IBM System x3950 servers feature dual-core Intel Xeon MP processors

Overview
Models of the x3950 server are powered with dual-core Intel® Xeon MP processors at up to 3.00 GHz with 2 x 2 MB L2 cache.

The x3950 server contains advanced technology that combines scalable SMP-capable power, PCI-X expansion, third-generation Enterprise X-Architecture™ (EXA), high availability, scalability, and substantial internal data storage capacity.

Potential benefits include:
• Increased performance
• Memory availability
• System manageability
• Simultaneous support for 32- and 64-bit applications with x86-64-bit extensions

System x3950 E server
Functionally identical to the System x3950 server, the x3950 E server supports the same hardware configurations. However, it is supported only as an expansion module to a base x3950 and not in a stand-alone configuration. It comes configured with two empty four-slot memory expansion cards (41Y5000) and two power supplies, but without any processors, memory, disks, or optical drive.

In addition to processors and memory, the six disk bays and six PCI-X I/O card slots in each chassis are accessible. You can add up to a total of 48 hard disks and 48 I/O slots into a 32-socket configuration, eliminating the need for an external I/O expansion enclosure.

Power and scalability
• XA-64e third-generation EXA chipset powering
  XpandOnDemand up to 32-socket
• x86 64-bit extensions (EM64T) support 32-bit or 64-bit applications on the same platform
• Active Memory with hot-swap support: Memory ProteXion, memory mirroring, hot-swap, and hot-add memory
• Xcel4v Server Accelerator cache for high performance with 256 MB per chassis
• 2 GB of high-speed PC2-3200 double data rate (DDR2) memory; expandable to 512 GB in a 32-socket complex
• Serial Attach SCSI (SAS) plus optional RAID maximize throughput, ease installation of RAID option card
• Six 2.5-inch SAS HDDs, up to 438 GB of maximum internal storage
• High-performance integrated dual Gigabit Ethernet built-in high-speed networking with support for latest technologies
• Remote Supervisor Adapter II Slimline
• 3U rack-optimized, tool-free chassis that strikes the balance between rack density and ease of maintenance

Third-generation EXA features
• Advanced third-generation Chipkill™ ECC memory controller to help correct single-, two-, three-, and four-bit memory errors
• Memory ProteXion and memory mirroring support
• Active PCI slots, hot-add and hot-swap adapters
• Hot-swap drive bays and redundant fans to replace select components without powering down the server
• Two hot-swap, redundant power supplies
• Predictive Failure Analysis® (PFA) on processors, memory, fans, power supply, and HDD options to help warn of problems before they occur
• Innovative Light Path Diagnostics and top access design; easy to service and configure

At a glance
New IBM System x3950 servers incorporate high-performance, dual-core Xeon MP processors:
• Intel dual-core Xeon MP up to 3.00 GHz with 2x2 MB L2 cache
• Up to 512 GB of high-speed PC2-3200 ECC double data rate 2 (DDR2) SDRAM system memory
• Six Active 64-bit/266 MHz Peripheral Component Interconnect-X (PCI-X 2.0) slots
• Serial Attached SCSI (SAS) controller
• Integrated Broadcom 5704 Dual-port 10/100/1000 Gigabit Ethernet
• Six 2.5 inch hot-swap bays for flexible installation of HDDs, supporting up to 440.4 GB internal data storage
• Standard Remote Supervisor Adapter II Slimline, enabling remote, full-band systems management
• Two 1300-watt, voltage sensing, hot-swap power supplies
• Standard DVD-ROM
• Three USB ports, SVGA video port, mouse port, two serial ports, two Gb Ethernet ports, and one keyboard port per chassis
• Three-year on-site² limited warranty³

Product number
For details, refer to the Product number section in this announcement.

Planned availability date
May 10, 2006

Key prerequisites
Refer to the Hardware requirements section for details.

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AP distribution

To all Asia Pacific countries for release.

Country/Region Announced
Asean  * Yes
Australia Yes
Hong Kong Yes
PRC Yes
Macao Yes
Taiwan Yes
Korea Yes
Japan Yes
New Zealand Yes

* Bangladesh, Brunei, Myanmar, Sri Lanka, India, Nepal, Indonesia, Malaysia, Philippines, Singapore, Thailand, Laos, Cambodia, Vietnam

Description

Related options

Intel Xeon Processor 7020 2.67Ghz 667MHz 2x1MB L2 Cache Dual Core Processor Upgrade (40K2522) supports internal processing speeds of 2.67 GHz and external processing operations to memory at 667 MHz. It contains an integrated, full-speed, 2x1 MB level 2 cache.

Intel Xeon Processor 7040 3.00 Ghz 667MHz 2x2MB L2 Cache Dual Core Processor Upgrade (40K2523) supports internal processing speeds of 3.00 GHz and external processing operations to memory at 667 MHz. It contains an integrated, full-speed, 2x2 MB level 2 cache.

These processor options support up to 32-socket (64-cores), SMP applications in the x3950. A VRM, and heatsink, specifically designed to support this, is included.

IBM System x3950 Scalability Enablement/Memory Adapter (41Y5004)

This adapter enables a scalable configuration of System x3950 and x3950 E nodes to be run in configurations of 16 sockets or more. One adapter is required for each node that is part of the scalable configuration.

In addition to delivering scalability support, this adapter supports four memory DIMMs. It can be used in place of one of the standard four-slot memory adapters.

Dual Core X3 Upgrade Kit (41Y5005)

This option kit includes the components necessary to upgrade System x3950 and x3950 E systems that currently have single-core Intel Xeon MP processors installed to support the newer dual-core, Intel Xeon MP processors. Processors are not part of the kit and must be purchased separately.

ServeRAID™ 8i SAS RAID Controller (39R8729) performs with Serial Attached SCSI (SAS) RAID technology. The ServeRAID 8i is a Zero Channel RAID (ZCR) controller designed to manage your internal data storage in selected servers. The ServeRAID 8i controller achieves higher performance and up to 10 times higher transfer rates at up to 3 GB per second than its Ultra320 SCSI predecessors for a nominal increase in price.

The half-length adapter runs on a dedicated system’s PCI-X 64-bit ZCR slot at speeds up to 133 MHz. With the onboard 256 MB memory and 600 MHz Intel processor, the ServeRAID 8i takes RAID processing workload and offloads it directly to the controller. This allows your CPU ample bandwidth to perform the application processing required.

The ServeRAID 8i SAS RAID controller offers:
- RAID levels 0, 1, 10, 5, 6, 50, IBM exclusive 1E, and 5E
- Cache size of 256 MB battery-backed, low-power DDR memory for protection of valuable data
- RAID-6 for double parity checking for added data redundancy
- Expansion of existing arrays through online capacity expansion
- Performance at up to 3 GB per second of throughput
- Independent and adjustable stripe unit sizes from 16 KB up to 512 KB and default to 64 KB configurable per logical drive
- BIOS and firmware updates under supported operating system
- Additional ServeRAID features such as Logical Drive Migration, Global Hot Spare, Copyback, and FlashCopy® to manage your storage drives
- Rebuild and Rapid Restore™ features to preserve RAID configurations
- ServeRAID Manager software application for managing the SAS RAID array configurations
- Performance measured at 6 SFF drives 16K OLTP:850 10/sec

2 GB (2 x 1 GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM (39M5809) contains two 1 GB DIMMs.

4 GB (2 x 2 GB Kit) PC2-3200 CL3x4 ECC DDR2 SDRAM RDIMM (39M5812) contains two 2 GB DIMMs.

8 GB (2 x 4 GB Kit) PC2-3200 CL3x4 ECC DDR2 SDRAM RDIMM (30R5145) contains two 4 GB DIMMs.

These high-speed, DDR2 registered DIMMs are synchronized to the processor. Once addressed, data can be transferred on both edges of the clock signal. This significantly improves performance of the 667 MHz front-side bus Xeon MP processor. The memory bus transfers data at up to 5.3 GB per second.

Memory upgrade card (41Y5000) allows you to upgrade your machine with up to four memory expansion cards. System memory can be expanded to 512 GB by adding two memory expansion card options and a 4 GB PC2-3200 ECC DDR-2 SDRAM RDIMM in each of the four DIMM sockets.

Scalability cables
- 2.3 m Scalability cable (13M7414)
- 2.9 m Scalability cable (13M7416)

The two cables are functionally identical; they differ only in length.

IBM Director CD with 20 agent license proofs of entitlement includes support for the System x3950 server.
**System x3950 server description**

**Standard System x3950 model configurations**

<table>
<thead>
<tr>
<th>Models</th>
<th>Processor</th>
<th>L2 Cache</th>
<th>Memory</th>
<th>HDDs</th>
<th>Power supply</th>
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<tr>
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</table>

**High-performance server subsystems:** x3950 servers are high-throughput, scalable SMP-compatible dual-core Xeon-based network servers. They deliver excellent scalability for adding memory, adapter cards, or multiple processors.

These models are equipped with powerful dual-core Xeon MP processors up to 3.00 GHz and 2x2 MB L2 cache that uses 64-byte cache lines. EMT64T architecture supports 64-bit extensions. Four connectors for Xeon MP processors are standard on the system board. High-speed PC2-3200 ECC SDRAM provides excellent processor-to-memory subsystem performance.

The x3950 system architecture is fine tuned and engineered to optimize the powerful Xeon MP processors. This architecture consists of the following components:

- Dual-core Xeon MP processors
- Third-generation EXA-64e chipset
- System memory card
- PCI-X 2.0 host-bridge controller

These Xeon MP processors use 667 MHz common clock speed for external operations. They support 667 MHz data buses to the memory controller. This allows up to 5.3 GB per second data transfers between memory and the processor.

The MIOC supports:

- Data flow between the processor and memory, and to the PCI-X 2.0 host-bridge controller
- Chipkill ECC memory function

The two PCI-X 2.0 host-bridge controllers reside between the PCI buses and memory controller.

**High-availability and serviceability features:** Many enterprise on demand environments run around the clock to supply information around the globe. These environments require ruggedly dependable servers designed with features that can tolerate a component failure without total shutdown. x3950 servers pack numerous fault-tolerant and high-availability features into a high-density, rack-optimized package that helps significantly reduce the space needed to support massive network computing operations.

Features include:

- Active PCI-X 2.0 slots: hot-add and hot-swap adapters in Windows™, Linux™, and NetWare environments
- Six Serial Attach SCSI (SAS) HDD bays
- ECC DIMMs combined with an integrated advanced ECC memory controller with third-generation Chipkill support to correct many single-, two-, three-, and four-bit memory errors to minimize disruption of service to LAN clients
- Memory ProteXion and memory mirroring hot-add and hot-swap memory support
- Memory hardware scrubbing to correct many soft memory errors automatically without software intervention
- ECC L3 cache processors to improve data integrity and help reduce downtime
- PFA on HDD options, memory, processors, power supply, and fans in conjunction with IBM Director to help alert the system administrator of an imminent component failure
- Two 1300-watt power supplies that support typical configuration redundancy or full configurations requiring redundancy
- Eight, hot-swap, multispeed fans to provide cooling redundancy and enable individual fan replacement without powering down the server
- Standard Remote Supervisor Adapter II Slimline enabling diagnostic, reset, POST, and auto recovery functions from remote locations and monitoring of temperature, voltage, and fan speed; alerts generated when thresholds are exceeded without utilizing an IO slot
- Information LED panel, diagnostics LED panel, and component LEDs for visual indications of system well-being
- Light Path Diagnostics for an outside view of the potential problem without removing the cover to reduce downtime and service costs
- Easy top access to system board, adapter cards, power supplies, and memory
- CPU failure recovery in SMP configurations, allowing a failed processor to be forced offline, the server rebooted, an alert generated, and operation continued with the working processor

**XpandOnDemand scalability:** The x3950 servers are designed for complex applications. They feature XpandOnDemand scalability from third-generation EXA technology for future growth potential.

The servers include:

- Massive I/O expansion options supporting up to 48 PCI/PCI-X card slots with eight scaled chassis
- Up to 32-sockets (64-cores) SMP operations with powerful dual-core Xeon MP processors
- 2 GB high-speed PC2-3200 DDR2 ECC memory standard, supporting up to 512 GB of system memory
- Two worldwide, voltage-sensing 1300-watt, hot-swap power supplies with auto restart are standard
- Six hot-swap drive bays, supporting up to 440 GB of internal data storage (using six 73.4 GB SAS Hot-Swap HDDs)
- Terabytes of external data storage supporting optional EXP400 storage units, ServeRAID SCSI controllers, and Fibre Channel controllers and storage units

**Configurations**

**XpandOnDemand scalability**

Modular building-block scalability eliminates the need for upgrades and provides an easier growth path to larger, scale-up, high-performance SMP configurations.

- x3950 server two-socket to four-socket single chassis, up to 64 GB memory
• x3950 server plus one x3950 E system; two chassis 8-sockets, up to 128 GB memory
• x3950 server plus three x3950 E systems; four chassis 16-sockets, up to 256 GB memory
• x3950 server plus seven x3950 E systems; eight chassis 32-sockets, up to 512 GB memory

Note: An x3950 E system is not required for system scalability. Either x3950 server or x3950 E servers can be used interchangeably for system scaling. The only requirement is that an x3950 server is used as the primary boot node.

Scalable Partition Web Interface
The Scalable Partition Web Interface, an extension of the Remote Supervisor Adapter II (RSA II) Slimline Web interface, is used to create, delete, control, and view scalable partitions. This Web interface is in the RSA II Slimline service processor.

The scalable partition defines a multinode configuration that interconnects 2, 4, or 8 servers for up to 32-way operation. With this configuration you can individually power on and power off each node. The multinode configuration uses a single, contiguous memory space and provides access to all associated adapters. Each multinode configuration can have one or more scalable partitions.

• Two chassis
  - x3950 server plus x3950 E system: single 8-socket configuration
  - x3950 server plus x3950 system: single 8-socket or two partitioned 4-socket servers
  - Two 2.3 m scalability cables

• Four chassis
  - x3950 server plus three x3950 E servers: Single 16-socket configuration
  - Two x3950 servers plus two x3950 E servers: single 16-socket or two partitioned 8-socket configurations
  - Four x3950 servers: single 16-socket, two partitioned 8-socket or four partitioned 4-socket servers
  - Six 2.3 m scalability cables

• Eight chassis
  - x3950 server plus seven x3950 E servers: single 32-socket configuration
  - Any combination of System x3950 and x3950 E server chassis that when combined results in a supported 4-socket, 8-socket, or 16-socket combination and that has a System x3950 servers as the bootable node (x3950 E not supported as a bootable node for any partition size)
  - Eight 2.3 m scalability cables and four 2.9 m scalability cables

Systems management: x3950 servers feature IBM Director, a powerful, highly integrated, systems-management software solution built on industry standards and designed for ease of use.

With IBM Director, a network administrator can perform the following tasks:

• View the hardware configuration of remote systems in detail

• Monitor the usage and performance of critical components such as microprocessors, disks, and memory

• Centrally manage individual or large groups of IBM and non-IBM, Intel-based servers, desktop computers, workstations, and mobile computers on a variety of platforms

IBM Director provides a comprehensive entry-level workgroup hardware manager. It includes the following key features:

• Advanced self-management capabilities for maximum system availability.

• Support for multiple operating systems, including Microsoft Windows 2000 Server, Windows XP Professional, Red Hat Linux, SUSE Linux, and Novell NetWare. For a complete list of operating systems that support IBM Director, visit


  The list is updated periodically.

• Support for IBM and non-IBM servers, desktop computers, workstations, and mobile computers.

• Support for systems-management industry standards.

• Integration into leading workgroup and enterprise systems-management environments.

• Ease of use, training, and setup.

IBM Director also provides an extensible platform that supports advanced server tools that are designed to help reduce the total cost of managing and supporting networked systems. By deploying IBM Director, you may achieve reductions in ownership costs through the following potential benefits:

• Reduced downtime
• Increased productivity of IT personnel and users
• Reduced service and support costs

For more information about IBM Director, refer to the CD that comes with the server, the IBM Director documentation on the CD, or visit


IBM Director includes IBM Director Extensions, a portfolio of server tools that integrates into the IBM Director interface and works with the Remote Supervisor Adapter II Slimline, or other systems-management monitoring functions contained in System x3950 servers. Typical functions and monitoring capabilities can include:

• PFA-enabled critical hardware components
• Temperature
• Voltage
• Fan speed
• Light Path Diagnostics

The IT administrator gains comprehensive, virtual on-site control of System x3950 servers through the ability to remotely:

• Access the server in many cases regardless of its status
• Inventory and display detailed system and component information
• View server bootup during POST
• Browse and delete logs of events and errors
• Reset or power cycle the server
• Run diagnostics, SCSI, and RAID setup during POST
• Monitor thresholds on server health including:
  - Operating system load
  - POST time-out
  - Voltage
  - Temperature
• Set proactive alerts for critical server events including PFA on
  - Processors
  - Memory
  - Fans
  - Power supplies
  - HDDs
• Define automated actions such as:
  - Send an e-mail or page to an administrator
  - Execute a command or program
  - Pop up an error message to the IBM Director console
• Flash BIOS
• Monitor and graph the utilization of server resources such as:
  - Memory
  - Processor
  - HDDs
• Identify potential performance bottlenecks and react to prevent downtime
• Monitor, manage, and configure RAID subsystems without taking them offline

IBM Director Agent provides integration into leading workgroup and enterprise system management environments, viaUpward Integration Modules. This enables the advanced management capabilities built into System x3950 servers to be accessed from:
• Tivoli® Enterprise and Tivoli NetView®
• Computer Associates Unicenter TNG
• HP OpenView
• Microsoft SMS
• BMC Patrol
• NetIQ

World-class support tools and programs: x3950 servers include tools and programs designed to make ownership a positive experience. From the start, IBM programs help you purchase servers, get them running, and keep them running. IBM can help your company maintain ownership of technology leadership network servers.

• IBM on-site, three-year limited warranty with next-business-day service (same-business-day service optionally available) protects your investment if a problem occurs. This service also includes replacement of parts identified through PFA.
• The ServerProven® program lets you confidently configure your server with various devices and operating systems. This Web-based program provides compatibility information from actual testing of the x3950 server with various adapters and devices.
• The ServerGuide™ CD library includes online publications and utilities and drivers that help you load popular network operating systems.
• Electronic support on the Web offers additional support in an easy-to-use format.

<table>
<thead>
<tr>
<th>System number</th>
<th>Processor</th>
<th>L2 Cache</th>
<th>Memory</th>
<th>HDDs</th>
<th>Power supply</th>
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<tr>
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<td>Xeon 7020</td>
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<td>8874</td>
<td>Open</td>
<td>2xMemory</td>
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</table>

Standard x3950 Configurations

Product positioning

These new System x3950 models enhance the server line by providing new levels of performance and price/performance. The System x3950 server features a high-density, 3 U mechanical platform that supports dual-core Xeon MP processors, PCI-X 2.0 architecture, and high-speed DDR2 memory.

System x3950 servers deliver additional processing, expandability, and high-availability features over that of the System x3850 server. These features make them ideal for handling complex, business-critical On Demand Business applications that must be supported by space-saving, rack-optimized servers.

System x3950 server is designed for extremely complex, compute-intensive applications requiring eight-socket plus processing power and large memory support.

The System x3950 servers provide excellent scalable processing capability with models supporting dual-core Intel Xeon Processor 7020 at 2.67 GHz and 2x1 MB level 2 cache and dual-core Intel Xeon Processor 7040 at 3.00 GHz and 2x2 MB level 2 cache, high-speed memory and PCI-X 2.0 bus architecture. This makes the System x3950 servers an excellent fit for today and future enterprise on demand applications.

These high-density, Xeon-based servers are designed to handle complex applications requiring high-speed computing power, advanced high-availability functions, and a minimum amount of rack space.

Applications include:
• On Demand Business
• Business intelligence
• Transaction processing
• ERP
• Collaboration applications (Microsoft Exchange and Lotus Notes®)
• Server consolidation
• Internet or intranet front-end serving
• Web content serving
• Database storage as a SAN solution

Product number

GAV Models

Bangladesh, Brunei, Cambodia, Hong Kong, Myanmar, Indonesia, Laos, Malaysia, Myanmar(Burma), Philippines, Singapore, Sri Lanka, Thailand, Taiwan, Vietnam — (English)

<table>
<thead>
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<th>IBM System x3950</th>
<th>8872</th>
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<td>8RA</td>
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<td>IBM System x3950 E</td>
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<td>3RA</td>
<td>88743RA</td>
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Hong Kong
IBM System x3950
**Reference information**

1. When referring to hard drive or tape backup capacity, GB stands for one billion bytes. Total user capacity may vary depending on operating environments.
2. IBM sends a technician after attempting to diagnose and resolve the problem remotely.
3. For information on the IBM Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request. For the latest information on safe and effective computing, visit [http://www.ibm.com/pc/safecomputing/](http://www.ibm.com/pc/safecomputing/)
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<td>Intel Xeon Processor 7020 -- Upgrade</td>
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<td>Intel Xeon Processor 7040 -- Upgrade</td>
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<td>3.00GHz 66MHz 2x2MB L2 Cache Dual Core Processor</td>
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**Non-GAV Models**

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**Taiwan**

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**Non-GAV Models**

**Japan**

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**India, Nepal, Sri Lanka**

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</tr>
<tr>
<td>IBM System x3950 E</td>
<td>8874 3RQ</td>
<td>88743RQ</td>
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**xxA** = Bangladesh, Brunei, Cambodia, Hong Kong, Myanmar, India, Indonesia, Laos, Malaysia, Myanmar(Burma), Philippines, Singapore, Sri Lanka, Thailand, Taiwan, Vietnam (English)
**xxB** = Hong Kong (Trad Chinese)
**xxK** = Korea (Korean)
**xxR** = Korea (English)
**xxM** = Australia, New Zealand (English)
**xxV** = Taiwan, (Trad Chinese)
**xxQ** = India, Nepal, Sri Lanka (English)
**xxJ** = Japan (Japanese)
**xxE** = Japan (English)
**xxD** = PRC (Trad Chinese)
**xxC** = PRC (Simple Chinese)
**xxN** = PRC (English)
Discretionary information

Memory ProteXion — Redundant bit steering
- Utilizes unused bits in each memory DIMM (hot-spare bits)
- Doubles the amount of Chipkill™ memory sustainable per server
- Included at no additional cost, requires no additional hardware, and works independently of operating system
- Similar to the “hot-spare” of a DASD array

Memory mirroring
- Propels Intel®-based servers towards continuous operations
- Dramatically helps to increases uptime and allows scheduled maintenance
- Provides mainframe capability and reliability
- Operating system independent; does not require drivers or operating system support

Chipkill memory
- Integrated XA-64e chipsets for using off-the-shelf DIMMs
- Better memory reliability to support in-memory databases
- Increased availability by detecting and helping to correct single-, two-, three-, and four-bit memory errors
- Third-generation Chipkill design

Publications

The following publications and CD-ROMs are shipped with the x3950 servers.

- The x3950 Installation Guide contains an introduction to the computer, installation and setup, installing options, reference information, and problem determination. The installation guide has easy-to-use text and illustrations to enable you to quickly set up your x3950 server.
- The ServerGuide™ contains online publications and drivers to support the x3950 server. In addition, it includes a set of easy-to-use utilities on CD to help you install several popular network operating systems.
- IBM Director systems-management software is included.

Note: Software versions, features, and functions shipped with these systems may change as new releases become available or may be discontinued at any time.

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

http://www.ibm.com/services/

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

http://www.ibm.com/services/continuity

For details on education offerings related to specific products, visit


Select your country, and then select the product as the category.

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.
### Physical specifications

<table>
<thead>
<tr>
<th></th>
<th>88727Rx</th>
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<tbody>
<tr>
<td>Processor</td>
<td>Xeon 7020</td>
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<td>Number standard</td>
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<tr>
<td>Maximum</td>
<td>4</td>
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</tr>
<tr>
<td>L2 cache/core (full speed)</td>
<td>1 MB</td>
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</tr>
<tr>
<td>L2 cache total</td>
<td>2 MB</td>
<td>4 MB</td>
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<tr>
<td>Memory (PC2-3200 DDR2)</td>
<td>2 GB ECC</td>
<td>2 GB ECC</td>
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<tr>
<td>DIMMs</td>
<td>2 x 1 GB</td>
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<tr>
<td>DIMMs sockets</td>
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<tr>
<td>Capacity</td>
<td>64 GB(6)</td>
<td>64 GB(6)</td>
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<td>Memory Expansion Card</td>
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<td>Video</td>
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<td>Memory</td>
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<td>16 MB</td>
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<td>SAS SCSI controller</td>
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<td>Ports</td>
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<td>Connector internal</td>
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<td>Connector external</td>
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<td>HDD</td>
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<tr>
<td>Total bays</td>
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<td>7</td>
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<tr>
<td>5.25-inch slim</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.5-inch slim</td>
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<td>0</td>
</tr>
<tr>
<td>Hot-swap</td>
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<td>6</td>
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<tr>
<td>Accessible</td>
<td>7</td>
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</tr>
<tr>
<td>Internal capacity</td>
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<td>440.4 GB(7)</td>
</tr>
<tr>
<td>Bays available</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5.25-inch slim</td>
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<tr>
<td>3.5-inch slim</td>
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<td>0</td>
</tr>
<tr>
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<td>PCI-X slots</td>
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<td>Management processor</td>
<td>BMC</td>
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<tr>
<td></td>
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<td>ServeRAID(TM) B1</td>
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<tr>
<td>Dual Ethernet</td>
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<td>CD-ROM / DVD</td>
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<td>2</td>
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<td>Hot-swap</td>
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<td>Yes</td>
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<tr>
<td>Redundant power</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Auto restart</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(5) Number of sockets is based on installation of the four memory expansion cards (41Y5000).

(6) Capacities are based on installation of the four memory expansion cards (41Y5000) and 4 x 4 GB DIMMs installed in each card (when support is available).

(7) Capacities are based on installation of six 73.4 GB 2.5-in SAS HDDs. For the latest information on supported HDD options, visit [http://www.ibm.com/servers/eserver/serverproven/compat/us/](http://www.ibm.com/servers/eserver/serverproven/compat/us/)

Supported video mode capabilities for the SVGA PCI controller:

Microsoft™ Windows™ 2000 and Windows 2003

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Colors</th>
<th>Refresh Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>640 x 480 x 8</td>
<td>256</td>
<td>60, 72, 75, 85</td>
</tr>
<tr>
<td>640 x 480 x 16</td>
<td>64K</td>
<td>60, 72, 75, 85</td>
</tr>
<tr>
<td>640 x 480 x 32</td>
<td>16 million</td>
<td>60, 72, 75, 85</td>
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<tr>
<td>800 x 600 x 8</td>
<td>256</td>
<td>60, 72, 75, 85</td>
</tr>
<tr>
<td>800 x 600 x 16</td>
<td>64K</td>
<td>60, 72, 75, 85</td>
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<tr>
<td>800 x 600 x 32</td>
<td>16 million</td>
<td>60, 72, 75, 85</td>
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<tr>
<td>1024 x 768 x 8</td>
<td>256</td>
<td>60, 70, 75, 85</td>
</tr>
<tr>
<td>1024 x 768 x 16</td>
<td>64K</td>
<td>60, 70, 75, 85</td>
</tr>
<tr>
<td>1024 x 768 x 32</td>
<td>16 million</td>
<td>60, 70, 75, 85</td>
</tr>
</tbody>
</table>
Dimensions

3 U rack drawer
- Width: 440 mm (17.32 in)
- Depth: 715 mm (28.15 in)
- Height: 128.35 mm (5.05 in)
- Minimum configuration: 31.75 kg (70 lb)
- Maximum configuration: 38.5 kg (85 lb)

Electrical
- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 8.5 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 8.5 A
- Input kilovolt-amperes (kVA) (approximately)
  - Minimum configuration: 0.388 kVA (two power supplies)
  - Maximum configuration: 1.524 kVA (two power supplies)
- Btu output
  - Ship configuration: 1,325 Btu/hr (388 watts)
  - Full configuration: 5,200 Btu/hr (1524 watts)
- Noise level horizontal position: 6.6 bels

Note: The noise emission level stated is the declared (upper limit) sound power level, in bels, for a random sample of machines. All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.

Japan Energy Saving Standard

MACHINE
TYPE/MODEL 8872-7Rx 8872-8Rx
CATEGORY B B
POWER™
CONSUMPTION (WATTS) 393.0 388.0
CTP (MTOPS) 39862 44958
ENERGY
CONSUMPTION EFFICIENCY 0.010 0.009
Input (Hz) Frequency 60 60

x3950 configuration idling with Windows 2000

8872-7Rx
- CPU: 2 CPU -- Xeon
- PSU: 2 standard
- DVD-ROM: 1 standard
- RAM Memory: 16 x 2 GB DIMMs

872-8Rx
- CPU: 2 CPU -- Xeon
- PSU: 2 standard
- DVD-ROM: 1 standard
- RAM Memory: 16 x 2 GB DIMMs

x3950 servers are intended for use as rack-drawer servers and are tested and designed to operate in a horizontal position.

Standards

These systems support or comply with the following standards:
- Multiprocessor Specification (MPS) 1.4
- Hardware-enabled to meet ISO 9241, Part 3
In addition to the above standards, they are compatible with the PCI-X specification 2.0.

Equipment approvals and safety

- Japan VCCI, Class A
- IEC-60950-1, 1st edition (CB Certificate and CB Test Report)
- Australia and New Zealand C-Tick Mark CISPR 22, Class A
- Taiwan BSMI CNS13438, Class A
- Korea — MIC

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Operating environment

- Temperature:
  - 10°C to 35°C (50°F to 95°F) at 0 to 914 m (0 to 3,000 ft)
  - 10°C to 32°C (50°F to 90°F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)

Note: With a dual core CPU at maximum power, reduce the 35°C by 1°C per 300 m above sea level, or the CPU may throttle to remain within its internal thermal specifications.

Hardware requirements: For attended installation of an operating system, this server requires a compatible:
- Keyboard
- Mouse
- Display

Unattended or remote installation may be performed without requiring some or all of these components. Review your unattended software installation program information for specific hardware configuration requirements.

For service, the server requires a compatible:
- Keyboard
- Mouse
- Display

When having the unit serviced, plan to have these components attached to your server either directly or indirectly via a console switch.

Software requirements: The following network operating systems have been tested for compatibility with the x3950 server:
Network operating systems

- Microsoft
  - Windows Server 2003 R2 32-bit Datacenter 1-through 8-node (HT off)
  - Windows Server 2003 R2 x64 Datacenter 1-through 8-node (HT off)
  - Windows Server 2003 R2 32-bit Standard and Enterprise 1-node Standard, up to 2-node Enterprise (HT off)
  - Windows Server 2003 R2 x64 Standard and Enterprise 1-node Standard, up to 2-node Enterprise (HT off)
  - Windows Server 2003 SP1 32-bit Datacenter 1 through 8-node (HT off)
  - Windows Server 2003 SP1 x64 Datacenter 1 through 8-node (HT off)
  - Windows Server 2003 SP1 32-bit Standard and Enterprise 1-node Standard, up to 2-node Enterprise (HT off)
  - Windows Server 2003 SP1 x64 Standard and Enterprise 1-node Standard, up to 2-node Enterprise (HT off)
  - Windows 2000 Advanced Server 1-node

- Linux™
  - Red Hat Enterprise Linux RHEL4 U3 32-bit 1-through 2-node
  - Red Hat Enterprise Linux RHEL4 U3 64-bit 1-through 2-node
  - Red Hat Enterprise Linux RHEL3 U6 64-bit 1-node (HT off)
  - Red Hat Enterprise Linux RHEL3 U6 32-bit 1-node (HT off)
  - SUSE Linux Enterprise Server SLES9 SP3 32-bit 1-through 4-node (HT off > 2-nodes)
  - SUSE Linux Enterprise Server SLES9 SP3 64-bit 1-through 4-node

For those customers who would like to “scale up” with Linux using a large multinode server (greater than four processors), IBM highly recommends a proof of concept (POC) to accurately measure application throughput. Performance can be affected by many factors, such as application scalability, and Linux kernel. Some kernels better optimize the assignment of memory address ranges to take advantage of tightly-coupled SMP systems. Other kernels and applications perform better in a “scale out” environment. For assistance with a proof-of-concept, contact your local marketing representative or IBM Business Partner.

- Other
  - VMWare ESX Server 3 1-through 4-node (HT off at 4-node)
  - VMWare ESX Server 2.5.2 (w/OEM patch for IBM renaming) 1-through 2-node
  - Netware 6.5 1-node

Note: For information on additional support, certification, and versions of network operating systems, visit


Compatibility: The System x3950 server contains licensed system programs that include set configuration, set features, and test programs. IBM system BIOS is loaded from a “flash” EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the System x3950 server and to maintain compatibility with many current software programs.

For detailed information about IBM and non-IBM devices, adapters, software, and network operating systems supported with System x3950 servers, visit


Contact your IBM representative, IBM Business Partner, or refer to the IBM Sales Manual for information on the compatibility of hardware and software for System x3950 servers. The Sales Manual is updated periodically as new features and options are announced that support these servers.

Limitations

Memory
The x3950 servers are shipped with 2 GB (2 x 1 GB) of memory. A maximum of up to 64 GB of system memory is supported by adding two additional memory expansion card options and a 4 GB PC2-3200 ECC DDR-2 SDRAM RDIMM in each of the four DIMM sockets. All supported system memory is addressable through direct memory access (DMA). This server supports 1 GB, 2 GB, and 4 GB 1.8 V, 240-pin, 8-byte RDIMMs. Supported DIMMs can coexist in the same server; however, memory DIMMs of the same capacity must be installed in matched pairs. Refer to the Planning information section or the System x3950 server Web page memory options.

The x3950 supports up to six HDDs, which limits the optional ServeRAID 8i SAS Controller to reach RAID configurations of RAID 0, 1, 10, 5, 6, 50, 1E, and 5EE, but not RAID 60.

ServerGuide
Use the version of ServerGuide that is shipped with the system, or a later version, to load software and drivers. Earlier versions of ServerGuide may not be compatible with the server.

For the two-socket, four-socket, and eight-socket configurations, ServerGuide can help you:

- Set up and configure the system
- Set up and configure any ServeRAID adapters as well as the onboard SAS chipset
- Perform an unattended install of Windows 2003 with SP1 integrated CD (32-bit only)

For the 16-socket, and 32-socket configurations, the ServerGuide can help you:

- Set up and configure the system
- Set up and configure any ServeRAID adapters as well as the onboard SAS chipset


Hot-swap limitations

- PCI hot-plug is not supported in Red Hat Enterprise Linux 3.
• PCI hot-plug support is limited in SLES9, and Novell NetWare 6.5.
• For Linux, multifunction adapters (those that use PCI bridges) are currently not supported.
• For NetWare, only hot-replace of adapters is supported.

Refer to the Software requirements section for operating system limitations.

Planning information

Customer responsibilities

x3950 Server and Related Options: The x3950 server is designated as customer setup. Customer setup instructions are shipped with systems.

Configuration information

Bay configuration: The x3950 server contains seven customer-accessible drive bays on the front of the server. The top right bay is for the slim DVD-ROM. Six unpopulated 2.5-inch, slim-high, hot-swap drive bays are located beneath this bay.

The IDE DVD-ROM is cabled directly to the IDE port. The six hot-swap bays are connected to the integrated SAS SCSI controller through an integrated circuit.

Internal SCSI cabling: The x3950 server contains a DASD backplane supporting six hot-swap, SCA-2-compliant drive bays. For configurations where an optional ServeRAID controller is used to support internal RAID applications, plug in optional RAID adapter into designated slot.

Processor upgrades: The following processor upgrade options are supported:
• Intel Xeon Processor 3.16 GHz 667 MHz 1 MB L2 Cache single-core Processor Upgrade (40K2521)
• Intel Xeon Processor 3.66 GHz 667 MHz 1 MB L2 Cache single-core Processor Upgrade (40K2520)
• Intel Xeon Processor 7020 2.67 GHz 667 MHz 2x1 MB L2 Cache Dual Core Processor Upgrade (40K2522)
• Intel Xeon Processor 7040 3.00 GHz 667 MHz 2x2 MB L2 Cache Dual Core Processor Upgrade (40K2523)

Memory support

The following memory options are supported:
• 2 GB (2 x 1 GB Kit) PC2-3200 CL3 ECC DDR2 SDRAM RDIMM (39M5809)
• 4 GB (2 x 2 GB Kit) PC2-3200 CL3x4 ECC DDR2 SDRAM RDIMM (39M5812)
• 8 GB (2 x 4 GB Kit) PC2-3200 CL3x4 ECC DDR2 SDRAM RDIMM (30R5145)

The 256 MB Xcel4v cache, in multi-chassis configurations, uses system memory for this function. The total system memory as seen by the operating system is reduced by 256 MB per chassis for configurations of more than four sockets.

PCI-X 2.0 adapter installations: The x3950 server contains PCI-X 2.0 architecture. Six full-length slots support PCI-X 2.0 and PCI adapters at up to 266 MHz clock speeds.

Rack installations: x3950 3 U, rack-drawer models are designed to be installed in a 19-inch rack cabinet designed for 26-inch deep devices, such as the NetBAY42 ER, NetBAY42 SR, NetBAY25 SR, or NetBAY11.

If using a non-IBM rack, the cabinet must meet the EIA-310-D standards with a depth of at least 71.1 cm (28 in). Also, adequate space (approximately 5 cm (2 in) for the front bezel and 2.5 cm (1 in) for air flow) must be maintained from the slide assembly to the front door of the rack cabinet to allow sufficient space for the door to close and provide adequate air flow.

Power considerations: These x3950 models include two standard 1300-watt, hot-swap power supplies which have redundancy for all configurations when powered at 200 to 240 V ac.

Cable orders: The 10/100/1000 Mbps full-duplex, Dual Ethernet PCI-X Controller is standard with the x3950 server. The RJ-45 connectors provide a 10BaseT or 100/1000Base-TX interface for connecting twisted-pair cable to the Ethernet network. Cabling is not included with the server. To connect the Ethernet controller to a repeater or switch, use a UTP cable with RJ-45 connectors at both ends. For 100/1000 Mbps operation, Category 5 cabling must be used. For 10 Mbps operation, Category 3, or better, cabling must be used.

There are no additional cabling requirements, other than for system power, keyboard, mouse, and monitor connections.

Installability: The x3950 server requires about 20 minutes for installation. Installation includes unpacking, setting up, and powering on the system. Additional time is required to install an operating system, additional adapters, or features.

Packaging

One box

Shipment group

• System unit carton
  • System unit
  • Rack components
  • Cable management hardware
• Country kit carton
  • Two 9-foot 220 V intra-rack cables
  • IBM System x3950 Installation Guide
  • Safety booklet
  • SCSI cable
  • Rack install template
  • IBM Director
  • ServerGuide
  • CD-ROM Packages
  • On/off switch cover

The x3950 system is shipped as a single package. The country kit carton is contained inside the top portion of the system unit carton, while the rack components are contained in the system unit carton.

Related options

Processor upgrades
• Xeon MP processor
• VRM and heat sink
• Installation publications/warranty
Supplies: None

Security, auditability, and control

Security and auditability features include:

- Power-on and privileged access password functions provide controls of who has access to the data and server setup program on the server.
- A set unattended boot mode allows the system keyboard to be locked to all entries except the password and at the same time allows other computers on the network to access the system disk drive.
- A selectable boot sequence can be used to prevent unauthorized installation of software or removal of data from the diskette drive.
- Atmel Trusted Platform Module ver 1.1b, TCG (Trusted Computing Group) compliant.

Limitations: The x3950 server has no security intrusion detection; therefore, it should be installed in a rack environment that provides security through lockable doors or other security measures. It is a customer’s responsibility to ensure that the server is secure to protect sensitive data.

The system does not support integrity measurements, therefore the TPM only provides Protected Storage and Platform Authentication and Identification. Protected Storage allows material on the operating system disk storage to be protected by the TPM. Platform Authentication and Identification allows for digital signatures or keys which represent the platform’s identity. The TPM is TCG V1.1b-compliant, and is ready for use with Software purchased from third party TPM Ecosystem partners in compliance with the TPM v1.1b specification. The TPM has been implemented on the x460 in addition to the new x3950, from the initial release to the current release.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and conditions

System x3950

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

Warranty period

- System hardware — Three years
- Optional features — One year

Optional IBM features initially installed in an IBM system carry the same warranty period as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

Warranty service: If required, IBM provides repair or exchange service depending on the type of warranty service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM’s normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

Customer replaceable unit (CRU) (keyboard, mouse, speaker, memory, HDD) service and on-site service for other selected parts.

CRU service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU. Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU, at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge under the type of warranty service specified.

Based upon availability, CRUs will be shipped for next-business-day (NBD) delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- Battery Cable-management arm
- CD-ROM drive
- DVD-ROM drive
- HDD
- Hot-swap fan
- Hot-swap power supply
- Lift handle kit
- Memory DIMM
- Memory expansion card
- PCI adapters
- PCI divider
- Power cord
- Service label
- System labels
- Top cover

On-site service: IBM on-site repair (IOR), 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where on-site service is not available, the normal in-county service delivery is used.

International Warranty Service (IWS): IWS is available during the warranty period to customers who travel or relocate to countries where their computer is sold and serviced by IBM or IBM resellers authorized to perform warranty service. Eligible IBM computers are identified by their four-digit machine type.

You can obtain IWS through the method of service, such as CRU, depot, carry-in, or on-site, provided in the servicing country. Service methods and procedures vary by country, and some service or parts may not be available in all countries. Service centers in certain
countries may not be able to service all models of a
particular machine type. In addition, some countries may
have fees and restrictions that apply at the time of
service.

To determine the eligibility of the System x3950 and to
view a list of countries where service is available, visit

warranty/warranty.vm

For more information on IWS, refer to Services

Note: Due to the earth’s magnetic field, CRT monitors are
manufactured to work in northern, southern, and
equatorial regions of the earth and may not produce a
satisfactory image when moved between them. Any
required adjustment (if possible) is not covered under IWS
and may be subject to a chargeable action. The magnetic
field does not affect flat-panel LCD monitors.

Licensing: Programs included with this product are
licensed under the terms and conditions of the license
agreements that are shipped with the system.

Field-installable features: Yes

Model conversions: No

Machine installation: Customer setup: customers are
responsible for installation according to the instructions
IBM provides with the machine.

Graduated program license charges apply: No. This
product does not contain licensed internal code or
licensed machine code.

Educational allowance: None

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**Prices**

For all local charges contact your IBM representative.

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