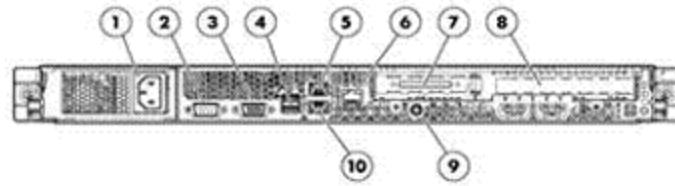
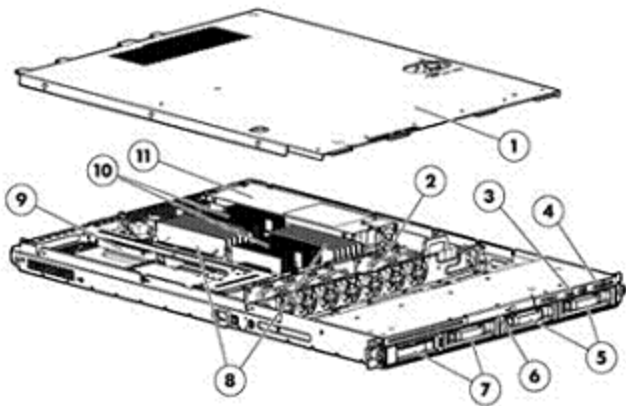


Overview

Hot Plug SAS/SATA and Non-Hot Plug SATA Models



Front View:

1. Access panel
2. System fans
3. Two USB ports
4. Power on/off & system LEDs
5. Optional 3rd and 4th 3.5" Non-Hot plug SATA or hot plug SAS/SATA hard drive bays
6. Optional DVD-RW or DVD-ROM drive
7. Standard 1st and 2nd 3.5" Non-Hot plug SATA or hot plug SAS/SATA hard drive bays (Small Form Factor drive cage not shown here. See the Storage Section for orientation of eight small form factor drive option)
8. Eighteen DIMM slots : DDR3 Registered (RDIMM) or Unbuffered (UDIMM) memory
9. Expansion Slots:
Slot 1: Full-length/Full height x16 PCI-Express Gen2 slot, or
Slot 1: Half-length/Full height x16 PCI-Express Gen2 slot and
Slot 2: Low Profile x4 PCI-Express Gen2 slot (accepts x8 cards, internal only)
10. Six Core Intel® Xeon® 5600 ,Quad-Core Intel® Xeon® 5600 & Quad-Core Intel® Xeon® 5500 series processors (supports up to two)
11. Power supply (500 Watts - standard, other PS options available)

Rear View:

1. Power Supply Cable Socket
2. Video Port
3. Serial Port
4. Rear USB ports (2)
5. One GbE LAN ports for shared NIC 2 (RJ-45)
6. Optional LO100i 10/100 Mbps LAN port for dedicated IPMI management (RJ-45)
7. Low-Profile slot cover (not used in this model)
8. Full-height PCI-Express x16
9. UID - Rear Unit Identification LED
10. One GbE LAN ports for NIC 1 (RJ-45)

What's New

- Announcing support for the Intel® Xeon® processor X5680 (3.33 GHz, 12MB L3 Cache, 130W,DDR3-1333, HT, Turbo 1/1/2/2/3/)
- Support for 460 W ,94% efficient Backplane FIO Kit
- Support for I/O Accelerators

At A Glance

The HP ProLiant DL160 G6 server is a high performance, low cost, ultra-dense, dual processor capable, 1U rack server for memory intense High Performance Computing (HPC) environments, Web 2.0, hosting, and general large memory footprint server deployments.

- **Processors:**
 - Supports up to two Intel® Six -Core 5600 sequence processors with 12 MB Level 3 cache
 - Supports up to two Intel® Quad-Core Intel® Xeon® processors 5000 sequence with 8 MB Level 3 cache
 - Intel® 5520 Chipset
- **Memory:**
 - Up to 192GB, using 16GB Quad-Rank PC3-8500R-7 DDR3 Registered (RDIMM) memory, operating at 800MHz when populated at 2 DIMMs per Channel in 12 slots.
 - Up to 144GB, using PC3-10600R or PC3-8500R DDR3 Registered (RDIMM) memory, operating at 800MHz when populated at 3 DIMMs per Channel in 18 slots.
 - Up to 48GB, using PC3-10600E DDR3 Unbuffered (UDIMM) memory, operating at 1066MHz when populated at 2 DIMMs per Channel in 12 slots.
- **Internal Drive Support:**
 - Support for up to four 3.5" Non-Hot plug serial ATA (SATA) hard drives or

NOTE: Embedded SATA controller support transfer rate up to 3Gb/s SATA.

Overview

- Support for up to four 3.5" Hot plug Serial Attached SCSI (SAS) or SATA hard drives.
NOTE: Supports transfer rate up to 3GB/s SATA and 6Gb/s SAS
- Support for 2.5" Hot Plug Serial Attached SCSI (SAS) or SATA hard drives.
NOTE: Installation of the HP 8SFF Hard Drive Cage & Backplane G6, FIO is required if ordering 2.5" Hot Plug hard drives. Supports transfer rate up to 3GB/s SATA and 6Gb/s SAS
- Internal storage capacity of up to 8.0TB (4 x 2TB Hot Plug 3.5" SATA/SAS), 8.0TB (4 x 2TB Non-Hot Plug SATA) , 4.0TB (8 x 500GB Hot Plug 2.5" SAS) or 4.0TB (8 x 500GB Hot Plug 2.5" SATA)
NOTE: Supports transfer rate up to 3GB/s SATA and 6Gb/s SAS
- Standard model drive bays:
 - Four (4) 3.5" Large Form Factor (LFF) hot-plug drive bays supporting up to 6Gb/s SAS or 3Gb/s SATA transfer rate.
NOTE: Embedded SATA controller support transfer rate up to 3Gb/s SATA. HP Smart Array P212 or P410 controller is required to achieve 6Gb/s SAS or 3Gb/s SATA transfer rate.
 - Eight (8) 2.5" Small Form Factor (SFF) hot-plug drive bays supporting up to 6Gb/s SAS or 3Gb/s SATA transfer rate.
NOTE: 8SFF drive bay option require HP Smart Array P410 or P212 controller.
NOTE: To achieve highest possible stated transfer rate please make sure the firmware on the drive bays (backplanes) and HP Smart Array controller up to date. Latest firmware is available to download from HP support web site.
- **Network Controller:**
 - HP NC362i Integrated Dual Port Gigabit Server Adapter
- **Storage Controllers:**
 - Non-Hot Plug SATA Models: HP Embedded B110i SATA RAID Controller (RAID 0, 1, 10)
NOTE: Embedded SATA Controller support transfer rate: up to 3 Gb/s
NOTE: To enable RAID functionality on Embedded SATA, use the HP Smart Array B110i SATA Raid controller. To enable use of the B110i, enter the ROM Based Setup Utility (RBSU). The option for enabling RAID can be functionality found in the Advanced section of the RBSU.
NOTE: For Hot Plug SATA, upgrade to the Smart Array Hot Plug Advance Pack for B110i
 - Hot Plug SAS/SATA Models: HP P410 Smart Array Controller RAID 0,1,10, 5
NOTE: Support speed up to 6Gb/s or 3Gb/s SATA
- **Expansion Slots:**
 - Non-Hot Plug Models: Up to two available PCI Express 2.0 slots:
 - Slot 1: full-length/full-height PCI-Express 2.0 x16 or
 - Slot 1: half-length/full-height PCI-Express 2.0 x16
 - Slot 2: low-profile internal only PCI-Express 2.0 x4 (x8 mechanically)
 - Hot Plug Models: One available PCI-Express slot:
 - Slot 1: half-length/full-height PCI-Express 2.0 x16
 - Slot 2: low-profile internal only PCI-Express 2.0 x4 (x8 mechanically) - slot populated by the SAS/SATA storage controller – HP Smart Array P410 Controller
- **Infrastructure Management:**
 - HP Insight Control for Linux a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, control and optimize your IT infrastructure through a single, simple management console. The IC-Linux supports Linux-based servers and management consoles
 - HP Lights-Out 100i with optional LO100i Advanced Licenses for Virtual KVM and Virtual Media. Lights-Out 100i can use the standard shared high speed system management port or use an optional dedicated high speed management port
 - The HP ProLiant Easy Set-up CDs and ISO image downloads offer Assisted and Manual single server installation, setup, and deployment capability. Capabilities provided are:
 - AutoRun
 - Assisted Installation Microsoft Windows 2003 Server and Microsoft Windows 2008 Server
 - OS and SW available for Manual Installation are listed on each servers' QuickSpecs
- **Ports:**
 - Five USB ports (two front, one internal, two rear)
NOTE: In order to utilize the internal USB port the USB cable (P/N: 536769-B21) must be connected to the internal USB header.
- **Optical Drive:**
 - Support for one (optional): DVD-ROM, DVD RW
- **Power Supply:**
 - 500W Power Supply (Non-Hot Plug, Autoswitching)
 - Optional FIO high-efficiency pluggable power supplies: 460W Power Supply or 750W Power Supply
 - Optional FIO Hot Plug 400W G6 Redundant Power Supply. It includes the two power supplies as a part of the kit.
- **Additional Features:**
 - **NOTE:** For more information on the latest visualization and acceleration qualification status, please see: <http://www.hp.com/go/accelerators>
NOTE: When the Full length Graphic card is installed in the system, no additional PCIe slots is available and only embedded storage controller is available for up to 4 SATA HDDs configuration. For SAS Hard Disk Drive support for the accelerators, please refer to HP ProLiant DL160se G6
- **Form Factor:**
 - Rack (1U)
- **Operating Systems and Virtualization Software:**
 - Supports Windows, RHEL, SLES, VMware, and Citrix Essentials for XenServer (Retail)
- **Deployment/Serviceability:**
 - HP ProLiant DL160 G6 models have fixed rails which provide support for racks with round mounting holes and

Overview

tool-free support for racks with square mounting holes (including Compaq/HP 7000, 9000, 10000 and HP series), with an adjustment range of 24" - 36"

- Tool-less access to all system components for easy in rack serviceability
- Customer Self Repair (CSR): HP products are designed with many CSR parts to minimize repair time and allow for greater flexibility in performing defective parts replacement

- **Warranty:**

- This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and parts replacement is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support. Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>.

Standard Features

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor

One of the following depending on Model

Six -Core Processors

Intel® Xeon® Processor X5680 (3.33 GHz, 12MB L3 Cache, 130W,DDR3-1333, HT, Turbo 1/1/2/2/3/)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor X5670 (2.93 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor X5660 (2.80 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor X5650 (2.66 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)

Intel® Xeon® Processor L5640 (2.26GHz, 12MB L3 Cache, 60W, DDR3-1333, HT, Turbo 2/2/3/3/4/4)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Quad -Core Processors

Intel® Xeon® Processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)

Intel® Xeon® Processor E5640 (2.66 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor E5630 (2.53 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor E5620 (2.40 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

Intel® Xeon® Processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

Intel® Xeon® Processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)

Intel® Xeon® Processor L5630 (2.13 GHz, 12MB L3 Cache, 40W, DDR3-1066, HT, Turbo 1/1/2/2/)

Intel® Xeon® Processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2)

Intel® Xeon® Processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800)

Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)

Dual Core Processors

Intel® Xeon® Processor E5503 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)

NOTE: Available through Configure To Order only. See Factory Integration Models section for more details.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active.

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: For the Intel 5000 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

Standard Features

Upgradeability Upgradeable to two processors

Chipset Intel® 5520 Chipset

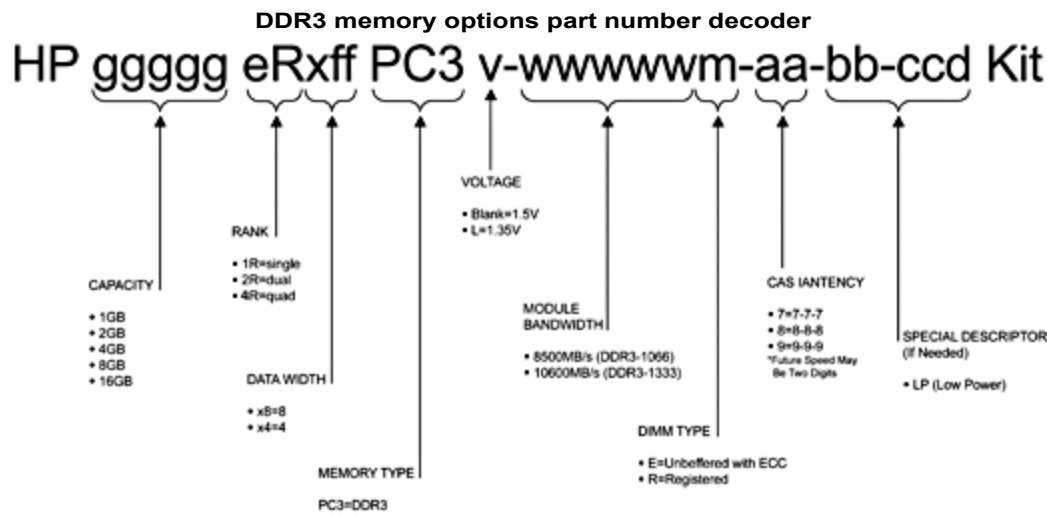
Cache Memory 12 MB Level 3 cache
4MB Level 3 cache

Memory Protection Advanced memory protection
Mirroring Mode
Lockstep Mode

Memory

Type	DDR3 Registered (RDIMM) or Unbuffered (UDIMM)
Standard (Entry Models)	4 GB (1 x 4 GB) RDIMMs
Standard (Base Models)	8 GB (2 x 4 GB) RDIMMs
Standard (Performance Models)	12 GB (3 x 4 GB) RDIMMs
Maximum (RDIMM)	192 GB (12 x 16 GB)
Maximum (UDIMM)	48 GB (12 x 4 GB)

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1333MHz, 1066MHz, or 800MHz. Please see the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.



Network Controller HP NC362i Integrated Dual Port Gigabit Server Adapter

Expansion Slots #	Technology	Bus Width	Connector Width*	Bus Number*	Device No.**	Form Factor	Notes
1	PCI-Express 2.0	x16	x16	1	0	Full length, full height	3.3 volts
2***	PCI-Express 2.0	x4	x8	6	3	Low Profile, Internal Only	3.3 volts

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

** Slots are enumerated differently based on OS. MS OS's enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

***In order to access expansion slot #2, the low profile internal only slot, expansion slot #1 may only be populated with a half length, full height form factor card.

Standard Features

Storage Controller	Non-Hot Plug and Cold Plug SATA Models	<p>HP Smart Array B110i SATA RAID</p> <p>NOTE: Embedded SATA controller support transfer rate up to 3Gb/s</p> <p>NOTE: To enable RAID for embedded SATA controller, use EZ set-up CD to download driver, hpahcizr.sys, is part of the 8.20 PSP, Smart Start, EZSetup CD. For more information on SW Smart Array, go to: www.hp.com/go/sataraid</p> <p>NOTE: A diskette drive or virtual FDD using LO100 Advanced Pack is needed to install storage controller drivers during a Windows operating system installation from a CD.</p> <p>NOTE: The addition of a Smart Array hardware based storage controller to a Non-Hot Plug SATA Model is only supported for external storage.</p>
	Hot Plug SATA/SAS Models	<p>HP Smart Array P410 Controller (RAID 0/1/1+0)</p> <p>NOTE: Support transfer rate up to 6Gb/s SAS or 3Gb/s SATAHP Smart Array P410 Controller 256 BBWC (RAID/0/1/1+0/5/5+0)</p> <p>NOTE: Support transfer rate up to 6Gb/s SAS or 3Gb/s SATA</p> <p>NOTE: Available upgrades: P410 with FBWC, 256MB with BBWC, 512MB with FBWC, Battery kit upgrade (for the 256MB cache), and Smart Array Advanced Pack (SAAP).</p> <p>NOTE: A minimum of 256 MB cache, battery kit, and Smart Array Advanced Pack License Key upgrade (P/N: 516471-B21) is required to enable RAID 6, 6+0</p> <p>NOTE: To achieve highest possible stated transfer rate please make sure the firmware on the drive bays (backplanes) and HP Smart Array controller up to date. Latest firmware are available to download from HP support web site.</p>

Storage	Diskette Drives	Via USB only
	Optical Drives	Optional SATA 9.5mm DVD-ROM Optical Drive Optional SATA 9.5mm DVD RW Optical Drive
	Drive Bays	Up to 4 Non-hot plug SATA 3.5" drives Up to 4 Hot plug SAS/SATA 3.5" drives

Maximum Internal Storage	Non-Hot Plug LFF SATA	8.0TB	4 x 2TB
	Hot Plug LFF SATA	8.0TB	4 x 2TB
	Hot Plug LFF SAS	8.0TB	4 x 2TB
	Hot Plug SFF SATA	4.0TB	8 x 500GB
	Hot Plug SFF SAS	4.0TB	8 x 500GB

Interfaces	Parallel	None
	Network RJ-45(Ethernet)	2 10/100/1000 NIC ports (plus 1 optional dedicated port for the HP ProLiant Lights-Out 100i Remote Management)
	Serial	1
	Pointing Device (Mouse)	0 (via USB only)
	Graphics	1
	Keyboard	0 (via USB only)
	USB	5 (two front, one internal, two rear)
		<p>NOTE: In order to connect a USB device internally, the internal USB Cable G6 Kit must be used (536769-B21)</p> <p>NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.</p>

Graphics	<p>32MB shared supporting all display resolutions up to 1600x1200 16bpp@75Hz</p> <p>NOTE: 8MB is dedicated to video memory.</p>
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Form Factor	Rack (1U), (1.75 in/4.45 cm)
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Standard Features

Embedded Systems Management	HP Lights-Out 100 (LO100) Advanced	HP LO100 with Optional LO100 Advanced Licenses for Virtual KVM and Virtual Media.
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Features:

- Embedded IPMI standard reporting
System event log access
- Remote Serial console (serial redirection)
- Browser, Telnet access
- SMASH-CLP compliant
- IPMI 2.0 compliant
- Secure Socket Layer Encryption
- Secure Shell Encryption
- Virtual media (Floppy, CD, USB 2.0) with Advanced License
- Virtual KVM with Advanced License

NOTE: For more information, see: <http://www.hp.com/go/lo100>

Core Infrastructure Management	HP Insight Control for Linux	HP Insight Control for Linux, as a product option, delivers essential lifecycle management that can help save time and money by integrating discovery, server deployment, firmware updates & provisioning, health & performance management, remote management, and virtualization. This makes it easy to optimize your IT infrastructure through a single, simple management console. The IC-Linux installs and licenses software modules that are integrated into HP System Insight Manager (HP SIM).
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HP Insight Control for Linux serves environments requiring a Linux-based management console. See www.hp.com/go/ic-linux.

HP Insight Control for Linux includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: <http://www.hp.com/services/insight>

Insight Control server deployment

HP Insight Control server deployment is a deployment solution for HP ProLiant and Integrity servers hosted on a Windows CMS. It automates the process of deploying and provisioning server software, enabling companies to quickly and easily adapt to changing business demands. Insight Control server deployment includes software optimizations for HP servers, including the HP scripting toolkits, configuration jobs for leading industry-standard operating systems, sample unattended files, and HP server support packs that include software drivers, management agents, and important documentation. Deploying servers can be accomplished either through imaging or through scripting.

Insight Control server deployment is hosted on a Windows server and is intended for heterogeneous environments deploying Windows, Linux, VMware ESX and Microsoft Hyper-V systems.

Insight Control server deployment includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: <http://www.hp.com/services/insight>.

Standard Features

High Performance Clusters	<p>HP Cluster Platforms</p> <p>HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and Novell SLES, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering.</p> <p>http://www.hp.com/go/clusters</p>
	<p>HP HPC Interconnects</p> <p>High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools.</p> <p>http://www.hp.com/techservers/clusters/ucp/index.html</p>
	<p>HP Cluster Management Utility</p> <p>HP Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used to manage large-scale Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective.</p> <p>http://www.hp.com/go/cmu</p>
	<p>HP HPC Linux Value Pack</p> <p>HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported specially priced software bundle for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler, the HP-MPI parallelization library, the HP Unified Parallel C compiler and the HP Shmem library, as well as the execution environments for the libraries and compiler. HP HPC Linux Value Pack</p>

Industry Standard Compliance	<p>ACPI V2.0 Compliant</p> <p>PCI 2.2 Compliant</p> <p>PXE Support</p> <p>WOL Support</p> <p>Microsoft® Logo certifications</p> <p>IPMI 2.0, SMASH CLP, DCMI 1.0 compliant</p>
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Security	<p>Power-on password</p> <p>Setup password</p> <p>Diskette boot control</p> <p>Secure Sockets Layer (SSL)</p> <p>Secure Shell (SSH)</p>
Security - Trusted Platform Module	<p>The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.</p> <p>NOTE: For more information about TPM, including a white paper, go to: http://www.hp.com/go/TPM</p> <p>NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.</p> <p>NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.</p>

Server Power Cords	<p>One 6' Highline (IEC-IEC) power cord ships standard</p> <p>NOTE: HP ProLiant DL servers no longer ship standard with NEMA power cords (163719-002) that allow connection to 110V US wall outlets in a home or office. ProLiant DL servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately.</p> <p>If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.</p>
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Standard Features

UPS and PDU Power Cord Matrix Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link:
www.hp.com/products/powercords.

Power Supply 500 Watts, auto-switching, high efficiency, PFC (Power Factor Correcting)
NOTE: Factory upgradeable to high-efficiency (HE) pluggable or Hot Plug Redundant power supply.

System Fans 6 system fans ship standard; Non-hot plug, N+1 Redundant Standard
NOTE: Fan redundancy is not available when 130W processors are installed.

Operating Systems and Virtualization Software [Microsoft Windows Server](#)
[Microsoft Windows Server Hyper V](#)
Support for ProLiant Servers [Red Hat Enterprise Linux \(RHEL\)](#)
[SUSE Linux Enterprise Server \(SLES\)](#)
[VMware](#)
[Citrix Essentials for XenServer \(Retail\)](#)
NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <http://www.hp.com/go/supportos> and our driver download page <http://www.hp.com/support/DL160G6>.

Rack Airflow Requirements **Rack 10000 G2 series Cabinets**
 The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 G2 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).

Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches)

CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: www.hp.com/servers/dl160.

Rack Support The DL Fixed Rail System supports installation in racks with square or round mounting holes (including Compaq/HP 7000, 9000, 10000 and HP series), with an adjustment range of 24" - 36".

Telco Rack Support Support for all 2 and threaded hole racks requires an additional option kit from Rack Solutions. The Rack Solutions brackets can be purchased at: www.racksolutions.com/hp.

NOTE: The 4 post Telco racks also supported.

Standard Features

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: <http://www.hp.com/go/factory-express>.

HP Enterprise Configurator

The HP eConfigure Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>.

Service and Support

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack services include coverage for the HP branded hardware options qualified for the server that are purchased at the same time or afterward and internal to the enclosure. It also includes the 22" and smaller external monitors and tower UPS options up to 3kVA. These items will be covered at the same service level and for the same coverage period as the server. Coverage of UPS Battery is not included and standard warranty terms & conditions apply. For servers or storage systems installed within a rack, service also covers all HP qualified rack options installed within the same rack.

To fully capitalize on your HP ProLiant servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions provides a range of support services designed to meet the varying needs of business. Whether an SMB or large global corporation HP has a ProLiant server support offer to help you speedily deploy and maximize system uptime.

Recommended Service - Simplify ProLiant solution implementation, maintenance and management.

- **Support Service** - 3-Year 24x7 4 hr Response service support coverage
- **Deployment Service** - Hardware Installation only

Enhanced Service - Optimize service level to increase IT performance and availability

- **Support** -3-Year 24x7 24 hr Call to repair service support coverage
- **Support** - 3-Year 24x7 6 hr Call to repair service support coverage
- **Support Plus** -24x7 4 hr Response service support including OS coverage

Installation of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays.

For a complete listing of service offerings and information visit:

<http://www.hp.com/services/proliantservices>

<http://h20219.www2.hp.com/services/us/en/warranty/carepack-servers-proliant.html>

Models

Non-Hot Plug Serial ATA (SATA) Models

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.

NOTE: Non-Hot Plug models are not upgradeable to Hot Plug.

NOTE: The addition of a Smart Array controller and the HP NHP Internal Mini SAS/SATA 4 port cable kit (P/N 487734-B21) is required to support SAS Non-Hot Plug hard drives.

HP DL160G6 E5504 NHP SATA, 4GB 490427-xx1	Processor(s)	Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)
	Cache Memory	4MB shared L3 cache (E5504)
	Memory	4GB (2 x 2GB) PC3-10600E (UDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array B110i SATA RAID Controller
	Hard Drive	HP 160GB 7.2k Non Hot Plug SATA
	Internal Storage	Up to 4 large form factor Non-Hot Plug drives
	Optical Drive	None ships standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U

HP DL160G6 L5520 NHP SATA, 4GB 490432-xx1	Processor(s)	Intel® Xeon® Processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2)
	Cache Memory	8MB shared L3 cache (L5520)
	Memory	4GB (2 x 2GB) PC3-10600E (UDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array B110i SATA RAID Controller
	Hard Drive	HP 160GB 7.2k Non Hot Plug SATA
	Internal Storage	Up to 4 large form factor Non-Hot Plug drives
	Optical Drive	None ships standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U

Hot Plug Serial ATA (SATA)/ Serial Attached SCSI (SAS) Models

NOTE: To enable Hot Plug functionality for P/N's 590159-xx1 and 590160-xx1 use Smart Array Advanced Pack license (P/N 516471-B21) or HP Smart Array Controller P410 /Zero Memory FIO (P/N 462860-B21) or HP Smart Array P212/256 MB w/Battery FIO (P/N 491191-B21).

HP DL160G6 L5630 Cold Plug, 4GB 590159-xx1	Processor(s)	Intel® Xeon® Processor L5630 (2.13 GHz, 12MB L3 Cache, 40W, DDR3-1066, HT, Turbo 1/1/2/2/)
	Cache Memory	12 MB shared L3 cache
	Memory	4GB (1 x 4GB) PC3-10600R (RDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array B110i SATA RAID Controller
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor Hot Plug drives
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U

HP DL160G6 E5506 Cold Plug, 4GB 590160-xx1	Processor(s)	Intel® Xeon® Processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800)
	Cache Memory	4 MB shared L3 cache
	Memory	4GB (1 x 4GB) PC3-10600R (RDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array B110i SATA RAID Controller
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor Hot Plug drives
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U

Models

HP DL160G6 E5620 Hot Plug, 4LFF, 8GB 590161-xx1	Processor(s)	Intel® Xeon® Processor E5620 (2.40 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)
	Cache Memory	12 MB shared L3 cache
	Memory	8GB (2 x 4GB) PC3-10600R (RDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410 Controller
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor Hot Plug drives
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U
<hr/>		
HP DL160G6 X5650 Hot Plug, 24GB, 2P 590162-xx1	Processor(s)	(2)Intel® Xeon® Processor X5650 (2.66 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3/4/4)
	Cache Memory	12MB shared L3 cache
	Memory	24GB (6 x 4GB) PC3-10600R (RDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410/ 256MB BBWC
	Hard Drive	None ship standard
	Internal Storage	Up to 8 Small form factor Hot Plug drives
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U
<hr/>		
HP DL160G6 E5504 Hot Plug, 4GB 490442-xx1	Processor(s)	Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)
	Cache Memory	4MB shared L3 cache
	Memory	4GB (2 x 2GB) PC3-10600E (UDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410 SAS/SATA RAID 0,1,10
	Hard Drive	None ship standard
	Internal Storage	Up to 2 large form factor Hot Plug drive
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U
<hr/>		
HP DL160G6 E5520 Hot Plug, 6GB 490454-xx1	Processor(s)	Intel® Xeon® Processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)
	Cache Memory	8MB shared L3 cache
	Memory	6GB (3 x 2GB) PC3-10600E (UDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410 SAS/SATA RAID 0,1,10
	Hard Drive	None ship standard
	Internal Storage	Up to 2 large form factor Hot Plug drive
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)
	Form Factor	1U
<hr/>		
HP DL160G6 X5550 Hot Plug, 4LFF, 12GB, 2P 490455-xx1	Processor(s)	(2) Intel® Xeon® Processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)
	Cache Memory	8MB shared L3 cache
	Memory	12GB (6 x 2GB) PC3-10600R (RDIMM)
	Network Controller	HP NC362i Integrated Dual Port Gigabit Server Adapter
	Storage Controller	HP Smart Array P410/ 256MB BBWC RAID 0,1,10,5,50 (P/N 490455-xx1)
	Hard Drive	None ship standard
	Internal Storage	Up to 4 large form factor Hot Plug drives
	Optical Drive	None ship standard
	Power Supply	500W high efficiency multi-output supply (ships standard)

Models

Form Factor	1U
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Country Code Key	xx=00	U.S.
	xx=20	Brazil (ONLY P/N 490442-xx1)
	xx=29	Japan
	xx=37	APD
	xx=42	Euro
	xx=AA	PRC

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

NOTE: HP does not allow factory integration of options into standard models listed above. Configure-to-order servers must start with a CTO Chassis.

NOTE: FIO indicates that this option is a Factory Installable Option.

Step 1: Base Configuration (choose one of the following configurable models)

HP Models

Non-Hot Plug LFF SATA Model

NOTE: Non-Hot Plug models are not upgradeable to Hot Plug.

NOTE: The addition of a Smart Array controller is supported for external storage use only.

HP ProLiant DL160 G6 Non-Hot Plug SATA Rack CTO Chassis 491531-B21

Factory Integrated Model ships with:

HP NC362i Integrated Dual Port Gigabit Server Adapter

Slot 1: FL /FH PCI-Express x16 Gen 2 slot or

Slot 1 : HL/FH x16 PCI-Express Gen2 slot and

Slot 2 : HL/LP x8 PCI-Express Gen2 slot (internal only)

One available full-length/full-height PCI-Express x16 Generation 2 slot

One Highline IEC Power Cord

6 Non-Hot Plug Fans

Rack (1U), (1.75 in / 4.45 cm)

Tool-less Fixed Rails

Hot Plug LFF Model

HP ProLiant DL160 G6 Hot Plug SAS/SATA Rack CTO Chassis 491532-B21

Factory Integrated Model ships with:

HP NC362i Integrated Dual Port Gigabit Server Adapter

One available PCI-Express Generation 2 slot:

Slot 1: half-length/full-height

Slot 2: low-profile/half-height - occupied by HP Smart Array P410 Controller

One Highline IEC Power Cord

6 Non-Hot Plug Fans

Rack (1U), (1.75 in / 4.45 cm)

Tool-less Fixed Rails

Hot Plug SFF Model

HP DL160G6 8 SFF Hot Plug Model SAS/SATA Rack CTO Chassis 593352-B21

Factory Integrated Model ships with:

HP NC362i Integrated Dual Port Gigabit Server Adapter

Slot 1: half-length/full-height

Slot 2: low-profile/half-height - occupied by HP Smart Array P410 Controller

One Highline IEC Power Cord

6 Non-Hot Plug Fans

Rack (1U), (1.75 in / 4.45 cm)

Tool-less Fixed Rails

NOTE: SFF CTO Chassis (P/N: 593352-B21) is not configurable with Intel® Xeon® Processor X5680 (P/N: 589727-L21).

Configuration Information - Factory Integrated Models

Step 2: Choose Required Options (only one of the following from each list unless otherwise noted)

HP Processors

NOTE: If 2 processors are desired, select one xxxxxx-L21 and one xxxxxx-B21.

Six-Core Processors

Intel® Xeon® Processor X5680 (3.33 GHz, 12MB L3 Cache, 130W,DDR3-1333, HT, Turbo 1/1/2/2/3/3), FIO	589727-L21
Intel® Xeon® Processor X5670 (2.93 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3), FIO	589725-L21
Intel® Xeon® Processor X5660 (2.80 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3), FIO	589723-L21
Intel® Xeon® Processor X5650 (2.66 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3), FIO	589721-L21
Intel® Xeon® Processor L5640 DL160 G6 (2.26 GHz, 12MB L3 Cache, 60W DDR3-1066, HT, Turbo 2/2/3/3/4/4), FIO	589700-L21

Quad-Core Processors

Intel® Xeon® Processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO	508231-L21
Intel® Xeon® Processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO	573893-L21
Intel® Xeon® Processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO	491511-L21
Intel® Xeon® Processor E5640 (2.66 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	589715-L21
Intel® Xeon® Processor E5630 (2.53 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	589713-L21
Intel® Xeon® Processor E5620 (2.40 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	589711-L21
Intel® Xeon® Processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	490461-L21
Intel® Xeon® Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	573895-L21
Intel® Xeon® Processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	490459-L21
Intel® Xeon® Processor L5630 (2.13 GHz, 12MB L3 Cache, 40W, DDR3-1066, HT, Turbo 1/1/2/2/), FIO	589698-L21
Intel® Xeon® Processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2), FIO	491507-L21
Intel® Xeon® Processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800), FIO	573897-L21
Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800), FIO	490457-L21

Dual Core Processors

Intel® Xeon® Processor E5503 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800), FIO	593899-L21
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NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active.

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Support on Intel® Xeon® Processor X5680 (P/N 589727-L21),130W processor:

- HP 750W CS HE Power Supply (P/N: 535683-B21) is required
- 8SFF drive cage is not supported when 130W processors are installed
- No Fan redundancy is available when 130W Processors are installed.
- Change fan location from #6 to #3

NOTE: For the Intel 5000 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

Configuration Information - Factory Integrated Models

HP Memory

Registered DIMMs (RDIMMs)

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	516423-B21
HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21

Unbuffered with ECC DIMMs (UDIMMs)

HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <http://www.hp.com/go/proliant-energy-efficient>

NOTE: There is a maximum support limitation of 8 ranks per memory channel (maximum of 2 quad rank DIMMs per channel)

HP Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives

NOTE: A minimum of one SATA Non-Hot Plug hard drive is required ONLY when purchasing Non-Hot Plug CTO Chassis Model (P/N 491531-B21) in Step 1.

HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507774-B21
HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507772-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	458941-B21
SATA Non-Hot Plug LFF (3.5-inch) Entry (ETY) Drives	
HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1yr Warranty Hard Drive	458947-B21

Configuration Information - Factory Integrated Models

HP Storage Controllers **NOTE:** A minimum of one Smart Array Controller is ONLY required when purchasing Hot Plug SFF CTO Chassis Model (P/N 593352-B21) in Step 1.
NOTE: The below storage controllers are intended for use with internal drives in the Hot Plug CTO Chassis Model (P/N 491532-B21).
NOTE: With the HP Smart Array P410 Controller, the addition of the battery backed cache upgrade enables BBWC, RAID 5, 5+0, array expansion, logical drive extension, RAID migration, and stripe size migration. In order to upgrade to RAID 6, at least 256MB Cache and a Battery is required in addition to the Smart Array Advanced Pack license (P/N 516471-B21).
NOTE: To use the internal only PCI-e slot when purchasing the Hot Plug CTO Chassis, a HP Smart Array P410 controller must be selected.

HP Smart Array P812/1G Flash Backed Cache Controller	487204-B21
HP Smart Array P410/1G with FBWC	572532-B21
HP Smart Array P410/512MB with FBWC	578230-B21
HP P410/Zero Memory FIO Smart Array Controller	462860-B21
HP Smart Array P410/256 MB w/Battery FIO	491195-B21

HP Hot Plug HDD Backplane Option **NOTE:** A minimum of one Hot Plug HDD Backplane option is ONLY required when purchasing Hot Plug CTO Chassis Model (P/N 491532-B21) in Step 1.

HP 2 HDD Backplane G6 FIO Kit NOTE: Supports LFF hard drives only.	518593-B21
HP 4HDD Hot Plug Backplane G6 Kit NOTE: Supports LFF hard drives only.	512181-B21

HP Power Supplies **CAUTION:** Many HP ProLiant Servers now offer new power options, including Common Slot Power Supplies. These power supplies come in multiple power ratings and higher efficiency levels to offer the Right Size solution to fit your configuration. This provides improved power delivery and the advantage of reclaiming lost power. Prior to making a power supply selection it is "highly recommended" that the "HP Power Advisor" is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at: www.hp.com/go/hppoweradvisor. In ProLiant Servers that have more than one power slot (bay), only same size power supplies are recommended. If non-matched power supplies are inserted you will get errors and operation will fail.

HP High Efficiency 500W Multi-output Power Supply Kit	515915-B21
HP High Efficiency 460W Power Supply FIO Kit	535684-B21
HP High Efficiency 750W Power Supply FIO Kit	535683-B21
HP DL160G6 460W 94P Backplane FIO Kit	605923-B21
HP 400W 1U G6 Redundant Power Supply Kit NOTE: The 400W 1U G6 RPS (P/N: 532092-B21) is limited to the following configuration support: (1.) NHP SATA Model (P/N: 491531-B21), (2.) Up to 2 60W Low Voltage processors (P/N: 491507-L21, -B21) (3.) Unbuffered memory (P/N: 500668-B21 or 500670-B21), 4. No graphics cards supported via PCI-e.	532092-B21

Step 3: Choose Additional Factory Integratable Options

HP Storage Controllers **NOTE:** The below storage controllers are intended for use with internal drives in the Hot Plug CTO Chassis Model (P/N 491532-B21 or P/N 593352-B21). The HP Smart Array P212 Controller (P/N 491191-B21) is supported in the Non-Hot Plug Model (P/N 491531-B21) for external storage control ONLY.
NOTE: With the HP Smart Array P410 Controller, the addition of the battery backed cache upgrade enables BBWC, RAID 5, 5+0, array expansion, logical drive extension, RAID migration, and stripe size migration. In order to upgrade to RAID 6, at least 256MB Cache and a Battery is required in addition to the Smart Array Advanced Pack license (P/N 516471-B21).
NOTE: To use the internal only PCI-e slot when purchasing the Hot Plug CTO Chassis, a HP Smart Array P410 controller must be selected. When selecting the HP Smart Array P212 Controller (P/N 491191-B21), the controller will be installed in the x16 slot since it has both an internal and external port. This prevents the use of the internal slot and no PCI-E slots will be available.

HP Smart Array P212/256 MB w/ Battery FIO	491191-B21
HP P410/Zero Memory FIO Smart Array Controller	462860-B21
HP Smart Array P410/256 MB w/Battery FIO	491195-B21

Configuration Information - Factory Integrated Models

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional "Core Options" and "Additional Options", please refer to the "Options" section below.

Core Options

NOTE: Some options may not be available for factory integration. Please contact an HP sales representative for additional information.

HP Unique Options	HP Dedicated Management Port Kit	516006-B21
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HP Processors

Six-Core Processors

Intel® Xeon® Processor X5680 (3.33 GHz, 12MB L3 Cache, 130W,DDR3-1333, HT, Turbo 1/1/2/2/3/3)	589727-B21
Intel® Xeon® Processor X5670 (2.93 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)	589725-B21
Intel® Xeon® Processor X5660 (2.80 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)	589723-B21
Intel® Xeon® Processor X5650 (2.66 GHz, 12MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3)	589721-B21
Intel® Xeon® Processor L5640 DL160 G6 (2.26 GHz, 12MB L3 Cache, 60W DDR3-1066, HT, Turbo 2/2/3/3/4/4)	589700-B21

Quad-Core Processors

Intel® Xeon® Processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	508231-B21
Intel® Xeon® Processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	573893-B21
Intel® Xeon® Processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	491511-B21
Intel® Xeon® Processor E5640 (2.66 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	589715-B21
Intel® Xeon® Processor E5630 (2.53 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	589713-B21
Intel® Xeon® Processor E5620 (2.40 GHz, 12MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	589711-B21
Intel® Xeon® Processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	490461-B21
Intel® Xeon® Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	573895-B21
Intel® Xeon® Processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	490459-B21
Intel® Xeon® Processor L5630 (2.13 GHz, 12MB L3 Cache, 40W, DDR3-1066, HT, Turbo 1/1/2/2/)	589698-B21
Intel® Xeon® Processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2)	491507-B21
Intel® Xeon® Processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800)	573897-B21
Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)	490457-B21

Dual Core Processors

Intel® Xeon® Processor E5503 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)	593899-B21
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NOTE: If 2 processors are desired, select one 593899-L21 and one 593899-B21.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active.

NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: For the Intel 5000 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

Core Options

HP Memory	Registered DIMMs (RDIMMs)	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	516423-B21
	HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
	Unbuffered with ECC DIMMs (UDIMMs)	
	HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
	NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator .	
	NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: http://www.hp.com/go/proliant-energy-efficient	

HP Optical Drives	DVD-ROM Drive Optical Drive	481045-B21
	DVD RW Drive Optical Drive	481047-B21

HP Hard Drives	NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.	
	NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.	
	SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
	HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
	HP 160GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	530888-B21
	SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives (SAS/SATA Hot Plug Models Only)	
	NOTE: A SAS HBA or Array Controller is required.	
	HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
	HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
	HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21
	SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives (Non-Hot Plug Models Only)	
	HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507774-B21
	HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507772-B21
	HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	458941-B21
	SATA Hot Plug SFF (2.5-inch) Entry (ETY) Drives	
	HP 250GB 3G SATA 5.4K rpm SFF (2.5-inch) Entry 1yr Warranty Hard Drive	460355-B21
	HP 120GB 1.5G SATA 5.4K rpm SFF (2.5-inch) Entry 1yr Warranty Hard Drive	458924-B21
	SATA Non-Hot Plug LFF (3.5-inch) Entry (ETY) Drives	
	HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1yr Warranty Hard Drive	571232-B21
	HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1yr Warranty Hard Drive	458947-B21
SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives		
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21	

Core Options

HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive 458945-B21

NOTE: Please see QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html
(Worldwide)

SATA Hot Plug Midline (MDL) Solid State Drives

HP 60GB 3G SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive 572071-B21

HP 120GB 3G SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive 572073-B21

SATA Hot Plug 3.5" Midline (MDL) Solid State Drives

HP 60GB 3G SATA LFF (3.5-inch) Midline 1yr Warranty Solid State Drive 570761-B21

HP 120GB 3G SATA LFF (3.5-inch) Midline 1yr Warranty Solid State Drive 570763-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13415_div/13415_div.html
(Worldwide)

SAS Hot Plug (2.5") SFF Enterprise (ENT) Drives

HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 507127-B21

HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 512547-B21

HP 146GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 507125-B21

HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 512545-B21

SAS Hot Plug (3.5") Enterprise (ENT) Drives

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 516828-B21

HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 516816-B21

HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 516814-B21

NOTE: The addition of a Smart Array controller and the HP NHP Internal Mini SAS/SATA 4 port cable kit (P/N 487734-B21) is required to support SAS Non-Hot Plug hard drives.

SAS Non Hot Plug (3.5") LFF Enterprise (ENT) Drives

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive 516830-B21

HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive 516826-B21

HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive 516824-B21

NOTE: The addition of a Smart Array controller and the HP NHP Internal Mini SAS/SATA 4 port cable kit (P/N 487734-B21) is required to support SAS Non-Hot Plug hard drives.

SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive 507610-B21

SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive 507616-B21

HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive 507614-B21

NOTE: The purchase of SAS HBA or array controller is required.

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html
(Worldwide)

Core Options

HP Networking

Gigabit Ethernet Adapters

HP NC112T PCIe Gigabit Server Adapter	503746-B21
HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter	458492-B21
HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
HP NC365T 4-port Ethernet Server Adapter	593722-B21
HP NC375T PCI Express Quad Port Gigabit Server Adapter	538696-B21

10 Gigabit Ethernet Adapters

NOTE: No more than two 10GbE I/O devices are supported in a single ProLiant server.

NOTE: A minimum of two Gigabytes (2 GB) of server memory is required per each adapter.

NOTE: Direct Attach Cable (DAC) for copper environments or fiber transceivers and cables for fiber-optic environments must be purchased separately.

HP NC522SFP Dual Port 10GbE Server Adapter	468332-B21
HP NC550SFP Dual Port 10GbE Server Adapter	581201-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs

Additional Options

HP Entry Level Management	<p>HP LO100i Advanced Pack, No Media 1-Server License including 1 year of 24x7 Technical Support and Updates</p> <p>NOTE: For additional License Kits please see the Lights-Out 100i QuickSpecs at: www.hp.com/go/lo100</p>	530521-B21
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HP Insight software	<p>HP Insight Control for Linux</p> <p>HP Insight Control for Linux, 1-server license, including one year of 24x7 Technical Support and Updates, Electronic</p> <p>NOTE: This part number can be purchased as a single license or as multiple licenses with a single activation key. Customer will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.</p> <p>NOTE: Electronic LTUs are only available through limited points of sales; if not available, order a printed license entitlement certificate instead.</p> <p>HP Insight Control for Linux, No Media, 1-Server license, including one year of 24x7 Technical Support and Updates.</p> <p>HP Insight Control for Linux, Media pack (DVD) - No licenses included</p> <p>NOTE: This optional Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately.</p> <p>NOTE: This Media pack is optional because the latest ISO image and latest updates may be downloaded at no cost from: http://www.hp.com/go/ic-linux (click on Download button).</p> <p>NOTE: Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent.</p> <p>NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.</p> <p>NOTE: For additional License Kits, including electronic licensing options, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html</p> <p>HP Insight Control server deployment</p> <p>HP Insight Control server deployment Electronic License including 1 year 24x7 Technical Support and Updates</p> <p>HP Insight Control server deployment, Single-Server License including 1 year of 24x7 Technical Support and Updates</p> <p>NOTE: This license allows 1 server to be deployed. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.</p> <p>NOTE: Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent.</p> <p>NOTE: For additional license kits including electronic delivery options, please see the Insight Rapid Deployment software QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html</p>	<p>TC213AAE</p> <p>TC209A</p> <p>TC208A</p> <p>T9082AAE</p> <p>452151-B21</p>
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Additional Options

High Performance Clusters	HP Cluster Management Utility	
	HP Cluster Management Utility Compute Node Flexible License	436284-B21
	NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	
	HP Cluster Management Utility License and Media	433257-B21
	NOTE: Order a minimum of one license per cluster to purchase media including software and documentation, which will be delivered to the customer, and also licenses CMU management. No license key is delivered or required	
	NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_div/12612_div.html	
	HP HPC Linux Value Pack	
	HP High Performance Computing Linux Value Pack 1 Processor Flexible License	TC293A
	NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one socket (a.k.a. processor). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	
	HP High Performance Computing Linux Value Pack Media Kit	TC294A
	NOTE: This part number can be used to purchase media including software and documentation, which will be delivered to the customer.	
	NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13485_div/13485_div.html	
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HP Drive Cage Options	HP 4HDD Hot Plug Backplane G6 Kit	512181-B21
	NOTE: Installation of the 4 HDD Hot Plug Backplane G6 Kit (512181-B21) is required if ordering third or fourth Hard Drives for Hot Plug models only.	
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HP I/O Accelerator Options	HP 160GB SLC PCIe ioDrive	600278-B21
	NOTE: A low-profile PCI bracket is included for use in low-profile slots.	
	NOTE: A minimum of 4 GB of system memory is required per card.	
	HP 320GB MLC PCIe ioDrive	600279-B21
	NOTE: A low-profile PCI bracket is included for use in low-profile slots.	
	NOTE: A minimum of 8 GB of system memory is required per card.	
	HP 320GB SLC PCIe ioDrive Duo	600281-B21
	NOTE: A minimum of 8 GB of system memory is required per card.	
	HP 640GB MLC PCIe ioDrive Duo	600282-B21
	NOTE: A minimum of 16 GB of system memory is required per card.	
	NOTE: For additional license kits please see the Insight Control QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13587_div/13587_div.html	
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HP Security - TPM	HP Trusted Platform Module Option Kit	488069-B21
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HP Storage Controllers	NOTE: The addition of storage controllers for internal hard drive use is intended for use ONLY with the Hot Plug SATA/SAS Model Chassis (P/N 491532-B21). The addition of a storage controller to the Non-Hot Plug Model Chassis (P/N 491531-B21) is supported for external storage ONLY.	
	NOTE: To utilize the internal only slot, the HP Smart Array P410 Controller must be selected. The selection of the HP Smart Array P212 Controller for internal and external connectivity, will require the use of the Full Length Full Height PCI-E x16 slot	
	NOTE: With the HP Smart Array P410 Controller, the addition of the battery backed cache upgrade enables BBWC, RAID 5, 5+0, array expansion, logical drive extension, RAID migration, and stripe size migration. In order to upgrade to RAID 6, at least 256MB Cache and a Battery is required in addition to the HP Smart Array Advanced Pack license (P/N 516471-B21).	
	SAS Controllers	
	Smart Array P212 Controller	
	HP Smart Array P212/Zero Memory Controller	462828-B21
	HP Smart Array P212/256MB Controller	462834-B21
	Smart Array P410 Controller	
	HP Smart Array P410/256MB Controller	462862-B21

Additional Options

HP Smart Array P410/512MB with BBWC	462864-B21
HP Smart Array P410/1G with FBWC	572532-B21
Smart Array P411 Controller	
HP Smart Array P411/1G Flash Backed Write Cache	572531-B21
HP Smart Array P411/512MB Flash Backed Write Cache	578229-B21
Smart Array P812 Controller	
HP Smart Array P812/1G Flash Backed Cache Controller	487204-B21
Storage Controllers for use with External Storage Only	
HP Smart Array P411/256MB Controller	462830-B21
HP Smart Array P411/512MB BBWC	462832-B21
Optional upgrades	
1G Flash Backed Write Cache	534562-B21
512MB Flash Backed Write Cache	534916-B21
HP NHP Internal SAS/SATA 4 Port Cable Kit	487734-B21
NOTE: NHP Internal SAS/SATA 4 Port Cable (487734-B21) is required when adding a Smart Array Controller on Non-Hot Plug SATA/SAS server models.	
HP Smart Array Advanced Pack No Media 1-Server license including 1yr 24x7 Technical Support	516471-B21
HP Hot Plug Advance Pack for B110i SATA RAID, 1-server, 1Yr 24X7 Support	TC421A
NOTE: This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HP Software Technical Support Services.	
SAS HBA	
HP SC08Ge Host Bus Adapter	488765-B21
HP SC08e 6Gb 2-ports Ext PCIe SAS HBA	614988-B21
NOTE: This is a 2 x4 External Port HBA	
NOTE: This is only approved for the HP Storage Works P2000 G3 SAS Modular Smart Array.	
NOTE: Please see the QuickSpecs for Technical Specifications and additional information:	
http://h18004.www1.hp.com/products/quickspecs/13651_div/13651_div.html (SC08Ge HBA)	
NOTE: Please see the following QuickSpecs for Technical Specifications and additional information:	
http://h18000.www1.hp.com/products/quickspecs/13203_div/13203_div.html (Smart Array P212 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13201_div/13201_div.html (Smart Array P410 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13202_div/13202_div.html (Smart Array P411 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13558_div/13558_div.html (Smart Array P812 Controller)	
http://h18000.www1.hp.com/products/quickspecs/13200_div/13200_div.html (Smart Array Advanced Pack)	
http://h18004.www1.hp.com/products/quickspecs/13082_div/13082_div.html (SC08Ge HBA)	

HP InfiniBand Options	HP 4X QDR PCI-e G2 QLogic InfiniBand Dual Port HCA	583211-B21
	HP IB 4X QDR CX-2 PCI-e G2 Dual Port HCA	592520-B21
	HP IB 4X DDR CX-2 PCI-e G2 Dual Port HCA	592521-B21
	HP 10 GbE PCI-e G2 Dual Port Network Interface Card	516937-B21
NOTE: For HPC interconnect adapters please see the HPC Interconnect section of this QuickSpecs.		

HP Backup & Recovery Data Protector Express

Software	HP Data Protector Express 4.0 SP1 Backup Server	BB117BA
	HP Data Protector Express 4.0 SP1 for Microsoft Small Business Server	BB118BA
	HP Data Protector Express Backup Server 4.0 SP1 Upgrade from Data Protector Express Single Server Edition	BB117BT
	NOTE: Only one of these Data Protector Express base products is required. To see available options: http://www.hp.com/go/dataprotectorexpress	

Additional Options

HP Tape Backup

NOTE: For the complete range of StorageWorks tape drives, autoloaders, libraries and media see: <http://www.hp.com/go/tape>. For hardware and software compatibility of HP StorageWorks tape backup products see: <http://www.hp.com/go/connect>.

Tape Drives

HP StorageWorks DAT 160 SAS Internal Tape Drive Q1587A

NOTE: For installation into 1U SAS Rack-Mount Kit (AE459B) or 3U SAS Rack-Mount Kit (AG576B). No peripheral bay available for installation into the server. Connection using the HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.

HP StorageWorks 1U USB Rack-Mount Kit with one DAT 320 USB Tape Drive AP835A

HP StorageWorks DAT 320 SAS Internal Tape Drive AJ830A

NOTE: For installation into 1U SAS Rack-Mount Kit (AE459B) or 3U SAS Rack-Mount Kit (AG576B). No peripheral bay available for installation into the server. Connection using the HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.

HP StorageWorks LTO-2 Ultrium 448 SAS Internal Tape Drive DW085A

NOTE: Mounts inside the 1U SAS Rack-Mount Kit (AE459A).

HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive EH847A

NOTE: Mounts inside the 1U SAS Rack-Mount Kit (AE459A).

Tape Autoloader

HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Tape Autoloader AH558A

NOTE: Requires HP 1U Tape Autoloader Rack-Mount Kit (AH166A) for rack installation. Connection using the HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.

Tape Library

HP StorageWorks MSL2024 Tape Library with one LTO-3 Ultrium 920 SAS Drive AH559A

NOTE: Connection using the HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.

HP Disk Backup

NOTE: For the complete range of StorageWorks D2D Backup Systems see: <http://www.hp.com/go/d2d>. For the complete range of StorageWorks RDX drives and media see: <http://www.hp.com/go/rdx>. For hardware and software compatibility of HP StorageWorks disk backup products see: <http://www.hp.com/go/connect>.

HP StorageWorks D2D Backup Systems with Backup Data Deduplication

HP StorageWorks D2D2502i Backup System EJ001B

NOTE: 1.5TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

HP StorageWorks D2D2504i Backup System EJ002B

NOTE: 3.0TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

USB Removable Media RDX Disk Backup Systems

HP StorageWorks RDX320 Internal Removable Disk Backup System AJ767A

NOTE: For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 320GB of disk capacity per data cartridge.

HP StorageWorks RDX500 Internal Removable Disk Backup System AJ934A

NOTE: For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 500GB of disk capacity per data cartridge.

HP StorageWorks RDX750 Internal Removable Disk Backup System AW577A

NOTE: For installation into 1U USB Rack-Mount Kit (A8007A). No peripheral bay available for drive installation into the server. 750GB of disk capacity per data cartridge.

Additional Options

HP StorageWorks Options

StorageWorks Fibre Channel HBA

NOTE: The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see: <http://h18006.www1.hp.com/storage/saninfrastructure/hba.html>

Brocade Fibre Channel HBAs

HP 81B PCIe 8Gb FC Single Port HBA	AP769A
HP 82B PCIe 8Gb FC Dual Port HBA	AP770A
HP 41B PCIe 4Gb FC Single Port HBA	AP767A
HP 42B PCIe 4Gb FC Dual Port HBA	AP768A

Emulex Fibre Channel HBAs

HP StorageWorks 81E 8Gb SP PCI-e FC HBA	AJ762A
HP 82E 8Gb Dual-port PCI-e FC HBA	AJ763A
HP StorageWorks FC2142SR 4Gb PCI-e HBA	A8002A
HP StorageWorks FC2242SR 4Gb DC PCI-e FC HBA	A8003A

QLogic Fibre Channel HBAs

HP StorageWorks 81Q PCI-e FC HBA	AK344A
HP 82Q 8Gb Dual Port PCI-e FC HBA	AJ764A
HP StorageWorks FC1142SR 4Gb PCI-e HBA	AE311A
HP StorageWorks FC1242SR Dual Channel 4 Gb PCI-e HBA	AE312A

StorageWorks SCSI HBA

HP U320e SCSI Host Bus Adapter	AH627A
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NOTE: Recommended Dual Channel Ultra320 SCSI Controller for connecting multi-drive MSL tape libraries to ProLiant servers.

StorageWorks Converged Network Adapter

HP CN1000E 2P Converged Network Adapter	AW520A
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HP Disk Storage Systems

MSA SAN Storage Arrays

HP StorageWorks 60 Modular Smart Array	418408-B21
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NOTE: Supports 12 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html
(Worldwide)

HP StorageWorks 70 Modular Smart Array	418800-B21
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NOTE: Supports 25 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

NOTE: Please see the QuickSpecs for additional options and configuration information at:
http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html

HP Uninterruptible Power Systems

HP Rack-mountable UPS

HP UPS R1500 G2 UPS

HP, R1.5k VA UPS, 1U, NA	AF419A
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HP, R1.5kVA UPS, 1U, INTL	AF418A
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HP, R1.5kVA UPS, 1U, JPN/TW	AF421A
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NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13130_div/13130_div.html
(Worldwide)

HP R/T3000 UPS

HP R/T3000 UPS, High voltage NA/JPN	AF453A
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HP R/T3000 UPS, High voltage, detachable inlet cord INTL	AF454A
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NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/10671_div/10671_div.html
(Worldwide)

HP Rack-Mountable R5500 UPS

HP R5500 VA UPS, INTL	AF416A
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HP R5500 VA UPS, NA/JPN	AF426A
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NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/11871_div/11871_div.html
(Worldwide)

Additional Options

NOTE: For additional information on HP Uninterruptible Power Systems please go to: www.hp.com/servers/rackups.

NOTE: For additional information on sizing your server, please reference: <http://www.upssizer.com>

NOTE: Additional HP Uninterruptible Power Systems (UPS) are available for this equipment. For information on all HP UPSs and accessories please go to www.hp.com/products/ups (Worldwide)

NOTE: For additional information on sizing your HP UPS, please reference: <http://www.upssizer.com>

HP Power Distribution Units	HP Monitored Power Distribution Unit: Full Rack Version	
	HP 8.6 kVA S1324 Monitored PDU- single input, 3Ø, 24A (NA/JPN)	AF504A
	HP 8.3 S1140 Monitored PDU- single input, 1Ø, 40A (NA/JPN)	AF506A
	HP 11 kVA S1316 Monitored PDU- single input, 3Ø, 16A (INTL)	AF508A
	HP 7.3 kVA S1132 Monitored PDU- single input, 1Ø, 32A (INTL)	AF510A
	HP Monitored Power Distribution Unit: Half Rack Version	
	HP 7.3 kVA S132 Monitored PDU- single input, 1Ø, 32A (INTL)	AF915A
	HP 4.9 kVA S124 Monitored PDU- single input, 1Ø, 24A (NA/JPN)	AF914A
	Modular Power Distribution Units 1U/0U (Up to 32 outlets)	
	3.6kVA Model - mPDU, 16A, High (WW)	252663-B24
	4.9kVA Model - mPDU, 24A, High (NA/JPN)	252663-D72
	7.3kVA Model - mPDU, 32A, High (INT'L)	252663-B31
	8.3kVA Model - mPDU, 40A, High (power cord attached) (NA/JPN)	252663-D73

HP Rack Options	HP KVM Switch Options	
	HP Server Console Switch (KVM), 0 x 2 x 8 port	AF616A
	HP Server Console Switch (KVM), 0 x 2 x 16 port	AF617A

HP USB and SD Options		
	HP USB-P/S2 Mouse	DC369A
	HP Keyboard (USB) standard 2004	DT528A#ABA
	HP External USB CD/DVD R/RW Optical Drive	FS943AA
	HP Internal USB Cable G6 Kit	536769-B21
	NOTE: In order to connect a USB device internally, the internal USB Cable G6 Kit (536769-B21) must be used.	
	HP 2GB USB Flash Media Drive Key Kit	608447-B21
	NOTE: HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Guide for installation instructions.	

HP Care Pack Services	Hardware Services 4-Hour On-site Service	
	13-Hour x 5-Day Coverage, 3 Years, Electronic	U9509E
	24-Hour x 7 Day Coverage, 3 Years, Electronic	U9510E
	Hardware Services	
	9-Hour x 5-Day Coverage, 3 Years, Electronic	U9508E
	Hardware Installation, Electronic	U9520E
	NOTE: For more information, customer/resellers can contact: http://www.hp.com/services/carepack	

Memory

HP ProLiant DL160 G6 (all models)

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

Standard Memory

4GB (1x4GB) , 8GB (2 x 4GB) or 24GB(6 x 4GB) depending on model, PC3-10600R-9 Registered RDIMM memory, with ECC.

Maximum Memory

Up to 192GB memory is available with the optional installation of quad-rank PC3-8500R-7 16GB Registered RDIMM memory kits.

NOTE: Charts do not represent all possible memory configurations.

DDR3 memory population guidelines

NOTE: For detailed memory configuration rules and guidelines, please use the [Online DDR3 Memory Configuration Tool](http://www.hp.com/go/ddr3memory-configurator):

www.hp.com/go/ddr3memory-configurator

Some DIMM installation guidelines are summarized below:

- For servers with eighteen (18) memory slots:
 - There are three (3) channels per processor; six (6) channels per server
 - There are three (3) DIMM slots for each memory channel; eighteen (18) total slots
 - Memory channel 1 consists of the three (3) DIMMs that are closest to the processor
 - Memory channel 3 consists of the three (3) DIMMs that are furthest from the processor
- DIMM slots that are white should be populated first
- Do not mix Unbuffered memory (UDIMMs) with Registered memory (RDIMMs)
- Do not install DIMMs if the corresponding processor is not installed
- If only one processor is installed in a 2CPU system, only half of the DIMM slots are available
- To maximize performance, balance the total memory capacity between all installed processors
- It is not required, but it is recommended to load the channels similarly if possible
- If any Quad rank DIMMs are installed, all channels are limited to only 2 DIMMs per channel.
- You can only install two quad-rank DIMMs per channel
- You can only install two UDIMMs per channel; if available, the third slot in the channel must remain empty
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- If mixing DIMM voltage is a requirement, please note that the DIMMs will run at 1.5V since all 1.35V are capable of supporting 1.5V operations
- Low Voltage DIMMs can only be used with Intel Xeon 5600 series processors.
- For memory mirroring mode, channel 3 must be unpopulated. Channels 1 and 2 are populated identically
- For lock-step mode, channel 3 must be unpopulated. DIMMs in channels 1 and 2 will be installed in pairs. The paired slots will be 1,4; 2,5; 3,6 on a 3DPC system or 1,4; 2,5; on a 2DPC system

DIMM slot/capacity/populated speed table										
DIMM Type	Registered DIMMS (RDIMMs)							Unbuffered with ECC DIMMs (UDIMMs)		
	Single Rank (1R)	Dual Rank (2R)			Quad Rank (4R)			Single Rank (1R)	Dual Rank (2R)	
DIMM Rank	4GB	2GB	4GB	8GB	8GB	4GB	16GB	1GB	2GB	4GB
DIMM Capacity	1333	1333	1333	1066	1333	1066	1066	1333	1333	1333
DIMM Native Speed (MHz)										
SLOTS THAT CAN BE POPULATED										
18 slot servers	18	18	18	18	18	12	12	12	12	12
MAXIMUM CAPACITY (GB)										
	72	36	72	144	144	48	192	12	24	48
POPULATED DIMM SPEED (MHz)										
1 DIMM Per Channel	1333	1333	1333	1066	1333	1066	1066	1333	1333	1333
2 DIMM Per Channel	1333*	1333*	1333*	1066	1333*	800	800	1066	1066	1066
3 DIMM Per Channel	800	800	800	800	800	n/a	n/a	n/a	n/a	n/a

* Supported with ROM update via ROM Based Setup Utility (RBSU). UDIMM support is on 12-slot server.

NOTES:

- Mixing DIMM speeds is allowed, but the system processor speed rules always override the DIMM capabilities
- If you do mix DIMM speeds, the memory bus will default to the minimum clock rate of all DIMMs in the system - even if the slower DIMM is on the other processor
- If you install 1x 1066MHz DIMM in channel 1 and 1x 1333MHz DIMM in channel 2, you still run at 1066MHz
- If you install 1x 1066MHz DIMM in channel 1 and 5x 1333MHz DIMMs with 1 DIMM Per Channel (DPC) in each of the



Memory

other channels, you run at 1066MHz

- If you install 3DPC in one channel (if applicable) and 1DPC in all other channels, you run at 800MHz
- 95 Watt CPU's are required for 1333MHz DIMM speeds. All other CPU's are capable of up to 1066MHz
- References to the above MHz speeds are for the various speeds of DDR3 DIMMs; 1333 refers to DDR3-1333, etc.

DIMM slot and configuration diagrams

Basic memory slot & population diagram

- Population order; start with "A" first, "B" second, "C" third, etc.

18 DIMM SLOTS (9 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G	1	G	Chnl 1
	2	D	2	D	
	3	A	3	A	
Chnl 2	4	H	4	H	Chnl 2
	5	E	5	E	
	6	B	6	B	
Chnl 3	7	I	7	I	Chnl 3
	8	F	8	F	
	9	C	9	C	

Standard memory configuration (1 CPU model)

- 6GB, consisting of three (3) 2GB dual-rank PC3-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; empty	2	D; empty	
	3	A; 2GB DIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; empty	5	E; empty	
	6	B; 2GB DIMM	6	B; empty	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; empty	8	F; empty	
	9	C; 2GB DIMM	9	C; empty	

Standard memory plus optional memory (1 CPU model)

- 54GB, consisting of three (3) 2GB RDIMMs plus six (6) 8GB RDIMMs
- 3x 2GB dual-rank PC3-10600 RDIMMs
- 6x 8GB dual-rank PC3-10600 or PC3-8500 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; 8GB DIMM	1	G; empty	Chnl 1
	2	D; 8GB DIMM	2	D; empty	
	3	A; 2GB DIMM	3	A; empty	
Chnl 2	4	H; 8GB DIMM	4	H; empty	Chnl 2
	5	E; 8GB DIMM	5	E; empty	
	6	B; 2GB DIMM	6	B; empty	
Chnl 3	7	I; 8GB DIMM	7	I; empty	Chnl 3
	8	F; 8GB DIMM	8	F; empty	
	9	C; 2GB DIMM	9	C; empty	

Standard memory replaced with optional memory (1 CPU model)

RDIMM maximum configuration

- 96GB, consisting of six (6) 16GB quad-rank PC3-8500R-7 RDIMMs

Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 16GB DIMM	2	D; empty	
	3	A; 16GB DIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 16GB DIMM	5	E; empty	
	6	B; 16GB DIMM	6	B; empty	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 16GB DIMM	8	F; empty	
	9	C; 16GB DIMM	9	C; empty	

UDIMM maximum configuration (1 CPU model)

- 24GB, consisting of six (6) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 4GB DIMM	2	D; empty	
	3	A; 4GB DIMM	3	A; empty	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 4GB DIMM	5	E; empty	
	6	B; 4GB DIMM	6	B; empty	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 4GB DIMM	8	F; empty	
	9	C; 4GB DIMM	9	C; empty	

Standard memory replaced with optional memory (2 CPU model)

RDIMM maximum configuration

- 192GB, consisting of twelve (12) 16GB quad-rank PC3-8500R-7 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 16GB DIMM	2	D; 16GB DIMM	
	3	A; 16GB DIMM	3	A; 16GB DIMM	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 16GB DIMM	5	E; 16GB DIMM	
	6	B; 16GB DIMM	6	B; 16GB DIMM	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 16GB DIMM	8	F; 16GB DIMM	
	9	C; 16GB DIMM	9	C; 16GB DIMM	

UDIMM maximum configuration (2 CPU model)

- 48GB, consisting of twelve (12) 4GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	G; empty	1	G; empty	Chnl 1
	2	D; 4GB DIMM	2	D; 4GB DIMM	
	3	A; 4GB DIMM	3	A; 4GB DIMM	
Chnl 2	4	H; empty	4	H; empty	Chnl 2
	5	E; 4GB DIMM	5	E; 4GB DIMM	
	6	B; 4GB DIMM	6	B; 4GB DIMM	
Chnl 3	7	I; empty	7	I; empty	Chnl 3
	8	F; 4GB DIMM	8	F; 4GB DIMM	
	9	C; 4GB DIMM	9	C; 4GB DIMM	

Memory

NOTE: Capacity references are rounded to the common Gigabyte values.

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB
- 16 GB=16384MB

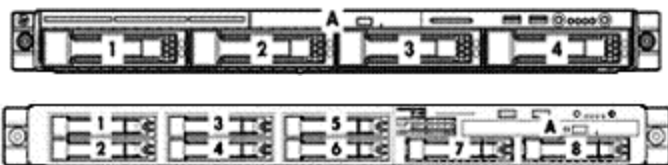
Following are memory options available from HP:

HP Memory	Registered DIMMs (RDIMMs)	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	593339-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	516423-B21
	HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21
	Unbuffered with ECC DIMMs (UDIMMs)	
	HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <http://www.hp.com/go/proliant-energy-efficient>

Storage



- 1-4 Four Non-hot plug SATA or four 3.5" Hot-plug SAS/SATA hard drive bays
- A Optional DVD-ROM, or DVD RW
- 1-8 Eight Hot-plug SATA/SAS hard drive bays
- A Optional DVD-ROM, or DVD RW

Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
DVD-ROM	Up to 1	A	Integrated IDE (ATAPI) (optional)
DVD RW	Up to 1	A	Integrated IDE (ATAPI) (optional)

Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500GB 3GSATA 7.2K	Up to 4	1-4	HP Smart Array P212 Controller
160GB 3G SATA 7.2K			HP Smart Array P410 Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
2TB 3G SATA 7.2K	Up to 4	1-4	HP Smart Array P212 Controller
1TB 3G SATA 7.2K			HP Smart Array P410 Controller
500GB 3G SATA 7.2K			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
2TB 3G SATA 7.2K	Up to 4	1-4	HP Smart Array P212 Controller
1TB 3G SATA 7.2K			HP Smart Array P410 Controller
500GB 3GSATA 7.2K			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Hot Plug SFF (2.5-inch) Entry (ETY) Drives

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 5.4K	Up to 8	1-8	HP Smart Array P212 Controller
120GB 1.5G SATA 5.4K			HP Smart Array P410 Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 7.2K	Up to 4	1-4	HP Smart Array P212 Controller
160GB 3G SATA 7.2K			HP Smart Array P410 Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

SATA Hot Plug Midline (MDL) Solid State Drives

	Quantity Supported	Position Supported	Controller
60GB 3.0G SATA SSD	Up to 8	1-8	HP Smart Array P212 Controller
120GB 3.0G SATA SSD			HP Smart Array P410 Controller
			HP Smart Array P812/1G Flash Backed Cache Controller

Storage

SATA Hot Plug 3.5" Midline (MDL) Solid State Drives

	Quantity Supported	Position Supported	Controller
60GB 3.0G SATA SSD	Up to 4	1-4	HP Smart Array P212 Controller
120GB 3.0G SATA SSD			HP Smart Array P410 Controller HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500 6G SAS 7.2K	Up to 8	1-8	HP Smart Array P212 Controller HP Smart Array P410 Controller HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
300GB 6G SAS 10K	Up to 8	1-8	HP Smart Array P212 Controller
146GB 6G SAS 15K			HP Smart Array P410 Controller
146GB 6G SAS 10K			HP Smart Array P812/1G Flash Backed Cache Controller
72GB 6G SAS 15K			

SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K	Up to 4	1-4	HP Smart Array P212 Controller
450GB 6G SAS 15K			HP Smart Array P410 Controller
300GB 6G SAS 15K			HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500GB 6G SAS 7.2K	Up to 8	1-8	HP Smart Array P800/512 BBWC Controller HP Smart Array P212/Zero Memory Controller HP Smart Array P212/ 256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller HP Smart Array P812/1G Flash Backed Cache Controller

SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
2TB 6G SAS 7.2K	Up to 4	1-4	HP Smart Array P212 Controller
1TB 6G SAS 7.2K			HP Smart Array P410 Controller HP Smart Array P812/1G Flash Backed Cache Controller

External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
60 HP StorageWorks Modular Smart Array	Up to 8	External	HP Smart Array P212/256MB Controller HP Smart Array P212/256MB Controller
70 HP StorageWorks Modular Smart Array	Up to 8	External	HP Smart Array P411/256MB Controller

Storage

Tape and Disk Backup

NOTE: For the complete range of StorageWorks tape drives, autoloaders, libraries and media, including the internal fitting models, see: <http://www.hp.com/go/tape>. For the complete range of StorageWorks D2D Backup Systems see: <http://www.hp.com/go/d2d>. For the complete range of StorageWorks RDX drives and media see: <http://www.hp.com/go/rdx>. For hardware and software compatibility of HP StorageWorks disk and tape backup products see: <http://www.hp.com/go/connect>.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP StorageWorks SCSI Tape Drives LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO4 Ultrium 1760 LTO-4 Ultrium 1840 DAT 40 DAT 72 DAT 160 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC11Xe Host Bus Adapter Please check the full compatibility information at: http://www.hp.com/go/connect	412911-B21
HP StorageWorks USB Tape Drives DAT 40 DAT 72 DAT 160 DAT 320 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP StorageWorks SAS Tape Drives DAT 160 DAT 320 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760 LTO-4 Ultrium 1840 LTO-5 Ultrium 3000 LTO-5 Ultrium 3280 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP Smart Array P212 SAS controller Please check the full compatibility information at: http://www.hp.com/go/connect	462828-B21
HP StorageWorks SCSI Tape Autoloaders DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Host Bus Adapter Please check the full compatibility information at: http://www.hp.com/go/connect	412911-B21
HP StorageWorks SCSI Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Dual Channel Controller Please check the full compatibility information at: http://www.hp.com/go/connect	AH627A
HP StorageWorks SAS Tape Autoloaders and Libraries 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP Smart Array P212 SAS controller Please check the full compatibility information at: http://www.hp.com/go/connect	462828-B21
HP StorageWorks Fibre Channel Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpecs.	

Storage

HP StorageWorks USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX750	External	USB 2.0 port	N/A
HP StorageWorks D2D Backup Systems, iSCSI D2D2500i D2D4000i	Rack Mount	Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	
HP StorageWorks D2D Backup Systems, Fibre Channel D2D4000fc	Rack Mount	Direct server attach is not supported, requires connection via SAN fabric. See: http://www.hp.com/go/connect	

Power Specifications

HP 750W CS HE Power Supply Kit							
Part Number	535683-B21 Option Kit						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage Rating	750	750	750	750	750	750	750
Nominal Input Current (A rms)	8.9	7.4	4.3	4.1	3.9	3.7	3.6
Maximum Rated Input Wattage Rating (Watts)	857	847	824	825	820	820	820
Maximum Rated VA (Volt-Amp)	894	884	859	859	854	854	854
Efficiency (%)	87.5	88.5	91	91	91.5	91.5	91.5
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	2925	2892	2812	2812	2797	2797	2797

HP 500W Power Supply							
Part Number - AC 500W PSU	515915-B21 Option Kit						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	47/63						
Nominal Input Voltage (Vrms)	100	120	200	220	230	240	
Maximum Rated Output Wattage Rating	500	500	500	500	500	500	500
Nominal Input Current (A rms)	5.74	4.99	2.86	2.58	2.46	2.36	
Maximum Rated Input Wattage Rating (Watts)	568	568	562	556	556	556	556
Maximum Rated VA (Volt-Amp)	574	574	573	567	567	567	567
Efficiency (%)	88	88	89	90	90	90	90
Power Factor	0.99	0.99	0.98	0.98	0.98	0.98	0.98
Leakage Current (mA)	0.42	0.50	0.81	0.91	0.95	1.00	
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)							

HP 460W Power Supply							
Part Number - AC 460W PSU	535684-B21 Option Kit						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage Rating	460	460	460	460	460	460	460
Nominal Input Current (A rms)	5.5	4.5	2.6	2.5	2.4	2.3	2.2
Maximum Rated Input Wattage Rating (Watts)	526	520	505	505	503	503	503
Maximum Rated VA (Volt-Amp)	548	542	527	527	524	524	524
Efficiency (%)	87.5	88.5	91	91	91.5	91.5	91.5
Power Factor	0.97						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	1794	1773	1725	1725	1715	1715	1715

Power Specifications

HP 400W Power Supply							
Part Number - AC 400W PSU	532092-B21 Option Kit						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage	320	320	360	360	360	360	360
Nominal Input Current (A rms)	4.15	3.41	2.23	2.16	2.03	1.94	1.86
Maximum Rated Input Wattage Rating (Watts)	412	406	445	445	444	443	443
Maximum Rated VA (Volt-Amp)	413	407	447	447	446	446	445
Efficiency (%)	77.4	78.5	80.5	80.6	80.7	80.8	81.0
Power Factor	0.99						
Leakage Current (mA)	0.75	0.75	0.85	0.90	0.95	0.95	1.00
Maximum Inrush Current (A peak)	35						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	1354	1334	1462	1462	1459	1456	1456

HP 460W CS Platinum Power Supply Kit							
Part Number	605923-B21 Option Kit						
Input Voltage Range (Vrms)	100 to 240						
Frequency Range (Nominal) (Hz)	50/60						
Nominal Input Voltage (Vrms)	100	120	200	208	220	230	240
Maximum Rated Output Wattage	460	460	460	460	460	460	460
Nominal Input Current (A rms)	5.3	4.3	2.5	2.4	2.3	2.2	2.1
Maximum Rated Input Wattage Rating (Watts)	512	505	493	493	492	492	491
Maximum Rated VA (Volt-Amp)	526	518	506	506	505	505	504
Efficiency (%)	89.8	91.2	93.2	93.3	93.5	93.6	93.6
Power Factor	0.985						
Leakage Current (mA)	0.42	0.50	0.83	0.87	0.92	0.96	1.00
Maximum Inrush Current (A peak)	30						
Maximum Inrush Current duration (mS)	20						
Maximum British Thermal Unit Rating (BTU-Hr)	1747	1722	1683	1682	1679	1678	1677

NOTE:
 To review typical system power ratings use the Active Answers Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor

System Specifications

Power		
ProLiant DL160 G6 Fully Configured	115V/60Hz	220V/50Hz
Fully Loaded System Input Wattage (W)	448	445
Fully Loaded System Input Current (A rms)	3.833	2.046
Fully Loaded System Thermal (BTU- Hr)	1529	1518
Fully Loaded System VA (Volt-Amp)	449	454
System Inrush Current with all power supplies loaded (A)	10.1	10.96
Power cord requirements	Nema 5-15P to IEC320-C13	IEC320-C13 to IEC320-C14
NOTE: Power shown is for a fully configured system consisting of (2) CPU, (8) double-sided DIMMs, (2) HDDs, (1) CD-ROM, and (2) PCI cards.		
Power Cord	AF556A	

Server Power Cords

One 6' Highline (IEC-IEC) power cord ships standard

NOTE: HP ProLiant DL servers no longer ship standard with NEMA power cords (163719-002) that allow connection to 110V US wall outlets in a home or office. ProLiant DL servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately.

If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: <http://www.hp.com/go/powercordmatrix>.

Technical Specifications

System Unit	Dimensions (H x W x D) 1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm) (with bezel)		
Weight (approximate)	Maximum	34.00 lb (16.78 kg)	
	(all hard drives, power supplies, and processors installed)		
Input Requirements (per power supply)	Rated Line Voltage	90 to 132 VAC 180 to 264 VAC	
	Rated Input Current	5.8 Amps (at 100 VAC) to 2.9 Amps (at 200 VAC)	
BTU Rating	Rated Input Frequency	47 to 63 Hz	
	Rated Input Power	570W (at 100 VAC) 565W (at 200 VAC)	
Power Specifications	Maximum	500W	1940 BTU / hr (at 100 VAC) 1920 BTU/hr (at 200 VAC)
		460W	1773 BTU / hr (at 120 VAC) 1715 (at 240 VAC)
		750W	2892 BTU / hr (at 120 VAC) 2797 (at 240 VAC)
	To review typical system power ratings use the Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient Or www.hp.com/go/hppoweradvisor		
Power Supply Output (per power supply)	Rated Steady-State Power	500 Watts (at 100 VAC), 500 Watts (at 200 VAC)	
	Maximum Peak Power (See Power Specifications Tables)	500Watts (at 100 VAC), 500 Watts (at 200 VAC)	
System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).	
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment.		

Technical Specifications

Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

Idle

LWAd	6.3B
LpAm	48dBA

Operating

LWAd	6.3B
LpAm	48dBA

Emissions

Classification (EMC)

FCC Rating	Class A
Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

HP 160GB 3G SATA 458947-B21
7.2K rpm LFF (3.5-inch)
Non-hot Plug Entry 1yr
Warranty Hard Drive

Capacity	160,041 MB
Height	1.028 in (2.61 cm)
Width	4.0 in (10.16 cm)
Depth	5.787 in (147.0 mm)
Interface	SATA ATA
Transfer Rate	1.5Gb/s
Synchronous (Maximum)	
Seek Time (typical reads, including settling)	Single Track 0.9 ms Average 9.0 ms Full-Stroke 17.8 ms Rotational Speed 7,200 rpm
Physical Configuration	Bytes/Sector 512 Logical Blocks 312,581,808
Operating Temperature	41° to 131° F (5° to 55° C)

NC362i Integrated Dual Network Interface
Port Gigabit Server
Adapter

Integrated 10/100/1000BASE-T Transceiver
 Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.

Data Transfer Method	Compliant to x1 PCIe Specification
Controller	Intel® 82576
Network Transfer Rate	10Base-T (Half-Duplex) 10 Mb/s 10Base-T (Full-Duplex) 20 Mb/s 100Base-TX (Half-Duplex) 100 Mb/s 100Base-TX (Full-Duplex) 200 Mb/s 1000Base-TX (Half and Full-Duplex) 2000Mb/s
Connector	RJ-45 connector
Cable Support	Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethernet on standard Category 5 UTP

Technical Specifications

Smart Array P410/410i Controller	Disk Drive and Enclosure Interface	6Gb/s SAS (Serial Attached SCSI)
	SAS Connectors	3Gb/s SATA (Serial ATA)
	Cache Memory Speed	2 internal (Mini-SAS) x8 wide port connectors
	Server Interface	DDR2-533MHz with 40 or 72-bit wide bus provides up to 4.2 GB/s maximum bandwidth.
	SAS Speed	x8 2.5G PCIe 2.0 provides 2GB/s maximum bandwidth
	Cache Memory	x8 6Gb/s SAS provides 4.8GB/s maximum bandwidth
	Logical Drives Supported	40-bit 256MB ECC protected cache (72-bit 512MB BBWC module upgrades available); transportable with battery-backed upgrade
	Host Memory Addressing	Up to 64 logical drives
	RAID Support	64-bit, supporting greater than 4GB server memory space
		RAID 6, 6+0 (Advanced Data Guarding) NOTE: The minimum of 256 MB cache, battery kit, and Smart Array Advanced Pack License Key upgrade is required to enable RAID 6, 6+0
		RAID 5, 5+0 (Distributed Data Guarding) NOTE: The 256 MB is required to enable RAID 5, 5+0 support of the Smart Array P410
		RAID 1+0 (Striping & Mirroring)
		RAID 0 (Striping)

Environment-friendly Products and Approach	End-of-life Management and Recycling	<p>Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>
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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.