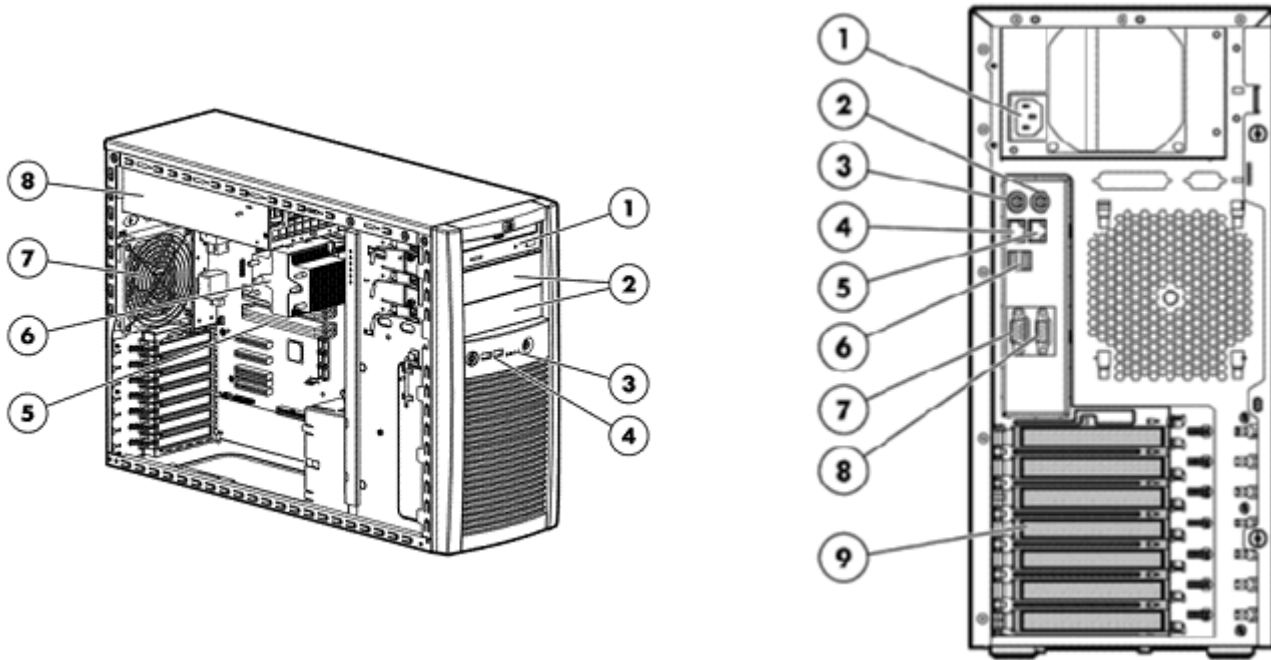


### Overview



#### Front View:

1. SATA DVD-ROM
2. Removable Media Bays
3. LED Indicators and Power Button
4. Upfront USB Ports
5. Four DIMM Sockets for up to 8GB DDR2 memory
6. Processor Socket (Intel® Xeon®, Core™2, Pentium® or Celeron®)
7. System Fan
8. 410W Non-Hot Plug Non-Redundant Power Supply or 430W Hot Plug Redundant Power Supplies

#### Rear View:

1. Power cord connections for Non-Redundant Power Supply
2. PS/2 Mouse connector
3. PS/2 Keyboard connector
4. 10/100/1000 NIC 1 Shared iLO 2
5. 10/100/1000 NIC 2
6. USB 2.0 (qty 2)
7. Video Port
8. Serial Port
9. Up to Five Expansion Slots (Four PCI Express and One PCI-X (Optional))

### What's New

- Dual-Core Intel® Xeon® E3110 Processor

### At A Glance

The HP ProLiant ML310 G5p is an affordable, single processor tower server engineered to meet the needs of corporate small sites. It is designed to provide the solid network foundation essential to fuel thriving small offices. Processing power ranging from single-core Celeron to quad-core Xeon combines with industry-leading management and essential data protection features for a secure, affordable platform that helps you run your business efficiently.

#### • Processors:



### Overview

- Intel® Xeon™ 3000 sequence
  - Intel® 3210 chipset
  - Dual-Core Intel® Core™2 duo E8400 processor
  - Quad-Core Intel® Core™2 Quad Q9400 processor
  - Dual-Core Intel® Core™2 duo E6400 processor
  - Dual-Core Intel® Pentium® E2160 processor
  - Single-Core Intel® Celeron® 400 sequence
  - **Memory:**
    - Up to 8 GB of PC2-6400 800MHz unbuffered DDR2 SDRAM with ECC capabilities and optional interleaving
  - **Storage Controller:**
    - SATA Models: Embedded SATA with integrated SATA RAID 0,1
  - **Internal Drive Support:**
    - Supports up to four hot plug SAS or SATA hard drives for up to 4.0TB internal storage
    - Models support SAS and SATA hard drives
  - **Network Controller:**
    - NC326i Dual Integrated Gigabit NICs
  - **Expansion Slots:**
    - Up to 5 Total: (1) PCI Express x8, (3) PCI Express x1, Optional Extender Board for (1) 64-bit/100MHz PCI-X
  - **USB 2.0 Ports:**
    - 6 Total: (2) front; (2) rear; (1) internal; (1) dedicated internal for tape
  - **Infrastructure Management:**
    - Convenient slide-out Systems Insight Display for quick and easy front view server diagnostics, along with status LEDs, Automatic Server Recovery (ASR), ROM Based Setup Utility (RBSU)
    - HP Integrated Lights-Out 2 management processor for simplified server setup, health monitoring and recovery, power and thermal control, and lights-out remote administration.
    - HP Insight Control a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, control and optimize your IT infrastructure through a single, simple management console. Insight Control supports both Windows and Linux-based central management servers.
    - HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. This ultimately enables them to dynamically keep pace with the organization's changing business requirements.
  - **Operating Systems and Virtualization Software Support for ProLiant Servers:**
    - Supports Windows, RHEL, SLES, OEL
  - **Deployment/Serviceability:**
    - Customer Self Repair (CSR): HP products are designed with many CSR parts to minimize repair time and allow for greater flexibility in performing defective parts replacement
  - **Form Factor:**
    - Tower (5U)
    - Optional Tower-to-Rack Enabling Kit available, system & tray occupy 6U
  - **Security:**
    - Trusted Platform Module Option
    - This server platform is designed to use the trusted platform module. The HP TPM can be installed tool-free by inserting the module into a header located on the system board
  - **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, with 1 year Next Business Day and year on-site support from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Expanded support may be covered under the warranty or available for an additional fee. 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 Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These

### Overview

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>

### 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

Quad-Core Intel® Xeon® processor X3370 Quad (3.0GHz, 12MB cache, 1333MHz FSB)

Quad-Core Intel® Xeon® processor X3360 (2.83GHz, 12MB L2 Cache, 1333MHz FSB)

Quad-Core Intel® Core™2 processor Q9400 (2.66 GHz, 6MB L2 Cache, 1333MHz FSB)

Quad-Core Intel® Xeon® processor X3330 (2.66GHz, 6MB cache, 1333MHz FSB)

##### Dual-Core Processors

Dual-Core Intel® Xeon® processor E3120 (3.16GHz, 6MB cache, 1333MHz FSB)

Dual-Core Intel® Xeon® processor E3110 (3.00GHz, 6MB cache, 1333MHz FSB)

Dual-Core Intel® Core™2 duo processor E8400 (3.00 GHz, 6MB L2 Cache, 1333MHz FSB)

Dual-Core Intel® Core™2 duo processor E6400 (2.13 GHz, 2MB L2 Cache, 1066MHz FSB)

Dual-Core Intel® Pentium processor E2160 (1.8GHz, 1MB L2 Cache, 800MHz FSB)

##### Single-Core Processors

Single-Core Intel® Celeron® processor 440 (2.0GHz, 512KB L2 Cache, 800MHz FSB)

#### Cache Memory

One of the following depending on Model

12 MB L2 Cache

**NOTE:** For Models with Intel Xeon processor X3360 and X3370.

6 MB L2 Cache

**NOTE:** For Models with Intel Xeon processor X3330, and E3120. For Models with Intel Core 2 processor Q9400, E8400.

2 MB L2 Cache

**NOTE:** For Models with the Intel Core2 processor E6400.

1 MB L2 Cache

**NOTE:** For Models with the Intel Pentium processor E2160.

512 KB L2 Cache

**NOTE:** For Models with the Intel Celeron processor 440.

#### Chipset

Intel® 3210 Chipset

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

#### Memory Protection

ECC

#### Memory

One of the following depending on Model

Type PC2-6400 unbuffered DDR2 SDRAM (800MHz)

Standard 1 GB (1 x 1 GB)

Maximum 8 GB

#### Network Controller

NC326i Dual Integrated Gigabit NICs

### Standard Features

Expansion Slots	Expansion Slots #	Technology	Bus Width***	Connector Width	Bus Number*	Device No.**	Form Factor	Notes
	7	PCIe	x1	x8	4	0	Half length, full height slot	
	6	PCIe	x1	x8	7	0	Half length, full height slot	
	5	PCIe	x1	x8	10	0	Full length, full height slot	
	3	PCIe	x8	x8	18	0	Full length, full height slot	
	1 (Optional)	PCI-X (100MHz, 3.3V)	64-bit	Not applicable	14	2	Full length, full height slot	

\* Default bus assignment (in decimal). 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).

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

### Storage Controllers

The HP ProLiant ML310 G5p supports Serial ATA (SATA) and Serial Attached SCSI (SAS) hard drives. Models described as SAS models include an 8 port HBA or controller that supports both SATA and SAS hard drives in non-RAID, RAID 0, or RAID 1 configurations. Models described as SATA/SAS support SATA hard drives standard and require the installation of an HBA or controller to support SAS.

Embedded SATA with integrated SATA RAID 0,1 (SATA/SAS Models)

**NOTE:** Use of the embedded SATA RAID feature with a Linux operating system requires installation of a driver from a floppy drive. The supported floppy drive can be a USB drive key (except Windows 2003), USB floppy drive, half-height internal floppy drive, or virtual floppy via Integrated Lights-Out 2 (iLO 2).

**NOTE:** See the "Storage" section of these QuickSpecs for information on required to support SATA and SAS hard drive configurations.

### Storage

Optical Drive

SATA DVD-ROM Drive Standard

Diskette Drive

Optional 1.44 MB Diskette Drive

**NOTE:** Use of the embedded SATA RAID feature with a Linux operating system requires installation of a driver from a floppy drive. The supported floppy drive can be a USB drive key, USB floppy drive, half-height internal floppy drive, or virtual floppy via Integrated Lights-Out 2 (iLO 2).

### Standard Features

<b>Maximum Internal Storage</b>	Hot Plug SAS (3.5")	4.0TB	4 x 1TB
	Hot Plug SATA (3.5")	8.0TB	4 x 2TB

**NOTE:** See the "Storage" section of these QuickSpecs for information on controllers required to support SATA and SAS hard drive configurations.

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<b>Interfaces</b>	Parallel	1 (Optional)
	Serial	1 (Optional second serial port available)
	Pointing Device (Mouse)	1
	Graphics	1
	Keyboard	1
	USB Ports	5 (2 front; 2 rear; 1 internal) <b>NOTE:</b> Please see the following URL for additional information regarding USB support: <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>
	Dedicated USB Port	1 (available for USB tape connectivity)
	Network RJ-45 (Ethernet)	2 (1 Shared iLO 2 port)
	iLO 2 Remote Management port	1 (see Network RJ-45 port)

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<b>Graphics</b>	Integrated ATI ES1000, 32 MB video standard <ul style="list-style-type: none"><li>• 16 bit color: maximum resolution of 1600 x 1200</li><li>• 32 bit color: maximum resolution of 1280 x 1024</li></ul>
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**NOTE:** Maximum resolution available via iLO 2 remote console is 1280 x 1024.

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<b>Form Factor</b>	Tower (5U) Optional Tower-to-Rack Enabling Kit available (system & tray occupy 6U)
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<b>HP Insight management software</b>	HP Foundation Pack	Managing the growing number of servers can be complex and expensive for your organization. IT managers need to address changing business needs with tools that meet the challenges of managing today's complex Datacenters.
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HP provides management solutions that are designed to simplify a server's installation, configuration and maintenance throughout the entire server lifecycle. This provides the customer with higher levels of operational efficiency and highly reliable systems:

[www.hp.com/go/foundation](http://www.hp.com/go/foundation).

The foundation pack includes:

- HP SmartStart
- HP Management
- HP ProLiant Firmware Maintenance

### Standard Features

	<p>SmartStart version supported (minimum): SmartStart 7.51 <a href="http://www.hp.com/servers/smartstart">http://www.hp.com/servers/smartstart</a></p>
HP Integrated Lights-Out (iLO)	<p>HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control, and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: <a href="http://www.hp.com/go/iLO">www.hp.com/go/iLO</a></p>
HP Insight Control	<p>HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, remote control, and optimize your IT infrastructure through a single, simple management console.</p> <p>Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management servers: HP Insight Control for Linux, and HP Insight Control. See <a href="http://www.hp.com/go/insightcontrol">www.hp.com/go/insightcontrol</a></p> <p>HP Insight Control 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: <a href="http://www.hp.com/services/insight">http://www.hp.com/services/insight</a>.</p>
HP Insight Dynamics for ProLiant	<p>HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. As a powerfully integrated by design toolkit to accelerate complex technology projects and simplify daily operations that ultimately enable IT Staff personnel to dynamically keep pace with the organizations changing business requirements. It enables them to plan capacity and power continuously, balance across physical and virtual resources, and ensure cost-effective high availability. It also enables IT organizations to provision infrastructure consistently and automatically from pools of shared resources using a self-service portal. Resources provisioned can range from a single virtual machine to complex multi-tier environments and their associated physical and virtual resource requirements. In addition to the previous functional benefits, it also provides a cost-effective disaster recovery for physical and virtual environments that works with HP StorageWorks Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.</p> <p><b>NOTE:</b> For more information, visit: <a href="http://www.hp.com/go/insightdynamics">http://www.hp.com/go/insightdynamics</a></p>

### Standard Features

<b>Industry Standard Compliance</b>	ACPI V1.0b and 2.0 Compliant PCI 3.0 Compliant PCI-X 3.0 Compliant PCI-Express 3.0 Compliant PXE Support WOL Support Microsoft Logo certifications Novell Logo certifications USB 2.0
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<b>Manageability</b>	HP Systems Insight Manager Online ROM Flash Utility Drive Parameter Tracking (with Smart Array Controller) Dynamic Sector Repairing (with Smart Array Controller) Pre-Failure Warranty (covers processors, memory and SAS hard drives) BIOS Serial Console
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<b>Security</b>	Power-on password Setup password Diskette boot control Power switch security
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<b>Security - Trusted Platform Module</b>	<p>Trusted Platform Module option kit</p> <p>The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.</p> <p>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. <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>
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<b>Server Power Cords</b>	<p>All models ship with one 1.8m (6 foot) standard low-line, country specific power cord. Localized cables included with geographic specific models in other world regions.</p> <p><b>NOTE:</b> HP ProLiant ML310 a C13 to C14 2.8M jumper cord ships standard. If customers require a local power cord, they can check the power cord matrix for the appropriate country specific sku. Please see the following power cord matrix: <a href="http://www.hp.com/go/powercordmatrix">http://www.hp.com/go/powercordmatrix</a>.</p>
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<b>Power Specifications</b>	<p><b>NOTE:</b> To review typical system power ratings use the HP Power Advisor which is available online located at url: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a> or <a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a></p>
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### Standard Features

<b>Power Supply</b>	410 Watt PFC (Power Factor Correcting) non-hot plug non-redundant power supply or 430 Watt PFC hot plug redundant power supplies (ships with two power supplies)
<b>UPS and PDU Power Cord Matrix</b>	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: <a href="http://www.hp.com/products/powercords">www.hp.com/products/powercords</a> .
<b>System Fans</b>	1 - Non-hot plug, Non-redundant system fans; 1 optional fan for PCI-X Extender Board <b>NOTE:</b> Does not include fan in power supply.
<b>Operating Systems and Virtualization Software Support for ProLiant Servers</b>	<a href="#">Microsoft Windows Server</a> <a href="#">Microsoft Windows Server Hyper V</a> <a href="#">Red Hat Enterprise Linux (RHEL)</a> <a href="#">SUSE Linux Enterprise Server (SLES)</a> <a href="#">Oracle Enterprise Linux (OEL)</a> <b>NOTE:</b> 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: <a href="http://www.hp.com/go/ossupport">http://www.hp.com/go/ossupport</a> and our driver download page <a href="http://www.hp.com/support/ML310G5p">www.hp.com/support/ML310G5p</a> .
<b>Factory Express Portfolio for Servers and Storage</b>	<p>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.</p> <p>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.</p> <p>For more information on Factory Express services for your specific server model please contact your sales representative or go to: <a href="http://www.hp.com/go/factory-express">http://www.hp.com/go/factory-express</a>.</p>
<b>Rack and Rack Options Rack Cabinets:</b>	<ul style="list-style-type: none"><li>For information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a></li></ul>
<b>KVM Switches, Serial Console Servers, Rackmount Monitors, Keyboards:</b>	<ul style="list-style-type: none"><li>For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>.</li></ul>

### Standard Features

#### HP Enterprise Configurator

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

#### Service and Support

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

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

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

**Recommended Service** - simplify ProLiant solution implementation, maintenance, and management.

- **Support** - 3-Year 9x5 Next Business Day coverage, excluding HP holidays only
- **Deployment Service** - HW Installation only

**Enhanced Service** - optimize service level to increase IT performance and availability.

- **Support** - 3-Year 13x5 Same Business Day, 4-Hour response coverage only
- **Deployment Service** - Installation and Start up only

Refer to the information on the Installation of a ProLiant on the ProLiant Data Sheet; to be delivered on a scheduled basis 8am-5pm, M-F, excluding HP holidays.

**NOTE:** For a complete listing of service offerings and information visit:

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

<http://www.hp.com/go/proliant/carepack>

### 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.

<b>HP ML310G5p Q9400</b> <b>1GB SATA</b> 515866-xx1	<b>Processor(s)</b>	Quad-Core Intel® Core™2 processor Q9400 (2.66 GHz, 6MB L2 Cache, 95 Watts, 1333MHz FSB)
	<b>Cache Memory</b>	6MB L2
	<b>Memory</b>	1GB (1x1GB) UDIMM
	<b>Network Controller</b>	Embedded NC326i Dual Integrated Gigabit NICs
	<b>Storage Controller</b>	Embedded SATA with integrated SATA RAID 0, 1
	<b>Hard Drives</b>	None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller)
	<b>Internal Storage</b>	SAS: 4.0TB maximum; SATA: 8.0TB maximum
	<b>Optical Drive</b>	SATA DVD-ROM Drive
	<b>Diskette Drive</b>	None ship standard (Optional 1.44 MB Diskette Drive)
	<b>Power Supply</b>	430W redundant power supply
	<b>Form Factor</b>	Tower (5U) (Optional Tower to Rack Enabling Kit available, system & tray occupy 6U)

<b>HP ML310G5p E8400</b> <b>1GB SATA</b> 515867-xx1	<b>Processor(s)</b>	Dual-Core Intel® Core™2 duo processor E8400 (3.00 GHz, 6MB L2 Cache, 65 Watts, 1333MHz FSB)
	<b>Cache Memory</b>	6MB L2
	<b>Memory</b>	1GB (1x1GB) UDIMM
	<b>Network Controller</b>	Embedded NC326i Dual Integrated Gigabit NICs
	<b>Storage Controller</b>	Embedded SATA with integrated SATA RAID 0, 1
	<b>Hard Drives</b>	None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller)
	<b>Internal Storage</b>	SAS: 4.0TB maximum; SATA: 8.0TB maximum
	<b>Optical Drive</b>	SATA DVD-ROM Drive
	<b>Diskette Drive</b>	None ship standard (Optional 1.44 MB Diskette Drive available)
	<b>Power Supply</b>	410W non-hot plug non-redundant power supply
	<b>Form Factor</b>	Tower (5U) (Optional Tower to Rack Enabling Kit available, system & tray occupy 6U)

<b>Country Code Key</b>	xx=00	US
	xx=01	Australia
	xx=03	UK
	xx=04	Germany
	xx=05	France
	xx=29	Japan
	xx=37	AP
	xx=42	Europe

### 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.

**NOTE:** FIO indicates that this option only available as a Factory Installable Option.

### Step 1: Base Configuration

<b>HP Models</b>	HP ProLiant ML310G5p Model X CTO Chassis	445343-B22
	<b>Factory Integrated Models ship with:</b>	
	Embedded NC326i Gigabit Server Adapter	
	Integrated Four Port SATA Controller (HP-SATA/SAS chassis only)	
	Keyboard and Mouse	
	<b>NOTE:</b> The ML310G5p CTO chassis offers pluggable SATA/SAS Drives. It is required to purchase a Smart Array controller if hot plug function is needed.	

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

<b>HP Processors</b>	HP 440 ML310G5p FIO Kit	519647-L21
	HP E2160 ML310G5p FIO Kit	519649-L21
	HP E3120 ML310G5p FIO Kit	519651-L21
	HP X3330 ML310G5p FIO Kit	519655-L21
	HP E8400 ML310G5p FIO Kit	517494-L21
	HP Q9400 ML310G5p FIO Kit	517495-L21
	HP E6400 ML310G5p FIO Kit	519170-L21
	HP E3110 ML310G5p FIO Kit	577026-L21
<b>HP Memory</b>	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21
<b>HP Power Supplies</b>	430W Hot-plug Redundant Power Supply Kit, FIO	431652-B21
	<b>NOTE:</b> Hot plug redundant power supply Kit ships with two power supplies.	
	410W Non-hot-plug Power Supply, FIO	459902-B21
	<b>NOTE:</b> Non-hot plug power supply ships with one power supply.	

### Step 3: Choose Additional Factory Integratable Options

<b>HP Controllers</b>	<b>NOTE:</b> When hot-plug SATA hard drives are installed, SATA LED functionality and full SATA hot-plug capability are not supported with the embedded controller. For full LED and hot-plug support, an optional SATA/SAS RAID controller must be installed. SAS Controllers support both SAS and SATA hard drives. Some SAS Controllers also have SAS tape support. Please refer to the "Tape and Disk-Based Backup" table in the Storage section for a list of SAS Controllers with tape support.	
	HP Smart Array E200/128 BBWC Controller	411508-B21
	<b>NOTE:</b> RAID 0, 1, 1+0, 5.	
	HP Smart Array P400/256MB Controller	405132-B21
	<b>NOTE:</b> RAID 0, 1, 1+0, 5.	

### Configuration Information - Factory Integrated Models

HP Smart Array P400/512MB BBWC Controller <b>NOTE:</b> RAID 0, 1, 1+0, 5, 6.	411064-B21
HP Smart Array E500/256MB Controller <b>NOTE:</b> RAID 0, 1, 1+0 standard, 5 optional.	435129-B21
HP Smart Array P800/512MB BBWC Controller <b>NOTE:</b> RAID 0, 1, 1+0, 5, 6.	381513-B21
HP Smart Array P212/256MB Controller <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	462834-B21
HP Smart Array P212/Zero Memory Controller <b>NOTE:</b> RAID 0, 1, 1+0.	462828-B21
HP P411/256 FIO SA Cntrlr w/Battery <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	491193-B21
HP Smart Array P411/256MB Controller <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	462830-B21
HP Smart Array P411/512MB BBWC <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	462832-B21
HP P410/256 FIO SA Cntrlr w/Battery <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	491195-B21
HP Smart Array P410/256MB Controller <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	462862-B21
HP Smart Array P410/512MB with BBWC <b>NOTE:</b> RAID 0, 1, 1+0, 5, 5+0.	462864-B21
HP P410/ZM FIO Smart Array Controller <b>NOTE:</b> RAID 0, 1, 1+0.	462860-B21
HP ML310 G5 SAS Cable <b>NOTE:</b> This part number must be used with Smart Array E200 or SAS HBA for SAS models.	460310-B21
HP Mini SAS to 8484 18in, 24in Cable As <b>NOTE:</b> This part number must be used with Smart Array P212/P411 Controller for SAS models.	496015-B21
<b>SAS HBA</b>	
HP SC08Ge Host Bus Adapter	488765-B21
HP SC44Ge Host Bus Adapter <b>NOTE:</b> RAID 0, 1. <b>NOTE:</b> When using the SC44Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.	416096-B21
HP 8 Internal Port SAS HBA with RAID <b>NOTE:</b> When using the 8 Internal Port SAS HBA with SATA Hard Drives, 1.5G SATA Hard Drives are required. <b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.	347786-B21
<b>HP Insight Software</b> HP Insight Control, No Media 1-Server License Factory-Integratable Option (FIO) including 1 year of 24x7 Technical Support and Updates	582765-B21

### Step 4: Choose Additional Options for Factory Integration

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

### Core Options

**NOTE:** Some options may not be factory integrated. Please contact your local sales representative for additional information.

<b>HP Memory</b>	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21

<b>HP Floppy Drives</b>	1.44MB Diskette Drive Option Kit	379257-B21
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<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

### HP Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, 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.

**NOTE:** A HP Smart Array Controller is required for hot plug functionality.

#### 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
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HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
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HP 450GB 3G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	454232-B21
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HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21
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HP 300GB 3G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	416127-B21
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HP 146GB 3G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	384854-B21
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#### SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21
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HP 1TB 3G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	461137-B21
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HP 750GB 3G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	461135-B21
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**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)

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

HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
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HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
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HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21
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### Core Options

#### 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

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

**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)

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

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

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

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

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

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### HP Networking

#### Gigabit Ethernet Adapters

HP NC112T PCIe Gigabit Server Adapter 503746-B21

HP NC360T PCI Express Dual Port Gigabit Server Adapter 412648-B21

HP NC364T PCI Express Quad Port Gigabit Server Adapter 435508-B21

HP NC365T 4-port Ethernet Server Adapter 593722-B21

HP NC373F PCI Express Multifunction Gigabit Server Adapter 394793-B21

HP NC373T PCI Express Multifunction Gigabit Server Adapter 394791-B21

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

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

### Additional Options

<b>HP Insight Software</b>	<b>HP Insight Control</b>	
	HP Insight Control, Single-Server License including 1 year of 24x7 Technical Support and Updates	452148-B22
	HP Insight Control suite, No Media, Electronic License including 1 year of 24x7 Technical Support and Updates	T9074BAE
	HP Insight Control, Electronic License for bundling with ProLiant ML/DL server, including 1 year of 24x7 Technical Support and Updates	TC278AAE
	HP Insight Control, Tracking License for bundling with ProLiant ML/DL server, including 1 year of 24x7 Technical Support and Updates	TC275A
	HP Insight Software Media Kit	436222-B21
	<p><b>NOTE:</b> Insight Software DVD media without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Insight Dynamics, HP Insight Control for Microsoft System Center, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.</p> <p><b>NOTE:</b> Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key.</p> <p><b>NOTE:</b> Electronic software is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.</p> <p><b>NOTE:</b> Customer will receive a license entitlement certificate. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service.</p> <p><b>NOTE:</b> Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at: <a href="http://www.hp.com/go/insightupdates">http://www.hp.com/go/insightupdates</a>.</p> <p><b>NOTE:</b> For additional license options please see the Insight Control QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html">http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html</a></p>	
	<b>HP Insight Control for Linux</b>	
	HP Insight Control for Linux, 1-server license, including one year of 24x7 Technical Support and Updates, Electronic	TC213AAE
	HP Insight Control for Linux, No Media, 1-Server license, including one year of 24x7 Technical Support and Updates	TC209A
	HP Insight Control for Linux, Media pack (DVD) - No licenses included	TC208A
	<p><b>NOTE:</b> Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately.</p> <p><b>NOTE:</b> Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: <a href="http://www.hp.com/go/ic-linux">http://www.hp.com/go/ic-linux</a> (click on Download button).</p> <p><b>NOTE:</b> Electronic software is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.</p> <p><b>NOTE:</b> Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single set of activation keys.</p> <p><b>NOTE:</b> For additional License Kits, including electronic licensing options, please see the QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html">http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html</a></p>	
	<b>HP Integrated Lights-Out (iLO) Advanced</b>	

### Additional Options

HP Integrated Lights-Out Advanced, No Media, 1-Server License, including 1 year of 24x7 Technical Support and Updates	512485-B21
HP ProLiant Essentials Integrated Lights-Out Advanced Pack, Electronic, including 1 year of 24x7 Technical Support and Updates	TA850AAE
<p><b>NOTE:</b> This license allows 1 server to be deployed and managed via HP iLO Advanced. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service</p> <p><b>NOTE:</b> Electronic software is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.</p> <p><b>NOTE:</b> For additional license kits, including electronic delivery options, please see the QuickSpecs at:  <a href="http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html">http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html</a></p>	

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<b>HP Security - TPM</b>	HP Trusted Platform Module Option Kit	488069-B21
<p><b>NOTE:</b> Data security in HP ProLiant servers using the Trusted Platform Module and Microsoft® Windows® BitLocker™ Drive Encryption.  <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01681891/c01681891.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c01681891/c01681891.pdf</a></p>		

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### HP Storage Controllers SAS Cable

**NOTE:** A SAS HBA or Controller is required if SAS hard drives are selected. SAS HBAs support both SAS and SATA hard drives. Some SAS HBAs also have SAS tape support. Please refer to the "Tape and Disk-Based Backup" table in the Storage section for a list of SAS HBAs with tape support.

#### SAS Controllers

**NOTE:** Any Smart Array Controller or SAS HBA requires the purchase of the HP SAS Cable (p/n 460310-B21) for the ML310 G5p. Smart Array P212/P410/P411 Controller for SAS models require the purchase of the HP mini SAS Cable (p/n 496015-B21) for the ML310 G5p.

#### Smart Array E200 Controller

HP Smart Array E200/128 BBWC Controller	411508-B21
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#### Smart Array E500 Controller

HP Smart Array E500/256MB Controller	435129-B21
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#### Smart Array P400 Controller

HP Smart Array P400/256MB Controller	405132-B21
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HP Smart Array P400/512MB BBWC Controller	411064-B21
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#### Smart Array P800 Controller

HP Smart Array P800/512 BBWC Controller	381513-B21
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#### Smart Array P212 Controller

HP Smart Array P212/Zero Memory Controller	462828-B21
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HP Smart Array P212/256 MB Controller	462834-B21
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#### Smart Array P410 Controller

HP Smart Array P410/256 MB Controller	462862-B21
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HP Smart Array P410/512 MB with BBWC Controller	462864-B21
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HP Smart Array P410/512MB with FBWC	578230-B21
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### Additional Options

HP Smart Array P410/1G with FBWC	572532-B21
<b>Smart Array P411 Controller</b>	
HP Smart Array P411/256 MB Controller	462830-B21
HP Smart Array P411/512 MB with BBWC Controller	462832-B21
HP Smart Array P411/512MB Flash Backed Write Cache	578229-B21
HP Smart Array P411/1G Flash Backed Write Cache	572531-B21
<b>Smart Array P812 Controller</b>	
HP Smart Array P812/1G Flash Backed Cache Controller	487204-B21
<b>Optional Upgrades</b>	
HP SA-P400 and SA-E500 24 In Battery Cable Kit	417836-B21
<b>NOTE:</b> This option kit contains a 24" battery cable and adhesive material for installing a batter into the server if a Smart Array E500 is integrated outside of the factory. For all solutions, please refer to the server QuickSpecs and User's Manual for detailed installation instructions.	
Battery-backed write cache upgrade	383280-B21
<b>NOTE:</b> For Smart Array P400 Controller only.	
512MB Battery-backed cache upgrade	405148-B21
<b>NOTE:</b> For Smart Array P400 Controller only.	
256 MB Cache Module	462968-B21
<b>NOTE:</b> Supported on HP Smart Array P212 Controller only.	
512MB BBWC	462967-B21
<b>NOTE:</b> Supported on HP Smart Array P410 Controller and HP Smart Array P411 Controller only.	
512MB Flash Backed Write Cache	534916-B21
1G Flash Backed Write Cache	534562-B21
HP Mini SAS to 8484 18in, 24in Cable As	496015-B21
<b>NOTE:</b> This part number must be used with Smart Array P212/P411 Controller for SAS models.	
HP Smart Array Advanced Pack No Media 1-Server license including 1yr 24x7 Technical Support	516471-B21
<b>NOTE:</b> 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.	
<b>NOTE:</b> Please see the following QuickSpecs for Technical Specifications and additional information:	
<a href="http://h18000.www1.hp.com/products/quickspecs/12460_div/12460_div.html">http://h18000.www1.hp.com/products/quickspecs/12460_div/12460_div.html</a> (Smart Array E200 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12700_div/12700_div.html">http://h18000.www1.hp.com/products/quickspecs/12700_div/12700_div.html</a> (Smart Array E500 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.html">http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.html</a> (Smart Array P400 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.html">http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.html</a> (Smart Array P800 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/13203_div/13203_div.html">http://h18000.www1.hp.com/products/quickspecs/13203_div/13203_div.html</a> (Smart Array P212 Controller)	
<a href="http://h18000.www1.hp.com/products/quickspecs/13201_div/13201_div.html">http://h18000.www1.hp.com/products/quickspecs/13201_div/13201_div.html</a> (Smart Array P410 Controller)	

### Additional Options

[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)

#### SAS HBA

HP SC08Ge Host Bus Adapter 488765-B21

HP SC44Ge Host Bus Adapter 416096-B21

**NOTE:** When using the SC44Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.

HP 8 Internal Port SAS HBA with RAID 347786-B21

**NOTE:** When using the 8 Internal Port SAS HBA with SATA Hard Drives, 1.5G SATA Hard Drives are required.

**NOTE:** Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.

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

[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)

[http://h18004.www1.hp.com/products/quickspecs/12617\\_div/12617\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12617_div/12617_div.html)  
(SC44Ge HBA)

[http://h18004.www1.hp.com/products/quickspecs/12332\\_div/12332\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12332_div/12332_div.html)  
(8 Internal Port SAS HBA)

#### SCSI Controllers for External Drive/Storage Support

64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2 374654-B21

**NOTE:** If a Non-Hot Plug SCSI Tape Drive is selected in any model, then customer must add either 374654-B21 or 412911-B21.

#### SCSI HBA

HP SC11Xe Host Bus Adapter 412911-B21

**NOTE:** Recommended HBA for SCSI tape drive connect.

**NOTE:** If a Non-Hot Plug SCSI Tape Drive is selected in any model, then customer must add either 374654-B21 or 412911-B21.

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

[http://h18004.www1.hp.com/products/quickspecs/11943\\_div/11943\\_div.html](http://h18004.www1.hp.com/products/quickspecs/11943_div/11943_div.html)  
(SCSI HBA)

[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)

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<b>HP PCI-X Slot</b>	HP ML310 G5p PCI-X Extender Board Kit 451778-B21 <b>NOTE:</b> An additional fan is required with PCI-X Extender Board. This fan is included in the HP ML310 G5p PCI-X Extender Board Kit.
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<b>HP Interconnect</b>	HP ProLiant Second Serial / Parallel port option kit 401222-B21
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### Additional Options

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

<b>Software</b>	HP Data Protector Express 4.0 SP1 Backup Server	BB117BA
	HP Data Protector Express 4.0 SP1 for Microsoft Small Business Server	BB118BA
	HP Data Protector Express Backup Server 4.0 SP1 Upgrade from Data Protector Express Single Server Edition	BB117BT

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

##### Rack-Mount Tape Solutions

HP StorageWorks DAT 320 USB Internal Tape Drive	AJ825A
HP StorageWorks DAT 320 SAS Internal Tape Drive	AJ830A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-4 Ultrium 1760 SAS Internal Tape Drive	EH919A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-5 Ultrium 3000 SAS Internal Tape Drive	EH957A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks 1/8 G2 LTO-5 Ultrium 3000 SAS Tape Autoloader	BL536A
<b>NOTE:</b> Requires HP 1U Tape Autoloader Rack Kit (AH166A) for rack installation. Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks MSL2024 Tape Library with one LTO-5 Ultrium 3000 SAS Drive	BL537A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks MSL4048 Tape Library with one LTO-5 Ultrium 3000 SAS Drives	BL538A
<b>NOTE:</b> Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	

### Additional Options

#### HP Disk Backup

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

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

HP StorageWorks D2D2502i Backup System EJ001B

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

HP StorageWorks D2D2504i Backup System EJ002B

**NOTE:** 3.0TB of useable 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 D2D4004i Backup System EH938A

**NOTE:** 3.0TB (expandable to 7.5TB) of useable 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 D2D4112fc Backup System EH993B

**NOTE:** 9.0TB (expandable to 18.0TB) of useable network disk backup capacity. Fibre Channel SAN connected appliance. Direct server attach is not supported, requires connection via SAN fabric.

#### HP StorageWorks RDX Removable Disk Backup Systems USB

HP StorageWorks RDX320 Internal Removable Disk Backup System AJ767A

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

HP StorageWorks RDX500 Internal Removable Disk Backup System AJ934A

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

HP StorageWorks RDX750 Internal Removable Disk Backup System AW577A

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

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#### HP StorageWorks Options

#### StorageWorks SCSI HBA

HP U320e SCSI Host Bus Adapter AH627A

**NOTE:** Recommended HBA for MSL SCSI Tape Library connect.

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### Additional Options

#### HP Disk Storage Systems

#### MSA SAN Storage Arrays

HP StorageWorks 60 Modular Smart Array

418408-B21

**NOTE:** Supports 12 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/12627\\_div/12627\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html)

HP StorageWorks 70 Modular Smart Array

418800-B21

**NOTE:** Supports 25 SFF drives, and SAS 3 Gb/s and SATA 1.5 Gb/s.

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/12652\\_div/12652\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html)

#### HP Disk Storage Systems

HP StorageWorks D2600 Disk Enclosure

AJ940A

**NOTE:** Please see the QuickSpecs for additional options and configuration information at:

[http://h18000.www1.hp.com/products/quickspecs/13404\\_div/13404\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13404_div/13404_div.html) (Worldwide)

#### HP Uninterruptible Power Systems

#### HP Tower UPS

#### HP T750 G2 UPS

HP T750 G2 UPS, NA/JPN

AF446A

**NOTE:** Please see the QuickSpecs for 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)

**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>.

#### HP Rack Options

#### Rack Kits

ProLiant Rack Enabling Kit (RoHS Compliant)

417705-B21

**NOTE:** This is a Rack Enabling Kit that supports the HP ProLiant ML110 and HP ProLiant ML310 servers (system & tray occupy 6U).

**NOTE:** Support for racks with round or square mounting holes (including all Compaq and HP Rack System /E and HP Systems), with an adjustment range of 24" - 36".

#### HP USB and SD Options

HP 2GB USB Flash Media Drive Key

608447-B21

**NOTE:** HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to [HP VMware Getting Started Guide](#) for installation instructions.

### Additional Options

#### HP Care Pack Services Hardware Services On-site Service

Next Business Day On-site Service, 5-Day x 9-Hour Coverage, 3 Years, Electronic U4445E

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic U4446E

4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic U4447E

6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic U4448E

#### Installation & Start-up Services

Hardware Installation, Electronic U4456E

Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays, Electronic U4457E

#### Support Plus

Onsite HW support, 8am-9pm, M-F, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, Electronic U4458E

#### Support Plus 24

Onsite HW support 24x7, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic U4459E

Onsite HW support 24x7, 4hr response and SuSE Linux SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic U6306E

**NOTE:** For more information, customer/resellers can contact:  
<http://www.hp.com/services/carepack>.

### Memory

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

#### HP ProLiant ML310 G5p Memory Configuration

##### Standard Memory

All HP ProLiant ML310 G5p models ship with unbuffered, ECC PC2-6400 DDR2 SDRAM running at 800MHz.

All models include a single 1GB DIMM.

Factory Integrated Models include the memory capacity of your choice.

##### Standard Memory Replaced with Optional Memory

Up to 8 GB memory is available with the optional installation of four 2 GB PC2-6400 Unbuffered ECC DDR2 SDRAM DIMM kits.

DIMM upgrades do not need to be installed in pairs although installation of pairs (an equal size DIMM for each channel) provides the best performance. The BIOS will detect the DIMM population and initialize the system accordingly as follows:

- Single-channel mode - DIMMs installed for one channel only
- Dual-channel asymmetric mode - DIMMs installed for both channels but of unequal channel capacities.
- Dual-channel interleaved mode (recommended) - DIMMs installed for both channels and offering equal channel capacities, providing the highest performance.

The first DIMM should be installed in Socket 1. A DIMM should not be installed in Socket 2 without a DIMM in Socket 1. Likewise a DIMM should not be installed in Socket 4 without a DIMM in Socket 3. A DIMM need not be installed in Socket 2 in order to install a DIMM in Socket 3.

Table 3-1 shows some of the suggested memory configurations for these systems.

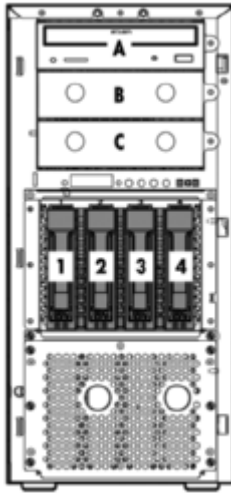
**NOTE:** Table 3-1 does not list all possible configurations. Balanced-capacity, dual-channel loading yields best performance.

Channel A		Channel B		Total	Mode
Socket 1	Socket 2	Socket 3	Socket 4		
512 MB	none	none	none	512 MB	Single-channel
512 MB	none	512 MB	none	1 GB	Single-channel interleaved
1 GB	none	none	none	1 GB	Single-channel
1 GB	none	1 GB	none	2 GB	Single-channel interleaved
1 GB	1 GB	1 GB	none	3 GB	Dual-channel asymmetric
1 GB	1 GB	1 GB	1 GB	4 GB	Dual-channel interleaved
1 GB	2 GB	1 GB	2 GB	6 GB	Dual-channel interleaved
2 GB	2 GB	2 GB	2 GB	8 GB	Dual-channel interleaved

Following are memory options available from HP:

<b>HP Memory</b>	HP 2GB (1x2GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450260-B21
	HP 1GB (1x1GB) Dual Rank PC2-6400 (DDR2-800) Unbuffered Memory Kit	450259-B21

### Storage



B, C Removable Media Bays (1.6" each)

A SATA DVD-ROM

1 - 4 Four Hot Plug Hard Drive Bays

### Drive Support

	Quantity Supported	Position Supported	Controller
<b>Removable Media</b>			
1.44-MB Diskette Drive	Up to 1	A, B, or C	Integrated
HP Half-Height SATA DVD-ROM Optical Drive	Up to 2	A, B, or C	Integrated SATA
HP Half-Height SATA DVD RW Optical Drive	Up to 2	A, B, or C	Integrated SATA

### Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, 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.

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

	Quantity Supported	Position Supported	Controller
600GB 6G SAS 15K DP	Up to 4	1-4	HP SC40Ge SAS HBA with RAID 0, 1
450GB 6G SAS 15K DP			<b>NOTE:</b> When using the SC40Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
450GB 3G SAS 15K DP			HP 8 Internal Port SAS HBA with RAID
300GB 6G SAS 15K DP			<b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
300GB 3G SAS 15K DP			HP Smart Array P212 0 MB Controller
146GB 3G SAS 15K DP			HP Smart Array E200/128 BBWC Controller
			HP Smart Array P212/256 MB Controller
			HP Smart Array P400/256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array E500/256 MB Controller
			HP Smart Array P400/512 MB BBWC Controller
			HP Smart Array P800/512 BBWC Controller

### Storage

**NOTE:** Use of SAS hard drives in SATA/SAS models requires installation of one of the controllers or HBAs listed above.

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

	Quantity Supported	Position Supported	Controller
1TB 6G SAS 7.2K DP	Up to 4	1-4	HP SC40Ge SAS HBA with RAID
1TB 3G SAS 7.2K DP			<b>NOTE:</b> When using the SC40Ge with SATA Hard Drives, 1.5G SATA Hard Drives are required. Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
750GB 3G SAS 7.2K DP			HP 8 Internal Port SAS HBA with RAID
			<b>NOTE:</b> Transfer rate: 1.5 Gb/s SATA, 3 Gb/s SAS.
			HP Smart Array E200/128 BBWC Controller
			HP Smart Array E500/256 MB Controller
			HP Smart Array P400/256 MB Controller
			HP Smart Array P400/512 MB BBWC Controller
			HP Smart Array P800/512 BBWC Controller
			HP Smart Array P212/Zero Memory Controller
			HP Smart Array P212/256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller

**NOTE:** Use of SAS hard drives in SATA/SAS models requires installation of one of the controllers or HBAs listed above.

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

	Quantity Supported	Position Supported	Controller
2TB 3G SATA 7.2K	Up to 2	1-2	HP Smart Array E200/128 BBWC Controller
1TB 3G SATA 7.2K	Up to 4	1-4	HP Smart Array P400/256MB Controller
500GB 3G SATA 7.2K	<b>NOTE:</b> depending on model.	<b>NOTE:</b> depending on model.	HP Smart Array P400/512MB BBWC Controller
			HP Smart Array P800/512MB BBWC Controller
			HP Smart Array P212/Zero Memory Controller
			HP Smart Array P212/256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller

**NOTE:** Hot plug capability and drive LED status support requires installation of one of the controllers or HBAs listed above.

#### 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/Zero Memory Controller
120GB 3.0G SATA SSD			HP Smart Array P212/256 MB Controller
			HP Smart Array P410/256 MB Controller
			HP Smart Array P410/512 MB BBWC Controller

### Storage

#### External Storage

	Quantity Supported	Position Supported	Controller
60 Modular Smart Array	Up to 8	External	HP Smart Array P800/512 BBWC Controller
	Up to 8	External	HP Smart Array E500/256 MB Controller
	Up to 4	External	HP Smart Array P212/Zero Memory Controller
			HP Smart Array P212/256 MB Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller
70 Modular Smart Array	Up to 4	External	HP Smart Array P800/512 BBWC Controller
	Up to 4	External	HP Smart Array E500/256 MB Controller
	Up to 2	External	HP Smart Array P212/Zero Memory Controller
			HP Smart Array P212/ 256 MB Controller
			HP Smart Array P411/256 MB Controller
			HP Smart Array P411/512 MB BBWC Controller

#### Tape and Disk Backup

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

	Position Supported	Controller	Part Number
<b>HP StorageWorks SCSI Tape Drives</b>	Internal or External	HP SC11Xe 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>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	
<b>HP StorageWorks SCSI Rack Mount Kits</b>	External	HP SC11Xe Host Bus Adapter	412911-B21
1U Rack-Mount Kit			
3U Rack-Mount Kit			
<b>HP StorageWorks USB Tape Drives</b>	Internal or External	USB 2.0 Port	N/A
DAT 40			
DAT 72			
DAT 160			
DAT 320			

### Storage

<b>HP StorageWorks USB Rack Mount Kits</b> 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
<b>HP StorageWorks SAS Tape Drives</b> 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	Internal or External	HP SC44Ge Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks SAS Rack Mount Kits</b> 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks SCSI Tape Autoloaders</b> DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	412911-B21
<b>HP StorageWorks SCSI Tape Libraries</b> MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Dual Channel Controller  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	AH627A
<b>HP StorageWorks SAS Tape Autoloaders and Libraries</b> 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter  <b>NOTE:</b> Please check the full compatibility information at: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	416096-B21
<b>HP StorageWorks 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.	
<b>HP StorageWorks USB RDX Removable Disk Backup System</b>	Internal or External	USB 2.0 Port	N/A



### Storage

RDX160  
RDX320  
RDX500  
RDX750

**HP StorageWorks D2D  
Backup Systems, iSCSI**  
D2D2500i  
D2D4000i

External

Embedded Network Controller. If the server requires a hardware iSCSI initiator, the QLogic QLA4050 Host Bus Adapter is recommended.

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

External

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

### Technical Specifications

<b>System Unit</b>	<b>Dimensions</b> (H x W x D) 17.0 x 7.9 x 24.0 in (43.2 x 20.0 x 61.0 cm) (with bezel)									
	<b>Tower Weight</b> (approximate)	<table border="0"> <tr> <td>Maximum</td> <td>50 lb (22.7 kg)</td> </tr> <tr> <td colspan="2">(two hard drives, power supply, and processor installed)</td> </tr> <tr> <td>Minimum</td> <td>33.1 lb (15.0 kg)</td> </tr> <tr> <td colspan="2">(one hard drive, power supply, and processor installed)</td> </tr> </table>	Maximum	50 lb (22.7 kg)	(two hard drives, power supply, and processor installed)		Minimum	33.1 lb (15.0 kg)	(one hard drive, power supply, and processor installed)	
	Maximum	50 lb (22.7 kg)								
(two hard drives, power supply, and processor installed)										
Minimum	33.1 lb (15.0 kg)									
(one hard drive, power supply, and processor installed)										
	<b>Input Requirements</b> (per power supply)	<table border="0"> <tr> <td>Rated Line Voltage</td> <td>90 VAC - 264 VAC</td> </tr> <tr> <td>Rated Input Current</td> <td>6.5 A (at 100 VAC), 3 A (at 230 VAC)</td> </tr> <tr> <td>Rated Input Frequency</td> <td>47 to 63 Hz</td> </tr> <tr> <td>Rated Input Power</td> <td>&lt;527W @115/230 VRMS</td> </tr> </table>	Rated Line Voltage	90 VAC - 264 VAC	Rated Input Current	6.5 A (at 100 VAC), 3 A (at 230 VAC)	Rated Input Frequency	47 to 63 Hz	Rated Input Power	<527W @115/230 VRMS
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	Rated Input Current	6.5 A (at 100 VAC), 3 A (at 230 VAC)								
	Rated Input Frequency	47 to 63 Hz								
Rated Input Power	<527W @115/230 VRMS									
	<b>BTU Rating</b>	<table border="0"> <tr> <td>Maximum</td> <td>1836 BTU/hr (at 100 VAC), 1706 BTU/hr (at 200 VAC)</td> </tr> </table>	Maximum	1836 BTU/hr (at 100 VAC), 1706 BTU/hr (at 200 VAC)						
Maximum	1836 BTU/hr (at 100 VAC), 1706 BTU/hr (at 200 VAC)									
	<b>Power Specifications</b>	<p><b>NOTE:</b> To review typical system power ratings use the <a href="http://www.hp.com/go/proliant-energy-efficient">HP Power Advisor</a> which is available online located at url: <a href="http://www.hp.com/go/proliant-energy-efficient">www.hp.com/go/proliant-energy-efficient</a> or <a href="http://www.hp.com/go/hppoweradvisor">www.hp.com/go/hppoweradvisor</a></p> <p>- Click on the system of interest. Example: ML310 G5p - Follow the instructions of the next screens.</p>								
	<b>Power Supply Output</b> (per power supply)	<table border="0"> <tr> <td>Rated Steady-State Power</td> <td>400 W (at 100 VAC), 400 W (at 200 VAC)</td> </tr> <tr> <td>Maximum Peak Power</td> <td>400 W (at 100 VAC), 400 W (at 200 VAC)</td> </tr> </table>	Rated Steady-State Power	400 W (at 100 VAC), 400 W (at 200 VAC)	Maximum Peak Power	400 W (at 100 VAC), 400 W (at 200 VAC)				
Rated Steady-State Power	400 W (at 100 VAC), 400 W (at 200 VAC)									
Maximum Peak Power	400 W (at 100 VAC), 400 W (at 200 VAC)									
	<b>System Inlet Temperature</b>	<table border="0"> <tr> <td>Operating</td> <td>10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).</td> </tr> <tr> <td>Non-operating</td> <td>-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).</td> </tr> </table>	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).				
	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).								
Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).									
	<b>Relative Humidity</b> (non-condensing)	<table border="0"> <tr> <td>Operating</td> <td>10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.</td> </tr> <tr> <td>Non-operating</td> <td>5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.</td> </tr> </table>	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.				
	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.								
Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.									
	<b>Altitude</b>	<table border="0"> <tr> <td>Operating</td> <td>3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is</td> </tr> </table>	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						
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									

### Technical Specifications

		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).	
	Idle	
	L WAd (BELS)	5.0 B
	L pAm (dBA)	32 dBA
	Operating	
	L WAd (BELS)	5.0 B
	L pAm (dBA)	32 dBA
<b>Emissions Classification (EMC)</b>	<b>FCC Rating</b>	B
	<b>Normative Standards</b>	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.

<b>HP SATA DVD-ROM Optical Drive</b>	<b>Applicable Disk</b>	DVD-ROM DVD-R /-RW (Read Only) DVD+R /+RW (Read Only) 2.6 GB/side DVD-RAM (Read Only) 5.2 GB/side DVD-RAM (Read Only) CD-ROM Mode-1 data disc CD-ROM Mode-2 data disc CD Audio disc CD-Extra CD-RW (Read Only) CD-R (Read Only) CD Text PhotoCD CD-I (mode 2) CD-I Ready CD-Bridge		
	<b>Capacity</b>	DVD-ROM	DVD-SL DVD-DL Double Sided	4.7 GB/side 8.5 GB/side 9.40 GB/side
		DVD-R/-RW		4.7 GB/side
		DVD-RAM		2.6 GB/5.2 GB/side

### Technical Specifications

	DVD+R/+RW		4.7 GB
	CD-ROM	Mode-1	650 (700 MB)
		Mode-2	742 MB (640 MB)
<b>Block Size</b>	DVD		2,048 bytes
	CD		2,352 (Mode-0) 2352, 2340, 2336, 2048 bytes (Mode-1) 2352, 2340, 2336, 2048 bytes (Mode-2)
<b>Diameter</b>	120 mm, 80 mm (with adapter at vertical mounting mode)		
<b>Loading Mechanism</b>	Tray type Auto Loading		
<b>Interface</b>	SATA 1.5		
<b>Access Times (typical)</b>	Random	DVD-ROM < 140 ms, CD-ROM < 125 ms	
	Full-Stroke	DVD-ROM < 250 ms, CD-ROM < 210 ms	
<b>Data Transfer Rate (sustained)</b>	DVD-ROM	21.6 MB/sec. Max.	
	CD-ROM	6 MB/sec. Max.	
<b>Cache Buffer</b>	2 MB		
<b>Spin-up Time (typical)</b>	less than 10 seconds		
<b>MTBF</b>	125,000 Power On Hours (POH)		
<b>Ambient Temperature</b>	Operating	41° to 122° F (5° to 50° C)	
	Storage/Transportation	-40° to 120° F (-40° to 60° C)	
<b>Relative Humidity</b>	Operating	10% to 90%	
	Storage/Transportation	5% to 95%	
<b>Drive Dimensions (HxWxD, maximum)</b>	1.62 x 5.75 x 7.87 in (41.3 x 146 x 200 mm)		

<b>HP SC40Ge SAS Host Bus Adapter with RAID</b>	<b>RAID Support</b>	RAID 1 (Mirroring) RAID 0 (Striping)
	<b>Logical Drives Supported</b>	Up to 2 Logical Volumes Up to 10 drives total in all RAID volumes Up to 2 Drives per RAID 1 Up to 8 Drives per RAID 0
	<b>Maximum Capacity</b>	4TB (4 x 1TB)
	<b>Data Transfer Method</b>	64-bit wide, PCIe 133 MHz (1 GB/s maximum bandwidth)
	<b>Port Transfer Rate</b>	12 Gb/s per x4 Wide SAS Port (4 x 3 Gb/s)
	<b>Simultaneous Drive Transfer Ports</b>	2 x4 Wide SAS Connectors
	<b>Protocols</b>	3 Gbps SAS (Serial Attached SCSI) 1.5 Gbps SATA (Serial Advanced Technology Attachment)
	<b>External SAS Connectors</b>	None
	<b>Internal SAS Connectors</b>	2 internal SFF8484 x4 SAS Connectors
	<b>Upgradeable Firmware</b>	4MB flashable ROM

### Technical Specifications

<b>Embedded NC326i Gigabit Server Adapter</b>	<b>Network Interface</b>	10Base-T/100Base-TX/1000Base-TX	
	<b>Compatibility</b>	IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX	
	<b>Data Transfer Method</b>	Four lane (x4), 100MHz PCI Express Reference Clock	
	<b>Controller</b>	BCM5715C	
<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	
<b>Cable Support</b>	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)	
	10/100/1000Base-TX	Category 5 UTP; up to 328 ft (100 m)	

<b>HP Integrated Lights-Out 2 (iLO 2) integrated on system board</b>	<b>Architecture</b>	32-bit PCI-based health and remote management ASIC	
	<b>Processor</b>	32-bit RISC processor core running at 66MHz	
	<b>Upgradeability</b>	Option firmware upgradeable via Flash ROM	
	<b>Operating System Support</b>	Microsoft Windows Server 2008 Standard Edition (32bit and 64bit)	
		Microsoft Windows Server 2008 Enterprise Edition (32bit and 64bit)	
		Microsoft Windows Server 2003 and Windows Server 2003 R2, and Windows Server 2003 for Extended Systems Standard Edition, Enterprise Edition	
		Red Hat Enterprise Linux 5.4 (32bit and 64bit)	
		SUSE LINUX Enterprise Server 11 (32bit and 64bit)	
		SUSE LINUX Enterprise Server 10 (32bit and 64bit)	
		VMware ESX 4.0 VMware ESX 3.5.0	
Microsoft Windows XP Professional Edition Microsoft Windows Vista Business and Ultimate Editions Red Hat Enterprise Linux Desktop 5.00 SUSE Linux Enterprise Desktop 11 SUSE Linux Enterprise Desktop 10			
<b>Client Browser Support</b>	Microsoft Internet Explorer 7		
	Microsoft Internet Explorer 6		
	Firefox 3.5 (on supported Windows and Linux systems) Firefox 3.0 (on supported Windows and Linux systems)		
<b>Command Line Support</b>	Telnet, Secure Shell and serial port access Secure Socket Layer Secure Shell version 2 (Password and certificate)		

### Technical Specifications

<b>Security</b>	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface RC4 encryption of video
<b>Directory Support Services</b>	Active Directory v1.0 (Windows 2003)
<b>Driver Support</b>	Health Driver (HP ProLiant iLO 2 Management Controller Driver) iLO Management Channel Interface Driver
<b>Management protocols supported</b>	SNMP 2, IPMI 2.0 (KCS interface), DMTF Server Management Command Line Protocol Specification (SM CLP), DMTF Web Services Management Specification (WS Management)

### 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.