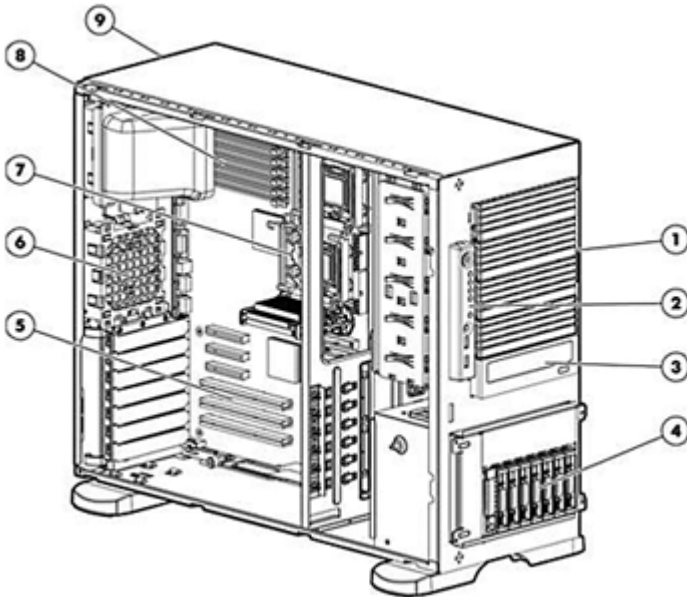
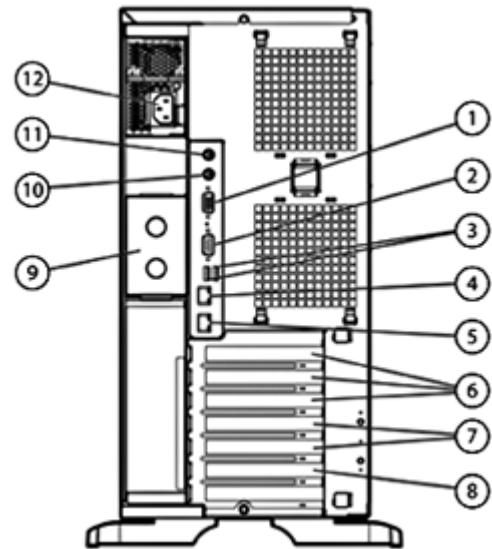


### Overview



#### Front View:

1. Five removable media bays
2. Front display panel; includes power button, UID, two USB 2.0 ports, and system status LED's
3. CD-ROM Drive (Dual-Core models), DVD-ROM Drive (Quad-Core models)
4. Eight SFF (2.5") (shown) or six LFF (3.5") SAS or SATA Hot Plug drive bays
5. Six expansion slots (three PCI Express, three PCI-X)
6. Two system fans standard with support for optional redundant system fans
7. Support for two Intel Dual-Core or Quad-Core Xeon 5000 sequence processors
8. Eight PC2-5300 FB-DIMM (DDR2 667) memory sockets
9. Single Hot-Plug power supply standard, optional second redundant supply for availability



#### Rear View:

1. Monitor port
2. Serial port
3. USB ports
4. Integrated Lights-Out 2 (iLO2) port
5. Network port
6. PCI Express x4
7. PCI-X 64/100
8. PCI-X 64/133
9. Access to add 2nd redundant power supply
10. Mouse port
11. Keyboard port
12. Power

### What's New

- New Intel's latest Quad-Core Xeon 5400 series processors with 12MB (2x6MB) L2 cache
- Base models with Quad-Core Xeon 5400 series processors come standard with 2GB system memory

### At A Glance

Building on a tradition of excellence, the HP ProLiant family introduces the fifth generation HP ProLiant ML350 server. The HP ProLiant ML350 G5 server provides Multi-Core performance, enterprise level management, and highly available redundant options in a modular server form factor. New for this generation is a smaller and quieter chassis, embedded Smart Array E200i Controller and 5 media bays.

### Overview

- **Processors:**
    - Quad-Core and Dual-Core Intel® Xeon™ processors for blazing performance; systems support up to 2 processors
    - 1333/1066/667 MHz front side bus (FSB)
    - Intel® 5000Z chipset
  - **Memory:**
    - Eight PC2-5300 Fully Buffered DIMMs (DDR2 667) sockets with online-spare support for cost-effective memory configuration and expansion and 2:1 interleaving
    - Up to 16 GB of memory supported on Dual-Core Models (5000 and 5100 series)
    - Up to 32 GB of memory supported on Quad-Core Models (5300 and 5400 series)
  - **Storage Controllers:**
    - Entry Models: HP Smart Array E200i/64MB Controller (integrated SAS/SATA Hot-Plug Controller with RAID 0/1/1+0 support)
      - 128MB BBWC optional upgrade kit for RAID 5 support also available
    - Base Models: HP Smart Array E200i/128 BBWC Controller (RAID 0/1/1+0/5)
  - **Internal Drive Support:**
    - Up to eight SFF (2.5") or six LFF (3.5") Hot Plug Serial Attached SCSI (SAS) or Serial-ATA (SATA) hard drives
    - Maximum of 4.50TB of internal storage capacity (using Hot-Plug SATA drives)
  - **Network Controller:**
    - Embedded NC373i Multifunction Gigabit Network Adapter with TCP/IP Offload Engine, including support for Accelerated iSCSI through an optional Licensing Kit
  - **Expansion Slots:**
    - Six total expansion slots
    - One 64-bit/133-MHz PCI-X; two 64-bit/100-MHz PCI-X; three x8 PCI Express (x4 speed)
    - Optional PCI-X Expander provides additional two 64-bit/100-MHz PCI-X slots by converting a single PCI Express slot
    - A single x8 PCI Express slot with x8 bus speed can be achieved by attaching the x4/x8 PCIE Bus Expander option kit. (Please see the chart and notes in the Expansion Slots under Standard Features below for more details)
  - **USB Ports:**
    - Six USB 2.0 ports: (2) front; (2) rear; (2) internal
  - **Redundancy:**
    - Optional Hot plug redundant power supplies
    - Support for optional redundant system fans
  - **Management:**
    - HP Insight Control Environment server management software
    - Integrated Lights-Out 2 featuring Integrated Remote Console with KVM over IP performance over shared network access
    - Support for ROM-Based Setup Utility (RBSU) and redundant ROM
    - Systems Insight Manager, SmartStart, and Automatic Server Recovery 2 (ASR-2)
    - HP Power Meter and Power Regulator for ProLiant, delivering integrated power consumption monitoring and server level, policy based power management for industry leading energy efficiency and savings on system power and cooling costs
  - **Deployment/Serviceability:**
    - Optional parallel and second serial port available without using a PCI slot
    - Tool-free chassis entry and component access
    - Tool-free motherboard removal
    - Universal rail solution supporting both square and round hole rack environments
  - **Warranty:**
    - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. SATA hard drives have a one-year warranty.
- NOTE:** Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response.

## Overview

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 a brief, printer friendly data sheet that describes this product and informs you of the essential capabilities and specifications, please visit: <http://h71028.www7.hp.com/ERC/downloads/4AA0-6362ENW.pdf>.

**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 Intel Xeon Processor E5440 (2.83 GHz, 80 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Quad-Core Intel Xeon Processor E5405 (2.00 GHz, 80 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Quad-Core Intel Xeon Processor X5355 (2.66 GHz, 120 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Quad-Core Intel Xeon Processor E5345 (2.33 GHz, 80 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Quad-Core Intel Xeon Processor E5335 (2.00 GHz, 80 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Dual-Core Intel Xeon Processor 5160 (3.00 GHz, 80 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Dual-Core Intel Xeon Processor 5150 (2.66 GHz, 65 Watts, 1333 FSB)

**NOTE:** Available via Configuration To Order only.

Dual-Core Intel Xeon Processor 5110 (1.60 GHz, 65 Watts, 1066 FSB)

**NOTE:** Available via Configuration To Order only.

Quad-Core Intel Xeon Processor E5430 (2.66 GHz, 80 Watts, 1333 FSB)

Quad-Core Intel Xeon Processor E5420 (2.50 GHz, 80 Watts, 1333 FSB)

Quad-Core Intel Xeon Processor E5410 (2.33 GHz, 80 Watts, 1333 FSB)

Quad-Core Intel Xeon Processor E5320 (1.86 GHz, 80 Watts, 1066 FSB)

Quad-Core Intel Xeon Processor E5310 (1.60 GHz, 80 Watts, 1066 FSB)

Dual-Core Intel Xeon Processor 5140 (2.33 GHz, 65 Watts, 1333 FSB)

Dual-Core Intel Xeon Processor 5130 (2.00 GHz, 65 Watts, 1333 FSB)

Dual-Core Intel Xeon Processor 5120 (1.86 GHz, 65 Watts, 1066 FSB)

Dual-Core Intel Xeon Processor 5080 (3.73 GHz, 130 Watts, 1066 FSB)

Dual-Core Intel Xeon Processor 5060 (3.2 GHz, 130 Watts, 1066 FSB)

Dual-Core Intel Xeon Processor 5050 (3.0 GHz, 95 Watts, 667 FSB)

#### Cache Memory

One of the following depending on Model

12MB (2 x 6MB) Level 2 cache (5400 series)

8MB (2 x 4MB) Level 2 cache (5300 series)

4MB (1 x 4MB) Level 2 cache (5100 series)

4MB (2 x 2MB) Level 2 cache (5000 series)

#### Upgradeability

Upgradeable to dual processing (8 or 4 cores)

(Please contact your regional sales support to determine quad core upgradeability. Some of the earlier shipping models may not support this upgrade)

### Standard Features

Chipset	Intel 5000Z Chipset <b>NOTE:</b> For more information regarding Intel chipsets, please see the following URL: <a href="http://www.intel.com/products/server/chipsets/">http://www.intel.com/products/server/chipsets/</a> .
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Memory Protection	Online spare Advanced ECC
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Memory One of the following depending on model	Type	PC2-5300 Fully Buffered DIMMs (DDR2-667)
	Standard (Entry Models)	1 GB (2 x 512 MB) on Quad-Core 5400 series
		1 GB (2 x 512 MB) on Quad-Core 5300 series 512 MB (1 x 512 MB) on Dual-Core Models
	Standard (Base Models)	2 GB (2 x 1GB) on Quad-Core 5400 series
		1 GB (2 x 512 MB) on Quad-Core 5300 series
		1 GB (2 x 512 MB) on Dual-Core Models
Maximum (Dual-Core Models)	16 GB (8 x 2 GB)	
Maximum (Quad-Core Models)	32 GB (8 x 4 GB)	

Network Controller	Embedded NC373i Multifunction Gigabit Network Adapter with TCP/IP Offload Engine, including support for Accelerated iSCSI through an optional Licensing Kit
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Expansion Slots	Slot Number	Bus Speed/Connector	Maximum Card Length	Bus Number*	Device Number**	Hot Plug	PCI Voltage
	6****	PCI Express x4/x8	12.28"	15	0	no	N/A
	5	PCI Express x4/x8	12.28"	6	0	no	N/A
	4***	PCI Express x4/x8	12.28"	9	0	no	N/A
	3	64-bit/100MHz PCI-X	12.28"	12	2	no	3.3 Volt
	2	64-bit/100MHz PCI-X	12.28"	12	1	no	3.3 Volt
	1	64-bit/133MHz PCI-X	12.28"	20	1	no	3.3 Volt

\*NOTE: Bus number listed reflects the default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

\*\*NOTE: Slots are enumerated differently based on operating system. Microsoft's operating systems enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

\*\*\*NOTE: A single PCI Express slot with x8 Bus Speed can be achieved by attaching the x4/x8 PCIe Bus Expander option kit (403724-B21) to slot number 4. The installation of this kit uses both slots 4 and 5 to create the single x8 speed PCI Express slot.

\*\*\*\*NOTE: The optional PCI-X expander can utilize slot 6 to provide an additional two (2) 64-Bit PCI-X full length, full height slots. Please see "Server Specific Options" below for more information. (435670-B21)

NOTE: Slots 1-3 can accept 3.3V or universal keyed PCI cards.

### Standard Features

Storage Controller	Entry Models	HP Smart Array E200i/64MB Controller
	Base Models	HP Smart Array E200i/128 BBWC Controller

**NOTE:** Supports RAID 0/1/1 +0 with 64MB of Cache, upgradeable to 128MB with BBWC for RAID 5 support.

Storage	Diskette Drives	None included standard
	Optical Drive	Quad-Core 5400 series: 16x SATA DVD-ROM drive
	One of the following depending on model	Quad-Core 5300 series: 16x PATA DVD-ROM drive Dual-Core: 48x IDE CD-ROM drive

**NOTE:** Quad-Core 5400 series BTO Models are configured with SATA optical drive.

Hard Drives	None included standard
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Maximum Internal Storage One of the following depending on model	Hot Plug LFF (3.5") Serial ATA (SATA)	4.50TB	6 x 750GB
	Hot Plug LFF (3.5") Serial Attached SCSI (SAS)	1.80TB	6 x 300GB
	Hot Plug SFF (2.5") SATA	960GB	8 x 120GB
	Hot Plug SFF (2.5") SAS	1.168TB	8 x 146GB

Interfaces	Parallel	Optional parallel port available
	Serial	1 (optional 2nd serial port available)
	Pointing Device (Mouse)	1
	Graphics	1
	Keyboard	1
	Network RJ-45	2 (1 dedicated for iLO 2)
	USB 2.0 Ports	6 (2 front, 2 rear, 2 internal)

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

Graphics	Integrated ATI ES1000, 32MB video standard
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- 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 1280x1024.

### Standard Features

#### Form Factor

Tower or Rack (5U)

**NOTE:** Rack models (and rack conversion kit) support:

- Square or round hole racks 24" - 36" deep, including HP Rack System /E and HP Systems
- Telco racks with 3rd part option kit from Rack Solutions  
<http://www.racksolutions.com/hp>

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#### ProLiant Essentials Foundation Pack Software

HP Systems Insight  
Manager

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

Through a single management view, HP SIM provides core management services that include device discovery and identification, event views, health monitoring, inventory data collection, software version control and reporting. HP SIM is built on industry standards and is extensible with value-added ProLiant Essentials, Integrity Essentials and Storage Essentials software to meet individual management needs. For more details on HP SIM visit <http://www.hp.com/go/hpsim>.

HP SIM provides organizations with the following benefits:

- Simplifies and consolidates infrastructure lifecycle management using task and query based functionality
- Provides the foundation for infrastructure automation and virtualization
- Enables IT management based on business processes not hardware platforms
- Lowers infrastructure maintenance cost and frees resources for innovation
- Maximizes resource utilization with virtualization technologies
- Provides a central point of integration between infrastructure and Enterprise management tools such as HP OpenView

Insight Management  
Agents

Insight Management Agents should be installed on all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers

Insight Management Agents and The HP System Management Homepage are included on ProLiant Support Packs, and can also be installed using the server profiles provided with the ProLiant Essentials Rapid Deployment Pack. For additional information about the Management Agents and the HP System Management Homepage please visit the management Web site at: <http://www.hp.com/servers/manage>

SmartStart

SmartStart simplifies server setup by providing a quick, easy way to deploy reliable and consistent server configurations. For more information, please visit the SmartStart Web site at <http://www.hp.com/servers/manage>.  
Minimum SmartStart version supported: 7.60

### Standard Features

Subscriber's Choice	Subscriber's Choice Driver and Support Alerts/Notifications is a web-based email subscription service that provides automatic delivery of software and driver change notifications for ProLiant products. Sign up at <a href="http://www.hp.com/go/subscriberschoice">http://www.hp.com/go/subscriberschoice</a> and customize your profile to receive alerts on updates as they become available.
ROMPaq, support software, and configuration utilities	The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options Available in SmartStart or downloadable from the Software and Drivers download pages at <a href="http://www.hp.com/go/support">http://www.hp.com/go/support</a> .
Insight Diagnostics Online Edition	The most advanced configuration analysis, reporting and troubleshooting utilities used by HP at your fingertips Available in SmartStart.
Optional ProLiant Essentials Value Packs	Optional software offerings that extend the functionality of an Adaptive Infrastructure to address specific business problems and needs: <ul style="list-style-type: none"><li>● <b>Accelerated iSCSI Pack</b> - enables the embedded Multifunction network controller to serve as both a NIC and an iSCSI HBA providing access to SAN storage over the same connection used for networking. Processing of the protocol stack is offloaded to the NIC reducing CPU utilization and greatly improving the speed with which the requests are processed and sent to the network.</li><li>● <b>HP Insight Control Environment</b> - is based on HP Systems Insight Manager and ProLiant Essentials software, and brings the value of Insight Control to ProLiant customers by delivering comprehensive health and performance monitoring, remote control, vulnerability scanning and patch management as well as flexible deployment and power management through an integrated installation package and streamlined licensing. For more information, visit: <a href="http://www.hp.com/go/ice">http://www.hp.com/go/ice</a></li><li>● <b>Rapid Deployment Pack (RDP)</b> is an automated deployment and provisioning solution for all ProLiant servers. RDP includes the ProLiant Integration Module featuring ProLiant server pre-configured events for OS installation, and optimized software drivers, firmware and management agents. Every RDP disc includes 7-day, 10-node trial licenses for evaluation purposes. RDP requires a license for each server deployed and is available for purchase with HP servers. For more information, visit: <a href="http://www.hp.com/servers/rdp">http://www.hp.com/servers/rdp</a>.</li><li>● <b>Server Migration Pack - Universal Edition</b> - Upgrading, replacing, or virtualizing your existing server? Effortlessly transition to new virtual or physical HP ProLiant servers or BladeSystem with automated, accurate and affordable migration of OS, application and data. SMP Universal automates the manual processes required for migrating servers between physical or virtual platforms, whether migrating to VMware or Microsoft virtual machines. SMP Universal allows all of the following:<ul style="list-style-type: none"><li>○ Physical to ProLiant</li><li>○ Physical to virtual</li><li>○ Virtual to virtual</li><li>○ Virtual to ProLiant</li></ul></li><li>● <b>Performance Management Pack</b> (offered exclusively through the Insight Control suites) - a performance management solution that</li></ul>



### Standard Features

#### Optional Remote Management Packs

identifies and explains hardware performance bottlenecks on ProLiant servers and attached options enabling users to better utilize their valuable resources.

- **Integrated Lights-Out Advanced Pack** - upgrades the iLO 2 processor with comprehensive remote control including Virtual KVM remote graphical console, enhanced console sharing and replay, virtual media (floppy, CD/DVD, USB key), virtual folders, historical power reporting, power capping and enterprise security (directory services and two-factor authentication).
- **Integrated Lights-Out Select Pack** - upgrades the iLO 2 processor with enhanced console sharing and replay, virtual media (floppy, CD/DVD, USB key), virtual folders, historical power reporting, power capping and enterprise security (directory services and two-factor authentication) for servers managed using remote consoles available in iLO 2 Standard and iLO 2 Standard Blade Edition.
- **Insight Power Manager (IPM)** - upgrades the single-server remote management capabilities of iLO Select/Advanced to include centralized reporting and policy-based management of power consumption and thermal output provided by the Insight Power Manager. IPM unifies all of this functionality within a single user interface - HP Systems Insight Manager.

**NOTE:** Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to <http://www.hp.com/servers/proliantessentials> or the various ProLiant Essentials Value Pack product QuickSpecs for more information.

**NOTE:** For more information regarding ProLiant Essentials Software, please see the following URL: <http://www.hp.com/servers/proliantessentials>.

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#### Industry Standard Compliance

ACPI V2.0 Compliant  
PCI 2.2 Compliant  
PXE Support  
WOL Support  
PCI-X 1.0a Compliant  
Novell Certified  
Microsoft® Logo certifications  
USB 2.0

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#### Availability

Optional Hot-Plug, Redundant Power supply  
Online-Spare Memory  
Optional Dual Redundant System Fans

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### Standard Features

#### Remote Management

##### Integrated Lights-Out (iLO 2) Management 2

- Virtual Text Remote Console (pre-OS only)
- Remote Serial Console
- Virtual Power Button Control
- Virtual Unit ID control
- Integrated Remote Console (ActiveX Control client)
- Dedicated & full function shared network connectivity with VLAN
- Embedded system health
- Present power consumption
- Browser, command line and scripted access
- Automatic IP Configuration via DHCP/DNS/WINS
- Industry Standard 128-bit Secure Sockets Layer (SSL) and Secure Shell security (SSH)
- Advanced Encryption Standard (AES)/Triple Data Encryption Standard (3DES)
- OS independent hardware health status
- IML and iLO Event Logging
- Support for 12 user accounts with customizable access privilege

#### System Management

HP Systems Insight Manager  
SmartStart  
Redundant ROM  
System Firmware Update  
ROMPaq  
ProLiant RBSU (ROM-Based Setup Utility)  
Automatic Server Recovery-2 (ASR-2)  
Dynamic Sector Repairing (with Smart Array Controller)  
Drive Parameter Tracking (with Smart Array Controller)  
Pre-Failure Warranty (covers processors, memory, and SAS hard drives)

#### Security

Power-on password  
Setup password  
Diskette boot control  
Parallel and serial interface control  
Disk configuration lock  
Power switch security

#### Server Power Cords

ProLiant ML servers in a rack-mount configuration no longer ship standard with NEMA power cords that allow connection to 110V US wall outlets in a home or office. These servers are primarily connected to PDU's in data center racks so they now ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant ML rack-mount server using a 110V receptacle (NEMA-15), the NEMA power cord must be ordered separately. The 12' cord (AF556A) or 6' cord (187335-001) can be purchased online at HP.COM. In a tower configuration, the servers ship standard with a 6' country specific NEMA power cord. 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

<b>UPS and PDU Power Cord Matrix</b>	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: <a href="http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html">http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html</a>
<b>Power Supply</b>	800 Watt-CE Mark Compliant Hot Plug Power Supply (1000 Watt high line) Optional second Power Supply provides redundant capability <b>NOTE:</b> Please see the "Power Specifications" section later in this document for low line and high line requirements.
<b>System Fans</b>	2 fans ship standard, dual redundant fans are optional, 4 fans total supported (does not include power supply or processor heat sink fans)
<b>Required Cabling</b>	For required cabling information, refer to the HP ProLiant ML350 G5 cabling matrix at <a href="http://www.hp.com/servers/proliantML350">http://www.hp.com/servers/proliantML350</a> . <b>NOTE:</b> Please see the "Storage" section of this QuickSpecs for important information on controllers and cables required to support SAS or SATA hard drives as well as storage management software available for SATA hard drives.
<b>OS Support</b>	Microsoft Windows Server 2003/R2 (Standard, Web, and Enterprise Editions) Microsoft Windows Small Business Server 2003 Microsoft Windows 2000 Server and Advanced Server Novell NetWare 6.5/Open Enterprise Server Red Hat Enterprise Linux SUSE Linux Enterprise Server SCO OpenServer 5.0.7/6.0 SCO UnixWare 7.1.3/7.1.4  <b>NOTE:</b> For a complete and up-to-date listing of supported operating systems please visit our OS Support Matrix at: <a href="http://www.hp.com/go/supportos">http://www.hp.com/go/supportos</a> . <b>NOTE:</b> For more Linux OS support & certification information, please visit the ProLiant & BladeSystem Server Linux matrix <a href="http://h18004.www1.hp.com/products/servers/linux/hpLinuxcert.html">http://h18004.www1.hp.com/products/servers/linux/hpLinuxcert.html</a> <b>NOTE:</b> Optional hardware may be required to support some operating systems. <b>NOTE:</b> For information on how to buy server operating systems from HP please visit the OS product site at: <a href="http://h18004.www1.hp.com/products/servers/software/OEM.html">http://h18004.www1.hp.com/products/servers/software/OEM.html</a> <b>NOTE:</b> For an up-to-date listing of the latest drivers available for the HP ProLiant ML350 G5, please see: <a href="http://www.compaq.com/support/files/server/us/index.html">http://www.compaq.com/support/files/server/us/index.html</a> . <b>NOTE:</b> For more information on VMware support, please visit the VMware Server Support Matrix at: <a href="http://h18004.www1.hp.com/products/servers/software/vmware/hpvmwarecert.html">http://h18004.www1.hp.com/products/servers/software/vmware/hpvmwarecert.html</a> .
<b>Installation of Server into Telco Racks</b>	Support for all 2-post Telco racks requires the use of the HP ProLiant ML350 G5 rack kit and an additional option kit from Rack Solutions. <a href="http://www.racksolutions.com/hp">http://www.racksolutions.com/hp</a> .

### Standard Features

#### Factory Express Portfolio for Servers and Storage

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

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSA1000, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

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

#### HP Enterprise Configurator

The HP eCo-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.

#### HP ProLiant Smart Buys (NA only)

The HP Smart Buy program offers mainstream business solutions at competitive prices with excellent availability and superior HP quality. It offers a wide range of industry-leading HP products at compelling prices, allowing you to receive richer configurations with additional options.

**NOTE:** ProLiant Smart Buys are available in NA only. For detailed specification information on ProLiant Smart Buys please click on the following link: <ftp://ftp.compaq.com/pub/products/servers/smartbuys.pdf>

#### Service and Support

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

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

To fully 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 multi vender 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 a ProLiant server support offer to help you speedily deploy and maximize system uptime.

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

- **Support** - 3-Year 4-Hour response 24x7 Same Business Day Coverage only
- **Deployment Service** - Installation and Start up only

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

- **Support** - 3-Year Support Plus 24 only

### Standard Features

Refer to the information on "Installation & Start-Up" for service on 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, 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:** ProLiant Smart Buys are available in NA only. For detailed specification information on ProLiant Smart Buys please click on the following link: <ftp://ftp.compaq.com/pub/products/servers/smartbuys.pdf>.

<p><b>HP ML350 G5 Entry Models</b></p> <p><b>Tower</b></p> <p><b>Quad-Core Models</b></p> <p><b>HP ML350T05 E5420 LFF</b> 458239-xx1</p> <p><b>HP ML350T05 E5410 LFF</b> 458244-xx1</p> <p><b>HP ML350T05 E5310 LFF</b> 440188-xx1</p> <p><b>Dual-Core Models</b></p> <p><b>HP ML350T05 5130 LFF</b> 416893-xx1</p> <p><b>HP ML350T05 5120 LFF</b> 416892-xx1</p> <p><b>Rack</b></p> <p><b>Quad-Core Models HP ML350R05 E5420 LFF</b> 458240-xx1</p> <p><b>Dual-Core Models</b></p> <p><b>HP ML350R05 5130 LFF</b> 416894-xx1</p>	<p><b>Processor(s)</b> <i>One of the following depending on Model</i></p> <p><b>Cache Memory</b></p> <p><b>Memory</b> <i>One of the following depending on Model</i></p> <p><b>Network Controller</b></p> <p><b>Storage Controller</b></p> <p><b>Hard Drive</b></p> <p><b>Internal Storage</b></p> <p><b>Optical Drive</b> <i>One of the following depending on Mode</i></p> <p><b>PCI-Express Slots</b></p> <p><b>Power Supplies</b></p> <p><b>Fans</b></p> <p><b>Form Factor</b> <i>One of the following depending on Model</i></p>	<p>(1) Quad-Core Intel Xeon E5420 Processor (2.50 GHz, 80 Watts, 1333 FSB)</p> <p>(1) Quad-Core Intel Xeon E5410 Processor (2.33 GHz, 80 Watts, 1333 FSB)</p> <p>(1) Quad-Core Intel Xeon E5310 Processor (1.6 GHz, 80 Watts, 1066 FSB)</p> <p>(1) Dual-Core Intel Xeon 5130 Processor (2.0GHz, 65 Watts, 1333 FSB)</p> <p>(1) Dual-Core Intel Xeon 5120 Processor (1.86 GHz, 65 Watts, 1066 FSB)</p> <p>12MB (2x6MB) Level 2 cache - 5400 Series</p> <p>8MB (2 x 4MB) Level 2 cache - 5300 Series</p> <p>4MB (1 x 4MB) Level 2 cache - 5100 Series</p> <p>Quad-Core 5400 Series: 1GB (2 x 512MB)</p> <p>Quad-Core 5300 Series: 1GB (2x512MB)</p> <p>Dual-Core: 512 MB (1 x 512 MB)</p> <p>Embedded NC373i Multifunction Gigabit Server Adapter</p> <p>Smart Array E200i/64 Controller (RAID 0/1/1+0)</p> <p>None Ship Standard; (0/6 LFF)</p> <p>1.80TB LFF SAS; 4.50TB LFF SATA</p> <p>Quad-Core: 16x DVD-ROM standard</p> <p>Dual-Core: 48x CD-ROM standard</p> <p>Six expansion slots (three PCI Express, three PCI-X)</p> <p>800-Watt CE-mark compliant Hot-Plug power supply</p> <p>Optional second power supply provides redundant operation</p> <p>2 fans ship standard, 4 fans total supported (does not include power supply or processor heatsink fans)</p> <p>Tower</p> <p>Rack (5U), (8.75 in/22.25 cm)</p>
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### Models

<p>HP ML350 G5 Base Models</p> <p>Tower</p> <p>Quad-Core Models</p> <p>HP ML350T05 E5430 SFF 458238-xx1</p> <p>HP ML350T05 E5420 SFF 458242-xx1</p> <p>HP ML350T05 E5410 SFF 458246-xx1</p> <p>HP ML350T05 E5320 SFF 438730-xx1</p> <p>HP ML350T05 E5310 SFF 434717-xx1</p> <p>Dual-Core Models</p> <p>HP ML350T05 5140 SFF 417605-xx1</p> <p>HP ML350T05 5130 SFF 417536-xx1</p> <p>Rack</p> <p>Quad-Core Models</p> <p>HP ML350R05 E5430 SFF 458237-xx1</p> <p>HP ML350R05 E5420 SFF 458243-xx1</p> <p>HP ML350R05 E5320 SFF 440189-xx1</p> <p>Dual-Core Models</p> <p>HP ML350R05 5140 SFF 417538-xx1</p> <p>HP ML350R05 5130 SFF 417537-xx1</p>	<p><b>Processor(s)</b> <a href="#">One of the following depending on Model</a></p> <p><b>Cache Memory</b> <a href="#">One of the following depending on Model</a></p> <p><b>Memory</b></p> <p><b>Network Controller</b></p> <p><b>Storage Controller</b></p> <p><b>Hard Drive</b></p> <p><b>Internal Storage</b></p> <p><b>Optical Drive</b> <a href="#">One of the following depending on Mode</a></p> <p><b>PCI-Express Slots</b></p> <p><b>Power Supplies</b></p> <p><b>Fans</b></p> <p><b>Form Factor</b> <a href="#">One of the following depending on Model</a></p>	<p>(1) Quad-Core Intel Xeon E5430 Processor (2.66 GHz, 80 Watts, 1333 FSB)</p> <p>(1) Quad-Core Intel Xeon E5420 Processor (2.50 GHz, 80 Watts, 1333 FSB)</p> <p>(1) Quad-Core Intel Xeon E5410 Processor (2.33 GHz, 80 Watts, 1333 FSB)</p> <p>(1) Quad-Core Intel Xeon E5320 Processor (1.86 GHz, 80 Watts, 1066 FSB)</p> <p>(1) Quad-Core Intel Xeon E5310 Processor (1.6 GHz, 80 Watts, 1066 FSB)</p> <p>(1) Dual-Core Intel Xeon 5140 Processor (2.33 GHz, 65 Watts, 1333 FSB)</p> <p>(1) Dual-Core Intel Xeon 5130 Processor (2.0 GHz, 65 Watts, 1333 FSB)</p> <p>12MB (2 x 6MB) Level 2 cache - 5400 Series</p> <p>8MB (2 x 4MB) Level 2 cache - 5300 Series</p> <p>4MB (1 x 4MB) Level 2 cache - 5100 Series</p> <p>Quad-Core 5400 Series: 2 GB (2 x 1GB) standard</p> <p>Quad-Core 5300 Series: 1 GB (2 x 512MB) standard</p> <p>Dual-Core: 1 GB (2 x 512MB) standard</p> <p>Embedded NC373i Multifunction Gigabit Server Adapter</p> <p>Smart Array E200i/128 BBWC Controller (RAID 0/1/1+0/5)</p> <p>None Ship Standard; (0/8 SFF)</p> <p>1.168TB SFF SAS; 480GB SFF SATA</p> <p>Quad-Core: 16x DVD-ROM standard</p> <p>Dual-Core: 48x CD-ROM standard</p> <p>Six expansion slots (three PCI Express, three PCI-X)</p> <p>800-Watt CE-mark compliant Hot-Plug power supply</p> <p>Optional second power supply provides redundant operation</p> <p>2 fans ship standard, 4 fans total supported (does not include power supply or processor heatsink fans)</p> <p>Tower</p> <p>Rack (5U), (8.75 in/22.25 cm)</p>
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### Models

#### Country Code Key

XX=00  
XX=01  
XX=03  
XX=04  
XX=05  
XX=20  
XX=29  
XX=37  
XX=42  
XX=AA

#### Tower Code Key

U.S. English  
Australia  
UK  
Germany  
France  
Brazil  
Japan  
APD  
Europe  
PRC

#### Rack Code Key

U.S. English  
N/A  
N/A  
N/A  
N/A  
N/A  
Japan  
APD  
Europe  
PRC



### Configuration Information - Factory Integrated Models

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

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

**NOTE:** This product offering does not support HP Factory Express Server Configuration Level 1.

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

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

<b>Models</b>	<b>ML350 G5 Tower Models</b>	
	<b>LFF - 3.5" Drives</b>	
	HP ProLiant ML350G5 LFF SAS/SATA Tower CTO Chassis	412645-B21
	<b>Includes:</b>	
	Embedded NC373i Multifunction Gigabit Server Adapter	
	Integrated Smart Array E200i Controller	
	Six Hot-Plug (LFF) SAS/SATA Drive Bays	
	Six expansion slots: one 64-bit/133-MHz PCI-X, two 64-bit/100-MHz PCI-X, and three x4 PCI Express (with x8 connectors)	
	Six USB ports	
	800W Hot-Plug Power Supply	
	Tower Form Factor	
	Keyboard	
	2-button Mouse	
	<b>SFF - 2.5" Drives</b>	
	HP ProLiant ML350G5 SFF SAS/SATA Tower CTO Chassis	395570-B21
	<b>Includes:</b>	
	Embedded NC373i Multifunction Gigabit Server Adapter	
	Integrated Smart Array E200i Controller	
	Eight Hot-Plug (SFF) SAS/SATA Drive Bays	
	Six expansion slots: one 64-bit/133-MHz PCI-X, two 64-bit/100-MHz PCI-X, and three x4 PCI Express (with x8 connectors)	
	Six USB ports	
	800W Hot-Plug Power Supply	
	Tower Form Factor	
	Keyboard	
	2-button Mouse	
	<b>ML350 G5 Rack Models</b>	
	<b>LFF - 3.5" Drives</b>	
	HP ProLiant ML350G5 LFF SAS/SATA Rack CTO Chassis	412644-B21
	<b>Includes:</b>	
	Embedded NC373i Multifunction Gigabit Server Adapter	

### Configuration Information - Factory Integrated Models

Integrated Smart Array E200i Controller  
 Six Hot-Plug (LFF) SAS/SATA Drive Bays  
 Six expansion slots: one 64-bit/133-MHz PCI-X, two 64-bit/100-MHz PCI-X, and three x4 PCI Express (with x8 connectors)  
 Six USB ports  
 800W Hot-Plug Power Supply  
 Rack (5U) Form Factor

#### SFF - 2.5" Drives

HP ProLiant ML350G5 SFF SAS/SATA Rack CTO Chassis 395569-B21

#### Includes:

Embedded NC373i Multifunction Gigabit Server Adapter  
 Integrated Smart Array E200i Controller  
 Eight Hot-Plug (SFF) SAS/SATA Drive Bays  
 Six expansion slots: one 64-bit/133-MHz PCI-X, two 64-bit/100-MHz PCI-X, and three x4 PCI Express (with x8 connectors)  
 Six USB ports  
 800W Hot-Plug Power Supply  
 Rack (5U) Form Factor

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

<b>Processors</b>	HP E5440 ML350G5 FIO Kit	458257-L21
	HP E5430 ML350G5 FIO Kit	458259-L21
	HP E5420 ML350G5 FIO Kit	458265-L21
	HP E5410 ML350G5 FIO Kit	458267-L21
	HP E5405 ML350G5 FIO Kit	458269-L21
	HP X5355 ML350G5 FIO Kit	436015-L21
	HP E5345 ML350G5 FIO Kit	436013-L21
	HP E5335 ML350G5 FIO Kit	437444-L21
	HP E5320 ML350G5 FIO Kit	435512-L21
	HP E5310 ML350G5 FIO Kit	435513-L21
	HP X5160 ML350G5 FIO Kit	416891-L21
	HP X5150 ML350G5 FIO Kit	416890-L21
	HP X5140 ML350G5 FIO Kit	416889-L21
	HP X5130 ML350G5 FIO Kit	416888-L21
	HP X5120 ML350G5 FIO Kit	416887-L21
	HP X5110 ML350G5 FIO Kit	416886-L21
<b>Base Memory</b>	512 MB FBD PC2-5300 1 x 512 MB Kit	413507-B21
	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21

### Configuration Information - Factory Integrated Models

	2 GB FBD PC2-5300 2 x 1 GB LP Kit	461826-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21
	4 GB FBD PC2-5300 2 x 2 GB LP Kit	461828-B21
	8 GB FBD PC2-5300 2 x 4 GB Kit	397415-B21
Smart Array E200i Controller Cache	HP SA E200 64MB Cache FIO Kit	405102-B21
	<b>NOTE:</b> Select this option for RAID 0/1/1 +0 128-MB Battery-Backed Write Cache (BBWC) <b>NOTE:</b> Select this option for RAID 0/1/1 +0/5.	351580-B21
Optical Drive	Floppy Drive ML350/370 G5 Kit	409582-B21
	CD-RW/DVD-ROM Combo Drive Option Kit	331346-B21
	HP 48X CD-ROM ALL (no screws)	384758-B21
	HP DVD±R/RW 16X Half Height	383974-B21
	16X DVD-ROM Drive Option Kit (Carbon)	217053-B21
	HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
	HP Half-Height SATA DVD RW Optical Drive	447328-B21

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

Controllers	HP Smart Array P400/256MB Controller	405132-B21
	<b>NOTE:</b> SAS Controller supporting RAID 0/1/1 +0/5.	
	HP Smart Array P600/256 BBWC Controller	337972-B21
	<b>NOTE:</b> SAS Controller supporting RAID 0/1/1 +0/5/6.	
	Smart Array 642 Controller	291967-B21
	<b>NOTE:</b> U320 Controller.	
	Smart Array 6402/128 Controller	273915-B21
<b>NOTE:</b> U320 Controller.		
Smart Array 6404/256 Controller	273914-B21	
<b>NOTE:</b> U320 Controller.		
	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2	374654-B21
	HP Smart Array 6404/512 FIO CNTRLR	452240-B21

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

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

### Options

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

<b>HP ProLiant ML350 G5 Unique Options</b>	HP Redundant Fan ML350 G5 Kit	409579-B21
	HP PCI-X Expander Kit (2 x 64-bit 100MHz PCI-X slots) <b>NOTE:</b> The HP PCI-X Expander kit converts a single PCI Express slot (slot 6) into two full height, full length 64-bit 100MHz PCI-X slots <b>NOTE:</b> The HP PCI-X Expander kit can support a maximum of one (1) HP Smart array, HBA, or SCSI PCI-X adapter. Prioritize internal slots for use with PCI-X storage controllers. Please refer to the ML350G5 user guide for additional details.	435670-B21
	HP Tower to Rack Conversion Kit - ML350 G5 Kit <b>NOTE:</b> See "Redundant Options" section below for Hot Plug Redundant Power supplies.	412640-B21

### HP Insight Control and ProLiant Essentials Offerings

<b>ProLiant Essentials Value Pack</b>	<b>NOTE:</b> Electronic licensing options are available for Insight Control suites and select ProLiant Essentials software products. Please see the appropriate Insight Control and ProLiant Essentials QuickSpecs for additional information.	
<b>Accelerated iSCSI Pack</b>	ProLiant Essentials Accelerated iSCSI Pack, No Media, Single License <b>NOTE:</b> For use with a single NIC port. Contains one license with a unique license activation key and documentation. <b>NOTE:</b> For additional License Kits, please see the QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/12466_div/12466_div.html">http://h18000.www1.hp.com/products/quickspecs/12466_div/12466_div.html</a>	452679-B21
<b>HP Insight Control Environment</b>	HP Insight Control Environment, No Media 1-Server License including 1 year of 24x7 Technical Support and Updates <b>NOTE:</b> For additional License Kits, please see the 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>	452148-B21
<b>ProLiant Essential RDMA Pack</b>	HP ProLiant Essentials RDMA Pack for Embedded Multifunction Gigabit Server Adapters, No Media, 1-Server License <b>NOTE:</b> For additional License Kits, please see the QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/12573_div/12573_div.html">http://h18000.www1.hp.com/products/quickspecs/12573_div/12573_div.html</a>	452681-B21
<b>Rapid Deployment Pack</b>	ProLiant Essentials Rapid Deployment Pack No Media 1-Server License including 1 year of 24x7 Technical Support and Updates <b>NOTE:</b> This license allows 1 server to be deployed and managed via RDP. <b>NOTE:</b> For additional License Kits, please see the QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/11053_div/11053_div.html">http://h18000.www1.hp.com/products/quickspecs/11053_div/11053_div.html</a>	452151-B21
<b>HP Server Migration Pack - Universal Edition</b>	HP Server Migration Pack - Universal Edition, No Media, 1-Year Unlimited Migration License, including 1 year of 24x7 Technical Support and Updates <b>NOTE:</b> This license allows unlimited migrations (physical to ProLiant, physical to virtual, virtual to virtual, and virtual to ProLiant) for one year. Contains one license with a unique license activation key and documentation.	460756-B21
	HP Server Migration Pack - Universal Edition, No Media, Physical / Virtual to ProLiant Single Migration License, including 1 year of 24x7 Technical Support and Updates	460750-B21

### Options

**NOTE:** This license allows 1 physical to ProLiant or virtual to ProLiant migration. Customer will receive a printed license entitlement certificate and documentation 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 and Update Service.

HP Server Migration Pack - Universal Edition, No Media, Physical / Virtual to Virtual Single Migration License, including 1 year of 24x7 Technical Support and Updates 460753-B21

**NOTE:** This license allows 1 physical to virtual or virtual to virtual migration. Customer will receive a printed license entitlement certificate and documentation 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 and Update Service.

#### Remote Management

**NOTE:** Electronic licensing options are available for Insight Control suites and select ProLiant Essentials software products. Please see the appropriate Insight Control and ProLiant Essentials QuickSpecs for additional information.

#### Integrated Lights-Out Advanced Pack

Integrated Lights-Out Advanced Pack, No Media, 1 Server License, including 1 year of 24x7 Technical Support and Updates 452141-B21

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/10861\\_div/10861\\_div.html](http://h18000.www1.hp.com/products/quickspecs/10861_div/10861_div.html)

#### Integrated Lights-Out Select Pack

Integrated Lights-Out Select Pack, No Media, 1 Server License, including 1 year of 24x7 Technical Support and Updates 452158-B21

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/10861\\_div/10861\\_div.html](http://h18000.www1.hp.com/products/quickspecs/10861_div/10861_div.html)

#### Integrated Lights-Out Power Management Pack

HP iLO Power Management Pack, No Media, 1-Server License, including 1 year of 24x7 Technical Support and Updates 452145-B21

**NOTE:** This option kit includes 1 license for iLO Advanced and Insight Power Manager.

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/12632\\_div/12632\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12632_div/12632_div.html)

#### Insight Power Manager

HP Insight Power Manager, No Media, 1-Server License, including 1 year of 24x7 Technical Support and Updates 452677-B21

**NOTE:** This option kit includes 1 license for Insight Power Manager.

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/12623\\_div/12623\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12623_div/12623_div.html)

**NOTE:** Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to <http://www.hp.com/servers/proliantessentials> or the various ProLiant Essentials Value Pack product QuickSpecs for more information.

**NOTE:** For more information regarding ProLiant Essentials Software, please see the following URL: <http://www.hp.com/servers/proliantessentials>.

### Options

<b>Processors</b>	Quad-Core Intel Xeon Processor E5440 (2.83 GHz, 80 Watts, 1333 FSB)	458257-B21
	Quad-Core Intel Xeon Processor E5430 (2.66 GHz, 80 Watts, 1333 FSB)	458259-B21
	Quad-Core Intel Xeon Processor E5420 (2.50 GHz, 80 Watts, 1333 FSB)	458265-B21
	Quad-Core Intel Xeon Processor E5410 (2.33 GHz, 80 Watts, 1333 FSB)	458267-B21
	Quad-Core Intel Xeon Processor E5405 (2.00 GHz, 80 Watts, 1333 FSB)	458269-B21
	Quad-Core Intel Xeon Processor X5355 (2.66 GHz, 120 Watts, 1333 FSB)	436015-B21
	Quad-Core Intel Xeon Processor E5345 (2.33 GHz, 80 Watts, 1333 FSB)	436013-B21
	Quad-Core Intel Xeon Processor E5335 (2.00 GHz, 80 Watts, 1333 FSB)	437444-B21
	Quad-Core Intel Xeon Processor E5320 (1.86 GHz, 80 Watts, 1066 FSB)	435512-B21
	Quad-Core Intel Xeon Processor E5310 (1.6 GHz, 80 Watts, 1066 FSB)	435513-B21
	Dual-Core Intel Xeon Processor 5160 (3.0 GHz, 80 Watts, 1333 FSB)	416891-B21
	Dual-Core Intel Xeon Processor 5150 (2.67 GHz, 65 Watts, 1333 FSB)	416890-B21
	Dual-Core Intel Xeon Processor 5140 (2.33 GHz, 65 Watts, 1333 FSB)	416889-B21
	Dual-Core Intel Xeon Processor 5130 (2.0 GHz, 65 Watts, 1333 FSB)	416888-B21
	Dual-Core Intel Xeon Processor 5120 (1.86 GHz, 65 Watts, 1066 FSB)	416887-B21
	Dual-Core Intel Xeon Processor 5110 (1.6 GHz, 65 Watts, 1066 FSB)	416886-B21
	Dual-Core Intel Xeon Processor 5080 (3.73 GHz, 130 Watts, 1066 FSB)	409397-B21
	Dual-Core Intel Xeon Processor 5060 (3.2 GHz, 130 Watts, 1066 FSB)	409401-B21
Dual-Core Intel Xeon Processor 5050 (3.0 GHz, 95 Watts, 667 FSB)	409400-B21	
<b>Memory (DIMMs)</b>	512 MB FBD PC2-5300 1 x 512 MB Kit	413507-B21
	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21
	2 GB FBD PC2-5300 2 x 1 GB LP Kit	461826-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21
	4 GB FBD PC2-5300 2 x 2 GB LP Kit	461828-B21
	8 GB FBD PC2-5300 2 x 4 GB Kit	397415-B21
<b>Optical Drives</b>	Floppy Drive ML350/370 G5 Kit	409582-B21
	CD-RW/DVD-ROM Combo Drive Option Kit	331346-B21
	HP DVD±R/RW 16X Half Height	383974-B21
	16X DVD-ROM Drive Option Kit (Carbon)	217053-B21
	HP Half-Height SATA DVD-ROM Optical Drive	447326-B21
	HP Half-Height SATA DVD RW Optical Drive	447328-B21
<b>Serial Port Kit</b>	Parallel/Serial Port ML370/350 G5 Kit	401222-B21

### Options

#### Hard Drives

##### Hot Plug SFF SAS 2.5" Drives

HP 36GB 3G SAS 10K SFF SP HDD	375859-B21
HP 36GB 3G SAS 15K SFF SP HDD	431933-B21
HP 36GB 3G SAS 15K SFF DP HDD	418369-B21
HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
HP 72GB 3G SAS 10K SFF DP HDD	384842-B21
HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
HP 72GB 3G SAS 15K SFF DP HDD	418371-B21
HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
HP 146GB 3G SAS 10K SFF DP HDD	418367-B21

##### Hot Plug SAS 3.5" Drives

HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
HP 300GB 3G SAS 15K 3.5" DP HDD	416127-B21
HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
HP 146GB 3G SAS 15K 3.5" DP HDD	384854-B21
HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
HP 72GB 3G SAS 15K 3.5" DP HDD	384852-B21
HP 36GB 3G SAS 15K 3.5" SP HDD	375868-B21

**NOTE:** Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature:

[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)

##### SFF SATA Hot Plug Drives

HP 120GB 1.5G SATA 5.4K SFF HDD	431786-B21
HP 60GB 1.5G SATA 5.4K SFF HDD	379306-B21

**NOTE:** SATA hard drives have a 1-year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature:

[http://h18000.www1.hp.com/products/quickspecs/11940\\_div/11940\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html)  
(Worldwide)

##### 3.5" SATA Hot Plug Drives

HP 750GB 1.5G SATA 7.2K 3.5" HDD	432341-B21
HP 500GB 1.5G SATA 7.2K 3.5" HDD	395473-B21
HP 250GB 1.5G SATA 7.2K 3.5" HDD	349239-B21
HP 160GB 1.5G SATA 7.2K 3.5" HDD	349238-B21
HP 80GB 1.5G SATA 7.2K 3.5" HDD	349237-B21

**NOTE:** SATA hard drives have a 1-year warranty. Please see the SATA Hard Drive QuickSpecs for additional technical information on the hard drives Support details, please see the following:

[http://h18000.www1.hp.com/products/quickspecs/11940\\_div/11940\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html)  
(Worldwide)

### Options

PCI Option	<p>HP x4-x8 PCI-E Bus Expander Option Kit</p> <p><b>NOTE:</b> The HP x4/x8 PCI Express Bus Expander kit converts 2 x4 PCI Express slots into a single x8 PCI Express slot for high performance x8 PCI Express cards</p>	403724-B21
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### Storage Controllers

#### SAS Controllers

##### Smart Array E200 Controller

HP Smart Array E200/128 BBWC Controller 411508-B21

128-MB Battery-Backed Write Cache (BBWC) 351580-B21

**NOTE:** Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.

##### Smart Array E500 Controller

HP Smart Array E500/256MB Controller 435129-B21

##### Smart Array P400 Controller

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

**NOTE:** Supports RAID 0/1/1+0/5/6.

HP Smart Array P400/256MB Controller 405132-B21

**NOTE:** Supports RAID 0/1/1+0/5.

512MB Battery-backed cache (BBWC) upgrade 405148-B21

**NOTE:** for Smart Array P400 Controller.

Battery-backed write cache (BBWC) upgrade 383280-B21

**NOTE:** for Smart Array P400 Controller.

Smart Array P400 Battery Attach Kit 417836-B21

**NOTE:** This option kit contains a 24" battery cable and adhesive material for installing a battery into the server if a Smart Array P400 is integrated outside of the factory. For all solutions, please refer to the server QuickSpecs and User's Manual for detailed installation instructions.

##### Smart Array P600 Controller

HP Smart Array P600/256 BBWC Controller 337972-B21

**NOTE:** Supports external drive attach.

512MB Battery-backed write cache (BBWC) upgrade 372538-B21

**NOTE:** For Smart Array P600 Controller.

##### Smart Array P800 Controller

HP Smart Array P800/512 BBWC Controller 381513-B21

**NOTE:** Supports external drive attach.

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

[http://h18000.www1.hp.com/products/quickspecs/12460\\_div/12460\\_div.html](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](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](http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.html)  
(Smart Array P400 Controller)

[http://h18000.www1.hp.com/products/quickspecs/12247\\_div/12247\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12247_div/12247_div.html)  
(Smart Array P600 Controller)

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

#### SAS HBA



### Options

HP SC44Ge Host Bus Adapter	416096-B21
HP 8 Internal Port SAS HBA with RAID	347786-B21

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

[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

Smart Array 6402/128 Controller	273915-B21
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**NOTE:** Ultra320 SCSI.

Smart Array 6404/256 Controller	273914-B21
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**NOTE:** Ultra320 SCSI.

Smart Array 642 Controller	291967-B21
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**NOTE:** Ultra320 SCSI.

128MB Battery-Backed Write Cache (BBWC)	351580-B21
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**NOTE:** Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.

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

HP SC11Xe Host Bus Adapter	412911-B21
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**NOTE:** Supports external drive attach.

**NOTE:** Please see the following Controller or SCSI Adapter QuickSpecs for Technical Specifications such as PCI Bus, PCI Peak Data Transfer Rate, SCSI Protocols supported, SCSI Peak Data Transfer Rate, Channels, SCSI Ports, Drives supported, Cache, RAID support, and additional information:

[http://h18000.www1.hp.com/products/quickspecs/11943\\_div/11943\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11943_div/11943_div.html)  
(Single Channel Ultra320 SCSI HBA)

[http://h18000.www1.hp.com/products/quickspecs/11587\\_div/11587\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11587_div/11587_div.html)  
(Smart Array 6400 Series)

[http://h18000.www1.hp.com/products/quickspecs/12069\\_div/12069\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12069_div/12069_div.html)  
(Smart Array 642)

[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)

### Options

<b>Communications</b>	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	<b>NOTE:</b> Does not support Windows 2000.	
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
	<b>NOTE:</b> Does not support Windows 2000.	
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC510F PCIe 10 Gigabit Server Adapter	414126-B21
	<b>NOTE:</b> A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510F adapter.	
	HP NC510C PCIe 10 Gigabit Server Adapter	414129-B21
<b>NOTE:</b> A minimum of 1 gigabyte (1 GB) of server memory is required per each NC510C adapter.		
HP NC7170 PCI-X Dual Port 1000T Gigabit Server Adapter	313881-B21	
HP NC7771 PCI-X 1000T Gigabit Server Adapter	290563-B21	
Agere O6 PCI Hi-Speed 56K SftMd	440519-B21	

<b>Redundant Options</b>	Hot Plug Redundant Power Supply 350/370/380 G5 AU Kit	399771-011
	Hot Plug Redundant Power Supply 350/370/380 G5 EU Kit	399771-021
	Hot Plug Redundant Power Supply 350/370/380 G5 JP Kit	399771-291
	Hot Plug Redundant Power Supply 350/370/380 G5 Worldwide Kit	399771-B21
	Hot Plug Redundant Power Supply 350/370/380 G5 UK Kit	399771-031
	Hot Plug Redundant Power Supply 350/370/380 G5 US Kit	399771-001
	Redundant Fan ML350 G5 Kit	409579-B21

### Tape Drives

**NOTE:** For the complete listing of Tape Drive offerings, please see:  
<http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

#### USB Tape Drives

HP StorageWorks 1U USB Rack-Mount Kit with one DAT 160 USB drive	AG703A
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#### SAS Tape Drives

**NOTE:** For the ML350 G5, HP recommends purchasing the HP SC44Ge HBA (416096-B21) for a dedicated SAS HBA for tape.

HP StorageWorks LTO-2 Ultrium 448 SAS Internal Tape Drive	DW085A
HP StorageWorks LTO-3 Ultrium 920 SAS Internal Tape Drive	EH847A

**NOTE:** Please refer to the "Tape Drives, Tape Autoloaders & Tape Libraries" table in the Storage section of this document for a list of SAS controllers with tape support.

#### Ultrium Tape Drives

HP StorageWorks LTO-1 Ultrium 232 Internal Tape Drive (Carbonite)	DW064A
HP StorageWorks LTO-2 Ultrium 460 Internal Tape Drive (Carbon)	Q1518B
HP StorageWorks LTO-2 Ultrium 448 SCSI Internal Tape Drive (Carbonite)	DW016A
HP StorageWorks LTO-3 Ultrium 920 SCSI Internal Tape Drive	EH841A
HP StorageWorks LTO-3 Ultrium 960 Internal Tape Drive (Carbonite)	Q1538A

### Options

HP StorageWorks LTO-4 Ultrium 1840 SCSI Internal Tape Drive EH853A

**NOTE:** Please see the HP StorageWorks LTO Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items:

[http://h18006.www1.hp.com/products/quickspecs/11739\\_div/11739\\_div.html](http://h18006.www1.hp.com/products/quickspecs/11739_div/11739_div.html)  
(Worldwide)

[http://h18006.www1.hp.com/products/quickspecs/12128\\_div/12128\\_div.html](http://h18006.www1.hp.com/products/quickspecs/12128_div/12128_div.html)  
(Worldwide)

For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: <http://www.hp.com/go/connect>

#### Rack-Mount Tape Drive Enclosures

HP StorageWorks 1U SCSI Rack-Mount kit A7445B

**NOTE:** The 1U Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including the DAT 40, DAT 72, DAT 160, DLT VS160, LTO-1 Ultrium 232, LTO-2 Ultrium 448 and LTO-3 Ultrium 920 tape drives.

HP StorageWorks 1U USB Rack-Mount Kit A8007A

**NOTE:** The 1U USB Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 40 USB, DAT 72 USB and DAT 160 tape drives.

HP StorageWorks 1U SAS Rack-Mount Kit AE459A

**NOTE:** The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the LTO-2 Ultrium 448 SAS and LTO-3 Ultrium 920 SAS tape drives.

HP StorageWorks 3U Rack-mount kit 274338-B22

**NOTE:** The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple LVD SCSI tape drives including DAT 40, DAT 72, DLT VS160, SDLT 600, LTO-1 Ultrium 232, LTO-2 Ultrium 460, LTO-2 Ultrium 448, LTO-3 Ultrium 920, LTO-3 Ultrium 960 and LTO-4 Ultrium 1840 tape drives.

**NOTE:** Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits:

[http://h18000.www1.hp.com/products/quickspecs/10854\\_div/10854\\_div.html](http://h18000.www1.hp.com/products/quickspecs/10854_div/10854_div.html)  
(Worldwide)

HP D2D Backup System HP StorageWorks D2D110 Backup System EH880A

**NOTE:** 1TB of Disk Storage

HP StorageWorks D2D110 Backup System with Data Protector Express Software Kit EH923A

**NOTE:** 1TB of Disk Storage

HP StorageWorks D2D120 Backup System EH884A

**NOTE:** 2TB of Disk Storage

HP StorageWorks D2D120 Backup System with Data Protector Express Software Kit EH924A

**NOTE:** 2TB of Disk Storage

**NOTE:** Please see the HP D2D Backup Systems QuickSpecs for additional information:

[http://h18000.www1.hp.com/products/quickspecs/12651\\_div/12651\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12651_div/12651_div.html)  
(Worldwide)

### Options

<b>Tape Autoloaders</b>	<b>HP StorageWorks DAT Autoloader</b>		
	HP StorageWorks DAT 72x10 tape autoloader	AE313B	
	<b>HP StorageWorks 1/8 Tape Autoloader</b>		
	HP StorageWorks 1/8 LTO-3 Ultrium 920 G2 Tape Autoloader	AH165A	
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A	
	HP StorageWorks 1/8 LTO-2 Ultrium 448 G2 Tape Autoloader	AH164A	
	HP StorageWorks 1/8 LTO-1 Ultrium 232 G2 Tape Autoloader	AH163A	
	HP StorageWorks 1/8 G2 Tape Autoloader Rack Kit	AH166A	
	<b>NOTE:</b> Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions		
	<b>NOTE:</b> Please reference the Tape Autoloader QuickSpecs at <a href="http://www.hp.com/go/automation">http://www.hp.com/go/automation</a> for additional information needed to create a complete solution; reference current compatibility information at <a href="http://www.hp.com/go/ebs">http://www.hp.com/go/ebs</a>		

<b>Tape Libraries</b>	<b>HP StorageWorks MSL2024 Tape Library</b>	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ033A
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1840 4GB FC Library	AJ034A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 SCSI Drive Library	AG115A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 960 4GB FC Library	AG326B
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SCSI Drive Library	AH169A
	HP StorageWorks MSL2024 1 LTO-2 Ultrium 448 SCSI Drive Library	AG116A
	<b>HP StorageWorks MSL4048 Tape Library</b>	
	HP StorageWorks MSL4048 1 LTO-2 Ultrium 448 SCSI Drive Library	AG320A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 SAS Drive Library	AH560A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 SCSI Drive Library	AH171A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 960 SCSI Drive Library	AG322A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 960 4GB FC Library	AG324B
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ035A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library	AJ036A
	<b>HP StorageWorks MSL8096 Tape Library</b>	
	HP StorageWorks MSL8096 2 LTO-3 Ultrium 920 SAS Drive Library	AH561A
	HP StorageWorks MSL8096 2 LTO-3 Ultrium 960 4GB FC Library	AH218A
	HP StorageWorks MSL8096 2 LTO-3Ultrium 960 SCSI Drive Library	AH219A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ039A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 4GB FC Library	AJ040A
	<b>HP StorageWorks MSL6000 Tape Library</b>	
	<b>LTO-4 Ultrium 1840 technology</b>	
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 SCSI Drive Library	AJ029A
	HP StorageWorks MSL6030 1 LTO-4 Ultrium 1840 4GB FC Library	AJ030A
	HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 SCSI Drive Library	AJ031A

### Options

HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 4GB FC Library <b>LTO-3 Ultrium 960 technology</b>	AJ032A
HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 Dr LVDS Library	AD606B
HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 Dr FC Library	AD608B
HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 Dr LVDS Library	AD607B
HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 Dr FC Library	AD609B

HP StorageWorks Modular Smart Array 20	HP StorageWorks Modular Smart Array 20 <b>NOTE:</b> Rack-mountable 12 (SATA) drive enclosure with U320 Host connectivity, redundant power supplies. <b>NOTE:</b> The Modular Smart Array Enclosure 20 Family supports the SATA 1.5Gb/s 3.5" Hot Plug Hard Drives.	335921-B21
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HP StorageWorks Modular Smart Array 30	HP StorageWorks Modular Smart Array 30 SB <b>NOTE:</b> Rack-mountable 14 drive enclosure with single bus, redundant power supplies	302969-B21
	HP StorageWorks Modular Smart Array 30 DB <b>NOTE:</b> Rack-mountable 14 drive enclosure with dual bus, redundant power supplies <b>NOTE:</b> The Modular Smart Array Enclosure 30 Family supports the Wide Ultra3, Ultra320 Hot Plug Hard Drives.	302970-B21

HP StorageWorks Modular Smart Array 50	HP StorageWorks Modular Smart Array 50 Enclosure <b>NOTE:</b> Please see the Modular Smart Array 50 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: <a href="http://h18000.www1.hp.com/products/quickspecs/12245_div/12245_div.html">http://h18000.www1.hp.com/products/quickspecs/12245_div/12245_div.html</a> (Worldwide)	364430-B21
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HP StorageWorks Modular Smart Array 60	HP StorageWorks 60 Modular Smart Array Enclosure <b>NOTE:</b> Please see the Modular Smart Array 60 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: <a href="http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html">http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html</a> (Worldwide)	418408-B21
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HP StorageWorks Modular Smart Array 70	HP StorageWorks 70 Modular Smart Array Enclosure <b>NOTE:</b> Please see the Modular Smart Array 70 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: <a href="http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html">http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html</a> (Worldwide)	418800-B21
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### Options

**NOTE:** For configuration/certification options for HP Serviceguard for Linux please go to: <http://www.hp.com/info/sglx>

<b>StorageWorks Options</b>	<p><b>NOTE:</b> The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see: <a href="http://h18006.www1.hp.com/storage/saninfrastructure/hba.html">http://h18006.www1.hp.com/storage/saninfrastructure/hba.html</a></p> <p>HP StorageWorks FC2142SR 4Gb PCI-e HBA A8002A</p> <p>HP StorageWorks FC2242SR Dual Channel 4 Gb PCI-e HBA A8003A</p> <p>HP StorageWorks FC1142SR 4Gb PCI-e HBA AE311A</p> <p>HP StorageWorks FC1242SR Dual Channel 4 Gb PCI-e HBA AE312A</p> <p>HP StorageWorks FC2143 4Gb PCI-X 2.0 -to-Fibre Channel HBA AD167A</p> <p>HP StorageWorks FC2243 Dual Channel 4Gb PCI-X 2.0 HBA AD168A</p> <p>HP StorageWorks FC1143 4Gb PCI-X 2.0 HBA AB429A</p> <p>HP StorageWorks FC1243 Dual Channel 4Gb PCI-X 2.0 HBA AE369A</p>
<b>Uninterruptible Power Systems – Tower</b>	<p>HP, T1000 UPS NA AF403A</p> <p>HP, T1000 UPS JPN AF404A</p> <p>HP, T1000 UPS INTL AF405A</p> <p>HP, T1500 UPS NA AF406A</p> <p>HP, T1500 UPS JPN AF407A</p> <p>HP, T1500 UPS INTL AF408A</p> <p>HP, R/T 2200 UPS NA AF409A</p> <p>HP, R/T 2200 UPS JPN AF410A</p> <p>HP, R/T 2200 UPS INTL AF411A</p>
<b>Uninterruptible Power Systems - Rack</b>	<p>HP, R1.5kVA UPS, 1U, NA AF419A</p> <p>HP, R1.5kVA UPS, 1U, INTL AF418A</p> <p>HP, R1.5kVA UPS, 1U, JPN/TW AF421A</p> <p>HP R3000 VA UPS, 2U, DTC, INTL AF414A</p> <p>HP R3000 VA UPS, 2U, L5-30, NA AF422A</p> <p>HP R3000 VA UPS, 2U, L6-20, NA AF423A</p> <p>HP R3000 VA UPS, 2U, L6-20, JPN AF424A</p> <p>HP R3000 VA UPS, 2U, L5-30, JPN AF425A</p> <p>HP R5500 VA UPS, INTL AF416A</p> <p>HP R5500 VA UPS, NA/JPN AF426A</p>

### Options

<b>HP Monitored Power Distribution Unit (PDU)</b>	<b>HP Monitored Power Distribution Unit: Full Rack Version</b>	
	17.3 kVA Monitored PDU Model S2324	AF503A
	8.6 kVA Monitored PDU Model S1324	AF504A
	16.6 kVA Monitored PDU Model S2140	AF505A
	8.3 kVA Monitored PDU Model S1140	AF506A
	22 kVA Monitored PDU Model S2316	AF507A
	11 kVA Monitored PDU Model S1316	AF508A
	14.7 kVA Monitored PDU Model S2132	AF509A
	7.3 kVA Monitored PDU Model S1132	AF510A
	4.9kVA Monitored PDU model S124	AF914A
7.3kVA Monitored PDU model S132	AF915A	

<b>Modular PDUs 1U/0U</b> (Up to 32 outlets) <b>NOTE:</b> 1U/0U mounting brackets shipped with the unit (optimized for 10000 and 9000 series racks).	3.6kVA Model - mPDU, 16A, High (WW)	252663-B24
	2.8 kVA Model - mPDU, 24A, Low (NA/JPN)	252663-D71
	4.9kVA Model - mPDU, 24A, High (NA/JPN)	252663-D72
	7.3kVA Model - mPDU, 32A, High (INT'L)	252663-B31
	8.3kVA Model - mPDU, 40A, High (WW)	252663-B21
	8.3kVA Model - mPDU, 40A, High (power cord attached) (NA/JPN)	252663-D73
	9.2kVA Model - mPDU, 40A, High (power cord attached) (INT'L)	252663-B32
	8.3kVA Model - mPDU 40A, High (core only) (NA/JPN)	252663-D75
	9.2kVA Model - mPDU 40 A, High (core only) (Int'l)	252663-B34
	8.3kVA Model - mPDU 32A, High (core only) (Int'l)	252663-B33
	4.9kVA Model - mPDU 24A, High (core only) (NA/JPN)	252663-D74
	<b>NOTE:</b> Please see the following Modular Power Distribution Unit (Zero-U/1U Modular PDUs) QuickSpecs for additional options including shorter jumper cables and country specific power cords: <a href="http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.html">http://h18000.www1.hp.com/products/quickspecs/11041_div/11041_div.html</a> (Worldwide)	

<b>USB Options</b>	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	DC172B
	USB 1.44-MB External Diskette Drive (Carbonite)	DC141B
	HP USB 04 Standard Keyboard	DT528A# ABA
	HP 1GB USB 2.0 Floppy Drive Key	442085-B21
	HP 256MB USB 2.0 Floppy Drive Key	442084-B21

<b>Rack Conversion Kit</b>	HP ML350 G5 Tower to Rack Conversion Kit	412640-B21
	ProLiant DL380 G4, ML370 G4, ML350 G4 Shipping Bracket for Round Hole Racks <b>NOTE:</b> This kit is required if the server will be configured and shipped within a round hole rack.	371482-B21



### Options

<b>HP Rack 5000 Series</b> (Graphite Metallic)	HP 5642 Rack-Unassembled <b>NOTE:</b> Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color: <a href="http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.html">http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.html</a> (Worldwide) <b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a> .	358254-B21
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<b>HP Rack 10000 G2 Series</b> (Carbon/Graphite Metallic)	10642 G2 (42U) Rack Cabinet - Pallet 10642 G2 (42U) Rack Cabinet - Shock Pallet 10642 G2 (42U) Rack Cabinet - Crated 10642 G2 (42U) Rack Cabinet, with Extension - Shock Pallet 10636 G2 (36U) Rack Cabinet - Pallet 10636 G2 (36U) Rack Cabinet - Shock Pallet 10636 G2 (36U) Rack Cabinet - Crated 10636 G2 (36U) Rack Cabinet, with Extension - Shock Pallet 10622 G2 (22U) Rack Cabinet - Pallet 10622 G2 (22U) Rack Cabinet - Shock Pallet 10842 G2 (42U) 800mm Wide Rack Cabinet - Pallet 10842 G2 (42U) 800mm Wide Rack Cabinet - Shock Pallet 10647 G2 (47U) Rack Cabinet - Pallet <b>NOTE:</b> It is mandatory to use a shock pallet when shipping racks with equipment installed. <b>NOTE:</b> Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: <a href="http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.html">http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.html</a> (Worldwide) <b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a> .	AF001A AF002A AF003A AF004A AF011A AF012A AF013A AF014A AF021A AF022A AF041A AF042A AF031A
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<b>HP Rack 10000 Series</b> (Graphite Metallic)	HP S10614 (14U) Rack Cabinet - Shock Pallet <b>NOTE:</b> xxxxx-B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels). <b>NOTE:</b> It is mandatory to use a shock pallet in order to ship racks with equipment installed. Not all equipment is qualified to be shipped in the Rack 10000 series. <b>NOTE:</b> Please see the Rack 10000 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: <a href="http://h18000.www1.hp.com/products/quickspecs/10995_div/10995_div.html">http://h18000.www1.hp.com/products/quickspecs/10995_div/10995_div.html</a> (Worldwide) <b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a>	292302-B22
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### Options

<b>Keyboards and Monitors</b>	TFT7210R Rack Mounted 17" Monitor	348373-B21
	TFT7600 Rackmount Keyboard Monitor US	AG052A
	TFT7600 Rackmount Keyboard Monitor UK	AG053A
	TFT7600 Rackmount Keyboard Monitor GR	AG054A
	TFT7600 Rackmount Keyboard Monitor FR	AG055A
	TFT7600 Rackmount Keyboard Monitor IT	AG056A
	TFT7600 Rackmount Keyboard Monitor SP	AG057A
	TFT7600 Rackmount Keyboard Monitor DEN	AG058A
	TFT7600 Rackmount Keyboard Monitor NOR	AG059A
	TFT7600 Rackmount Keyboard Monitor SE/FI	AG060A
	TFT7600 Rackmount Keyboard Monitor SWI	AG061A
	TFT7600 Rackmount Keyboard Monitor PORT	AG062A
	TFT7600 Rackmount Keyboard Monitor BEL	AG063A
	TFT7600 Rackmount Keyboard Monitor JPN2	AG064A
	TFT7600 Rackmount Keyboard Monitor RUS	AG065A
	TFT7600 Rackmount Keyboard Monitor INTL	AG066A
	1U Rackmount Keyboard with USB, US	AG072A
	1U Rackmount Keyboard with USB, UK	AG073A
	1U Rackmount Keyboard with USB, GR	AG074A
	1U Rackmount Keyboard with USB, FR	AG075A
	1U Rackmount Keyboard with USB, ITL	AG076A
	1U Rackmount Keyboard with USB, SP	AG077A
	1U Rackmount Keyboard with USB, DEN	AG078A
	1U Rackmount Keyboard with USB, NOR	AG079A
	1U Rackmount Keyboard with USB, SE/FI	AG080A
	1U Rackmount Keyboard with USB, SWI	AG081A
	1U Rackmount Keyboard with USB, PORT	AG082A
	1U Rackmount Keyboard with USB, BEL	AG083A
	1U Rackmount Keyboard with USB, JPN2	AG084A
	1U Rackmount Keyboard with USB, RUS	AG085A
	1U Rackmount Keyboard with USB, INTL	AG086A

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

### Options

<b>HP KVM Switch Options</b>	2x1x16 IP Console Switch with Virtual Media	AF601A
	4x1x16 IP Console Switch with Virtual Media	AF602A
	2x16 Server Console Switch with Virtual Media	AF600A
	PS/2 Virtual Media Interface Adapter, 1 pack	AF604A
	<b>NOTE:</b> Requires PS/2 and one USB port on server.	
	Server Console Switch (KVM), 0 x 1 x 8 port	336044-B21
	Server Console Switch (KVM), 0 x 2 x 16 port	336045-B21
	PS/2 Interface Adapter, 1 pack	262588-B21
	PS/2 Interface Adapter, 8 pack	262587-B21
	USB Interface Adapter, 1 pack	336047-B21
	Serial Interface adapter - 1 Pack with power supply	373035-B21
	<b>NOTE:</b> Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a> .	
	HP 1x4 Console Switch	AF611A
	PS2 Server Console Cable, 6 ft, 2 pack	AF612A
USB Server Console Cable, 6 ft, 2 pack	AF613A	
<b>NOTE:</b> 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> .		

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<b>HP Serial Console Server Options</b>	HP 16 Port Serial Console Server (worldwide)	AF101A
	HP 48 Port Serial Console Server (worldwide)	AF102A
	Serial Adapter, RJ45-DB9 DCE Female, 1 Pack	AF103A
	Serial Adapter, RJ45-DB9 DCE Female, 8 Pack	AF110A
	<b>NOTE:</b> Cat5e cables are required to connect Serial Adapters to Serial Console Servers. Additional Serial Adapters and Cat5e cables can be found at the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a> .	
<b>NOTE:</b> 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> .		

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### Options

#### Service and Support

Offerings (HP Care Pack Services)

#### Hardware Services On-site Service

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years (Electronic) U4512E

4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years (Electronic) U4513E

6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years (Electronic) U4514E

#### O/S and Hardware Installation

Hardware Installation (Electronic) U4522E

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) U4523E

#### 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) U4524E

#### 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 U4525E

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 U6308E

Onsite HW support 24x7, 4hr response and Red Hat ES Linux SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, Electronic U8330E

**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 ML350 G5 Memory Configuration

The HP ProLiant ML350 G5 requires memory interleaving when more than one DIMM is installed. For interleaving, DIMMs must be configured in identical pairs. The system will not boot properly if multiple DIMMs of varying density or type are installed in the system.

#### Standard Memory

All HP ProLiant ML350 G5 models ship with PC2-5300 Fully Buffered DIMMs (DDR2-667).

Entry models include a single 512 MB DIMM (Dual-Core) or two 512MB DIMMs (Quad-Core).

Base models include two 512 MB DIMMs (1 GB total memory).

Factory Integrated Models include the memory capacity of your choice.

#### Common Memory Configuration

Valid DIMM pair combinations use slots 1/5, slots 2/6, slots 3/7, and slots 4/8. Maximum supported memory is 16 GB for Dual-Core and 32 GB on Quad-Core models.

**NOTE:** Charts does not represent all possible memory configurations.

Memory		Slot							
		1A	2B	3C	4D	5A	6B	7C	8D
Standard	1 GB	512 MB	Empty	Empty	Empty	512 MB	Empty	Empty	Empty
Optional	13 GB	512 MB	2 GB	2 GB	2 GB	512 MB	2 GB	2 GB	2 GB
Maximum	32 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Following are memory options available from HP:

- 512MB FBD PC2-5300 1 x 512 MB Kit 413507-B21
- 1 GB FBD PC2-5300 2 x 512 MB Kit 397409-B21
- 2 GB FBD PC2-5300 2 x 1 GB Kit 397411-B21
- 2 GB FBD PC2-5300 2 x 1 GB LP Kit 461826-B21
- 4 GB FBD PC2-5300 2 x 2 GB Kit 397413-B21
- 4 GB FBD PC2-5300 2 x 2 GB LP Kit 461828-B21
- 8 GB FBD PC2-5300 2 x 4 GB Kit 397415-B21

### Memory

#### Online spare memory configuration

FBDIMMs can either be single-rank or dual-rank. Certain FBDIMM configuration requirements are based on these classifications. A dual-rank FBDIMM is similar to having two separate FBDIMMs, or ranks, on the same module. Although only a single FBDIMM module, a dual-rank FBDIMM acts as two separate FBDIMMs.

In online spare mode, a single rank of memory acts as the spare memory. For single-rank FBDIMMs, the entire FBDIMM acts as the spare memory. For a dual-rank FBDIMM, only half of the FBDIMM acts as the spare memory while the other half is available for operating system and application usage.

Online spare FBDIMM configuration requirements (in addition to general configuration requirements):

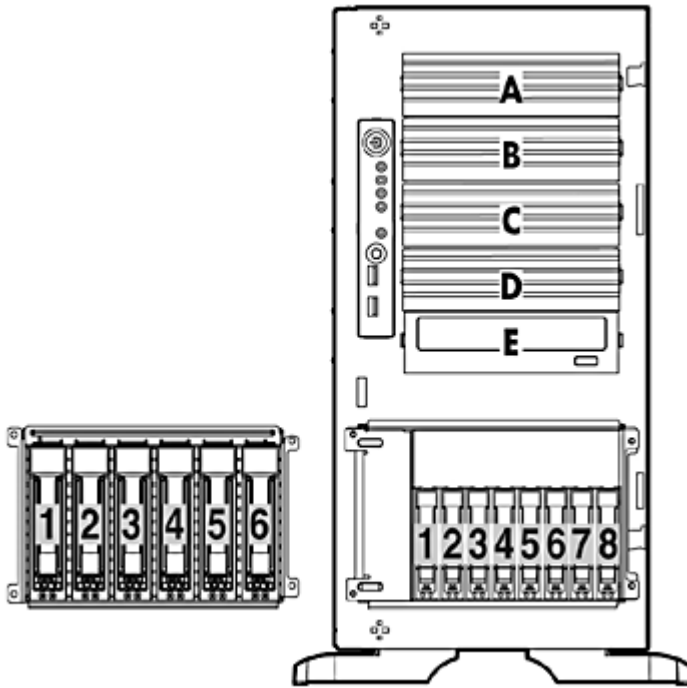
- When only bank A is being used, it must be fully populated with dual-rank FBDIMMs.
- For optimum memory usage, HP recommends all FBDIMMs be the same size with the same HP part number. If different sized FBDIMMs are used, a portion of the installed memory may not be utilized.

In online spare mode, FBDIMMs must be populated as specified in the following table:

- Configuration 1 (Bank A only) is only supported if using bank A, populated with dual-rank FBDIMMs.
- After installing FBDIMMs, use RBSU to configure the system for online spare memory support.

Bank A 1A and 5A	Bank B 2B and 6B	Bank C 3C and 7C	Bank D 4D and 8D
X	—	—	—
X	X	—	—
X	X	X	X

### Storage



1 - 6 6 x 3.5" (LFF) Hot-Plug SAS/SATA hard drive bays

Or

1 - 8 8 x 2.5" (SFF) Hot-Plug SAS/SATA hard drive bays

A,B,C,D Available half height media bays

E Optical Drive

### Drive Support

	Quantity Supported	Position Supported	Controller
<b>Removable Media</b>			
1.44-MB Diskette Drive	Up to 1	A, B, C, D, E	Integrated SATA Controller
IDE (ATAPI) CD-ROM Drive	Up to 1	A, B, C, D, E	Integrated SATA Controller
HP DVD±R/RW 16X Half Height	Up to 1	A, B, C, D, E	Integrated SATA Controller
DVD-ROM Drive Option Kit	Up to 1	A, B, C, D, E	Integrated SATA Controller
HP Half-Height SATA DVD-ROM Optical Drive	Up to 1	A, B, C, D, E	Integrated SATA Controller
HP Half-Height SATA DVD RW Optical Drive	Up to 1	A, B, C, D, E	Integrated SATA Controller

## Storage

### Hard Drives

#### 3.5" SATA Hot Plug Drives

	Quantity Supported	Position Supported	Controller
750GB 1.5G SATA 7.2K	Up to 6	1-6	HP Smart Array E200i/64MB Controller
500GB 1.5G SATA 7.2K			HP Smart Array E200i/128 BBWC Controller
250GB 1.5G SATA 7.2K			HP Smart Array E500/256MB Controller
160GB 1.5G SATA 7.2K			HP Smart Array P400/256MB Controller
80GB 1.5G SATA 7.2K			HP Smart Array P400/512MB BBWC Controller
			HP Smart Array P600/256 BBWC Controller
	HP Smart Array P800/512 BBWC Controller		
		HP 6-Port SATA RAID Controller	

#### SFF SATA Hot Plug Drives

	Quantity Supported	Position Supported	Controller
120GB 1.5G SATA 5.4K	Up to 8	1-8	HP Smart Array E200i/64MB Controller
60GB 1.5G SATA 5.4K			HP Smart Array E200i/128 BBWC Controller
			HP Smart Array E500/256MB Controller
			HP Smart Array P400/256MB Controller
			HP Smart Array P400/512MB BBWC Controller
			HP Smart Array P600/256 BBWC Controller
	HP Smart Array P800/512 BBWC Controller		
		HP 6-Port SATA RAID Controller	

**NOTE:** HP Systems Insight Manager should not be used to view the status of SATA hard drives and SATA RAID configurations.

#### Hot Plug SFF SAS 2.5" Drives

	Quantity Supported	Position Supported	Controller
146GB 3G SAS 10K SP	Up to 8 SFF	1-8	HP Smart Array E200i/64MB Controller
146GB 3G SAS 10K DP			HP Smart Array E200i/128 BBWC Controller
72GB 3G SAS 10K SP			HP Smart Array E500/256MB Controller
72GB 3G SAS 10K DP			HP Smart Array P400/256MB Controller
72GB 3G SAS 15K SP			HP Smart Array P400/512MB BBWC Controller
72GB 3G SAS 15K DP			HP Smart Array P600/256 BBWC Controller
36GB 3G SAS 10K SP			HP Smart Array P800/512 BBWC Controller
36GB 3G SAS 15K SP			HP 6-Port SATA RAID Controller
36GB 3G SAS 15K DP			

#### Hot Plug SAS 3.5" Drives

	Quantity Supported	Position Supported	Controller
300GB 3G SAS 15K 3.5" SP	Up to 6 LFF	1-6	HP Smart Array E200i/64MB Controller
300GB 3G SAS 15K 3.5" DP			HP Smart Array E200i/128 BBWC Controller
146GB 3G SAS 15K 3.5" SP			HP Smart Array E500/256MB Controller
146GB 3G SAS 15K 3.5" DP			HP Smart Array P400/256MB Controller
			HP Smart Array P400/512MB BBWC Controller
			HP Smart Array P600/256 BBWC Controller
	HP Smart Array P800/512 BBWC Controller		
		HP 6-Port SATA RAID Controller	



### Storage

SP  
72GB 3G SAS 15K 3.5"  
DP  
36GB 3G SAS 15K 3.5"  
SP

### External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
Modular Smart Array 20 Family	Up to 2	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller
Modular Smart Array 30 Family	Up to 2	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller Smart Array 642 Controller
Modular Smart Array 50 Enclosure	Up to 2	External	HP Smart Array P600/256 BBWC Controller
Modular Smart Array 500 G2	1	External	Please see the Modular Smart Array 500 or 500 G2 QuickSpecs for the latest list of supported HBAs: <a href="http://www.hp.com/go/msa500">http://www.hp.com/go/msa500</a> .
Modular Smart Array 1500 cs or 1000	Please see the Modular Smart Array 1500 cs or Modular Smart Array 1000 QuickSpecs links to determine configuration requirements		Please see the Modular Smart Array 1000 QuickSpecs for the latest list of supported HBAs: <a href="http://www.hp.com/go/MSA1000">http://www.hp.com/go/MSA1000</a> Please see the Modular Smart Array 1500 cs QuickSpecs for the latest list of supported HBAs: <a href="http://www.hp.com/go/MSA1500cs">http://www.hp.com/go/MSA1500cs</a>

### Tape Drives, Tape Autoloaders, Tape Libraries & D2D Backup

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: <http://h18000.www1.hp.com/products/quickspecs/division/10233.html> (Worldwide)

**NOTE:** For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders and Tape Libraries listed below, please see the following: <http://h18000.www1.hp.com/products/quickspecs/division/10809.html> (Worldwide)

**NOTE:** For complete listing of tape drive offerings see <http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

**NOTE:** SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP StorageWorks SCSI Tape Drives, Internal	Internal	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2	374654-B21

## Storage

LTO-1 Ultrium 232  
 LTO-2 Ultrium 448  
 LTO-2 Ultrium 460  
 LTO-3 Ultrium 920  
 LTO-3 Ultrium 960  
 LTO-4 Ultrium 1840  
 DAT 40  
 DAT 72  
 DAT 160  
 DLT VS160  
 SDLT 600

<b>HP StorageWorks SCSI Tape Drives, External</b>	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2	374654-B21
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LTO-1 Ultrium 232  
 LTO-2 Ultrium 448  
 LTO-2 Ultrium 460  
 LTO-3 Ultrium 920  
 LTO-3 Ultrium 960  
 LTO-4 Ultrium 1840  
 DAT 40  
 DAT 72  
 DAT 160  
 DLT VS160  
 SDLT 600  
 1U Rack-Mount Kit  
 3U Rack-Mount Kit

<b>HP StorageWorks USB Tape Drives, Internal</b>	Internal	USB 2.0 Port	N/A
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DAT 40 USB  
 DAT 72 USB  
 DAT 160 USB

<b>HP StorageWorks USB Tape Drives, External</b>	External	USB 2.0 Port	N/A
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DAT 40 USB  
 DAT 72 USB  
 DAT 160 USB  
 1U USB Rack-Mount Kit

<b>HP StorageWorks SAS Tape Drives, Internal</b>	External	HP SC44Ge Host Bus Adapter	416096-B21
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LTO-2 Ultrium 448 SAS		HP Smart Array E500 Controller	435129-B21
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LTO-3 Ultrium 920 SAS

**NOTE:** The following SAS Smart Array controllers require ROM Flash version 2.04 or higher for SAS tape support:

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

<b>HP StorageWorks SAS Tape Drives, External</b> LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS 1U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter <b>NOTE: Recommended.</b> HP Smart Array E500 Controller <b>NOTE: The following SAS Smart Array controllers require ROM Flash version 2.04 or higher for SAS tape support:</b> HP Smart Array P400/256MB Controller HP Smart Array P400/512MB Controller	416096-B21  435129-B21  405132-B21 411064-B21
<b>HP StorageWorks SCSI Tape Automation, External</b> DAT 72x10 Autoloader 1/8 G2 Tape Autoloader MSL2024 MSL4048 MSL8096 MSL6000	External	64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2	374654-B21
<b>HP StorageWorks SAS Tape Automation, External</b> 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter <b>NOTE: Please visit <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a> for details about minimum SAS controller firmware version and SAS cabling requirements.</b>	416096-B21
<b>HP StorageWorks Fibre Tape Automation, External</b> MSL2024 MSL4048 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 detailed connectivity information.	N/A
<b>HP StorageWorks D2D Backup Systems</b> D2D110 D2D120	External	Embedded Network Controller	N/A

### Power Specifications

Part Number	380622-001
Spare Kit	403781-001
Operational Input Voltage Range (V rms)	90 - 264
Frequency Range (Nominal) (Hz)	47 - 63 (50 / 60)

Nominal Input Voltage (Vrms)	100	120	208	220	230	240
Max Rated Output Wattage Rating	800	950	1000	1000	1000	1000
Nominal Input Current (A rms)	10.0	8.8	5.85	5.5	5.2	4.97
Max Rated Input Wattage Rating (Watts)	980	1035	1193	1186	1172	1169
Max. Rated VA (Volt-Amp)	1000	1056	1217	1210	1196	1193
Efficiency (%)	81.5	82	84	84	85	85.5
Power Factor	0.98	0.98	0.98	0.98	0.98	0.98
Leakage Current (mA)	0.44	0.52	0.91	0.96	1.00	1.04
Maximum Inrush Current (A peak)	30	30	30	30	30	30
Maximum Inrush Current duration (milliseconds)	3	3	3	3	3	3

#### NOTES:

ActiveAnswers Power Calculation

Power calculator is LIVE on ActiveAnswers Web site. This is an external link.

Follow this link: <http://h30099.www3.hp.com/configurator/powercalcs.asp>

To drill down to calculators:

- Click on: "ProLiant Servers"
- Click on the Server of interest. Example: ML350 G5
- Click on: "Power Calculator" link. (You may need to scroll down to see it)

### Technical Specifications

<b>System Unit</b>	<b>Tower Dimensions</b> (H x W x D) (with feet/bezel)	18.39 x 8.59 x 23.46 in (46.7 x 21.8 x 59.6 cm)	
	<b>Rack Dimensions</b> (H x W x D) (with feet/bezel)	8.54 x 17.5 x 21.9 in. (21.7 x 44.5 x 55.7cm)	
	<b>Tower Weight</b> (approximate)	Maximum	67 lb (30.4 kg) (all hard drives, power supplies, and processors installed)
		Minimum	50 lb (22.7 kg) (one hard drive, power supply, and processor installed)
	<b>Rack Weight</b> (approximate)	Maximum	61 lb (27.7 kg) (all hard drives, power supplies, and processors installed)
		Minimum	44 lb (20.0 kg) (one hard drive, power supply, and processor installed)
	<b>Max Input Requirements</b> (per power supply)	Rated Line Voltage	100 VAC, 120 VAC 200 - 240 VAC
		Rated Input Current	10A (at 100 VAC) 9A (at 120 VAC) 6.1A (at 200 VAC)
		Rated Input Frequency	50 to 60 Hz
		Rated Input Power	980W (at 100 VAC) 1035W (at 120 VAC) 1170W (at 240 VAC)
<b>BTU Rating</b>	BTU/HR	3350 BTU/hr (at 100 VAC) 3530 BTU/hr (at 120 VAC) 3990 BTU/hr (at 240 VAC)	
<b>Power Specifications</b>	To review typical system power ratings use the Power Calculator which is available via the online tool located at URL: <a href="http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls">http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls</a>		
<b>Power Supply Output</b> (per power supply)	Rated Steady-State Power	800 W (at 100 VAC) 850 W (at 120 VAC) 1000 W (at 200-240 VAC)	
	Maximum Peak Power	800 W (at 100 VAC) 850 W (at 120 VAC) 1000 W (at 200-240 VAC)	
<b>System Inlet Temperature</b>	Operating	10° to 35°C (50° to 95°F) at sea level with an	

### Technical Specifications

		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).
<b>Relative Humidity</b> (non-condensing)	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
<b>Altitude</b>	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	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).
<b>Acoustic Noise</b>	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
		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	5.2 B
	L pAm	35 dBA
	Operating	
	L WAd	5.3 B
	L pAm	35 dBA

### Technical Specifications

<b>Smart Array E200i Controller</b>	<b>Disk Drive and Enclosure Interface</b>	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial Advanced Technology Attachment)	
	<b>SAS Connectors</b>	2 internal (SFF8484) x4 wide port connectors	
	<b>Cache Memory Speed</b>	DDR-1/266 MHz provides up to 4.2 GB/s maximum bandwidth.	
	<b>Server Interface</b>	x4 2.5G PCIe provides 2GB/s maximum bandwidth.	
	<b>SAS Speed</b>	x8 3G SAS provides 2.4GB/s maximum bandwidth.	
	<b>Cache Memory</b>	40-bit 64MB ECC read cache or 40-bit 128MB ECC battery backed, transportable read/write cache	
	<b>Logical Volumes Supported</b>	Up to 32 logical volumes	
	<b>Maximum Volume Capacity</b>	4.5TB (6 x 750GB SATA)	
	<b>Host Memory Addressing</b>	64-bit, supporting greater than 4GB server memory space	
	<b>RAID Support</b>	RAID 5 (Distributed Data Guarding) RAID 1, 1+0 (Striping & Mirroring) RAID 0 (Striping)	
	<b>Upgradeable Firmware</b>	Upgradeable Firmware	
	<hr/>		
	<b>Embedded NC373i Multifunction Gigabit Server Adapter</b>	<b>Network Interface Compatibility</b>	10Base-T/100Base-TX/1000Base-TX IEEE 802.3 10Base-T IEEE 802.3ab 1000Base-T IEEE 802.3u 100Base-TX
<b>Data Transfer Method</b>		PCI Express, four lanes (x4)	
<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)
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### Technical Specifications

#### Environment-friendly Products and Approach

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

Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to <http://www.hp.com/go/green>. To recycle your product, please go to: <http://www.hp.com/go/green> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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