	Y		U_FRU	1