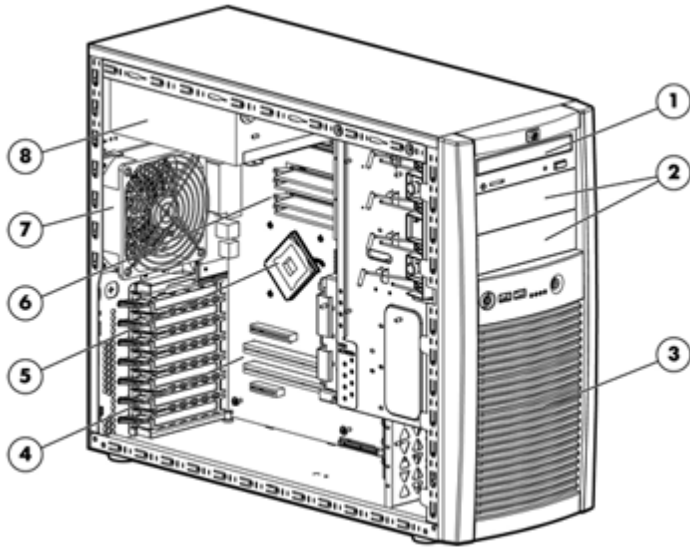
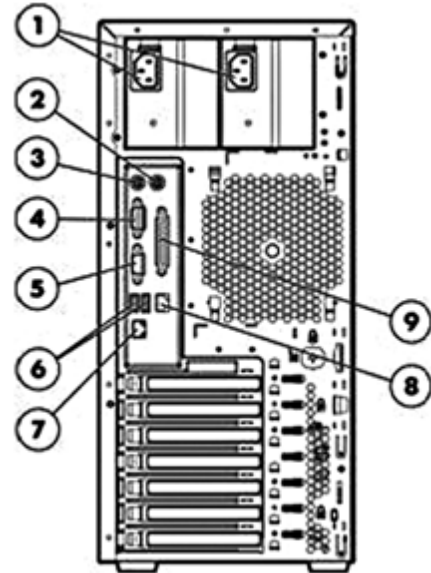


### Overview



#### Front View:

1. 48x IDE (ATAPI) CD-ROM
2. Removable Media Bays
3. Four Hot-Plug Drive Bays
4. Four Expansion Slots (Two PCI-X, Two PCI Express)
5. Processor Socket (Intel® Xeon®, Pentium® D or Celeron® D)
6. Four DIMM Sockets for up to 8GB DDR2 memory
7. System Fan
8. 410W Non-Hot Plug Non-Redundant Power Supply or 430W Hot Plug Redundant Power Supplies



#### Rear View:

1. Power cord connections for Power Supply 1 & 2
2. Mouse connector
3. Keyboard connector
4. Serial Port
5. Video Port
6. USB 2.0 (qty 2)
7. Embedded NIC
8. Integrated Lights-Out 2 (iLo2) connector
9. Printer PS1

### What's New

- Intel® Xeon® 3070 (2.66 GHz/1066 - 4MB L2) DC, Factory Installed Only

### Overview

### At A Glance

The HP ProLiant ML310 G4 is an affordable, single processor tower server designed to provide the solid network foundation essential to fuel thriving small offices. Dual-Core Intel Xeon, Dual-Core Pentium D or single-core Celeron D processing power combines with industry-leading management and essential data protection features for a secure, affordable platform that helps you run your business efficiently.

- **Processors:**
  - Dual-Core Intel® Xeon® processor 3000 Sequence
  - Dual-Core Pentium® D 800 or 900 Series processor
  - Single-core Celeron D® 300 Sequence processor
  - 1066 MHz or 800 MHz Front Side Bus (FSB)
  - Intel® 3000 Chipset
- **Memory:**
  - Up to 8GB of PC2-5300 667MHz unbuffered DDR2 SDRAM with ECC capabilities and optional interleaving
- **Storage Controller:**
  - SAS Models: HP 8 Internal Port SAS HBA with RAID 0,1 in a PCI-X slot
  - SATA Models: Embedded SATA with integrated SATA RAID 0,1
- **Internal Drive Support:**
  - Supports up to four hot plug SAS or SATA hard drives for up to 3TB internal storage
  - Models support SAS and SATA hard drives
- **Network Controller:**
  - Embedded NC320i PCIe Gigabit Server Adapter
- **Expansion Slots:**
  - 4 Total: (2) PCI-X 64-bit/100MHz; (2) PCI Express
- **USB 2.0 Ports:**
  - 5 Total: (2) front; (2) rear; (1) internal; (1) dedicated internal
- **Management:**
  - Integrated Lights-Out 2 featuring Integrated Remote Console
  - ROM Based Setup Utility (RBSU) and PXE support
- **Form Factor:**
  - Tower
  - Optional Tower-to-Rack Enabling Kit available
- **Warranty:**
  - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for one year from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Expanded support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. SATA hard drives have a one-year warranty.  
**NOTE:** Server Warranty includes one year parts, one year labor, and one year on-site support with next business day response. 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/4aa0-8146enw.pdf>.

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

|   |  |
|---|--|
| <b>Processor</b>                        | Dual-Core Intel® Xeon® 3070 (2.66 GHz, 65 Watts, 1066 FSB, 4MB L2 Cache)       |
| One of the following depending on Model | Dual-Core Intel® Xeon® 3060 (2.4 GHz, 65Watts, 1066 FSB, 4MB L2 Cache)         |
|   | Dual-Core Intel® Xeon® 3040 (1.86 GHz, 65Watts, 1066 FSB, 2x1MB L2 Cache)      |
|   | Dual-Core Intel® Pentium® D 820 (2.8 GHz, 95 Watts, 800 FSB, 2 x 1MB L2 Cache) |
|   | Dual-Core Intel® Pentium® D 925 (3.0 GHz, 95 Watts, 800 FSB, 2x2MB L2 Cache)   |
|   | Intel® Celeron D® 352 (3.2 GHz, 86 Watts, 533 FSB, 512KB L2 Cache)             |

**NOTE:** The processors listed above available via Configure to Order only. Please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

|  |  |
|--|--|
|  | Dual-Core Intel® Xeon® 3050 (2.13 GHz, 65 Watts, 1066 FSB, 2MB L2 Cache)       |
|  | Dual-Core Intel® Pentium® D 945 (3.4 GHz, 95 Watts, 800 FSB, 2 x 2MB L2 Cache) |

|   |  |
|---|--|
| <b>Cache Memory</b>                     | Integrated 4MB (3060 and 3070 Series) level 2 ECC cache (Intel® Xeon® processor 3000 Sequence) |
| One of the following depending on Model | Integrated 2MB (3040 and 3050 Series) level 2 ECC cache (Intel® Xeon® processor 3000 Sequence) |
|   | Integrated 2 x 2MB level 2 ECC cache (Pentium D 900 Series)                                    |
|   | Integrated 2 x 1MB level 2 ECC cache (Pentium D 800 Series)                                    |
|   | Integrated 512KB level 2 ECC cache (Celeron D 300 Series)                                      |

|                          |     |
|--------------------------|-----|
| <b>Memory Protection</b> | ECC |
|--------------------------|-----|

|   |                            |   |
|---|----------------------------|---|
| <b>Memory</b>                           | Type                       | PC2-5300 unbuffered DDR2 SDRAM (667MHz) |
| One of the following depending on Model | Standard (Model dependent) | 512 MB (1 x 512 MB)<br>1 GB (1 x 1 GB)  |
|   | Maximum                    | 8 GB                                    |

|                           |   |
|---------------------------|---|
| <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter |
|---------------------------|---|

| Expansion Slots | Slot Number | Bus Speed              | Maximum Card Length | Hot Plug | Connector Type |
|-----------------|-------------|------------------------|---------------------|----------|----------------|
|                 | 4           | PCI Express x4         | 12.3                | No       | x8             |
|                 | 3           | 64-bit/100MHz<br>PCI-X | 12.3                | No       | 3.3V           |
|                 | 2           | 64-bit/100MHz<br>PCI-X | 12.3                | No       | 3.3V           |
|                 | 1           | PCI Express x1         | 12.3                | No       | x8             |

### Standard Features

#### Storage Controllers

The HP ProLiant ML310 G4 supports Serial ATA (SATA) and Serial Attached SCSI (SAS) hard drives. Models described as SAS models include an 8 port HBA that supports both SATA and SAS hard drives in non-RAID, RAID 0, or RAID 1 configurations. Models described as SATA/SAS support SATA hard drives standard and require the installation of an HBA or controller to support SAS.

HP 8 Internal Port SAS HBA with RAID (in PCI-X slot) (SAS Models)

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

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

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

#### Storage

Optical Drive 48x IDE (ATAPI) CD-ROM Drive

Diskette Drive Optional 1.44 MB Diskette Drive

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

#### Maximum Internal Storage

|                      |       |                |
|----------------------|-------|----------------|
| Hot Plug SAS (3.5")  | 1.2TB | 4 x 300GB SAS  |
| Hot Plug SATA (3.5") | 3.0TB | 4 x 750GB SATA |

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

#### Interfaces

|                         |   |
|-------------------------|---|
| Parallel                | 1   |
| Serial                  | 1 (Optional second serial port available) |
| Pointing Device (Mouse) | 1   |
| Graphics                | 1   |
| Keyboard                | 1   |
| USB Ports               | 5 (2 front; 2 rear; 1 internal)           |

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

|                              |   |
|------------------------------|---|
| Dedicated USB Port           | 1 (available for USB tape connectivity) |
| Network RJ-45 (Ethernet)     | 1                                       |
| iLO 2 Remote Management port | 1                                       |

#### Graphics

Integrated ATI ES1000 Video Controller with 16-MB SDRAM Video Memory

#### Form Factor

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

### Standard Features

#### HP Insight Control Management Suites

HP Insight Control Environment delivers foundation management, including remote monitoring, hardware resource deployment, health monitoring, software version control, performance monitoring, vulnerability scanning and patch management, and power management. HP Insight Control Environment installs and licenses the following components by default using a wizard-based integrated installer:

- HP Systems Insight Manager
- HP iLO Advanced Pack
- HP Rapid Deployment Pack
- HP Insight Power Manager
- HP Performance Management Pack
- HP Vulnerability and Patch Management Pack

Additional ProLiant Essentials software and management tools included on the Insight Control Management kit can be installed manually

- HP Server Migration Pack - Universal Edition
- HP Open Service Event Manager
- HP Instant Support Enterprise Edition

**NOTE:** Server Migration Pack - Universal Edition can be installed from the SMP Universal CD included in the Insight Control Management media kit.

**NOTE:** For additional product and licensing information about HP Insight Control Environment, visit: <http://www.hp.com/go/ice>.

HP Insight Control management suites and most HP ProLiant Essentials include a one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit:

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

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#### Server Management Stand Alone Software Product - ProLiant Essentials

HP Systems Insight Manager

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

ProLiant Essentials Server Migration Pack - Universal Edition

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 migrations:

- physical to ProLiant
- physical to virtual
- virtual to virtual
- virtual to ProLiant

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

ProLiant Essentials Performance Management Pack

Performance Management Pack (offered exclusively through the Insight Control suites) - a performance management solution that identifies and explains hardware performance bottlenecks on ProLiant servers and attached options enabling users to better utilize their valuable resources

### Standard Features

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, and enterprise security (directory services and two-factor authentication).

**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.

### Core Infrastructure Management

**SmartStart** SmartStart is a tool that simplifies server setup, providing a rapid way to deploy reliable and consistent server configurations. For more information, please visit the SmartStart Web site at: <http://www.hp.com/servers/smartstart>. SmartStart version supported (minimum): SmartStart 7.51.

**Insight Management Agents** The 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>.

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

**ProLiant Support Packs and ROMPaq, software** The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options, available through ProLiant Support Packs the ProLiant Essentials Rapid Deployment Pack, SmartStart or downloaded from software and drivers download pages website at: <http://www.hp.com/go/support>.

### Industry Standard Compliance

ACPI V1.0b and 2.0 Compliant  
PCI 3.0 Compliant  
PCI-X 3.0 Compliant  
PCI-Express 3.0 Compliant  
PXE Support  
WOL Support  
Microsoft Logo certifications  
Novell Logo certifications  
USB 2.0

### 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)
- 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

#### Manageability

HP Systems Insight Manager  
Online ROM Flash Utility  
Drive Parameter Tracking (with Smart Array Controller)  
Dynamic Sector Repairing (with Smart Array Controller)  
Pre-Failure Warranty (covers processors, memory and SAS hard drives)  
BIOS Serial Console

#### Security

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

#### Server Power Cords

All models ship with one 1.8m (6 foot) standard low-line, country specific power cord. Localized cables included with geographic specific models in other world regions.

**NOTE:** HP ProLiant ML310 a C13 to C14 2.8M jumper cord ships standard. If customers require a local power cord, they can check the power cord matrix for the appropriate country specific sku. Please see the following power cord matrix: <http://www.hp.com/go/powercordmatrix>.

#### Power Specifications

To review typical system power ratings use the Active Answers Power Calculator at:  
<http://h30099.www3.hp.com/configurator/powercalcs.asp>

#### Power Supply

410 Watt PFC (Power Factor Correcting) non-hot plug non-redundant power supply or 430 Watt PFC hot plug redundant power supplies (ships with two power supplies)

#### UPS and PDU Power Cord Matrix

Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units:  
<http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html>

### Standard Features

#### System Fans

1 - Non-hot plug, Non-redundant system fan

**NOTE:** Does not include fans in CPU heatsink or power supply.

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#### OS Support

Microsoft Windows Server 2003  
Microsoft Small Business Server 2003  
Novell NetWare  
Red Hat Enterprise Linux  
SUSE Enterprise Linux Server  
SCO OpenServer

**NOTE:** The ML310 Embedded SATA RAID feature is not available for use with Netware or SCO operating systems.

**NOTE:** For a more complete and up-to-date listing of supported OSs and versions, please visit our OS Support Matrix at: <http://www.hp.com/go/supportos>

**NOTE:** For an up-to-date listing of the latest software and drivers available for your server, please select your server: <http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?lang=en&cc=us&taskId=135&prodTypeId=15351&prodCatId=241435>.

**NOTE:** For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix <http://h18004.www1.hp.com/products/servers/linux/hpLinuxcert.html>

**NOTE:** For more complete and up-to-date information on how to buy server operating systems from HP please visit the OS product site at: <http://h18004.www1.hp.com/products/servers/software/OEM.html>

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#### Factory Express Portfolio for Servers and Storage

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

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

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#### Rack and Rack Options

##### Rack Cabinets:

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

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

- For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <http://www.hp.com/go/kvm>.
-



### Standard Features

#### 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.

<http://www.hp.com/products/configurator>.

#### Service and Support

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

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

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

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

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

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

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

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

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

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

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

### Models

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

### Models with SAS Support Standard

|  |                           |  |
|--|---------------------------|--|
| <b>ML310T04 3050 HP SAS/SATA</b><br>418038-xx1 | <b>Processor(s)</b>       | Dual-Core Intel® Xeon® 3050 (2.13 GHz, 65 Watts, 1066 FSB, 2MB L2 Cache) |
|  | <b>Cache Memory</b>       | 1 x 2MB L2   |
|  | <b>Memory</b>             | 1 GB (1 x 1GB)   |
|  | <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter                              |
|  | <b>Storage Controller</b> | HP 8 Internal Port SAS HBA with RAID 0, 1 in a PCI-X slot                |
|  | <b>Hard Drives</b>        | None ship standard (up to 4 hot plug SAS or SATA 3.5" drives supported)  |
|  | <b>Internal Storage</b>   | SAS: 584GB maximum; SATA: 3TB maximum                                    |
|  | <b>Optical Drive</b>      | 48x IDE (ATAPI) CD-ROM Drive   |
|  | <b>Diskette Drive</b>     | None ship standard (Optional 1.44 MB Diskette Drive available)           |
|  | <b>Power Supply</b>       | 410W non-hot plug non-redundant power supplies                           |
|  | <b>Form Factor</b>        | Tower (5U) (Tower to Rack Enabling Kit available)                        |

|   |                           |  |
|---|---------------------------|--|
| <b>ML310T04 3050 HP SAS RPS</b><br>418039-xx1 | <b>Processor(s)</b>       | Dual-Core Intel® Xeon® 3050 (2.13 GHz, 65 Watts, 1066 FSB, 2MB L2 Cache) |
|   | <b>Cache Memory</b>       | 1 x 2MB L2   |
|   | <b>Memory</b>             | 1 GB (1 x 1GB)   |
|   | <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter                              |
|   | <b>Storage Controller</b> | HP 8 Internal Port SAS HBA with RAID 0, 1 in a PCI-X slot                |
|   | <b>Hard Drives</b>        | None ship standard (up to 4 hot plug SAS or SATA 3.5" drives supported)  |
|   | <b>Internal Storage</b>   | SAS: 584GB maximum; SATA: 3TB maximum                                    |
|   | <b>Optical Drive</b>      | 48x IDE (ATAPI) CD-ROM Drive   |
|   | <b>Diskette Drive</b>     | None ship standard (Optional 1.44 MB Diskette Drive available)           |
|   | <b>Power Supply</b>       | 430W hot plug redundant power supplies                                   |
|   | <b>Form Factor</b>        | Tower (5U) (Tower to Rack Enabling Kit available)                        |

### Models

#### Models with SATA Support Standard

|  |                           |  |
|--|---------------------------|--|
| <b>ML310T04 3050 HP<br/>SATA</b><br>418040-xx1 | <b>Processor(s)</b>       | Dual-Core Intel® Xeon® 3050 (2.13 GHz, 65 Watts, 1066 FSB, 2MB L2 Cache)   |
|  | <b>Cache Memory</b>       | 1 x 2MB L2   |
|  | <b>Memory</b>             | 512 MB (1 x 512 MB)  |
|  | <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter  |
|  | <b>Storage Controller</b> | Embedded SATA with integrated SATA RAID 0, 1   |
|  | <b>Hard Drives</b>        | None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller) |
|  | <b>Internal Storage</b>   | SATA: 3 TB maximum; SAS: 1.2TB maximum   |
|  | <b>Optical Drive</b>      | 48x IDE (ATAPI) CD-ROM Drive   |
|  | <b>Diskette Drive</b>     | None ship standard (Optional 1.44 MB Diskette Drive)   |
|  | <b>Power Supply</b>       | 410W non-hot plug non-redundant power supplies   |
|  | <b>Form Factor</b>        | Tower (5U) (Tower to Rack Enabling Kit available)  |

|  |                           |  |
|--|---------------------------|--|
| <b>ML310T04 3050 HP<br/>SATA/SAS RPS</b><br>418041-xx1 | <b>Processor(s)</b>       | Dual-Core Intel® Xeon® 3050 (2.13 GHz, 65 Watts, 1066 FSB, 2MB L2 Cache)   |
|  | <b>Cache Memory</b>       | 1 x 2MB L2   |
|  | <b>Memory</b>             | 512 MB (1 x 512 MB)  |
|  | <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter  |
|  | <b>Storage Controller</b> | Embedded SATA with integrated SATA RAID 0, 1   |
|  | <b>Hard Drives</b>        | None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller) |
|  | <b>Internal Storage</b>   | SATA: 3 TB maximum; SAS: 1.2TB maximum   |
|  | <b>Optical Drive</b>      | 48x IDE (ATAPI) CD-ROM Drive   |
|  | <b>Diskette Drive</b>     | None ship standard (Optional 1.44 MB Diskette Drive available)   |
|  | <b>Power Supply</b>       | 430W hot plug redundant power supplies   |
|  | <b>Form Factor</b>        | Tower (5U) (Tower to Rack Enabling Kit available)  |

### Models

ML310T04 p945 HP  
SATA/SAS  
418042-xx1

|                           |  |
|---------------------------|--|
| <b>Processor(s)</b>       | Dual-Core Intel® Pentium® D 945 (3.4 GHz, 95 Watts, 800 FSB, 2 x 2MB L2 Cache)   |
| <b>Cache Memory</b>       | 2 x 2MB L2   |
| <b>Memory</b>             | 512 MB (1 x 512 MB)  |
| <b>Network Controller</b> | Embedded NC320i PCIe Gigabit Server Adapter  |
| <b>Storage Controller</b> | Embedded SATA with integrated SATA RAID 0, 1   |
| <b>Hard Drives</b>        | None ship standard (Up to 4 hot plug SATA 3.5" drives supported standard. SAS 3.5" drives supported with optional HBA or controller) |
| <b>Internal Storage</b>   | SATA: 3 TB maximum; SAS: 1.2TB maximum   |
| <b>Optical Drive</b>      | 48x IDE (ATAPI) CD-ROM Drive   |
| <b>Diskette Drive</b>     | None ship standard (Optional 1.44 MB Diskette Drive available)   |
| <b>Power Supply</b>       | 410W non-hot plug non-redundant power supplies   |
| <b>Form Factor</b>        | Tower (5U) (Tower to Rack Enabling Kit available)  |

---

|                         |       |           |
|-------------------------|-------|-----------|
| <b>Country Code Key</b> | XX=00 | NA        |
|                         | XX=01 | Australia |
|                         | XX=20 | Brazil    |
|                         | XX=03 | UK        |
|                         | XX=04 | Germany   |
|                         | XX=05 | France    |
|                         | XX=29 | Japan     |
|                         | XX=37 | AP        |
|                         | XX=42 | EURO      |
|                         | XX=AA | PRC       |
|                         | XX=AB | Taiwan    |
|                         | XX=AD | Korea     |

### 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

|        |  |            |
|--------|--|------------|
| Models | HP ProLiant ML310 G4 CTO Chassis                                   | 419278-B21 |
|        | <b>Factory Integrated Models ship with:</b>                        |            |
|        | Embedded NC320i PCIe Gigabit Server Adapter                        |            |
|        | Integrated Four Channel SATA Controller (HP-SATA/SAS chassis only) |            |
|        | Keyboard and Mouse   |            |

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

|               |   |            |
|---------------|---|------------|
| Processors    | Intel® Celeron D 352 (3.2 GHz/533 - 512KB L2), FIO  | 431702-L21 |
|               | Intel® Pentium D 820 (2.8 GHz/800 - 2 x 1MB L2) DC, FIO                                     | 432406-L21 |
|               | Intel® Pentium D 945 (3.4 GHz/800 - 2 x 2MB L2) DC, FIO                                     | 433972-L21 |
|               | Intel® Pentium D 925 (3.0 GHz/800 - 2x2MB L2) DC, FIO                                       | 433971-L21 |
|               | Intel® Xeon® 3040 (1.86 GHz,/1066 - 2MB L2), DC, FIO  | 433376-L21 |
|               | Intel® Xeon® 3050 (2.13 GHz/1066 - 2MB L2) DC, FIO  | 419275-L21 |
|               | Intel® Xeon® 3060 (2.4 GHz/1066 - 4MB L2) DC, FIO   | 419276-L21 |
|               | Intel® Xeon® 3070 (2.66 GHz/1066 - 4MB L2) DC, FIO  | 441621-L21 |
| Base Memory   | 2 GB Unbuffered PC2-5300 ECC DIMM (1 x 2 GB)  | 432806-B21 |
|               | 1 GB Unbuffered PC2-5300 ECC DIMM (1 x 1 GB)  | 432804-B21 |
|               | 512 MB Unbuffered PC2-5300 ECC DIMM (1 x 512 MB)  | 432803-B21 |
| Optical Drive | 48x IDE (ATAPI) CD-ROM  | 398972-B21 |
|               | CD-RW/DVD-ROM Combo Drive Option Kit  | 331346-B21 |
|               | 16X DVD-ROM Drive Option Kit (Carbon)   | 217053-B21 |
|               | HP DVD±R/RW 16X Half Height   | 383974-B21 |
| Power Supply  | 410W Non-Redundant Power Supply, FIO  | 431653-B21 |
|               | 430W Hot-plug Redundant Power Supply, FIO   | 431652-B21 |
|               | <b>NOTE:</b> Hot plug redundant power supply (PN 431652-B21) ships with two power supplies. |            |

### Configuration Information - Factory Integrated Models

#### Step 3: Choose Additional Factory Integratable Options

##### Controllers

**NOTE:** When SATA hard drives are installed, SATA LED functionality and full SATA hot-plug capability are not supported with the embedded controller. For full LED and hot-plug support, an optional SAS RAID controller must be installed.

**NOTE:** When hot-plug SATA hard drives are installed, SATA LED functionality and full SATA hot-plug capability are not supported with the embedded controller. For full LED and hot-plug support, an optional SATA RAID or SAS controller must be installed. A SAS HBA or Controller is required if SAS hard drives are selected. SAS HBAs and Controllers support both SAS and SATA hard drives. Some SAS HBAs and Controllers also have SAS tape support. Please refer to the "Tape Drives, Tape Autoloader & Tape Libraries" table in the Storage section for a list of SAS HBAs and Controllers with tape support.

HP 8 Internal Port SAS HBA with RAID 347786-B21

**NOTE:** RAID 0, 1.

HP Smart Array E200/128 BBWC Controller 411508-B21

**NOTE:** RAID 0, 1, 1+0, 5.

HP Smart Array P400/256MB Controller 405132-B21

**NOTE:** RAID 0, 1, 1+0, 5.

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

**NOTE:** RAID 0, 1, 1+0, 5, 6.

##### Modems

Agere 06 PCI Hi-Speed 56K SftMd 440519-B21

**NOTE:** This part number must be used for factory integration. For field integration (or as an additional "ship along" option) choose EK694AA.

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

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

### Options

#### HP Insight Control Management Suites

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

##### HP Insight Control Environment

HP Insight Control Environment, No Media 1-Server License including 1 year of 24x7 Technical Support and Updates 452148-B21

HP Insight Control Management Software Media Kit 436222-B21

**NOTE:** Insight Control Management DVD media without licenses. Contains Insight Manager and Essentials software products and components licensed by Insight Control Management suites. Uses an integrated installer to perform quick and accurate software installation and updates.

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/12631\\_div/12631\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html)

#### Server Management Stand Alone Software Product - ProLiant Essentials

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

##### Deploy

##### HP Server Migration Pack - Universal Edition

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

**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.

HP Server Migration Pack - Universal Edition, No Media, 1-Year Unlimited Migration License, including 1 year of 24x7 Technical Support 460756-B21

**NOTE:** This license allows unlimited migrations (physical to ProLiant, physical to virtual, virtual to virtual, and virtual to ProLiant) for one year. 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 Service.

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/12855\\_div/12855\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12855_div/12855_div.html)

##### Control

##### Integrated Lights-Out Select Pack

ProLiant Essentials Integrated Lights-Out Select Pack, No Media, 1-Server License 452158-B21

**NOTE:** For additional License Kits, please see the QuickSpecs at:  
[http://h18000.www1.hp.com/products/quickspecs/12362\\_div/12362\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html)

### Options

#### Integrated Lights-Out Advanced Pack

Integrated Lights-Out Advanced Pack, No Media ,1 Server License 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)

**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 QuickSpecs for more information.

|                   |  |            |
|-------------------|--|------------|
| Memory<br>(DIMMs) | 2 GB Unbuffered PC2-5300 ECC DIMM (1 x 2 GB)     | 432806-B21 |
|                   | 1 GB Unbuffered PC2-5300 ECC DIMM (1 x 1 GB)     | 432804-B21 |
|                   | 512 MB Unbuffered PC2-5300 ECC DIMM (1 x 512 MB) | 432803-B21 |

|                |                                       |            |
|----------------|---------------------------------------|------------|
| Optical Drives | 16X DVD-ROM Drive Option Kit (Carbon) | 217053-B21 |
|                | CD-RW/DVD-ROM Combo Drive Option Kit  | 331346-B21 |
|                | HP DVD±R/RW 16X Half Height           | 383974-B21 |

|                 |                                  |            |
|-----------------|----------------------------------|------------|
| Diskette Drives | 1.44MB Diskette Drive Option Kit | 379257-B21 |
|-----------------|----------------------------------|------------|

|                 |   |            |
|-----------------|---|------------|
| Serial Port Kit | HP ProLiant Second Serial port option kit | 390390-B21 |
|-----------------|---|------------|

|             |   |            |
|-------------|---|------------|
| Hard Drives | <b>Serial-Attached SCSI (SAS) Hot Plug Hard Drive</b> |            |
|             | <b>NOTE:</b> SAS HBA or array controller is required. |            |
|             | HP 36GB 3G SAS 15K 3.5" SP HDD                        | 375868-B21 |
|             | HP 72GB 3G SAS 15K 3.5" SP HDD                        | 375870-B21 |
|             | HP 72GB 3G SAS 15K 3.5" DP HDD                        | 384852-B21 |
|             | HP 146GB 3G SAS 15K 3.5" SP HDD                       | 375872-B21 |
|             | HP 146GB 3G SAS 15K 3.5" DP HDD                       | 384854-B21 |
|             | HP 300GB 3G SAS 15K 3.5" SP HDD                       | 431944-B21 |
|             | HP 300GB 3G SAS 15K 3.5" DP HDD                       | 416127-B21 |
|             | <b>Serial-ATA (SATA) Hot Plug Hard Drive</b>          |            |
|             | HP 80GB 1.5G SATA 7.2K 3.5" HDD                       | 349237-B21 |
|             | HP 160GB 1.5G SATA 7.2K 3.5" HDD                      | 349238-B21 |
|             | HP 250GB 1.5G SATA 7.2K 3.5" HDD                      | 349239-B21 |
|             | HP 500GB 1.5G SATA 7.2K 3.5" HDD                      | 395473-B21 |
|             | HP 750GB 1.5G SATA 7.2K 3.5" HDD                      | 432341-B21 |

**NOTE:** Please see the 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)



## Options

### Storage Controllers

#### SAS Controllers

##### Smart Array E200 Controller

HP Smart Array E200/128 BBWC Controller 411508-B21

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

**NOTE:** Supports the Smart Array E200 Controller.

##### Smart Array E500 Controller

HP Smart Array E500/256MB Controller 435129-B21

##### Smart Array P400 Controller

HP Smart Array P400/256MB Controller 405132-B21

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

Battery-backed write cache upgrade 383280-B21

**NOTE:** For Smart Array P400 Controller only.

512MB Battery-backed cache upgrade 405148-B21

**NOTE:** For Smart Array P400 Controller only.

##### Smart Array P800 Controller

HP Smart Array P800/512 BBWC Controller 381513-B21

**NOTE:** Please see the following QuickSpecs for Technical Specifications and 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/12616\\_div/12616\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12616_div/12616_div.html)  
(Smart Array P800 Controller)

#### SAS HBA

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

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

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

#### SCSI HBA

HP SC11Xe Host Bus Adapter 412911-B21

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

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

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

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

### Options

|                |  |            |
|----------------|--|------------|
| Communications | HP NC110T PCI Express Gigabit Server Adapter                         | 434905-B21 |
|                | HP NC360T PCI Express Dual Port Gigabit Server Adapter               | 412648-B21 |
|                | HP NC364T PCI Express Quad Port Gigabit Server Adapter               | 435508-B21 |
|                | 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 |
|                | 2006 Agere PCI high-speed international soft modem                   | EK694AA    |

### Tape Drives

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

For recommended tape drive offerings for this ProLiant server see the following:

#### USB Tape Drives

|   |        |
|---|--------|
| HP StorageWorks DAT 160 USB Internal Tape Drive | Q1580A |
|---|--------|

#### SAS Tape Drives

**NOTE:** For the ML310 G4, HP recommends purchasing the HP SC44Ge HBA (416096-B21) for a dedicated SAS HBA for tape.

|   |        |
|---|--------|
| HP StorageWorks DAT 160 SAS Internal Tape Drive           | Q1587A |
| 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.

#### SCSI Tape Drives

**NOTE:** For the ML310 G4, HP recommends purchasing the HP SC11Xe HBA (412911-B21) for a dedicated SCSI HBA for tape.

|  |        |
|--|--------|
| HP StorageWorks LTO-1 Ultrium 232 Internal Tape Drive (Carbonite)      | DW064A |
| HP StorageWorks LTO-2 Ultrium 448 SCSI Internal Tape Drive (Carbonite) | DW016A |
| HP StorageWorks LTO-3 Ultrium 920 SCSI Internal Tape Drive             | EH841A |

**NOTE:** Please see the HP StorageWorks 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 USB tape drives.

### Options

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.  
**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)

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**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)

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**Tape Autoloaders** **HP StorageWorks DAT Autoloader**  
 HP StorageWorks DAT 72x10 tape autoloader AE313B  
**HP StorageWorks 1/8 Tape Autoloader**  
 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  
**NOTE:** Required to install the 1/8 G2 Autoloaders in a standard 19-inch rack; includes rails and rackmount instructions.  
**NOTE:** Please reference the Tape Autoloader QuickSpecs at <http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at: <http://www.hp.com/go/ebs>.

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### Options

#### Tape Libraries

##### HP StorageWorks MSL2024 Tape Library

|   |        |
|---|--------|
| 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 |

##### HP StorageWorks MSL4048 Tape Library

|   |        |
|---|--------|
| HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 SCSI Drive Library | AJ035A |
| HP StorageWorks MSL4048 1 LTO-4 Ultrium 1840 4GB FC Library     | AJ036A |
| 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-3 Ultrium 920 SAS Drive Library   | AH560A |
| HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 SCSI Drive Library  | AH171A |
| HP StorageWorks MSL4048 1 LTO-2 Ultrium 448 SCSI Drive Library  | AG320A |

##### HP StorageWorks MSL8096 Tape Library

|   |        |
|---|--------|
| HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 SCSI Drive Library | AJ039A |
| HP StorageWorks MSL8096 2 LTO-4 Ultrium 1840 4GB FC Library     | AJ040A |
| 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-3 Ultrium 960 SCSI Drive Library  | AH219A |

##### HP StorageWorks MSL6000 Tape Library

###### LTO-4 Ultrium 1840 technology

|   |        |
|---|--------|
| 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 |
| HP StorageWorks MSL6060 2 LTO-4 Ultrium 1840 4GB FC Library     | AJ032A |

###### Ultrium 960 technology

|  |        |
|--|--------|
| HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 SCSI Drive Library | AD606B |
| HP StorageWorks MSL6030 1 LTO-3 Ultrium 960 4GB FC Library     | AD608B |
| HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 SCSI Drive Library | AD607B |
| HP StorageWorks MSL6030 2 LTO-3 Ultrium 960 4GB FC Library     | AD609B |

**NOTE:** Please reference the MSL2024, MSL4048 and MSL6000 Tape Library QuickSpecs at: <http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at: <http://www.hp.com/go/ebs>.

### Options

|  |                                   |            |
|--|-----------------------------------|------------|
| <b>Uninterruptible Power Systems – Tower</b> | HP T500 UPS 120 V (US)            | 361475-001 |
|  | HP T750 UPS, Low Voltage (NA/JPN) | 378439-D71 |
|  | HP T750 UPS, High Voltage (INTL)  | 378439-B31 |
|  | HP, T1000 UPS NA                  | AF403A     |
|  | HP, T1000 UPS JPN                 | AF404A     |
|  | HP, T1000 UPS INTL                | AF405A     |
|  | HP, T1500 UPS NA                  | AF406A     |
|  | HP, T1500 UPS JPN                 | AF407A     |
|  | HP, T1500 UPS INTL                | AF408A     |
|  | HP, R/T 2200 UPS NA               | AF409A     |
|  | HP, R/T 2200 UPS JPN              | AF410A     |
|  | HP, R/T 2200 UPS INTL             | AF411A     |

|                  |  |            |
|------------------|--|------------|
| <b>Rack Kits</b> | ProLiant Rack Enabling Kit (RoHS Compliant)  | 417705-B21 |
|                  | <b>NOTE:</b> The system and optional Tower-to-Rack tray occupy 6U.   |            |
|                  | <b>NOTE:</b> Support for racks with round or square mounting holes (including all Compaq and HP Rack System /E and HP Systems), with an adjustment range of 24" - 36". |            |

|                    |   |            |
|--------------------|---|------------|
| <b>USB Options</b> | HP USB-P/S2 Optical Mouse                       | DC369A     |
|                    | USB 1.44-MB External Diskette Drive (Carbonite) | DC141B     |
|                    | HP 1GB USB 2.0 Floppy Drive Key                 | 442085-B21 |
|                    | HP 256MB USB 2.0 Floppy Drive Key               | 442084-B21 |
|                    | HP USB 04 Standard Keyboard                     | DT528A#ABA |

|  |  |        |
|--|--|--------|
| <b>Service and Support Offerings (HP Care Pack Services)</b> | <b>Hardware Services On-site Service</b>   |        |
|  | Next Business Day On-site Service, 5-Day x 9-Hour Coverage, 3 Years, Electronic  | U4445E |
|  | 4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic  | U4446E |
|  | 4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic  | U4447E |
|  | 6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic  | U4448E |
|  | <b>Installation &amp; Start-up Services</b>  |        |
|  | Hardware Installation, Electronic  | U4456E |
|  | Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays, Electronic | U4457E |
|  | <b>Support Plus</b>  |        |
|  | Onsite HW support, 8am-9pm, M-F, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, Electronic                         | U4458E |

### Options

#### *Support Plus 24*

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

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

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 U8328E

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

### Memory

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

#### HP ProLiant ML310 G4 Memory Configuration

##### Standard Memory

All HP ProLiant ML310 G4 models ship with unbuffered, ECC PC2-5300 DDR2 SDRAM running at 667MHz.

SATA/SAS models include a single 512 MB DIMM. SAS models include a single 1 GB DIMM.

Factory Integrated Models include the memory capacity of your choice.

##### Standard Memory Replaced with Optional Memory

Up to 8 GB memory is available with the optional installation of four 2 GB PC2-5300 Unbuffered ECC DDR2 SDRAM DIMM kits.

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

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

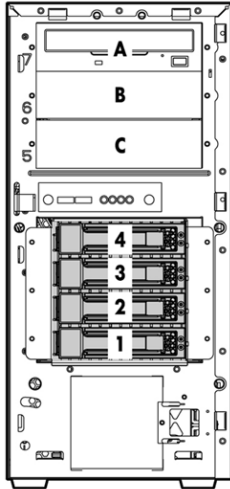
The first DIMM should be installed in Socket 1. A DIMM should not be installed in Socket 2 without a DIMM in Socket 1. Likewise a DIMM should not be installed in Socket 4 without a DIMM in Socket 3. A DIMM need not be installed in Socket 2 in order to install a DIMM in Socket 3.

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

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

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

## Storage



|       |                                  |
|-------|----------------------------------|
| B, C  | Removable Media Bays (1.6" each) |
| A     | 48x IDE (ATAPI) CD-ROM           |
| 1 - 4 | Four Hot Plug Hard Drive Bays    |

## Drive Support

|                          | Quantity Supported | Position Supported | Controller             |
|--------------------------|--------------------|--------------------|------------------------|
| <b>Removable Media</b>   |                    |                    |                        |
| 1.44-MB Diskette Drive   | Up to 1            | A, B, or C         | Integrated             |
| IDE (ATAPI) CD-ROM Drive | Up to 2            | A, B, or C         | Integrated IDE (ATAPI) |
| DVD-ROM Drive Option Kit | Up to 2            | A, B, or C         | Integrated IDE (ATAPI) |

## Hard Drives Hot Plug SAS

|                     | Quantity Supported | Position Supported | Controller   |
|---------------------|--------------------|--------------------|--|
| 300GB 3G SAS 15K SP | Up to 4            | 1-4                | HP 8 Internal Port SAS HBA with RAID<br>Smart Array E200/128 BBWC Controller<br>Smart Array E500/256MB Controller<br>Smart Array P400/256MB Controller<br>Smart Array P400/512MB BBWC Controller |
| 300GB 3G SAS 15K DP |                    |                    |  |
| 146GB 3G SAS 15K SP |                    |                    |  |
| 146GB 3G SAS 15K DP |                    |                    |  |
| 72GB 3G SAS 10K SP  |                    |                    |  |
| 72GB 3G SAS 15K DP  |                    |                    |  |
| 36GB 3G SAS 10K SP  |                    |                    |  |

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



## Storage

### Hot Plug SATA

|                      | Quantity Supported | Position Supported | Controller                                  |
|----------------------|--------------------|--------------------|---|
| 750GB 1.5G SATA 7.2K | Up to 4            | 1-4                | Embedded SATA with integrated SATA RAID 0,1 |
| 500GB 1.5G SATA 7.2K |                    |                    | HP 8 Internal Port SAS HBA with RAID        |
| 250GB 1.5G SATA 7.2K |                    |                    | Smart Array E200/128 BBWC Controller        |
| 160GB 1.5G SATA 7.2K |                    |                    | Smart Array E500/256MB Controller           |
| 80GB 1.5G SATA 7.2K  |                    |                    | Smart Array P400/256MB Controller           |
|                      |                    |                    | Smart Array P400/512MB BBWC Controller      |

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

### 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 Part Number |
|--|--------------------|----------------------------|------------------------|
| <b>Internal USB Tape Drives</b><br>DAT 40 USB<br>DAT 72 USB<br>DAT 160 USB   | B or C             | USB 2.0 Port               | N/A                    |
| <b>USB Tape Drives, External</b><br>DAT 40 USB<br>DAT 72 USB<br>DAT 160 USB<br>1U Rack-Mount Kit   | External           | USB 2.0 Port               | N/A                    |
| <b>SCSI Tape Drives, Internal</b><br>LTO-1 Ultrium 232<br>LTO-2 Ultrium 448<br>LTO-3 Ultrium 920<br>DAT 40<br>DAT 72<br>DAT 160<br>DLT VS160 | B or C             | HP SC11Xe Host Bus Adapter | 412911-B21             |

### Storage

|                                   |                |  |            |
|-----------------------------------|----------------|--|------------|
| <b>SCSI Tape Drives, Internal</b> | Rackmount only | HP SC11Xe Host Bus Adapter   | 412911-B21 |
| LTO-3 Ultrium 960                 |                |  |            |
| LTO-4 Ultrium 1840                |                |  |            |
| SDLT 600                          |                |  |            |
| <b>SCSI Tape Drives, External</b> | External       | HP SC11Xe Host Bus Adapter   | 412911-B21 |
| LTO-1 Ultrium 232                 |                |  |            |
| LTO-2 Ultrium 448                 |                |  |            |
| LTO-2 Ultrium 460                 |                |  |            |
| LTO-3 Ultrium 960                 |                |  |            |
| LTO-3 Ultrium 920                 |                |  |            |
| LTO-4 Ultrium 1840                |                |  |            |
| DAT 40                            |                |  |            |
| DAT 72                            |                |  |            |
| DAT 160                           |                |  |            |
| DLT VS160                         |                |  |            |
| SDLT 600                          |                |  |            |
| 1U Rack-Mount Kit                 |                |  |            |
| 3U Rack-Mount Kit                 |                |  |            |
| <b>SAS Tape Drives, Internal</b>  | B or C         | HP SC44Ge Host Bus Adapter   | 416096-B21 |
| DAT 160 SAS                       |                | <b>NOTE:</b> Recommended.  |            |
| LTO-2 Ultrium 448 SAS             |                | HP 8 Internal Port SAS HBA with RAID   | 347786-B21 |
| LTO-3 Ultrium 920 SAS             |                | HP Smart Array E500 Controller   | 435129-B21 |
|                                   |                | <b>NOTE:</b> 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 |
|                                   |                | HP Smart Array P400/512MB Controller   | 411064-B21 |
|                                   |                | <b>NOTE:</b> 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>SAS Tape Drives, Internal</b>  | Rackmount only | HP SC44Ge Host Bus Adapter   | 416096-B21 |
| LTO-4 Ultrium 1840 SAS            |                | <b>NOTE:</b> Recommended.  |            |
|                                   |                | HP 8 Internal Port SAS HBA with RAID   | 347786-B21 |
|                                   |                | HP Smart Array E500 Controller   | 435129-B21 |
|                                   |                | <b>NOTE:</b> 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 |
|                                   |                | HP Smart Array P400/512MB Controller   | 411064-B21 |
|                                   |                | <b>NOTE:</b> 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. |            |

### Storage

|   |          |  |            |
|---|----------|--|------------|
| <b>SAS Tape Drives, External</b><br>DAT 160 SAS<br>LTO-2 Ultrium 448 SAS<br>LTO-3 Ultrium 920 SAS<br>LTO-4 Ultrium 1840 SAS<br>1U Rack-Mount Kit<br>3U Rack-Mount Kit | External | HP SC44Ge Host Bus Adapter<br><b>NOTE: Recommended.</b>  | 416096-B21 |
| <b>SCSI Tape Automation, External</b><br>DAT 72x10 Autoloader<br>1/8 G2 Autoloader<br>MSL2024<br>MSL4048<br>MSL8096<br>MSL6000  | External | HP SC11Xe Host Bus Adapter   | 412911-B21 |
| <b>SAS Tape Automation, External</b><br>1/8 G2 Autoloader<br>MSL2024<br>MSL4048<br>MSL8096  | External | HP SC44Ge Host Bus Adapter   | 416096-B21 |
| <b>Fibre Tape Automation, External</b><br>MSL2024<br>MSL4048<br>MSL8096<br>MSL6000  | External | Please consult the EBS connectivity matrix at:<br><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><br>D2D110<br>D2D120   | External | Embedded Network Controller  | N/A        |

### Technical Specifications

|  |   |  |                |  |
|--|---|--|----------------|--|
| <b>System Unit</b>                           | <b>Dimensions (HxWxD)</b>                       | 17.0 x 7-7/8 x 22 in (43.0 x 20.0 x 55.0 cm)   |                |  |
|  | <b>Weight</b><br>(no drives installed)          | 17.9 kg (39.5 lbs)   |                |  |
|  | <b>Ready steady state power</b>                 | 3.3 V/ 5V 110W<br>12 V CPU 300W  |                |  |
|  | <b>Maximum peak power</b>                       | 410W (non-redundant non-hot plug)<br>430W (redundant hot-plug)   |                |  |
|  | <b>Input Requirements</b><br>(per power supply) | Range Line Voltage   | 88-269VAC      |  |
|  |   | Normal Line Voltage  | 100 to 240 VAC |  |
|  | <b>Line Frequency</b>                           | 47 to 66 Hz  |                |  |
|  | <b>Rated Input Current</b>                      | 6.4A RMS max at 100VAC with maximum load;<br>3.2A RMS max at 230V with maximum load  |                |  |
|  | <b>BTU Rating</b>                               | 1,560 BTU  |                |  |
|  | <b>Ultra 320 SCSI Connectors</b>                | None   |                |  |
|  |   | <b>NOTE:</b> Support for either one internal or one external SCSI channel is available. To use the channel for external connection, order an internal-to-external SCSI cable option kit (PN 159547-B22 or 333370-B21). |                |  |
|  | <b>Power Supply Output Power</b>                | Rated Steady-State Power   | 350W           |  |
|  |   | Maximum Peak Power   | 410W           |  |
|  | <b>Power Supply Output Power - RPS</b>          | Rated Steady-State Power   | 350W           |  |
|  | Maximum Peak Power                              | 430W   |                |  |
| <b>Temperature Range</b>                     | Operating                                       | 50° to 95° F (10° to 35° C)  |                |  |
|  | Shipping  | -40° to 160° F (-40° to 71° C)   |                |  |
| <b>Relative Humidity</b><br>(non-condensing) | Operating                                       | 20% to 80%   |                |  |
|  | Non-operating                                   | 5% to 95%  |                |  |
| <b>Acoustic Noise</b>                        | Idle<br>(Fixed Disk Drives Spinning)            |  |                |  |
|  |   | L WAd (BELS)   | 5.4            |  |
|  |   | L pAm (dBA)  | 34             |  |
|  | Operating<br>(Random Seeks to Fixed Disks)      |  |                |  |
|  |   | L WAd (BELS)   | 5.4            |  |
|  |   | L pAm (dBA)  | 34             |  |

### Technical Specifications

|                      |   |              |      |
|----------------------|---|--------------|------|
| Acoustic Noise - RPS | Idle<br>(Fixed Disk Drives<br>Spinning)       | L WAd (BELS) | 5.2  |
|                      |   | L pAm (dBA)  | 37.8 |
|                      | Operating<br>(Random Seeks to Fixed<br>Disks) |              |      |
|                      |   | L WAd (BELS) | 5.3  |
|                      |   | L pAm (dBA)  | 39.6 |

|                                     |                         |                   |  |
|-------------------------------------|-------------------------|-------------------|--|
| 48X Max IDE (ATAPI)<br>CD-ROM Drive | Disk                    | Applicable Disk   | CD-ROM, CD-XA, CD-DA (Mode 1, Mode 2, Form 1 and 2)<br>Photo CD (Single and Multi-session)<br>Mixed Mode (Audio and Data combined)<br>CD-R |
|                                     |                         | Capacity          | 540 MB (Mode 1, 12 cm)<br>650 MB (Mode 2, 12 cm)   |
|                                     | Block Size              | Mode 1            | 2,048 bytes  |
|                                     |                         | Mode 2            | 2,340 bytes, 2,336 bytes   |
|                                     |                         | CD-DA             | 2,352 bytes  |
|                                     |                         | CD-XA             | 2,328 bytes  |
|                                     | Interface               | IDE (ATAPI)       |  |
|                                     | Access Times (typical)  | Random            | <100 ms  |
|                                     |                         | Full-Stroke       | <150 ms  |
|                                     | Data Transfer Rate      | Sustained         | 3000 to 7200 KB/s (20X to 48X)   |
|                                     |                         | Burst             | 150 KBps to 7,200 KBps   |
|                                     |                         | Bus Rate          | 16.7 MBps  |
|                                     | Cache Buffer            | 128 KB            |  |
|                                     | Start-up Time (typical) | < 7seconds        |  |
|                                     | Stop Time               | < 4seconds        |  |
|                                     | Laser Parameters        | Type              | Semiconductor Laser GaAlAs   |
|                                     |                         | Wave Length       | 780 ± 25 nm  |
|                                     | Operating Conditions    | Temperature       | 41° to 113° F (5° to 45° C)  |
|                                     |                         | Humidity          | 10% to 80%   |
|                                     | Dimensions              | (HxWxD, maximum)  | 1.7 x 5.85 x 8.11 in (4.29 x 14.86 x 20.60 cm)   |
| Weight                              |                         | 2.09 lb (0.95 kg) |  |

### Technical Specifications

|   |                                      |   |         |  |
|---|--------------------------------------|---|---------|--|
| HP 8 Internal Port SAS Host Bus Adapter with RAID | RAID Support                         | RAID 1 (Mirroring)<br>RAID 0 (Striping)   |         |  |
|   | Logical Drives Supported             | Up to 2 Logical Volumes<br>Up to 10 drives total in all RAID volumes<br>Up to 2 Drives per RAID 1<br>Up to 8 Drives per RAID 0  |         |  |
|   | Maximum Capacity                     | 576GB (8 x 72GB)  |         |  |
|   | Data Transfer Method                 | 64-bit wide, PCI-X 133 MHz (1 GB/s maximum bandwidth)   |         |  |
|   | Port Transfer Rate                   | 12 Gb/s per x4 Wide SAS Port (4 x 3 Gb/s)   |         |  |
|   | Simultaneous Drive Transfer Ports    | 2 x4 Wide SAS Connectors  |         |  |
|   | Protocols                            | 3 Gbps SAS (Serial Attached SCSI)<br>1.5 Gbps SATA (Serial Advanced Technology Attachment)  |         |  |
|   | External SAS Connectors              | None  |         |  |
|   | Internal SAS Connectors              | 2 internal SFF8484 x4 SAS Connectors  |         |  |
|   | Upgradeable Firmware                 | 4MB flashable ROM   |         |  |
| <hr/>   |                                      |   |         |  |
| Embedded NC320i PCIe Gigabit Server Adapter       | Network Interface                    | 10Base-T/100Base-TX/1000Base-TX   |         |  |
|   | Compatibility                        | IEEE 802.3 10Base-T   |         |  |
|   |                                      | IEEE 802.3ab 1000Base-T   |         |  |
|   |                                      | IEEE 802.3u 100Base-TX  |         |  |
|   | Data Transfer Method                 | Single lane (x1), 100MHz PCI Express Reference Clock  |         |  |
|   | Network Transfer Rate                | 10Base-T (Half-Duplex)  | 10 Mb/s |  |
|   |                                      | 10Base-T (Full-Duplex)  | 20 Mb/s |  |
| 100Base-TX (Half-Duplex)                          |                                      | 100 Mb/s  |         |  |
| 100Base-TX (Full-Duplex)                          |                                      | 200 Mb/s  |         |  |
| 1000Base-TX (Half and Full-Duplex)                |                                      | 2000Mb/s  |         |  |
| Connector   | RJ-45                                |   |         |  |
| Cable Support                                     | 10Base-T                             | Categories 3, 4 or 5 UTP; up to 328 ft (100 m)  |         |  |
|   | 10/100/1000Base-TX                   | Category 5 UTP; up to 328 ft (100 m)  |         |  |
| <hr/>   |                                      |   |         |  |
| Environment-friendly Products and Approach        | End-of-life Management and Recycling | <p>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 <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a>. To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>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: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a>. 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.</p> |         |  |

### *Technical Specifications*

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