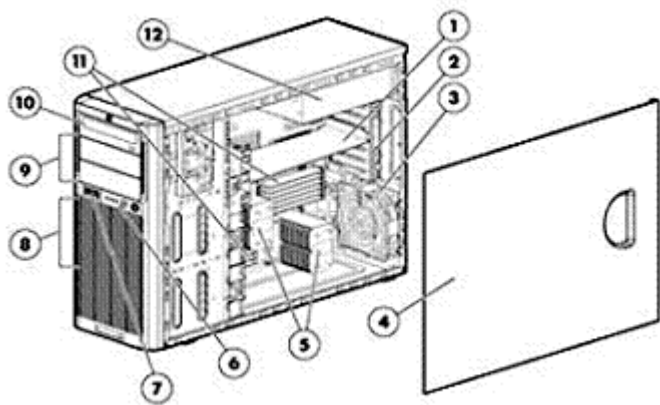


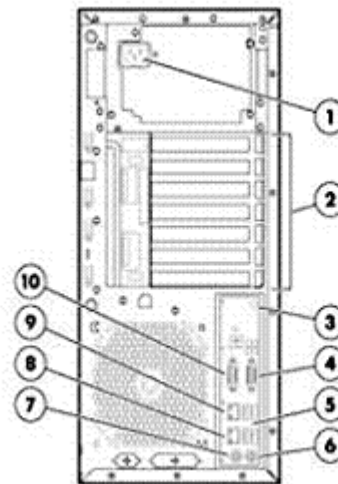
### Overview

The HP ProLiant ML150 G6 is an expandable and affordable solution for growing businesses. Redundant power supply and redundant fan options help to provide more protection on power and thermal to keep your critical business running. Data security, which is one of the major concerns in the industry, is ensured by the TPM offering that provides data encryption to protect from data theft. Companies with remote locations can take advantage of the ML150 G6 embedded Lights-Out 100 remote management feature to decrease server/company downtime, decrease emergency travel needs, and increase overall productivity. Overall, the HP ProLiant ML150 G6 is easy on your IT budget with significant headroom to grow with your business.



#### Front View:

1. SATA/SAS adapter card
2. Card bracket retainer
3. Rear fan
4. Side access panel
5. Processor socket and Heatsink
6. LED indicators and power button
7. Upfront USB ports
8. Hard drive bays (inside)
9. One full height or two half height media bay (s)
10. Optical drive media bay
11. DIMM socket (total twelve DIMMs supported)
12. Power Supply



#### Rear View:

1. AC input connector
2. Expansion slots
3. UID LED
4. VGA monitor connector
5. USB 2.0 ports (4)
6. Keyboard connector
7. Mouse connector
8. NIC port
9. Dedicate NIC port
10. Serial port connector

### What's New

- Support for R5000 and R7000 Uninterruptible Power System.

### 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

#### Quad-Core Processors

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

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

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

#### Dual-Core Processors

Intel® Xeon® E5502 (1.86GHz/2-core/4MB/80W, DDR3-800) Processor

**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 5500 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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#### Cache Memory

One of the following depending on Model

Integrated 1 x 8MB level 3 cache (E5540, E5530, E5520 sequence)

Integrated 1 x 4MB level 3 cache (E5506, E5504, E5502 sequence)

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#### Chipset

Intel® 5500 Chipset

**NOTE:** For more information regarding Intel chipsets, please see the following URL:  
<http://www.intel.com/products/server/chipsets/>

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#### Upgradeability

Upgradeable to two processors (dual or quad-core)

**NOTE:** Please contact your regional sales support.

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### Standard Features

<b>Memory</b> One of the following depending on Model	Type	DDR3 Registered (RDIMM) or Unbuffered (UDIMM)
	DIMM Slots	Total 12 DIMM slots
	Standard (Entry/Base Models)	2 GB
	Standard (Performance Models)	4 GB
	Maximum (RDIMM)	48 GB (12 x 4 GB) for Registered Memory configurations
	Maximum (UDIMM)	48 GB (12 x 4 GB) for Unbuffered Memory configurations

**NOTE:** Depending on the memory configuration and processor model the memory speed may run at 1066MHz or 800MHz. See the Online Memory Configuration Tool for details:  
<http://www.hp.com/go/ddr3memory-configurator>.

<b>Network Controller</b>	Embedded HP NC107i PCI Express Gigabit Server Adapter
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Expansion Slots #	Technology	Bus Width**	Connector Width	Bus Number*	Form Factor	Notes
1	32-bit/33MHz PCI	N/A	N/A	1	Full length, full height slot	Non Hot-plug
2	PCI-Express (Gen 1)	x4	x8	2	Full length, full height slot	Non Hot-plug
3	PCI-Express (Gen 2)	x4	x8	7	Full length, full height slot	Non Hot-plug
4	PCI-Express (Gen 2)	x16	x16	5	Full length, full height slot	Non Hot-plug
5	PC-Express (Gen 2)	x4	x8	6	Full length, full height slot	Non Hot-plug

\* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number.

\*\* Indicates the number of physical electrical lanes running to a PCI-e connector.

<b>Storage Controller</b> One of the following depending on Model	Entry Model	HP Smart Array B110i SATA RAID Controller (RAID 0,1,10) <b>NOTE:</b> To enable RAID for HP Smart Array B110i SATA controller, use EZ set-up CD to download driver, hpahcizr.sys, part of EZ Set-up CD For more information go to: <a href="http://www.hp.com/go/sataraid">www.hp.com/go/sataraid</a> . <b>NOTE:</b> SA B110i SATA RAID Controller ships standard with every server. <b>NOTE:</b> HP Smart Array B110i does not support greater than 2TB hard drive.
	Base Model	HP Smart Array P410/Zero Memory RAID Controller (RAID 0,1std)
	Performance Model	HP Smart Array P410/256MB RAID Controller (RAID 0/1/1+0/5/5+0)

### Standard Features

<b>Internal Storage Devices</b> One of the following depending on Model	Diskette Drive	None ships standard
	Optical Drive	HP Half-Height SATA DVD-ROM Optical Drive ships standard
	Hard Drive	Performance and Base Models (Hot Plug): None ships standard Entry Model (Non-Hot Plug): 1x160GB NHP SATA Drive <b>NOTE:</b> Support for additional 4 LFF SAS/SATA hot plug drive requires 2nd hot-plug hard disk drive cage, 750W CS HE Power Supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller (if not already part of the configuration).

<b>Maximum Internal Storage</b> One of the following depending on Model	SATA	24.0TB (8 x 3TB 3.5") SATA
	SAS	24.0TB (8 x 3TB 3.5") SAS
<b>NOTE:</b> HP Smart Array B110i SATA RAID controller support for a single logical drive is limited to 2TB.		
<b>NOTE:</b> Support for more than 4 hard drives requires the purchase of one (1) Hot-plug hard drive cage (P/N: 487737-B21), one (1) HP 750W Common Slot Gold Hot Plug Power Supply Kit (P/N: 512327-B21), one (1) Redundant Power Supply Enablement Kit (P/N: 508544-B21) and HP Smart Array P410 Controller (if not already part of the configuration).		
<b>NOTE:</b> Supports up to eight (8) SAS/SATA hard drives via 2nd hot plug hard disk drive cage, 750W CS HE Power Supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller.		
<b>NOTE:</b> HP NHP Internal SAS/SATA 4 Port Cable Kit (487734-B21) is required when adding Smart Array P410 Controller on Non-Hot Plug SATA/SAS server models.		

<b>Interfaces</b>	Parallel	0
	Serial	1
	Pointing Device (Mouse, PS2)	1
	Graphics	1
	Keyboard (PS2)	1
	USB 2.0 Ports	8 total (4 Rear, 2 Front, and 2 Internal)
	<b>NOTE:</b> 1 Dedicated USB port available for internal USB tape connectivity	
	Network RJ-45 (Ethernet)	1 (10/100/1000 bits/s)
Remote Management	HP Lights-Out 100i Baseboard Management Controller	

<b>Industry Standard Compliance</b>	ACPI V2.0 compliant
	PCI 2.3 compliant
	IPMI 2.0
	DCMI 1.0
	PXE Support
	WOL Support
	Microsoft® Logo certifications

### Standard Features

**Server Power Cord** One Lowline NEMA power cord

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**Power Supply** Standard: HP 460W Factory Integrated Power Supply  
Optional: HP 750W Common Slot Gold Hot Plug Power Supply  
**NOTE:** The installation of the optional 750W Redundant Power Supply requires a HP Redundant Power Supply Enablement Kit (P/N 508544-B21).  
**NOTE:** Two (2) 750W Redundant Power Supply units and one (1) RPS enablement kit (P/N 508544-B21) are required to achieve redundancy.  
**NOTE:** The 2nd hot plug hard disk drive cage requires the purchase of 750W Redundant Power Supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller (if not already part of the configuration)

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**System Fans** System supports a total of four (4) fans  
Two (2) fans ship standard for 1P configuration - Non-hot plug, Non-redundant system fans  
**NOTE:** For redundancy, please order a redundant fan option kit (513927-B21) which comes with 2 fans  
Three(3) fans ship standard for 2P configuration - Non-hot plug, Non-redundant system fans  
**NOTE:** If customer orders the standalone redundant fan option kit (513927-B21), two (2) fans in a two-fan packaged box will be received. Only one (1) fan is required for system redundancy. The other one can be saved as a spare part.  
**NOTE:** If customer orders the redundant fan kit along with the server, the extra fan will not be received.

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**Operating Systems and Virtualization Software Support for ProLiant Servers** Microsoft Windows Server Hyper V  
Red Hat Enterprise Linux (RHEL)  
SUSE Linux Enterprise Server (SLES)  
**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/ossupport>

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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** Tower (5U)  
**NOTE:** Rack mounting available via HP Tower to Rack Conversion Tray, Universal Kit. Please see the options section in this QuickSpecs.

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### Standard Features

#### Embedded Manageability HP LO100i Advanced

HP LO100i Lights-Out 100 Baseboard Management Controller with Optional LO100i 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
- DCMI 1.0
- 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, please refer to the QuickSpecs for the LO100i found at: [www.hp.com/go/lo100](http://www.hp.com/go/lo100)

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#### Manageability

HP Integrated Lights-Out 100i Baseboard Management Controller with optional LO100i Advanced Licenses for Virtual KVM and Virtual Media.  
Embedded IPMI standard reporting  
Easy Set-up CD and ISO Image Web downloads  
Array Configuration Utility (ACU)  
Array Diagnostics Utility (ADU)  
HP Insight Diagnostics  
HP Insight Management Agents and Insight Management Providers for Systems Insight Manager (SIM) Integration

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#### Security

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

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### Standard Features

#### 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 repair is available for one year 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 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. (3-1-1 warranty offered only in Brazil and APEJ). Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. 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

**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 to meet customer needs. 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 on 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.pdf>

##### **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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### Service and Support

**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.pdf>

**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.pdf>

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

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**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.pdf>

**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.pdf>

**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>

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### Pre-configured Models

#### SAS/SATA Hot Plug Models

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

**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.

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

**NOTE:** The following Performance and Base hot -plug models can support up to 4 hard drives only. Support for more than 4 hard drives (maximum 8 hard drive support on this server) require the purchase of one (1) Hot-plug hard drive cage (P/N: 487737-B21), one (1) HP 750W Common Slot Gold Hot Plug Power Supply Kit (P/N: 512327-B21), and one (1) Redundant Power Supply Enablement Kit (P/N: 508544-B21).

#### Performance Model

<b>HP ProLiant ML150 G6 E5520 1P 4GB-U P410/256 SAS/SATA 460W PS Server 466133-xx1</b>	<b>Processor</b>	(1) Intel® Xeon® E5520 (2.26GHz/4-core/8MB/80W, DDR3-1066, HT, Turbo 1/1/2/2) Processor
	<b>Cache Memory</b>	Integrated 1x 8 MB L3 cache
	<b>Memory</b>	4 GB (2 x 2 GB) PC3-10600E Unbuffered Advanced ECC memory <b>NOTE: Total 12 DIMM slots</b>
	<b>Network Controller</b>	Embedded HP NC107i PCI Express Gigabit Server Adapter
	<b>Storage Controller</b>	HP Smart Array P410 controller w/256MB cache Raid Controller (RAID 0/1/1+0/5/5+0)
	<b>Hard Drive</b>	None ships standard
	<b>Internal Storage</b>	SAS: 8.0TB (4 x 2TB 3.5") Maximum SATA: 8.0TB (4 x 2TB 3.5") Maximum
	<b>Optical Drive</b>	HP Half-Height SATA DVD-ROM Optical Drive
	<b>Power Supply</b>	460W Non-Hot Plug, Non-Redundant Power Supply
	<b>Fans</b>	Two (2) - Non-hot plug, Non-redundant system fans
	<b>Accessories</b>	USB Keyboard ship standard <b>NOTE: EURO (-421) Models excludes the keyboard.</b>
	<b>Form Factor</b>	5U Tower
	<b>Warranty</b>	Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. (3-1-1 warranty offered only in Brazil and APeJ)

#### Base Model

<b>HP ProLiant ML150 G6 E5504 1P 2GB-U P410/ZM Hot Plug SAS/SATA 460W PS Server 466132-xx1</b>	<b>Processor</b>	(1) Intel® Xeon® E5504 (2.00GHz/4-core/4MB/80W, DDR3-800) Processor
	<b>Cache Memory</b>	Integrated 1 x 4 MB L3 cache
	<b>Memory</b>	2 GB (1 x 2GB) PC3-10600E Unbuffered Advanced ECC memory <b>NOTE: Total 12 DIMM slots</b>
	<b>Network Controller</b>	Embedded HP NC107i PCI Express Gigabit Server Adapter

### Pre-configured Models

<b>Storage Controller</b>	HP Smart Array P410 controller w/ Zero Memory cache Raid Controller (RAID 0,1, 0+1)
<b>Hard Drive</b>	None ships standard
<b>Internal Storage</b>	SAS: 8.0TB (4 x 2TB 3.5") Maximum SATA: 8.0TB (4 x 2TB 3.5") Maximum
<b>Optical Drive</b>	HP Half-Height SATA DVD-ROM Optical Drive
<b>Power Supply</b>	460W Non-Hot Plug, Non-Redundant Power Supply
<b>Fans</b>	Two (2) - Non-hot plug, Non-redundant system fans
<b>Accessories</b>	USB Keyboard ship standard <b>NOTE:</b> EURO (-421) Models excludes the keyboard.
<b>Form Factor</b>	5U Tower
<b>Warranty</b>	Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. (3-1-1 warranty offered only in Brazil and APeJ)

### SATA Non-Hot Plug Models

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

**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.

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

**NOTE:** The following Entry non-hot plug model can support up to 4 hard drives only. Support for more than 4 hard drives (maximum 8 hard drive support on this server) require the purchase of one (1) Hot-plug hard drive cage (P/N: 487737-B21), one (1) HP 750W Common Slot Gold Hot Plug Power Supply Kit (P/N: 512327-B21), one (1) Redundant Power Supply Enablement Kit (P/N: 508544-B21) and HP Smart Array P410 Controller with HP NHP Internal SAS/SATA 4 Port Cable Kit (487734-B21).

**NOTE:** A hot-plug hard drive cage can be installed into a non-hot plug server by ordering one (1) hot-plug hard disk drive cage option kit (P/N 487737-B21) and a Smart Array P410 controller with HP NHP Internal SAS/SATA 4 Port Cable Kit (P/N 487734-B21).

### Entry Model

<b>HP ProLiant ML150 G6 E5502 1P 2GB-U B110i Non-hot Plug SATA 160GB 460W PS Server</b> 466131-xx1	<b>Processor(s)</b>	(1) Intel® Xeon® E5502 (1.86GHz/2-core/4MB/80W, DDR3-800) Processor
	<b>Cache Memory</b>	Integrated 1 x 4 MB L3 cache
	<b>Memory</b>	2 GB (1 x 2GB) PC3-10600E Unbuffered Advanced ECC memory <b>NOTE:</b> Total 12 DIMM slots
	<b>Network Controller</b>	Embedded HP NC107i PCI Express Gigabit Server Adapter
	<b>Storage Controller</b>	HP Smart Array B110i SATA RAID Controller (RAID 0,1,10)
	<b>Hard Drive</b>	One 160GB Non-Hot Plug SATA HDD
	<b>Internal Storage</b>	SATA: 8.0TB (4 x 2TB 3.5") Maximum
	<b>Optical Drive</b>	HP Half-Height SATA DVD-ROM Optical Drive
	<b>Power Supply</b>	460W Non-Hot Plug, Non-Redundant Power Supply
	<b>Fans</b>	Two (2) - Non-hot plug, Non-redundant system fans

### Pre-configured Models

<b>Accessories</b>	USB Keyboard ship standard <b>NOTE:</b> EURO (-421) Models excludes the keyboard.
<b>Form Factor</b>	5U Tower
<b>Warranty</b>	Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. (3-1-1 warranty offered only in Brazil and APeJ)

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<b>Country Code Key</b>	xx=00	US
	xx=01	AUS (Except 466131-xx1)
	xx=03	UK
	xx=04	GR
	xx=05	FR
	xx=20	BRZ
	xx=29	JP
	xx=37	AP
	xx=42	EURO <b>NOTE:</b> EURO (-421) Models excludes the keyboard.
	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 CTO product offerings and requirements.

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

### Step 1: Base Configuration

<b>HP Models</b>	HP ProLiant ML150 G6 Configure-to-order Tower Server	487912-B21
	<b>Factory Integrated Models ship with:</b>	
	Embedded NC107i	
	Embedded B110i SATA RAID Controller (RAID 0/1/10)	
	PCA	
	Easy Set up CD	
	Keyboard and Mouse (selection required)	
	Power Cord	
	Tower 5U Form Factor	

### Step 2: Choose Required Options (Select only one option from each category unless otherwise noted)

<b>HP Processors</b>	<b>Quad-Core Processor</b>	
	HP ML150 G6 Intel® Xeon® E5540 (2.53GHz/4-core/8MB/80W) FIO Processor Kit	507849-L21
	HP ML150 G6 Intel® Xeon® E5530 (2.40GHz/4-core/8MB/80W) FIO Processor Kit	507848-L21
	HP ML150 G6 Intel® Xeon® E5520 (2.26GHz/4-core/8MB/80W) FIO Processor Kit	507722-L21
	HP ML150 G6 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) FIO Processor Kit	507847-L21
	HP ML150 G6 Intel® Xeon® E5504 (2.00GHz/4-core/4MB/80W) FIO Processor Kit	507721-L21
	<b>Dual-Core Processor</b>	
	HP ML150 G6 Intel® Xeon® E5502 (1.86GHz/2-core/4MB/80W) FIO Processor Kit	507720-L21

<b>HP Memory</b>	<b>Registered DIMMs (RDIMMs)</b>	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	<b>Unbuffered DIMMs (UDIMMs)</b>	
	HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
	<b>NOTE:</b> 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: <a href="http://www.hp.com/go/ddr3memory-configurator">www.hp.com/go/ddr3memory-configurator</a> .	
	<b>NOTE:</b> Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a>	

### Configuration Information - Factory Integrated Models

<b>HP Optical Drives</b>	HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
	HP Half-Height SATA DVD-RW Optical Drive	447328-B21

<b>HP Drive Cage Options</b>	<b>Non-hot Plug HDD Model</b>	
	<p>HP SATA 5U G6 Module FIO Kit</p> <p><b>NOTE:</b> If non-hot plug drive cage is selected, then at least one non-hot plug SATA or SAS hard drive must be selected.</p> <p><b>NOTE:</b> Non-hot plug drive cage only supports non-hot plug drives.</p>	500448-B21
	<b>Hot Plug HDD Model</b>	
	<p>HP 5U Large Form Factor (LFF) Hot Plug Drive Cage Kit</p> <p><b>NOTE:</b> Hot-plug drive cage only supports hot-plug drives.</p> <p><b>NOTE:</b> Support for more than 4 hard drives requires the purchase of one (1) Hot-plug hard drive cage (P/N: 487737-B21), one (1) HP 750W Common Slot Gold Hot Plug Power Supply Kit (P/N: 512327-B21), one (1) Redundant Power Supply Enablement Kit (P/N: 508544-B21) and HP Smart Array P410 Controller (if not already part of the configuration)</p> <p><b>NOTE:</b> HP NHP Internal SAS/SATA 4 Port Cable Kit (487734-B21) is required when adding Smart Array P410 Controller to a non-hot plug SATA server model.</p>	487737-B21

<b>HP Hard Drives</b>	<p><b>NOTE:</b> 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.</p> <p><b>NOTE:</b> Mixing SAS and SATA hard drives is allowed. However, only SAS hard drives will be used for RAID setting.</p> <p><b>NOTE:</b> Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.</p>	
	<b>SAS Non-Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives</b>	
	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
	<b>NOTE:</b> SAS hard drives require a SAS HBA or Smart Array Controller.	
	<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
	<b>SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives</b>	
	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>HP Storage Controllers</b>	<b>SAS Controller</b>
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### Configuration Information - Factory Integrated Models

#### Smart Array P212 Controller

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
HP Smart Array P212/256 BBWC 1-ports Int/1-ports Ext PCIe x8 FIO SAS Controller	491191-B21

#### Smart Array P410 Controller

HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller	462862-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 Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller	462864-B21
HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller	578230-B21
HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller	572532-B21

**NOTE:** To support RAID 5, HP P410 requires at least 256MB Cache

**NOTE:** To support RAID 6, HP P410 requires at least 256MB Cache + Battery + SAAP or 512MB BBWC + Smart Array Advanced Pack (SAAP) license key.

Smart Array P411 Controller.

#### Smart Array P411 Controller

HP Smart Array P411/256 2-ports Ext PCIe x8 SAS Controller	462830-B21
HP Smart Array P411/256 BBWC 2-ports Ext PCIe x8 FIO SAS Controller	491193-B21
HP Smart Array P411/512 BBWC 2-ports Ext PCIe x8 SAS Controller	462832-B21
HP Smart Array P411/512 FBWC 2-ports Ext PCIe x8 SAS Controller	578229-B21
HP Smart Array P411/1G FBWC 2-ports Ext PCIe x8 SAS Controller	572531-B21

#### Optional Upgrades

HP 1GB Flash Backed Cache	534562-B21
HP 512MB Flash Backed Write Cache	534916-B21
HP 512MB P-Series Battery Backed Write Cache Upgrade	462967-B21

**NOTE:** Supported on HP Smart Array P410 Controller and HP Smart Array P411 Controller only.

HP 256MB P-series Cache Upgrade	462968-B21
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**NOTE:** Supported on HP Smart Array P212 and HP Smart Array P410/ZM (FIO) Controller.

HP 650 mAh P-Series Battery	462969-B21
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**NOTE:** To enable BBWC on the 256MB cache.

**NOTE:** Supported on HP Smart Array P212 Controller, HP Smart Array P410 Controller, and HP Smart Array P411 Controller only.

HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21
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**NOTE:** Smart Array Advanced Pack (SAAP) is a license key to activate RAID 6 and the advance feature sets provided by the controller.

This part number (516471-B21) can be used to purchase a single SAAP 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.

#### SCSI HBA

### Configuration Information - Factory Integrated Models

HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter 412911-B21  
**NOTE:** Recommended HBA for SCSI tape drive connection.

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#### HP Power Supplies

##### Power Supplies

HP 460W Factory Integrated Power Supply Kit 500447-B21

HP 750W Common Slot Gold Hot Plug Power Supply Kit 512327-B21

**NOTE:** 750W RPS requires one (1) RPS Enablement Kit 5U G6 (P/N 508544-B21).

**NOTE:** Two (2) 750W PSUs and one (1) RPS enablement kit are required to achieve redundancy.

**NOTE:** The 2nd hot plug hard disk drive cage requires the purchase of 750W Redundant Power Supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller (if not already part of the configuration).

##### Power Options

HP 5U G6 Redundant Power Supply Enablement Kit 508544-B21

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### Step 3: Choose Additional Options for Factory Integration

**NOTE:** For additional options, please refer to the "Core Options" and "Additional Options" sections 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.

<b>HP Processors</b>	<b>Quad-Core Processors</b>	
	HP ML150 G6 Intel® Xeon® E5540 (2.53GHz/4-core/8MB/80W) Processor Kit	507849-B21
	HP ML150 G6 Intel® Xeon® E5530 (2.40GHz/4-core/8MB/80W) Processor Kit	507848-B21
	HP ML150 G6 Intel® Xeon® E5520 (2.26GHz/4-core/8MB/80W) Processor Kit	507722-B21
	HP ML150 G6 Intel® Xeon® E5506 (2.13GHz/4-core/4MB/80W) Processor Kit	507847-B21
	HP ML150 G6 Intel® Xeon® E5504 (2.00GHz/4-core/4MB/80W) Processor Kit	507721-B21
	<b>Dual-Core Processor</b>	
	HP ML150 G6 Intel® Xeon® E5502 (1.86GHz/2-core/4MB/80W) Processor Kit	507720-B21

<b>HP Memory</b>	<b>Registered DIMMs (RDIMMs)</b>	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	<b>Unbuffered DIMMs (UDIMMs)</b>	
	HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21
	<b>NOTE:</b> 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: <a href="http://www.hp.com/go/ddr3memory-configurator">www.hp.com/go/ddr3memory-configurator</a> .	
	<b>NOTE:</b> Kits described as LP include Low Power DIMMs. For more information on ProLiant Energy Efficient Features, see: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a>	

<b>HP Optical Drives</b>	HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
	HP Half-Height SATA DVD-RW Optical Drive	447328-B21

<b>HP Drive Cage Options</b>	HP 5U Large Form Factor (LFF) Hot Plug Drive Cage Kit	487737-B21
	<b>NOTE:</b> A 2nd hot-plug hard disk drive cage option kit is needed to support more than 4 hard drives.	

<b>HP Hard Drives</b>	<b>NOTE:</b> 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.	
	<b>NOTE:</b> Transfer rates of drives are dependent on the maximum transfer rate supported by the HBA or Controller. Refer to the HBA or Controller technical specifications for details.	
	<b>NOTE:</b> Mixing SAS and SATA hard drives is allowed. However, only SAS hard drives will be used for RAID setting.	
	<b>NOTE:</b> Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.	
	<b>NOTE:</b> HP Smart Array B110i does not support greater than 2TB hard drive.	

### Core Options

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

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

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

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 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1yr Warranty Hard Drive	571232-B21
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#### SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21
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**NOTE:** Please see the [QuickSpecs for Technical Specifications and additional information:](#)

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

**NOTE:** The previous generations of 1.5G SATA non-hot plug hard drives are supported. These drives can be purchased as an option. However, they can no longer be configurable.

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

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

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21

**NOTE:** SAS hard drives require a SAS HBA or Smart Array Controller.

#### 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

#### SATA Hot Plug LFF (3.5-inch) Enterprise Mainstream Solid State Drives

HP 400GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636611-B21
HP 200GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636609-B21

### Core Options

HP 100GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive 636607-B21

**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)

### 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 NC364T PCI-E Quad Port Gigabit Server Adapter 435508-B21

HP NC373F PCI-E Multifunction 1000SX Gigabit Svr Adapter 394793-B21

HP NC373T PCI-E Multifunction Gigabit Server Adapter 394791-B21

HP NC375T PCI Express Quad Port Gigabit Server Adapter 538696-B21

HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter 458492-B21

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

### HP Power Supplies

#### Power Supplies

HP 750W Common Slot Gold Hot Plug Power Supply Kit 512327-B21

**NOTE:** 750W RPS requires a Redundant Power Supply Enablement Kit 5U G6 (P/N 508544-B21). Two (1) 750W PSUs and one (1) RPS enablement kit are required to achieve redundancy.

#### Power Options

HP 5U G6 Redundant Power Supply Enablement Kit 508544-B21

### HP Cooling Options

HP 5U G6 Redundant Fan Kit 513927-B21

**NOTE:** Option Kits contain optional power supply, an IEC power cable and PDU IEC cables.

**NOTE:** Two (2) fans ship standard for 1P configuration. For redundancy, please order a redundant fan option kit (513927-B21) which ships with 2 fans.

**NOTE:** Three (3) fans ship standard for 2P configuration. If customer orders the standalone redundant fan option kit (513927-B21), two (2) fans in a two-fan packaged box will be received. Only one (1) fan is required for system redundancy. The other one can be saved as a spare part.

**NOTE:** If customer orders the redundant fan kit along with the server, the extra fan will not be received.

### 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.

HP Insight Software	<p><b>HP Insight Control</b></p> <p>HP Insight Management Media Kit</p> <p><b>NOTE:</b> HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.</p>	436222-B21
<b>HP Entry-Level Server Management</b>	<p>HP Lights-Out 100i (LO100i) Advanced including 1yr 24x7 Support Single Server License</p> <p><b>NOTE:</b> Other license types available, please check LO100i Advanced QuickSpecs at: <a href="http://www.hp.com/go/lo100">http://www.hp.com/go/lo100</a> for more details.</p>	530521-B21
<b>HP Port Options</b>	<p>HP Non-Hot Plug Internal SAS/SATA 4 Port Cable Kit</p> <p><b>NOTE:</b> This cable is required when adding Smart Array P410 Controller on Non-Hot Plug SATA/SAS server models.</p>	487734-B21
<b>HP Security</b>	<p>HP Trusted Platform Module Option</p> <p><b>NOTE:</b> The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.</p> <p><b>NOTE:</b> For more information about TPM, including a white paper, go to: <a href="http://www.hp.com/go/TPM">www.hp.com/go/TPM</a></p> <p><b>NOTE:</b> ProLiant OS pre-installed units will come with the partition required for TPM deployment.</p> <p><b>NOTE:</b> The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.</p>	488069-B21
<b>HP Storage Controllers</b>	<p><b>SAS Controller</b></p> <p><b>Smart Array P212 Controller</b></p> <p>HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller 462828-B21</p> <p>HP Smart Array P212/256 1-ports Int/1-ports Ext PCIe x8 SAS Controller 462834-B21</p> <p><b>Smart Array P410 Controller</b></p> <p>HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller 462862-B21</p> <p>HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller 462864-B21</p> <p>HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller 578230-B21</p> <p>HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller 572532-B21</p>	

### Additional Options

**NOTE:** To support RAID 5, HP P410 requires at least 256 MB Cache.

**NOTE:** To support RAID 6, HP P410 requires at least 256 MB Cache + Battery + SAAP or 512MB BBWC + SAAP.

#### Smart Array P411 Controller

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
HP Smart Array P411/512 FBWC 2-ports Ext PCIe x8 SAS Controller	578229-B21
HP Smart Array P411/1G FBWC 2-ports Ext PCIe x8 SAS Controller	572531-B21

#### Optional Upgrades

HP 256MB P-series Cache Upgrade	462968-B21
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**NOTE:** Supported on HP Smart Array P212 and HP Smart Array P410/ZM (FIO) Controller.

HP 1GB Flash Backed Cache	534562-B21
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HP 512MB Flash Backed Write Cache	534916-B21
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HP 512MB P-Series Battery Backed Write Cache Upgrade	462967-B21
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**NOTE:** Supported on HP Smart Array P410 Controller and HP Smart Array P411 Controller only.

HP 650 mAh P-Series Battery	462969-B21
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**NOTE:** To enable BBWC on the 256MB cache.

**NOTE:** Supported on HP Smart Array P212 Controller, HP Smart Array P410 Controller, and HP Smart Array P411 Controller only.

HP Non-Hot Plug Internal SAS/SATA 4 Port Cable Kit	487734-B21
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**NOTE:** NHP Internal SAS/SATA 4 Port Cable (487734-B21) is required when adding Smart Array P410 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
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**NOTE:** Smart Array Advanced Pack (SAAP) is a license key to activate RAID 6 and the advance feature sets provided by the controller.

This part number (516471-B21) can be used to purchase a single SAAP 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.

**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)

#### SCSI HBA

HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
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### Additional Options

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

[http://h18000.www1.hp.com/products/quickspecs/12566\\_div/12566\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12566_div/12566_div.html)  
(SC11Xe HBA)

#### 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/storage/SPOCK>

**NOTE:** Connection using HP P212 Smart Array Controller SAS (462828-B21) recommended.

HP DAT 320 USB Internal Tape Drive	AJ825A
HP DAT 320 SAS Internal Tape Drive	AJ830A
HP Ultrium 448 SAS Internal Drive	DW085A
HP Ultrium 920 SAS Internal Tape Drive	EH847A
HP 1/8 G2 Ultrium 920 SAS Autoloader	AH558A
<b>NOTE:</b> Requires HP 1U Tape Autoloader Rack-Mount Kit (AH166A) for rack installation.	
HP MSL2024 Ultrium 920 SAS Tape Library	AH559A
HP 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/storage/SPOCK>

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

**NOTE:** These are network connected appliances with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

HP D2D2502i Backup System	EJ001C
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**NOTE:** 1.5TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

HP D2D2504i Backup System	EJ002C
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**NOTE:** 3.0TB of usable network disk backup capacity. Network connected appliance with connectivity using the iSCSI protocol. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

HP RDX1000 Internal Removable Disk Backup System	BV847A
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##### USB Removable Media RDX Disk Backup Systems

HP RDX320 Internal Removable Disk Backup System	AJ767A
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**NOTE:** 320GB of disk capacity per data cartridge.

HP RDX500 Internal Removable Disk Backup System	AJ934A
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**NOTE:** 500GB of disk capacity per data cartridge.

#### HP Uninterruptible Power HP Tower UPS



### Additional Options

#### Systems

##### **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 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 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 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)

##### **R5000 Uninterruptible Power System (UPS)**

HP R5KVA 3U IEC309-32A High Voltage INTL Uninterruptible Power System AF461A

HP R5KVA 3U L630 High Voltage NA/JP Uninterruptible Power System AF460A

##### **R7000 Uninterruptible Power System (UPS)**

HP R7KVA 4U 50A High Voltage NA/JP Uninterruptible Power System AF462A

HP R7KVA 4U IEC-32A High Voltage INTL Uninterruptible Power System AF463A

##### **HP T1000 G3 UPS Models**

HP T1000 G3 1000VA INTL Tower Uninterruptible Power System AF449A

HP T1000 G3 1000VA NA Tower Uninterruptible Power System AF448A

HP T1000J JP Uninterruptible Power System AF457A

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

[http://h18000.www1.hp.com/products/quickspecs/13160\\_div/13160\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13160_div/13160_div.html)  
(Worldwide)

##### **HP T750 G2 UPS Models**

HP T750 G2 750VA NA Tower Uninterruptible Power System AF446A

HP T750 G2 750VA INTL Tower Uninterruptible Power System AF447A

HP T750J JP Uninterruptible Power System AF456A

##### **HP T1500 Uninterruptible Power System (UPS)**

HP T1500 G3 1400VA INTL Tower Uninterruptible Power System AF451A

HP T1500 G3 1400VA NA Tower Uninterruptible Power System AF450A

HP T1500J JP Uninterruptible Power System AF458A

**NOTE:** Please see the QuickSpecs for additional information:

[http://h18000.www1.hp.com/products/quickspecs/13417\\_div/13417\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13417_div/13417_div.html)  
(Worldwide)

**NOTE:** For additional information on sizing your server, please reference:

<http://www.upssizer.com>

**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.

### Additional Options

Please see the following link: [www.hp.com/products/powercords](http://www.hp.com/products/powercords).

#### HP Rack Series

HP 10642 G2 Shock Universal Rack

AF002A

**NOTE:** 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 830 square inches (5,350 sq cm) 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 2.75 inches (7 cm).

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

**NOTE:** HP ProLiant DL rack 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 26" - 36".

**NOTE:** Support for all 2 and 4 post Telco racks and threaded hole racks requires an additional option kit from Rack Solutions. The Rack Solutions brackets can be purchased at: [www.hp.com/go/rackandpower](http://www.hp.com/go/rackandpower).

#### HP Rack Options

HP USB BFR with PVC Free INDIA Keyboard/Mouse Kit

672097-D63

#### HP KVM Switch Options

HP 1x1Ex8 KVM IP Console Switch G2 with Virtual Media CAC Software

AF620A

HP 2x1Ex16 KVM IP Console Switch G2 with Virtual Media CAC Software

AF621A

HP 4x1Ex32 KVM IP Console Switch G2 with Virtual Media CAC Software

AF622A

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

[http://h18000.www1.hp.com/products/quickspecs/13474\\_div/13474\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13474_div/13474_div.html)  
(Worldwide)

#### HP Server Console 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 Server Console Switch G2 with Virtual Media & CAC

### Additional Options

HP 0x2x16 KVM Server Console Switch G2 with Virtual Media CAC Software	AF618A
HP 0x2x32 KVM Server Console Switch G2 with Virtual Media CAC Software	AF619A

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

[http://h18000.www1.hp.com/products/quickspecs/13475\\_div/13475\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13475_div/13475_div.html)  
(Worldwide)

**NOTE:** For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL:

<http://www.hp.com/go/kvm>.

#### Rack Kits

HP Tower to Rack Conversion Tray Universal Kit	417705-B21
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### HP USB and SD Options

HP USB 2-Button Optical Scroll Mouse	DC172B
HP USB 04 Standard Keyboard	DT528A#ABA

**NOTE:** For the installation of Windows and other OS's, a floppy drive or the HP USB Floppy Drive Key may be required to complete driver installation. A standard USB drive key may not work to complete driver installation.

### HP Care Pack Services

#### Extended Care

HP 3 year Next business day ProLiant ML150 Hardware Support	U8184E
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#### Committed Care

HP 3 year 4 hour 13x5 ProLiant ML150 Hardware Support	U8192E
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#### Deployment Services

HP Install ProLiant ML150 Service	U8195E
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**NOTE:** For more information, customer/resellers can contact:

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

### Memory

#### HP ProLiant ML150 G6 Memory Population Guidelines

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

**NOTE:** Charts do not represent all possible memory configurations. Memory must be populated in one of the following ways.

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 the HP ProLiant ML150 G6 server with twelve (12) memory slots
- There are three (3) channels per processor; six (6) channels per server
- There are two (2) DIMM slots for each memory channel; twelve (12) total slots
- Memory channel 1 consists of the two (2) DIMMs that are closest to the processor
- Memory channel 3 consists of the two (2) 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
- You can only have up to eight (8) ranks installed 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 chipset
- 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
- No mixing DIMM voltage; all DIMMs must be the same voltage

DIMM Type	Registered DIMMs (RDIMMs)			Unbuffered DIMMs (UDIMMs)			
	Dual Rank (2R)		Quad Rank (4R)	Single Rank (1R)		Dual Rank (2R)	
DIMM Rank							
DIMM Capacity	2GB	4GB	2GB	1GB	2GB	2GB	4GB
DIMM Native Speed (MHz)	1333	1333	*	1333	*	1333	1333
<b>SLOTS THAT CAN BE POPULATED</b>							
12 slot servers	12	12	*	12	*	12	12
<b>MAXIMUM CAPACITY (GB)</b>							
12 slot servers	24	48	*	12	*	24	48
<b>POPULATED DIMM SPEED (MHz)</b>							
1 DIMM Per Channel	1333	1333	*	1333	*	1333	1333
2 DIMM Per Channel	1066	1066	*	1066	*	1066	1066

\* - not supported by HP at this time.

#### 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

### Memory

- 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
- References to the above MHz speeds are for the various speeds of DDR3 DIMMs; 1333 refers to DDR3-1333, etc.

### Standard Memory

All HP ML150 G6 models ship with 12 DIMM sockets.

Factory Integrated Models include the memory capacity of your choice.

### Basic memory slot and population diagram

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

12 DIMM SLOTS (6 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D	1	D	Chnl 1
	2	A	2	A	
Chnl 2	3	E	3	E	Chnl 2
	4	B	4	B	
Chnl 3	5	F	5	F	Chnl 3
	6	C	6	C	

### Standard Memory (1 CPU model)

Hot Plug SAS/SATA performance and base models include 2 x 2 GB UDIMM and 1 x 2 GB UDIMM respectively

Non-Hot Plug SATA entry models include 1 x 2 GB UDIMM

- 4 GB (2 x 2GB) of PC3-10600 (DDR3-1066) Advanced ECC UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: empty	1	D: empty	Chnl 1
	2	A: 2GB DIMM	2	A: empty	
Chnl 2	3	E: empty	3	E: empty	Chnl 2
	4	B: 2GB DIMM	4	B: empty	
Chnl 3	5	F: empty	5	F: empty	Chnl 3
	6	C: empty	6	C: empty	

### Memory

#### Standard memory plus Optional Memory (1 CPU model)

- 18GB, consisting of three (3) 2GB RDIMMs plus three (3) 4GB RDIMMs
  - 3x 2GB dual-rank PC3-10600 RDIMMs
  - 3x 4GB dual-rank PC3-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: 2GB DIMM	1	D: empty	Chnl 1
	2	A: 4GB DIMM	2	A: empty	
Chnl 2	3	E: 2GB DIMM	3	E: empty	Chnl 2
	4	B: 4GB DIMM	4	B: empty	
Chnl 3	5	F: 2GB DIMM	5	F: empty	Chnl 3
	6	C: 4GB DIMM	6	C: empty	

#### Standard memory Replaced with Optional Memory (1 CPU model)

##### RDIMM maximum configuration

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

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: 4GB DIMM	1	D: empty	Chnl 1
	2	A: 4GB DIMM	2	A: empty	
Chnl 2	3	E: 4GB DIMM	3	E: empty	Chnl 2
	4	B: 4GB DIMM	4	B: empty	
Chnl 3	5	I: 4GB DIMM	5	I: empty	Chnl 3
	6	C: 4GB DIMM	6	C: empty	

#### UDIMM Maximum Configuration (1 CPU model)

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

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: 4GB DIMM	1	D: empty	Chnl 1
	2	A: 4GB DIMM	2	A: empty	
Chnl 2	3	E: 4GB DIMM	3	E: empty	Chnl 2
	4	B: 4GB DIMM	4	B: empty	
Chnl 3	5	F: 4GB DIMM	5	F: empty	Chnl 3
	6	C: 4GB DIMM	6	C: empty	

### Memory

#### Standard memory Replaced with Optional Memory (2 CPU model) RDIMM maximum configuration

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

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: 4GB DIMM	1	D: 4GB DIMM	Chnl 1
	2	A: 4GB DIMM	2	A: 4GB DIMM	
Chnl 2	3	E: 4GB DIMM	3	E: 4GB DIMM	Chnl 2
	4	B: 4GB DIMM	4	B: 4GB DIMM	
Chnl 3	5	F: 4GB DIMM	5	F: 4GB DIMM	Chnl 3
	6	C: 4GB DIMM	6	C: 4GB DIMM	

#### UDIMM maximum configuration (2 CPU model)

- 48GB, consisting of twelve (12) 2GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	D: 4GB DIMM	1	D: 4GB DIMM	Chnl 1
	2	A: 4GB DIMM	2	A: 4GB DIMM	
Chnl 2	3	E: 4GB DIMM	3	E: 4GB DIMM	Chnl 2
	4	B: 4GB DIMM	4	B: 4GB DIMM	
Chnl 3	5	F: 4GB DIMM	5	F: 4GB DIMM	Chnl 3
	6	C: 4GB DIMM	6	C: 4GB DIMM	

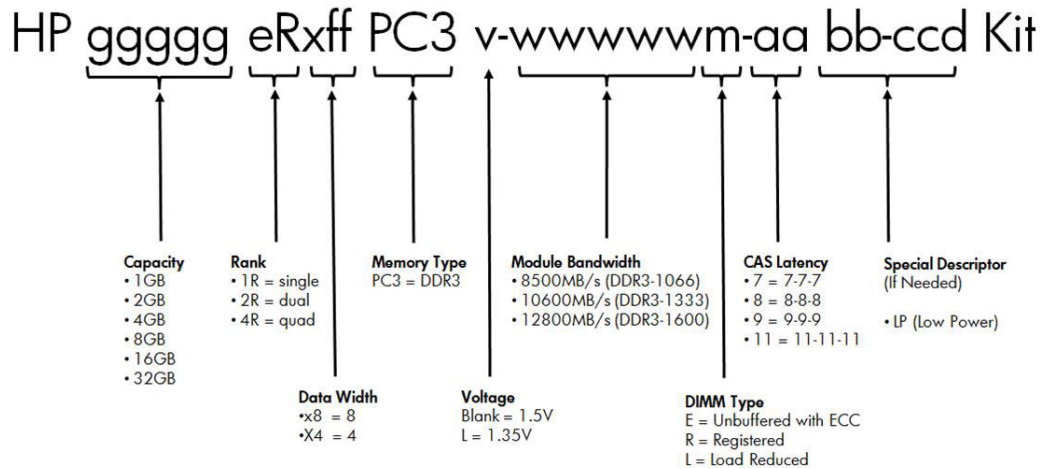
**NOTE:** Capacity references are rounded to the common Gigabyte values.

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

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool:  
<http://www.hp.com/go/ddr3memory-configurator>

**DDR3 memory options part number decoder**

### 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) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21

**Unbuffered DIMMs (UDIMMs)**

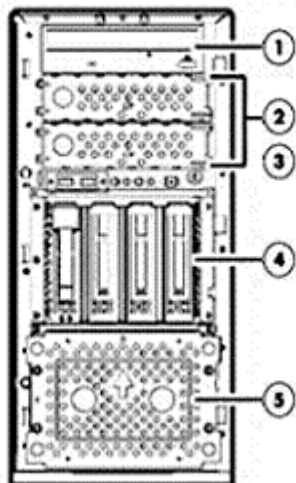
HP 1GB (1x1GB) Single Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500668-B21
HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500670-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-10600 (DDR3-1333) Unbuffered CAS-9 Memory Kit	500672-B21

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

### Storage

#### Non-Hot Plug SATA or Hot Plug SAS/SATA



- 1 Optical Drive Media Bay
- 2 Media Bays
- 3 USB 2.0 ports (2)
- 4 Hard Drive Bays (1-4)
- 5 Hard Drive Bays (5-8)

#### Drive Support

	Quantity Supported	Position Supported	Controller
<b>Removable Media</b>			
SATA DVD-ROM Drive	Up to 1	1	SATA

#### 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:** Supports up to eight (8) SAS/SATA hard drives via 2nd Hot plug Hard Disk Drive cage and HP Smart Array P410 Controller.

**NOTE:** The 2nd hot-plug hard drive cage requires the purchase of one 750W hot plug power supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller (if not already part of the configuration).

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

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

	Quantity Supported	Position Supported	Controller
3TB 3G SATA 7.2K	Up to 8	4,5	Smart Array P212 Controller
2TB 3G SATA 7.2K		(Drive slots 1-8)	Smart Array P410 Controller
1TB 3G SATA 7.2K			Smart Array P411 Controller
500GB 3G SATA 7.2K			

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

	Quantity Supported	Position Supported	Controller
2TB 3G SATA 7.2K	Up to 4	4	HP Smart Array B110i SATA RAID Controller (RAID 0,1,10)
1TB 3G SATA 7.2K		(Drive slots 1-4)	Smart Array P212 Controller

### Storage

500GB 3G SATA 7.2K

Smart Array P410 Controller  
 Smart Array P411 Controller  
**NOTE:** Hardware Raid 5 requires a Smart Array P212/P410/P411 Controllers.

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

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 7.2K	Up to 4	4 (Drive slots 1-4)	HP Smart Array B110i SATA RAID Controller (RAID 0,1,10) Smart Array P212 Controller Smart Array P410 Controller Smart Array P411 Controller <b>NOTE:</b> Hardware Raid 5 requires a Smart Array P212/P410/P411 Controllers.

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

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 7.2K	Up to 8	4,5 (Drive slots 1-8)	Smart Array P212 Controller Smart Array P410 Controller Smart Array P411 Controller

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

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K 450GB 6G SAS 15K 300GB 6G SAS 15K	Up to 4	4 (Drive slots 1-8)	Smart Array P212 Controller Smart Array P410 Controller Smart Array P411 Controller

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

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K 450GB 6G SAS 15K 300GB 6G SAS 15K	Up to 8	4,5 (Drive slots 1-8)	Smart Array P212 Controller Smart Array P410 Controller Smart Array P411 Controller

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

	Quantity Supported	Position Supported	Controller
3TB 6G SAS 7.2K 2TB 6G SAS 7.2K 1TB 6G SAS 7.2K	Up to 8	4,5 (Drive slots 1-8)	Smart Array P212 Controller Smart Array P410 Controller Smart Array P411 Controller

### Storage

**NOTE:** To support 8 drives, the purchase of the optional 2nd hot plug drive cage, 750W Redundant Power Supply, Redundant Power Supply Enablement Kit and HP Smart Array P410 Controller (if not already part of the configuration) are required.

#### Maximum Storage Capacity - SAS Models

Internal	24.0TB (8 x 3TB SAS hard drives)
Total	24.0TB (8 x 3TB SAS hard drives)

#### Maximum Storage Capacity - SATA Models

Internal	24.0TB (8 x 3TB SATA drives)
Total	24.0TB (8 x 3TB SATA drives)

### Tape and Disk-Based 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/storage/SPOCK>

	Position	Recommended Controller	Part Number
<b>HP SCSI Tape Drives</b>	Internal or External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
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			
<b>HP SCSI Rack Mount Kits</b>	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
1U Rack-Mount Kit			
3U Rack-Mount Kit			
<b>HP USB Tape Drives</b>	Internal or External	USB 2.0 Port	N/A
DAT 40			
DAT 72			
DAT 160			
DAT 320			
<b>HP USB Rack Mount Kits</b>	External	USB 2.0 Port	N/A
1U USB Rack-Mount Kit			
<b>HP SAS Tape Drives</b>	Internal or External	HP Smart Array P212/ZM 1-ports Int/1-ports Ext PCIe x8 SAS Controller	462828-B21
DAT 160			
DAT 320			
LTO-2 Ultrium 448			
LTO-3 Ultrium 920			
LTO-4 Ultrium 1760			

### Storage

LTO-4 Ultrium 1840  
LTO-5 Ultrium 3000  
LTO-5 Ultrium 3280

<b>HP SAS Rack Mount Kits</b> 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
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<b>HP SCSI Tape Autoloaders</b> DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Ultra320 Single Channel/ PCIe x4 SCSI Host Bus Adapter	412911-B21
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<b>HP SCSI Tape Libraries</b> MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Dual Channel Host Bus Adapter	AH627A
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<b>HP SAS Tape Autoloaders and Libraries</b> 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
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<b>HP Fibre Channel Tape Libraries</b> MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a> for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpecs.	
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<b>HP USB RDX Removable Disk Backup System</b> RDX160 RDX320 RDX500 RDX750	Internal or External	USB 2.0 port	N/A
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<b>HP D2D Backup Systems, iSCSI</b> D2D2500i D2D4000i	External	Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.	
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### Storage

**HP D2D Backup Systems,  
Fibre Channel**  
D2D4000fc

External

Direct server attach is not supported, requires connection via SAN fabric. See: <http://www.hp.com/storage/SPOCK>

### Power Specifications

<b>HP 460W Factory Integrated Power Supply Kit</b>							
<b>Part Number</b>	500447-B21						
<b>Operational Input Voltage Range (Vrms)</b>	90 to 135 and 180 to 264 V ac full ranging						
<b>Frequency Range (Nominal) (Hz)</b>	47 to 66 Hz						
<b>Nominal Input Voltage (Vrms)</b>	<b>100</b>	<b>115</b>	<b>208</b>	<b>220</b>	<b>230</b>	<b>240</b>	
Max Rated Output Wattage Rating	460	460	460	460	460	460	460
Nominal Input Current (A rms)	10	10	5	5	5	5	5
Max Rated Input Wattage Rating (Watts)	760	760	700	700	700	700	700
Max. Rated VA (Volt-Amp)	850	850	830	830	830	830	830
Efficiency (%)	65	65	65	65	65	65	65
Power Factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Leakage Current (mA)	3.5mA	3.5mA	3.5mA	3.5mA	3.5mA	3.5mA	3.5mA
Maximum Inrush Current (A peak)	450	450	450	450	450	450	450
Maximum Inrush Current duration (mS)							

<b>HP 750W Common Slot Gold Hot Plug Power Supply Kit (Optional)</b>							
<b>Part Number</b>	512327-B21						
<b>HP RPS Enablement Kit Part Number</b>	508544-B21						
<b>Input Voltage Range ( V rms)</b>	100 to 240						
<b>Frequency Range (Nominal) (Hz)</b>	50/60						
<b>Nominal Input Voltage (Vrms)</b>	<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	824	820	820	820
Maximum Rated VA (Volt-Amp)	894	884	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	.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

### System Specifications

	<b>Power**</b>
HP ProLiant ML150 G6 Fully Configured	(see**)
Fully Loaded System Input Wattage (W)	567W (595W)
Fully Loaded System Input Current (A rms)	4.78A (5.1A) @ 115V, 2.38A (2.55A) @ 230V
Fully Loaded System Thermal (BTU- Hr)r)	1794 BTU/526W (1933BTU/595W)
Fully Loaded System VA (Volt-Amp)	568.1 (601)
System Leakage with all power supplies loaded (mA)	0.7mA (1.25mA)
System Inrush Current with all power supplies loaded (A)	50A (37.6A)
Power cord requirements	Nema 5-15P to IEC320-C13
	IEC320-C13 to IEC320-C14
<b>**Power shown is for a fully configured system consisting of:</b>	
(2) CPUs up to 80W (95W), 2.4G (2.93G)	
(12) 2GB UDIMMs or 10 2GB RDIMMs (12pc 4G RDIMM)	
(4) HDDs SAS (8* HDDs SAS)	
(2) DVD-ROMs	
(3) x8 PCI-E	
(1) x16 PCI-E	
(1) PCI 32 3.3V	
(1) 460 watts power supply (750W power supply)	

<b>Power Cords (13 Cord Sets)</b>	
<b>Country</b>	<b>Power Cord Part Number</b>
APD	100614-009, 100613-008, 139867-005, 397138-002 (India)
Brazil	285052-001
Australia/New Zealand	100661-001
Euro	100614-009
France	100614-009
Germany	100614-009
Japan	139867-005
PRC	286496-001, 100613-008, 393312-001
Brazil	438723-001
UK/Singapore	100613-008
US, Taiwan	121565-001

### Technical Specifications

<b>System Unit</b>	<b>Dimensions (WxHxD)</b>	7.87 x 16.81 x 24.13 in (200 x 427 x 613 mm) (W/O foot stand)	
	<b>Weight (approximate)</b>	Maximum:	30 kg
		(All hard drives, power supplies and processors installed)	
		Minimum:	16kg
		(One hard drive, power supply and processor installed)	
	<b>Input Requirements (per power supply)</b>	Range Input Voltage	90 to 135 VAC
			180 to 265 VAC
		Normal Line Voltage	100 to 127 VAC
			200 to 240 VAC
		Rated Input Current	load 10A at 100 to 127 VAC
			5A at 200 to 240 VAC
	Rated Input Frequency	47 to 66 Hz	
Rated Input Power (optional 750W RPS)		760 W Max (940W) Max	
<b>BTU Rating</b>	Maximum (optional 750W RPS)	1814 BTU (2243) BTU	
<b>Power Specifications</b>	To review typical power ratings use the Power Advisor which is available via the online tool located at URL: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a>		
<b>Power Supply Output Power (per power supply)</b>	Rated Steady-State Power	460W (750W) at 100 VAC for system	
		460W (750W) at 200 VAC	
	Maximum Peak Power	460W (750W) at 100 VAC	
		460W (750W) at 200 VAC	
<b>System Inlet Temperature</b>	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per 1,000 ft (1.0° C per every 305 m) above seal level to a maximum of 10,000 ft (3050 m) no direct sustained sunlight . Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).	
	Non-Operating	-40° to 140° F (-30° to 60° C)	
	<b>Relative Humidity (non-condensing)</b>	Operating	10% to 90% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
Non-operating**		10% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.	
<b>Altitude</b>	Operating	10,000 ft (3000m). Maximum allowable altitude change rate is 1°C per 300m.	
	Non-Operating	30,000 ft (9144m). Maximum allowable altitude change rate is 1°C per 300m.	

### Technical Specifications

#### Acoustic Noise

Listed are the declared A-Weighted sound power levels (LWad) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

##### Idle

(Fixed Disk Drives Spinning)

L WAd (BELS)	460W non-redundant:	5.4 B
	460W redundant:	5.5 B
	750W non-redundant:	5.6 B
	750W redundant:	5.5 B
L-pAm	460W non-redundant:	36.8 dBA
	460W redundant:	37.4 dBA
	750W non-redundant:	36.5 dBA
	750W redundant:	36.2 dBA

##### Operating

(Random Seeks to Fixed Disks)

L WAd (BELS)	460W non-redundant:	5.5 B
	460W redundant:	5.6 B
	750W non-redundant:	6.0 B
	750W redundant:	5.7 B
L-pAM	460W non-redundant:	37.4 dBA
	460W redundant:	37.1 dBA
	750W non-redundant:	40.6 dBA
	750W redundant:	39.1 dBA

#### Emissions Classification (EMC)

##### FCC Rating

Class B

##### Normative Standards

CISPR 22; EN55022; EN55024; 47 CFR, FCC Rules and Regulations Part 15 Subpart B; VCCI Class B ITE; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3.

**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.

### Technical Specifications

<b>HP Half-Height SATA DVD-ROM Optical Drive</b>	Applicable Disk	CD-ROM, CD-XA, CD-DA (Mode 1, Mode 2, Form 1 and 2) Photo CD (Single and Multi-session) Mixed Mode (Audio and Data combined) CD-R, CD-RW, DVD-ROM, DVD+R, DVD+RW	
	Capacity	4.7 GB (DVD-5) 8.54 GB (DVD-9)	
	<b>Block Size</b>	DVD Media 2,048 bytes	
	<b>Interface</b>	SATA 1.56Gb/s	
	<b>Access Times</b> (typical)	Random	<140 ms
		Full-Stroke	<250 ms
	<b>Data Transfer Rate</b>	Sustained 8100 to 21600 KB/s (6X to 16X)	
	<b>Cache Buffer</b>	128 KB	
	<b>Start-up Time</b> (typical)	< 7 seconds	
	<b>Stop Time</b>	< 4 seconds	
	<b>Laser Parameters</b>	Type	Semiconductor Laser GaAlAs
		Wave Length	780 ± 25 nm
	<b>Operating Conditions</b>	Temperature	41° to 113° F (5° to 45° C)
		Humidity	10% to 90%
<b>Dimensions</b>	(HxWxD, maximum)	1.7 x 5.85 x 8.11 in (4.49 x 15.0 x 20.3 cm)	
	Weight	2.64 lb (1.2 kg)	
<b>Smart Array P410 Controller</b>	<b>Dimensions</b> (not including bracket)	Low Profile PCIe Form Factor 19.05 cm x 24.13 cm x 5.72cm (7.5 in x 9.5 in x 2.25 in)	
	<b>Disk Drive and Enclosure Interface</b>	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial ATA)	
	<b>SAS Connectors</b>	x8 3G SAS provides 2.4GB/s maximum bandwidth	
	<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 3G SAS provides 2.4GB/s maximum bandwidth	
	<b>Logical Drives Supported</b>	Up to 32 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)	
		<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	
RAID 5, 5+0 (Distributed Data Guarding)			
	<b>NOTE:</b> The 256MB upgrade is required to enable RAID 5 support on the Smart Array P410i. RAID 5+0 is available with the addition of the optional Battery kit upgrade		
	RAID 1+0 (Striping & Mirroring)		
	RAID 0 (Striping)		

### Technical Specifications

<b>Embedded HP NC107i PCI Express Gigabit Server Adapter</b> (Embedded)	<b>Network Interface</b>	Integrated 10/100/1000BASE-T Transceiver Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.	
	<b>Data Transfer Method Controller</b>	Compliant to x1 PCIe Specification BCM5723	
	<b>Network Transfer Rate</b>	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000Mb/s
<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		

<b>HP Smart Array B110i SATA RAID Controller (RAID 0,1,10)</b>	<b>Dimensions</b>	N/A (embedded) ships standard	
	<b>Disk Drive and Enclosure Protocol Support</b>	3.0 Gbps SATA	
	<b>Architecture</b>	64-bit	
	<b>SAS Connectors</b>	4 internal x1 SATA connectors	
	<b>Software Upgradeable Firmware</b>	Yes	
	<b>Maximum Capacity</b>	2TB	
	<b>Memory Addressing</b>	6GB (maximum)	
	<b>Logical Drives Supported</b>	2 (maximum)	
	<b>RAID Support</b>	RAID 1 (Mirroring) RAID 0 (Striping) RAID 10	

### 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.