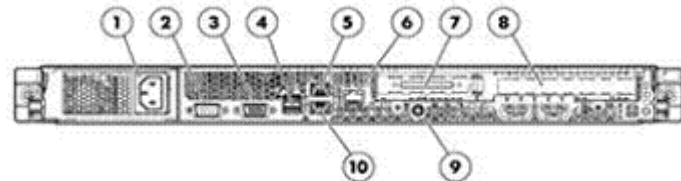
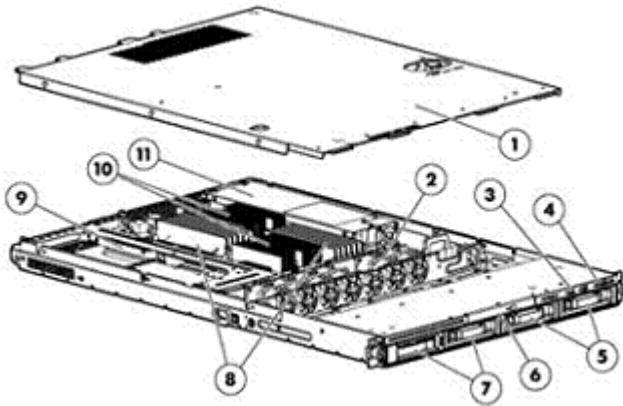


### Overview

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.

#### 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 3<sup>rd</sup> and 4<sup>th</sup> 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

- Support for 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive
- Support for 3TB 3G Non-Hot Plug SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive
- Support for HP 200GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive
- Support for HP 400GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive
- Support for HP 800GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive
- Support for HP NC552SFP 10Gb 2-port Ethernet Server Adapter

### 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® X5690 (3.46GHz/6-core/12MB/130W, DDR3-1333, HT, Turbo1/1/1/1/1/2/2) Processor

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

Intel® Xeon® X5680 (3.33GHz/6-core/12MB/130W, DDR3-1333, HT, Turbo 1/1/2/2/3/) Processor

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

Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

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

Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

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

Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

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

Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/2/2/3/3) Processor

Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/1/1/2/2) Processor

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

Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W, DDR3-1333, HT, Turbo 1/1/1/1/2/2) Processor

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

Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W, DDR3-1333, HT, Turbo 2/2/3/3/4/4) Processor

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

#### Quad -Core Processors

HP DL160 G6 Intel® Xeon® X5687 (3.60GHz/4-core/12MB/130W, DDR3-1333, HT, Turbo NA/NA/1/1/2/2) Processor

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

HP DL160 G6 Intel® Xeon® X5677 (3.46GHz/4-core/12MB/130W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

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

HP DL160 G6 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W, DDR3-1333, HT, Turbo NA/NA/2/2/3/3) Processor

Intel® Xeon® Processor X5570 (2.93GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

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

Intel® Xeon® X5560 (2.80GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

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

Intel® Xeon® X5550 (2.66GHz/4-core/8MB/95W, DDR3-1333, HT, Turbo 2/2/3/3) Processor

Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

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

Intel® Xeon® E5630 (2.53GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

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

## Standard Features

Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2)

Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W, DDR3-1066) Processor

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

Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W, DDR3-1066) Processor

Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W, DDR3-1066) Processor

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

Intel® Xeon® E5540 (2.53GHz/4-core/8MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

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

Intel® Xeon® E5530 (2.40GHz/4-core/8MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

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

Intel® Xeon® E5520 (2.26GHz/4-core/8MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W, DDR3-1066, HT, Turbo 1/1/2/2) Processor

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

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

### Dual Core Processors

Intel® Xeon® E5503 (2.0GHz/2-core/4MB/80W, DDR3-800) Processor

**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.

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|   |                     |
|---|---------------------|
| <b>Cache Memory</b>                     | 12 MB Level 3 cache |
| One of the following depending on Model | 4MB Level 3 cache   |

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|                |                     |
|----------------|---------------------|
| <b>Chipset</b> | Intel® 5520 Chipset |
|----------------|---------------------|

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|                       |                               |
|-----------------------|-------------------------------|
| <b>Upgradeability</b> | Upgradeable to two processors |
|-----------------------|-------------------------------|

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|                          |                            |
|--------------------------|----------------------------|
| <b>Memory Protection</b> | Advanced memory protection |
|                          | Mirroring Mode             |
|                          | Lockstep Mode              |

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### Standard Features

|               |                               |   |
|---------------|-------------------------------|---|
| <b>Memory</b> | 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)               | 288 GB (18 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](http://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.

|                           |  |  |
|---------------------------|--|--|
| <b>Storage Controller</b> | Non-Hot Plug and Cold Plug SATA Models | <p>HP Smart Array B110i SATA RAID</p> <p><b>NOTE:</b> Embedded SATA controller support transfer rate up to 3Gb/s</p> <p><b>NOTE:</b> 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: <a href="http://www.hp.com/go/sataraid">www.hp.com/go/sataraid</a></p> <p><b>NOTE:</b> 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><b>NOTE:</b> The addition of a Smart Array hardware based storage controller to a Non-Hot Plug SATA Model is only supported for external storage.</p> <p><b>NOTE:</b> Non VMware Support for software RAID. A Smart Array controller with hw RAID must be used to support ESX.</p> <p><b>NOTE:</b> To enable Hot plug functionality, use HP Smart Array Hot Plug Advance Pack for B110i (PN TC421A)</p> |
|                           | Hot Plug SATA/SAS Models               | <p>HP Smart Array P410 Controller (RAID 0/1/1+0)</p> <p><b>NOTE:</b> 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><b>NOTE:</b> Support transfer rate up to 6Gb/s SAS or 3Gb/s SATA</p> <p><b>NOTE:</b> 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><b>NOTE:</b> 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><b>NOTE:</b> 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.</p>   |

### Standard Features

|                                 |   |   |
|---------------------------------|---|---|
| <b>Internal Storage Devices</b> | Diskette Drives   | Via USB only  |
|                                 | Optical Drives  | Optional SATA 9.5mm DVD-ROM Optical Drive<br>Optional SATA 9.5mm DVD RW Optical Drive                                   |
|                                 | Drive Bays<br><a href="#">One of the following depending on Model</a> | Up to 4 Non-hot plug SATA 3.5" drives<br>Up to 4 Hot plug SAS/SATA 3.5" drives<br>Up to 8 Hot plug SAS/SATA 2.5" drives |

|  |                       |        |           |
|--|-----------------------|--------|-----------|
| <b>Maximum Internal Storage</b><br><a href="#">One of the following depending on Model</a> | Non-Hot Plug LFF SATA | 12.0TB | 4 x 3TB   |
|  | Hot Plug LFF SATA     | 12.0TB | 4 x 3TB   |
|  | Hot Plug LFF SAS      | 8.0TB  | 4 x 2TB   |
|  | Hot Plug SFF SATA     | 8.0TB  | 8 x 1TB   |
|  | Hot Plug SFF SAS      | 8.0TB  | 8 x 1TB   |
|  | Hot Plug SAS SSD      | 6.4TB  | 8 x 800GB |

|                   |                         |  |
|-------------------|-------------------------|--|
| <b>Interfaces</b> | 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)<br><b>NOTE:</b> In order to connect a USB device internally, the internal USB Cable G6 Kit must be used (536769-B21)<br><b>NOTE:</b> Please see the following URL for additional information regarding USB support:<br><a href="http://h18004.www1.hp.com/products/servers/platforms/usb-support.html">http://h18004.www1.hp.com/products/servers/platforms/usb-support.html</a> |

|                                     |   |
|-------------------------------------|---|
| <b>Industry Standard Compliance</b> | ACPI V2.0 Compliant                     |
|                                     | PCI 2.2 Compliant                       |
|                                     | PXE Support                             |
|                                     | WOL Support                             |
|                                     | Microsoft® Logo certifications          |
|                                     | IPMI 2.0, SMASH CLP, DCMI 1.0 compliant |

**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>.

**Power Supply** 500 Watts, auto-switching, high efficiency, PFC (Power Factor Correcting)  
**NOTE:** Factory upgradeable to high-efficiency hot plug common slot or redundant hot-plug power supply.





### Standard Features

**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.

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**Operating Systems and Virtualization Software Support for ProLiant Servers** Microsoft Windows Server  
Oracle Solaris  
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>.

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**Graphics** 32MB shared supporting all display resolutions up to 1600x1200 16bpp@75Hz  
**NOTE:** 8MB is dedicated to video memory.

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**Form Factor** Rack (1U), (1.75 in/4.45 cm)

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

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>

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**Security** Power-on password  
Setup password  
Diskette boot control  
Secure Sockets Layer (SSL)  
Secure Shell (SSH)

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**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 (3-1-1 warranty in APJ). Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>.

### Optional Features

#### HP Insight management software

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).

HP Insight Control for Linux serves environments requiring a Linux-based management console. See [www.hp.com/go/ic-linux](http://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>.

#### Core Infrastructure Management

HP Systems Insight Manager

HP Systems Insight Manager (HP SIM) provides a unified, secure and extensible standards-based environment to centrally manage servers, storage and other infrastructure devices, (both HP and non-HP) across multiple operating system platforms.

For additional information, please see: <http://www.hp.com/go/insight>.

Subscriber's Choice

Subscriber's Choice Driver and Support Alerts/Notifications is a web-based email subscription service that provides software and driver change notifications for ProLiant products. Sign up at: <http://www.hp.com/go/subscriberschoice> and customize your profile to receive various new alerts as they become available, on a weekly or monthly basis.

ROMPaq, software and latest drivers

The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options; downloaded from Software and Drivers download pages website at: <http://www.hp.com/go/support> and from [www.hp.com/servers/easysetup](http://www.hp.com/servers/easysetup). Contains the following:

- HP Insight Management Agents for Systems Insight Manager (SIM) Integration
- HP Systems Management Homepage
- Array Configuration Utility (ACU)
- Array Diagnostics Utility (ADU)

### Optional Features

- HP Insight Diagnostics

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#### High Performance Clusters

|                               |   |
|-------------------------------|---|
| HP Cluster Platforms          | 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. <a href="http://www.hp.com/go/clusters">http://www.hp.com/go/clusters</a>   |
| HP HPC Interconnects          | 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. <a href="http://www.hp.com/techservers/clusters/ucp/index.html">http://www.hp.com/techservers/clusters/ucp/index.html</a>   |
| HP Cluster Management Utility | 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. <a href="http://www.hp.com/go/cmu">http://www.hp.com/go/cmu</a>   |
| HP HPC Linux Value Pack       | 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 HPC Enterprise Edition suite of tools including the LSF workload scheduler, the HP-MPI parallelization library. Also included are the HP Unified Parallel C compiler and the HP Shmem library, as well as the execution environments for the libraries and compiler. <a href="#">HP HPC Linux Value Pack</a> |

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#### 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>.

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#### 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

#### Service and Support **HP Technology Services for Industry Standard Servers and BladeSystem**

Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

#### **What HP ProLiant and BladeSystem Services can do for you**

HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.

HP Technology Services meets business challenges with services offered in three packages:

#### **Optimized Care Package, Standard Care Package, and Basic Care Package**

Available for each product group. Such packaged solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support packages for servers, storage, networking and software.

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#### Optimized Care Package

#### **Supports maintaining servers at optimum performance availability**

##### **HP ProLiant Server Hardware Installation**

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

##### **3-Year HP 6 hour Hardware Support Onsite Call-to-Repair Service**

Provides an IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 hours of the initial service request to the HP Global Solution Center.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf>

**Additional Services:** Software OS (Microsoft, Linux (SUSE/Red Hat) Installation and Start Up and Software Support) plus Microsoft or Linux education courses +30 Proactive Select Credits, Factory Express.

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#### Standard Care Package **Package that maintains high level of server availability**

##### **HP ProLiant Server Hardware Installation**

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

##### **3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

**Additional Services:** Software OS (Microsoft, Linux (SUSE/Red Hat) Installation and Start Up and Software Support); +10 Proactive Select Credits, Factory Express.

## Service and Support

**Basic Care Package** Delivers minimum recommended support service level

**HP ProLiant Server Hardware Installation**

Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN>

**3-Year HP 13x5 4 hour Response, Hardware Support Onsite Service**

Delivers increased equipment availability and productivity with rapid remote support and onsite response for your HP server and storage hardware.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

**Additional Services:** Software OS (Microsoft, Linux (SUSE/Red Hat) Installation and Start Up and Software Support), Factory Express.

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**Insight Remote Support** The packages include HP Insight Remote Support that uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnoses, and problem resolution. It is available at no additional cost to all warranty, HP Care Pack Service, and service agreement customers.

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**For more information** To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner or visit: <http://www.hp.com/services/proliant>

### Pre-configured 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:** Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.

**NOTE:** HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.

**NOTE:** If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

### Hot Plug Serial ATA (SATA)/ Serial Attached SCSI (SAS) Pre-configured Models

**NOTE:** To enable Hot Plug functionality for P/N's 590159-xx1 and 590160-xx1 use a HP Smart Array P212 Controller or HP Smart Array P410 Controller or HP Hot Plug Advance Pack

|  |   |   |
|--|---|---|
| <b>HP ProLiant DL160 G6 L5630 1P 4GB-R B110i Cold Plug SATA 4 LFF 500W PS Server</b><br>590159-xx1 | <b>Processor(s)</b>   | (1) Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W, DDR3-1066, HT, Turbo 1/1/2/2/) Processor |
|  | <b>Cache Memory</b>   | 12 MB shared L3 cache   |
|  | <b>Memory</b>   | 4GB (1 x 4GB) PC3-10600R (RDIMM)<br><b>NOTE: Total of 18 DIMM slots</b>                   |
|  | <b>Network Controller</b>   | HP NC362i Integrated Dual Port Gigabit Server Adapter                                     |
|  | <b>Storage Controller</b>   | HP Smart Array B110i SATA RAID Controller   |
|  | <b>Hard Drive</b>   | None ship standard  |
|  | <b>Internal Storage</b>   | Up to 4 large form factor Pluggable drives  |
|  | <b>Optical Drive</b>  | None ship standard  |
|  | <b>Power Supply</b>   | 500W high efficiency multi-output supply (ships standard)                                 |
|  | <b>Form Factor</b>  | 1U  |
| <b>Warranty</b>  | Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ) |   |

|  |   |   |
|--|---|---|
| <b>HP ProLiant DL160 G6 E5506 1P 4GB-R B110i Cold Plug SATA 4 LFF 500W PS Server</b><br>590160-xx1 | <b>Processor(s)</b>   | (1) Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W, DDR3-800) Processor     |
|  | <b>Cache Memory</b>   | 4 MB shared L3 cache  |
|  | <b>Memory</b>   | 4GB (1 x 4GB) PC3-10600R (RDIMM)<br><b>NOTE: Total of 18 DIMM slots</b> |
|  | <b>Network Controller</b>   | HP NC362i Integrated Dual Port Gigabit Server Adapter                   |
|  | <b>Storage Controller</b>   | HP Smart Array B110i SATA RAID Controller                               |
|  | <b>Hard Drive</b>   | None ship standard  |
|  | <b>Internal Storage</b>   | Up to 4 large form factor Pluggable drives                              |
|  | <b>Optical Drive</b>  | None ship standard  |
|  | <b>Power Supply</b>   | 500W high efficiency multi-output supply (ships standard)               |
|  | <b>Form Factor</b>  | 1U  |
| <b>Warranty</b>  | Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ) |   |

|   |                           |  |
|---|---------------------------|--|
| <b>HP ProLiant DL160 G6 E5620 1P 8GB-R P410 SAS/SATA 4 LFF 500W PS Server</b><br>590161-xx1 | <b>Processor(s)</b>       | (1) Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor |
|   | <b>Cache Memory</b>       | 12 MB shared L3 cache  |
|   | <b>Memory</b>             | 8GB (2 x 4GB) PC3-10600R (RDIMM)<br><b>NOTE: Total of 18 DIMM slots</b>                  |
|   | <b>Network Controller</b> | HP NC362i Integrated Dual Port Gigabit Server Adapter                                    |
|   | <b>Storage Controller</b> | HP Smart Array P410 Controller   |
| <b>Hard Drive</b>   | None ship standard        |  |

### Pre-configured Models

|   |                           |   |
|---|---------------------------|---|
|   | <b>Internal Storage</b>   | Up to 4 large form factor Hot Plug drives   |
|   | <b>Optical Drive</b>      | None ship standard  |
|   | <b>Power Supply</b>       | 500W high efficiency multi-output supply (ships standard)   |
|   | <b>Form Factor</b>        | 1U  |
|   | <b>Warranty</b>           | Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ) |
| <b>HP ProLiant DL160 G6 X5650 2P 24GB-R P410/256 BBWC 8 SFF 500W PS Server 590162-xx1</b> | <b>Processor(s)</b>       | (2) Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W, DDR3-1333, HT, Turbo 2/2/3/3/4/4) Processor                              |
|   | <b>Cache Memory</b>       | 12MB shared L3 cache  |
|   | <b>Memory</b>             | 24GB (6 x 4GB) PC3-10600R (RDIMM)<br><b>NOTE: Total of 18 DIMM slots</b>  |
|   | <b>Network Controller</b> | HP NC362i Integrated Dual Port Gigabit Server Adapter   |
|   | <b>Storage Controller</b> | HP Smart Array P410/ 256MB BBWC   |
|   | <b>Hard Drive</b>         | None ship standard  |
|   | <b>Internal Storage</b>   | Up to 8 Small form factor Hot Plug drives   |
|   | <b>Optical Drive</b>      | None ship standard  |
|   | <b>Power Supply</b>       | 500W high efficiency multi-output supply (ships standard)   |
|   | <b>Form Factor</b>        | 1U  |
|   | <b>Warranty</b>           | Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ) |
| <b>HP ProLiant DL160 G6 E5606 1P 4GB-R 500W PS Entry Server 637235-xx1</b>                | <b>Processor(s)</b>       | (1) Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W, DDR3-800) Processor   |
|   | <b>Cache Memory</b>       | 8 MB shared L3 cache  |
|   | <b>Memory</b>             | 4GB (1 x 4GB) PC3-10600R (RDIMM)<br><b>NOTE: Total of 18 DIMM slots</b>   |
|   | <b>Network Controller</b> | HP NC362i Integrated Dual Port Gigabit Server Adapter   |
|   | <b>Storage Controller</b> | HP Smart Array B110i SATA RAID Controller   |
|   | <b>Hard Drive</b>         | None ship standard  |
|   | <b>Internal Storage</b>   | Up to 4 large form factor Pluggable drives  |
|   | <b>Optical Drive</b>      | None ship standard  |
|   | <b>Power Supply</b>       | 500W high efficiency multi-output supply (ships standard)   |
|   | <b>Form Factor</b>        | 1U  |
|   | <b>Warranty</b>           | Server Warranty includes 3 year Next Day Parts replacement, 0-Years Labor, 0-Years Onsite support (3-1-1 warranty in APJ) |
| <b>Country Code Key</b>   | 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 information on configurable product offerings and requirements.

**NOTE:** Configure-to-order (CTO) servers must start with a CTO Chassis.

**NOTE:** FIO indicates that this option is only available as 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 Configure-to-order Rack Server

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

4 LFF drive cage

#### Hot Plug LFF Model

HP ProLiant DL160 G6 Hot Plug Configure-to-order Rack Server

491532-B21

#### Factory Integrated Model ships with:

HP NC362i Integrated Dual Port Gigabit Server Adapter

Available PCI-Express Generation 2 slots:

Slot 1: PCIe 2.0 x16 (connector)/x16 (speed), half-length/full-height

Slot 2: PCIe 2.0 x8 (connector)/x4 (speed), half-length/half-height

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 ProLiant DL160 G6 8 SFF Hot Plug Configure-to-order Server

593352-B21

#### Factory Integrated Model ships with:

HP NC362i Integrated Dual Port Gigabit Server Adapter

Available PCI-Express Generation 2 slots:

Slot 1: PCIe 2.0 x16 (connector)/x16 (speed), half-length/full-height

Slot 2: PCIe 2.0 x8 (connector)/x4 (speed), half-length/half-height

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 130W Intel® Xeon® Processor Models.

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



### Configuration Information - Factory Integrated Models

#### HP Processors

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

#### Six-Core Processors

HP DL160 G6 Intel® Xeon® X5690 (3.46GHz/6-core/12MB/130W) FIO Processor Kit 639493-L21

**NOTE:** Not available with SFF CTO Chassis (P/N: 593352-B21) in Step 1.

HP DL160 G6 Intel® Xeon® X5680 (3.33GHz/6-core/12MB/130W) FIO Processor Kit 589727-L21

**NOTE:** Not available with SFF CTO Chassis (P/N: 593352-B21) in Step 1.

HP DL160 G6 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) FIO Processor Kit 637345-L21

HP DL160 G6 Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W) FIO Processor Kit 589725-L21

HP DL160 G6 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) FIO Processor Kit 589723-L21

HP DL160 G6 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) FIO Processor Kit 589721-L21

HP DL160 G6 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) FIO Processor Kit 637349-L21

HP DL160 G6 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) FIO Processor Kit 637351-L21

HP DL160 G6 Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W) FIO Processor Kit 589700-L21

#### Quad-Core Processors

HP DL160 G6 Intel® Xeon® X5687 (3.60GHz/4-core/12MB/130W) FIO Processor Kit 637343-L21

**NOTE:** Not available with SFF CTO Chassis (P/N: 593352-B21) in Step 1.

HP DL160 G6 Intel® Xeon® X5677 (3.46GHz/4-core/12MB/130W) FIO Processor Kit 629850-L21

**NOTE:** Not available with SFF CTO Chassis (P/N: 593352-B21) in Step 1.

HP DL160 G6 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) FIO Processor Kit 637347-L21

HP DL160 G6 Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W) FIO Processor Kit 589715-L21

HP DL160 G6 Intel® Xeon® E5630 (2.53GHz/4-core/12MB/80W) FIO Processor Kit 589713-L21

HP DL160 G6 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) FIO Processor Kit 589711-L21

HP DL160 G6 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) FIO Processor Kit 641512-L21

HP DL160 G6 Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W) FIO Processor Kit 637250-L21

HP DL160 G6 Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W) FIO Processor Kit 637353-L21

HP DL160 G6 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) FIO Processor Kit 589698-L21

HP DL160 G6 Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W) FIO Processor Kit 491507-L21

HP DL160 G6 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) FIO Processor Kit 573897-L21

#### Dual Core Processors

HP DL160 G6 Intel® Xeon® E5503 (2.0GHz/2-core/4MB/80W) FIO Processor Kit 593899-L21

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

### Configuration Information - Factory Integrated Models

**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 Models 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.

#### 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) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit | 604504-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 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit   | 604506-B21 |
| HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit              | 500662-B21 |
| HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit        | 627812-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 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit | 619488-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](http://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)

**NOTE:** PC3L is a low voltage memory.

## Configuration Information - Factory Integrated Models

### 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

### 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 FBWC 2-ports Int/4-ports Ext PCIe x8 SAS Controller 487204-B21

HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller 572532-B21

HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller 578230-B21

HP Smart Array P410/ZM 2-ports Int PCIe x8 FIO SAS Controller 462860-B21

HP Smart Array P410/256 BBWC 2-ports Int PCIe x8 FIO SAS Controller 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 518593-B21

**NOTE:** Supports LFF hard drives only.

HP 4 Hard Drive Hot Plug Backplane G6 Kit 512181-B21

**NOTE:** Supports LFF hard drives only.

## Configuration Information - Factory Integrated Models

### HP Power Supplies

**NOTE:** 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: <http://www.hp.com/go/hppoweradvisor>

|  |            |
|--|------------|
| HP 500W Factory Integrated Power Supply Kit  | 515915-B21 |
| HP 460W Common Slot Gold Hot Plug Factory Integrated Power Supply Kit with Backplane | 535684-B21 |
| HP 750W Common Slot Gold Hot Plug Factory Integrated Power Supply Kit with Backplane | 535683-B21 |
| HP 460W Common Slot Platinum Hot Plug Power Supply Kit with Backplane                | 605923-B21 |
| HP 365W Hot Plug Redundant Power Supply Kit with Backplane                           | 532092-B21 |

**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: , -B21) (3.) Unbuffered memory (P/N: 500668-B21 or 500670-B21), 4. No graphics cards supported via PCI-e.

## 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 BBWC 1-ports Int/1-ports Ext PCIe x8 FIO SAS Controller | 491191-B21 |
| HP Smart Array P410/ZM 2-ports Int PCIe x8 FIO SAS Controller                   | 462860-B21 |
| HP Smart Array P410/256 BBWC 2-ports Int PCIe x8 FIO SAS Controller             | 491195-B21 |

## 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 integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

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

### HP Processors

#### Six-Core Processors

HP DL160 G6 Intel® Xeon® X5690 (3.46GHz/6-core/12MB/130W) Processor Kit      639493-B21

**NOTE:** Not supported in Small Form Factor (SFF) Models.

HP DL160 G6 Intel® Xeon® X5680 (3.33GHz/6-core/12MB/130W) Processor Kit      589727-B21

**NOTE:** Not supported in Small Form Factor (SFF) Models.

HP DL160 G6 Intel® Xeon® X5675 (3.06GHz/6-core/12MB/95W) Processor Kit      637345-B21

HP DL160 G6 Intel® Xeon® X5670 (2.93GHz/6-core/12MB/95W) Processor Kit      589725-B21

HP DL160 G6 Intel® Xeon® X5660 (2.80GHz/6-core/12MB/95W) Processor Kit      589723-B21

HP DL160 G6 Intel® Xeon® X5650 (2.66GHz/6-core/12MB/95W) Processor Kit      589721-B21

HP DL160 G6 Intel® Xeon® E5649 (2.53GHz/6-core/12MB/80W) Processor Kit      637349-B21

HP DL160 G6 Intel® Xeon® E5645 (2.40GHz/6-core/12MB/80W) Processor Kit      637351-B21

HP DL160 G6 Intel® Xeon® L5640 (2.26GHz/6-core/12MB/60W) Processor Kit      589700-B21

#### Quad-Core Processors

HP DL160 G6 Intel® Xeon® X5687 (3.60GHz/4-core/12MB/130W) Processor Kit      637343-B21

**NOTE:** Not supported in Small Form Factor (SFF) Models.

HP DL160 G6 Intel® Xeon® X5677 (3.46GHz/4-core/12MB/130W) Processor Kit      629850-B21

**NOTE:** Not supported in Small Form Factor (SFF) Models.

HP DL160 G6 Intel® Xeon® X5672 (3.20GHz/4-core/12MB/95W) Processor Kit      637347-B21

HP DL160 G6 Intel® Xeon® X5570 (2.93GHz/4-core/8MB/95W) Processor Kit      508231-B21

HP DL160 G6 Intel® Xeon® X5560 (2.80GHz/4-core/8MB/95W) Processor Kit      573893-B21

HP DL160 G6 Intel® Xeon® X5550 (2.66GHz/4-core/8MB/95W) Processor Kit      491511-B21

HP DL160 G6 Intel® Xeon® E5640 (2.66GHz/4-core/12MB/80W) Processor Kit      589715-B21

HP DL160 G6 Intel® Xeon® E5630 (2.53GHz/4-core/12MB/80W) Processor Kit      589713-B21

HP DL160 G6 Intel® Xeon® E5620 (2.40GHz/4-core/12MB/80W) Processor Kit      589711-B21

HP DL160 G6 Intel® Xeon® E5607 (2.26GHz/4-core/8MB/80W) Processor Kit      641512-B21

HP DL160 G6 Intel® Xeon® E5606 (2.13GHz/4-core/8MB/80W) Processor Kit      637250-B21

HP DL160 G6 Intel® Xeon® E5603 (1.60GHz/4-core/4MB/80W) Processor Kit      637353-B21

HP DL160 G6 Intel® Xeon® E5540 (2.53GHz/4-core/8MB/80W) Processor Kit      490461-B21

HP DL160 G6 Intel® Xeon® E5530 (2.40GHz/4-core/8MB/80W) Processor Kit      573895-B21

HP DL160 G6 Intel® Xeon® E5520 (2.26GHz/4-core/8MB/80W) Processor Kit      490459-B21

HP DL160 G6 Intel® Xeon® L5630 (2.13GHz/4-core/12MB/40W) Processor Kit      589698-B21

HP DL160 G6 Intel® Xeon® L5520 (2.26GHz/4-core/8MB/60W) Processor Kit      491507-B21

HP DL160 G6 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) Processor Kit      573897-B21

HP DL160 G6 Intel® Xeon® E5504 (2.00GHz/4-core/4MB/80W) Processor Kit      490457-B21

#### Dual Core Processors

HP DL160 G6 Intel® Xeon® E5503 (2.0GHz/2-core/4MB/80W) Processor Kit      593899-B21

**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



### Core Options

(Mainstream); and "L" denotes Lower Wattage.

#### 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) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit | 604504-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 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit   | 604506-B21 |
| HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit              | 500662-B21 |
| HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit        | 627812-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 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit | 619488-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](http://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 Drive Cage Options

|   |            |
|---|------------|
| HP 4 Hard Drive Hot Plug Backplane G6 Kit   | 512181-B21 |
| <b>NOTE:</b> 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. |            |

#### HP Optical Drives

|                                     |            |
|-------------------------------------|------------|
| HP 9.5mm SATA DVD-ROM Optical Drive | 481045-B21 |
| HP 9.5mm SATA DVD-RW 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 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive | 625609-B21 |
| HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive        | 507750-B21 |

### Core Options

|   |            |
|---|------------|
| HP 160GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive  | 530888-B21 |
| <b>SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives</b>  |            |
| (SAS/SATA Hot Plug Models Only)   |            |
| <b>NOTE: A SAS HBA or Array Controller is required.</b>   |            |
| HP 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive  | 628059-B21 |
| 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 |
| <b>SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives</b>  |            |
| (Non-Hot Plug Models Only)  |            |
| HP 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive   | 628063-B21 |
| 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 |
| <b>SATA Non-Hot Plug LFF (3.5-inch) Entry (ETY) Drives</b>  |            |
| 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 |
| <b>SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives</b>  |            |
| HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive  | 571230-B21 |
| HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive  | 458945-B21 |
| <b>NOTE: Please see QuickSpecs for Technical Specifications and additional information:</b>   |            |
| <a href="http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html">http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html</a> |            |
| (Worldwide)   |            |
| <b>SATA Hot Plug Midline (MDL) Solid State Drives</b>   |            |
| 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 |
| <b>SATA Hot Plug 3.5" Midline (MDL) Solid State Drives</b>  |            |
| 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 |
| <b>NOTE: Please see the QuickSpecs for Technical Specifications and additional information:</b>   |            |
| <a href="http://h18000.www1.hp.com/products/quickspecs/13415_div/13415_div.html">http://h18000.www1.hp.com/products/quickspecs/13415_div/13415_div.html</a> |            |
| (Worldwide)   |            |
| <b>SAS Hot Plug (2.5") SFF Enterprise (ENT) Drives</b>  |            |
| HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive   | 619291-B21 |
| 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 |
| <b>SAS Hot Plug (3.5") Enterprise (ENT) Drives</b>  |            |

### Core Options

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 is required to support SAS 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 is required to support SAS hard drives.

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

HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive 605835-B21

HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 581286-B21

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

HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive 581284-B21

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

HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive 625031-B21

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

#### 6G SAS Hot Plug Enterprise Performance Solid State Drives

HP 400GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive 632494-B21

HP 200GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive 632492-B21

#### 6G SAS Hot Plug Enterprise Mainstream Solid State Drives

HP 800GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive 632506-B21

HP 400GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive 632504-B21

HP 200GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive 632502-B21

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

[http://h18000.www1.hp.com/products/quickspecs/14038\\_div/14038\\_div.html](http://h18000.www1.hp.com/products/quickspecs/14038_div/14038_div.html) (Worldwide)

### Core Options

#### HP Networking

##### Gigabit Ethernet Adapters

|  |            |
|--|------------|
| HP NC112T PCI Express Gigabit Server Adapter                         | 503746-B21 |
| HP NC360T PCI-E Dual Port Gigabit Server Adapter                     | 412648-B21 |
| HP NC373F PCI-E Multifunction 1000SX Gigabit Svr Adapter             | 394793-B21 |
| HP NC373T PCI-E Multifunction Gigabit Server Adapter                 | 394791-B21 |
| HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter | 458492-B21 |
| HP NC364T PCI-E 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 Gigabit Server Adapter | 468332-B21 |
| HP NC523SFP 10Gb 2-port Server Adapter             | 593717-B21 |
| HP NC550SFP Dual Port 10GbE Server Adapter         | 581201-B21 |
| HP NC552SFP 10Gb 2-port Flex-10 Server Adapter     | 614203-B21 |

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: [www.hp.com/go/ProLiantNICs](http://www.hp.com/go/ProLiantNICs)

#### HP InfiniBand

|   |            |
|---|------------|
| QLogic InfiniBand 4X QDR PCI-E G2 Dual Port HCA       | 583211-B21 |
| HP InfiniBand 4X QDR ConnectX-2 PCIe G2 Dual Port HCA | 592520-B21 |
| HP InfiniBand 4X DDR ConnectX-2 PCIe G2 Dual Port HCA | 592521-B21 |
| HP 10 GbE PCI-e G2 Dual Port Network Interface Card   | 516937-B21 |

## Additional Options

**NOTE:** Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

|                                  |   |            |
|----------------------------------|---|------------|
| <b>HP Entry Level Management</b> | HP Lights-Out 100i (LO100i) Advanced including 1yr 24x7 Support Single Server License | 530521-B21 |
|----------------------------------|---|------------|

**NOTE:** For additional License Kits please see the Lights-Out 100i QuickSpecs at: [www.hp.com/go/lo100](http://www.hp.com/go/lo100)

|                            |   |          |
|----------------------------|---|----------|
| <b>HP Insight software</b> | <b>HP Insight Control for Linux</b><br>HP Insight Control for Linux including 1yr 24x7 Support Electronic License | TC213AAE |
|----------------------------|---|----------|

**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.

**NOTE:** Electronic LTUs are only available through limited points of sales; if not available, order a printed license entitlement certificate instead.

|  |   |        |
|--|---|--------|
|  | HP Insight Control for Linux including 1yr 24x7 Support Single Server License | TC209A |
|  | HP Insight Control for Linux Media Kit  | TC208A |

**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.

**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).

**NOTE:** Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent.

**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.

**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](http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html)

### HP Insight Control server deployment

|  |  |          |
|--|--|----------|
|  | HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License | T9082AAE |
|--|--|----------|

|  |   |            |
|--|---|------------|
|  | HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License | 452151-B21 |
|--|---|------------|

**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.

**NOTE:** Electronic software is available in all countries except China and Japan. For China and Japan should order the physical equivalent.

**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](http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html)



### Additional Options

#### High Performance Clusters

##### HP Cluster Management Utility

HP Cluster Management Utility Compute Node Flexible License

QL803A

**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](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

TC293B

**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](http://h18004.www1.hp.com/products/quickspecs/13485_div/13485_div.html)

#### HP Security - TPM

HP Trusted Platform Module Option

488069-B21

**NOTE:** 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. For more information about TPM, including a white paper, go to: [www.hp.com/go/TPM](http://www.hp.com/go/TPM).

**NOTE:** ProLiant OS pre-installed units will come with the partition required for TPM deployment.

**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.

### Additional Options

|  |  |            |
|--|--|------------|
| <b>HP I/O Accelerator Options</b>  | HP 160GB Single Level Cell PCIe ioDrive for ProLiant Servers   | 600278-B21 |
|  | <b>NOTE:</b> A low-profile PCI bracket is included for use in low-profile slots.   |            |
|  | HP 320GB Multi Level Cell PCIe ioDrive for ProLiant Servers  | 600279-B21 |
|  | <b>NOTE:</b> A low-profile PCI bracket is included for use in low-profile slots.   |            |
|  | HP 320GB Single Level Cell PCIe ioDrive Duo for ProLiant Servers   | 600281-B21 |
|  | HP 640GB Multi Level Cell PCIe ioDrive Duo for ProLiant Servers  | 600282-B21 |
|  | HP 1.28TB Multi Level Cell PCIe IO Accelerator   | 641027-B21 |
|  | <b>NOTE:</b> 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   |            |
|  | <b>NOTE:</b> For more information on the latest visualization and acceleration qualification status, please see: <a href="http://www.hp.com/go/accelerators">http://www.hp.com/go/accelerators</a>   |            |
|  | <b>NOTE:</b> For minimum system memory requirements and additional information, please refer to HP PCIe IO Accelerators for ProLiant Servers QuickSpecs at: <a href="http://h18004.www1.hp.com/products/quickspecs/13587_div/13587_div.html">http://h18004.www1.hp.com/products/quickspecs/13587_div/13587_div.html</a> (Worldwide)  |            |
| <hr/>  |  |            |
| <b>HP Graphics Options</b>   | HP Graphic Card Power Adapter Kit  | 533955-B21 |
|  | <b>NOTE:</b> The Graphic Power Adapter Kit can support up to 150 Watts.<br><b>NOTE:</b> A full-length graphic card cannot fit in the models which have one of the PCIe expansion slots already populated with SAS controller.  |            |
| <hr/>  |  |            |
| <b>HP Storage Controllers</b>  | <b>NOTE:</b> 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.   |            |
|  | <b>NOTE:</b> 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  |            |
|  | <b>NOTE:</b> 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). |            |
|  | <b>SAS Controllers</b>   |            |
|  | <b>Smart Array P212 Controller</b>   |            |
|  | HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller  | 462828-B21 |
|  | HP Smart Array P212/256 1-ports Int/1-ports Ext PCIe x8 SAS Controller   | 462834-B21 |
|  | <b>Smart Array P410 Controller</b>   |            |
|  | HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller   | 462862-B21 |
|  | HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller  | 462864-B21 |
| HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller             | 572532-B21   |            |
| <b>Smart Array P411 Controller</b>   |  |            |
| HP Smart Array P411/1G FBWC 2-ports Ext PCIe x8 SAS Controller             | 572531-B21   |            |
| HP Smart Array P411/512 FBWC 2-ports Ext PCIe x8 SAS Controller            | 578229-B21   |            |
| <b>Smart Array P812 Controller</b>   |  |            |
| HP Smart Array P812/1G FBWC 2-ports Int/4-ports Ext PCIe x8 SAS Controller | 487204-B21   |            |
| <b>Storage Controllers for use with External Storage Only</b>              |  |            |
| HP Smart Array P411/256 2-ports Ext PCIe x8 SAS Controller                 | 462830-B21   |            |
| HP Smart Array P411/512 BBWC 2-ports Ext PCIe x8 SAS Controller            | 462832-B21   |            |

### Additional Options

#### Optional upgrades

|   |            |
|---|------------|
| HP 1GB Flash Backed Cache   | 534562-B21 |
| HP 512MB Flash Backed Write Cache   | 534916-B21 |
| HP Non-Hot Plug Internal SAS/SATA 4 Port Cable Kit  | 487734-B21 |
| <b>NOTE:</b> 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 including 1yr 24x7 Technical Support and Updates Single Server License   | 516471-B21 |
| HP Smart Array Hot Plug Advance Pack for B110i w/1y 24x7 Supp Physical 1 Svr LTU  | 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 2-ports Ext PCIe x8 SAS Host Bus Adapter                    | 488765-B21 |
| HP Modular Smart Array SC08e 2-ports Ext PCIe x8 SAS Host Bus Adapter | 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](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](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](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](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](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](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](http://h18004.www1.hp.com/products/quickspecs/13082_div/13082_div.html)  
(SC08Ge HBA)

#### HP InfiniBand

|   |            |
|---|------------|
| QLogic InfiniBand 4X QDR PCI-E G2 Dual Port HCA       | 583211-B21 |
| HP InfiniBand 4X DDR PCI-E Dual Port HCA              | 448397-B21 |
| HP InfiniBand 4X QDR ConnectX-2 PCIe G2 Dual Port HCA | 592520-B21 |
| HP InfiniBand 4X DDR ConnectX-2 PCIe 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.

### Additional Options

#### HP Backup & Recovery Data Protector Express Software

|  |          |
|--|----------|
| HP Data Protector Express V5.0 for 1 Server E-LTU                | TC330AAE |
| HP Data Protector Express V5.0 for 3 Servers E-LTU               | TC331AAE |
| HP Data Protector Express V5.0 for 10 Servers E-LTU              | TC332AAE |
| HP Basic Upgrade to Data Protector Express V5 for 1 Server E-LTU | TC333AAE |

**NOTE:** Only one of these Data Protector Express base products is required. To see available options: <http://www.hp.com/go/dataprotectorexpress>

#### HP Tape Backup

**NOTE:** For the complete range of tape drives, autoloaders, libraries and media see: <http://www.hp.com/go/tape>. For hardware and software compatibility of HP tape backup products see: <http://www.hp.com/go/connect>.  
**NOTE:** Connection using the HP P212 SAS Smart Array Controller (462828-B21) recommended.

##### Tape Drives

|  |        |
|--|--------|
| HP StorageWorks DAT 160 SAS Internal Tape Drive  | Q1587A |
| <b>NOTE:</b> 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. |        |
| HP StorageWorks DAT 320 USB (1) in 1U Rack-mount Kit   | AP835A |
| HP StorageWorks DAT 320 SAS Internal Tape Drive  | AJ830A |
| <b>NOTE:</b> 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. |        |
| HP StorageWorks Ultrium 448 SAS Internal Drive   | DW085A |
| <b>NOTE:</b> Mounts inside the 1U SAS Rack-Mount Kit (AE459A).   |        |
| HP StorageWorks Ultrium 920 SAS Internal Tape Drive  | EH847A |
| <b>NOTE:</b> Mounts inside the 1U SAS Rack-Mount Kit (AE459A).   |        |

##### Tape Autoloader

|  |        |
|--|--------|
| HP StorageWorks 1/8 G2 Ultrium 920 SAS Autoloader  | AH558A |
| <b>NOTE:</b> Requires HP 1U Tape Autoloader Rack-Mount Kit (AH166A) for rack installation. |        |

##### Tape Library

|   |        |
|---|--------|
| HP StorageWorks MSL2024 Ultrium 920 SAS Tape Library          | AH559A |
| HP StorageWorks MSL2024 1 LTO-5 Ultrium 3000 SAS Tape Library | BL537A |

#### HP Disk Backup

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

##### HP D2D Backup Systems with Backup Data Deduplication

|   |        |
|---|--------|
| HP StorageWorks D2D2502i Backup System  | EJ001B |
| <b>NOTE:</b> 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 |
| <b>NOTE:</b> 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 RDX1000 Internal Removable Disk Backup System | BV847A |
|---|--------|

### Additional Options

|   |        |
|---|--------|
| HP StorageWorks RDX320 Internal Removable Disk Backup System  | AJ767A |
| <b>NOTE:</b> 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 |
| <b>NOTE:</b> 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 Storage Options

##### 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 StorageWorks 81B PCIe 8Gb Fibre Channel Single Port Host Bus Adapter | AP769A |
| HP StorageWorks 82B PCIe 8Gb Fibre Channel Dual Port Host Bus Adapter   | AP770A |
| HP StorageWorks 41B PCIe 4Gb Fibre Channel Single Port Host Bus Adapter | AP767A |
| HP StorageWorks 42B PCIe 4Gb Fibre Channel Dual Port Host Bus Adapter   | AP768A |

##### Emulex Fibre Channel HBAs

|  |        |
|--|--------|
| HP StorageWorks 81E 8Gb Single Port PCI-e Fibre Channel Host Bus Adapter | AJ762A |
| HP StorageWorks 82E 8Gb Dual Port PCI-e Fibre Channel Host Bus Adapter   | AJ763A |
| HP StorageWorks FC2142SR 4Gb PCIe Host Bus Adapter                       | A8002A |
| HP StorageWorks FC2242SR 4Gb PCIe DC Host Bus Adapter                    | A8003A |

##### QLogic Fibre Channel HBAs

|  |        |
|--|--------|
| HP StorageWorks 81Q PCI-e Fibre Channel Host Bus Adapter               | AK344A |
| HP StorageWorks 82Q 8Gb Dual Port PCI-e Fibre Channel Host Bus Adapter | AJ764A |
| HP StorageWorks FC1142SR 4Gb PCIe Host Bus Adapter                     | AE311A |
| HP StorageWorks FC1242SR 4Gb PCIe DC Host Bus Adapter                  | AE312A |

##### SCSI HBA

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

##### Converged Network Adapter

|   |        |
|---|--------|
| HP StorageWorks CN1000E Dual Port Converged Network Adapter | AW520A |
| HP CN1000Q Dual Port Converged Network Adapter              | BS668A |

#### HP Disk Storage Systems

##### MSA SAN Storage Arrays

|   |            |
|---|------------|
| HP StorageWorks MSA60 Array   | 418408-B21 |
| <b>NOTE:</b> Supports 12 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.  |            |
| <b>NOTE:</b> Please see the QuickSpecs for Technical Specifications and additional information: <a href="http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html">http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html</a> (Worldwide) |            |
| HP StorageWorks MSA70 Array   | 418800-B21 |
| <b>NOTE:</b> Supports 25 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.  |            |
| <b>NOTE:</b> Please see the QuickSpecs for additional options and configuration information at: <a href="http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html">http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html</a>             |            |

#### HP Uninterruptible

##### HP Rack-mountable UPS





## Additional Options

### Power Systems

#### HP Rack-Mountable R5500 UPS

HP R5500 6000VA INTL 3U Rackmount Uninterruptible Power System AF416A

HP R5500 5000kVA NA/JP 3U Rackmount Uninterruptible Power System AF426A

**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

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

#### HP R/T3000 G2 Uninterruptible Power System (UPS)

HP R/T3000 G2 2U L530 Low Voltage NA/JP Uninterruptible Power System AF466A

HP R/T3000 G2 2U L620 High Voltage NA/JP Uninterruptible Power System AF467A

HP R/T3000 G2 2U Detachable Cord High Voltage INTL Uninterruptible Power System AF468A

**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

[http://h18000.www1.hp.com/products/quickspecs/14058\\_div/14058\\_div.html](http://h18000.www1.hp.com/products/quickspecs/14058_div/14058_div.html)  
(Worldwide)

#### HP R/T3000 UPS

HP R/T3000 2880VA Low Voltage NA/JPN 2U Rackmount Uninterruptible Power System AF452A

HP R/T3000 3300VA High Voltage NA/JPN 2U Rackmount Uninterruptible Power System AF453A

HP R/T3000 3300VA INTL 2U Rackmount Uninterruptible Power System AF454A

**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

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

#### HP R1500 G3 Uninterruptible Power Supply (UPS)

HP R1.5kVA G3 1U NA Uninterruptible Power System AF469A

HP R1.5kVA G3 1U JP/TW Uninterruptible Power System AF470A

HP R1.5kVA G3 1U INTL Uninterruptible Power System AF471A

**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

[http://h18000.www1.hp.com/products/quickspecs/14059\\_div/14059\\_div.html](http://h18000.www1.hp.com/products/quickspecs/14059_div/14059_div.html)  
(Worldwide)

#### HP UPS R1500 G2 UPS

HP R1500 G2 1440VA Low Voltage NA 1U Rackmount Uninterruptible Power System AF419A

HP R1500 G2 1440VA INTL 1U Rackmount Uninterruptible Power System AF418A

HP R1500 G2 1200kVA Low Voltage JP 1U Rackmount Uninterruptible Power System AF421A

**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

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

**NOTE:** For additional information on HP Uninterruptible Power Systems please go to: [www.hp.com/servers/rackups](http://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](http://www.hp.com/products/ups) (Worldwide)



### Additional Options

**NOTE:** 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](http://www.hp.com/products/powercords).

#### HP Power Distribution Units

##### HP Monitored Power Distribution Unit: Full Rack Version

|   |        |
|---|--------|
| HP Single Input 3 Phase 24A Monitored Power Distribution Unit     | AF504A |
| HP Single Input 1 Phase 40A Monitored Power Distribution Unit     | AF506A |
| HP Single Input 3 Phase 16A Monitored Power Distribution Unit     | AF508A |
| HP Single Input 1 Phase 32A INT Monitored Power Distribution Unit | AF510A |

**NOTE:** Please see the following QuickSpecs for additional information:  
[http://h18000.www1.hp.com/products/quickspecs/12118\\_div/12118\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12118_div/12118_div.html)  
 (Worldwide)

##### HP Monitored Power Distribution Unit: Half Rack Version

|   |        |
|---|--------|
| HP Single Input 1 Phase 32A Monitored Power Distribution Unit | AF915A |
| HP Single Input 1 Phase 24A Monitored Power Distribution Unit | AF914A |

##### Modular Power Distribution Units 1U/0U (Up to 32 outlets)

|   |            |
|---|------------|
| HP 16A High Voltage Modular Power Distribution Unit       | 252663-B24 |
| HP 24A High Voltage Modular Power Distribution Unit       | 252663-D72 |
| HP 32A High Voltage Modular Power Distribution Unit       | 252663-B31 |
| HP 40A High Voltage NA/JP Modular Power Distribution Unit | 252663-D73 |

**NOTE:** Please see the following QuickSpecs for additional options including shorter jumper cables and country specific power cords:  
[http://h18000.www1.hp.com/products/quickspecs/11041\\_div/11041\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.html)  
 (Worldwide)

**NOTE:** 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](http://www.hp.com/products/powercords).

#### HP Intelligent Power Distribution Units (iPDU)

##### iPDU Core Units

|  |        |
|--|--------|
| HP 24A NA/JP Core Only Intelligent Modular Power Distribution Unit         | AF520A |
| HP 24A 3 Phase NA/JP Core Only Intelligent Modular Power Distribution Unit | AF522A |
| HP 32A Intl Core Only Intelligent Modular Power Distribution Unit          | AF525A |
| HP 16A 3 Phase Intl Intelligent Modular Power Distribution Unit            | AF526A |

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:  
[http://h18000.www1.hp.com/products/quickspecs/13650\\_div/13650\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13650_div/13650_div.html)  
 (Worldwide)

#### HP Rack Series

##### Rack 10000 G2 Series

|                                    |        |
|------------------------------------|--------|
| HP 10642 G2 1200mm deep Shock Rack | AF092A |
| HP 10647 G2 1200mm deep Shock Rack | AF094A |
| HP 10642 G2 Pallet Universal Rack  | AF001A |
| HP 10642 G2 Shock Universal Rack   | AF002A |

**NOTE:** For additional information regarding Rack Cabinets, please see the following URL: <http://www.hp.com/go/rackandpower>.

### Additional Options

#### HP Rack Options

#### HP KVM Switches

HP Server Console 0x2x8 Port Analog Switch AF616A

HP Server Console 0x2x16 Port Analog Switch AF617A

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

[http://h18000.www1.hp.com/products/quickspecs/11834\\_div/11834\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11834_div/11834_div.html)  
(Worldwide)

HP 48 Port Serial Console Server AF102A

HP 1x4 USB/PS2 KVM Console Switch AF611A

#### 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.

HP ProLiant DL160 G6 models have fixed rails which provide support for racks with round mounting holes and 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"

**NOTE:** For additional information regarding Rack Cabinets and Telco Rack support, please see the following URL: [www.hp.com/go/rackandpower](http://www.hp.com/go/rackandpower).

#### 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 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 Care Pack Services Hardware Services 4-Hour On-site Service

HP 3 year 4 hour 13x5 ProLiant DL14x and DL16x Hardware Support U9509E

HP 3 year 4 hour 24x7 ProLiant DL14x and DL16x Hardware Support U9510E

#### Hardware Services

HP 3 year Next business day ProLiant DL14x and DL16x Hardware Support U9508E

HP Install ProLiant DL14x and DL16x Service 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 288GB memory is available with the optional installation of dual-rank PC3L-10600R 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: [www.hp.com/go/ddr3memory-configurator](http://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

## Memory

| DIMM slot/capacity/populated speed table |                           |                |       |      |       |                 |                |                  |                                    |      |      |
|--|---------------------------|----------------|-------|------|-------|-----------------|----------------|------------------|------------------------------------|------|------|
| DIMM Type                                | Registered DIMMS (RDIMMs) |                |       |      |       |                 |                |                  | Unbuffered with ECC DIMMs (UDIMMs) |      |      |
| DIMM Rank                                | Single Rank (1R)          | Dual Rank (2R) |       |      |       |                 | Quad Rank (4R) | Single Rank (1R) | Dual Rank (2R)                     |      |      |
| DIMM Capacity                            | 4GB                       | 2GB            | 4GB   | 8GB  | 8GB   | 16GB            | 4GB            | 16GB             | 1GB                                | 2GB  | 4GB  |
| DIMM Native Speed (MHz)                  | 1333                      | 1333           | 1333  | 1066 | 1333  | 1333            | 1066           | 1066             | 1333                               | 1333 | 1333 |
| <b>SLOTS THAT CAN BE POPULATED</b>       |                           |                |       |      |       |                 |                |                  |                                    |      |      |
| 18 slot servers                          | 18                        | 18             | 18    | 18   | 18    | 18              | 12             | 12               | 12                                 | 12   | 12   |
| <b>MAXIMUM CAPACITY (GB)</b>             |                           |                |       |      |       |                 |                |                  |                                    |      |      |
|  | 72                        | 36             | 72    | 144  | 144   | 288             | 48             | 192              | 12                                 | 24   | 48   |
| <b>POPULATED DIMM SPEED (MHz)</b>        |                           |                |       |      |       |                 |                |                  |                                    |      |      |
| 1 DIMM Per Channel                       | 1333                      | 1333           | 1333  | 1066 | 1333  | 1333            | 1066           | 1066             | 1333                               | 1333 | 1333 |
| 2 DIMM Per Channel                       | 1333*                     | 1333*          | 1333* | 1066 | 1333* | 1066/<br>1333** | 800            | 800              | 1066                               | 1066 | 1066 |
| 3 DIMM Per Channel                       | 800                       | 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.  
 \*\* 2DPC: LV runs at 1066, Std voltage runs at 1333  
 \*\*\* 3DPC: LV/Std voltage runs at 800

### 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 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                |        |

## Memory

### 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

|        | 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         |        |

## Memory

### 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

- 288GB, consisting of eighteen (18) 16GB dual-rank PC3-8500R-7 RDIMMs DDR3 Registered (RDIMM) memory, operating at 800MHz when populated at 3 DIMMs per Channel in 18 slots.

|        | CPU1   |                  | CPU2   |                  |        |
|--------|--------|------------------|--------|------------------|--------|
|        | slot # | population order | slot # | population order |        |
| Chnl 1 | 1      | G; 16GB DIMM     | 1      | G; 16GB DIMM     | Chnl 1 |
|        | 2      | D; 16GB DIMM     | 2      | D; 16GB DIMM     |        |
|        | 3      | A; 16GB DIMM     | 3      | A; 16GB DIMM     |        |
| Chnl 2 | 4      | H; 16GB DIMM     | 4      | H; 16GB DIMM     | Chnl 2 |
|        | 5      | E; 16GB DIMM     | 5      | E; 16GB DIMM     |        |
|        | 6      | B; 16GB DIMM     | 6      | B; 16GB DIMM     |        |
| Chnl 3 | 7      | I; 16GB DIMM     | 7      | I; 16GB DIMM     | 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 PC3-10600E DDR3 Unbuffered (UDIMM) memory, operating at 1066MHz when populated at 2 DIMMs per Channel in 12 slots.

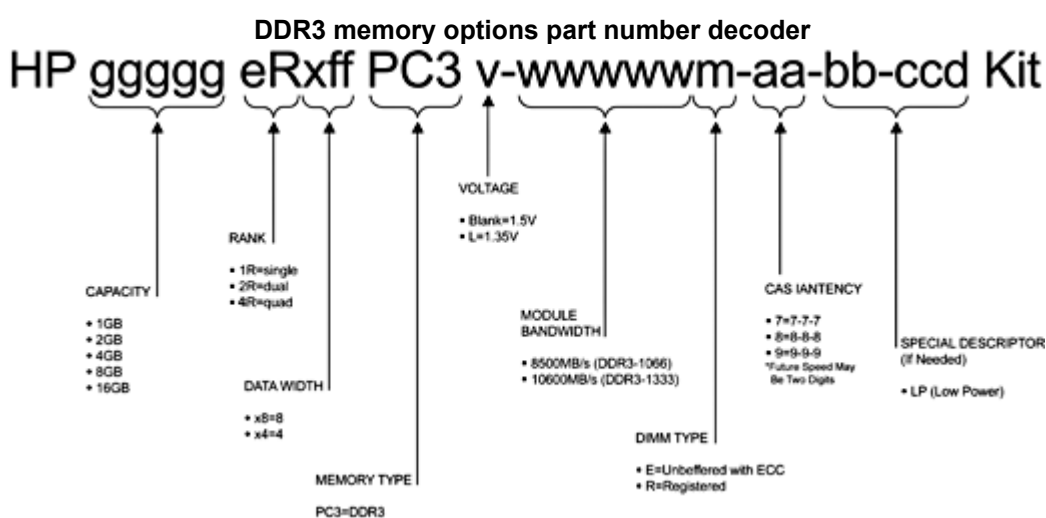


## Memory

|        | 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      |        |

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

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



## Memory

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) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit | 604504-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 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit   | 604506-B21 |
| HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit              | 500662-B21 |
| HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit        | 627812-B21 |
| HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit             | 500666-B21 |

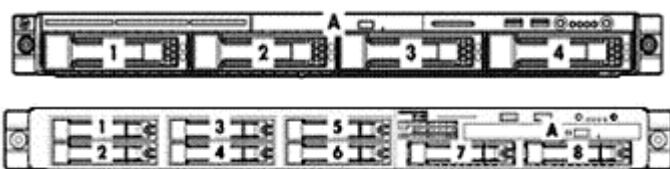
#### Unbuffered with ECC DIMMs (UDIMMs)

|  |            |
|--|------------|
| 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 PC3L-10600 (DDR3-1333) Unbuffered CAS-9 Low Power Memory Kit | 619488-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](http://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                        |
|------------------------|--------------------|--------------------|-----------------------------------|
| <b>Removable Media</b> |                    |                    |                                   |
| 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   |
|--------------------|--------------------|--------------------|--|
| 1TB 3G SATA 7.2K   | Up to 8            | 1-8                | HP Smart Array P212 Controller                       |
| 500GB 3G SATA 7.2K |                    |                    | HP Smart Array P410 Controller                       |
| 160GB 3G SATA 7.2K |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |

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

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

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

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

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

|                    | Quantity Supported | Position Supported | Controller   |
|--------------------|--------------------|--------------------|--|
| 250GB 3G SATA 7.2K | Up to 4            | 1-8                | HP Smart Array P212 Controller                       |
| 160GB 3G SATA 7.2K |                    |                    | HP Smart Array P410 Controller                       |
|                    |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |

## Storage

### SATA Hot Plug 2.5" 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 |

### 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 |

### SATA Non-Hot Plug LLF ( 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 |

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

|                   | Quantity Supported | Position Supported | Controller   |
|-------------------|--------------------|--------------------|--|
| 1TB 6G SAS 7.2K   | Up to 8            | 1-8                | HP Smart Array P212 Controller                       |
| 600GB SAS 7.2K    |                    |                    | HP Smart Array P410 Controller                       |
| 500GB 6G SAS 7.2K |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |
| 450GB 6G SAS 7.2K |                    |                    |  |

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

|                  | Quantity Supported | Position Supported | Controller   |
|------------------|--------------------|--------------------|--|
| 900GB 6G SAS 10K | Up to 8            | 1-8                | HP Smart Array P212 Controller                       |
| 300GB 6G SAS 10K |                    |                    | HP Smart Array P410 Controller                       |
| 146GB 6G SAS 15K |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |
| 146GB 6G SAS 10K |                    |                    |  |
| 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                                 |
|-------------------|--------------------|--------------------|--|
| 1TB 6G SAS 7.2K   | Up to 8            | 1-8                | HP Smart Array P800/512 BBWC Controller    |
| 500GB 6G SAS 7.2K |                    |                    | HP Smart Array P212/Zero Memory Controller |
|                   |                    |                    | HP Smart Array P212/ 256 MB Controller     |

### Storage

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   |
|-----------------|--------------------|--------------------|--|
| 3TB 6G SAS 7.2K | Up to 4            | 1-4                | HP Smart Array P212 Controller                       |
| 2TB 6G SAS 7.2K |                    |                    | HP Smart Array P410 Controller                       |
| 1TB 6G SAS 7.2K |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |

#### SAS Non-Hot Plug (3.5-inch) LFF 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 |

#### 6G SAS Hot Plug Enterprise Performance Solid State Drives

|                  | Quantity Supported | Position Supported | Controller   |
|------------------|--------------------|--------------------|--|
| 400GB 6G SAS SLC | Up to 4            | 1-4                | HP Smart Array P212 Controller                       |
| 200GB 6G SAS SLC |                    |                    | HP Smart Array P410 Controller                       |
|                  |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |

#### 6G SAS Hot Plug Enterprise Mainstream Solid State Drives

|                  | Quantity Supported | Position Supported | Controller   |
|------------------|--------------------|--------------------|--|
| 800GB 6G SAS MLC | Up to 4            | 1-4                | HP Smart Array P212 Controller                       |
| 400GB 6G SAS MLC |                    |                    | HP Smart Array P410 Controller                       |
| 200GB 6G SAS MLC |                    |                    | HP Smart Array P812/1G Flash Backed Cache Controller |

#### External Storage

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

#### Tape and Disk Backup

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

|                     | Position Supported | Controller   | Controller/HBA Option Kit Part Number |
|---------------------|--------------------|--|---------------------------------------|
| HP SCSI Tape Drives | External           | HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus | 412911-B21                            |



## Storage

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

Adapter

### HP USB Tape Drives

DAT 40  
 DAT 72  
 DAT 160  
 DAT 320  
 1U USB Rack-Mount Kit

External

USB 2.0 Port

N/A

### HP 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/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller

462828-B21

### HP SCSI Tape Autoloaders

DAT 72x10 Autoloader  
 1/8 G2 Autoloader

External

HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter

412911-B21

### HP SCSI Tape Libraries

MSL2024  
 MSL4048  
 MSL8096  
 MSL6000

External

HP StorageWorks U320e SCSI Dual Channel Host Bus Adapter

AH627A

### HP SAS Tape Autoloaders and Libraries

1/8 G2 Autoloader  
 MSL2024  
 MSL4048  
 MSL8096

External

HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller

462828-B21

### HP 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

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

## Power Specifications

| HP 750W Common Slot Gold Hot Plug Factory Integrated Power Supply Kit with Backplane |                       |            |            |            |            |            |            |
|--|-----------------------|------------|------------|------------|------------|------------|------------|
| Part Number  | 535683-B21 Option Kit |            |            |            |            |            |            |
| Input Voltage Range (Vrms)   | 100 to 240            |            |            |            |            |            |            |
| Frequency Range (Nominal) (Hz)   | 50/60                 |            |            |            |            |            |            |
| Nominal Input Voltage (Vrms)   | <b>100</b>            | <b>120</b> | <b>200</b> | <b>208</b> | <b>220</b> | <b>230</b> | <b>240</b> |
| 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 Factory Integrated Power Supply Kit  |                       |            |            |            |            |            |     |
|--|-----------------------|------------|------------|------------|------------|------------|-----|
| Part Number                                  | 515915-B21 Option Kit |            |            |            |            |            |     |
| Input Voltage Range (Vrms)                   | 100 to 240            |            |            |            |            |            |     |
| Frequency Range (Nominal) (Hz)               | 47/63                 |            |            |            |            |            |     |
| Nominal Input Voltage (Vrms)                 | <b>100</b>            | <b>120</b> | <b>200</b> | <b>220</b> | <b>230</b> | <b>240</b> |     |
| Maximum Rated Output Wattage                 | 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        |     |
| Maximum Rated VA (Volt-Amp)                  | 574                   | 574        | 573        | 567        | 567        | 567        |     |
| Efficiency (%)                               | 88                    | 88         | 89         | 90         | 90         | 90         |     |
| Power Factor                                 | 0.99                  | 0.99       | 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) |                       |            |            |            |            |            |     |

## Power Specifications

| HP 460W Common Slot Gold Hot Plug Factory Integrated Power Supply Kit with Backplane |                       |            |            |            |            |            |            |
|--|-----------------------|------------|------------|------------|------------|------------|------------|
| Part Number  | 535684-B21 Option Kit |            |            |            |            |            |            |
| Input Voltage Range (Vrms)   | 100 to 240            |            |            |            |            |            |            |
| Frequency Range (Nominal) (Hz)   | 50/60                 |            |            |            |            |            |            |
| Nominal Input Voltage (Vrms)   | <b>100</b>            | <b>120</b> | <b>200</b> | <b>208</b> | <b>220</b> | <b>230</b> | <b>240</b> |
| Maximum Rated Output Wattage   | 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       |

| HP 365W Hot Plug Redundant Power Supply Kit with Backplane |                       |            |            |            |            |            |            |
|--|-----------------------|------------|------------|------------|------------|------------|------------|
| Part Number  | 532092-B21 Option Kit |            |            |            |            |            |            |
| Input Voltage Range (Vrms)                                 | 100 to 240            |            |            |            |            |            |            |
| Frequency Range (Nominal) (Hz)                             | 50/60                 |            |            |            |            |            |            |
| Nominal Input Voltage (Vrms)                               | <b>100</b>            | <b>120</b> | <b>200</b> | <b>208</b> | <b>220</b> | <b>230</b> | <b>240</b> |
| 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       |

## Power Specifications

| HP 460W Common Slot Platinum Hot Plug Power Supply Kit with Backplane |                       |      |      |      |      |      |      |
|---|-----------------------|------|------|------|------|------|------|
| 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](http://www.hp.com/go/proliant-energy-efficient) or [www.hp.com/go/hppoweradvisor](http://www.hp.com/go/hppoweradvisor)

### System Specifications

|   |                          |                          |
|---|--------------------------|--------------------------|
| <b>Power</b>  |                          |                          |
| <b>ProLiant DL160 G6 Fully Configured</b>   | 115V/60Hz                | 220V/50Hz                |
| <b>Fully Loaded System Input Wattage (W)</b>  | 448                      | 445                      |
| <b>Fully Loaded System Input Current (A rms)</b>  | 3.833                    | 2.046                    |
| <b>Fully Loaded System Thermal (BTU- Hr)</b>  | 1529                     | 1518                     |
| <b>Fully Loaded System VA (Volt-Amp)</b>  | 449                      | 454                      |
| <b>System Inrush Current with all power supplies loaded (A)</b>   | 10.1                     | 10.96                    |
| <b>Power cord requirements</b>  | Nema 5-15P to IEC320-C13 | IEC320-C13 to IEC320-C14 |
| <b>NOTE:</b> 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. |                          |                          |
| <b>Power Cord</b>   | 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

|                    |   |   |   |
|--------------------|---|---|---|
| <b>System Unit</b> | <b>Dimensions</b> (H x W x D) 1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm)<br>(with bezel) |   |   |
|                    | <b>Weight</b><br>(approximate)  | Maximum   | 34.00 lb (16.78 kg)<br>(all hard drives, power supplies, and processors installed)  |
|                    |   | Minimum   | 28.00 lb (12.7 kg)<br>(one hard drive, power supply, and processor installed)   |
|                    | <b>Input Requirements</b><br>(per power supply)   | Rated Line Voltage  | 90 to 132 VAC<br>180 to 264 VAC   |
|                    |   | Rated Input Current   | 5.8 Amps (at 100 VAC) to 2.9 Amps (at 200 VAC)  |
|                    |   | Rated Input Frequency   | 47 to 63 Hz   |
|                    | <b>BTU Rating</b>   | Rated Input Power   | 570W (at 100 VAC)<br>565W (at 200 VAC)  |
|                    |   | Maximum   | 500W<br>1940 BTU / hr (at 100 VAC)<br>1920 BTU/hr (at 200 VAC)  |
|                    |   |   | 460W<br>1773 BTU / hr (at 120 VAC)<br>1715 (at 240 VAC)   |
|                    |   |   | 750W<br>2892 BTU / hr (at 120 VAC)<br>2797 (at 240 VAC)   |
|                    | <b>Power Specifications</b>   | To review typical system power ratings use the Power Advisor which is available via the online tool located at URL:<br><a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a><br>Or<br><a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a> |   |
|                    |   | - Click on the system of interest. Example: DL160 G6<br>- Follow the instructions of the next screens.  |   |
|                    | <b>Power Supply Output</b><br>(per power supply)  | Rated Steady-State Power  | 500 Watts (at 100 VAC),<br>500 Watts (at 200 VAC)   |
|                    |   | Maximum Peak Power<br>(See Power Specifications Tables)   | 500Watts (at 100 VAC),<br>500 Watts (at 200 VAC)  |
|                    | <b>System Inlet Temperature</b>   | 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.<br>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).  |



### Technical Specifications

|  |  |   |
|--|--|---|
| <b>Relative Humidity</b><br>(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).  |
| <b>Altitude</b>                              | 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).  |
| <b>Acoustic Noise</b>                        | 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. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). |   |
|  | <b>Idle</b>  |   |
|  | LWAd   | 6.3B  |
|  | LpAm   | 48dBA   |
|  | <b>Operating</b>   |   |
|  | LWAd   | 6.3B  |
|  | LpAm   | 48dBA   |
| <b>Emissions Classification (EMC)</b>        | 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**

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

## Technical Specifications

|   |                              |   |
|---|------------------------------|---|
| <b>NC362i Integrated Dual Network Interface Port Gigabit Server Adapter</b> |                              | Integrated 10/100/1000BASE-T Transceiver<br>Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.                      |
|   | <b>Data Transfer Method</b>  | Compliant to x1 PCIe Specification  |
|   | <b>Controller</b>            | Intel® 82576  |
|   | <b>Network Transfer Rate</b> | 10Base-T (Half-Duplex) 10 Mb/s<br>10Base-T (Full-Duplex) 20 Mb/s<br>100Base-TX (Half-Duplex) 100 Mb/s<br>100Base-TX (Full-Duplex) 200 Mb/s<br>1000Base-TX (Half and Full-Duplex) 2000Mb/s |
|   | <b>Connector</b>             | RJ-45 connector   |
|   | <b>Cable Support</b>         | Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethernet on standard Category 5 UTP   |

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

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### Technical Specifications

#### Environment-friendly Products and Approach

#### End-of-life Management and Recycling

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.

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.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.