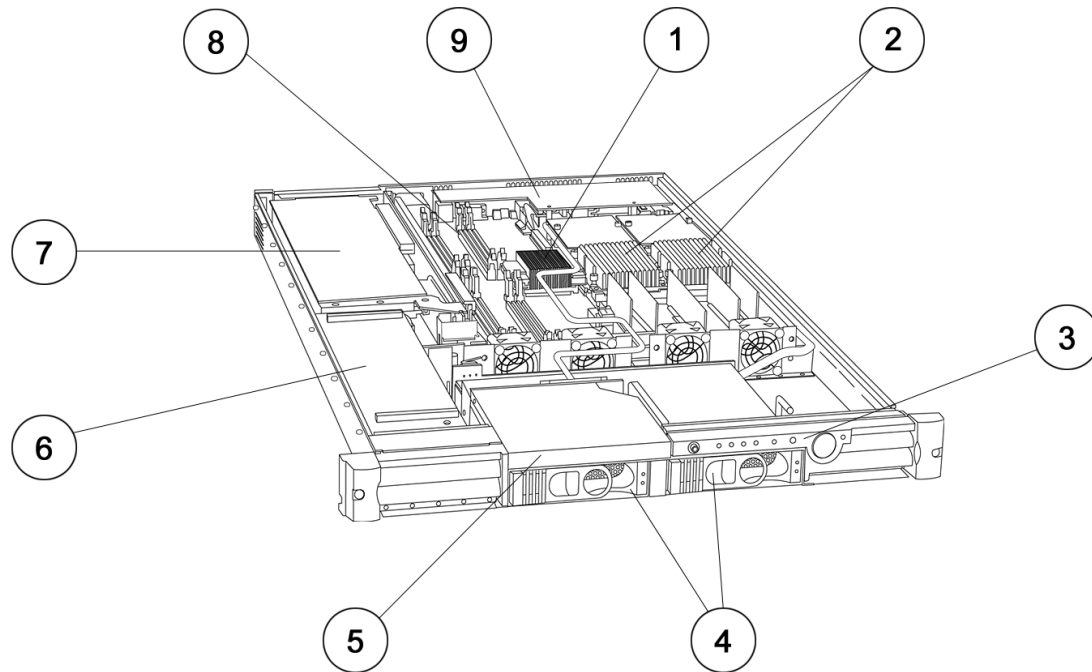


Overview



1. ZX1 CEC
2. 1 or 2 IFF CPUs (Deerfield)
3. Front Panel
4. 2 Hot-swap U320 Drives (internal RAID support with optional RAID card)
5. Slimline Optical Drive (optional)
6. System Power Supply Unit
7. 2 PCI-X Slots
8. 8 DIMM slots 512-MB to 16-GB with chip sparing
9. Optional ECI (Enhanced Manageability)

At A Glance

rx1600 Server Product Numbers

Configurable Server and one low-voltage 1.0-GHz/1.5-MB CPU, 512-MB RAM (2×256MB), 36-GB 10k rpm disk, factory rack kit	AB218A
Configurable Server and two low-voltage 1.0-GHz/1.5-MB CPU, 2-GB RAM (2×1 GB), 73-GB 15k rpm disk, factory rack kit	AB219A
Base Server and one low-voltage 1.0-GHz/1.5-MB CPU	A9901A

Standard System Features

- Three Operating System support: HP UX 11i version 2, Linux, and OpenVMS
- Dual channel Ultra320 SCSI controller, 2 internal disks on one channel, one channel external disks only
- External Ultra320 SCSI port
- 10/100/1000Base TX LAN (auto speed sensing, RJ 45 connector)
- 10/100Base TX LAN (auto speed sensing, wake on capability, RJ 45 connector)
- General purpose RS 232 serial port
- Three RS 232 serial ports linked to the management processor (multiplexed from a single DB 25 port)
- Factory integration of CPUs, memory, disk drives, removable media, and I/O cards
- Rackmountable into 19 inch cabinets
- One year warranty with next business day on site

Standard Features

Minimum System

- One 64 bit Low voltage Itanium 2 processor with one core: 1.0 GHz/1.5 MB cache
- 512 MB PC2100 ECC Registered DDR266A SDRAM (2×256MB DIMMs)
- One internal DVD ROM, required for OpenVMS and Windows
- One power supply

Maximum Server Capacities

- Two 64 bit Low voltage Itanium 2 processors, one core each: 1.0 GHz/1.5 MB cache
- 16-GB PC2100 ECC Registered DDR266A SDRAM (8×2GB DIMMs)
- Two PCI-X/PCI IO adapter cards
- One internal DVD ROM or CD-RW/DVD-ROM combo drive
- Two internal hot-plug LVD SCSI disks

Standard System Features

- Three Operating System support: HP UX 11i version 2, Linux, and OpenVMS
- Dual channel Ultra320 SCSI controller, 2 internal disks on one channel, one channel external disks only
- External Ultra320 SCSI port
- 10/100/1000Base TX LAN (auto speed sensing, RJ 45 connector)
- 10/100Base TX LAN (auto speed sensing, wake on capability, RJ 45 connector)
- General purpose RS 232 serial port
- Three RS 232 serial ports linked to the management processor (multiplexed from a single DB 25 port)
- Factory integration of processors, memory, disk drives, removable media, and I/O cards
- Rackmountable into 19 inch cabinets
- One year warranty with next business day on site

High Availability

- On-line memory page deallocation
- ECC protected DDR memory
- Memory chip spare to overcome single DRAM chip failures
- Dynamic Processor resilience and deallocation
- UPS power management
- Hot Plug internal disks
- Journal file system for HP-UX
- Auto reboot
- HP MC/ServiceGuard for HP-UX
- HP ServiceGuard Extension for RAC for HP-UX
- ServiceGuard Manager for HP-UX
- Insight Manager 7 – proactive fault management
- EMS HA Monitors for HP-UX
- ECM Toolkit for HP-UX
- HP Surestore AutoPath for HP-UX
- MirrorDisk for HP UX
- OpenVMS Clusters

Security

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

Standard Features

Manageability

- HP Ignite-UX for installation and deployment of the operating system
- HP Software Distributor-UX for software and patch management
- HP Servicecontrol Suite for HP-UX
- HP TopTools for Linux
- Optional management processor for comprehensive remote management of HP-UX and Linux
- Process Resource Manager for HP-UX workload management

Configuration

Processor Configuration The HP Integrity rx1600 is a symmetrical multiprocessing (SMP) server supporting up to two high performance 64 bit Low voltage Itanium 2 processors.

- Processor Details**
- 1.0-GHz
 - Level 3 Cache: 1.5-MB
 - Level 2 Cache: 256 KB
 - Level 1 Cache: 32 KB
 - Single-bit cache error correction
 - 50-bit physical addressing
 - 64-bit virtual addressing
 - 4 GB maximum page size

Memory Configuration The HP Integrity rx1600 supports DDR (double data rate) SyncDRAM (synchronous dynamic random access memory) DIMMs with ECC and chip spare protection. The HP Integrity rx1600 has eight DIMM slots, allowing a maximum of 16 GB of total system memory (using 2 GB DIMMs).

- Memory Loading Rules and Performance Guidelines**
- Memory must be installed in groups of two DIMMs also known as pairs
 - Each pair must consist of equal density DIMMs
 - Memory must be installed in pairs of 512 MB (2×256 MB), 1 GB (2×512 MB), 2 GB (2×1 GB), or 4 GB (2×2 GB). To support chip sparing, identically sized DIMMs must be loaded in quads.
 - Minimum memory is 512 MB (2×256 MB)
 - Maximum memory is 16 GB (8×2 GB)
 - Each pair of memory is loaded across both memory buses (one DIMMs on each bus) to ensure maximum bandwidth and performance
 - Total memory bandwidth is 8.5 GB/s, split across two 4.25 GB/s memory buses
 - Open page memory latency is 80 nanoseconds

Supported Memory Options

Description	Product Number
512-MB DDR-SDRAM memory pair (2 x 256MB DIMMs)	AB221A
1-GB DDR-SDRAM memory pair (2 x 512MB DIMMs)	AB222A
2-GB DDR-SDRAM memory pair (2 x 1GB DIMMs)	AB223A
4-GB DDR-SDRAM memory pair (2 x 2GB DIMMs)	AB224A

Racking Configurations The HP Integrity rx1600 is customer installable in HP or third party cabinets. The racking hardware includes slider rails, enabling the server to easily slide out of a cabinet for servicing, and an optional cable management arm that protects and organizes the external interface cables. The rails have adjustable mounting hardware, enabling the server to mount in many non HP cabinets.

HP Cabinets The HP Integrity rx1600 was designed for and has been tested in HP Rack System/E series cabinets and HP Universal Rack G2 cabinets.. The capacity of servers in the 10000 series rack is equal to the number of EIA units. To support the maximum number of servers in a cabinet, power from an adjacent cabinet PDU or wall outlet is required. HP cabinets are the best option for customers who want to ensure that their rack environment offers the utmost in safety, ease of service, and HP field support. The rack kit is included with the server base system.

Configuration

Non-HP Cabinets

For customers who choose to use non HP cabinets, the HP Integrity rx1600 provides simple options for installation and HP field support. The HP Integrity rx1600 field rack kit (AB276A) contains adjustable slide rails, allowing the server to be mounted in cabinets that use the four post EIA mounting system. The rack kit is included with the server base system.

Once the server is mounted in a non HP cabinet, it must meet some simple criteria to ensure that HP field personnel can fully support the rack environment.

- **Anti Tip** – The rack/cabinet must be solidly anchored to the floor both front and rear. This is usually accomplished by anti tip feet or by direct bolting to the floor.
- **Air Flow** – The HP Integrity rx1600 uses front to back airflow to cool the unit. Thus a cabinet cannot have a solid front or rear door. Solid doors may have to be removed or changed to an open perforation pattern.
- **Cable Strain Relief** – A proper method of strain relief must be used. This may force the elimination of the rear door in some cases.
- **Front and Rear Access** – For proper cooling and ease of service access, HP recommends 32 inches of unobstructed floor space in the front and rear of rack installations. This recommendation applies to both HP and third party racks and cabinets.

I/O Architecture

The HP Integrity rx1600 I/O architecture utilizes industry standard PCI X and PCI buses in a unique design for maximum performance, scalability and reliability.

The HP Integrity rx1600 architecture uses seven high speed I/O channels. Each channel provides 0.5 GB/s of sustained I/O throughput. The diagram above shows how these channels allocate bandwidth to the open PCI X slots and to the integrated core I/O.

The two open PCI X slots each have their own dedicated 64 bit 133 MHz PCI X bus and their own independent I/O channel or channels. The independent channels provide improved I/O 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.

Both PCI X slots have two dedicated I/O channels, resulting in sustained PCI X bandwidth of 1.0 GB/s for each slot.

All I/O slots are keyed to support 3.3V and universal PCI cards. 5V cards are not supported in the HP Integrity rx1600.

The remaining three I/O channels are allocated to the integrated core I/O, which is described in the **Chapter 2** of this guide.

	Number of Slots	Bandwidth Per Slot	Bus Width	Bus Speed	Slot Keying
Dedicated 1 GB/s	2	1.0 GB/s	64 bits	133 MHz, 66 MHz or 33 MHz	3.3 Volts

Supported I/O Cards

I/O Card	Product Number	Full or Half Slot ¹ /Boot Support	Connector Type(s)	Operating Systems ²	Max Cards / Max Ports
Mass Storage Host Bus Adapters					
PCI 2 Gb/s Fibre Channel	A6795A	Half / Yes	LC	HP-UX	2 / 2
PCI 1 channel U160 SCSI	A6828A	Full / Yes	VHDCI	HP-UX	1 / 1
PCI 2 channel U160 SCSI	A6829A	Full / Yes	VHDCI	HP-UX	1 / 2
PCI Windows and Linux Ultra160 SCSI	A7059A	Full / Yes	VHDCI	Linux	1 / 1

Configuration

PCI Windows Linux 2 port Ultra160 SCSI	A7060A	Full / Yes	VHDCI	Linux	1 / 2
PCI 2 channel Ultra320 SCSI	A7173A	Half / Yes	VHDCI	HP-UX OpenVMS ²	2 / 4
PCI-X 2 channel Smart Array 6402 U320	A9890A	Full / Yes	VHDCI	HP-UX, Linux OpenVMS ²	1 / 2
PCI-X 4 channel Smart Array 6404 U320	A9891A	Full / Yes	VHDCI	HP-UX OpenVMS	1 / 4
PCI X 2 channel 2 Gb /sFibre Channel	A6826A	Half / Yes	LC	HP-UX OpenVMS	2 / 4
Local Area Network Interface Cards					
PCI 1 port 1000Base T (gigabit copper)	A6825A	Half / No	RJ 45	HP-UX OpenVMS	2/2
PCI 1 port 1000Base SX (gigabit fiber)	A6847A	Half / No	Duplex SC	HP-UX OpenVMS	2/2
PCI 1 port 10/100Base TX	A5230A	Half / No	RJ 45	HP-UX OpenVMS	2/2
PCI X 2 port 1000Base T	A7012A	Half / No	RJ 45	HP-UX OpenVMS	2/4
PCI X 2 port 1000Base SX	A7011A	Half / No	Duplex SC	HP-UX OpenVMS	2/4
PCI 4 port 100Base TX	A5506B	Half / No	RJ 45	HP-UX, Linux OpenVMS	2/8
PCI 1 port 1000Base T	A7061A	Half / No	RJ 45	Linux	2/2
PCI 1 port 1000Base SX	A7073A	Half / No	Duplex SC	Linux	2/2
PCI-X 2 port 4x Fabric (HPC) Adapter ²	AB286A	Full / No	4x Infiniband Copper	HP-UX	1/2
PCI-X 1-port 10-GbE Fiber Adapter	AB287A	Full/Yes	Duplex LC	HP UX	1/1
PCI-X 4-port 1000Base-T 1-GbE Adapter	AB545A	Full/Yes	RJ-45	HP-UX, OpenVMS	1 / 4
PCI-X 2-port 4X Fabric (HA and DB) Adapter	AB345A	Half/No	4x Infiniband Copper	HP-UX	2 / 4
Multi-Function Cards (Mass Storage/LAN)					
PCI 2 port 100Base T/2 port Ultra2 SCSI	A5838A	Full / No	VHDCI/RJ 45	HP-UX	1/4
PCI X 2 Gb Fibre Channel/1000Base SX	A9782A	Half/Yes	LC	HP UX, OpenVMS	2/4
PCI X 2 Gb Fibre Channel/1000Base TX	A9784A	Half/Yes	1 LC, 1 RJ 45	HP UX, OpenVMS	2/4
PCI-X 2-port 2-Gb Fibre Channel/2-port 1-Gb Ethernet Adapter	AB465A	Full/Yes	2 RJ-45	HP-UX	1/2
PCI-X 2-port 1000BT and 2-port U320 SCSI Multifunction adapter	AB290A	Full/Yes	SCSI-LVD/SE	HP-UX, OpenVMS	1/4
Wide Area Network Interface Cards					
2 port Programmable Serial Interface (PSI) X.25 / Frame Relay / SDLC	J3525A	Half / No	RS 530, RS 232, V.35, RS 449 or X.21	H	2 / 4
Additional Interface Cards					
PCI HyperFabric 2 Fibre	A6386A	No / No	LC Duplex	H	2 / 2

Configuration

PCI 2D/3D Graphics	AB551A	Full/No	VGA	OpenVMS HP-UX	1/1
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¹ One of the two I/O slots is full length, while one slot will accommodate cards up to 7.5 inches in length.

² Support with V8.2-1 in Q3 Calendar Year 2005.

Supported Internal Storage Devices

Device	Product Number
Internal Disk Drives (Optional – Maximum 2)	
36GB 15K RPM Ultra320 SCSI Low Profile Hot Plug Disk	AB420A
72GB 15K RPM Ultra320 SCSI Low Profile Hot Plug Disk	AB421A
146GB 10K RPM Ultra320 SCSI Low Profile Hot Plug Disk	AB422A
300-GB 10K RPM Ultra320 SCSI Low Profile Hot Plug Disk	AB423A
Removeable Media Drives (Optional – Maximum 1)	
DVD ROM Drive, Slimline (required for OpenVMS and Windows orders)	AB299B
DVD+RW Drive, Slimline	AB350B

Integrated Multi-function Core I/O The integrated multi-function I/O provides core I/O functionality and includes the optional management processor, which provides remote management and high availability monitoring capabilities.

Core I/O

- 10/100/1000Base T LAN with RJ 45 connector-Supports LAN boot for operating system installation
- 10/100Base T LAN with RJ 45 connector and wake on LAN capabilities
- Two-channel Ultra320 SCSI external port with 68-pin high-density connector and one internal port for integrated disks
- Two USB 2.0 style A ports (USB 1.1 compatible)
- One general purpose serial port with DB-15 connector
- Telnet and web console via 10/100Base TX management LAN (RJ45 connector) requires Management Processor Card.

Optional Management Processor Functionality

NOTE: Requires the Management Processor Card

- Dedicated 10/100Base-T LAN port for LAN console and embedded web console access
- DB-25 serial port – multiplexed (using W cable) into three RS-232 ports: local ASCII console, remote/modem console, and general purpose
- 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
- The Management Processor Card provides basic graphic capabilities via integrated Radeon 7000 2D graphics chip with 16 MB of memory. VGA port is provided on rear of the system. Supported resolutions and refresh rates include:

Configuration

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
OpenVMS	640x480	60 Hz	1920x1200	75 Hz

System Console Configurations

The HP Integrity rx1600's Management Processor provides five 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 is available with purchase of the optional Enhanced Manageability Card, which is supported on Linux and HP UX

Internal Disk and Media Drives

- The HP Integrity rx1600 supports up to two internal low profile hot plug Ultra320 SCSI disk drives.
- A dual channel U320 SCSI channel provides one internal channel for connection to up to two internal disks, and one channel for connection to external disks.
- 36 GB 10K, 73 GB 15K, 146 GB and 300-GB 10K hot plug Ultra320 SCSI disks are supported. Optional optical media drives include a DVD ROM (AB299A), CD RW/DVD ROM combo drive (AB298A), and DVD+RW (AB350A).
- Factory configured RAID 1 array on internal disks is supported on the IPF servers. Refer to the following URL for details on servers, Smart Array cards, and operating systems supported.

http://www.docs.hp.com/en/RAID_SM-20050125/CombinedRaidsupportMatrix.html

HP Integrity rx1600 Power Subsystem

The HP Integrity rx1600 provides a high level of integrated power protection.

- Wide ranging input voltage VIN = 100V - 127V & 200V - 240V
- Input line THD < 10%
- Power Factor designed to 0.98 @ 120VAC and 0.92 @ 240VAC
- 80% Efficiency
- Power monitoring and control
- Brownout protection
- Over Current Protection
- Over Voltage Protection
- Over temperature protection

Technical Specifications

Server model number	rx1600		
	<p>NOTE: Two power cords are shipped with each system; one that connects the system to the rack PDU and one that enables direct connection to the wall socket. Localized cords are provided by the regional distribution site.</p>		
Server product numbers	Configurable server and one low voltage 1.0 GHz/1.5 MB processor with one core, 512 MB RAM (2×256MB), 36 GB 10k rpm disk, factory rack kit		AB218A
	Configurable server and two low voltage 1.0 GHz/1.5 MB processor with one core, 2 GB RAM (2×1GB), 73 GB 15k rpm disk, factory rack kit		AB219A
	Base server and one low voltage 1.0 GHz/1.5 MB processor with one core		A9901A
	<p>NOTE: Two power cords are shipped with each system; one that connects the system to the rack PDU and one that enables direct connection to the wall socket. Localized cords are provided by the regional distribution site.</p>		
	Number of Processors		1-2
Supported Processors	1.0-GHz Low-voltage Itanium 2 processor	Cache Floating Point Coprocessor included	1.5 MB Yes
System Memory	Minimum memory	512 MB	
	Maximum memory capacity	16 GB	
Internal Disks	Max. disk mechanisms	2	
	Max. disk capacity	600 GB	
Standard Integrated I/O	Ultra320 SCSI-LVD	2 Channels	
	10/100/1000Base-T (RJ-45 connector)	1 Port	
	10/100Base-T (RJ-45 connector)	1 Port	
	RS-232 serial ports	1	
	10/100Base-T management port (RJ-45 connector)	Optional	
	VGA graphics	Optional	
	USB 2.0	2	

Technical Specifications

I/O Buses and Slots	Total PCI X/PCI Slots; one 2 full length, one shorter length slot (accommodates cards up to 7.5") Both slots are 133-MHz, 64-bit slots on dedicated PCI-X buses
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Maximum Mass Storage Host Bus Adapters (see supported I/O table)	Ultra160 SCSI-LVD 1	
	Dual-port Ultra160 SCSI-LVD	1
	Smart Array Ultra320 SCSI RAID	1
	2-Gb single-port fibre channel	2

Maximum Network Interface Cards (see supported I/O table)	1000Base-SX	2
	1000Base-TX	2
	10/100Base-TX	2
	Dual-port X.25	2
	4-port 10/100 Base-TX	2
	Dual-port GigE-TX	2
	Dual-port GigE-SX	2

Electrical Characteristics	AC Input power	100-240V 50/60 Hz
	Max. input power	500W
	Typical input power	370W
	Max. input current	6A@100Vrms & 3A@200Vrms
	Typical BTU	1165

Site Preparation	Site planning and installation included	No
	Rack depth (in/mm)	26.8 in (680 mm)
	Rack height (in/mm)	3.4 in (86mm)
	Rack width (in/mm)	19 in (482mm)
	Minimum standalone configuration	29 lb (13.2 kg)
	Maximum standalone configuration	31 lb (14.1 kg)
	Minimum rack configuration	31 lb (14.1 kg)
	Maximum rack configuration	33 lb (15.0 kg)

Technical Specifications

Environmental Characteristics	Acoustics (operator/bystander) at 25°C	7.1 Bels LwA
	Operating Temperature (up to 5000 ft) ¹	32° to 95° F (0° to 35° C)
	Non-operating Temperature	-40° to 158° F (-40° to 70° C)
	Maximum rate of temperature change	68° F/hour (20° C/hour) w/disc media
	Operating relative humidity	15% to 80% RH non-condensing
	Non-operating relative humidity	8% to 85% non-condensing
	Operating altitude above sea level	10,000 ft (3000 m) max
	Non-operating altitude above sea level	4,572 m (15000 ft) max

NOTE 1: Max operating temperature range up to 5000 ft (1524 m). For higher altitudes de-rate the max temperature by 2° C/1000 ft above 5000 ft (1524 m).

Regulatory Compliance	Regulatory Model	RSVLA-0302
	Electromagnetic interference	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
	Safety	CSA Certified, IEC 60950-1

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