

DELL™

OPTIPLEX™ 9010

TECHNICAL GUIDEBOOK

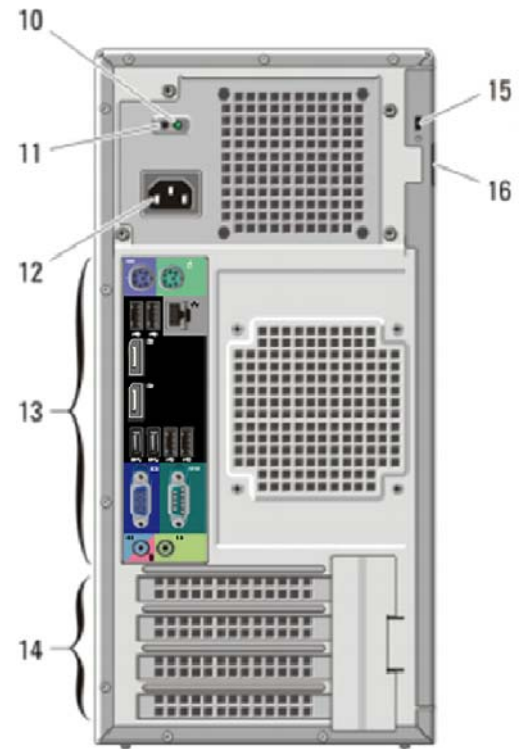
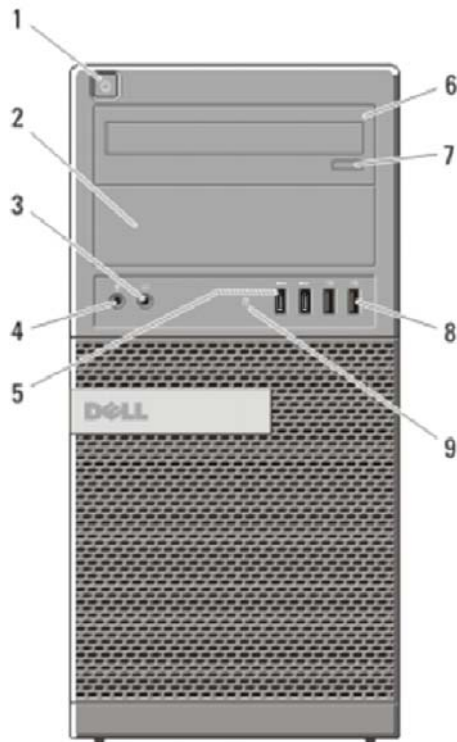
INSIDE THE OPTIPLEX 9010



TABLE OF CONTENTS

| | |
|-------------------------------------------------------|-------|
| OVERVIEW | |
| Mini Tower Computer (MT) View | 3-4 |
| Desktop Computer (DT) View | 5-6 |
| Small Form Factor Computer (SFF) View | 7-8 |
| Ultra Small Form Factor Computer (USFF) View | 9-10 |
| MARKETING SYSTEM CONFIGURATIONS | |
| Operating System, Chipset | 11 |
| Processor | 12 |
| Memory | 13 |
| Drives and Removable Storage, System Board Connectors | 14-15 |
| Graphics/Video Controller | 16 |
| External Ports/Connectors | 16 |
| Communications—Network Adapter (NIC), Wireless | 17 |
| Audio and Speakers, Keyboard and Mouse | 17 |
| Security, Service and Support, Software | 18 |
| DETAILED ENGINEERING SPECIFICATIONS | |
| System Dimensions (Physical) | 19 |
| System Board Connector Maximum Allowable Dimensions | 19 |
| System Level Environmental and Operating Conditions | 20 |
| Power | 21-22 |
| Audio | 23 |
| Communications | 23-28 |
| Graphics/Video Controller | 29-31 |
| Hard Drives | 32-40 |
| Optical Drive | 41-43 |
| Media Card Reader | 44 |
| BIOS Defaults | 45 |
| Chassis Enclosure and Ventilation Requirements | 46 |
| Acoustic Noise Emission Information | 47-50 |

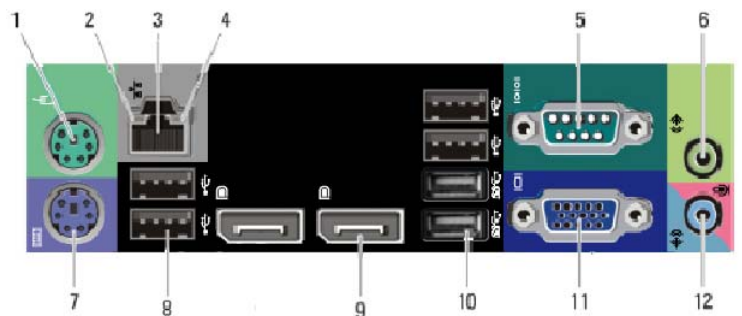
MINI TOWER COMPUTER (MT) VIEW

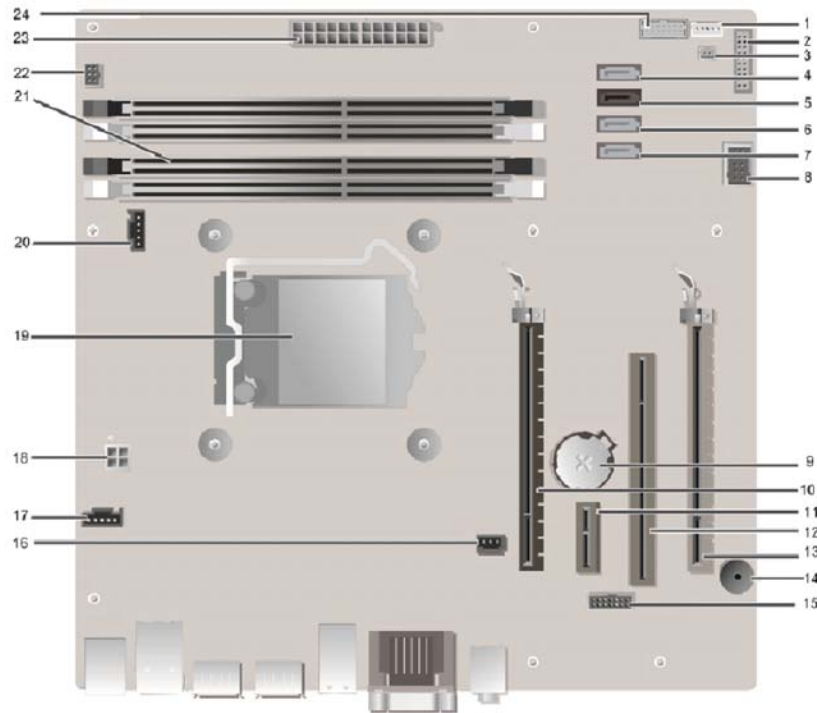


| FRONT VIEW | | | |
|------------|------------------------------|---|----------------------------|
| 1 | Power Button, Power Light | 6 | Optical Drive (optional) |
| 2 | Optical Drive Bay (optional) | 7 | Optical Drive Eject Button |
| 3 | Headphone Connector | 8 | USB 2.0 Connectors (2) |
| 4 | Microphone Connector | 9 | Drive Activity Light |
| 5 | USB 3.0 Connectors (2) | | |

| BACK VIEW | | | |
|-----------|--------------------------------|----|----------------------------------------|
| 10 | Power Supply Diagnostic Light | 14 | Expansion Card Slots (4) |
| 11 | Power Supply Diagnostic Button | 15 | Kensington / Noble Security Cable Slot |
| 12 | Power Connectors | 16 | Padlock Ring |
| 13 | Back Panel Connectors | | |

| BACK PANEL CONNECTORS | | | |
|-----------------------|------------------------|----|------------------------------------------------|
| 1 | PS2 Mouse Connector | 7 | PS2 Keyboard Connector |
| 2 | Link Integrity Light | 8 | USB2.0 Connectors (2) |
| 3 | Network Connector | 9 | DisplayPort Connector (2) |
| 4 | Network Activity Light | 10 | USB2.0 Connectors (2) USB3.0 Connectors (2) |
| 5 | Serial Connector | 11 | VGA Connector |
| 6 | Line-out Connector | 12 | Line-in/Microphone Connector |

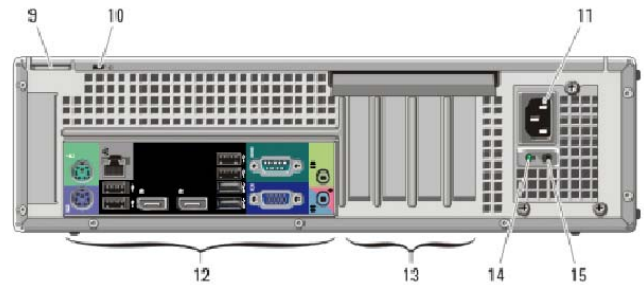
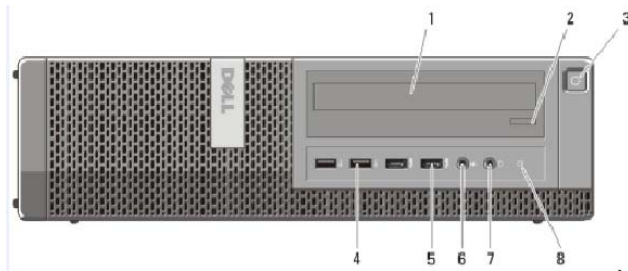




MT System Board Components

| Number | Name | Number | Name |
|--------|---------------------------------------|--------|------------------------------------------------|
| 1 | Internal Speaker Connector (INT_SPKR) | 13 | PCI-e x16 (wire x4) Connector (SLOT4) |
| 2 | Front IO Connector (FRONTPANEL) | 14 | Buzzer (BEEP) |
| 3 | Thermal Sensor Connector (THRM_2) | 15 | LPC Debug Connector (LPC_DEBUG) |
| 4 | SATA 0 Connector (SATA0) | 16 | Intrusion Switch Connector (INTRUDER) |
| 5 | SATA 1 Connector (SATA1) | 17 | System Fan Connector (FAN_HDD) |
| 6 | SATA 2 Connector (SATA2) | 18 | P2 Power Connector (12V_PWRCONN) |
| 7 | SATA 3 Connector (SATA3) | 19 | Processor Socket (N/A) |
| 8 | Internal USB Connector (INT_USB) | 20 | CPU fan Connector (FAN_CPU) |
| 9 | Battery Connector (BATTERY) | 21 | Memory Connectors (DIMM1, DIMM2, DIMM3, DIMM4) |
| 10 | PCI-e x16 Connector (SLOT1) | 22 | Power Switch Connector (PWR_SW) |
| 11 | PCI-e x1 Connector (SLOT2) | 23 | P1 Power Connector (POWER) |
| 12 | PCI Connector (SLOT3) | 24 | Front USB3.0 Connector (Front_USB) |

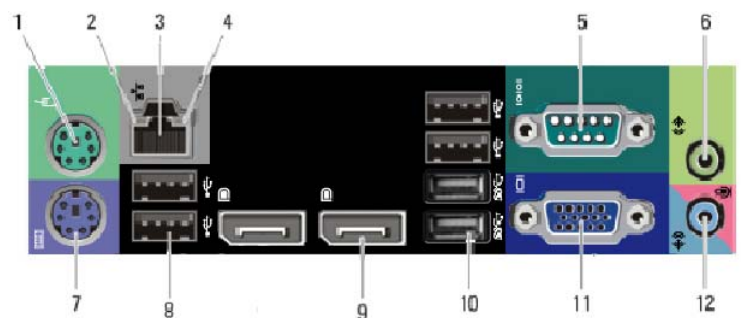
DESKTOP COMPUTER (DT) VIEW



| FRONT VIEW | | | |
|------------|----------------------------|---|------------------------|
| 1 | Optical Drive | 5 | USB 3.0 Connectors (2) |
| 2 | Optical Drive Eject Button | 6 | Microphone Connector |
| 3 | Power Button, Power Light | 7 | Headphone Connector |
| 4 | USB 2.0 Connectors (2) | 8 | Drive Activity Light |

| BACK VIEW | | | |
|-----------|----------------------------------------|----|--------------------------------|
| 9 | Padlock Ring | 13 | Expansion Card Slots (4) |
| 10 | Kensington / Noble Security Cable Slot | 14 | Power Supply Diagnostic Light |
| 11 | Power Connectors | 15 | Power Supply Diagnostic Button |
| 12 | Back Panel Connectors | | |

| BACK PANEL CONNECTORS | | | |
|-----------------------|------------------------|----|------------------------------------------------|
| 1 | PS2 Mouse Connector | 7 | PS2 Keyboard Connector |
| 2 | Link Integrity Light | 8 | USB2.0 Connectors (2) |
| 3 | Network Connector | 9 | DisplayPort Connector (2) |
| 4 | Network Activity Light | 10 | USB2.0 Connectors (2) USB3.0 Connectors (2) |
| 5 | Serial Connector | 11 | VGA Connector |
| 6 | Line-out Connector | 12 | Line-in/Microphone Connector |

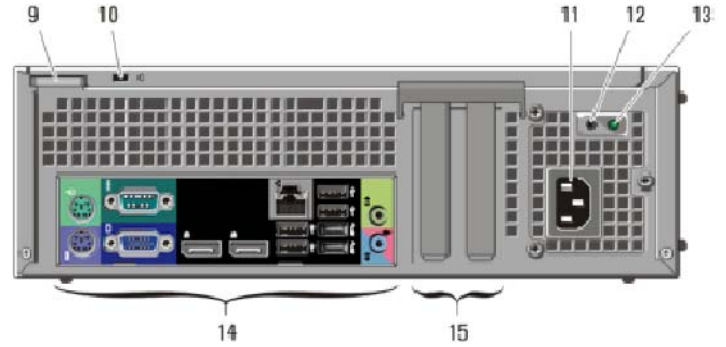
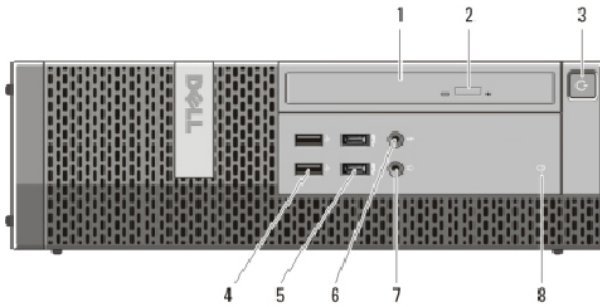




DT System Board Components

| Number | Name | Number | Name |
|--------|---------------------------------------|--------|------------------------------------------------|
| 1 | Internal Speaker Connector (INT_SPKR) | 12 | PCI-ex 16 (wire x4) Connector (SLOT4) |
| 2 | Front IO Connector (FRONTPANEL) | 13 | Buzzer (BEEP) |
| 3 | Thermal Sensor Connector (THRM_2) | 14 | LPC Debug Connector (LPC_DEBUG) |
| 4 | SATA 0 Connector (SATA0) | 15 | Intrusion Switch Connector (INTRUDER) |
| 5 | SATA 1 Connector (SATA1) | 16 | System Fan Connector (FAN_HDD) |
| 6 | SATA 2 Connector (SATA2) | 17 | P2 Power Connector (12V_PWRCONN) |
| 7 | Internal USB Connector (INT_USB) | 18 | Processor Socket (N/A) |
| 8 | Battery Connector (BATTERY) | 19 | CPU fan Connector (FAN_CPU) |
| 9 | PCI-e x16 Connector (SLOT1) | 20 | Memory Connectors (DIMM1, DIMM2, DIMM3, DIMM4) |
| 10 | PCI-e x1 Connector (SLOT2) | 21 | Power Switch Connector (PWR_SW) |
| 11 | PCI Connector (SLOT3) | 22 | P1 Power Connector (POWER) |
| | | 23 | Front USB3.0 Connector (Front_USB) |

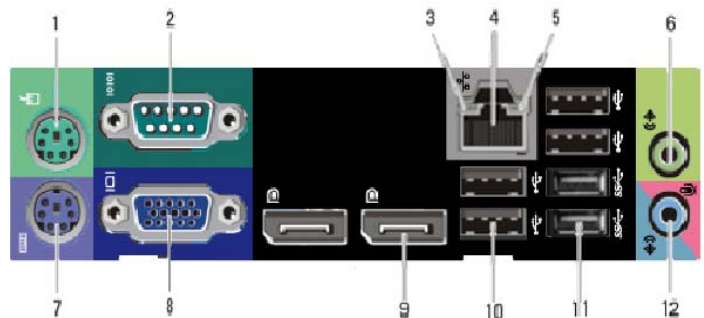
SMALL FORM FACTOR COMPUTER (SFF) VIEW

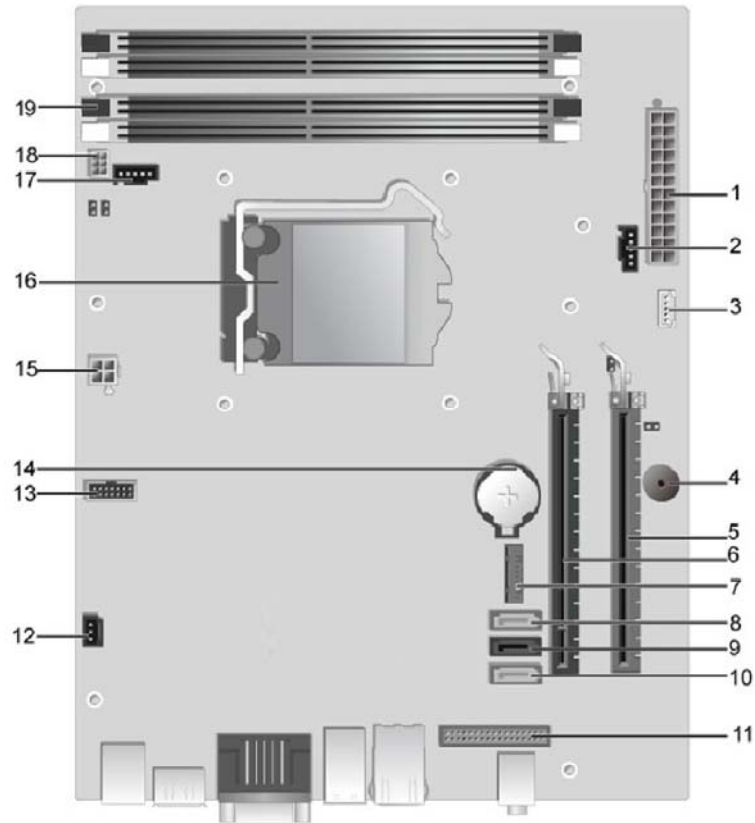


| FRONT VIEW | | | |
|------------|----------------------------|---|------------------------|
| 1 | Optical Drive | 5 | USB 3.0 Connectors (2) |
| 2 | Optical Drive Eject Button | 6 | Microphone Connector |
| 3 | Power Button, Power Light | 7 | Headphone Connector |
| 4 | USB 2.0 Connectors (2) | 8 | Drive Activity Light |

| BACK VIEW | | | |
|-----------|----------------------------------------|----|-------------------------------|
| 9 | Padlock Ring | 13 | Power Supply Diagnostic Light |
| 10 | Kensington / Noble Security Cable Slot | 14 | Back Panel Connectors |
| 11 | Power Connectors | 15 | Expansion Card Slots (2) |
| 12 | Power Supply Diagnostic Button | | |

| BACK PANEL CONNECTORS | | | |
|-----------------------|------------------------|----|------------------------------------------------|
| 1 | PS2 Mouse Connector | 7 | PS2 Keyboard Connector |
| 2 | Serial Connector | 8 | VGA Connector |
| 3 | Link Integrity Light | 9 | DisplayPort Connector (2) |
| 4 | Network Connector | 10 | USB2.0 Connectors (2) |
| 5 | Network Activity Light | 11 | USB2.0 Connectors (2) USB3.0 Connectors (2) |
| 6 | Line-out Connector | 12 | Line-in/Microphone Connector |

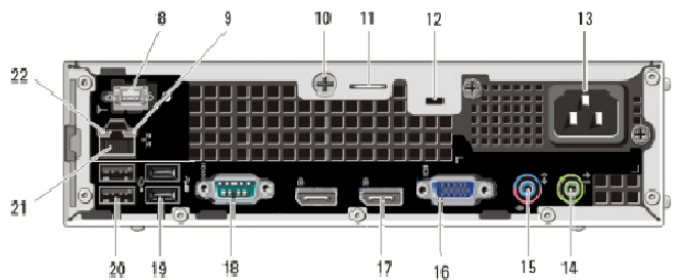
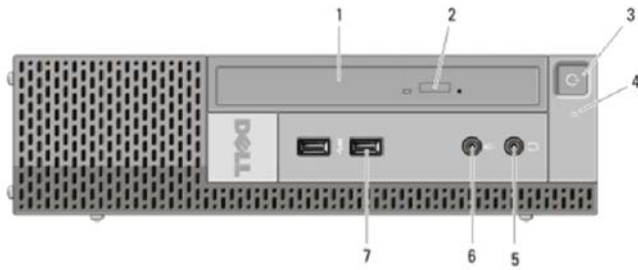




SFF System Board Components

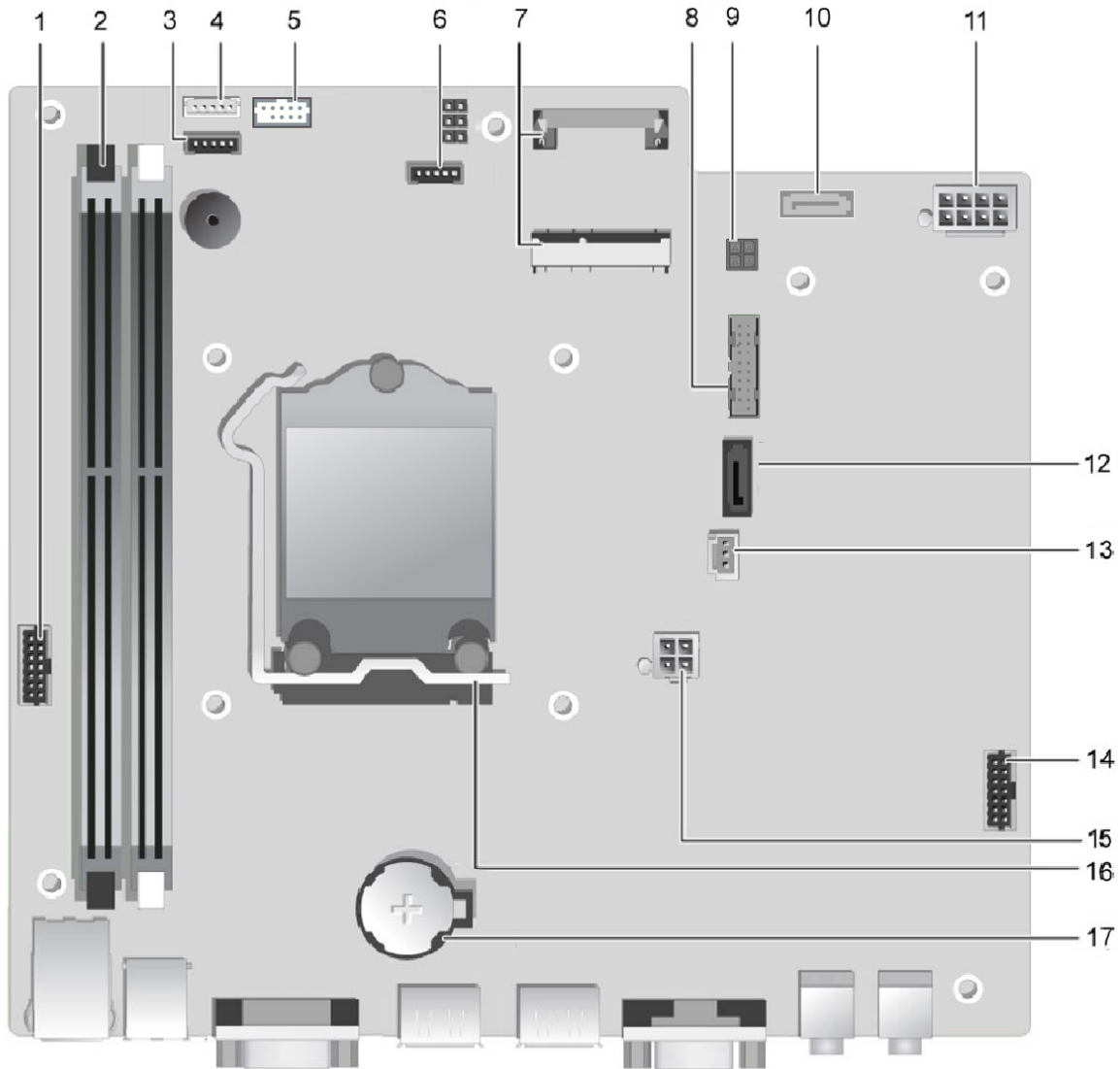
| Number | Name | Number | Name |
|--------|---------------------------------------|--------|------------------------------------------------|
| 1 | P1 power Connector (POWER) | 11 | Front IO Connector (FRONTPANEL) |
| 2 | System fan Connector (FAN_HDD) | 12 | Intrusion Switch Connector (INTRUDER) |
| 3 | Internal Speaker Connector (INT_SPKR) | 13 | LPC debug Connector (LPC_DEBUG) |
| 4 | Buzzer (BEEP) | 14 | Battery Connector (BATTERY) |
| 5 | PCI-e x16 (wire x4) Connector (SLOT2) | 15 | P2 Power Connector (12V_PWRCONN) |
| 6 | PCI-e x16 Connector (SLOT1) | 16 | Processor Connector (N/A) |
| 7 | Front USB3.0 Connector (Front_USB) | 17 | CPU Fan Connector (FAN_CPU) |
| 8 | SATA 2 Connector (SATA2) | 18 | Power Switch Connector (PWR_SW) |
| 9 | SATA 1 Connector (SATA1) | 19 | Memory Connectors (DIMM1, DIMM2, DIMM3, DIMM4) |
| 10 | SATA 0 Connector (SATA0) | | |

ULTRA SMALL FORM FACTOR COMPUTER (USFF) VIEW



| FRONT VIEW | | | |
|------------|----------------------------|---|------------------------|
| 1 | Optical Drive | 5 | Headphone Connector |
| 2 | Optical Drive Eject Button | 6 | Microphone Connector |
| 3 | Power Button, Power Light | 7 | USB 3.0 Connectors (2) |
| 4 | Drive Activity Light | | |

| BACK VIEW | | | |
|-----------|----------------------------------------|----|-------------------------------|
| 8 | Wi-Fi Antenna (optional) | 15 | Line-in/ Microphone Connector |
| 9 | Network Activity Light | 16 | VGA Connector |
| 10 | Captive Thumbscrew | 17 | DisplayPort Connector (2) |
| 11 | Padlock Ring | 18 | Serial Connector |
| 12 | Kensington / Noble Security Cable Slot | 19 | USB 3.0 Connectors (2) |
| 13 | Power Connector | 20 | USB 2.0 Connectors (2) |
| 14 | Line-Out Connector | 21 | Network Connector |
| | | 22 | Link Integrity Light |



USFF System Board Components

| Number | Name | Number | Name |
|--------|---------------------------------------|--------|-----------------------------------------|
| 1 | Front Panel Connector (FRONTPANEL) | 9 | HDD-ODD Power Connector (HDD_ODD_POWER) |
| 2 | Memory Connector (DIMM_1, DIMM_2) | 10 | SATA 1 Connector (SATA1) |
| 3 | CPU Fan Connector (FAN_CPU) | 11 | P1 Power Connector (POWER) |
| 4 | Internal Speaker Connector (INT_SPKR) | 12 | SATA 0 Connector (SATA0) |
| 5 | Front IO Connector (F_USB_AUDIO) | 13 | Intrusion Switch Connector (INTRUDER) |
| 6 | System Fan Connector (FAN_HDD) | 14 | LPC Debug Connector (LPC_DEBUG) |
| 7 | Mini-PCI Socket (PCIE_MINICARD) | 15 | P2 Power Connector (12V_PWRCONN) |
| 8 | Front USB3.0 connector (Front USB) | 16 | Processor socket (N/A) |
| | | 17 | Battery Connector (BATTERY) |

MARKETING SYSTEM CONFIGURATIONS

NOTE: Offerings may vary by country. 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

| | MT | DT | SFF | USFF |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|------|
| Windows Operating System | Microsoft® Windows 7® Home Basic SP1 (32 and 64 bit), Microsoft® Windows 7® Home Premium SP1 (32 and 64 bit), Microsoft® Windows 7® Home Premium w/MUI SP1 (32 and 64 bit), Microsoft® Windows 7® Professional w/MUI SP1 (32 and 64 bit), Microsoft® Windows 7® Professional SP1 (32 and 64 bit), Microsoft® Windows 7® Ultimate SP1 (32 and 64 bit), | | | |
| Other | Ubuntu (N-Series DIB) (32bit) Ubuntu (32bit) | | | |
| OS Media Support | Optional | | | |

CHIPSET

| | MT | DT | SFF | USFF |
|----------------------------------------------------------------|------------------------------------------------------------------------|----|-----|------|
| Chipset | Intel Q77 Express Chipset | | | |
| Non-volatile memory on chipset | | | | |
| BIOS Configuration SPI (Serial Peripheral Interface) | 64Mbit (8MB) & 32Mbit(4MB) located at SPI_FLASH on chipset | | | |
| TPM 1.2 Security Device (Trusted Platform Module) ¹ | 4KB located at TPM1.2 on chipset | | | |
| Non-TPM | Available in select countries | | | |
| NIC EEPROM | LOM configuration contained within SPI_FLASH – no dedicated LOM EEPROM | | | |

PROCESSOR¹

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. Processor availability subject to change and may vary by region/

| | MT | DT | SFF | USFF |
|--------------------------------------------------------------------------------|-----|-----|-----|------|
| Intel® Quad Core Processors | | | | |
| Intel® Core™ i7 3770 / 3.40GHz, 8M, VT-x, VT-d, TXT (vPro™), 77W | GSP | GSP | GSP | |
| Intel® Core™ i7 3770S / 3.10GHz, 8M, VT-x, VT-d, TXT (vPro™), 65W | | | | GSP |
| Intel® Core™ i5 3570 / 3.40GHz, 6M, VT-x, VT-d, TXT (vPro™), 77W ² | GSP | GSP | GSP | |
| Intel® Core™ i5 3570S / 3.10GHz, 6M, VT-x, VT-d, TXT (vPro™), 65W ² | | | | GSP |
| Intel® Core™ i5 3470 / 3.20GHz, 6M, VT-x, VT-d, TXT (vPro™), 77W ² | GSP | GSP | GSP | |
| Intel® Core™ i5 3475S / 2.90GHz, 6M, VT-x, VT-d, TXT (vPro™), 65W ² | GSP | GSP | GSP | GSP |
| Intel® Core™ i5 3470S / 2.90GHz, 6M, VT-x, VT-d, TXT (vPro™), 65W ² | | | | GSP |
| Intel® Core™ i5 3550 / 3.30GHz, 6M, VT-x, VT-d, TXT (vPro™), 77W ³ | X | X | X | |
| Intel® Core™ i5 3550S / 3.00GHz, 6M, VT-x, VT-d, TXT (vPro™), 65W ³ | | | | X |
| Intel® Core™ i5 3450 / 3.10GHz, 6M, 77W ³ | X | X | X | |
| Intel® Core™ i5 3450S / 2.80GHz, 6M, 65W ³ | | | | X |
| Intel® Dual Core Processors | | | | |
| Intel® Core™ i3-3240 / 3.4GHz, 3M, VT-x, 55W ² | X | X | X | X |
| Intel® Core™ i3 3225, / 3.3GHz, 3M, VT-x, 55W ² | X | X | X | X |
| Intel® Core™ i3 3220, / 3.3GHz, 3M, VT-x, 55W ² | X | X | X | X |
| Intel® Core™ i3 2130 / 3.40GHz, 3M, VT-x, 65W ³ | X | X | X | X |
| Intel® Core™ i3 2125 / 3.30GHz, 3M, VT-x, 65W ³ | X | X | X | X |
| Intel® Core™ i3 2120 / 3.30GHz, 3M, VT-x, 65W ³ | X | X | X | X |
| Intel® Core™ G860 / 3.0GHz, 3M, VT-x, 65W ² | X | X | X | X |
| Intel® Core™ G850 / 2.9GHz, 3M, VT-x, 65W ³ | X | X | X | X |
| Intel® Core™ G640 / 2.8GHz, 3M, VT-x, 65W ² | X | X | X | X |
| Intel® Core™ G630 / 2.7GHz, 3M, VT-x, 65W ³ | X | X | X | X |

¹3rd generation CPUs natively support 3 displays with the integrated CPU graphics. 2 of the displays must be DP and connected to onboard DP through DP cables, the other could be any other format. One of the DP port has a maximum resolution of 2500x1600 at 60Hz refresh rate and the other DP and VGA port have max resolutions of 1920x1200 at 60Hz refresh rates. Active dongles must be used to connect non DP displays to the 2 onboard DP ports.

²Post launch CPU, available from June for G860; July for G640, i5 3470/S, i5 3570/S, i5 3475S; September for i3 3220, i3 3225, i3 3240

³ Available at launch, will be replaced in July or September, i5 3470/S replace i5 3450/S; i5 3570/S replace i5 3550/S; i3 3220 replace i3 2120; i3 3225 replace i3 2125; i3 3240 replace i3 2130; G860 replace G850; G640 replace G630.

MEMORY

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

| | MT | DT | SFF | USFF |
|------------------------------------------------------------|----------------------|-------------------|-------------------|-------------------|
| Type: DDR3 Synch DRAM Non-ECC Memory | 1600MHz ² | | | |
| DIMM Slots | 4 | 4 | 4 | 2 |
| DIMM Capacities | Up to 8GB | Up to 8GB | Up to 8GB | Up to 8GB |
| Minimum Memory | 2GB | 2GB | 2GB | 2GB |
| Maximum System Memory | 32GB ¹ | 32GB ¹ | 32GB ¹ | 16GB ¹ |
| Memory configurations | | | | |
| 32GB ¹ DDR3, 1600MHz ² , (4 x 8GB) | X | X | X | |
| 16GB ¹ DDR3, 1600MHz ² , (4 x 4GB) | X | X | X | |
| 16GB ¹ DDR3, 1600MHz ² , (2 x 8 GB) | | | | X |
| 8GB ¹ DDR3, 1600 MHz ² , (2 x 4GB) | X | X | X | X |
| 6GB ¹ DDR3, 1600MHz ² , (2GB + 4GB) | X | X | X | X |
| 4GB ¹ DDR3, 1600MHz ² , (2 x 2GB) | X | X | X | X |
| 4GB ¹ DDR3, 1600MHz ² , (1 DIMM) | X | X | X | X |
| 2GB DDR3, 1600MHz ² , (1 DIMM) | X | X | X | X |

¹To fully utilize 4GB or more of memory requires a 64-bit enabled processor and 64-bit operating system. With 32-bit OS, the total amount of available memory will be less than 4GB. The amount less depends on the actual system configuration.

²1600MHz memory will only perform as 1600MHz memory when 3rd generation CPUs are used. It will perform as 1333MHz memory if 2nd generation i3 2130, i3 2125, i3 2120, G860, G850 CPUs are installed in the system. It will perform as 1066MHz memory if 2nd generation G640, G630 CPUs are installed in the system.

DRIVES AND REMOVABLE STORAGE

| | MT | DT | SFF | USFF |
|-----------------------------------------------------------------------------------|-----|-----|---------------|---------------|
| Bays: | | | | |
| 5.25-inch Optical Bay Supported (External) | 2 | 1 | 1 | 1 |
| Optical Drives Supported (maximum) | 2 | 1 | 1 (slim-line) | 1 (slim-line) |
| Hard Drive Bay Supported (Internal) | 2 | 1 | 1 | 1 |
| Hard Drives Supported 3.5"/2.5" (maximum) | 2/2 | 1/2 | 1/2 | 0/1 |
| Interface: | | | | |
| SATA 2.0 | 2 | 1 | 1 | 0 |
| SATA 3.0 | 2 | 2 | 2 | 2 |
| 3.5" Hard Drives: | | | | |
| 1TB ¹ SATA 7200 RPM HDD | X | X | X | |
| 500GB ¹ SATA 7200 RPM HDD | X | X | X | |
| 250GB ¹ SATA 7200 RPM HDD | X | X | X | |
| 250GB ¹ SATA 1000 RPM HDD | X | X | X | |
| 2.5" Hard Drives: | | | | |
| 500GB ¹ SATA 7200 RPM HDD | X | X | X | X |
| 320GB ¹ SATA 7200 RPM HDD | X | X | X | X |
| 320GB ¹ SATA 7200 RPM OPAL SED w/FIPS HDD | X | X | X | X |
| 500GB ¹ SATA 7200 RPM Hybrid HDD | X | X | X | X |
| 128GB ¹ SATA Solid State drive | X | X | X | X |
| RAID 1 Data Protection: (includes two matching capacity/speed hard drives) | | | | |
| 1TB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 500GB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 250GB ¹ SATA 10000 RPM HDD (3.5") | X | | | |
| 250GB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 500GB ¹ SATA 7200 RPM HDD (2.5") | X | X | X | |
| 320GB ¹ SATA 7200 RPM HDD (2.5") | X | X | X | |
| 500GB ¹ SATA 7200 RPM Hybrid HDD (2.5") | X | X | X | |

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

DRIVES AND REMOVABLE STORAGE

| | MT | DT | SFF | USFF |
|-------------------------------------------------------------------------------|----|----|-----|------|
| RAID 0 Performance: (includes two matching capacity/speed hard drives) | | | | |
| 1TB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 500GB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 250GB ¹ SATA 7200 RPM HDD (3.5") | X | | | |
| 500GB ¹ SATA 7200 RPM HDD (2.5") | X | X | X | |
| 320GB ¹ SATA 7200 RPM HDD (2.5") | X | X | X | |
| 500GB ¹ SATA 7200 RPM Hybrid HDD (2.5") | X | X | X | |
| Optical Drive: (SFF/USFF require slim-line optical drive) | | | | |
| Blu-ray Writer SATA | X | X | X | X |
| DVD+/-RW ² SATA | X | X | X | X |
| DVD-ROM ³ SATA | X | X | X | X |
| Media Card Reader: | | | | |
| Dell 19 in 1 Media Card Reader ⁴ | X | X | | |

¹ For hard drives, GB means 1 billion 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.

⁴ Dell 19 in 1 Media Card Reader (MCR) is supported via a F5 to F3 bay converter on the MT and DT and requires a slim line optical drive.

SYSTEM BOARD CONNECTORS

NOTE: See Detailed Engineering Specifications for maximum card dimensions.

| | MT | DT | SFF | USFF |
|-----------------------------------------|----|----|-----|------|
| PCI Slot(s) ¹ | 1 | 1 | | |
| PCIe x16 Slot(s) ² | 1 | 1 | 1 | |
| PCIe x16 (wired x4)Slot(s) ³ | 1 | 1 | 1 | |
| PCIe x1 Slot(s) ³ | 1 | 1 | | |
| miniPCIe connector (s) ³ | | | | 1 |
| Serial ATA (SATA) ⁴ | 4 | 3 | 3 | 2 |

¹ PCI Slots (Support Standard Rev 2.3)

² PCIe x16 Slots (Support Standard Rev 3.0)

³ PCIe x16 (wired x 4), PCIe x1 Slots, miniPCIe (Support Standard Rev 2.0)

⁴ Serial ATA (2 ports Support Standard Rev 3.0, the rest of ports Support Standard Rev 2.0)

GRAPHICS/VIDEO CONTROLLER

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| | MT | DT | SFF | USFF |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----|-----|------|
| Integrated Intel® HD Graphics 2500/4000 (3 rd generation Core i3/i5/i7 CPUs); Integrated Intel® HD Graphics 2000/3000 (2 nd generation Core i3 CPUs); Integrated Intel® HD Graphics (Pentium® Dual Core CPU); | Integrated on CPU | | | |
| Enhanced Graphic/Video Options | | | | |
| 1GB AMD RADEON HD 7570 | Optional card | | | |
| 1GB AMD RADEON HD 7470 | Optional card | | | |
| 1GB NVIDIA GEFORCE™ GT640 ¹ | Optional card | | | |

¹GT640 available in June 2012

EXTERNAL PORTS/CONNECTORS

| | MT | DT | SFF | USFF |
|----------------------------------------|------------------|------------------|-------|-------|
| USB 2.0 (Front/Rear/Internal) | 2/4/2 | 2/4/2 | 2/4/0 | 0/2/0 |
| USB 3.0 (Front/Rear/Internal) | 2/2/0 | 2/2/0 | 2/2/0 | 2/2/0 |
| Serial | 1 Rear | | | |
| Network Connector (RJ-45) | 1 Rear | | | |
| PS/2 | 2 Rear | | | |
| 1394a Controller via optional PCI card | Optional FH card | Optional LP card | | |
| Video: | | | | |
| VGA | 1 Rear | | | |
| DisplayPort | 2 Rear | | | |
| Audio: | | | | |
| Line in for microphone | 1 Front | | | |
| Line in for microphone or stereo | 1 Rear | | | |
| Line out for headphones or speakers | 1 Front, 1 Rear | | | |

COMMUNICATIONS - NETWORK ADAPTER (NIC)

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| | MT | DT | SFF | USFF |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----|-----|------|
| Intel® 82579LM 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 | Optional 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.

COMMUNICATIONS – WIRELESS

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| | MT | DT | SFF | USFF |
|------------------------------------------------------|---------------|----|-----|----------|
| Dell Wireless 1530 PCIe WLAN card (802.11n) | Optional card | | | |
| Dell Wireless 1530 half miniPCIe WLAN card (802.11n) | | | | Optional |

AUDIO AND SPEAKERS

| | MT | DT | SFF | USFF |
|-------------------------------------------------|----------------------------|----|-----|------|
| Realtek ALC269Q High Definition Audio Codec | Integrated on system board | | | |
| Dell AX210 USB Stereo speakers | Optional | | | |
| Dell AX510/AX510PA Flat Panel Soundbar Speakers | Optional | | | |

KEYBOARD AND MOUSE

| | MT | DT | SFF | USFF |
|------------------------------------------------|----------|----|-----|------|
| Dell USB Entry Keyboard with optional palmrest | Optional | | | |
| Dell Multimedia Pro Keyboard | Optional | | | |
| Dell Smart Card Keyboard | Optional | | | |
| Dell USB Optical Mouse | Optional | | | |
| Dell Laser Mouse | Optional | | | |

SECURITY

| | MT | DT | SFF | USFF |
|---------------------------------------------------|----------------------------|----|-----|------|
| Trusted Platform Module (TPM) 1.2 ¹ | Integrated on system board | | | |
| Chassis Intrusion Switch | Optional | | | |
| Dell Smartcard Keyboard | Optional | | | |
| Chassis lock slot and loop support | Standard | | | |
| Dell Data Protection Hardware Encryption Engine | Optional | | | |

¹TPM is not available in all countries. Depending on your country regulations, no-TPM system may be available.

SOFTWARE

| | MT | DT | SFF | USFF |
|------------------------------------------|------------------------|----|-----|------|
| Dell Client Manager | Available via Dell.com | | | |
| Dell Data Protection Access (DDPA) | Standard | | | |
| Dell Data Protection Encryption (DDPE) | Optional | | | |

ENVIRONMENTAL

NOTE: For more details on Dell Environmental features, please to go to Environmental Attributes section. See your specific region for availability.

| | MT | DT | SFF | USFF |
|-------------------------------------|-------------------|----|-----------------------|----------|
| Sustainable packaging | X | X | X | |
| BFR/PVC—free limited configurations | | | Select countries only | |
| MultiPack packaging | Optional, US only | | | |
| Energy Efficient Power Supply | Optional | | | Standard |

ALL-IN-ONE STANDS AND MOUNTS

| | MT | DT | SFF | USFF |
|-------------------------------------------------|----|----|----------|----------|
| Small Form Factor AIO Stand | | | Optional | |
| Ultra Small Form Factor AIO Stand | | | | Optional |
| Ultra Small Form Factor Wall Mount / Desk Mount | | | | Optional |

SERVICE AND SUPPORT

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

| | MT | DT | SFF | USFF |
|-----------------------------------------------------------------------------|----------|----|-----|------|
| 3 Year Warranty ¹ Next Business Day On-site ² (3-3-3) | Standard | | | |
| 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.

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. A typical configuration includes: integrated graphics, one hard drive, one optical drive.

| | MT | DT | SFF | USFF |
|--------------------------------------------------------------------------|---------------|---------------|-------------|--------------|
| Chassis Volume (liters) | 26.27 | 15.06 | 8.38 | 3.70 |
| Chassis Weight (pounds/kilograms) | 20.68 / 9.4 | 17.38 / 7.9 | 13.2 / 6.0 | 7.26 / 3.3 |
| Chassis Dimensions: (HxWxD) | | | | |
| Height (inches/centimeters) | 14.17 / 36 | 14.17 / 36 | 11.42 / 29 | 9.32 / 23.67 |
| Width (inches/centimeters) | 6.89 / 17.5 | 4.02 / 10.2 | 3.65 / 9.26 | 2.56 / 6.5 |
| Depth (inches/centimeters) | 16.42 / 41.7 | 16.14 / 41 | 12.28/31.2 | 9.44 / 24 |
| Shipping Weight (pounds/kilograms - includes packaging materials) | 24.57 / 11.17 | 20.75 / 9.43 | 15.82/7.19 | 9.63 /4.375 |
| Packaging Parameters (HxWxD) | | | | |
| Height (inches/centimeters) | 21.31/54.13 | 21.31 / 54.13 | 19.25/48.90 | 19.13/48.59 |
| Width (inches/centimeters) | 18.75/47.63 | 18.75/47.63 | 15.81/40.16 | 14.38/36.53 |
| Depth (inches/centimeters) | 14.09 / 35.79 | 10.84/27.53 | 10.19/25.88 | 9.63/24.46 |

SYSTEM BOARD CONNECTOR MAXIMUM ALLOWABLE DIMENSIONS

| | MT | DT | SFF | USFF |
|---------------------------------------------------------------------|----------------|--------------|-------------|------|
| PCI Slot (Voltage supported 3.3V/5V/12V/-12V) | 1 | 1 | | |
| Height (inches/centimeters) | 4.376 / 11.115 | 2.731 /6.89 | | |
| Length (inches/centimeters) | 6.6 / 16.765 | 6.6/16.765 | | |
| Maximum Wattage | 25W | 25W | | |
| PCIex16 Slot (BLUE) (Voltage supported 3.3V/12V) | 1 | 1 | 1 | |
| Height (inches/centimeters) | 4.376 / 11.115 | 2.731 /6.89 | 2.731 /6.89 | |
| Length (inches/centimeters) | 6.6/ 16.765 | 6.6 /16.765 | 6.6 /16.765 | |
| Maximum Wattage | 75W | 50W | 50W | |
| PCIex16 wired as x4 Slot (BLACK) (Voltage supported 3.3/12V) | 1 | 1 | 1 | |
| Height (inches/centimeters) | 4.376 / 11.115 | 2.731 /6.89 | 2.731 /6.89 | |
| Length (inches/centimeters) | 6.6 / 16.765 | 6.6 /16.765 | 6.6/16.765 | |
| Maximum Wattage | 25W | 25W | 25W | |
| PCIe x1 Slot (Voltage supported 3.3V/12V) | 1 | 1 | | |
| Height (inches/centimeters) | 4.376 / 11.115 | 2.731 / 6.89 | | |
| Length (inches/centimeters) | 4.5 / 11.44 | 4.5 / 11.44 | | |
| Maximum Wattage | 10W | 10W | | |
| Mini PCIe x1 Slot | | | | 1 |

SYSTEM LEVEL ENVIRONMENTAL AND OPERATING CONDITIONS

| | MT | DT | SFF | USFF |
|--------------------------|---------------------------------------------------------------------------------|----|-----|------|
| Temperature | | | | |
| Operating | 10°C to 35°C (50°F to 95°F) | | | |
| Non-Operating (Storage) | -40°C to 65°C (-40°F to 149°F) | | | |
| Relative Humidity | 20% to 80% (non-condensing) | | | |
| Maximum vibration | | | | |
| Operating | 0.25 G at 3 to 200 Hz at 0.5 octave/min | | | |
| Non-Operating | 0.5 G at 3 to 200 Hz at 1 octave/min | | | |
| Maximum Shock | | | | |
| Operating | Bottom half-sine pulse with a change in velocity of 50.8 cm/sec (20 inches/sec) | | | |
| Non-Operating | 27-G faired square wave with a velocity change of 508 cm/sec (200 inches/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

NOTE: 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. If you have questions, please contact the manufac-

| | MT | | DT | | SFF | | USFF |
|-----------------------------------------------------------------|--------------------|-------------------------------------|-------------|-------------------------------------|-------------|-------------------------------------|-----------------------------------------------------------------------------------|
| | APFC | EPA | APFC | EPA | APFC | EPA | EPA |
| Power Supply Wattage | 275W | 275W High Efficiency | 250W | 250W High Efficiency | 240W | 240W High Efficiency | 200W High Efficiency |
| AC input Voltage Range | 90 – 264Vac | 90 – 264Vac | 90 – 264Vac | 90 – 264Vac | 90 – 264Vac | 90 – 264Vac | 90 – 264Vac |
| AC input current (low ac range/high AC range) | 5.0A / 2.5A | 5.0A / 2.5A | 4.4A / 2.2A | 4.4A / 2.2A | 4.0A / 2.0A | 3.6A / 1.8A | 2.9A / 1.45A |
| AC input Frequency | 47HZ/63HZ | 47HZ/63HZ | 47HZ/63HZ | 47HZ/63HZ | 47HZ/63HZ | 47HZ/63HZ | 47 – 63 Hz |
| AC holdup time (80% load) | 16 mini sec | 16 mini sec | 16 mini sec | 16 mini sec | 16 mini sec | 16 mini sec | 16 mini sec |
| Minimum Efficiency (Energy Star 5.2 Compliant) | | 87 – 90 – 87% @ 20 – 50 – 100% load | | 87 – 90 – 87% @ 20 – 50 – 100% load | | 87 – 90 – 87% @ 20 – 50 – 100% load | 87 – 90 – 87% @ 20 – 50 – 100% load |
| Typical Efficiency (Active PFC) | 65% | | 65% | | 65% | | N/A |
| DC parameters | | | | | | | |
| +3.3V output | 10.0A | 10.0A | 7.0 A | 7.0 A | 3.5A | 3.5A | N/A |
| +5.0V output | 13A | 13A | 15A | 15A | 11A | 11A | N/A |
| +12.0V output | 12VA/17A; 12VB/10A | 12VA/17A; 12VB/10A | 17.8A | 17.8A | 17A | 17A | +12VA - 12.5 A & +12VB - 6.0 A Note: +12VB Rated at 0.4A when in Standby Mode. |
| +5.0V auxiliary output | 4.0A | 4.0A | 4.0 | 4.0 | 4.0A | 4.0A | N/A |
| -12.0V output | 0.5A | 0.5A | 0.5A | 0.5A | 0.5A | 0.5A | 0.1 A |
| Max total power | 275W | 275W | 250W | 250W | 240W | 240W | 200W |
| Max combined +3.3V / +5.0V power | 100W | 100W | 90W | 90W | 60W | 60W | N/A |
| Max combined 12.0V power (note: only if more than one 12V rail) | 240W | 240W | N/A | N/A | N/A | N/A | 200W |
| BTUs/h (based on PSU max wattage) | 938 BTU | 938 BTU | 853 BTU | 853 BTU | 819 BTU | 819 BTU | 682 BTU |
| Power Supply Fan | 80*25mm | 80*25mm | 80*20/25mm | 80*20/25mm | 60*25mm | 60*25mm | N/A |
| Compliance: | | | | | | | |
| Erp Lot6 Tier 2 0.5watt requirement | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Blue Angel Compliant | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Climate Savers / 80Plus Compliant | No | Yes | No | Yes | No | Yes | Yes |
| FEMP Standby Power Compliant | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| CECP Compliant | No | Yes | No | Yes | No | Yes | Yes |

POWER

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

| 3.0v CMOS battery (Type and estimated battery life) | | | | |
|------------------------------------------------------------|-----------------|---------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Brand | Type | Voltage | Composition | Life |
| PANASONIC | CR-2032L/ BE | 3V | Lithium | Continuous Discharge Under 15 kΩ Load to 2.5V End-Voltage. 20°C±2°C: 1183Hrs. or Longer, 1133Hrs.or Longer after 12 months. |
| MITSUBISHI | CR2032 | 3V | Lithium | Continuous Discharge Under 15 kΩ Load to 2.0V End-Voltage. 20°C ±2°C: 1000Hrs. or Longer, 970Hrs. or Longer after 12 months. 0°C ±2°C: 910Hrs. or Longer, 890Hrs. or Longer after 12 months. |

AUDIO

| INTEGRATED REALTEK ALC269Q HIGH DEFINITION AUDIO | MT | DT | SFF | USFF |
|---------------------------------------------------------|--------------------------------------------|-----------|------------|-------------|
| High Definition Stereo support | X | X | X | X |
| Number of channels | 2 | | | |
| Number of Bits / Audio resolution | 16, 20, and 24-bit resolution | | | |
| Sampling rate (recording/playback) | Support 44.1K/48K/96K/192 kHz sample rates | | | |
| Signal to Noise Ratio | 98 dB DAC outputs, 90 dB for ADC inputs | | | |
| Analog Audio | X | X | X | X |
| Dolby Digital | | | | |
| THX | | | | |
| Digital out (S/PDIF) | | | | |
| Audio Jack Impedance | | | | |
| Microphone | 40K ohm~60K ohm | | | |
| Line-In | 40K ohm~60K ohm | | | |
| Line-Out | 100~150 ohm | | | |
| Headphone | 1~4 ohm | | | |
| Internal Speaker Power Rating | 2Watt (peak) / 1Watt (average) | | | |

COMMUNICATIONS - INTEGRATED LAN

| INTEGRATED INTEL® 82579 GIGABIT¹ ETHERNET LAN 10/100/1000 | MT | DT | SFF | USFF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------|------------|-------------|
| External Connector Type | RJ45 | | | |
| Data Rates supported | 10/100/1000 Mbps | | | |
| Controller Details | | | | |
| Controller bus architecture | PCIe-based interface for S0 state, SMBus for Sx low power state | | | |
| Integrated memory | N/A | | | |
| Data transfer mode (example Bus-Master DMA) | N/A | | | |
| Power consumption (full operation per data rate connection speed) | 711mW (Max.) | | | |
| Power consumption (standby operation) | 227mW (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) | | | |

COMMUNICATIONS - INTEGRATED LAN (CON.)

| INTEGRATED INTEL® 82579 GIGABIT ¹ ETHERNET LAN 10/100/1000 (CONT.) | MT | DT | SFF | USFF |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----|-----|------|
| Environmental | | | | |
| Operating temperature | 0° C to 85° C (32° F to 185° F) | | | |
| Operating humidity | 20% to 80% (non-condensing) | | | |
| Operating System Driver Support | Microsoft Client XP/Vista/Win 7 (32bit/64bit) | | | |
| Manageability (examples WOL, PXE) | WOL, PXE 2.1 | | | |
| Management Capabilities Alerting | Intel® Standard Manageability, 3rd generation i5/i7 processors with vPro Technology | | | |

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.

COMMUNICATIONS – NETWORK ADAPTER (NIC)

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| BROADCOM NETXTREME 10/100/1000 PCIE GIGABIT ¹ NETWORKING CARD | MT | DT | SFF | USFF |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|------|
| Connector Type | RJ45 | | | |
| Data Rates supported | 10/100/1000 Mbps Half/Full duplex | | | |
| Controller Details | | | | |
| Controller bus architecture (example PCIe 1.0a x1) | PCIe c1.0a 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 | | | |
| 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) | | | | |
| 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. | | | |

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

COMMUNICATIONS – NETWORK ADAPTER (NIC) (CONT.)

**BROADCOM NETXTREME 10/100/1000
PCI-E GIGABIT¹ NETWORKING CARD (CONT.)**

| | MT | DT | SFF | USFF |
|----------------------------------------------------|--------------------------------------------------------|----|-----|------|
| Environmental | | | | |
| Operating temperature | 0°C to 55°C (32°F - 131°F) | | | |
| Operating humidity | 5% ~ 85% (non-condensing) | | | |
| Operating System Driver Support | Microsoft Client XP/Vista/Win 7 (32bit/64bit) Linux | | | |
| Manageability (examples WOL, PXE) | WOL, PXE2.1, ACPI | | | |
| Management Capabilities Alerting (example ASF 2.0) | None | | | |

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.

| 1394a FIREWIRE PCI ADD-IN CARD | |
|----------------------------------------------------|-----------------------------------------------------------------------|
| Connector Type | IEEE-1394a-2000 (6 pins) |
| Controller Details | |
| Controller bus architecture (example PCIe 1.0a x1) | PCI 2.3 |
| Chipset | LSI |
| IO Ports | IEEE 1394a (FireWire) with a transfer rate of up to 400Mbps |
| Power Consumption | Under 30 mA |
| Connector | 2 IEEE-1394a 6 pins connectors |
| OS Support | Win XP (32bit/64bit), Win Vista (32bit/64bit) and Win 7 (32bit/64bit) |

COMMUNICATIONS – WIRELESS

| DELL WIRELESS 1530 PCIE WLAN CARD (802.11N) | MT | DT | SFF | USFF |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|------------|---------------------|
| Dell Wireless 1530 PCIe WLAN card (802.11n) | Custom WLAN Antenna | | | |
| Dell Wireless 1530 half miniPCIe WLAN card (802.11n) | | | | Custom WLAN Antenna |
| Controller Details | | | | |
| Controller bus architecture | Electrically compatible with the PCI Express Base Specification v1.1 (x1 lane) and PCIe v1.0a. | | | |
| 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, 11, 9, 6, 5.5, 2, 1 Mbps | | | |
| 802.11n Data Rates supported | 270, 240, 180, 135, 130, 121.5, 120, 117, 108, 104, 90, 81, 78, 65, 60, 58.5, 54, 52, 40.5, 39, 30, 27, 26, 19.5, 13.5, 13, 6.5 Mbps | | | |
| Encryption | WEP 64-bit and 128-bit, TKIP, AES-CCMP 128-bit | | | |
| Operating temperature | 0°C –70°C | | | |
| Operating humidity | Max Operating Humidity 85% | | | |
| Operating System Driver Support | Microsoft Client XP/Vista/Win 7 (32bit/64bit) | | | |

COMMUNICATIONS – SERIAL / PARALLEL PORT PCIE ADD-IN CARD

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| SERIAL / PARALLEL PORT PCIE ADD-IN CARD | MT | DT | SFF | USFF |
|----------------------------------------------------|----------------------------------------------------------------|----|-----|------|
| Connector Type | RS-232 and IEEE1284 | | | |
| Data Rates supported | 50bps ~115.2Kbps (Serial) &Maximum 1.8MBp(Parallel) | | | |
| Controller Details | | | | |
| Controller bus architecture (example PCIe 1.0a x1) | PCI Express one lane (x1) | | | |
| Driver Support | Microsoft Client XP/Vista/ Win 7 (32bit/64bit) Linux DOS | | | |
| Full height Serial / Parallel add-in card | Optional | | | |
| Environment | | | | |
| Operation Temperature | 0°C to 60°C (32°F to 140°F) | | | |
| Operation Humidity | 5 to 95% RH | | | |
| Storage Temperature | -20°C to 85°C (-4°F to 185°F) | | | |

COMMUNICATIONS – SERIAL PORT PCIE ADD-IN CARD

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| SERIAL PORT PCIE ADD-IN CARD | MT | DT | SFF | USFF |
|----------------------------------------------------|---------------------------------------------------------------|----------|-----|------|
| Connector Type | RS-232 | | | |
| Data Rates supported | 50bps ~115.2Kbps | | | |
| Controller Details | | | | |
| Controller bus architecture (example PCIe 1.0a x1) | PCI Express one lane (x1) | | | |
| Driver Support | Microsoft Client XP/Vista/Win 7 (32bit/64bit) Linux DOS | | | |
| Half height Serial add-in card | | Optional | | |
| Environment | | | | |
| Operation Temperature | 0°C to 60°C (32°F to 140°F) | | | |
| Operation Humidity | 5 to 95% RH | | | |
| Storage Temperature | -20°C to 85°C (-4°F to 185°F) | | | |

COMMUNICATIONS – SERIAL / PARALLEL PORT PCIE ADD-IN CARD

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

| PARALLEL PORT PCIE ADD-IN CARD | MT | DT | SFF | USFF |
|----------------------------------------------------|-----------------------------------------------------------|----------|-----|------|
| Connector Type | IEEE1284 | | | |
| Data Rates supported | Maximum 1.8MBp | | | |
| Controller Details | | | | |
| Controller bus architecture (example PCIe 1.0a x1) | PCI Express one lane (x1) | | | |
| Driver Support | Microsoft Client XP/Vista/7 (32bit/64bit) Linux DOS | | | |
| Half height parallel add-in card | | Optional | | |
| Environment | | | | |
| Operation Temperature | 0°C to 60°C (32°F to 140°F) | | | |
| Operation Humidity | 5 to 95% RH | | | |
| Storage Temperature | -20°C to 85°C (-4°F to 185°F) | | | |

GRAPHICS/VIDEO CONTROLLER

NOTE: MT supports full height (FH) cards and DT and SFF supports low profile (LP) cards.

Onboard Graphics^{1,2,3,4}
 Integrated Intel® HD Graphics 2500/4000 (3rd generation Core i3/i5/i7 CPUs);
 Integrated Intel® HD Graphics 2000/3000 (2nd generation Core i3 CPUs);
 Integrated Intel® HD Graphics (Pentium® Dual Core CPU);

| | MT | DT | SFF | USFF |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------|-----|------|
| Bus Type | Integrated | | | |
| GPU core clock | Gen6 Core Intel® HD Graphics /HD Graphics 2000 @ 850MHz Gen7 Core Intel® HD Graphics 2500 / 4000 @ 650MHz | | | |
| Frame Buffer Memory (onboard and shared) Size and Speed | Depends on available system memory (Up to 1.7GB with 4GB system Memory) | | | |
| Overlay Planes | Yes | | | |
| Maximum Color Depth | 32 bit | | | |
| Maximum Vertical Refresh Rate | 75 Hz | | | |
| Multiple Display Support | Yes | | | |
| Operating Systems Graphics/ Video API Support | OpenGL 3.1/OpenCLv1.1 /DirectX 11 | | | |
| Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital) | Up to 2560x1600 @ 60Hz (DP) Up to 1920 x 1200 @ 60 Hz (VGA only) | | | |
| External Connectors | VGA, 2 DisplayPort | | | |
| DisplayPort | | DisplayPort | | |
| Bus Type | DDPC | | | |
| DisplayPort Audio Support | Yes | | | |
| VGA | | | | |
| Bus Type | CRT | | | |
| VGA Audio Support | No | | | |

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.

² 3rd generation CPUs natively support 3 displays with the integrated CPU graphics. Three simultaneous display output requires one DP port with a maximum resolution of 2500x1600 at 60Hz refresh rate and a DP and VGA port with max resolutions of 1920x1200 at 60Hz refresh rates.

³ Display output from both onboard and discrete simultaneously if multi display option in BIOS is enabled and Win 7 OS is used.

⁴ For dual graphics card configuration in PCIe16 and PCIe16 (wire as 4), BIOS will disable multi display option automatically and display output only from graphics cards.

| 1GB NVIDIA GEFORCE™ GT640 | MT | DT | SFF |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----|-----|
| Bus Type (example integrated or PCIe x16) | PCIEx16 | | |
| GPU core clock | 950Mhz | | |
| Frame Buffer Memory (onboard and shared) Size and Speed | 1250Mhz | | |
| Maximum power consumption | 75W | | |
| Overlay Planes | Yes | | |
| Maximum Color Depth | 32bit | | |
| Maximum Vertical Refresh Rate | 240Hz | | |
| Multiple Display Support | Yes | | |
| Operating Systems Graphics/ Video API Support | D3D/OpenGL 4.1/OpenCLv1.1/DirectX11 | | |
| Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital) | Dual-Link DVI: 2560 x 1600, 32-bit color DisplayPort: 2560 x 1600, 32-bit color HDMI: 1920 x 1440, 32-bits color | | |
| External connectors | Display Port, DVI-I, HDMI | | |
| Audio support | Yes (For native DP and HDMI), Able to support audio for DP to HDMI dongle that support audio pass through. | | |
| Dimensions of full height card inches/centimeters (L x H) | 6.6 x 4.7 / 16.764 x 12.0 | | |
| Dimensions of low profile card inches/centimeters (L x H) | | NA | |
| Environmental Operating Conditions (Non-Condensing): | | | |
| Operating Temperature Range | 10°C -50°C | | |
| Relative Humidity Range | 5-90% RH | | |
| Altitude Range | 0-20,000 ft. | | |

| 1GB AMD RADEON™ HD7570 | MT | DT | SFF |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|------------|
| Bus Type (example integrated or PCIe x16) | PCIEx16 | | |
| GPU core clock | 650Mhz | | |
| Frame Buffer Memory (onboard and shared) Size and Speed | 800Mhz | | |
| Maximum power consumption | 50W | | |
| Overlay Planes | Yes | | |
| Maximum Color Depth | 32-bit | | |
| Maximum Vertical Refresh Rate | 200Hz | | |
| Multiple Display Support | Yes | | |
| Operating Systems Graphics/ Video API Support | D3D/OpenGL 4.1/OpenCLv1.1/DirectX11 | | |
| Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital) | Dual-Link DVI: 2560 x 1600, 32-bit color DisplayPort: 2560 x 1600, 32-bit color | | |
| External connectors | Display Port, DVI-I | | |
| Audio Support | Yes (For native DP). Able to support audio for DP to HDMI dongle that support audio pass through. | | |
| Dimensions of full height card inches/centimeters (L x H) | 6.6 x 4.7 / 16.764 x 12.0 | | |
| Dimensions of low profile card inches/centimeters (L x H) | 6.6 x 3.35 / 16.764 x 8.5 | | |
| Environmental Operating Conditions (Non-Condensing): | | | |
| Operating Temperature Range | 10°C -55°C | | |
| Relative Humidity Range | 5-90% RH | | |
| Altitude Range | 0-20,000 ft. | | |

| 1GB AMD RADEON™ HD7470 | MT | DT | SFF |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|------------|
| Bus Type (example integrated or PCIe x16) | PCIEx16 | | |
| GPU core clock | 775Mhz | | |
| Frame Buffer Memory (onboard and shared) Size and Speed | 900Mhz | | |
| Maximum power consumption | 25W | | |
| Overlay Planes | Yes | | |
| Maximum Color Depth | 32-bit | | |
| Maximum Vertical Refresh Rate | 200Hz | | |
| Multiple Display Support | Yes | | |
| Operating Systems Graphics/ Video API Support | D3D/OpenGL 4.1/OpenCLv1.1/DirectX11 | | |
| Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or digital) | Dual-Link DVI: 2560 x 1600, 32-bit color DisplayPort: 2560 x 1600, 32-bit color | | |
| External connectors | DisplayPort, DVI-I | | |
| Audio Support | Yes (For native DP). Able to support audio for DP to HDMI dongle that support audio pass through. | | |
| Dimensions of full height card inches/centimeters (L x H) | 6.6 x 4.7 / 16.764 x 12.0 | | |
| Dimensions of low profile card inches/centimeters (L x H) | 6.6 x 3.35 / 16.764 x 8.5 | | |
| Environmental Operating Conditions (Non-Condensing): | | | |
| Operating Temperature Range | 10°C -55°C | | |
| Relative Humidity Range | 5-90% RH | | |
| Altitude Range | 0-20,000 ft. | | |

HARD DRIVES¹

| 3.5" 1TB SATA 7200 RPM HDD | |
|-----------------------------------------------------------------|--------------------------------------------------|
| Capacity | 1TB |
| Dimensions inches (W x D x H) | Approximately (4.00 x 5.787 x 1.028 inches) |
| Interface type and Maximum speed | Up to 6Gb/s (SATA 3.0) |
| Internal buffer size | 32 MB |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 1,953,525,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 5.0W, Active 10.0W(running IOmeter utility) |
| Spin Up Current (reference only) | 5V (1A) ,12V (2A) |
| 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 |

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

HARD DRIVES¹ (CONT.)

| 3.5" 500GB SATA 7200 RPM HDD | |
|-----------------------------------------------------------------|--------------------------------------------------|
| Capacity | 500GB |
| Dimensions inches (W x D x H) | Approximately (4.00 x 5.787 x 1.028 inches) |
| Interface type and Maximum speed | Up to 6Gb/s (SATA 3.0) |
| Internal buffer size | 16 MB |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 976,773,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 5.0W, Active 10.0W(running IOmeter utility) |
| Spin Up Current (reference only) | 5V (1A) ,12V (2A) |
| 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 |

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

HARD DRIVES¹ (CONT.)**3.5" 250GB SATA 7200 RPM HDD**

| | |
|------------------------------------|--------------------------------------------------|
| Capacity | 250GB |
| Dimensions inches (W x D x H) | Approximately (4.00 x 5.787 x 1.028 inches) |
| Interface type and Maximum speed | Up to 6Gb/s (SATA 3.0) |
| Internal buffer size | 8 MB |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 488,397,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 5.0W, Active 10.0W(running IOmeter utility) |
| Spin Up Current (reference only) | 5V (1A) ,12V (2A) |

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 |

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

HARD DRIVES¹

| 3.5" 250 GB SATA 10000 RPM HDD | |
|-----------------------------------------------------------------|--------------------------------------------------|
| Capacity | 250 GB |
| Dimensions inches (W x D x H) | Approximately (4.00 x 5.787 x 1.028 inches) |
| Interface type and Maximum speed | Up to 6Gb/s (SATA 3.0) |
| Internal buffer size | 64 MB |
| Rotational Speed | 10000 rpm |
| Logical Blocks | 488,397,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 5.0W, Active 10.0W(running IOmeter utility) |
| Spin Up Current (reference only) | 5V (0.39A) ,12V (1.425A) |
| Environmental Operating Conditions (Non-Condensing): | |
| Temperature Range | 5°C to 60°C |
| Relative Humidity Range | 5% to 95% non-condensing |
| Maximum Wet Bulb Temperature | 35°C |
| Altitude Range | -1,000 ft to 10,000 ft |
| Environmental Non-Operating Conditions (Non-Condensing): | |
| Temperature Range | -40°C to 70°C |
| Relative Humidity Range | 5% to 95% non-condensing |
| Maximum Wet Bulb Temperature | 38°C |
| Altitude Range | -1,000 ft to 40,000 ft |

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

HARD DRIVES¹ (CONT.)**2.5" 500GB SATA 7200 RPM HDD**

| | |
|-----------------------------------------------------------------|--------------------------------------------|
| Capacity | 500GB |
| 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 |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 976,773,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 0.7W, Active 3.25W |
| Spin Up Current (reference only) | 5V (1A) |
| 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 |

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

HARD DRIVES¹ (CONT.)

| 2.5" 320GB SATA 7200 RPM HDD | |
|-----------------------------------------------------------------|--------------------------------------------|
| Capacity | 320GB |
| 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 |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 625, 142,448 |
| Power Source | |
| Power Consumption (reference only) | Idle 0.7W, Active 3.25W |
| Spin Up Current (reference only) | 5V (1A) |
| Environmental Operating Conditions (Non-Condensing): | |
| Temperature Range | 5°C to 60°C |
| Relative Humidity Range | 10% to 90% 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 |

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

HARD DRIVES¹ (CONT.)

| 2.5" 320GB SATA 7200 RPM OPAL SED W/FIPS HDD | |
|-----------------------------------------------------------------|--------------------------------------------|
| Capacity | 320GB |
| Dimensions inches (W x D x H) | Approximately (2.75 x 3.94 x 0.374 inches) |
| Interface type and Maximum speed | Up to 3Gb/s |
| Internal buffer size | 16 MB |
| Rotational Speed | 7200 rpm |
| Logical Blocks | 625,142,448 |
| Power Source | |
| Power Consumption (reference only) | Idle 0.7W, Active 3.25W |
| Spin Up Current (reference only) | 5V (1A) |
| 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 |

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

HARD DRIVES¹ (CONT.)

| 2.5" 500GB SATA 7200 RPM HYBRID HDD | |
|-----------------------------------------------------------------|--------------------------------------------|
| Capacity | 500GB |
| Dimensions inches (W x D x H) | Approximately (3.93 x 2.75 x 0.374 inches) |
| Interface type and Maximum speed | Up to 6Gb/s |
| Internal buffer size | 16 MB |
| Flash Cache | 8GB |
| Logical Blocks | 976,773,168 |
| Power Source | |
| Power Consumption (reference only) | Idle 0.8W, Active 3.25W |
| Spin Up Current (reference only) | 5V (1A) |
| 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 |

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

HARD DRIVES¹ (CONT.)**2.5" 128GB¹ SATA SOLID STATE DRIVE**

| | |
|------------------------------------------------------|--------------------------------------------|
| 2.5" 128GB¹ SATA SOLID STATE DRIVE | |
| Capacity | 128GB |
| Dimensions inches (W x D x H) | Approximately (2.75 x 3.94 x 0.276 inches) |
| Interface type and Maximum speed | Up to 6Gb/s (SATA 3.0) |
| MTBF | 1M hours |
| Logical Blocks | 250,069,680 |
| Power Source | |
| Power Consumption (reference only) | Idle 0.5W, Active 2.5W |

Environmental Operating Conditions (Non-Condensing):

| | |
|------------------------------|-------------|
| Temperature Range | 0°C to 70°C |
| Relative Humidity Range | 10 to 90% |
| Maximum Wet Bulb Temperature | 29°C |
| Op Shock (@0.5ms) | 1,500G |

Environmental Non-Operating Conditions (Non-Condensing):

| | |
|------------------------------|---------------|
| Temperature Range | -55°C to 95°C |
| Relative Humidity Range | 5 to 95% |
| Maximum Wet Bulb Temperature | 38°C |

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

OPTICAL DRIVES

| BLU-RAY WRITER | MT | DT | SFF | USFF |
|---------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
| External Dimensions inches/centimeters (Without Bezel – W x H x D) | 148.2mm(6in)/42mm (2in)/ 171 (max) | 148.2mm(6in)/42mm (2in)/ 171 (max) | 128.0 mm (5.04in)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) | 128.0 mm (5.04in)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) |
| Weight (max) pounds/ kilograms | 730g | 730g | 190g | 190g |
| Interface type and speed | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s |
| Disc Capacity | Standard | Standard | Standard | Standard |
| Internal buffer size | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Access Times (typical) | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Maximum Data Transfer Rates | | | | |
| Writes | 6X BD/16x DVD/40x CD | 6x BD/16x DVD/40x CD | 6X BD/8x DVD/24x CD | 6X BD/8x DVD/24x CD |
| Reads | 8X BD/16x DVD/40x CD | 8x BD/16x DVD/40x CD | 6X BD/8x DVD/ 24x CD | 6X BD/8x DVD/ 24x CD |
| Power Source | | | | |
| DC Power Requirements | 12V, 5V | 12V, 5V | 5V | 5V |
| DC Current | 1200mA (12V)/ 900mA (5V) | 1200mA (12V)/ 900mA (5V) | 900mA | 900mA |
| Environmental Operating Conditions (Non-Condensing): | | | | |
| Operating Temperature Range | 5°C to 50°C | 5°C to 50°C | 5°C to 50°C | 5°C to 50°C |
| Relative Humidity Range | 20% to 80% RH | 20% to 80% RH | 20% to 80% RH | 20% to 80% RH |
| Maximum Wet Bulb Temperature | 29°C | 29°C | 29°C | 29°C |
| Altitude Range | -200 to 3048m | -200 to 3048m | -200 to 3048m | -200 to 3048m |
| Environmental Non-Operating Conditions (Non-Condensing): | | | | |
| Operating Temperature Range | -40°C to 65°C | -40°C to 65°C | -40°C to 65°C | -40°C to 65°C |
| Relative Humidity Range | 5% to 95% RH | 5% to 95% RH | 5% to 95% RH | 5% to 95% RH |
| Maximum Wet Bulb Temperature | 38°C | 38°C | 38°C | 38°C |
| Altitude Range | -200 to 10600m | -200 to 10600m | -200 to 10600m | -200 to 10600m |

OPTICAL DRIVES (CONT.)

| DVD +/- RW ¹ | MT | DT | SFF | USFF |
|---------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| External Dimensions inches/centimeters (Without Bezel – W x H x D) | 148.2mm(6in)/42mm (2in)/ 171 (max) | 148.2mm(6in)/42mm (2in)/ 171 (max) | 128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) | 128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) |
| Weight (max) pounds/ kilograms | 700g | 700g | 170g | 170g |
| Interface type and speed | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s |
| Disc Capacity | Standard | Standard | Standard | Standard |
| Internal buffer size | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Access Times (typical) | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Maximum Data Transfer Rates | | | | |
| Writes | 16x DVD/48x CD | 16x DVD/48x CD | 8x DVD/ 24x CD | 8x DVD / 24x CD |
| Reads | 16x DVD/48x CD | 16x DVD/48x CD | 8x DVD/ 24x CD | 8x DVD/ 24x CD |
| Power Source | | | | |
| DC Power Requirements | 12V, 5V | 12V, 5V | 5V | 5V |
| DC Current | 1200mA (12V)/ 900mA (5V) | 1200mA (12V)/ 900mA (5V) | 1000mA | 1000mA |
| Environmental Operating Conditions (Non-Condensing): | | | | |
| Operating Temperature Range | 5°C to 50°C | 5°C to 50°C | 5°C to 50°C | 5°C to 50°C |
| Relative Humidity Range | 20% to 80% RH | 20% to 80% RH | 20% to 80% RH | 20% to 80% RH |
| Maximum Wet Bulb Temperature | 29°C | 29°C | 29°C | 29°C |
| Altitude Range | -200 to 3048 | -200 to 3048 | -200 to 3048 | -200 to 3048 |
| Environmental Non-Operating Conditions (Non-Condensing): | | | | |
| Operating Temperature Range | -40°C to 65°C | -40°C to 65°C | -40°C to 65°C | -40°C to 65°C |
| Relative Humidity Range | 5% to 95% RH | 5% to 95% RH | 5% to 95% RH | 5% to 95% RH |
| Maximum Wet Bulb Temperature | 38°C | 38°C | 38°C | 38°C |
| Altitude Range | -200 to 10600m | -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 | USFF |
|---------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| External Dimensions inches/centimeters (Without Bezel – W x H x D) | 148.2mm(6in)/42mm (2in)/ 170 (max) | 148.2mm(6in)/42mm (2in)/ 170 (max) | 128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) | 128.0 mm (5.04)/ 12.7mm (0.5 in)/ 126.1mm (4.97in) |
| Weight (max) pounds/ kilograms | 700g | 700g | 165g | 165g |
| Interface type and speed | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s | SATA 1.5Gbit/s |
| Disc Capacity | Standard | Standard | Standard | Standard |
| Internal buffer size | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Access Times (typical) | supplier dependent | supplier dependent | supplier dependent | supplier dependent |
| Maximum Data Transfer Rates | | | | |
| Writes | N/A | N/A | N/A | N/A |
| Reads | 16x DVD/48x CD | 16x DVD/48x CD | 8x DVD/ 24x CD | 8x DVD/ 24x CD |

OPTICAL DRIVES (CONT.)

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

MEDIA CARD READER (MCR)

NOTE: Dell 19 in 1 Media Card Reader (MCR) is supported via a F5 to F3 bay converter on the MT and DT and may require a slim line optical drive depending on selectable configuration. MCR is not available on the SFF and USFF chassis.

| 19 IN 1 MEDIA CARD READER | MT/DT |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| External Dimensions inches/(centimeters) (With Bezel – W x H) | 3.99/(10.13cm)/1.0/(2.54cm) |
| Weight (max) pounds/kilograms | ~155g |
| Interface type and speed | USB 2.0, 480Mb/s |
| Media Supported (maximum capacity supported will vary by Flash Media Types) | |
| Media Supported | CF I CF II Micro Drive (MD) Secure Digital (SD) SDHC Mini Secure Digital (mini-SD) Micro Secure Digital (Micro-SD)(with adapter) Multi Media Card (MMC) RS Multi Media Card (RS-MMC) Multi Media Card plus (MMC plus) RS Multi Media Card plus (RS-MMC plus) Multi Media Card Micro(MMC Micro) (with adapter) Memory Stick (MS) Memory Stick Pro(MS Pro) Memory Stick Pro Duo (MS Pro Duo) Memory Stick Duo (MS-Duo) Memory Stick Micro(MS Micro)(M2) (with adapter) Smart Media (SM) xD |
| Support Specification Versions: | Compact Flash type I/II Version 4.0 Smart Media (SM) Specification 2003 Multi Media Card (MMC) Specification 4.2 Secure Digital (SD) 2.0 Memory Stick Pro (MS-PRO) Specification 1.02 Memory Stick (MS) Specification 1.43 xD Specification 1.2 |
| Power Source | |
| Max Power Requirements | 2.5W |
| Supply Voltage Range | 4.75V ~ 5.25V |
| Power Consumption: | Standby less than 0.5mA @ 5.0VDC |
| Environmental Operating Conditions (Non-Condensing): | |
| Operating Temperature Range | 5°C to 50°C |
| Relative Humidity Range | 10% to 90% RH |
| Environmental Non-Operating Conditions (Non-Condensing): | |
| Operating Temperature Range | -40°C to 65°C |
| Relative Humidity Range | 5% to 95% RH |

BIOS DEFAULTS

| | | |
|-------------------------------|-------------------------|----------------------------------------------------------------------------------|
| System Configuration | Integrated NIC: | Enable w/PXE |
| | Serial Port: | COM1 |
| | SATA Operation: | RAID On |
| | Drives: | Enable (SATA-0, SATA-1, SATA-2, SATA-3) |
| | SMART Reporting: | Disable |
| | USB Configuration: | Enable (Boot Support, Front USB Ports, Rear Dual USB Ports, Rear Quad USB Ports) |
| | Miscellaneous Devices: | Enable (PCI Slot) |
| Video | Multi-display: | Disable (For system with discrete graphics) |
| Security | Strong Password: | Disable |
| | Password Configuration: | 4~32 |
| | Password Bypass | Disable |
| | Password Changes: | Enable |
| | TPM Security: | Disable |
| | Computrace®: | Deactivate |
| | CPU XD Support: | Enable |
| | OROM Keyboard Access | Enable |
| | Admin Setup Lockout | Disable |
| | Chassis Intrusion | Disable (For system with Chassis Intrusion detection) |
| Performance | Multiple Core Support: | All |
| | Intel® SpeedStep™: | Enable |
| | C States Control: | Enable |
| | Intel TurboBoost | Enable |
| | HyperThread control: | Enable |
| | HDD Protection Support | Enable (For China market only) |
| Power Management | AC Recovery: | Power Off |
| | Auto On Time: | Disable |
| | Deep Sleep Control: | Disable |
| | Fan Control Override: | Disable |
| | USB Wake Support | Disable |
| | Wake on LAN/WLAN: | Disable |
| | Block sleep | Disable |
| POST Behavior | Numlock LED: | Enable |
| | Keyboard Errors: | Enable |
| | POST HotKeys: | Enable |
| Virtualization Support | Virtualization: | Enable |
| | VT for Direct I/O: | Enable |
| | Trusted Direct I/O | Disable |
| Maintenance | Service Tag: | Set by the factory |
| | Asset Tag: | Optional User Entry |
| | SERR Message: | 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.

ACOUSTIC NOISE EMISSION INFORMATION

OPTIPLEX 9010 MT

| Component | Typical Configuration | High-end Configuration |
|-------------------|---------------------------|------------------------|
| CPU | Ivy Bridge i5 3470 | Ivy Bridge i5 3770 |
| Memory | 4G DDR3 1600MHz | 8G DDR3 1600MHz(x2) |
| HDD (#, capacity) | 500G 7200RPM SATA3 | 1T 7200RPM SATA3(x2) |
| RMSD | 16X DVD+/-RW SATA HH | 16X DVD+/-RW SATA HH |
| Graphics Adapter | Intel® HD Graphics Family | ATI Radeon HD7570 |

The Declared Noise Emission in accordance with ISO 9296 for the Dell OptiPlex 9010 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 | 4.0 | 4.3 |
| HDD Operating | 4.0 | 4.4 |
| 90% CPU | 4.0 | 4.8 |
| ODD Operating | 5.2 | 5.2 |

The Declared A-weighted Sound Pressure Level in decibels (re 2×10^{-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 follows¹:

| Operating Mode | Typical Configuration Declared Sound Pressure (LpA) | | | | High-end Configuration Declared Sound Pressure (LpA) | | | |
|----------------|-----------------------------------------------------|--------------------------|-------------------------|--------------------------|------------------------------------------------------|--------------------------|-------------------------|--------------------------|
| | Table-Top | | Floor-Standing | | Table-Top | | Floor- Standing | |
| | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) |
| Idle | 29.4 | 25.3 | 23.2 | 22.1 | 35.9 | 33.6 | 24.7 | 24.3 |
| HDD Operating | 29.5 | 25.7 | 23.6 | 22.2 | 36.9 | 34.7 | 25.4 | 24.5 |
| 90% CPU | 30.3 | 26.9 | 23.9 | 22.7 | 37.5 | 35.9 | 26.9 | 26.8 |
| ODD Operating | 42.7 | 39.6 | 36.6 | 35.4 | 42.7 | 40.1 | 37.1 | 34.7 |

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.

² Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

ACOUSTIC NOISE EMISSION INFORMATION

OPTIPLEX 9010 DT

| Component | Typical Configuration | High-end Configuration |
|-------------------|---------------------------|------------------------|
| CPU | Ivy Bridge i5 3470 | Ivy Bridge i5 3770 |
| Memory | 4G DDR3 1600MHz | 8G DDR3 1600MHz(x2) |
| HDD (#, capacity) | 500G 7200RPM SATA3 | 1T 7200RPM SATA3 |
| RMSD | 16X DVD+/-RW SATA HH | 16X DVD+/-RW SATA HH |
| Graphics Adapter | Intel® HD Graphics Family | ATI Radeon HD7570 |

The Declared Noise Emission in accordance with ISO 9296 for the Dell OptiPlex 9010 DT 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 | 3.4 | 3.9 |
| HDD Operating | 3.4 | 4.0 |
| 90% CPU | 3.6 | 4.2 |
| ODD Operating | 5.1 | 5.2 |

The Declared A-weighted Sound Pressure Level in decibels (re 2×10^{-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 follows¹:

| Operating Mode | Typical Configuration Declared Sound Pressure (LpA) | | | | High-end Configuration Declared Sound Pressure (LpA) | | | |
|----------------|-----------------------------------------------------|--------------------------|-------------------------|--------------------------|------------------------------------------------------|--------------------------|-------------------------|--------------------------|
| | Table-Top | | Floor-Standing | | Table-Top | | Floor- Standing | |
| | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) |
| Idle | 22.5 | 20.1 | 19.8 | 19.1 | 25.2 | 23.1 | 22.0 | 21.1 |
| HDD Operating | 22.7 | 20.0 | 19.5 | 19.2 | 25.4 | 23.5 | 21.9 | 20.9 |
| 90% CPU | 23.9 | 22.2 | 24.6 | 23.5 | 32.6 | 30.2 | 25.7 | 25.2 |
| ODD Operating | 44.5 | 39.3 | 36.3 | 35.1 | 44.5 | 39.5 | 37.2 | 35.4 |

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.

² Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

ACOUSTIC NOISE EMISSION INFORMATION

OPTIPLEX 9010 SFF

| Component | Typical Configuration | High-end Configuration |
|-------------------|---------------------------|------------------------|
| CPU | Ivy Bridge i5 3470 | Ivy Bridge i5 3770 |
| Memory | 4G DDR3 1600MHz | 8G DDR3 1600MHz(x2) |
| HDD (#, capacity) | 500G 7200RPM SATA3 | 1T 7200RPM SATA3 |
| RMSD | 8X 12.7 SATA DVDRW | 8X 12.7 SATA DVDRW |
| Graphics Adapter | Intel® HD Graphics Family | ATI Radeon HD7570 |

The Declared Noise Emission in accordance with ISO 9296 for the Dell OptiPlex 9010 SFF 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 | 3.9 | 4.3 |
| HDD Operating | 3.9 | 4.3 |
| 90% CPU | 3.9 | 4.4 |
| ODD Operating | 4.8 | 4.8 |

The Declared A-weighted Sound Pressure Level in decibels (re 2×10^{-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 follows¹:

| Operating Mode | Typical Configuration Declared Sound Pressure (LpA) | | | | High-end Configuration Declared Sound Pressure (LpA) | | | |
|----------------|-----------------------------------------------------|--------------------------|-------------------------|--------------------------|------------------------------------------------------|--------------------------|-------------------------|--------------------------|
| | Table-Top | | Floor-Standing | | Table-Top | | Floor- Standing | |
| | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) |
| Idle | 30.2 | 25.5 | 25.2 | 24.5 | 31.1 | 27.2 | 26.2 | 25.7 |
| HDD Operating | 30.3 | 25.8 | 25.5 | 24.9 | 31.4 | 27.5 | 26.1 | 25.8 |
| 90% CPU | 33.1 | 29.2 | 26.9 | 26.0 | 34.3 | 30.7 | 28.9 | 28.5 |
| ODD Operating | 36.5 | 32.7 | 30.9 | 29.9 | 37.7 | 32.9 | 32.9 | 32.1 |

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.

² Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2

ACOUSTIC NOISE EMISSION INFORMATION

OPTIPLEX 9010 USFF

| Component | Typical Configuration |
|-------------------|---------------------------|
| CPU | Ivy Bridge i5 3470 |
| Memory | 4G DDR3 1600MHz |
| HDD (#, capacity) | 500G 7200RPM SATA2 |
| RMSD | 8X 12.7 SATA DVDRW |
| Graphics Adapter | Intel® HD Graphics Family |

The Declared Noise Emission in accordance with ISO 9296 for the Dell Optiplex 9010 USFF 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}) |
|----------------|----------------------------------------------------------|
| Idle | 3.9 |
| HDD Operating | 3.9 |
| 90% CPU | 4.8 |
| ODD Operating | 4.7 |

The Declared A-weighted Sound Pressure Level in decibels (re 2×10^{-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 follows¹:

| Operating Mode | Typical Configuration Declared Sound Pressure (LpA) | | | |
|----------------|-----------------------------------------------------|--------------------------|-------------------------|--------------------------|
| | Table-Top | | Floor-Standing | |
| | Operator Position (LpA) | Bystander Position (LpA) | Operator Position (LpA) | Bystander Position (LpA) |
| Idle | 28.5 | 25.4 | 22.9 | 21.6 |
| HDD Operating | 28.6 | 25.6 | 22.9 | 21.7 |
| 90% CPU | 28.9 | 25.8 | 23.8 | 21.9 |
| ODD Operating | 40.3 | 35.9 | 32.5 | 29.9 |

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.

² Declared Sound Power rounded to nearest tenth of a bel per ISO 9296 section 4.4.2