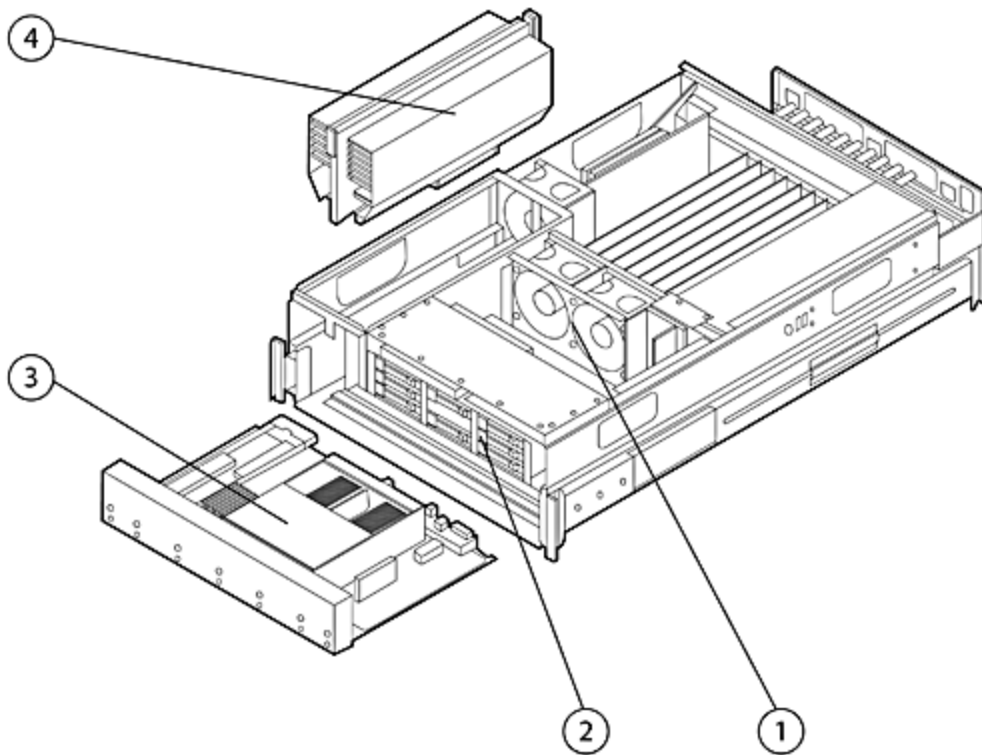


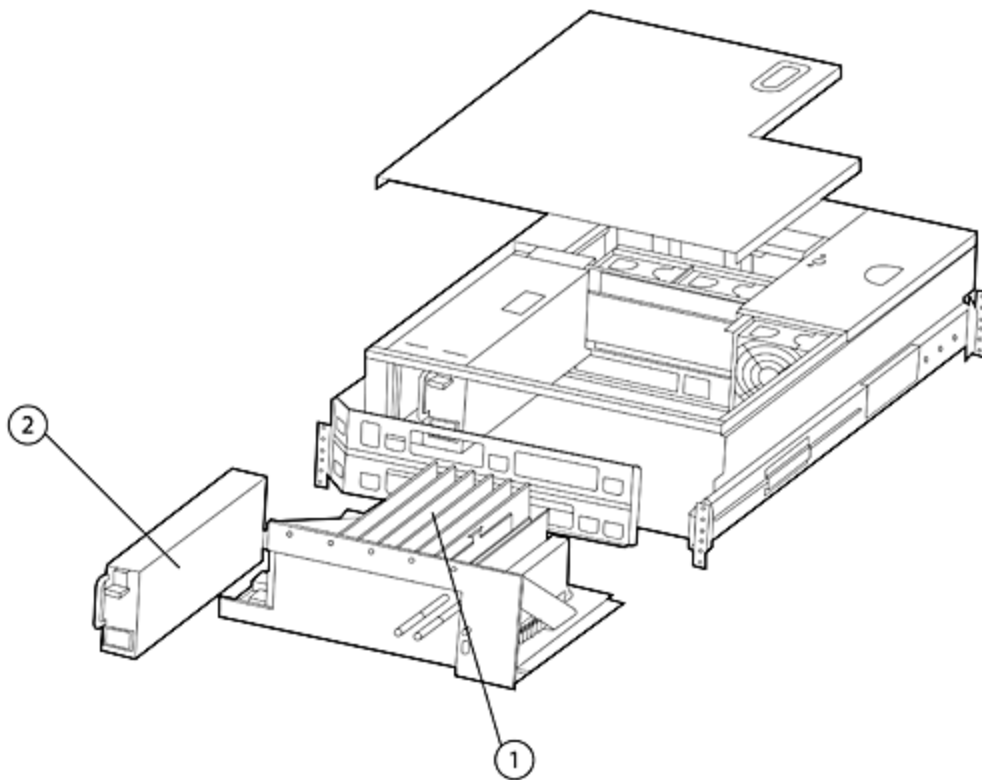
### Overview

HP Integrity rx3600 System Overview (Interior View)



- 1. Hot Swap Fans
- 2. 8 SAS HDDs
- 3. 2 Clamshell CPU Sockets
- 4. 8 or 24 DDR2 DIMM Slots

HP Integrity rx3600



- 1. 8 Hot Plug PCI-X IO Slots (2 @ 266 MHz)
- 2. Redundant Bulk Power

## Overview

## At A Glance

- Operating System support: HP-UX 11i version 2 September 2006 Update; HP-UX 11i version 3; Linux RHEL 4 U4 and SLES 10; OpenVMS V8.3 or higher for Integrity servers; and Microsoft Windows Server 2003 and 2008 Enterprise and Datacenter Edition
- Choice of core storage card.
  - **For HP UX and OpenVMS based systems:** Must select one of two choices: PCI-X 8 port Serial Attached SCSI (SAS) host bus adapter or PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller:
    - The PCI-X 8 port Serial Attached SCSI (SAS) host bus adapter: Card will be installed in reserved core PCI-X I/O slot #1. This card supports up to two internal RAID 1 volumes (2x2 HDDs) and a disk for global hot spare, for a maximum of five disks in RAIDed arrays for HP UX and OpenVMS. All HDDs must be the same size and speed. A second controller can be purchased to access the remaining three drives (of the maximum of eight drives supported). The second controller is not available with standard factory installation; it must be installed using Factory Express or field installed. Please note that the second controller must be configured in slot #2, and the core LAN card moved to slot #10. Factory set up of RAID 1 configurations is supported on the first controller. Please see rx3600 Ordering Guide for factory onfiguration details.
 

**NOTE:** MirrorDisk/UX is available for SW Mirroring on all HDDs in HP UX based systems and HP Volume Shadowing (software Raid 1) for HDDs in OpenVMS based systems.
    - PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller: Requires PCI Express Backplane (AD295A#200); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs, RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. (Identical disks means same size and speed.) Please see rx3600 Ordering Guide for factory configuration details. **NOTE:** MirrorDisk/UX is available for SW Mirroring on all HDDs in HP UX based systems and HP Volume Shadowing (software Raid 1) for HDDs in OpenVMS based systems.
 

For Windows and Linux based systems: Must select one of three choices: PCI-X 8 port Smart Array (P600) Serial Attached SCSI (SAS) controller, or PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller, or PCI Express 16 port Smart Array (P800) Serial Attached SCSI Controller.
    - PCI-X 8 port Smart Array (P600) Serial Attached SCSI (SAS) controller: Card will be installed in reserved core PCI-X I/O slot #1. Supports internal RAID 1, 5 and 6 configurations.. RAID 1 requires two identical HDDs, RAID 5 requires three identical HDDs, and RAID 6 requires four identical HDDs. Factory set up of RAID 1, 5 and 6 configurations with Smart Array SAS controller is also supported. Please see rx3600 Ordering Guide for details.
    - PCI Express 8 port Smart Array (P400) Serial Attached SCSI (SAS) controller. Requires PCI Express Backplane (AD295A#200); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs, RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. Please see rx3600
  - Ordering Guide for factory configuration details.
    - PCI Express 16 port Smart Array (P800) Serial Attached SCSI (SAS) controller: Requires PCI Express Backplane (AD295A#200); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal and external RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs, RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. Please see rx3600 Ordering Guide for factory configuration details.
- Core PCI-X dual port 10/100/1000Base TX LAN (with auto speed sensing; RJ 45 connector, Wake On LAN support)
- Integrated iLO2 Management Processor for remote management and HA monitoring
- Telnet and web console via 10/100Base TX management LAN (RJ 45 connector)
- Two RS 232 serial ports, one for console from the integrated management processor and one from the processor dependent hardware bus (PDH)
- Factory integration of processors, memory, disk drives, removable media, I/O cards, and HP Universal 10000 G2 series racks.
- Rackmountable into 19 inch cabinets-HP Universal 10000 G2 series as well as many third party racks, including field integration into existing HP System E racks
- Optional stand alone pedestal mount, field installation only.
- Three year warranty with next business day on site

### Standard Features

#### Minimum System

- One 64 bit dual core Intel Itanium processor; either 1.6 GHz/18 MB cache (now obsolete) or 1.4 GHz/12 MB cache (now obsolete); or 1.66 GHz/18 MB 9140M processor or 1.42 GHz/12 MB 9120N processor
- One I/O backplane. Either PCI-X 2.0 backplane with eight available slots or PCI Express/PCI-X Combo backplane with 8 available slots (4 PCI-X and 4 PCIe)
- 2 GB PC2 4200 ECC x4 Single rank Registered DDR2 SDRAMs (4x512MB DIMMs)
- Eight DIMM slots (2x4 DIMM slot memory carrier boards)
- One hot swap power supply

#### Maximum Server Capacities

- 1.6 GHz/18 MB cache or 1.4 GHz/12 MB cache; or 1.66 GHz/18 MB 9140M processor or 1.42 GHz/12 MB 9120N processor
- One I/O backplane. Either PCI-X 2.0 backplane with eight available slots or PCI Express/PCI-X Combo backplane with 8 available slots (4 PCI-X and 4 PCIe)
- 192 GB PC2 4200 ECC x4 Single rank Registered DDR2 SDRAMs (24x8 GB DIMMs)
- 24 DIMM slots (2x12 DIMM slot memory carrier boards)
- Eight Serial Attached SCSI (SAS) disk drive
- Two hot swap power supplies (two supplies enables redundancy)

#### Standard System Features

- Operating System support: HP UX 11i version 2 September 2006 Update; HP UX 11i version 3; Linux RHEL 4 U4 and SLES 10; OpenVMS V8.3 or higher for Integrity servers; and Microsoft Windows Server 2003 Enterprise and Datacenter Edition, Microsoft Windows Server 2008 for Itanium-based Systems, and Microsoft SQL Server 2005 and SQL Server 2008
- Choice of core storage card.  
**For HP UX and OpenVMS based systems:** Must select one of two choices: PCI-X 8 port Serial Attached SCSI (SAS) host bus adapter or PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller:
- The PCI-X 8 port Serial Attached SCSI (SAS) host bus adapter: Card will be installed in reserved core PCI-X I/O slot #1. This card supports up to two internal RAID 1 volumes (2x2 HDDs) and a disk for global hot spare, for a maximum of five disks in RAIDed arrays for HP UX and OpenVMS. All HDDs must be the same size and speed. A second PCI-X 8 Internal Port Serial Attached SCSI host bus adapter is supported. In this case each adapter is connected up to a maximum of 4 drives, and the maximum number of disks supported in a RAIDed array is four. The second PCI-X 8. Internal Port SAS host bus adapter is not available for standard factory installation; it must be installed via Factory Express or in the field. Use AD348A#006 upgrade product/option to order the second PCI-X 8 Internal Port SAS host bus adapter. When a second PCI-X 8 Internal Port SAS host bus adapter is installed in an rx3600, it must be located in slot #2, and the LAN adapter moved to slot #10. Please see rx3600 Ordering Guide for factory configuration details  
**NOTE:** MirrorDisk/UX is available for SW Mirroring on all HDDs in HP UX based systems and HP Volume Shadowing (software Raid 1) for HDDs in OpenVMS based systems.
- PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller: Requires PCI Express Backplane (AD295A#300); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs, RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. (Identical disks means same size and speed.) Please see rx3600 Ordering Guide for factory configuration details.  
**NOTE:** PCIe Generation 2 cards are NOT supported in slots 3 and 4 of the AD295A#200 PCIe I/O Backplane.  
**For Windows and Linux based systems:** Must select one of three choices: PCI-X 8 port Smart Array (P600) Serial Attached SCSI (SAS) controller, or PCI Express 8 port Smart Array (P400) Serial Attached SCSI Controller, or PCI Express 16 port Smart Array (P800) Serial Attached SCSI Controller.
- PCI-X 8 port Smart Array (P600) Serial Attached SCSI (SAS) controller: Card will be installed in reserved core PCI-X I/O slot #1. Supports internal RAID 1, 5 and 6 configurations.. RAID 1 requires two identical HDDs, RAID 5 requires three identical HDDs, and RAID 6 requires four identical HDDs. Factory set up of RAID 1, 5 and 6 configurations with Smart Array SAS controller is also supported. Please see rx3600 Ordering Guide for details.
- PCI Express 8 port Smart Array (P400) Serial Attached SCSI (SAS) controller. Requires PCI Express Backplane (AD295A#300); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs, RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. Please see rx3600 Ordering Guide for factory configuration details.
- PCI Express 16 port Smart Array (P800) Serial Attached SCSI (SAS) controller: Requires PCI Express Backplane (AD295A#300); card will be installed in public slot #3, leaving 3 available PCI Express slots and 4 available PCI-X slots. This card supports internal and external RAID 1, 5 and 6 configurations. RAID 1 requires a minimum of two identical HDDs,

### Standard Features

RAID 5 requires a minimum of three identical HDDs, and RAID 6 requires a minimum of four identical HDDs. Please see rx3600 Ordering Guide for factory configuration details.

- Core PCI-X dual port 10/100/1000Base TX LAN (with auto speed sensing; RJ 45 connector, Wake On LAN support)
- Integrated iLO2 Management Processor for remote management and HA monitoring
- Telnet and web console via 10/100Base TX management LAN (RJ 45 connector)
- Two RS 232 serial ports, one for console from the integrated management processor and one from the processor dependent hardware bus (PDH)
- Factory integration of processors, memory, disk drives, removable media, I/O cards, and HP Universal 10000 G2 series racks.
- Rackmountable into 19 inch cabinets-HP Universal 10000 G2 series as well as many third party racks, including field integration into existing HP System E racks
- Optional stand alone pedestal mount, field installation only.
- Three year warranty with next business day on site

**NOTE:** PCIe Generation 2 cards are NOT supported in slots 3 and 4 of the AD295A#300 PCIe I/O Backplane.

### High Availability

- N+1 Hot swap cooling
- One hot swap power supply-optional second power supply for N+1 protection
- Hot Plug PCI-X I/O slots
- On line memory page deallocation
- ECC protected DDR2 memory
- Memory double chip spare to overcome single DRAM chip failures
- Dynamic Processor resilience and deallocation
- UPS power management
- Hot Plug internal disks
- Internal RAID support. See Standard Systems Features on previous page and rx3600 Ordering Guide for various levels of RAID support
- Journal file system with HP-UX
- Auto reboot
- HP Serviceguard for HP-UX
- HP Serviceguard Extension for RAC for HP-UX
- HP Serviceguard Extension for SAP for HP-UX
- Serviceguard Manager for HP-UX and Linux Clusters
- HP Event Monitoring Service
- HA Monitors for HP-UX
- HA Toolkits for HP-UX and Linux
- HP Mirrordisk/UX
- Extended Campus Cluster, HP Metrocluster, and HP Continentalclusters for HP-UX
- HP OpenVMS clusters
- HP Volume Shadowing for OpenVMS
- HP RMS Journaling for OpenVMS
- HP System Insight Manager (SIM) for proactive fault management
- Microsoft Cluster Service for Windows Server 2003 Enterprise and Datacenter Edition
- HP StorageWorks Software for HP Integrity Servers running Windows Server 2003 Enterprise Edition. Includes Cluster Extension XP and EVA, Continuous Access, Business Copy and SQL Server Fast Recovery
- HP StorageWorks Cluster Extension XP for Linux

### Security

- Separate LAN for system management
- Password protection on console port
- Disablement of remote console ports
- SSL encryption on web console

### Standard Features

- Manageability - Deploy**
  - HP Ignite UX for installation and deployment of the operating system
  - HP Software Distributor UX for software and patch management
  - HP Integrity Essentials Foundation Pack for Linux
  - HP Integrity Essentials Foundation Pack for Windows including Smart Setup CD for easy server setup and configuration
  
- Manageability - Monitor**
  - Built in Integrity iLO 2 Management Processor for comprehensive remote server management of HP-UX, Linux, Windows and OpenVMS
  - HP Servicecontrol suite for HP-UX servers including tools for system administration, asset management, and fault management
  - HP-UX kernel configuration for easy, dynamic kernel parameter changes
  - HP System Insight Manager (SIM)
  
- Manageability - Optimize**
  - Process Resource Manager for HP-UX resource management
  - HP-UX Workload Manager for HP-UX workload management based upon service level objectives
  - HP OpenView GlancePlus Pack
  - HP Intelligent Networking Pack for Windows
  - HP Performance Management Pack for Windows
  - Windows System Resource Manager (included with each copy of Windows Server 2003 Enterprise Edition)

### Configuration

**Processor Configuration** The HP Integrity rx3600 is a symmetrical multiprocessing (SMP) server supporting up to two high performance 64 bit dual core Intel Itanium processors. The dual core Intel Itanium processor supports hyper threading. Each core of the processor supports two threads.

**Processor Details** Dual core Intel Itanium 2 processors:

- 1.66 GHz with 18 MB Level 3 Cache, 9 MB per core 9140M processor
- 1.42 GHz with 12 MB Level 3 Cache, 6 MB per core 9120N processor

All processors support:

- Level 2 Cache: 1 MB Instruction/256 KB Data per core
- Level 1 Cache: 32 KB
- Four threads (two threads per core)
- Single bit cache error correction
- 50 bit physical addressing
- 64 bit virtual addressing
- 4 GB maximum page size

**Processor Configuration Rules**

- Processors can be installed one at a time
- Processors must be installed in the following sequence: 0, 1
- Different speed and cache processors cannot be mixed in the same system

**Memory Configuration** The HP Integrity rx3600 supports double data rate (DDR2) synchronous dynamic random access memory (SDRAM) DIMMs with ECC and double chip spare protection. The HP Integrity rx3600 can be ordered with one of the following two memory carrier boards:

- AD124A-Supports from 2 GB (2×1GB DIMMs) minimum to 32 GB (8×4 GB DIMMs) maximum memory; 14.2 GB/s memory bandwidth. The AD124A can be replaced with the AD125A to increase maximum memory beyond 32 GB and to a maximum of 192 GB. Please note, there is no return credit for the AD124A.
- AD125A-Supports from 2 GB (2×1GB DIMMs) minimum to 192 GB (24×8 GB DIMMs) maximum; 14.2 GB/s memory bandwidth

#### Memory Loading Rules

1. Memory must be installed in groups of four DIMMs, also known as quads; except for the 2-GB option, which is installed as 2 x 1-GB DIMMs. Note: the 2-GB pair (2 x 1 GB DIMMs), product number AH350A, is only supported with the 8-DIMM carrier (AD124A).
2. Each DIMM in a memory option must consist of equal density DIMMs
3. Memory can be ordered in quads of 4 GB (4×1GB), 8 GB (4×2GB), 16 GB (4×4 GB), or 32-GB (4×8 GB). There is also a 2-GB pair (2×1 GB) supported with the 8-DIMM carrier (AD124A).
4. Minimum memory is 2 GB (2×1GB)
5. Maximum memory is 192 GB, using six 32 GB memory quads in memory carrier option AD125
6. Memory must be loaded in the order depicted on the memory carrier board
7. Arrange DIMMs so that the DIMMs with the largest capacity are in the lowest numbered slots.
8. For best performance, all DIMM slots on both memory carrier boards should be populated with the same size DIMM.

### Memory Options

Description	Product Number
2-GB Chip Spare PC2-4200 ECC x4 single rank Registered DDR2 SDRAM memory pair (2×1GB DIMMs)	AH350A
4-GB Chip Spare PC2-4200 ECC x4 single rank Registered DDR2 SDRAM memory quad (4×1GB DIMMs)	AB564A
8-GB Chip Spare PC2-4200 ECC x4 single rank Registered DDR2 SDRAM memory quad (4×2GB DIMMs)	AB565A
16-GB Chip Spare PC2-4200 ECC x4 single rank Registered DDR2 SDRAM memory quad (4×4GB DIMMs)	AB566A
32-GB Chip Spare PC2 4200 ECC x4 single rank Registered DDR2 SDRAM memory quad (4×8GB DIMMs)	AH405A

## Configuration

**Server Form Factor and Rack Configuration** The HP Integrity rx3600 is a 4U rack optimized server. It is supported in HP 10000 G2 series cabinets. For factory integration order AD053A with 0D1 feature code. Sliding mounts and a cable management arm will be installed with the server in a factory integrated rack.

The HP Integrity rx3600 can be installed in the field with the Field Rack Kit (AD053A with B01 feature code). This field kit contains the slide mounts, cable management arm, and all other hardware needed to mount an rx3600 into a 19 inch cabinet.

Refer to the 10000 G2 Series Rack Best Practices Guide for information on rack deployment, stabilization and transportation. Go to <http://www.hp.com/go/rackandpower> for more information.

The rx3600 is also available in a stand alone, pedestal form factor (AD054A). Kit will be shipped in the same box with the system and is field installable only.

## I/O Architecture

The HP Integrity rx3600 supports two I/O backplane options in order to provide maximum flexibility, I/O card availability, performance, scalability and reliability. The two options are a PCI-X 2.0 Backplane (AD295A#100) or a PCI-Express/PCI-X Backplane option (AD295A#300). Only one backplane per system is supported.

### PCI-X 2.0 Backplane:

This backplane provides ten PCI-X I/O slots, two of which are reserved for Core I/O cards and eight which are available for I/O card expansion. The Core I/O slots will always be filled with either an HP PCI-X 8 Internal Port Serial Attached SCSI (SAS) host bus adapter (for HP UX and OVMS systems) or an HP PCI-X Smart Array (P600) 8 Internal Port Serial Attached SCSI (SAS) card (for Windows and Linux systems) (slot #1) and a PCI-X dual port 10/100/1000Base TX LAN adapter (slot #2). A second host bus adapter is supported as a core I/O controller, but is not available for standard factory installation; it must be installed via Factory Express or in the field. When a second host bus adapter is ordered, it must be installed in slot #2, and the LAN adapter moved to slot #10.

### HP-UX and OpenVMS based systems with PCI-X 2.0 Backplane:

Must choose the HP PCI-X 8 Internal Port Serial Attached SCSI host bus adapter for Core I/O controller (AB036B#006 or AB036B#106). If factory configured RAID is not desired, select Option 006. If factory configured RAID 1 is desired, select Option 106. RAID 1 only is supported on the HP PCI-X 8 Internal Port SAS host bus adapter. When selecting Option 106, a minimum of 2 HDDs of the same size and speed are required. A maximum of two internal RAID 1 volumes (2x2 HDDs) and a disk for global hot spare, for a maximum of five disks in RAIDed arrays is supported. A second PCI-X 8 Internal Port Serial Attached SCSI host bus adapter is supported. In this case each adapter is connected up to a maximum of 4 drives, and the maximum number of disks supported in a RAIDed array is four. The second PCI-X 8. Internal Port SAS host bus adapter is not available for standard factory installation; it must be installed via Factory Express or in the field. Use AD348A#006 upgrade product/option to order the second PCI-X 8 Internal Port SAS host bus adapter. When a second PCI-X 8 Internal Port SAS host bus adapter is installed in an rx3600, it must be located in slot #2, and the LAN adapter moved to slot #10. Please see rx3600 Ordering Guide for factory configuration details.

### Windows and Linux based systems with PCI-X 2.0 backplane:

Must choose the HP PCI-X 8 port Smart Array (P600) Serial Attached SCSI (SAS) controller for Core I/O controller (AB036B#100, or AB036B#500, or AB036B#510). Option 100 provides for factory configuration of RAID 1 (requires a minimum of 2 HDDs). Option 500 provides for factory configuration of RAID 5 (requires a minimum of 3 HDDs). Option 510 provides for factory configuration of RAID 6 (requires a minimum of 4 HDDs). All HDDs must be the same size and speed. Please see rx3600 Ordering Guide for details.

### Remaining Eight (non-Core I/O) slots:

The two slots (#3 and #4) next to the Core I/O slots have their own dedicated 64 bit 266 MHz PCI-X bus and their own independent 2.1 GB/s I/O channel. These slots should be used for high performance PCI-X cards, such as clustering interconnects or multi port storage adapters. The next two slots (slots #5 and #6) each have their own dedicated 64 bit 133 MHz PCI-X bus and their own independent 1.1 GB/s I/O channel. The independent buses and I/O channels provide improved performance and error containment. Independence protects each I/O card from bus hangs or extended latencies due to the failure or high bandwidth demands of other I/O cards. Independence also ensures that each I/O card can achieve maximum throughput.

The remaining four slots (#7 through #10) share two 64 bit 66 MHz PCI-X buses, with two slots allocated to each bus. Each pair of slots shares a 0.5 GB/s I/O channel.

**NOTE:** Hot-plug operations are not supported with the Linux or OpenVMS operating systems nor in Core I/O slots.

All I/O slots are keyed for I/O cards with 3.3V signaling. Cards that use 5V signaling are not supported in the HP Integrity rx3600.

### PCI-Express/PCI-X Backplane:

This backplane also provides ten I/O slots. There are two PCI-X Core I/O slots; one PCI-X Core I/O slot will always have a PCI-X dual port 10/100/1000Base TX LAN adapter (slot #2), and one PCI-X Core I/O slot is provided in the case that the HP PCI-X 8 Internal Port Serial Attached SCSI (SAS) host bus adapter is chosen (slot #1) when ordering an HP-UX or OpenVMS-based system, or if an HP PCI-X Smart Array (P600) 8 Internal Port Serial Attached SCSI (SAS) card is chosen when ordering a Windows or Linux-based system. If a PCI-Express 8-port Smart Array (P400, supports only internal connection to SAS disks) Serial Attached SCSI controller (for HP-UX, OpenVMS, Windows, or Linux) is chosen, or if a PCI-Express 16-port (8 internal ports/8 external ports) Smart Array (P800) Serial Attached SCSI controller (for Windows or Linux,

## Configuration

also supports connection to external SAS disks) is chosen, the PCI-X Core I/O slot remains empty and the PCI-Express controller is installed in slot #3.

Each port of a Serial Attached SCSI card can be connected to a Serial Attached SCSI hard disk drive, therefore each HP PCI-X 8 port SAS card supports eight hard disks drives.

### HP-UX and OpenVMS based systems with PCI-Express/PCI-X Backplane:

These systems have the two choices for Core I/O controller; the HP PCI-X 8 Internal Port Serial Attached SCSI host bus adapter or the HP PCI-Express 8 Internal Port Smart Array (P400) Serial Attached SCSI controller.

1. HP PCI-X 8 Internal Port Serial Attached SCSI host bus adapter (AB036B#006 or AB036B#106). If factory configured RAID is not desired, select Option 006. If factory configured RAID 1 is desired, select Option 106. RAID 1 only is supported on the HP PCI-X 8 Internal Port SAS host bus adapter. When selecting Option 106, a minimum of 2 HDDs of the same size and speed are required. A maximum of two internal RAID 1 volumes (2x2 HDDs) and a disk for global hot spare, for a maximum of five disks in RAIDed arrays is supported. Please note that MirrorDisk/UX is available for SW Mirroring on all HDDs in HP UX based systems and HP Volume Shadowing (software Raid 1) for HDDs in OpenVMS based systems.

A second PCI-X 8 Internal Port Serial Attached SCSI host bus adapter is supported. In this case each adapter is connected up to a maximum of 4 drives, and the maximum number of disks supported in a RAIDed array is four. The second PCI-X 8 Internal Port SAS host bus adapter is not available for standard factory installation; it must be installed via Factory Express or in the field. Use AD348A#006 upgrade product/option to order the second PCI-X 8 Internal Port SAS host bus adapter. When a second PCI-X 8 Internal Port SAS host bus adapter is installed in an rx3600, it must be located in slot #2, and the LAN adapter moved to slot #10. Please see rx3600 Ordering Guide for factory configuration details.

#### NOTES:

A. PCI-X 8 Internal Port Serial Attached SCSI host bus adapters located in Slot 1 and Slot 2 is the only multiple Serial Attached SCSI Core IO Controller configuration supported on rx3600 servers.

B. The recommended cabling for this configuration is:

- SAS 1B cable connected to SAS host bus adapter Slot 1 Port B.
- SAS 1A cable connected to SAS host bus adapter Slot 2 Port A.

C. Wake on LAN is not supported on Core IO LAN card when moved to Slot #10.

2. PCI-Express 8-port Smart Array (P400) Serial Attached SCSI Controller (AB036B#130, or AB036B#530, or AB036B#540). Requires PCI-Express/PCI-X Backplane (AD295A#300). Option Code 130 provides for factory configuration of RAID-1 (requires a minimum of 2 HDD's). Option Code 530 provides for factory configuration of RAID-5 (requires a minimum of 3 HDD's). Option Code 540 provides for factory configuration of RAID-6 (requires a minimum of 4 HDD's). All HDD's must be the same size and speed. Please see rx3600 Ordering Guide for details. Note: MirrorDisk/UX is available for SW Mirroring on all HDDs in HP-UX based systems and HP Volume Shadowing (software Raid 1) for HDDs in OpenVMS-based systems. A maximum of one 8-port Smart Array (P400) Serial Attached

### Windows and Linux based systems with PCI-Express/PCI-X Backplane:

These system have three choices for Core I/O controller; the PCI-X 8 Internal Port Smart Array (P600) Serial Attached SCSI controller, or the PCI-Express 8 Internal Port Smart Array (P400) Serial Attached SCSI controller, or the PCI-Express 16-port (8 internal ports/8 external ports) Smart Array (P800) Serial Attached SCSI controller. A maximum of one of these Serial Attached SCSI Core IO Controllers is supported on rx3600 servers.

1. HP PCI-X 8 port Smart Array (P600) Serial Attached SCSI controller (AB036B#100, or AB036B#500, or AB036B#510). Option Code 100 provides for factory configuration of RAID-1 (requires a minimum of 2 HDD's). Option Code 500 provides for factory configuration of RAID-5 (requires a minimum of 3 HDD's). Option Code 510 provides for factory configuration of RAID-6 (requires a minimum of 4 HDD's). All HDDs must be the same size and speed. Please see rx3600 Ordering Guide for details.
2. PCI-Express 8-port Smart Array (P400) Serial Attached SCSI Controller (AB036B#130, or AB036B#530, or AB036B#540). Requires PCI-Express/PCI-X Backplane (AD295A#300). Option 130 provides for factory configuration of RAID-1 (requires a minimum of 2 HDDs). Option 530 provides for factory configuration of RAID-5 (requires a minimum of 3 HDDs). Option 540 provides for factory configuration of RAID-6 (requires a minimum of 4 HDDs). All HDDs must be the same size and speed. Please see rx3600 Ordering Guide for details.  
**NOTE:** The P400 controller supports a mixture of RAID-1 on two like drives and RAID-5 on five like drives, and combining RAID-1 and RAID-5 is supported, but not as factory integration.
3. PCI-Express 16-port (8 internal ports/8 external ports) Smart Array (P800) Serial Attached SCSI Controller (AB036B#150, or AB036B#550, or AB036B#560). Requires PCI-Express/PCI-X Backplane (AD296A#200). Option 150 provides for factory configuration of RAID-1 (requires a minimum of 2 HDDs). Option 550 provides for factory configuration of RAID-5 (requires a minimum of 3 HDDs). Option 560 provides for factory configuration of RAID-6 (requires a minimum of 4 HDDs). All HDDs must be the same size and speed. Please see rx3600 Ordering Guide for details.

### Remaining Eight (non-Core I/O) slots:

The two slots (#3 and #4) next to the Core I/O slots share a PCI-Express x8 1.3-GB/s I/O channel. The next two slots (slots #5 and #6) each have their own PCI-Express x8 2.6-GB/s I/O channel. The independent I/O channels provide improved performance and error containment. Independence protects each I/O card from bus hangs or extended latencies due to the failure or high bandwidth demands of other I/O cards. Independence also ensures that each I/O card can achieve maximum throughput. These slots should be used for high performance PCI-X cards, such as clustering interconnects or multi port storage adapters.



### Configuration

The remaining four slots (#7 through #10) are PCI-X slots. Slots #7 and #8 each have their own dedicated 64 bit 133 MHz PCI-X slot; slot #7 is 1.1 GB/s and #8 is .5 GB/s. Slots #9 and #10 share a 64-bit 66-MHz PCI-X 0.5 GB/s I/O channel.

**NOTE:** Hot plug operations are not supported with the Linux or OpenVMS operating systems or for the PCI-X Core I/O slots for any operating system. Hot plug operations are not supported for any operating system in slots #3 or #4.

All I/O slots are keyed for I/O cards with 3.3V signaling. Cards that use 5V signaling are not supported in the HP Integrity rx3600.

### Supported I/O Cards

#### Supported HP-UX I/O Cards

I/O Card	Product Number	PCIe/PCI-X	Boot Support	Connector Type(s)	Maximum Cards PCI-X Backplane	Maximum Cards PCI-Express/PCI-X Backplane	Special Notes
<b>Multi function Cards (Mass Storage/LAN)</b>							
HP PCI-X 1 port 4 GB Fibre Channel/1 port 1000Base T Adapter	AD193A	PCI-X	Yes	1 LC, 1 RJ 45	8	4	
HP PCI-X 2 port 4 GB Fibre Channel/2 port 1000Base T Adapter	AD194A	PCI-X	Yes	2LC, 2 RJ 45	8	4	
PCI-X 2 Gb Fibre Channel/1000Base-SX	A9782A	PCI-X	Yes	LC	8	4	For maximum performance, card should not be installed in a shared slot.
PCIe 4-Gb Fibre Channel/GbE-T HBA combo	AD221A	PCIe	Yes	-	0	4	HP-UX 11i v3 required
PCIe 2-port 4-Gb Fibre Channel/2-port GbE-T HBA combo	AD222A	PCIe	Yes	-	0	4	HP-UX 11i v3 required
PCIe 2-port 4-Gb Fibre Channel/2-port GbE-SX HBA combo	AD393A	PCIe	Yes	-	0	4	HP-UX 11i v3 required
PCI-X 2 port 1000Base T/2 port U320 Multi function Adapter	AB290A	PCI-X	Yes	SCSI - LVD/SE LAN - RJ 45	8	4	
<b>Local Area Network (LAN) Adapters</b>							
PCI-X 1-port 1000Base-T (gigabit copper)	AD331A	PCI-X	Yes	RJ-45	8	4	
PCI-X 2-port 1000Base-T	A7012A	PCI-X	Yes	RJ-45	8	4	
PCI-X 4 port 1000Base T 1GbE Adapter	AB545A	PCI-X	Yes	RJ 45	8	4	
Single-port GigE-SX adapter card for HP-UX (Half-length, PCI-X card)	AD332A	PCI-X	Yes		8	4	
PCI-X 2 port 1000Base SX	A7011A	PCI-X	Yes	Duplex SC	8	4	
HP PCIe 2-port 1000Base-T card	AD337A	PCIe	Yes	RJ-45	0	4	
HP PCIe 2-port 1000Base-SX card	AD338A	PCIe	Yes	Duplex SC	0	4	
HP PCIe 10GbE SR card	AD386A	PCIe	Yes		0	4	
HP NC364T PCIe 4PT Gigabit Server Adapter	AD339A	PCIe	Yes		0	4	
PCI-X 266-MHz 1 port 10GbE	AD385A	PCI-X	Yes	Duplex LC	4	2	For best performance, recommend at least one processor core per card installed in the system. Each card requires 512 MB of memory.

### Configuration

								Card cannot be installed in a shared slot.
<b>Fibre Channel Storage Host Bus Adapters</b>								
HP PCI2 1-port 4-Gb/s Fibre Channel HBA	AD299A	PCIe	No	LC	0	2		
HP PCI2 2-port 4-Gb/s Fibre Channel HBA	AD355A	PCIe	No	LC	0	2		
PCI X 266 MHz 1 channel 4 Gb/s Fibre Channel	AB378B	PCI X	Yes	LC	8	4		
PCI X 266 MHz 2 channel 4 Gb/s Fibre Channel	AB379B	PCI X	Yes	LC	8	4		
PCIe 2 port 4 Gb/s Fibre Channel	AD300A	PCIe	Yes	LC	0	2		
HP PCIe 1-port 8Gb FC SR (Qlogic) HBA	AH400A	PCIe	Yes	-	0	4		HP-UX 11i v3 required
HP PCIe 2-port 8Gb FC SR (Qlogic) HBA	AH401A	PCIe	Yes	-	0	4		HP-UX 11i v3 required
HP PCIe 1-port 8Gb FC SR (Emulex) HBA	AH402A	PCIe	Yes	-	0	4		HP-UX 11i v3 required
HP PCIe 2-port 8Gb FC SR (Emulex) HBA	AH403A	PCIe	Yes	-	0	4		HP-UX 11i v3 required
<b>SCSI Adapters</b>								
PCI 2 channel Ultra320 SCSI	A7173A	PCI-X	Yes	VHDCI	8	4		
PCI-X 2 channel Smart Array 6402 Ultra320	A9890A	PCI-X	Yes	VHDCI	6	2		Requires minimum of 512 MB of memory and full length slot
PCI-X 4 channel Smart Array 6404 Ultra320	A9891A	PCI-X	Yes	VHDCI	6	2		Requires minimum of 512 MB of memory and full length slot
<b>SAS RAID Adapters Cards</b>								
HP PCIe SC44Ge SAS HBA	AH303A	PCIe	Yes		0	4		-
PCIe Smart Array P800	AD335A	PCIe	No	Mini SAS	0	4		
<b>Wide Area Network (WAN) Adapters</b>								
2 port Programmable Serial Interface (PSI) X.25/Frame Relay/SDLC	J3525A	J3525A	No	RS 530, RS 232, V.35, RS 449 or X.21	8	4		
PCIe 2-port 4X DDR Fast IB HCA	AH304A	PCIe	No	-	0	4		-
<b>Cluster Interconnect</b>								
PCI-X 2 port 4x Fabric (HPC) Adapter	AB286C	PCI-X	No	4x Infiniband Copper	8	4		For maximum performance, card should not be installed in a shared slot. Requires a minimum of 512 MB memory.
PCIe 2-port 4X DDR Fast IB HCA	AH304A	PCIe	No		0	4		HP-UX 11i v3 required
PCI 8 port Serial MUX Adapter	AD278A	PCI-X	No		8	4		
PCI 64 port Serial MUX Adapter	AD279A	PCI-X	No		8	4		
16 port RS 232 RJ-45 Port Module	AD280A		No	4 per AD279A	N/A	N/A		AD280A #001 Port Module Power Supply, required on Port Module (3) and Port Module (4) connected to an AD279A 64 port

### Configuration

16-port RS-232 DB-25 Port Module	AD281A		No	4 per AD279A	N/A		MUX adapter. AD281A #001 Port Module Power Supply, required on Port Module (3) and Port Module (4) connected to an AD279A 64 port MUX adapter.
<b>Graphics Adapters</b>							
HP 2D PCI-X graphics card	AH391A	PCI	No	VGA	2	2	T/P/I: HP UX PCI-x and PCI-x/PCI-e 2/2/2

### Supported OpenVMS I/O Cards

I/O Card	Product Number	PCIe/PCI-X	Boot Support	Connector Type(s)	Maximum Cards PCI-X Backplane	Maximum Cards PCI-Express/PCI-X Backplane	Special Notes
<b>Multi function Cards (Mass Storage/LAN)</b>							
HP PCI X 1 port 4 GB Fibre Channel/1 port 1000Base T Adapter	AD193A	PCI X	Yes	1 LC, 1 RJ 45	2	2	
HP PCI X 2 port 4 GB Fibre Channel/2 port 1000Base T Adapter	AD194A	PCI X	Yes	2LC, 2 RJ 45	2	2	
PCI X 2 Gb Fibre Channel/1000Base SX	A9782A	PCI X	Yes	LC	4	4	For maximum performance, card should not be installed in a shared slot.
PCI X 2 port 1000Base T/2 port U320 Multi function Adapter	AB290A	PCI X	Yes	SCSI - LVD/SE LAN - RJ 45	2	2	Requires full length slot.
PCIe 4-Gb Fibre Channel/GbE-T HBA combo	AD221A	PCIe	Yes	-	0	2	
PCIe 2-port 4-Gb Fibre Channel/2-port GbE-T HBA combo	AD222A	PCIe	Yes	-	0	2	
PCIe 2-port 4-Gb Fibre Channel/2-port GbE-SX HBA combo	AD393A	PCIe	Yes	-	0	2	
<b>Local Area Network (LAN) Adapters</b>							
PCI-X 1 port 1000Base-T (gigabit copper)	AD331A	PCI-X	No	RJ-45	8	4	
PCI-X 2 port 1000Base T	A7012A	PCI-X	No	RJ 45	8	4	
PCI-X 4 port 1000Base T 1GbE Adapter	AB545A	PCI-X	No	RJ 45	3	3	
PCI-X 1 port 1000Base-SX (gigabit fiber)	AD332A	PCI-X	No	Duplex SC	8	4	
PCI-X 2-port 1000Base-SX	A7011A	PCI-X	No	Duplex SC	8	4	
HP PCIe 2-port 1000Base-T Card	AD337A	PCIe	Yes	Duplex SC	0	4	
HP PCIe 2-port 1000Base-SX card	AD338A	PCIe	Yes	Duplex SC	0	4	
HP NC364T PCIe 4PT Gigabit Server Adapter	AD339A	PCIe	No		0	4	
HP PCI-X 266MHz 10GigE SR Card	AD385A	PCI-X	Yes		2	2	
<b>Fibre Channel Storage Host Bus Adapters</b>							
HP PCI2 1-port 4-Gb/s Fibre Channel HBA	AD299A	PCIe	Yes	LC	0	4	
HP PCI2 2-port 4-Gb/s Fibre Channel HBA	AD355A	PCIe	Yes	LC	0	4	

### Configuration

PCI-X 266 MHz 1 channel 4 Gb/s Fibre Channel	AB378B	PCI-X	Yes	LC	8	4	
PCI-X 266 MHz 2 channel 4 Gb/s Fibre Channel	AB379B	PCI-X	Yes	LC	8	4	
PCIe 2 port 4 Gb/s Fibre Channel	AD300A	PCIe	Yes	LC	0	2	
<b>SCSI Adapters</b>							
PCI 2 channel Ultra320 SCSI	A7173A	PCI-X	Yes	VHDCI	4	4	No On Line Add and Replace support.
PCI-X 2 channel Smart Array 6402 Ultra320	A9890A	PCI-X	Yes	VHDCI	2	2	Requires minimum of 512 MB of memory and full length slot
PCI-X 4 channel Smart Array 6404 Ultra320	A9891A	PCI-X	Yes	VHDCI	1	1	Requires minimum of 512 MB of memory and full length slot
<b>SAS RAID Adapters</b>							
HP PCIe SC44Ge SAS HBA	AH303A	PCIe	Yes		0	4	
PCIe Smart Array P800	AD335A	PCIe	No	Mini SAS	0	4	
<b>Graphics Adapters</b>							
HP 2D PCI-X graphics card	AH391A	PCI	No	VGA	4	3	No OpenVMS factory integration. AH391A offers 2D graphics support. Support available for OpenVMS 8.3-1h1 and 8.3. OpenVMS PCI-x 4/4/4, PCIe 3/3/3

### Supported Windows I/O Cards

**NOTE:**  
While ordering Windows Server 2008, do not mix differing brands of HBAs (Emulex and Qlogic) within the same server configuration in an MPIO environment. This is to avoid issues which occur when different Fibre Channel HBAs are used within the same server which support different I/O max transfer packet sizes in an MPIO environment. For example, the Emulex Fibre Channel HBAs support a max I/O transfer packet size of 1MB and the Qlogic Fibre Channel HBAs support a max I/O transfer packet size of 2MB. Mixing these two cards in an MPIO configuration can cause the system to hit a BSOD 0X000000D1 with a reference to elxstor.sys

This applied to the following products:

Emulex:

- HP StorageWorks single port 8 Gigabit PCIeFC Emulex HBA (AJ762A)
- HP StorageWorks dual port 8 Gigabit PCIeFC Emulex HBA (AJ763A)
- HP StorageWorks 2 Gb Fibre Channel HBA (AB232A)
- HP StorageWorks 2 Gb, 64-Bit/133 MHz PCI-X-to-Fibre Dual Channel HBA (AB466A)
- HP StorageWorks 2 Gb, 64-Bit/133 MHz PCI-X-to-Fibre Single Channel HBA (AB467A)
- HP StorageWorks 4 Gb Single Port 64-bit 266 MHz Fibre Channel HBA (AD167A)
- HP StorageWorks 4 Gb Dual Port 64-bit 266 MHz Fibre Channel HBA (AD168A)
- HP StorageWorks FC2142 PCIe Single Port 4 Gb Fibre Channel adapter (A8002A)
- HP StorageWorks FC2242 PCIe Dual Port 4 Gb Fibre Channel adapter (A8003A)

Qlogic

- HP StorageWorks single port 8 Gigabit PCIeFC Qlogic HBA (AK344A)
- HP StorageWorks dual port 8 Gigabit PCIeFC Qlogic HBA (AJ764A)
- HP StorageWorks 4 Gb Single Port 64-bit 266 MHz Fibre Channel HBA (AB429A)
- HP StorageWorks 4 Gb Dual Port 64-bit 266 MHz Fibre Channel HBA (AB379A)
- HP StorageWorks 4 Gb Dual Port 64-bit 266 MHz Fibre Channel HBA (AB379B)
- HP StorageWorks FC1142 PCIe Single Port 4 Gb Fibre Channel adapter (AE311A)
- HP StorageWorks AD300A PCIe Dual Port 4 Gb Fibre Channel adapter (AD300A)

### Configuration

I/O Card	Product Number	PCI/PCI-X	Boot Support	Connector Type(s)	Maximum Cards PCI-X Backplane	Maximum Cards PCI-Express/PCI-X Backplane	Special Notes
<b>Local Area Network (LAN) Adapters</b>							
PCI 2 port Windows/Linux 1000Base-TX	A9900A	PCI-X	No	RJ-45	6	4	No On Line Add and Replace support.
PCI-X 2 port 1000Base SX	A7011A	PCI-X	Yes	Duplex SC	6	4	
HP PCIe 2-port 1000Base-T card	AD337A	PCIe	Yes	RJ-45	0	4	
HP PCIe 2-port 1000Base-SX card	AD338A	PCIe	Yes	Duplex SC	0	4	
HP PCI-X 266MHz 10GigE SR Card	AD385A	PCI-X	Yes		0	4	only Windows 2003 is supported
HP PCI-X 266MHz 10GigE SR Card	AD385A	PCI-X	Yes		2	2	
<b>Fibre Channel Storage Network Adapters Cards</b>							
HP PCIe 1-port 8Gb FC SR (Qlogic) HBA	AH400A	PCIe	Yes	-	0	4	
HP PCIe 2-port 8Gb FC SR (Qlogic) HBA	AH401A	PCIe	Yes	-	0	4	
HP PCIe 1-port 8Gb FC SR (Emulex) HBA	AH402A	PCIe	Yes	-	0	4	
HP PCIe 2-port 8Gb FC SR (Emulex) HBA	AH403A	PCIe	Yes	-	0	4	
PCI-X 266 MHz 1 channel 4 Gb/s Fibre Channel	AB429A	PCI-X	Yes	LC	6	4	
PCI-X 266 MHz 1 channel 4 Gb/s Fibre Channel	AD167A	PCI-X	Yes	LC	6	4	
PCI-X 266 MHz 2 channel 4 Gb/s Fibre Channel	AD168A	PCI-X	Yes	LC	6	4	
PCIe 1 port 4 Gb/s Emulex Fibre Channel	A8002A	PCIe	Yes	LC	0	4	
PCIe 2 port 4 Gb/s Emulex Fibre Channel	A8003A	PCIe	Yes	LC	0	4	
PCIe 1 port 4 Gb/s Fibre Channel	AE311A	PCIe	Yes	LC	0	4	
PCIe 2 port 4 Gb/s Fibre Channel	AD300A	PCIe	Yes	LC	0	4	
<b>SCSI Adapters</b>							
PCI 2 channel Ultra320 SCSI	A7173A	PCI-X	Yes	VHDCI	2	2	
PCI-X 2 channel Smart Array 6402 Ultra320	A9890A	PCI-X	Yes	VHDCI	2	2	
PCI-X 4 channel Smart Array 6404 Ultra320	A9891A	PCI-X	Yes	VHDCI	1	1	
PCIe Smart Array 500	AH226A	PCIe	Yes	Mini SAS	0	4	
<b>SAS RAID Adapters Cards</b>							
PCIe Smart Array E500	AH226A	PCIe	Yes	Mini SAS	0	4	
PCI-X Smart Array P600 Serial Attached SCSI (SAS) Controller (for external storage only)	337972-B21	PCI-X	Yes	SFF8470	6	4	A maximum of (4) may be ordered with #0D1, the remaining (2) must be ordered without #0D1
512 MB cache memory upgrade for SA640x and SA P600 controller	372538-B21	PCI-X	NA	NA	NA	NA	
PCIe Smart Array P800	AD335A	PCIe	Yes	Mini SAS	0	4	

### Supported Linux (RHEL 4 U4 and SLES 10) I/O Cards

### Configuration

I/O Card	Product Number	PCIe/PCI-X	Boot Support	Connector Type(s)	Maximum Cards PCI-X Backplane	Maximum Cards PCI-Express/PCI-X Backplane	Special Notes
<b>Local Area Network (LAN) Adapters</b>							
PCI 2 port Windows/Linux 1000Base TX	A9900A	PCI-X	Yes	RJ 45	8	4	No On Line Add and Replace support.
PCI-X 4 port 1000Base T 1GbE Adapter	AB545A	PCI-X	No	RJ 45			
PCI-X 2 port 1000Base SX	A7011A	PCI-X	Yes	Duplex SC	8	4	
HP PCIe 2-port 1000Base-T card	AD337A	PCIe	Yes	RJ-45	0	4	
HP PCIe 2-port 1000Base-SX card	AD338A	PCIe	Yes	Duplex SC	0	4	
HP PCI-X 266MHz 10GigE SR Card	AD385A	PCI-X	Yes		2	2	
<b>Fibre Channel Storage Network Adapters Cards</b>							
PCI-X 266 MHz 1 channel 4 Gb/s Fibre Channel	AB429A	PCI-X	Yes	LC	4	4	Qlogic and Emulex HBAs are not supported in the same server
PCI-X 266 MHz 1 channel 4 Gb/s Fibre Channel	AD167A	PCI-X	Yes	LC	6	4	
PCI-X 266 MHz 2 channel 4 Gb/s Fibre Channel	AD168A	PCI-X	Yes	LC	6	4	
PCIe 1 port 4 Gb/s Emulex Fibre Channel	A8002A	PCIe	Yes	LC	0	4	
PCIe 2 port 4 Gb/s Emulex Fibre Channel	A8003A	PCIe	Yes	LC	0	4	
PCIe 1 port 4 Gb/s Fibre Channel	AE311A	PCIe	Yes	LC	0	4	
PCIe 2 port 4 Gb/s Fibre Channel	AD300A	PCIe	Yes	LC	0	4	
<b>SCSI Adapters</b>							
PCI 2 channel Ultra320 SCSI	A7173A	PCI-X	Yes	VHDCI	4	4	
PCI-X 2 channel Smart Array 6402 Ultra320	A9890A	PCI-X	Yes	VHDCI	2	2	Requires minimum of 512 MB of memory and full length slot
PCI-X 4 channel Smart Array 6404 Ultra320	A9891A	PCI-X	Yes	VHDCI	1	1	
<b>SAS RAID Adapters</b>							
PCIe Smart Array E500	AH226A	PCIe	Yes	Mini SAS	0	4	
HP PCIe SC44Ge SAS HBA	AH303A	PCIe	No		0	4	
PCI-X Smart Array P600 Serial Attached SCSI (SAS) Controller (for external storage only)	337972-B21	PCI-X	Yes	SFF8470	4	4	
512 MB cache memory upgrade for SA640x and SA P600 controller	372538-B21	PCI-X	NA	NA	NA	NA	
PCIe Smart Array P800	AD335A	PCIe	Yes	Mini SAS	0	4	

### Configuration

Support Internal Storage Devices	Product Number
<b>Device</b>	
<b>Internal Hard Drives</b>	
72 GB 15K RPM Hot Plug Serial Attached SCSI (SAS) 2.5 inch Drive	AD379A
146 GB 10K RPM Hot Plug Serial Attached SCSI (SAS) 2.5-inch Drive	AD333A
300 GB 10K RPM Serial Attached SCSI (SAS) 2.5 inch Small Form Factor Hot Plug Disk	AM244A
HP Integrity 146GB 15K SAS SFF 3GB DP	AM302A
<b>Removable Media<sup>2</sup></b>	
DVD ROM Drive	AD142A
DVD+RW Drive <sup>3</sup>	AD143A
<sup>1</sup> While ordering Windows, please order at least 64GB HDD to support OS installation <sup>2</sup> Required for Windows, Linux, and OpenVMS. Optional for HP UX. Maximum 1 supported. <sup>3</sup> Third party software (not included with AD143A) is required to support DVD write with Windows on AD143A. For HP UX 11i v2, only DVD+R and DVD+RW media is supported. CD media is not supported	

### Integrated Multi-function Core I/O

The integrated multifunction I/O provides core I/O functionality and includes the integrated management processor, which provides remote management and high availability monitoring capabilities.

- PCI-X dual port 10/100/1000Base-T LAN with RJ 45 connector-Supports LAN boot for operating system installation.
- The base system offerings require choice of at least one HP 8 Port Serial Attached SCSI (SAS) controller. Choices vary depending on choice of I/O backplane (PCI-X 2.0 backplane or PCI-Express backplane) and choice of operating system. Please see Table 2.11.2 HP Integrity rx3600 Features - Standard System Features earlier in this chapter, or the section I/O Architecture beginning on page 2-256, and the rx3600 Ordering Guide.
- Factory configured RAID is available with all Core I/O controllers. Please see Table 2.11.2 HP Integrity rx3600 Features - Standard System Features earlier in this chapter, or the section I/O Architecture beginning on page 2-256, and the rx3600 Ordering Guide. When configuring for RAID, all HDD's in the system must be the same size and speed.

### Integrated Integrity iLO 2 Management Processor Functionality

- Dedicated 10/100BaseTX LAN port for LAN console and embedded web console access
- One RS 232 serial port for local console.
- Password protected console ports
- Console mirroring between all local, modem, LAN, and web consoles
- Remote power up and power down control
- Configurable remote access control
- Event notification to system console-Provides connectivity, information, and support for HP UX tools (such as STM and EMS) to notify by email, pager and/or HP response centers.
- Interface to system monitoring and diagnostic hardware via an internal IC bus
- Secure Sockets Layer security on web console
- Support for Integrated Lights Out version 2 (iLO v2) Advanced Pack activation key and license (AD301A). Firmware license installs on the integrated Management Processor Card. Integrated Lights Out (iLO) Advanced Pack provides additional remote management capabilities, including integrated remote console and virtual CD/DVD drive, and LDAP directory services, SSH security, and Group Actions with HP Systems Insight Manager (SIM)
- Basic graphic capabilities are available as an optional upgrade. The upgrade provides these capabilities via the Radeon 7000 2D graphics chip and 16 MB memory, which resides on the integrated Integrity iLO 2 management processor card. VGA port is provided on rear of the system. Supported resolutions and refresh rates include:

Operating System	Minimum Resolution	Refresh Rate	Maximum Resolution	Refresh Rate
HP-UX	1024x768	75 Hz	1920x1200	75 Hz
Linux	1024x768	75 Hz	1920x1200	75 Hz
Windows	640x480	75 Hz	1600x1200	75 Hz
OpenVMS	640x480	60 Hz	1920x1200	75 Hz

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**Configuration**
**System Console Configurations**

The HP Integrity rx3600's integrated Management Processor Card provides six methods for console connections.

- SSL secured Web console accessible through the 10/100Base T management LAN
- Standard telnet connections accessible through the 10/100Base T management LAN
- Local VT100 or hpterm terminal, or VT100 or hpterm emulator via local RS 232 serial connection
- Remote VT100 or hpterm terminal, or VT100 or hpterm emulator via external modem
- VGA graphics console using the upgrade to VGA port. This upgrade is mandatory for Windows systems and optional for HP UX and Linux systems. Keyboard and mouse connections are provided by USB. OpenVMS doesn't support VGA console for boot operations, but supports VGA device for graphics use after boot.
- Integrated Remote Console (virtual KVM) through the iLO 2 Advanced Pack (Windows systems only).

**Internal Disk and Media Drives**

- The HP Integrity rx3600 supports up to eight internal Serial Attached SCSI (SAS) 2.5 inch hot plug disk drives
- A PCI-X or PCI-Express 8 internal port host bus adapter provides 8 ports, 1 port per SAS disk, for point to point connection from the adapter to the disk. This means that each disk has its own 3 GB link.
- Factory configured RAID is available with all Core I/O controllers. Please see Table 2.11.2 HP Integrity rx3600 Features - Standard System Features earlier in this chapter, or the section I/O Architecture beginning on page 2-256, and the rx3600 Ordering Guide. When configuring for RAID, all HDD's in the system must be the same size and speed.
- Cables required to connect the internal disk drives to the host bus adapter are shipped with the system; no need to order separately.
- 36-GB 10K and 15K, 72 GB 10K and 15K, and 146 GB 10K Serial Attached SCSI (SAS) disks are supported. 300-GB 10K SAS disks will be supported on all operating systems in a future release
- Optical media drives include a DVD ROM (AD142A) and DVD+RW (AD143A). A DVD drive is required for all OpenVMS, Linux, and Windows configurations. Third party software (not included with the AD143A) is required to support DVD write with Windows on AD143A. The AD143A is not supported on HP UX-based systems. For HP-UX 11iv2, only DVD+R and DVD+RW media is supported. CD media is NOT supported.

**HP Integrity rx3600 Trusted Platform Module**

The rx3600 has an accessory option for an embedded security chip - the Trusted Platform Module (TPM) - product number AB404A. HP-UX Trusted Computing Services (HP-UX TCS) provides software support for the TPM when running HP-UX 11i v2. By providing a low-cost embedded security chip option (known as a Trusted Platform Module) in its zx2-based Integrity servers (rx2660, rx3600, and rx6600), HP has established a foundation for strong protection of sensitive information - including cryptographic keys. Built around industry standards, the Trusted Platform Module (TPM) provides a basis for key storage by securely generating and storing cryptographic keys. HP-UX 11i TCS takes this a step further by providing the necessary infrastructure for managing the TPM, as well as integrating it into select features such as HP-UX Encrypted Volumes and File Systems (EVFS).

Using HP-UX TCS with EVFS:

Using HP-UX TCS to make the unattended boot capability of EVFS more secure is an important example of how HP-UX TCS can be integrated with other applications to enhance security. For more information see the "Protecting EVFS Keys with HP-UX TCS" chapter in the "HP-UX Trusted Computing Services Administrators Guide" available in the HP-UX Trusted Computing Services section at: <http://docs.hp.com/en/internet.html>

Please note that HP-UX 11iTCS requires:

1. An HP zx2-based Integrity server (rx2660, rx3600, or rx6600) with a TPM installed, running HP-UX 11iv2 September 2006 release or later
2. Installation of kernel patch PHKL\_35428

To download TCS and EVFS, please see the HP-UX Software Depot web page at: <http://software.hp.com>

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### Configuration

#### HP Integrity rx3600 Power Subsystem

The HP Integrity rx3600 provides a high level of integrated power protection:

- N+1 redundant hot swap power supplies
- N+1 redundant AC power input protection with electrical phase isolation
- Power monitoring and control

The HP Integrity rx3600 supports a second hot swap power supply for N+1 protection. One supply is shipped as a standard part of every system and is required for correct operation. The hot swap design allows for the online replacement of a power supply when N+1=2 supplies are configured in the server.

The HP Integrity rx3600 provides an independent power input receptacle for each power supply. The independent design provides protection against losing the connection from a power cord or breaker. The HP Integrity rx3600 power cords should always be plugged into separate breakers when possible.

### Technical Specifications

Server model number rx3600

<b>Server product numbers</b>	<p><b>Two processor/four core capable HP Integrity rx3600</b> base system with one dual core processor module <span style="float: right;">AB463A</span></p> <p>Configure with one 1.6 GHz/18 MB dual core processor module <span style="float: right;">AB463A#160</span></p> <p>Configure with one 1.66 GHz/18 MB dual core 9140M processor modules <span style="float: right;">AB463A#260</span></p> <p>Base system includes one power supply (second supply can be added for redundancy) and a 2 port 10/100/1000 GbE PCI-X card (supports Wake On LAN) in one core I/O slot. Must select core I/O storage controller, I/O backplane, memory carrier board option, and memory (minimum 2 GB).</p> <p><b>Two processor/four core capable HP Integrity rx3600</b> base system with two dual core processor modules <span style="float: right;">AB596A</span></p> <p>Configure with two 1.6 GHz/18 MB dual core processor modules <span style="float: right;">AB596A#160</span></p> <p>Configure with two 1.66 GHz/18 MB dual core 9140M processor modules <span style="float: right;">AB596A#260</span></p> <p>Base system includes one power supply (second supply can be added for redundancy) and a 2 port 10/100/1000 GbE PCI-X card (supports Wake On LAN) in one core I/O slot. Must select core I/O storage controller, I/O backplane, memory carrier board option, and memory (minimum 2 GB).</p> <p><b>Server Form Factor</b> (Required - must choose either Field Rack Kit, or Factory Rack Integration, or Optional Stand Alone mount)</p> <p>Please refer to the HP 10000 Series G2 Rack Best Practices Guide for information on rack deployment, stabilization and transportation. (<a href="http://www.HP.com/go/rackandpower">http://www.HP.com/go/rackandpower</a>)</p> <p><b>Universal Rack Kit</b> <span style="float: right;">AD053A</span></p> <p>Field Rack Kit <span style="float: right;">AD053A#B01</span></p> <p>Includes rack slides and cable management arm</p> <p>Factory Rack Integration <span style="float: right;">AD053A#0D1</span></p> <p>For factory rack integration, a rack cabinet must appear in the same section of the order. The slides and cable management arm will be installed with the server in the rack cabinet when factory rack integration is ordered.</p> <p>Optional Stand-Alone Pedestal Form Factor <span style="float: right;">AD054A#B01</span></p> <p><b>NOTE:</b> Will not be factory configured, but will be shipped in the system box for field installation only.</p> <p><b>NOTE:</b> Two power cords are shipped with each system; one that connects the system to the rack PDU and one that enables direct connection to a wall socket. The cord that connects the system power supply to the PDU has an IEC 19 end, which plugs into the system power supply's IEC 20 socket, and an IEC 20 end, which plugs into the PDU's IEC 19 socket. The localized cord that connects the system power supply directly to the wall socket has an IEC 19 end, which plugs into the system power supply's IEC 20 socket, and a country specific end, which plugs into the wall socket. This localized cord is included at the distribution site.</p>
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<b>Supported Processors for Field Upgrades</b>	<p><b>1.66 GHz Dual core Intel Itanium 9140M Processor (AD391A)</b></p> <p>Cache-On chip Level 1 <span style="float: right;">32 KB</span></p> <p>Cache-On chip Level 2 <span style="float: right;">1 MB Instruction/256 KB Data (per core)</span></p> <p>Cache-On chip Level 3 <span style="float: right;">18 MB (9 MB per core)</span></p> <p>Floating point Coprocessor included <span style="float: right;">Yes</span></p> <p><b>1.42 GHz Dual core Intel Itanium 9120N Processor (AD390A)</b></p> <p>Cache-On chip Level 1 <span style="float: right;">32 KB</span></p> <p>Cache-On chip Level 2 <span style="float: right;">1 MB Instruction/256 KB Data (per core)</span></p> <p>Cache-On chip Level 3 <span style="float: right;">12 MB (6 MB per core)</span></p> <p>Floating point Coprocessor included <span style="float: right;">Yes</span></p>
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<b>System Memory</b>	<p><b>Minimum memory</b> <span style="float: right;">2 GB</span></p> <p><b>Maximum memory capacity</b> <span style="float: right;">192 GB</span></p>
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<b>Internal Disks</b>	<p><b>Maximum disk mechanisms</b> <span style="float: right;">8</span></p> <p><b>Maximum disk capacity</b> <span style="float: right;">2,000 GB</span></p>
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### Technical Specifications

<b>Standard Integrated I/O</b>	<b>Serial Attached SCSI (SAS)</b>	8 ports
	<a href="#">Please see specific system offerings for details</a>	
	<b>10/100/1000Base T</b> (RJ 45 connector)	2 ports
	<b>RS 232 serial ports</b>	2
	<b>10/100Base T management port</b> (RJ 45 connector)	1
	<b>USB (2.0) Ports</b>	1 front/2 rear
	<b>VGA</b>	Optional for HP UX, Linux, OpenVMS. Required for Windows.

<b>I/O Buses and Slots</b> (Must select 1 only)	<b>I/O Backplane Option</b>	AD295A
	<b>PCI-X 2.0 Backplane</b>	AD295A#100
	<b>Available I/O slots</b>	8
	Two 266 MHz, 64 bit slots, each on its own dedicated PCI-X bus	
	Two 133 MHz, 64 bit slots, each on its own dedicated PCI-X bus	
	Four 66 MHz, 64 bit slots distributed on 2 PCI-X buses; 2 slots per bus	
	<b>PCI-Express/PCI-X Backplane</b>	AD295A#300
	<b>Available I/O Slots</b>	8
	Two x8 PCI-Express slots one one 1.3-GB/s bus	
	Two x8 PCI-Express slots, each on its own dedicated 2.6-GB/s bus	
	Two PCI-X 133-MHz, 64-bit slots, each on its own dedicated bus	
	Two PCI-X 66-MHz, 64-bit slots distributed on 1 PCI-X bus	

<b>Maximum I/O Cards</b> (See supported I/O table for product specifics)	<b>Additional Interface Cards</b>	8
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<b>Electrical Characteristics</b>	<b>AC Input power</b>	100-240V 50/60 Hz
	<b>Hot swap Power supplies</b>	1 included, 2nd for N+1
	<b>Redundant AC power inputs</b>	1 included, 2nd for N+1
	<b>Maximum input current at 100V</b>	15 A
	<b>Typical power dissipation</b>	685 Watts
	<b>Maximum power dissipation</b>	1,095 Watts
	<b>Power factor at full load</b>	0.95 or higher
	<b>Typical Heat dissipation (BTUs/hour)</b>	2,337
	<b>Maximum Heat dissipation (BTUs/hour)</b>	3,736

<b>Site Preparation</b>	<b>Site planning and installation included</b>	No
	<b>NOTE: System is customer installable.</b>	
	<b>Rack system depth</b>	27.4 in (696 mm)
	<b>Rack system width</b>	17.32 in (440 mm)
	<b>Rack system height (EIA/mm)</b>	178 mm/6.8 in/4 U
	<b>Rack system weight maximum (kg/lbs)</b>	45 kg/99 lbs
	<b>Pedestal system depth</b>	696mm/27.4
	<b>Pedestal system width</b>	369mm/14.5 in
	<b>Pedestal system height</b>	512mm/20.2 in
	<b>Rack weight maximum (kg/lbs)</b>	52 kg/114 lbs

### Technical Specifications

#### Environmental Characteristics

<b>Acoustics (operator/bystander) at 77° F (25° C)</b>	<6.9 Bels LwA
<b>Operating Temperature (up to 5000 ft/1524 m)*</b>	41° to 95° F (5° to 35° C)
<b>Max. rate of temperature change, operating</b>	30 per hour
<b>Non-operating Temperature</b>	5° to 35° F (-40° to 70° C)
<b>Maximum rate of temperature change, non operating</b>	20° per hour
<b>Operating relative humidity</b>	15% to 80% RH non-condensing
<b>Non-operating relative humidity</b>	5% to 95% non-condensing
<b>Operating altitude above sea level</b>	3000 m (10,000 ft) max.
<b>Non-operating altitude above sea level</b>	4600 m (15,000 ft) max.

\* If the N+1 power supply is ordered standalone the power supply will ship with two cords; one that connects the system to the rack PDU and one that enables direct connection to a wall socket. The cord that connects the system power supply to the PDU has an IEC 19 end, which plugs into the system power supply's IEC 20 socket, and an IEC 20 end, which plugs into the PDU's IEC 19 socket. The localized cord that connects the system power supply directly to the wall socket has an IEC 19 end, which plugs into the system power supply's IEC 20 socket, and a country specific end, which plugs into the wall socket. This localized cord is included at the distribution site. If the N+1 power supply is ordered with the server, the additional cords will be included.

#### Regulatory Compliance

<b>RMN</b>	RSVLA-0404
<b>Electromagnetic interference</b>	Complies with FCC Rules and Regulations, Part 15 as a Class A digital device. Manufacturer's Declaration to EN55022 Level A, VCCI Registered, Class A, Korea RLL.
<b>Safety</b>	UL Listed, CSA Certified, TUV GS Mark compliant with EN 60950 and EN 41003
<b>More detailed regulatory documents and certifications</b>	<a href="http://docs.hp.com/en/hw.html">http://docs.hp.com/en/hw.html</a>

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