DELL™

OPTIPLEX™960

TECHNICAL GUIDEBOOK

INSIDE THE OPTIPLEX 960 V.4

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DELL™ OPTIPLEX™ 960

Professional users seeking a sophisticated, powerful desktop need to look no further than the OptiPlex 960. The stylish new OptiPlex 960 delivers advanced technologies to tackle any challenge without missing a beat. Available with top-of-the-line processors, generous memory options, native support for dual high-resolution displays, and a diskless option to support flexible computing environments are just a sampling of the built-in productivity options available. Protect systems and data with your choice of leading-edge hardware and software security options. Rest easy knowing IT professionals will have the system management tools they need, with the global Dell service and support options to cover systems from acquisition to asset retirement. Performance at the OptiPlex 960 level is just one of the reasons Dell is a world leader in business desktops—and why OptiPlex is the easiest choice you'll make today.

OPTIPLEX MEANS BUSINESS

The OptiPlex 960 delivers serious performance in a scalable platform you can build a business on:

Long-range planning support with up to a 24-month lifecycle, stable images, and managed transitions

Horsepower for your users' demanding applications with options including the Intel® Core™2 Quad Processor

Advanced manageability tools for IT, including next generation Intel® vPro™ technology

Smaller redesigned chassis including a space saving all-in-one option

OPTIPLEX SECURITY

From hardware to software, from local to remote, The OptiPlex 960 gives you the power to choose your level of security:

Isolate system threats and protect your network infrastructure with Intel® vPro™ client isolation features

Protect sensitive data with optional full disk encryption hard drives

Built-in TPM helps protect the network from unauthorized access, while enabling multi-factor authentication via optional Smart Card Reader and/or fingerprint reader (note, TPM may not be available in all countries)

OPTIPLEX IS EASY TO OWN

Productivity meets manageability in the OptiPlex 960, with a suite of highly customizable, global service and support options throughout the PC lifecycle. For users and IT professionals alike, the OptiPlex 960 is easy to own, enabling:

Remote system diagnosis and repair, reducing desk-side visits with Intel® vPro™ technology

Faster repairs for users with Intel® vPro™ Fast Call for Help Technology enabling end-user initiated remote support

Ease of deployment with the OptiPlex 960's support for integrated wireless networking

Time-saving tool-less cover removal for access to tool-less internal components

OPTIPLEX GETS GREEN

Dell is committed to being the greenest PC company on the planet. And the OptiPlex 960 delivers:

Help reduce power consumption—and cost— with Dell's power supply, which is up to 88% efficient

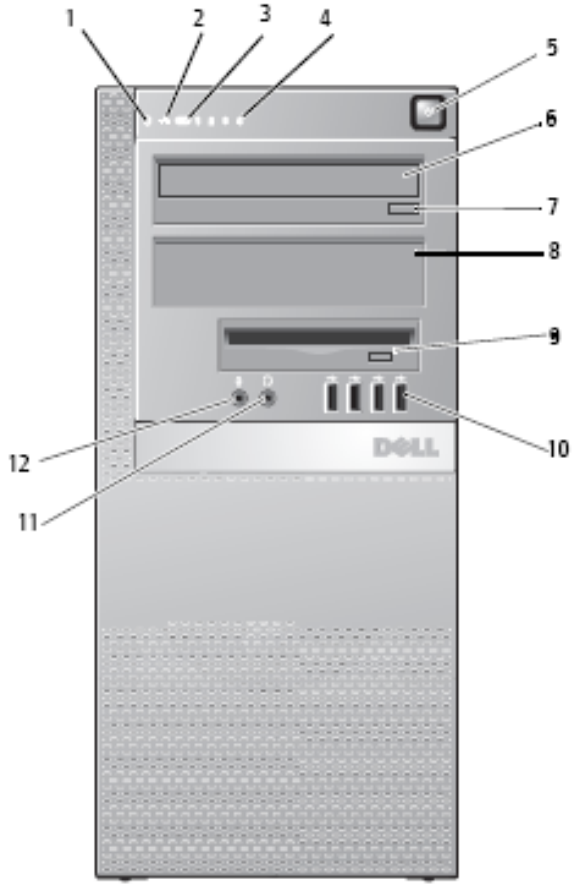
Enjoy a quieter workplace with Dell's ultra-silent QuietKit noise-reduction solution

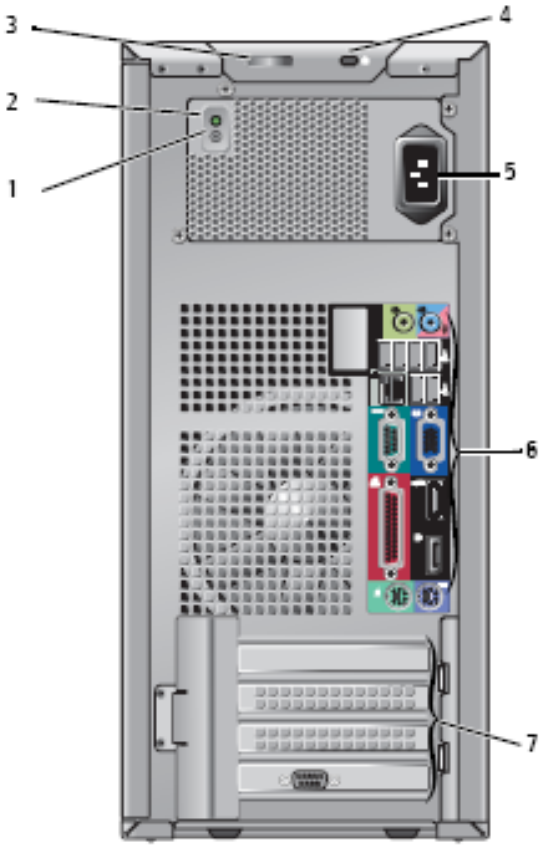
Reduced environmental impact with systems built with 10% post-consumer recycled content

Minimize power usage with Dell EnergySmart power management technology

Environmental sensitivity with the OptiPlex 960's Energy Star, EPEAT-Gold, TCO, and Blue Angel certification

MINI TOWER COMPUTER (MT) VIEW

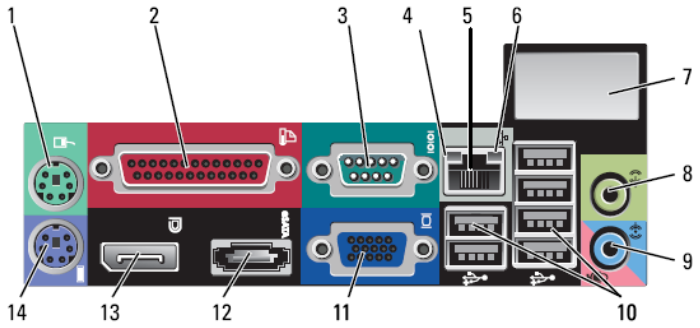




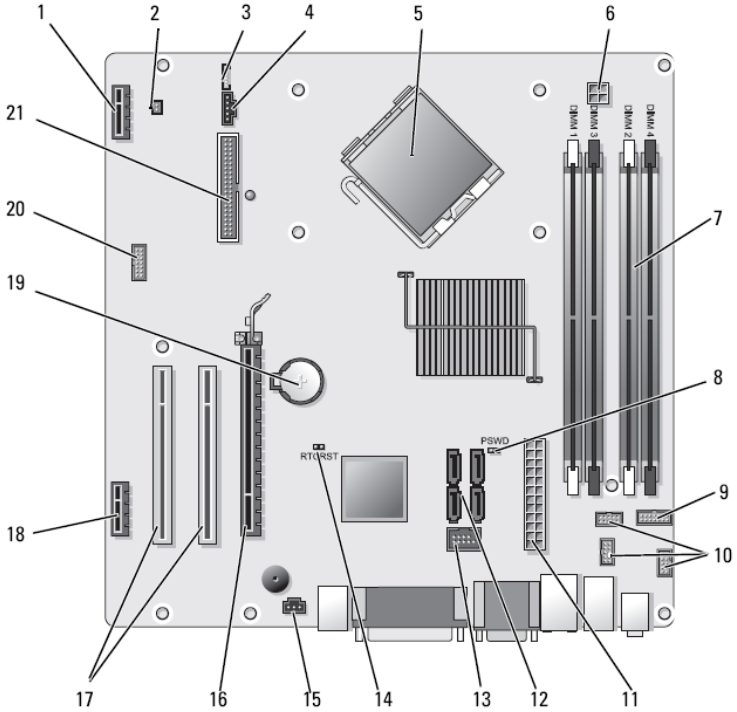
FRONT VIEW			
1	Hard Drive Activity Light	7	Optical Eject Button Drive
2	Link Integrity Light	8	Optical Drive Filler Panel
3	Wi-FI Light *(optional)*	9	Flex Bay *(for optional floppy drive or memory card reader)*
4	Diagnostic Lights	10	USB 2.0 Connectors (4)
5	Power Button, Power Lights	11	Headphone Connector
6	Optical Drive	12	Microphone Connector

BACK VIEW			
1	Power Supply Built in Self Test Button	5	Power Cable Connector
2	Power Supply Status Light	6	Back-panel Connectors
3	Cover-release latch and padlock ring (security screw optional)	7	Expansion-card Slots (4)
4	Security Cable Slot		

MINI TOWER COMPUTER (MT) VIEW (CONT.)

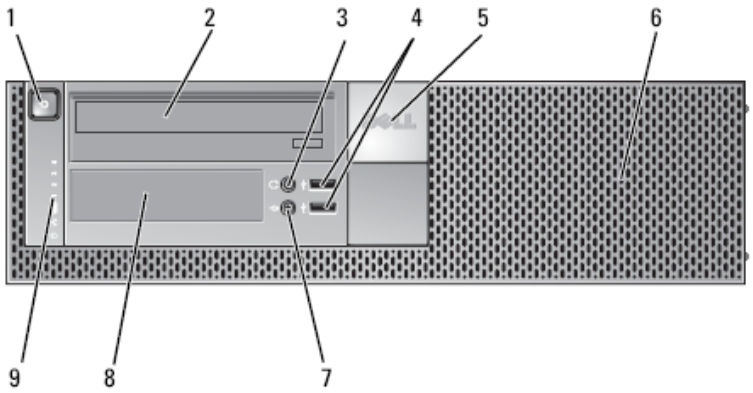


BACK PANEL CONNECTORS			
1	PS/2 Mouse Connector	8	Line-out Connector
2	Parallel Connector	9	Line-in/Microphone Connctor
3	Serial Connector	10	USB 2.0 Connectors (6)
4	Link Integrity Light	11	VGA Connector
5	Network Adapter Connector	12	eSATA Connector
6	Network Activity Light	13	DisplayPort Connector
7	Wireless Network Adapter (*optional*)	14	PS/2 Keyboard Connector

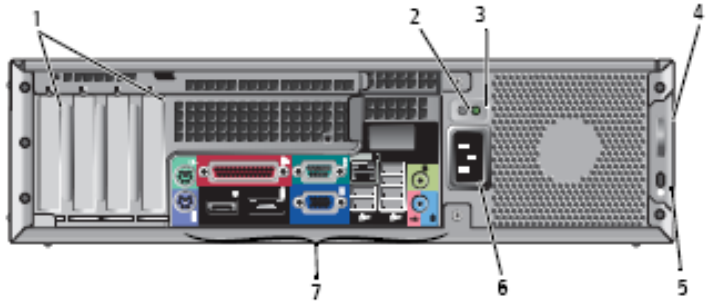


SYSTEM BOARD			
1	Wireless Card Connector	12	SATA Drive Connectors (4)
2	Thermal Sensor Connector	13	Internal USB Flex Bay Connector
3	Internal Speaker Connector (INT SPKR1)	14	BIOS/RTC Reset Jumper Pins
4	Fan (FAN_CPU)	15	Intrusion Switch Connector (INTRUDER)
5	Processor Connector (CPU)	16	PCI Express x16 Connector (SLOT1)
6	Processor Power Connector (12VPOWER)	17	PCI Connector (SLOT2, SLOT3)
7	Memory Module Connectors (4)	18	PCIe x1 Connector (SLOT4)
8	Password Reset Pins (PSWD)	19	RTC Battery
9	System Status LEDs Panel Connector	20	Serial Connector
10	Front Panel Connectors (3)	21	Floppy Disk Connector (DSKT2)
11	Power Connector (POWER)		

DESKTOP COMPUTER (DT) VIEW

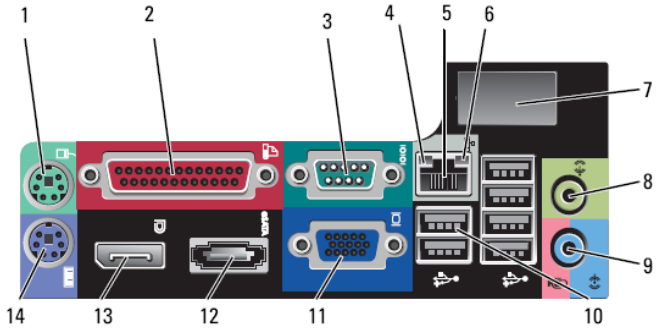


FRONT VIEW			
1	Power Button, Power Light	6	Bezel
2	5.25” Drive Bay	7	Microphone Connector
3	Headphone Connector	8	3.5” Drive Bay
4	USB 2.0 Connectors (2)	9	Diagnostic Lights
5	Dell Badge		

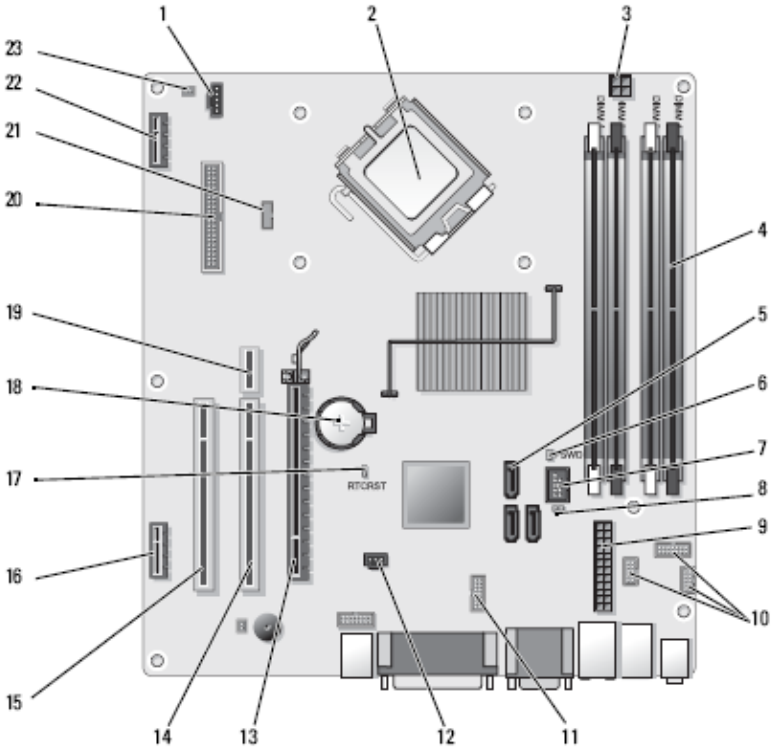


BACK VIEW			
1	Expansion card slots (4)	5	Security Cable Slot
2	Power Supply Built in Self Test Button	6	Power Connector
3	Power Supply Status Light	7	Back-panel Connectors
4	Cover-release Latch and Padlock Ring *(security screw optional)*		

DESKTOP COMPUTER (DT) VIEW (CONT.)

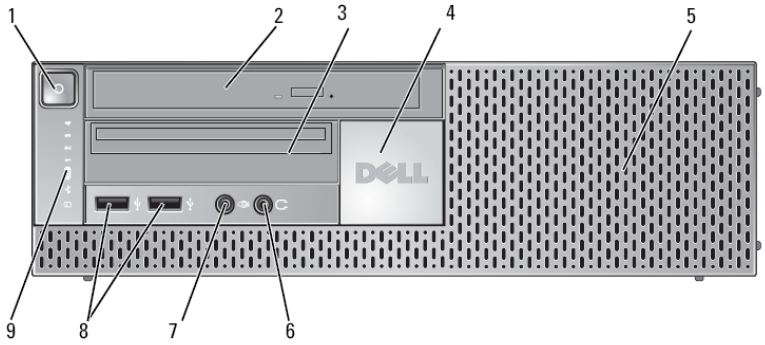


BACK PANEL CONNECTORS			
1	PS/2 Mouse Connector	8	Line-out Connector
2	Parallel Connector	9	Line-in/Microphone Connctor
3	Serial Connector	10	USB 2.0 Connectors (6)
4	Link Integrity Light	11	VGA Connector
5	Network Adapter Connector	12	eSATA Connector
6	Network Activity Light	13	DisplayPort Connector
7	Wireless Network Adapter (*optional*)	14	PS/2 Keyboard Connector

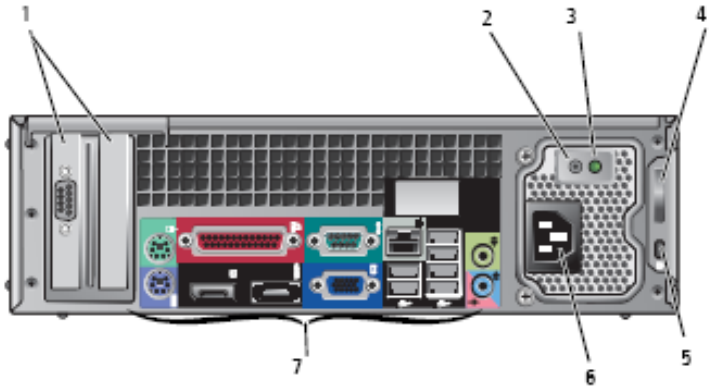


SYSTEM BOARD			
1	Fan Connector (FAN_CPU)	13	PCI Express x16 Connector (SLOT1)
2	Processor Connector (CPU)	14	PCI Connector (SLOT2)
3	Processor Power Connector (12VPOWER)	15	PCI Connector (SLOT3)
4	Memory Module Connectors (DIMM_1, DIMM_2, DIMM_3, DIMM_4)	16	PCI Express x1 Connector (SLOT4)
5	SATA Connectors (3)	17	RTC Reset Jumper Pins
6	Password Jumper (PSWD)	18	Battery Socket (BATTERY)
7	Internal USB Connector (FLEX_USB)	19	Riser Connector (uses PCI-E port/SLOT1 and PCI port/SLOT2)
8	Service Mode Jumper (SERVICE_MODE)	20	Floppy Connector (DSKT)
9	Power Connect (POWER)	21	Internal Speaker (INT_SPKR)
10	Front Panel Connector (FRONTPANEL)	22	Connector for Optional Wireless Card
11	Serial Connector	23	Front Panel Thermal Sensor
12	Intrusion Switch Connector (INTRUDER)		

SMALL FORM FACTOR COMPUTER (SFF) VIEW

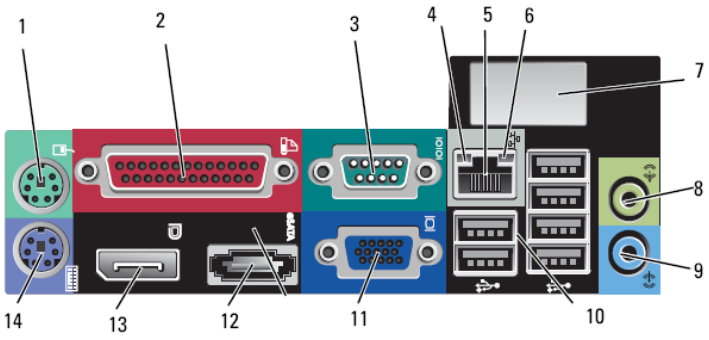


FRONT VIEW			
1	Power Button, Power Light	6	Headphone Connector
2	5.25” Drive Bay	7	Microphone Connector
3	3.5” Flex Bay for Floppy Drive (optional) or Media Card (optional)	8	USB 2.0 Connectors (2)
4	Dell Badge	9	Diagnostic Lights
5	Bezel		

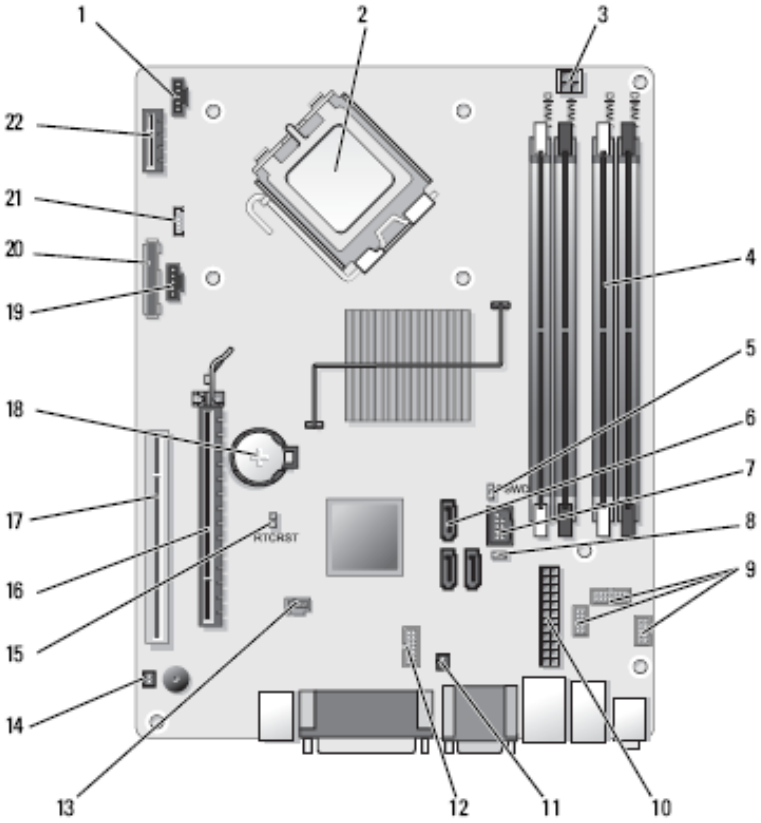


BACK VIEW			
1	Expansion card slots (2)	5	Security Cable Slot
2	Power Supply Check Button	6	Power Cable Connector
3	Power Supply Check Light	7	Back-panel Connectors
4	Cover-release Latch and Padlock Ring *(security screw optional)*		

SMALL FORM FACTOR COMPUTER (SFF) VIEW (CONT.)



BACK PANEL CONNECTORS			
1	PS/2 Mouse Connector	8	Line-out Connector
2	Parallel Connector	9	Line-in/Microphone Connctor
3	Serial Connector	10	USB 2.0 Connectors (6)
4	Link Integrity Light	11	VGA Connector
5	Network Adapter Connector	12	eSATA Connector
6	Network Activity Light	13	DisplayPort Connector
7	Wireless Network Adapter *(optional)*	14	PS/2 Keyboard Connector



SYSTEM BOARD			
1	Fan Connector (FAN_CPU)	12	Serial Port Connector
2	Processor Connector (CPU)	13	Intrusion Switch Connector (INTRUDER)
3	Processor Power Connector (12VPOWER)	14	Front Panel Thermal Sensor Cable Connector
4	Memory Module Connectors (DIMM_1, DIMM_2, DIMM_3, DIMM_4)	15	Real Time Clock Reset (RTCRST)
5	Password Jumper Pins (PSWD)	16	PCI Express x16 Connector (SLOT1)
6	SATA Drive Connectors (3)	17	PCI Connector (SLOT2)
7	Internal (FlexBay) USB Connector	18	Battery Socket (BATTERY)
8	Service Mode Jumper Pins	19	Hard Drive Fan Connector (FAN_HDD)
9	Front-panel Connector (FRONTPANEL)	20	Floppy Drive Connector (DSKT)
10	Power Connector (POWER)	21	Internal Speaker
11	PSU Thermal Sensor Connector	22	Connector for Optional Wireless Card

MARKETING SYSTEM CONFIGURATIONS

NOTE: Offerings may vary by region. For more information regarding the configuration of your computer, click Start>Help and Support and select the option to view information about your computer.

OPERATING SYSTEM

NOTE: One of the following Operating Systems will be preinstalled.

	MT	DT	SFF
Windows Vista® operating system	Windows Vista® SP1 Business (32 and 64 bit), Windows Vista® SP1 Ultimate (32 bit),		
Windows XP® operating system	Windows® XP Professional SP3 via Windows® Vista Business Downgrade Rights (32 bit)		
Other	FreeDOS for (n-series),		
OS Media Support	X	X	X

CHIPSET

	MT	DT	SFF
Chipset	Intel Q45 Express Chipset w/ICH10DO		
Non-volatile memory on chipset			
BIOS Configuration SPI (Serial Peripheral Interface)	64Mbit (8MB) located at SPI_FLASH on chipset		
TPM 1.2 Security Device (Trusted Platform Module)[1]	16KB located at TPM1P2 on chipset		
NIC EEPROM	LOM configuration contained within SPI_FLASH – no dedicated LOM EEPROM		

PROCESSOR

NOTE: Global Standard Products (GSP) are a subset of Dell's relationship products that are managed for availability and synchronized transitions on a worldwide basis. They ensure the same platform is available for purchase globally. This allows customers to reduce the number of configurations managed on a worldwide basis, thereby reducing their costs. They also enable companies to implement global IT standards by locking in specific product configurations worldwide. The following GSP processors identified below will be made available to Dell customers.

NOTE: Processor numbers are not a measure of performance.

	MT	DT	SFF
Intel Quad Core processors			
Intel Core 2 Quad Q9650/3.00GHz,12M,1333FSB	X-GSP	X-GSP	X-GSP
Intel Core 2 Quad Q9550/2.83GHz,12M,1333FSB	X-GSP	X-GSP	X-GSP
Intel Core 2 Quad Q9400/2.66GHz,6M,1333FSB	X	X	X
Intel Dual Core processors			
Intel Core 2 Duo E8600/3.33GHz, 6M, 1333FSB	X-GSP	X-GSP	X-GSP
Intel Core 2 Duo E8500/3.16GHz,6M,1333FSB	X-GSP	X-GSP	X-GSP
Intel Core 2 Duo E8400/3.0GHz,6M,1333FSB	X-GSP	X-GSP	X-GSP

ADVANCED SYSTEM MANAGEABILITY MODES

NOTE: Hardware management mode options allow you to select the right systems management feature support for your enterprise. Dell's innovative approach to scalable remote client management offers you a choice of built-in hardware management capabilities across platform offerings.

The latest generation of Intel® vPro™ technology provides the capability to manage your install base of systems regardless of the power state or hardware functionality of the system.

This functionality allows IT to address many issues remotely rather than having to physically visit systems.

The OptiPlex 960 supports the latest generation of Intel® vPro™ technology.

Intel® iAMT technology/ Intel® vPro™ technology support the following features:

Asset reporting and inventory capabilities, Remote troubleshooting and repair, Client System Isolation, Remote patching/ updating

Intel® vPro™ technology adds these additional features:

Client initialed "Fast Call for Help"/ beyond firewall systems management capability, Microsoft NAP support, Hardened security monitoring, Support for the latest generation of Intel® Core™ 2 Quad Processors

*The functionality described above requires an appropriate software management console

	MT	DT	SFF
Intel vPro Advanced Client Systems Management* (iAMT Professional 5.0)	X	X	X
Intel Standard Manageability* (iAMT 5.0)	X	X	X
No Management- Upgradeable	X	X	X
Management Disabled- Not Upgradeable	X	X	X

* This functionality requires the appropriate software management console

MEMORY

Your computer supports a maximum of 8GB of memory when you use four 2GB DIMMs; however, 32-bit operating systems, such as the 32-bit version of Microsoft® Windows® XP, can only use a maximum of 4GB of address space. Moreover, certain components within the computer require address space in the 4GB range. Any address space reserved for these components cannot be used by computer memory; therefore, the amount of memory available to the operating system is less than 4GB.

NOTE: The entire 8GB memory range is available to 64-bit operating systems.

Memory modules should be installed in pairs of matched memory size, speed, and technology. If the memory modules are not installed in matched pairs, the computer will continue to operate, but with a slight reduction in performance.

	MT	**DT**	**SFF**
Type: DDR2 Synch DRAM Non-ECC Memory	800MHz		
DIMM Slots	4	4	4
DIMM Capacities	Up to 8GB	Up to 8GB	Up to 8GB
Minimum Memory	1GB	1GB	1GB
Maximum Memory with 800MHz speed memory	8GB[1]	8GB[1]	8GB
800MHz Memory configurations			
8GB[1] DDR2 Non-ECC SDRAM, 800MHz, (4 DIMM)	X	X	X
4GB[1] DDR2 Non-ECC SDRAM, 800MHz, (4 DIMM)	X	X	X
4GB[1] DDR2 Non-ECC SDRAM, 800MHz, (2 DIMM)	X	X	X
3GB DDR2 Non-ECC SDRAM, 800MHz, (4 DIMM)	X	X	X
3GB DDR2 Non-ECC SDRAM, 800MHz, (2 DIMM)	X	X	X

MEMORY (CONT.)

	MT	DT	SFF
800MHz Memory configurations (Cont.)			
2GB DDR2 Non-ECC SDRAM, 800MHz, (4 DIMM)	X	X	X
2GB DDR2 Non-ECC SDRAM, 800MHz, (2 DIMM)	X	X	X
1GB DDR2 Non-ECC SDRAM, 800MHz, (2 DIMM)	X	X	X
1GB DDR2 Non-ECC SDRAM, 800MHz, (1 DIMM)	X	X	X

[1]The total amount of available memory will be less than 4GB. The amount less depends on the actual system configuration. To fully utilize 4GB or more of memory requires a 64-bit enabled processor and 64-bit operating system.

DRIVES AND REMOVABLE STORAGE

	MT	DT	SFF
Bays:			
3.5-inch bay (External Floppy)	1	1	1 (slimline)
5.25-inch bay (External Optical)	2	1	1 (slimline)
Hard Drives Supported (Internal and External)	2	1 x 3.5” or 2 x 2.5”	1 x 3.5” or 2 x 2.5”
Optical Drives Supported (External)	2	1	1
Interface:			
SATA	4	3	3
Floppy/Diskette	1	1	1
3.5” Hard Drives:			
160GB[1] SATA 10K RPM HDD	X	X	X
80GB[1] SATA 10K RPM HDD	X	X	X
320GB[1] SATA 7200 RPM HDD	X	X	X
250GB[1] SATA 7200 RPM HDD	X	X	X
160GB[1] SATA 7200 RPM HDD	X	X	X
80GB[1] SATA 7200 RPM HDD	X	X	X
2.5” Hard Drives			
64GB[1] SATA Solid State HDD	X	X	X
160GB[1] SATA Full Disk Encryption HDD	*X*	*X*	*X*
160GB[1] SATA 7200 RPM HDD	X	X	X
80GB[1] SATA 7200 RPM HDD	X	X	X

DRIVES AND REMOVABLE STORAGE (CONT.)

	MT	DT	SFF
3.5" RAID 1 Data Protection: (includes two matching capacity/speed hard drives)			
160GB[1] SATA 10K RPM HDD	X		
80GB[1] SATA 10K RPM HDD	X		
320GB[1] SATA 7200 RPM HDD	X		
250GB[1] SATA 7200 RPM HDD	X		
160GB[1] SATA 7200 RPM HDD	X		
80GB[1] SATA 7200 RPM HDD	X		
2.5" RAID 1 Data Protection: (includes two matching capacity/speed hard drives)			
160GB[1] SATA 7200 RPM HDD	X	X	X
80GB[1] SATA 7200 RPM HDD	X	X	X
3.5" RAID 0 Performance: (includes two matching capacity/speed hard drives)			
320GB[1] SATA 10K RPM HDD	X		
160GB[1] SATA 10K RPM HDD	X		
640GB[1] SATA 7200 RPM HDD	X		
500GB[1] SATA 7200 RPM HDD	X		
320GB[1] SATA 7200 RPM HDD	X		
160GB[1] SATA 7200 RPM HDD	X		
2.5" RAID 0 Performance: (includes two matching capacity/speed hard drives)			
320GB[1] SATA 7200 RPM HDD	X	X	X
160GB[1] SATA 7200 RPM HDD	X	X	X
Optical Drive: (SFF requires a slimline optical drive)			
DVD+/-RW[2]	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
DVD-ROM[3]	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
Combo Drive CD-RW	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
Floppy			
Floppy Drive	1.44MB		1.44MB
Media Card Reader: (uses Floppy Diskette Drive slot)			
Dell 19 in 1 Media Card Reader	480Mb/s		

[1] For hard drives, 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] Discs burned with this drive may not be compatible with some existing drives and players; using DVD+R media provides maximum compatibility.

[3] DVD-ROM drives may have write-capable hardware that has been disabled via firmware modifications.

SYSTEM BOARD CONNECTORS

NOTE: See Detailed Engineering Specifications for maximum card dimensions support.

	MT	DT	SFF
PCI Slot(s): number of	2	2	1
PCIe x16 Slot: number of	1	1	1
PCIe x1 Slot: number of	1	1	0
Flexbay	1	1	1
Serial ATA (SATA)	4	3	3

GRAPHICS/VIDEO CONTROLLER

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser. SFF supports low profile card.

	MT	DT	SFF
Integrated Intel GMA 4500[1]	Integrated on system board		
Enhanced Graphic/Video Options			
512MB ATI RADEON HD 4670 Graphics dual DVI	Optional	NA	NA
DVI (Digital) Adapter Card	Optional full height or low profile card		
256MB ATI RADEON HD 3450 Graphics dual DVI or VGA and TV Out	Optional full height or low profile card		
256MB ATI RADEON HD 3470 Graphics w/ Dual DP	Optional full height or low profile card		
256MB nVidia GeForce 9300 GE	Optional full height or low profile card		

[1] Up to 1.7 GB of system memory may be allocated to support integrated graphics, depending on operating system, system memory size and other factors.

EXTERNAL PORTS/CONNECTORS

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser. SFF supports low profile card.

See chassis diagrams section for port/connector locations	MT	DT	SFF
USB 2.0 (includes two internal)	12	10	10
Serial	One rear, second port optional		
PS/2	Two rear		
eSATA	One rear		
Parallel	One rear		
Network Connector (RJ-45)	One rear		
1394 Controller	Optional full height card or low profile card		
Video:			
VGA	One rear		
DVI	Optional full height or low profile card		
Display Port	One rear		

EXTERNAL PORTS/CONNECTORS (CONT.)

See chassis diagrams section for port/connector locations	MT	DT	SFF
Audio:			
Microphone-in	One minijack front		
Headphone	One minijack front		
Stereo line-in/microphone	One minijack rear		
Speakers line out	One minijack rear		
Risers: (replaces 1 PCI slot and 1 PCIe slot on DT system board)			
Combo full height riser with 1 PCI and 1 PCIe connector		X	
Dual full height riser with 2 PCI connectors		X	

COMMUNICATIONS - NETWORK ADAPTER (NIC)

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser.

	MT	DT	SFF
Intel® 82567LM Gigabit[1] Ethernet LAN 10/100/1000 (Remote Wake Up, PXE support and Intel Active Management Technology support)	Integrated on system board		
Broadcom NetXtreme 10/100/1000 PCIe Gigabit Networking Card[2]	Supports full height	Low-profile or full height card with optional riser	Supports low profile card

[1] This term does not connote an actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

[2] Intel Active Management Technology supported only with integrated Intel Gigabit Ethernet LAN

COMMUNICATIONS – MODEM

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser.

	MT	DT	SFF
V.92 Data/Fax Controllerless Modem	Optional full height or low profile card		

COMMUNICATIONS – WIRELESS

	MT	DT	SFF
Internal Intel 5300 802.11 draft-N WiFi (with Remote Wake Up support)	Optional and includes WLAN Antenna connector		

AUDIO AND SPEAKERS

	MT	DT	SFF
ADI 1984A High Definition Audio	Integrated on system board		
Internal Chassis Speaker	Optional		
Dell AX210 USB Stereo Speakers	Optional		
Dell AX510/AX510PA Dell Flat Panel Display Soundbar	Optional		

KEYBOARD AND MOUSE

	MT	DT	SFF
Dell USB Entry QuietKey Keyboard	Optional		
Dell USB Enhanced Multimedia Keyboard	Optional		
Dell Smart Card USB Keyboard	Optional		
Dell Bluetooth Keyboard and Mouse	Optional		
Dell USB Entry Optical Mouse	Optional		
Dell USB Premium 5 Button Mouse	Optional		
Dell Laser Mouse	Optional		
Dell Palmrest	Optional		
Dell Logo Mouse Pad	Optional		

SECURITY

	MT	DT	SFF
Trusted Platform Module (TPM) 1.2[1]	Integrated on system board		
Chassis Intrusion Switch	Standard		
Dell USB External Biometric Fingerprint Reader	Optional		
Dell Smart Card USB Keyboard	Optional		
Chassis lock slot	Standard		

[1] TPM may not be available in certain countries

SERVICE AND SUPPORT

NOTE: For more details on Dell Service Plans please to go to: www.dell.com/service/service_plans

	MT	DT	SFF
3 Year Limited Warranty[1] (3-3-0)	Standard		
3 Year Next Business Day On-site[2] Service (3-3-3)	Optional		
Dell ProSupport	Optional		

[1] For a copy of our guarantees or limited warranties, please write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, TX 78682. For more information, visit www.dell.com/warranty.
[2] Service may be provided by third-party. Technician will be dispatched if necessary following phone-based troubleshooting. Subject to parts availability, geographical restrictions and terms of service contract. Service timing dependent upon time of day call placed to Dell. U.S. only.

SOFTWARE

	MT	DT	SFF
Dell Client Manager Standard	Available via Dell.com		
Dell Control Point	Standard		
Norton Internet Security	90 Day Trial or Optional Subscription		
McAfee Security Center	90 Day Trial or Optional Subscription		

DETAILED ENGINEERING SPECIFICATIONS

SYSTEM DIMENSIONS (PHYSICAL)

NOTE: System Weight* and Shipping Weight* is based on a typical configuration and may vary based on PC configuration.

	MT	DT	SFF
Chassis Volume liters	32.62	15.08	8.00
Chassis Weight pounds/kilograms	25.3lbs/ 11.5kg	16.5lbs/ 7.5kg	13.0lbs/ 5.9kg
Chassis Dimensions: (HxWxD)			
Height inches/centimeters	16.06in/40.80cm	15.61in/39.65cm	11.40in/28.96cm
Width inches/centimeters	7.36in/18.70cm	4.30in/10.93cm	3.35in/8.52cm
Depth inches/centimeters	16.96in/43.08cm	13.70in/34.80cm	12.74in/32.36cm
Packaging Parameters (HxWxD)			
Height inches/centimeters	22.06/ 56.0	20.35/ 51.7	20.75/ 52.7
Width inches/centimeters	20.94/ 53.2	20.04/ 50.9	16.38/ 41.6
Depth inches/centimeters	14.56/ 37.0	11.96/ 30.4	11.25/ 28.6

SYSTEM BOARD CONNECTOR MAXIMUM ALLOWABLE DIMENSIONS

	MT	DT	SFF
PCIe x16 Slot Dimensions [slot 1]: (HxL)	1	1	1
Height inches/mm	4.37 [111.15]	2.731 [68.90]**	
Length inches/mm	7.40 [187.96)	6.600 [167.64]**	
PCI Slot Dimensions [slot 2]: (HxL)	1	1	1
Height inches/mm	4.37 [111.15]	2.731 [68.90]**	
Length inches/mm	7.40 [187.96)	6.600 [167.64]**	
PCI Slot Dimensions [slot 3]: (HxL)	1	1	0
Height inches/mm	4.37 [111.15]	2.731 [68.90]**	
Length inches/mm	6.60 [167.64]	6.600 [167.64]**	
PCIe x1 Slot Dimensions [slot 4]: (HxL)	1	1	0
Height inches/mm	4.37 [111.15]	2.731 [68.90]**	
Length inches/mm	6.60 [167.64]	6.600 [167.64]**	
PCIe Wireless Connector x1 Slot	1	1	1
Risers: (replaces PCIe x16 slot 1 and PCI slot 2 on DT system board)			
Combo Full Height Riser with 1 PCI and 1 PCIe connector* (HxL)		1	
Height inches/mm		4.37/111.15*	
Length inches/mm		6.60/167.64*	
Dual Full Height Riser with 2 PCI connectors* (HxL)		1	
Height inches/mm		4.37/111.15*	
Length inches/mm		6.60/167.64*	

*Maximum allowable dimensions for full height card options installed in riser within the desktop chassis

**These dimensions are for a standard low profile card installed in the desktop/sff chassis

SYSTEM LEVEL ENVIRONMENTAL AND OPERATING CONDITIONS

	MT	DT	SFF
Temperature			
Operating	10° to 35° C (50° to 95° F)		
Non-Operating (Storage)	-40° to 65° C (-40° to -149° F)		
Relative Humidity	20% to 80% (non-condensing)		
Maximum vibration			
Operating	5 to 350 Hz at 0.0002 G2/Hz		
Non-Operating	5 to 500 Hz at 0.001 to 0.01 G2/Hz		
Maximum Shock			
Operating	40 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 20 in/sec [51 cm/sec])		
Non-Operating	105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 50 in/sec [127 cm/sec])		
Maximum Altitude			
Operating	–15.2 to 3048 m (–50 to 10,000 ft)		
Non-Operating	–15.2 to 10,668 m (–50 to 35,000 ft)		

POWER

	MT		DT		SFF	
	APFC	EPA	APFC	EPA	APFC	EPA
Power Supply Wattage	**305W[1]**	**255W[1]**	**255W[1]**	**255W[1]**	**235W[1]**	**235W[1]**
AC input Voltage Range	90 – 264Vac	90 – 264Vac	90 – 264Vac	90 – 264Vac	90 – 264Vac	90 – 264Vac
AC input current (low ac range/high AC range)	5.6/2.8 Arms	3.6/1.8 Arms	5.0/2.5 Arms	4.0/2.0 Arms	4.5/2.25 Arms	3.5/1.75 Arms
AC input Frequency	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz
AC holdup time (80% load)	16 ms	16 ms	16 ms	16 ms	16 ms	16 ms
Average Efficiency (En-ergy Star Compliant)		85 – 88 – 85% @ 20 – 50 – 100% load		85 – 88 – 85% @ 20 – 50 – 100% load		85 – 88 – 85% @ 20 – 50 – 100% load
Typical Efficiency (Active PFC)	76%		76%		76%	
DC parameters						
+3.3v output	8.0 A	8.0 A	5.0 A	5.0 A	5.0 A	5.0 A
+5.0v output	16.0 A	16.0 A	15.0 A	15.0 A	16.0 A	16.0 A
+12.0v output	15.0 A & 10.0 A	15.0 A & 10.0 A	18.0 A	18.0 A	17.0 A	17.0 A
+5.0v auxiliary output	4.0 A	4.0 A	4.0 A	4.0 A	4.0 A	4.0 A
-12.0v output	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
Max total power	305 W	255 W	255 W	255 W	235 W	235 W
Max combined +3.3v / +5.0v power	80 W	80 W	91.5 W	91.5 W	88 W	88 W
Max combined 12.0v power (note: only if more than one 12v rail)	240W	240W	N/A	N/A	N/A	N/A

[1] These form factors utilize a more efficient Active Power Factor Correction (APFC) power supply. Dell recommends only Universal Power Supplies (UPS) based on Sine Wave output for APFC PSUs, not an approximation of a Sine Wave, Square Wave, or quasi-Square Wave (see UPS technical specifications). If you have questions, please contact the manufacture to confirm the output type.

POWER (CONT.)

	MT		DT		SFF	
	APFC	EPA	APFC	EPA	APFC	EPA
BTUs/h (based on PSU max wattage)	560 BTU	153.5 BTU	477 BTU	153.5 BTU	433 BTU	153.5 BTU
3.3v CMOS battery (type and estimated battery life)	3-V CR2032 lithium coin cell. Minimum est. 5 year life					
Power Supply Fan	80 x 25mm	80 x 25mm	92 x 25mm	92 x 25mm	80 x 15mm or 80 x 20mm	80 x 15mm or 80 x 20mm
Compliance:						
Energy Star Compliant	No	Yes	No	Yes	No	Yes
Blue Angel Compliant	Yes	Yes	Yes	Yes	Yes	Yes
Climate Savers / 80Plus Compliant	No	Silver	No	Silver	No	Silver
FEMP Standby Power Compliant	Yes	Yes	Yes	Yes	Yes	Yes

AUDIO

INTEGRATED ADI 1984A HIGH DEFINITION AUDIO	MT	DT	SFF
High Definition Stereo support	X	X	X
Number of channels	2		
Number of Bits / Audio resolution	16, 20, and 24-bit resolution		
Sampling rate (recording/playback)	Independent 8, 11.025, 16, 22.05, 32, 44.1, 48, 88.2, 96, 176.4, and 192 kHz sample rates		
Signal to Noise Ratio	96+ dB audio outputs, 90+ dB audio inputs		
Analog Audio	X	X	X
Dolby Digital			
THX			
Digital out (S/PDIF)			
Audio Jack Impedance			
Microphone	150 kΩ		
Line-In	150 kΩ		
Line-Out	190 Ω		
Headphone	.5 Ω		
Internal Speaker Power Rating	2W		

COMMUNICATIONS - LAN

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser. SFF supports low profile card.

INTEGRATED INTEL® 82567 GIGABIT ETHERNET LAN 10/100/1000	MT	DT	SFF
External Connector Type	RJ45		
Data Rates supported	10/100/1000 Mbps		
Controller Details			
Controller bus architecture (example PCIe 1.0a x1)	Intel Gigabit LAN Connect Interface (GLCI) and LAN Connect Interface (LCI)		
Integrated memory	N/A		
Data transfer mode (example Bus-Master DMA)	N/A		
Power consumption (full operation per data rate connection speed)	680mW (Max.)		
Power consumption (standby operation)	141mW (Max.)		
IEEE standards compliance (example 802.1P)	802.3		
Hardware Certifications (example FCC, B, GS mark…)	N/A		
Boot ROM Support	EEPROM (located in SPI)		
Network Transfer Mode (example Full Duplex, Half Duplex)			
Network Transfer Rate (example 10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps	10 Mb (full/half-duplex) 100 Mb (full/half-duplex) 1000 Mb (full-duplex)		
Environmental			
Operating temperature	0° C to 70° C (32° F to 158° F)		
Operating humidity	20% to 80% (non-condensing)		
Operating System Driver Support	Windows® XP, Windows Vista® Ultimate, Windows Vista® Business 32 bit/64 bit, Windows Vista Home Basic,		
Manageability (examples WOL, PXE..)	WOL, PXE 2.1		
Management Capabilities Alerting (examples ASF 2.0 AMT…)	iAMT5.0 Professional		

[1] This term does not connote an actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

BROADCOM NETXTREME 10/100/1000 PCIE GIGABIT[1] NETWORKING CARD	MT	DT	SFF
Connector Type	RJ45		
Data Rates supported	10/100/1000 Mbps Half/Full duplex		
Controller Details			
Controller bus architecture (example PCIe 1.0a x1)	PCIe 1.0a x1		
Integrated memory	64KBytes RX, 8KBytes TX		
Data transfer mode (example Bus-Master DMA)	Bus-Master DMA		
Power consumption (full operation per data rate connection speed)	2.84W (860mA @ +3.3V)		
Power consumption (standby operation)	Less than 300mW		

COMMUNICATIONS - INTEGRATED LAN (CONT.)

BROADCOM NETXTREME 10/100/1000 PCIE GIGA-BIT[1] NETWORKING CARD (CONT.)	MT	DT	SFF
IEEE standards compliance (example 802.1P)	802.3, 802.2, 802.3x, 802.1p		
Hardware Certifications (example FCC, B, GS mark…)	FCC B, VCCI B, CE		
Boot ROM Support	No		
Network Transfer Mode (example Full Duplex, Half Duplex)	Full Duplex/Half Duplex		
Network Transfer Rate (example 10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps	10BASE-T (full-duplex) 20 Mbps Max* 100BASE-TX (half-duplex) 100 Mbps Max* 100BASE-TX (full-duplex) 200 MbpsMax* 1000BASE-T (full-duplex) 2000 Mbps Max* * Depends on the system environment.		
Environmental			
Operating temperature	0° C to 55° C (32° F - 131° F)		
Operating humidity	5% ~ 85% (non-condensing)		
Operating System Driver Support	Windows® XP, Windows Vista® Ultimate, Windows Vista® Business 32 bit/64 bit, Windows Vista Home Basic, Linux		
Manageability (examples WOL, PXE..)	WOL, PXE2.1, ACPI		
Management Capabilities Alerting (examples ASF 2.0 AMT…)	None		

COMMUNICATIONS – MODEM

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser. SFF supports low profile card.

V.92 DATA/FAX CONTROLLERLESS MODEM	MT	DT	SFF
Bus	PCI		
External Connector	RJ-11		
Data Transmission	PCM - Pulse Coded Modulation (V.92/V.90) TCM - Trellis Coded Modulation (V.90/V.34/V.32 bis/V.32)		
Data Speeds	56kbps receive, 48kbps transmit		
Data Standards	ITU V.92/V.90, V.34/V.32 bis/V.32		
Fax Speeds	14.4kbps		
Fax Mode Capabilities	2-wire, half-duplex, synchronous		
Error Correction and Data Compression	V.44, V.42, V.42bis, MNP 2-4, MNP 5		
Power Management	WOR (wake on ring) capable		
Upgradeability	Driver upgradeable		
Video	V.80 Synchronous Access Mode (SAM) can be supported by software applications (not driver)		
Operating Temperature	0~50 degree C		
Operating Humidity	45 degree C 90% max		
Operating System Support	Vista 32/64, Windows XP 32/64		
Operating System Driver Support	Vista 32/64, Windows XP 32/64		

COMMUNICATIONS – MODEM

V.92 DATA/FAX CONTROLLERLESS MODEM	MT	DT	SFF
Power Requirements	+3.0V~+3.6V, 116.6mW max		
Chipset	Conexant SmartHSFs/LF (CX11256 & CX20493)		
Dimensions of full height card inches/centimeters (L X H)	L: 5.25'/13.325cm H: 4.73'/12.002cm		
Dimensions of low profile card inches/centimeters (L X H)		L: 5.26'/13.366cm H: 3.12'/7.923cm	

COMMUNICATIONS – WIRELESS

INTERNAL INTEL 5300 802.11 DRAFT-N WIFI (WITH REMOTE WAKE UP SUPPORT)	MT	DT	SFF
External Connector Type	Custom WLAN Antenna Connector		
Controller Details			
Controller bus architecture	PCIe 1.0a x1		
WLAN standards supported	802.11a, 802.11b, 802.11g, 802.11n		
802.11b Data Rates supported	11, 5.5, 2, 1 Mbps		
802.11a Data Rates supported	54, 48, 36, 24, 18, 12, 9, 6 Mbps		
802.11g Data Rates supported	54, 48, 36, 24, 18, 12, 9, 6 Mbps		
802.11n Data Rates supported	450, 300, 270, 243, 240, 180, 150, 144, 135, 130, 120, 117, 115.5, 90, 86.667, 72.2, 65, 60, 57.8, 45, 43.3, 30, 28.9, 21.7, 15, 14.4, 7.2 Mbps		
Encryption	WEP 64-bit and 128-bit, TKIP, AES-CCMP 128-bit		
Operating temperature	0 - 80°C		
Operating humidity	50% to 95% non-condensing (at temperatures of 25 ºC to 35 ºC)		
Operating System Driver Support	Windows XP, Windows XP x64, Windows Vista 32-bit, Windows Vista 64-bit		

GRAPHICS/VIDEO CONTROLLER

NOTE: MT supports full height card, DT supports low profile card or full height card with optional riser. SFF supports low profile card.

INTEGRATED INTEL GMA 4500	MT	DT	SFF
Bus Type	Integrated		
GPU core clock	350 MHz Integrated 24 bit RAMDAC		
Frame Buffer Memory (onboard and shared) Size and Speed	XP: Up to 1GB shared system memory with 2GB system memory Vista: Up to 2GB shared system memory with 4GB system memory		
Maximum power consumption	9.63 W		
Overlay Planes	Yes		
Maximum Color Depth	32 bit		
Maximum Vertical Refresh Rate	85 Hz		
Multiple Display Support	Yes		
Operating Systems Graphics/ Video API Support	OpenGL 2.0/DirectX 10.0		
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Up to 2560x1600 @ 60Hz (DP) Up to 1920x1200 @ 60Hz (DVI & VGA) Up to 1600x1200 @ 85Hz (VGA only)		
External connectors	VGA, DisplayPort		
Dimensions inches/centimeters (L x H)	N/A		
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	0° to 106° C (32° to 223° F)		
Relative Humidity Range	20% to 80% (non-condensing)		
Altitude Range	–15.2 to 3048 m (–50 to 10,000 ft)		
Display Port			
Bus Type	AUX 1, 2, 4 lanes		
Maximum supported resolution	Up to 2560x1600 @ 60Hz		
Maximum power consumption	N/A		
External connectors	DisplayPort		
DVI (Digital) Adapter (ADD2 card)[1]			
Bus Type	sDVO		
Maximum supported resolution	Up to 1920x1566 @ 60 Hz		
Dimensions of full height card inches/centimeters (L x H)	5.75x2.75in/ 14.61x6.99cm		
Dimensions of low profile card inches/centimeters (L x H)		5.75x2.75in/ 14.61x6.99cm	
Maximum power consumption	N/A		
External connectors	DVI		
Dongles Supported	Display Port to DVI Display Port to VGA		

[1] Up to 1.7 GB of system memory may be allocated to support integrated graphics, depending on operating system, system memory size and other factors.
Note: DVI and VGA can be used concurrently for multi-monitor display in DOS. The Display Port controller does not support multi-monitor display in DOS, but it does in the OS after the driver is loaded.

GRAPHICS/VIDEO CONTROLLER (CONT.)

256MB AMD RADEON™ HD 3450 GRAPHICS DUAL DVI OR VGA	MT	DT	SFF
Bus Type (example integrated or PCIe x16)	PCIEx16		
GPU core clock	600Mhz		
Frame Buffer Memory (onboard and shared) Size and Speed	500Mhz		
Maximum power consumption	22W		
Overlay Planes	Yes		
Maximum Color Depth	32-bit		
Maximum Vertical Refresh Rate	85Hz		
Multiple Display Support	Yes		
Operating Systems Graphics/ Video API Support	D3D and OpenGL		
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max : 1920x1440/32bpp @ 75Hz Min : 640x480/8bpp @ 60Hz		
External connectors	DMS-591 and S-video		
Dimensions of full height card inches/centimeters (L x H)	167.64mm x 120mm	167.64mm x 120mm	
Dimensions of low profile card inches/centimeters (L x H)		167.64mm x 85mm	
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	10°-50° C		
Relative Humidity Range	5-90% RH		
Altitude Range	0-20,000 ft.		

256MB NVIDIA GEFORCE 9300 GE GRAPHICS DUAL DVI OR GMA	MT	DT	SFF
Bus Type (example integrated or PCIe x16)	PCIEx16		
GPU core clock	540Mhz		
Frame Buffer Memory (onboard and shared) Size and Speed	500Mhz		
Maximum power consumption	25W		
Overlay Planes	Yes		
Maximum Color Depth	32-bit		
Maximum Vertical Refresh Rate	85Hz		
Multiple Display Support	Yes		
Operating Systems Graphics/ Video API Support	D3D and OpenGL		
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max : 1920x1440/32bpp @ 75Hz Min : 640x480/8bpp @ 60Hz		
External connectors	DMS-59[1] and S-video		
Dimensions of full height card inches/centimeters (L x H)	167.64mm x 120mm	167.64mm x 120mm	
Dimensions of low profile card inches/centimeters (L x H)		167.64mm x 85mm	
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	10°-50° C		
Relative Humidity Range	5-90% RH		
Altitude Range	0-20,000 ft.		

GRAPHICS/VIDEO CONTROLLER (CONT.)

256MB NVIDIA GEFORCE 9300 GE (CONT.)	MT	DT	SFF
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	10°-50° C		
Relative Humidity Range	5-90% RH		
Altitude Range	0-20,000 ft.		

[1]DMS-59 to VGA or DMS-59 to DVI adaptors required.

256MB AMD RADEON™ HD 3470 GRAPHICS W/ DUAL DISPLAYPORT	MT	DT	SFF
Bus Type (example integrated or PCIe x16)	PCIEx16		
GPU core clock	750Mhz		
Frame Buffer Memory (onboard and shared) Size and Speed	500Mhz		
Maximum power consumption	18W		
Overlay Planes	Yes		
Maximum Color Depth	32-bit		
Maximum Vertical Refresh Rate	85Hz		
Multiple Display Support	Yes		
Operating Systems Graphics/ Video API Support	D3D and OpenGL		
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital)	Max : 1920x1440/32bpp @ 75Hz Min : 640x480/8bpp @ 60Hz		
External connectors	2 Display Port		
Dimensions of full height card inches/centimeters (L x H)	167.64mm x 120mm	167.64mm x 120mm	
Dimensions of low profile card inches/centimeters (L x H)		167.64mm x 85mm	
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	10°-50° C		
Relative Humidity Range	5-90% RH		
Altitude Range	0-20,000 ft.		

HARD DRIVES

3.5” 80GB SATA 7200 RPM HDD	
Capacity (bytes)	80,026,361,856
Dimensions inches (W x D x H)	5.87 x 4 x 1
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	8 MB
Average Seek Time	8.5 ms
Rotational Speed	7200 rpm
Logical Blocks	156,301,488
Power Source	
DC Power (Max)	Idle 7.0W, Active 10.0W
DC Current	5V (.8A) and 12V (1.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5°C to 60°C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29°C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40°C to 65°C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38°C
Altitude Range	-50 ft to 35000 ft

3.5” 160GB SATA 7200 RPM HDD	
Capacity (bytes)	160,041,885,696
Dimensions inches (W x D x H)	5.87 x 4 x 1
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	8 MB
Average Seek Time	8.5 ms
Rotational Speed	7200 rpm
Logical Blocks	312,581,808
Power Source	
DC Power (Max)	Idle 7.0W, Active 10.0W
DC Current	5V (.8A) and 12V (1.8A)

HARD DRIVES (CONT.)

3.5” 160GB SATA 7200 RPM HDD (CONT.)	
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^0C to 65^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38^0C
Altitude Range	-50 ft to 35000 ft

3.5” 250GB SATA 7200 RPM HDD	
Capacity (bytes)	250,059,350,016
Dimensions inches (W x D x H)	5.87 x 4 x 1
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	8 MB
Average Seek Time	8.5 ms
Rotational Speed	7200 rpm
Logical Blocks	488,397,168
Power Source	
DC Power (Max)	Idle 7.0W, Active 10.0W
DC Current	5V (.8A) and 12V (1.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^0C to 65^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38^0C
Altitude Range	-50 ft to 35000 ft

HARD DRIVES (CONT.)

320GB SATA 7200 RPM HDD	
Capacity (bytes)	320,072,933,376
Dimensions inches (W x D x H)	5.87 x 4 x 1
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	16 MB
Average Seek Time	8.5 ms
Rotational Speed	7200 rpm
Logical Blocks	625,142,448
Power Source	
DC Power (Max)	Idle 7.0W, Active 10.0W
DC Current	5V (.8A) and 12V (1.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^0C to 65^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38^0C
Altitude Range	-50 ft to 35000 ft

3.5” 80GB SATA 10000 RPM HDD	
Capacity (bytes)	74,355 MB
Dimensions inches (W x D x H)	5.87 x 4 x 1 (includes sled)
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	16 MB
Average Seek Time	4.2 ms (average read)
Rotational Speed	10000 rpm
Logical Blocks	145,226,112
Power Source	
DC Power (Max)	Idle 4.7W, Active 6.2W
DC Current	5V (.275A) and 12V (.585A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-1000 ft to 10000 ft

HARD DRIVES (CONT.)

3.5” 80GB SATA 10000 RPM HDD (CONT.)	
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^{0}C to 70^{0}C
Relative Humidity Range	5% to 95% non-condensing
Maximum Wet Bulb Temperature	38^{0}C
Altitude Range	-1000 ft to 40000 ft

160GB SATA 10000 RPM HDD	
Capacity (bytes)	150,039 MB
Dimensions inches (W x D x H)	5.87 x 4 x 1 (includes sled)
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	16 MB
Average Seek Time	4.2 ms (average read)
Rotational Speed	10000 rpm
Logical Blocks	293,046,768
Power Source	
DC Power (Max)	Idle 4.7W, Active 6.2W
DC Current	5V (.275A) and 12V (.585A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^{0}C to 60^{0}C
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	29^{0}C
Altitude Range	-1000 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^{0}C to 70^{0}C
Relative Humidity Range	5% to 95% non-condensing
Maximum Wet Bulb Temperature	38^{0}C
Altitude Range	-1000 ft to 40000 ft

2.5” 80GB SATA 7200 RPM HDD	
Capacity (bytes)	80,1287,761,856
Dimensions inches (W x D x H)	Approximately (3.93 x 2.75 x 0.374 inches)
Interface type and Maximum speed	Up to 3.0Gb/s
Internal buffer size	16 MB
Average Seek Time	12 ms (Read)
Rotational Speed	7200 rpm
Logical Blocks	156,301,488

HARD DRIVES (CONT.)

2.5” 80GB SATA 7200 RPM HDD (CONT.)	
Power Source	
DC Power (Max)	Idle 1.0W, Active 3.25W
DC Current	5V (.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^0C to 65^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38^0C
Altitude Range	-50 ft to 35000 ft

2.5” 160GB SATA 7200 RPM HDD	
Capacity (bytes)	160,144,285,696
Dimensions inches (W x D x H)	Approximately (3.93 x 2.75 x 0.374 inches)
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	16 MB
Average Seek Time	12 ms (Read)
Rotational Speed	7200 rpm
Logical Blocks	312,581,808
Power Source	
DC Power (Max)	Idle 1.0W, Active 3.25W
DC Current	5V (.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	5^0C to 60^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	29^0C
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40^0C to 65^0C
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	38^0C
Altitude Range	-50 ft to 35000 ft

HARD DRIVES (CONT.)

2.5” 20GB SLC SOLID STATE SATA HDD	
Capacity (bytes)	20,014,718,976
Dimensions inches (W x D x H)	2.75 x 3.94 x 0.374
Interface type and Maximum speed	SATA 3.0 Gbps
Internal buffer size	32 MB
Average Seek Time	0
Rotational Speed	0
Logical Blocks	39,091,248
Power Source	
DC Power (Max)	0.887 W
DC Current	177 ma
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	0 to 70 C
Relative Humidity Range	10 to 90 %
Maximum Wet Bulb Temperature	29 C
Altitude Range	-200 to 5000 m
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-55 to 95 C
Relative Humidity Range	5 to 95 %
Maximum Wet Bulb Temperature	38 C
Altitude Range	-200 to 10,600 m

2.5” 32GB SLC SOLID STATE SATA HDD	
Capacity (bytes)	32,017,047,552
Dimensions inches (W x D x H)	2.75 x 3.94 x 0.374
Interface type and Maximum speed	SATA 3.0 Gbps
Internal buffer size	32 MB
Average Seek Time	0
Rotational Speed	0
Logical Blocks	62,533,296
Power Source	
DC Power (Max)	0.887 W
DC Current	177 ma
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	0 to 70 C
Relative Humidity Range	0 C to 55 C / 90~98% RH
Maximum Wet Bulb Temperature	29 C
Altitude Range	-200 to 5000 m

HARD DRIVES (CONT.)

2.5” 32GB SLC SOLID STATE SATA HDD	
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-55 to 95 C
Relative Humidity Range	0 C to 55 C / 90~98% RH
Maximum Wet Bulb Temperature	38 C
Altitude Range	-200 to 10,600 m

2.5” 160GB FULL DISK ENCRYPTION SATA HDD	
Capacity (bytes)	160,041,885,696
Dimensions inches (W x D x H)	5.87 x 4 x 1
Interface type and Maximum speed	Up to 3Gb/s
Internal buffer size	8 MB
Average Seek Time	8.5 ms
Rotational Speed	7200 rpm
Logical Blocks	312,581,808
Power Source	
DC Power (Max)	Idle 7.0W, Active 10.0W
DC Current	5V (.8A) and 12V (1.8A)
Environmental Operating Conditions (Non-Condensing):	
Temperature Range	41°F to 140°F (50C to 600C)
Relative Humidity Range	20% to 80% non-condensing
Maximum Wet Bulb Temperature	84°F (290C)
Altitude Range	-50 ft to 10000 ft
Environmental Non-Operating Conditions (Non-Condensing):	
Temperature Range	-40°F to 149°F (-400C to 650C)
Relative Humidity Range	10% to 90% non-condensing
Maximum Wet Bulb Temperature	100.4°F (380C)
Altitude Range	-50 ft to 35000 ft

Note: For hard drives, GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.

OPTICAL DRIVES

DVD +/- RW[1]	MT	DT	SFF
External Dimensions inches/ centimeters (Without Bezel – W x H x D)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in)
Weight (max) pounds/ kilograms	800g	800g	170g
Interface type and speed	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
Disc Capacity	Standard	Standard	Standard
Internal buffer size	supplier dependent	supplier dependent	supplier dependent
Access Times (typical)	supplier dependent	supplier dependent	supplier dependent
Maximum Data Transfer Rates			
Writes	16x DVD/48x CD	16x DVD/48x CD	8x DVD/ 24x CD
Reads	16x DVD/48x CD	16x DVD/48x CD	8x DVD/ 24x CD
Power Source			
DC Power Requirements	12V, 5V	12V, 5V	5V
DC Current	1200mA (12V)/ 900mA (5V)	1200mA (12V)/ 900mA (5V)	1000mA
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	5C to 50C	5C to 50C	5C to 50C
Relative Humidity Range	20% to 80% RH	20% to 80% RH	20% to 80% RH
Maximum Wet Bulb Tempera-ture	29C	29C	29C
Altitude Range	-200 to 3048	-200 to 3048	-200 to 3048
Environmental Non-Operating Conditions (Non-Condensing):			
Operating Temperature Range	-40C to 65C	-40C to 65C	-40C to 65C
Relative Humidity Range	5% to 95% RH	5% to 95% RH	5% to 95% RH
Maximum Wet Bulb Tempera-ture	38C	38C	38C
Altitude Range	-200 to 10600m	-200 to 10600m	-200 to 10600m

[1] Discs burned with this drive may not be compatible with some existing drives and players; using DVD+R media provides maximum compatibility.

DVD-ROM	MT	DT	SFF
External Dimensions inches/ centimeters (Without Bezel – W x H x D)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in)
Weight (max) pounds/ kilograms	750g	750g	165g
Interface type and speed	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
Disc Capacity	Standard	Standard	Standard
Internal buffer size	supplier dependent	supplier dependent	supplier dependent
Access Times (typical)	supplier dependent	supplier dependent	supplier dependent
Maximum Data Transfer Rates			
Writes	N/A	N/A	N/A
Reads	16x DVD/48x CD	16x DVD/48x CD	8x DVD/ 24x CD

OPTICAL DRIVES (CONT.)

DVD-ROM (CONT.)	MT	DT	SFF
Power Source			
DC Power Requirements	12V, 5V	12V, 5V	5V
DC Current	1200mA (12V)/ 900mA (5V)	1200mA (12V)/ 900mA (5V)	800mA
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	5C to 50C	5C to 50C	5C to 50C
Relative Humidity Range	20% to 80% RH	20% to 80% RH	20% to 80% RH
Maximum Wet Bulb Temperature	29C	29C	29C
Altitude Range	-200 to 3048m	-200 to 3048m	-200 to 3048m
Environmental Non-Operating Conditions (Non-Condensing):			
Operating Temperature Range	-40C to 65C	-40C to 65C	-40C to 65C
Relative Humidity Range	5% to 95% RH	5% to 95% RH	5% to 95% RH
Maximum Wet Bulb Temperature	38C	38C	38C
Altitude Range	-200 to 10600m	-200 to 10600m	-200 to 10600m

COMBO DVD/CDRW	MT	DT	SFF
External Dimensions inches/ centimeters (Without Bezel – W x H x D)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	148.2mm(6in)/42mm (2in)/ 190.5 (max)	128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in)
Weight (max) pounds/ kilograms	750g	750g	165g
Interface type and speed	SATA 1.5Gbit/s	SATA 1.5Gbit/s	SATA 1.5Gbit/s
Disc Capacity	Standard	Standard	Standard
Internal buffer size	supplier dependent	supplier dependent	supplier dependent
Access Times (typical)	supplier dependent	supplier dependent	supplier dependent
Maximum Data Transfer Rates			
Writes	48x CD	48x CD	24x CD
Reads	16x DVD/48x CD	16x DVD/48x CD	8x DVD/ 24x CD
Power Source			
DC Power Requirements	12V, 5V	12V, 5V	5V
DC Current	1200mA (12V)/ 900mA (5V)	1200mA (12V)/ 900mA (5V)	900mA
Environmental Operating Conditions (Non-Condensing):			
Operating Temperature Range	5C to 50C	5C to 50C	5C to 50C
Relative Humidity Range	20% to 80% RH	20% to 80% RH	20% to 80% RH
Maximum Wet Bulb Temperature	29C	29C	29C
Altitude Range	-200 to 3048m	-200 to 3048m	-200 to 3048m
Environmental Non-Operating Conditions (Non-Condensing):			
Operating Temperature Range	-40C to 65C	-40C to 65C	-40C to 65C
Relative Humidity Range	5% to 95% RH	5% to 95% RH	5% to 95% RH
Maximum Wet Bulb Temperature	38C	38C	38C
Altitude Range	-200 to 10600m	-200 to 10600m	-200 to 10600m

More details for optical drives can be found at: http://support.dell.com/support/systemsinfo/documentation.aspx?c=us&l=en&s=gen&~cat=7

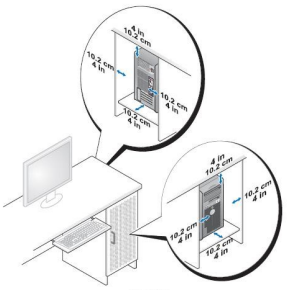
BIOS DEFAULTS

Drives	Diskette drive:	USB
	SATA-0:	Enable
	SATA-1:	Enable
	SATA-2:	Enable
	SATA-3[1]:	Enable
	External SATA:	Enable
	SATA Operation:	RAID On
	SMART Reporting:	Disable
Onboard Devices	Integrated NIC:	Enable
	Integrated Audio:	Enable
	USB Controller:	Enable
	Rear Quad USB:	Enable
	Rear Dual USB:	Enable
	Front USB:	Enable
	PCI Slots:	Enable
	LPT Port Mode:	PS/2
	Serial Port #1:	Auto
Video	Primary Video:	Auto
Performance	Multiple CPU Core:	Enable
	SpeedStep:	Disable, Unless the customer purchased a speedstep capable processor.
	HDD Acoustic Mode:	Bypass
Security	Admin Password:	Not set.
	System Password:	Not set.
	SATA-0 Password:	Not set.
	SATA-1 Password:	Not set.
	SATA-2 Password:	Not set.
	SATA-3 Password[1]:	Not set.
	External SATA Password:	Not set.
	Password Changes:	Enable
	TPM Security:	Disabled
	Execute Disable:	Enable
	Computrace®:	Deactivated
Power Management	AC Recovery:	Power Off
	Auto Power On:	Disable
	Auto Power Time:	12:00 AM
	Low Power Mode:	Disable
	Remote Wake Up:	Disable
	Suspend Mode:	S3
Maintenance	Service Tag:	Set by the factory.
	SERR Message:	Enable
Post Behavior	Fast Boot:	Enable
	Numlock Key:	Enable
	POST Hotkeys:	Enable
	Keyboard Errors:	Enable

CHASSIS ENCLOSURE & VENTILATION REQUIREMENTS

ENCLOSURE VENTILATION

If your enclosure has doors, they need to be of a type that allows at least 30% airflow through the enclosure (front and back).

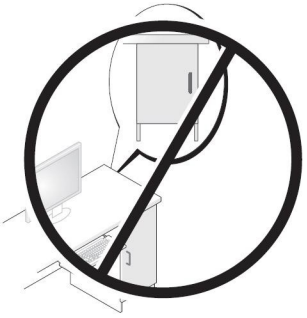


ENCLOSURE MINIMUM CLEARANCE

Leave a 10.2 cm (4 in.) minimum clearance on all vented sides of the computer to permit the airflow required for proper ventilation.

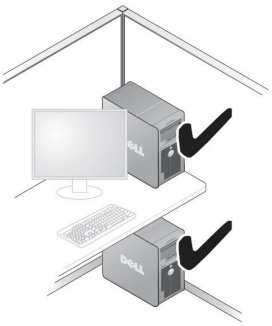
RECOMMENDED ENCLOSURE

Do not install your computer in an enclosure that does not allow airflow. This restricts the airflow and impacts your computer's performance, possibly causing it to overheat.



OPEN DESK MINIMUM CLEARANCE

If your computer is installed in a corner, on a desk, or under a desk, leave at least 5.1 cm (2 in.) clearance from the back of the computer to the wall to permit the airflow required for proper ventilation.



REGULATORY COMPLIANCE AND ENVIRONMENTAL

Product related conformity assessment and regulatory authorizations including Product Safety, Electromagnetic Compatibility (EMC), Ergonomics, and Communication Devices relevant to this product may be viewed at www.dell.com/regulatory_compliance. The Regulatory Datasheet for this product is located at http://www.dell.com/regulatory_compliance.

Details of Dell's environmental stewardship program to conserve product energy consumption, reduce or eliminate materials for disposal, prolong product life span and provide effective and convenient equipment recovery solutions may be viewed at www.dell.com/environment. Product related conformity assessment, regulatory authorizations, and information encompassing Environmental, Energy Consumption, Noise Emissions, Product Materials Information, Packaging, Batteries, and Recycling relevant to this product may be viewed by clicking the Design for Environment link on the webpage.

OptiPlex 960 MT

Component	Typical Configuration	High-end Configuration
CPU	E8400	Q9450
Memory	2 GB DDR2 800 MHz	4 GB DDR2 800 MHz
HDD (#, capacity)	160 GB 3.5” 7200 RPM SATA2	2 × 250 GB 3.5” 7200 RPM SATA2
RMSD	DVD +/- RW	DVD +/- RW
Graphics Adapter	Intel G45 Integrated Adapter	AMD HD3470

The Declared Noise Emission in accordance with ISO 9296 for the Dell Optiplex 960 MT is as follows:
(all values L_{WAd} expressed in bels; 1 bel=10 decibels, re 10^{-12} Watts)

Operating Mode	Typical Configuration Declared Sound Power (L_{WAd})	High-end Configuration Declared Sound Power (L_{WAd})
Idle	3.8	4.0
HDD Operating	3.8	4.0
ODD Operating	5.2	5.1
90% CPU	3.8	4.1

The Declared A-weighted Sound Pressure Level in decibels (re $2x10^{-5}$ Pa), at Operator, Bystander, and Desk Side Positions are measured in accordance with ISO 7779 7.6.1, 7.6.2, and C.15.2 and declared in accordance with ISO 9296 for this product is as follows[1]:

Operating Mode	Typical Configuration Declared Sound Pressure (L_{pA})			High-end Configuration Declared Sound Pressure (L_{pA})		
	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})
Idle	29	24	21	31	26	23
HDD Operating	29	24	22	31	27	23
ODD Operating	40	36	39	43	37	37
90% CPU	29	24	21	32	27	25

[1]All tests are conducted according to ISO 7779 and declared according to ISO 9296 except 90% CPU. For this mode, the system CPU was stressed at 90% utilization with no other peripheral device actively seeking. This test mode is not specified in ISO 7779, but was measured using the same microphone distances and measurement techniques defined for the other reported operating modes.

[4]Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

OptiPlex 960 DT

Component	Quiet Configuration	Typical Configuration	High-end Configuration
CPU	E8400	E8400	Q9450
Memory	2 GB DDR2 800 MHz	2 GB DDR2 800 MHz	4 GB DDR2 800 MHz
HDD (#, capacity)	80 GB 2.5" 7200 RPM SATA2	160 GB 3.5" 7200 RPM SATA2	250 GB 3.5" 7200 RPM SATA2
RMSD	DVD +/- RW	DVD +/- RW	DVD +/- RW
Graphics Adapter	Intel G45 Integrated Adapter	AMD HD3450	AMD HD3470

The Declared Noise Emission in accordance with ISO 9296 for the Dell Optiplex 960 DT is as follows[1]: (all values L_{WAd} expressed in bels[2]; 1 bel=10 decibels, re 10^{-12} Watts)

Operating Mode	Quiet Configuration Declared Sound Power (L_{WAd})	Typical Configuration Declared Sound Power (L_{WAd})	High-end Configuration Declared Sound Power (L_{WAd})
Idle	3.0	3.6	3.5
HDD Operating	3.0	3.6	3.6
ODD Operating	5.3	5.4	5.2
90% CPU	3.0	3.6	3.6

The Declared A-weighted Sound Pressure Level in decibels (re $2x10^{-5}$ Pa), at Operator, Bystander, and Desk Side Positions are measured in accordance with ISO 7779 7.6.1, 7.6.2, and C.15.2 and declared in accordance with ISO 9296 for this product is as follows[1]:

Operating Mode	Quiet Configuration Declared Sound Pressure (L_{pA})			Standard Configuration Declared Sound Pressure (L_{pA})			High-end Configuration Declared Sound Pressure (L_{pA})		
	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})
Idle	20	18	18	28	23	21	28	23	22
HDD Operating	21	18	17	28	23	21	28	23	22
ODD Operating	42	39	36	45	40	41	44	38	36
90% CPU	21	18	16	28	23	21	28	23	23

[1] All tests are conducted according to ISO 7779 and declared according to ISO 9296 except 90% CPU. For this mode, the system CPU was stressed at 90% utilization with no other peripheral device spinning. This test mode is not specified in ISO 7779, but was measured using the same microphone distances and measurement techniques defined for the other reported operating modes.
[2] Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

OptiPlex 960 SFF

Component	Quiet Configuration	Typical Configuration	High-end Configuration
CPU	E8500	E8500	Q9450
Memory	2 GB DDR2 800 MHz	2 GB DDR2 800 MHz	4 GB DDR2 800 MHz
HDD (#, capacity)	80 GB 2.5" 7200 RPM SA-TA2	160 GB 3.5" 7200 RPM SA-TA2	250 GB 3.5" 7200 RPM SATA2
RMSD	CDRW/DVD	CDRW/DVD	CDRW/DVD
Graphics Adapter	Intel G45 Integrated Adapter	AMD HD3450	AMD HD3470

The Declared Noise Emission in accordance with ISO 9296 for the Dell Optiplex 960 SFF is as follows[1]:
(all values L_{WAd} expressed in bels[2]; 1 bel=10 decibels, re 10^{-12} Watts)

Operating Mode	Quiet Configuration Declared Sound Power (L_{WAd})	Typical Configuration Declared Sound Power (L_{WAd})	High-end Configuration Declared Sound Power (L_{WAd})
Idle	3.1	3.6	3.5
HDD Operating	3.2	3.6	3.5
ODD Operating	4.9	4.6	4.9
90% CPU	3.9	4.0	4.6

The Declared A-weighted Sound Pressure Level in decibels (re $2x10^{-5}$ Pa), at Operator, Bystander, and Desk Side Positions are measured in accordance with ISO 7779 7.6.1, 7.6.2, and C.15.2 and declared in accordance with ISO 9296 for this product is as follows[1]:

Operating Mode	Quiet Configuration Declared Sound Pressure (L_{pA})			Typical Configuration Declared Sound Pressure (L_{pA})			High-end Configuration Declared Sound Pressure (L_{pA})		
	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})	Operator Position (L_{pA})	Bystander Position (L_{pA})	DeskSide Position (L_{pA})
Idle	23	19	17	28	24	20	27	23	19
HDD Operating	23	19	17	28	24	20	27	23	19
ODD Operating	39	34	40	40	35	32	40	34	30
90% CPU	29	24	18	32	27	24	37	33	29

[1] All tests are conducted according to ISO 7779 and declared according to ISO 9296 except 90% CPU. For this mode, the system CPU was stressed at 90% utilization with no other peripheral device spinning. This test mode is not specified in ISO 7779, but was measured using the same microphone distances and measurement techniques defined for the other reported operating modes.
[2] Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2