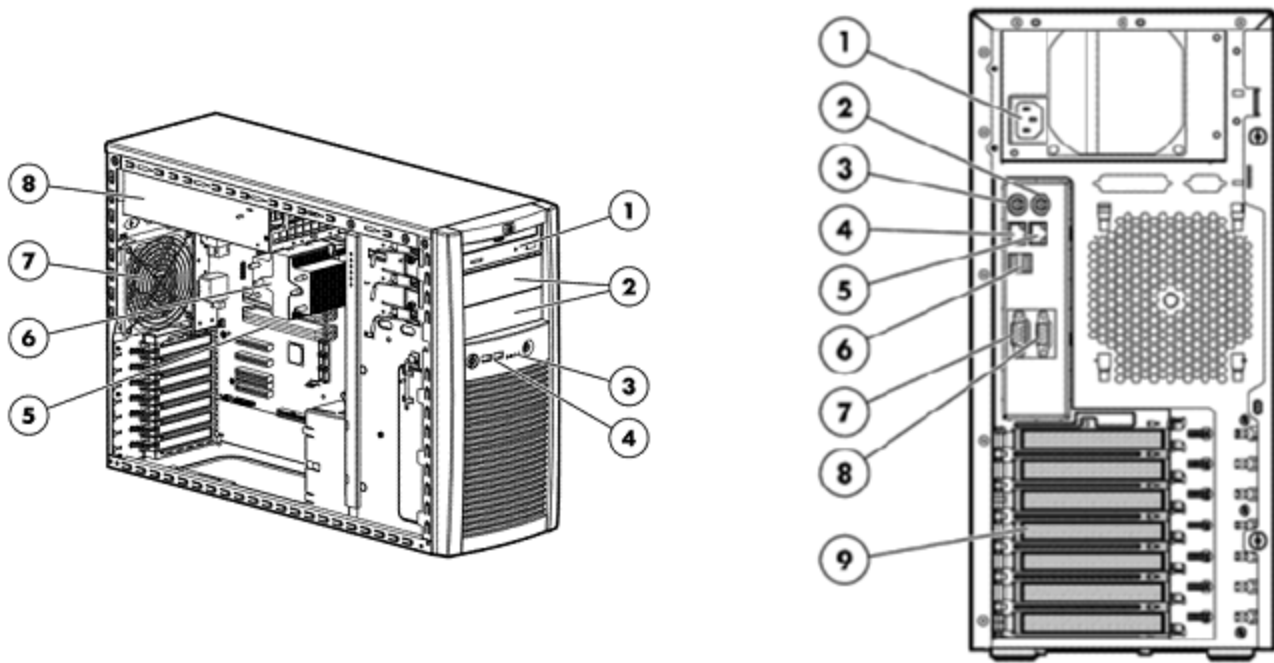


Overview



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:

- 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:

Overview

- 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 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).

Maximum Internal Storage

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.	

Standard Features

Interfaces	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) NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html .
	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)

Graphics	Integrated ATI ES1000, 32 MB video standard
	<ul style="list-style-type: none"> ● 16 bit color: maximum resolution of 1600 x 1200 ● 32 bit color: maximum resolution of 1280 x 1024

NOTE: Maximum resolution available via iLO 2 remote console is 1280 x 1024.

Form Factor	Tower (5U)
	Optional Tower-to-Rack Enabling Kit available (system & tray occupy 6U)

HP Insight management software	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.
---------------------------------------	--------------------	---

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.

The foundation pack includes:

- HP SmartStart
- HP Management
- HP ProLiant Firmware Maintenance

SmartStart version supported (minimum): SmartStart 7.51
<http://www.hp.com/servers/smartstart>

HP Integrated Lights-Out (iLO)	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: www.hp.com/go/iLO
--------------------------------	---

HP Insight Control	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.
--------------------	---

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 www.hp.com/go/insightcontrol

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

Standard Features

HP Insight Dynamics for ProLiant

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.

NOTE: For more information, visit:
<http://www.hp.com/go/insightdynamics>

Industry Standard Compliance

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

Manageability

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

Security

Power-on password
 Setup password
 Diskette boot control
 Power switch security

Security - Trusted Platform Module

Trusted Platform Module option kit

The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.

For more information about TPM, including a white paper, go to: www.hp.com/go/TPM

NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.
NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

Server Power Cords

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.

NOTE: 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: <http://www.hp.com/go/powercordmatrix>.

Standard Features

Power Specifications **NOTE:** To review typical system power ratings use the HP Power Advisor which is available online located at url: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor

Power Supply 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)

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

System Fans 1 - Non-hot plug, Non-redundant system fans; 1 optional fan for PCI-X Extender Board
NOTE: Does not include fan in power supply.

Operating Systems and [Microsoft Windows Server](#)

Virtualization Software [Microsoft Windows Server Hyper V](#)

Support for ProLiant [Red Hat Enterprise Linux \(RHEL\)](#)

Servers [SUSE Linux Enterprise Server \(SLES\)](#)

[Oracle Enterprise Linux \(OEL\)](#)

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> and our driver download page www.hp.com/support/ML310G5p.

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

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

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

Rack and Rack Options Rack Cabinets:

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

KVM Switches, Serial Console Servers, Rackmount Monitors, Keyboards:

- 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>.

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>.

Standard Features

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.

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

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

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

HP Models	HP ProLiant ML310G5p Model X CTO Chassis	445343-B22
	Factory Integrated Models ship with:	
	Embedded NC326i Gigabit Server Adapter	
	Integrated Four Port SATA Controller (HP-SATA/SAS chassis only)	
	Keyboard and Mouse	
	NOTE: 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)

HP Processors	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
HP Memory	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
HP Power Supplies	430W Hot-plug Redundant Power Supply Kit, FIO	431652-B21
	NOTE: Hot plug redundant power supply Kit ships with two power supplies.	
	410W Non-hot-plug Power Supply, FIO	459902-B21
	NOTE: Non-hot plug power supply ships with one power supply.	

Step 3: Choose Additional Factory Integratable Options

HP Controllers	NOTE: 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
	NOTE: RAID 0, 1, 1+0, 5.	
	HP Smart Array P400/256MB Controller	405132-B21
	NOTE: RAID 0, 1, 1+0, 5.	
	HP Smart Array P400/512MB BBWC Controller	411064-B21
	NOTE: RAID 0, 1, 1+0, 5, 6.	
	HP Smart Array E500/256MB Controller	435129-B21
	NOTE: RAID 0, 1, 1+0 standard, 5 optional.	
	HP Smart Array P800/512MB BBWC Controller	381513-B21
	NOTE: RAID 0, 1, 1+0, 5, 6.	
	HP Smart Array P212/256MB Controller	462834-B21
	NOTE: RAID 0, 1, 1+0, 5, 5+0.	
	HP Smart Array P212/Zero Memory Controller	462828-B21
	NOTE: RAID 0, 1, 1+0.	
	HP P411/256 FIO SA Cntrlr w/Battery	491193-B21
	NOTE: RAID 0, 1, 1+0, 5, 5+0.	
	HP Smart Array P411/256MB Controller	462830-B21
	NOTE: RAID 0, 1, 1+0, 5, 5+0.	
	HP Smart Array P411/512MB BBWC	462832-B21
	NOTE: RAID 0, 1, 1+0, 5, 5+0.	

Configuration Information - Factory Integrated Models

HP P410/256 FIO SA Cntrlr w/Battery	491195-B21
NOTE: RAID 0, 1, 1+0, 5, 5+0.	
HP Smart Array P410/256MB Controller	462862-B21
NOTE: RAID 0, 1, 1+0, 5, 5+0.	
HP Smart Array P410/512MB with BBWC	462864-B21
NOTE: RAID 0, 1, 1+0, 5, 5+0.	
HP P410/ZM FIO Smart Array Controller	462860-B21
NOTE: RAID 0, 1, 1+0.	
HP ML310 G5 SAS Cable	460310-B21
NOTE: This part number must be used with Smart Array E200 or SAS HBA for SAS models.	
HP Mini SAS to 8484 18in, 24in Cable As	496015-B21
NOTE: This part number must be used with Smart Array P212/P411 Controller for SAS models.	
SAS HBA	
HP SC08Ge Host Bus Adapter	488765-B21
HP SC44Ge Host Bus Adapter	416096-B21
NOTE: RAID 0, 1.	
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.	
HP Insight Software 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.

HP Memory	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

HP Floppy Drives	1.44MB Diskette Drive Option Kit	379257-B21
-------------------------	----------------------------------	------------

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

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

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

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
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 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
(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
(Worldwide)

Core Options

HP Networking

Gigabit Ethernet Adapters

HP NC112T PCIe Gigabit Server Adapter	503746-B21
HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
HP 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

Additional Options

HP Insight Software

HP Insight Control

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

NOTE: 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.

NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key.

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

NOTE: 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.

NOTE: Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at:

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

NOTE: For additional license options please see the Insight Control QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html

HP Insight Control for Linux

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

NOTE: Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately.

NOTE: Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: <http://www.hp.com/go/ic-linux> (click on Download button).

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

NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single set of activation keys.

NOTE: For additional License Kits, including electronic licensing options, please see the QuickSpecs at:

http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html

HP Integrated Lights-Out (iLO) Advanced

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

NOTE: 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

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

NOTE: For additional license kits, including electronic delivery options, please see the QuickSpecs at:

http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html

Additional Options

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

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

Smart Array E500 Controller

HP Smart Array E500/256MB Controller 435129-B21

Smart Array P400 Controller

HP Smart Array P400/256MB Controller 405132-B21

HP Smart Array P400/512MB BBWC Controller 411064-B21

Smart Array P800 Controller

HP Smart Array P800/512 BBWC Controller 381513-B21

Smart Array P212 Controller

HP Smart Array P212/Zero Memory Controller 462828-B21

HP Smart Array P212/256 MB Controller 462834-B21

Smart Array P410 Controller

HP Smart Array P410/256 MB Controller 462862-B21

HP Smart Array P410/512 MB with BBWC Controller 462864-B21

HP Smart Array P410/512MB with FBWC 578230-B21

HP Smart Array P410/1G with FBWC 572532-B21

Smart Array P411 Controller

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

Smart Array P812 Controller

HP Smart Array P812/1G Flash Backed Cache Controller 487204-B21

Optional Upgrades

HP SA-P400 and SA-E500 24 In Battery Cable Kit 417836-B21

NOTE: 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

NOTE: For Smart Array P400 Controller only.

512MB Battery-backed cache upgrade 405148-B21

NOTE: For Smart Array P400 Controller only.

256 MB Cache Module 462968-B21

NOTE: Supported on HP Smart Array P212 Controller only.

512MB BBWC 462967-B21

NOTE: 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

NOTE: 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

NOTE: This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license

Additional Options

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/12460_div/12460_div.html
(Smart Array E200 Controller)

http://h18000.www1.hp.com/products/quickspecs/12700_div/12700_div.html
(Smart Array E500 Controller)

http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.html
(Smart Array P400 Controller)

http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.html
(Smart Array P800 Controller)

http://h18000.www1.hp.com/products/quickspecs/13203_div/13203_div.html
(Smart Array P212 Controller)

http://h18000.www1.hp.com/products/quickspecs/13201_div/13201_div.html
(Smart Array P410 Controller)

http://h18000.www1.hp.com/products/quickspecs/13202_div/13202_div.html
(Smart Array P411 Controller)

http://h18000.www1.hp.com/products/quickspecs/13558_div/13558_div.html
(Smart Array P812 Controller)

http://h18000.www1.hp.com/products/quickspecs/13200_div/13200_div.html
(Smart Array Advanced Pack)

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
(SC08Ge HBA)

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
(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
(SCSI HBA)

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

HP PCI-X Slot	HP ML310 G5p PCI-X Extender Board Kit 451778-B21
	NOTE: An additional fan is required with PCI-X Extender Board. This fan is included in the HP ML310 G5p PCI-X Extender Board Kit.

HP Interconnect	HP ProLiant Second Serial / Parallel port option kit 401222-B21
------------------------	---

Additional Options

HP Backup & Recovery HP Data Protector Express

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

NOTE: 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
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-4 Ultrium 1760 SAS Internal Tape Drive	EH919A
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks LTO-5 Ultrium 3000 SAS Internal Tape Drive	EH957A
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	
HP StorageWorks 1/8 G2 LTO-5 Ultrium 3000 SAS Tape Autoloader	BL536A
NOTE: 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
NOTE: 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
NOTE: Connection using HP SC44Ge SAS Host Bus Adapter (416096-B21) recommended.	

HP Disk Backup

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

HP StorageWorks D2D Backup Systems with Backup Data Deduplication

HP StorageWorks D2D2502i Backup System	EJ001B
NOTE: 1.5 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.	

Additional Options

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.

HP StorageWorks Options

StorageWorks SCSI HBA

HP U320e SCSI Host Bus Adapter AH627A

NOTE: Recommended HBA for MSL SCSI Tape Library connect.

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

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

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
(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
(Worldwide)

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

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

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.

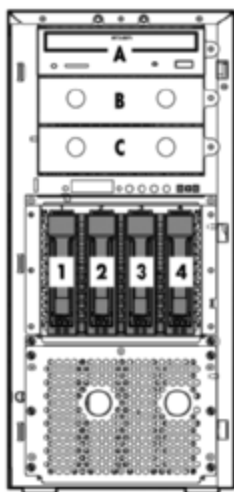
NOTE: Table 3-1 does not list all possible configurations. Balanced-capacity, dual-channel loading yields best performance.

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:

HP Memory	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
Removable Media			
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			NOTE: 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			NOTE: 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

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			NOTE: 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
			NOTE: 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

Storage

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	NOTE: depending on model.	NOTE: 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

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
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
HP StorageWorks SCSI Tape Drives	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			
HP StorageWorks SCSI Rack Mount Kits	External	HP SC11Xe Host Bus Adapter	412911-B21
1U Rack-Mount Kit			
3U Rack-Mount Kit			

NOTE: Please check the full compatibility information at: <http://www.hp.com/go/connect>



Storage

HP StorageWorks USB Tape Drives DAT 40 DAT 72 DAT 160 DAT 320	Internal or External	USB 2.0 Port	N/A
HP StorageWorks USB Rack Mount Kits 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP StorageWorks SAS Tape Drives DAT 160 DAT 320 LTO-2 Ultrium 448 LTO-3 Ultrium 920 LTO-4 Ultrium 1760 LTO-4 Ultrium 1840 LTO-5 Ultrium 3000 LTO-5 Ultrium 3280	Internal or External	HP SC44Ge Host Bus Adapter	416096-B21
HP StorageWorks SAS Rack Mount Kits 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter	416096-B21
HP StorageWorks SCSI Tape Autoloaders DAT 72x10 Autoloader 1/8 G2 Autoloader	External	HP SC11Xe Host Bus Adapter	412911-B21
HP StorageWorks SCSI Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Dual Channel Controller	AH627A
HP StorageWorks SAS Tape Autoloaders and Libraries 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter	416096-B21
HP StorageWorks Fibre Channel Tape Libraries MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for connectivity information and the supported Fibre Channel HBAs shown in this QuickSpecs.	
HP StorageWorks USB RDX Removable Disk Backup System RDX160 RDX320 RDX500 RDX750	Internal or External	USB 2.0 Port	N/A
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.	

Storage

**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

System Unit	Dimensions (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)													
	Tower Weight (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)														
	Input Requirements (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><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				
	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													
	BTU Rating	<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)													
	Power Specifications	<p>NOTE: To review typical system power ratings use the HP Power Advisor which is available online located at url: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor</p> <p>- Click on the system of interest. Example: ML310 G5p - Follow the instructions of the next screens.</p>												
	Power Supply Output (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)													
	System Inlet Temperature	<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).													
	Relative Humidity (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.													
	Altitude	<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 457 m/min (1500 ft/min).</td> </tr> <tr> <td>Non-operating</td> <td>9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).</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 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).								
	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).												
Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).													
	Acoustic Noise	<p>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).</p> <table border="0"> <tr> <td colspan="2">Idle</td> </tr> <tr> <td>L WAd (BELS)</td> <td>5.0 B</td> </tr> <tr> <td>L pAm (dBA)</td> <td>32 dBA</td> </tr> <tr> <td colspan="2">Operating</td> </tr> <tr> <td>L WAd (BELS)</td> <td>5.0 B</td> </tr> <tr> <td>L pAm (dBA)</td> <td>32 dBA</td> </tr> </table>	Idle		L WAd (BELS)	5.0 B	L pAm (dBA)	32 dBA	Operating		L WAd (BELS)	5.0 B	L pAm (dBA)	32 dBA
Idle														
L WAd (BELS)	5.0 B													
L pAm (dBA)	32 dBA													
Operating														
L WAd (BELS)	5.0 B													
L pAm (dBA)	32 dBA													
	Emissions	FCC Rating B												

Technical Specifications

Classification (EMC)	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
-----------------------------	----------------------------	---

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

HP SATA DVD-ROM Optical Drive	Applicable Disk	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		
	Capacity	DVD-ROM	DVD-SL DVD-DL Double Sided	4.7 GB/side 8.5 GB/side 9.40 GB/side
		DVD-R/-RW DVD-RAM DVD+R/+RW CD-ROM		4.7 GB/side 2.6 GB/5.2 GB/side 4.7 GB 650 (700 MB) 742 MB (640 MB)
	Block Size	DVD CD		2,048 bytes 2,352 (Mode-0) 2352, 2340, 2336, 2048 bytes (Mode-1) 2352, 2340, 2336, 2048 bytes (Mode-2)
	Diameter	120 mm, 80 mm (with adapter at vertical mounting mode)		
	Loading Mechanism	Tray type Auto Loading		
	Interface	SATA 1.5		
	Access Times (typical)	Random	DVD-ROM < 140 ms, CD-ROM < 125 ms	
		Full-Stroke	DVD-ROM < 250 ms, CD-ROM < 210 ms	
	Data Transfer Rate (sustained)	DVD-ROM CD-ROM	21.6 MB/sec. Max. 6 MB/sec. Max.	
	Cache Buffer	2 MB		
	Spin-up Time (typical)	less than 10 seconds		
	MTBF	125,000 Power On Hours (POH)		
	Ambient Temperature	Operating	41° to 122° F (5° to 50° C)	
		Storage/Transportation	-40° to 120° F (-40° to 60° C)	
	Relative Humidity	Operating	10% to 90%	
		Storage/Transportation	5% to 95%	
	Drive Dimensions (HxWxD, maximum)	1.62 x 5.75 x 7.87 in (41.3 x 146 x 200 mm)		

Technical Specifications

HP SC40Ge SAS Host Bus Adapter with RAID	RAID Support	RAID 1 (Mirroring) RAID 0 (Striping)		
	Logical Drives Supported	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		
	Maximum Capacity	4TB (4 x 1TB)		
	Data Transfer Method	64-bit wide, PCIe 133 MHz (1 GB/s maximum bandwidth)		
	Port Transfer Rate	12 Gb/s per x4 Wide SAS Port (4 x 3 Gb/s)		
	Simultaneous Drive Transfer Ports	2 x4 Wide SAS Connectors		
	Protocols	3 Gbps SAS (Serial Attached SCSI) 1.5 Gbps SATA (Serial Advanced Technology Attachment)		
	External SAS Connectors	None		
	Internal SAS Connectors	2 internal SFF8484 x4 SAS Connectors		
	Upgradeable Firmware	4MB flashable ROM		
	<hr/>			
Embedded NC326i Gigabit Server Adapter	Network Interface Compatibility	10Base-T/100Base-TX/1000Base-TX IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX		
	Data Transfer Method	Four lane (x4), 100MHz PCI Express Reference Clock		
	Controller	BCM5715C		
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s	
		10Base-T (Full-Duplex)	20 Mb/s	
		100Base-TX (Half-Duplex)	100 Mb/s	
		100Base-TX (Full-Duplex)	200 Mb/s	
		1000Base-TX (Half and Full-Duplex)	2000Mb/s	
	Connector	RJ-45		
	Cable Support	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)		
<hr/>				
HP Integrated Lights-Out 2 (iLO 2) integrated on system board	Architecture	32-bit PCI-based health and remote management ASIC		
	Processor	32-bit RISC processor core running at 66MHz		
	Upgradeability	Option firmware upgradeable via Flash ROM		
	Operating System Support	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				
Client Browser Support	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)			

Technical Specifications

Command Line Support	Telnet, Secure Shell and serial port access Secure Socket Layer Secure Shell version 2 (Password and certificate)
Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface RC4 encryption of video
Directory Support Services	Active Directory v1.0 (Windows 2003)
Driver Support	Health Driver (HP ProLiant iLO 2 Management Controller Driver) iLO Management Channel Interface Driver
Management protocols supported	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.

© Copyright 2010 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

Microsoft and Windows NT are US registered trademarks of Microsoft Corporation. Intel is a US registered trademark of Intel Corporation.

Intel, the Intel logo, Xeon and Xeon Inside are trademarks of Intel Corporation in the U.S. and other countries.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

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