IBM System x3655 -- SMP capable, rack-optimized servers include PCI-Express support and powerful 1.7 GHz and 2.1 GHz/2 MB quad-core AMD Opteron processors

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At a glance

The IBM® System x3655 is a low-cost, dual-socket server that is optimized for general-purpose computing. It provides flexibility and scalability while offering multiple levels of price/performance. The x3655 provides quad-core performance at an entry-level price. With features such as low-cost processors, 16 available DIMMs with up to 64 GB of DDR II memory, and robust I/O, users can configure to meet their needs.

Features include:

- Ultrathin, rack-optimized, 2 U high
- AMD Opteron 1.7 GHz and 2.1 GHz quad-core processors with 2 MB of L2 cache and 2 MB L3 cache
- Two-, four-, and eight-way interleaved Chipkill™, 667 MHz ECC DDR2 SDRAM RDIMM memory; addressable up to 64 GB
- Choice of configurations
  - 3.5-inch hot-swap SAS (6; 4 with tape)
  - 2.5-inch hot-swap SAS (8 with tape)
  - 3.5-inch hot-swap SATA (6; 4 with tape)
- Integrated SAS controller with 8 lanes for 1.168 TB high-speed internal disk storage solutions (eight x 146 GB) or up to 4.5 TB\(^1\) (six x 750 GB SATA HS HDDs)
- Support for PCI-Express, PCI-X, or HTX
- One standard DVD-CD/RW Combo drive in all models
- 835-watt, auto-ranging power supply
- Embedded systems management processor
- Integrated dual Gigabit Ethernet Broadcom BCM5706
- One serial port (16550A-compatible), six USB ports (two front, four rear), and two RJ-45 ports
Overview

The IBM System x3655 server delivers the reliability and performance your business demands. The highly manageable, 2 U, rack-optimized platform features up to two quad-core Opteron processors.

Power and scalability for general-purpose computing

The System x3655 system offers state of the art processors, large memory capacity, high memory bandwidth, and PCI-Express, PCI-X, and HyperTransport (HTX) buses to power through core-, memory-, and I/O-intensive applications. It includes:

- Quad-core AMD Opteron 1.7 GHz processor model 2344 and quad-core AMD Opteron 2.1 GHz processor model 2352, both processors come with 2 MB L2 and 2 MB L3 cache
- 2 GB (2 x 1 GB) memory standard, with high-speed 667 MHz ECC double data rate (DDR2) SDRAM RDIMM memory, 4 GB (4 x 1 GB) system memory on express models, upgradeable to 64 GB
- Support for two-, four-, and eight-way interleaving, depending on memory configuration
- Integrated SAS/SATA controller
- Up to 1.168 TB (eight-146 GB) of hot-swap SAS storage with 2.5-inch HDDs or up to 4.5 TB (six-750 GB) of HS SATA storage with 3.5-inch HDDs
- Dual Gigabit Ethernet controllers with TOE; high I/O capacity for demanding applications, plus failover capability
- 32- and 64-bit applications using a 64-bit operating system
- Embedded RAID-0,-1 HDD, optional RAID-5
- Three standard integrated PCI-Express
  - PCI-Express x4 low profile
  - PCI-Express x8 low profile
  - PCI-Express x8 low profile
- One riser card to support one I/O slot of the following types:
  - HyperTransport
  - PCI-Express (x16) full length, full height (optional)
  - PCI-X (optional)
- Support for optional hot-swap redundant power and cooling
- Support for slotless Remote Supervisor Adapter II SlimLine

High availability for around-the-clock On Demand Business

High availability, manageability, and serviceability features help diagnose problems quickly, even from remote locations:

- Intelligent Platform Management Interface (IPMI) 2.0 integrated systems management processor
- Remote power control for accessing and managing your server remotely
- TextConsole redirect over serial or LAN
- Early warning of problems before they occur: predictive failure analysis (PFA) on processors, voltage regulator module (VRM), memory, fans, power supply, and HDD options
- Fast and easy servicing -- diagnostics and diagnostic LED indicator
• Effective power management -- IBM Power Executive allows you to monitor and trend actual power usage

Service and support perfected for On Demand Business

• ServerGuide™ and IBM Director
• Web support
• Warranty: Three years, customer replaceable unit (CRU) and on-site service, limited warranty; optional warranty service upgrades available

1 When referring to HDD or tape backup capacity, GB stands for 1,000,000,000 bytes and TB stands for 1000 GB. Total user capacity may vary depending on operating environments.

2 GHz and MHz denote the internal and/or external clock speed of the microprocessor only, not application performance. Many factors affect application performance.

3 The Microsoft® Windows® Preinstallation Environment software included as part of ServerGuide software may be used for boot, diagnostic, setup, restoration, installation, configuration, test, or disaster recovery purposes only. Note: The Microsoft Windows Preinstallation Environment software contains a security feature that will cause an end-user customer's system to reboot without prior notification to the end-user customer after 24 hours of continuous use of the Microsoft Windows Preinstallation Environment. During routine usage of ServerGuide, which does not usually require usage of the Microsoft Windows Preinstallation Environment software for such an extended time period, this condition should not occur.

4 Some programs may not be available in all countries.

5 You may be asked certain diagnostic questions before a technician is sent.

6 For information on the IBM Statement of Limited Warranty, call 800-IBM-SERV (426-7873) or contact your IBM representative or reseller. Copies are available upon request.

Key prerequisites

• Monitor
• Universal serial bus (USB) keyboard
• USB mouse
• Rack

Planned availability date

August 8, 2008

Description

System x3655 related options

• Quad Core AMD Opteron Processor Model 2344 HE (46M2282) (1.7GHz, 55W ACP)

The System x3655 is an AMD Opteron processor system that supports an internal processing speed of up to 2.1 GHz processing operations to memory and the PCI-Express bus up to 133 MHz. It contains an integrated, full-speed 2 MB ECC L2 cache and 2 MB L3 cache processor. This system supports SMP applications through installation in the second processor slot of System x3655 models with like processors.
High-performance server subsystems

These servers are high-throughput, quad-core, two-way SMP-capable AMD Opteron processor-based network servers with excellent scalability when you add memory and a second processor.

Two connectors are standard on the system board to support installation of a second processor. High-speed 667 MHz DDR2 SDRAM is optimized for processor-to-memory subsystem performance. The System x3655 server uses the ServerWorks HT2000 and HT1000 chipsets to maximize throughput from processors to memory. These new chips provide:

- PCI-Express
- PCI-X
- HTX
- SAS/SATA
- BCM5706 Ethernet

Standard System x3655 configurations

<table>
<thead>
<tr>
<th>Model</th>
<th>Processor</th>
<th>Memory</th>
<th>HDD Interface</th>
<th>HDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7943-22x 2344 1.7 GHz</td>
<td>2 GB</td>
<td>SAS 2.5-in</td>
<td>Open bay, hot-swap</td>
<td></td>
</tr>
<tr>
<td>7943-E1U 2344 1.7 GHz</td>
<td>4 GB</td>
<td>SAS/SATA</td>
<td>Open-bay, hot-swap</td>
<td></td>
</tr>
<tr>
<td>7943-E2U 2352 2.1 GHz</td>
<td>4 GB</td>
<td>SAS 2.5-in</td>
<td>Open bay, hot-swap</td>
<td></td>
</tr>
</tbody>
</table>

Note:
Quad-core processors have 2 MB L2 cache and 2 MB L3 cache
DVD-CDRW combo included in all models.

Additional features

- System board contains sixteen DIMM connectors supporting 512 MB, 1 GB, 2 GB, and 4 GB of 667 MHz DDR2 memory, and also:
  - Supports up to 64 GB of system memory
  - Contains memory populated with two DIMMs at a time, with same size DIMMs
  - Supports two-, four-, and eight-way interleaving, depending on memory configuration
  - Supports mixed memory sizes in pairs
  - Features Chipkill memory
  - Features an integrated SAS controller, supporting high-speed internal storage solutions; up to 2.4 TB with hot-swap SAS and up to 4.5 TB with SATA hot-swap HDD storage
- Dual full-duplex Broadcom 5706 Gigabit Ethernet PCI controllers speeding network communications to LAN clients

The System x3655 subsystems are tuned to provide solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features combined with SMP capability make this server an excellent choice for:

- Scientific and technical computing
- Linux® clustering

High-availability and serviceability features

The System x3655 server subsystem delivers excellent reliability and serviceability features:

- Eight hot-swap 2.5-inch HDD bays with SAS connectors supporting SAS function
- Six hot-swap HDD bays with SAS/SATA connectors supporting both SAS/SATA function
- ECC DIMMs combined with an integrated ECC memory controller correcting many soft and hard single-bit memory errors, while minimizing disruption of service to LAN clients
- ECC L2 cache processors to improve data integrity and help reduce downtime
• PFA on HDD options, memory, processors, VRMs, and fans to alert the system administrator of an imminent component failure
• Dual Broadcom 5706 Gigabit Ethernet controllers support:
  — Failover, Adapter Fault Tolerance (AFT)
  — PXE 2.0 Boot Agent
  — Wake on LAN®
  — Load balancing or teaming
• Worldwide, voltage-sensing 835-watt power supply features auto restart
• Five cooling fans for added reliability
  — Five system fans for processors, memory, and HDD bays
  — Five additional fans with redundant power option
  — Fan speed controls incorporated to reduce noise while reducing system temperatures
• Embedded systems management processor for diagnostic, reset, power-on self-test (POST), and auto recovery functions, monitoring temperature, voltage, and fan speed, while generating alerts when thresholds exceeded (refer to the Limitations section for restrictions)
• Information LED panel gives visual indications of system well-being
• DVD-CDROM diagnostics and a Diagnostic LED indicator to help you find a failing component, which may reduce downtime and service costs
• Easy access to system board, adapter cards, processor, and memory

Expandability and growth
The System x3655 server contains high levels of function and storage capacity for a 2 U, 19-inch rack-drawer package. It supports customer installation of adapters, processors, memory, and HDD options. Functions (such as SVGA video, SAS, SATA, IDE, and two Gigabit Ethernet controllers) are integrated on the system board. Features include:

• Rack-optimized design for 19-inch wide industry-standard rack cabinets supported in the NetBAY42 and NetBAY25
• Sixteen DIMM connectors capable of support for up to 64 GB of system memory
• PCI riser cards to support one of three configurations:
  — One PCI-Express (x16) slot (full-length, full-height)
  — One PCI-x slot (full-length)
  — One HTX slot (full-length)
• Internal data storage up to:
  — 1.168 TB (using eight 146 GB SAS HDDs)
  — 4.5 TB (using six 750 GB HS SATA HDDs)
• DVD-CDRW Combo drive
• ATI RN50a video controller with 16 MB of memory

Systems management
The System x3655 server also features Cluster Systems Management Software and IBM Director, a powerful, highly integrated, systems management software solution built on industry standards and designed for ease of use. Exploit your existing enterprise or workgroup management environments and use rich security features to access and manage physically dispersed IT assets more efficiently over the Internet. It can help reduce costs through potentially:

• Reduced downtime
• Increased productivity of IT personnel and end users
• Reduced service and support costs
IT administrators can view the hardware configuration of remote systems in detail and monitor the usage and performance of critical components such as processors, HDDs, and memory.

IT administrators have comprehensive, virtual on-site control of System x™ servers with the ability to remotely:

- Access the server, often regardless of its status
- Inventory and display detailed system and component information
- View server boot up during POST
- Browse and delete logs of events and errors
- Reset or power cycle the server
- Monitor and set thresholds on server health including:
  - Operating system load
  - POST time-out
  - Voltage
  - Temperature
- Set proactive alerts for critical server events including PFA on HDDs
- Define automated actions such as
  - Sending an e-mail or page to an administrator
  - Executing a command or program
  - Ability to pop up an error message to the IBM Director console
- Flash BIOS
- Monitor and graph the use of server resources such as
  - Memory
  - Processor
  - HDDs
- Identify potential performance bottlenecks and react to prevent downtime

IBM Director Agent provides integration into leading workgroup and enterprise systems management environments via Upward Integration Modules (available from IBM and third parties). Advanced management capabilities built into xSeries® servers are available through:

- Tivoli® Enterprise and Tivoli NetView®
- Computer Associates Unicenter TNG
- HP OpenView
- Microsoft SMS
- BMC Patrol
- NetIQ

**World-class support tools and programs**

The System x3655 server includes a number of 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 customer replaceable unit (CRU) and on-site, three-year limited warranty with next-business-day (NBD) service (same-business-day service optionally available) helps protect 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 program includes compatibility information from actual testing of the System x3655 server with various adapters and devices.
• The ServerGuide CD library includes online publications, in addition to utilities and drivers that enable assisted loading of popular network operating systems.
• Electronic support on the Web provides additional support in an easy-to-use format.

IBM makes no warranties, expressed or implied, regarding non-IBM products and services that are ServerProven, including but not limited to implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

Product positioning

The IBM System x3655 is a low-cost, dual-socket server that is optimized for general-purpose computing. It provides flexibility and scalability while offering multiple levels of price/performance.

The x3655 provides quad-core performance at an entry-level price. With features such as low-cost processors, 16 available DIMMs with up to 64 GB of DDR II memory, and robust I/O, users can configure to meet their needs.

The x3655 offers low-cost DDR II memory when compared with competitive servers. Also, 16 available DIMMs allow users to scale memory incrementally as needed, lowering total cost of ownership (TCO). Several models come standard with lower-cost SATA hard disk drives, further decreasing TCO.

IBM Systems Director Active Energy Manager™ delivers advanced control to help monitor power usage and achieve decreased power and cooling costs. Grow your compute power without growing your data center.

Leverage AMD Opteron processor performance and IBM reliability to help improve your competitiveness.

The System x3655 server is an ultrathin 2 U rack platform. With the industry-standard x86 architecture, you have the flexibility to effectively manage your business in a cost-conscious manner.

High-performance, two-way, quad-core AMD Opteron processor models 2344 and 2352 let you protect your hardware investment with 32- to 64-bit computing. At the same time, the server can handle emerging applications requiring maximum computing power and function in a small amount of rack space. These applications include:

• Scientific and technical computing
• Linux clustering
• Financial analysis computing
• Digital content creation

These powerful servers also meet traditional enterprise network server requirements, but with an added benefit of requiring less space.
### Single Entity Offerings (SEOs)

<table>
<thead>
<tr>
<th>Description</th>
<th>SEO number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System x3655</td>
<td>794322U</td>
</tr>
<tr>
<td>ExpressSeller Models</td>
<td></td>
</tr>
<tr>
<td>System x3655</td>
<td>7943E1U</td>
</tr>
<tr>
<td></td>
<td>7943E2U</td>
</tr>
</tbody>
</table>

The following are newly announced features on the specified models of the IBM System x 7943 machine type:

<table>
<thead>
<tr>
<th>Description</th>
<th>MT</th>
<th>Model</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>7943-AC1</td>
<td>7943</td>
<td>AC1</td>
<td>6975</td>
</tr>
<tr>
<td>7943-MC1</td>
<td>7943</td>
<td>MC1</td>
<td></td>
</tr>
<tr>
<td>Quad Core AMD Opteron Processor Model 2344 HE</td>
<td>7943</td>
<td>AC1</td>
<td>4434</td>
</tr>
<tr>
<td>(1.7GHz, 55W ACP)</td>
<td></td>
<td>MC1</td>
<td></td>
</tr>
<tr>
<td>Addl Quad Core AMD Opteron Processor Model 2344 HE</td>
<td>7943</td>
<td>AC1</td>
<td>3977</td>
</tr>
<tr>
<td>(1.7GHz, 55W ACP)</td>
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<td>MC1</td>
<td>3978</td>
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The following are newly announced features on the specified models of the IBM System x 7940 machine type:

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<tr>
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<th>MT</th>
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<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>Machine Type: 7940 Models: AC1, MC1</td>
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<td></td>
<td></td>
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<tr>
<td>2.0GB DDR2 667 MHZ DIMM memory</td>
<td>7940</td>
<td>AC1</td>
<td>3977</td>
</tr>
<tr>
<td>4.0GB DDR2 667 MHZ DIMM memory</td>
<td>7940</td>
<td>AC1</td>
<td>3978</td>
</tr>
</tbody>
</table>

### Single Entity Offerings (SEO)

<table>
<thead>
<tr>
<th>Description</th>
<th>SEO number</th>
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<tbody>
<tr>
<td>System x3655</td>
<td>794322U</td>
</tr>
<tr>
<td>ExpressSeller models</td>
<td></td>
</tr>
<tr>
<td>System x3655</td>
<td>7943E1U</td>
</tr>
<tr>
<td></td>
<td>7943E2U</td>
</tr>
</tbody>
</table>

Options SEO

| Quad Core AMD Opteron Processor Model 2344 HE       | 46M2282    |
| (1.7GHz, 55W ACP)                                   |            |
Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBM ID).


Publications

The following publications and CDs are shipped with the System x3655 server:

- Installation Guide - This printed document contains instructions for setting up the server and basic instructions for installing some options.
- User's Guide - This document is in Portable Document Format (PDF) on the IBM eServer Documentation CD. It contains general information about the server, including information about features and how to configure the server.
- Warranty and Support Information - This document is in PDF on the IBM eServer Documentation CD. It contains information about the terms of the warranty and getting service and assistance.
- Option Installation Guide - This document is in PDF on the IBM eServer Documentation CD. It contains detailed instructions for installing, removing, and connecting optional devices that the server supports.
- Safety Information - This document is in PDF on the IBM eServer Documentation CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the Safety Information document.
- Rack Installation Instructions - This printed document contains instructions for installing the server installing the server in a rack.
- Hardware Maintenance Manual and Troubleshooting Guide - This document is available from the IBM Support Web site. It contains information to help you solve problems yourself, and it contains information for service technicians.
- ServerGuide - Contains online publications and drivers to support the System x3655 server. In addition, it includes a set of easy-to-use utilities to help you install the system using CDs of several popular network operating systems.
- IBM Director - Systems management software is included.

To check for updated documentation and technical updates, visit

http://www.ibm.com/support/

Under Search technical support, type 7985, and click Search.

Notes:

- Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
- Software versions, features, and functions shipped with these systems may change as new releases become available or may be discontinued at any time.

The System x3655 Specification Sheet is available immediately. To order, contact your IBM representative.

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems Information Center is at


IBM Publications Center Portal
The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. A large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Global Technology Services

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.

System x and BladeCenter support services

Recommended core technical support

When you sell IBM System x technology, include the support services your clients need -- to help keep both their hardware and software working day after day, at peak performance. It's their first step toward helping to protect their investment and sustain high levels of system availability. We offer service-level and response-time options to fit your customer's business needs. And we'll help your customer get started with a core support package that includes:

- Continuous system monitoring
  Electronic monitoring that helps speed up problem-solving with automated, early detection of potential problems and system errors.

- Hardware maintenance
  World-class remote and on-site hardware problem determination and repair services.

- Software technical support
  Access to help line calls for fast, accurate answers to your questions during installation and throughout ongoing operations.

For more information, visit

http://www.ibm.com/servers/eserver/xseries/services.html

Technical information

Specified operating environment

Physical specifications
<table>
<thead>
<tr>
<th>Feature</th>
<th>7943-E1U</th>
<th>7943-E2U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor (quad-core)</td>
<td>AMD Opteron 2344</td>
<td>AMD Opteron 2352</td>
</tr>
<tr>
<td>Internal speed -</td>
<td>1.7 GHz</td>
<td>2.1 GHz</td>
</tr>
<tr>
<td>External speed -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number standard -</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Maximum -</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>L2 cache (full speed)</td>
<td>2 MB</td>
<td>2 MB</td>
</tr>
<tr>
<td>L3 cache (full speed)</td>
<td>2 MB</td>
<td>2 MB</td>
</tr>
<tr>
<td>Memory (667 MHz SDRAM)</td>
<td>4 GB ECC</td>
<td>4 GB ECC</td>
</tr>
<tr>
<td>RDIMMs -</td>
<td>2 x 1 GB</td>
<td>2 x 1 GB</td>
</tr>
<tr>
<td>DIMM sockets -</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Address capability</td>
<td>64 GB(8)</td>
<td>64 GB(8)</td>
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<tr>
<td>Video -</td>
<td>SVGA</td>
<td>SVGA</td>
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<tr>
<td>Memory -</td>
<td>16 MB</td>
<td>16 MB</td>
</tr>
<tr>
<td>HDD controller</td>
<td>SAS/SATA</td>
<td>SAS/SATA</td>
</tr>
<tr>
<td>Channels -</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Connector internal -</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>IDE controller -</td>
<td>IDE</td>
<td>IDE</td>
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<tr>
<td>Channels -</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Connector internal -</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Connector external -</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>HDD -</td>
<td>Open-bay</td>
<td>Open-bay</td>
</tr>
<tr>
<td>Total bays -</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>5.25-in -</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.5-in slim -</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.5-in hot-swap -</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2.5-in hot-swap -</td>
<td>8 (12)</td>
<td>0</td>
</tr>
<tr>
<td>Internal capacity -</td>
<td>1.168 TB(9) SAS</td>
<td>4.5 TB(9) SAS/SATA</td>
</tr>
<tr>
<td>Bays available -</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>5.25/3.5-in slim -</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.5-in hot-swap -</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>2.5-in hot-swap -</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Total slots -</td>
<td>4</td>
<td>4</td>
</tr>
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<td>PCI-Express x4 -</td>
<td>1(10)</td>
<td>1(10)</td>
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<tr>
<td>PCI-Express x8 -</td>
<td>2(10)</td>
<td>2(10)</td>
</tr>
<tr>
<td>PCI-Express x16, or HTX</td>
<td>1(11)</td>
<td>1(11)</td>
</tr>
<tr>
<td>Slots available -</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Management proc. -</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Ethernet controller</td>
<td>Dual</td>
<td>Dual</td>
</tr>
<tr>
<td>DVD-CDRW (IDE) -</td>
<td>24x-10x(13)</td>
<td>24x-10x(13)</td>
</tr>
<tr>
<td>Diskette drive -</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Power supply -</td>
<td>835 W</td>
<td>835 W</td>
</tr>
<tr>
<td>Number standard -</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hot-swap -</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Redundant power -</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td>Auto restart -</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**IBM United States Hardware Announcement**

**7943-E1U**

**7943-E2U**

*IBM is a registered trademark of International Business Machines Corporation*
3.5-in slim - 0
3.5-in hot-swap - 0
2.5-in hot-swap - 8 (12)
Internal capacity - 4.5 TB(9) SAS/SATA
Bays available - 8
5.25/3.5-in slim - 0
3.5-in hot-swap - 0
2.5-in hot-swap - 8
Total slots - 4
PCI-Express x4 - 1(10)
PCI-Express x8 - 2(10)
PCI-Express x16, or 1(11)
PCI-X, or HTX
Slots available - 4
Management proc. - Standard
Ethernet controller - Dual 10/100/1000 Mbps
DVD-CDRW (IDE) - 24x-10x(13)
Diskette drive - 0
Power supply - 835 W
Number standard - 1
Hot-swap - Yes
Redundant power - Optional
Auto restart - Yes

8 These dual processor systems support 64 GB of memory.

9 Capacities are based on installation of eight 146 GB 2.5-inch SAS HDDs (2.5-inch SAS models) or six 750 GB 3.5-inch SATA HDDs (3.5-inch SATA models) or optional six 300 GB 3.5-inch SAS.

10 These slots are low profile.

11 The riser card slot (HTX, PCI-X, or PCI-Express x16) is full-height, full-length.

12 Two of the 2.5-inch bays will contain a tape drive. For the latest information on supported HDD options, visit http://www.ibm.com/us/compat

13 24x-10x DVD-CD/RW variable read rate. Actual playback speed will vary and is often less than the maximum possible.

24x-10x DVD-CDRW drive characteristics
- Formatted capacity: 650 MB
- Average access time: 110 ms
- Burst data transfer rate: 16.6 MB/s (ATA PIO Mode 4)
- Technology: Full constant angular velocity (CAV)
- Buffer size: 1 MB

Video subsystem
- ATI RN50a graphics controller chip
- Integrated on planar and connected to the PCI bus
- Support for DDR1 SDRAM external memory
- 128-bit graphics engine with 8, 16, and 24 bpp mode acceleration
- 32 bpp (4G colors/true color) support
- Integrated 350 MHz RAMDAC
- DDC2B monitor communications support
Supported video mode capabilities for the SVGA PCI controller with a 200 MHz memory clock:

**Microsoft Windows 2000/2003 (32- and 64-bit) and Linux (all distributions)**

<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, 90, 100, 120, 160, 200</td>
</tr>
<tr>
<td>640 x 480 x 16</td>
<td>64K</td>
<td>60, 72, 75, 85, 90, 100, 120, 160, 200</td>
</tr>
<tr>
<td>640 x 480 x 32</td>
<td>16M</td>
<td>60, 72, 75, 85, 90, 100, 120, 160, 200</td>
</tr>
<tr>
<td>800 x 600 x 8</td>
<td>256</td>
<td>60, 70, 72, 75, 85, 90, 100, 120, 160, 200</td>
</tr>
<tr>
<td>800 x 600 x 16</td>
<td>64K</td>
<td>60, 70, 72, 75, 85, 90, 100, 120, 160, 200</td>
</tr>
<tr>
<td>1024 x 768 x 8</td>
<td>256</td>
<td>60, 70, 72, 75, 85, 90, 100, 120, 140, 150, 160, 200</td>
</tr>
<tr>
<td>1024 x 768 x 16</td>
<td>64K</td>
<td>60, 70, 72, 75, 85, 90, 100, 120, 140, 150, 160, 200</td>
</tr>
<tr>
<td>1024 x 768 x 32</td>
<td>16M</td>
<td>60, 70, 72, 75, 85, 90, 100, 120</td>
</tr>
<tr>
<td>1280 x 1024 x 8</td>
<td>256</td>
<td>60, 70, 74, 75, 85, 90, 100, 120</td>
</tr>
<tr>
<td>1280 x 1024 x 16</td>
<td>64K</td>
<td>60, 70, 74, 75, 85, 90, 100, 120</td>
</tr>
</tbody>
</table>

**Note:** Some modes are not supported by all monitors. The maximum resolution supported is 1280 x 1024. However, if the system is using Remote Supervisor Adapter, then the maximum resolution is 1024 x 768.

**Dimensions**
- Width: 439.9 mm (17.3 in)
- Depth: 653.3 mm (25.7 in)
- Height: 43.7 mm (1.72 in)
- Weight:
  - Minimum configuration 11.8 kg (26 lb)
  - Maximum configuration 14.6 kg (32 lb)

**Electrical**
- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 4.0 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 2.0 A
- Input kilovolt-amperes (kVA) (approximately)
  - Minimum configuration: 0.12 kVA
  - Maximum configuration: 0.40 kVA
- Btu output
  - Ship configuration: 409 Btu/hr (120 watts)
  - Full configuration: 1366 Btu/hr (400 watts)
- Acoustical noise emission level: Sound power levels
  - 6.8 bels (idling)
  - 6.8 bels (operating)

**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.

System x3655 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:
• Peripheral Component Interconnect (PCI) specification 2.2
• Hardware-enabled to meet the International Organization for Standardization (ISO) 9241, Part 3

**Equipment approvals and safety**

• FCC - Verified to comply with Part 15 of the FCC Rules, Class A
• Canada ICES-003, issue 4, Class A
• UL/IEC 60950-1(11)
• CAN C22.2 No. 60950-1-03
• NOM-019

14 These servers are certified by the respective UL and NOM agencies.

**Operating environment**

• Temperature
  - 10.0 to 35.0 degrees C (50 to 95 degrees F) (server on)
  - 0.0 to 60.0 degrees C (-32 to 140 degrees F) (server off)
• Relative humidity: 8% to 80%
• Maximum altitude: 2,133 m (7,000 ft)
• Heat output: 1451 Btu/hr (maximum configuration)
• Electrical power:
  - 100 to 127 V ac, .40 kVA maximum
  - 200 to 240 V ac, .40 kVA maximum
• Capacity of exhaust: 52 CFM (1.472 CMM)
• Noise level: 6.5 bels (idling)

**Hardware requirements**

For attended installation of an operating system, this server requires a compatible:

• Keyboard
• Mouse
• HDD
• 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
• HDD
• Display

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

The following network operating systems are supported in the System x3655:

- Microsoft
  - Windows 2003, Enterprise Edition (64-bit)
  - Windows 2003, Standard Edition (64-bit)

- Linux
  - SUSE Linux Enterprise Server 9 for AMD64 and EM64T
  - SUSE Linux Enterprise Server 10 for AMD64 and EM64T
  - Red Hat Enterprise Linux 3 AS (AMD64 and EM64T)
  - Red Hat Enterprise Linux 3 ES (AMD64 and EM64T)
  - Red Hat Enterprise Linux 3 WS (AMD64 and EM64T)
  - Red Hat Enterprise Linux 4 AS (AMD64 and EM64T)
  - Red Hat Enterprise Linux 4 ES (AMD64 and EM64T)
  - Red Hat Enterprise Linux 4 WS (AMD64 and EM64T)

The following network operating systems are supported as preloads in the System x3655 server:

- Microsoft:
  - Windows Small Business Server 2003
  - Windows Server 2003 Enterprise Edition

- Linux:
  - Red Hat Enterprise Linux AS 3
  - Red Hat Enterprise Linux WS 3
  - Red Hat Enterprise Linux ES 3

Certification is planned for these network operating systems.

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


Compatibility

The System x3655 server contains licensed system programs that include set configuration, set features, and test programs. 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 x3655 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 xSeries 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 xSeries servers. The Sales Manual is updated periodically as new features and options are announced that support these servers.

Limitations
• The System x3655 server contains a single, configurable serial port. It can be configured to be operating-system controlled, service-processor controlled, or shared between the two. You can set the configuration by changing the header location to which the internal serial cable is plugged. The default location from the factory is in the shared position. In the shared position, the service processor controls the port until the operating system is running, then the operating system takes control. The service processor can regain control of the port for user-configured dial-out situations or if the operating system is not available, but operating system control cannot be reestablished without resetting the server.

• If using the Remote Supervisor Adapter II:
  — One USB port will not be available.
  — The maximum resolution supported is 1280 x 768.

• To enable proper air flow for cooling, the System x3655 server requires a rack with a perforated door, such as the NetBAY42 SR or NetBAY25 SR. An alternative is to remove the front door of rack cabinets where the door panel is of solid construction.

• Microprocessor SMP upgrades must be of the same type and clock speed. Mixing microprocessors of different speeds or cache size is not supported.

• Use the latest version of ServerGuide that is available on the Web. Earlier versions of ServerGuide may not be compatible with the server.

Refer to the Software requirements section for operating system system limitations.

User group requirements

This announcement satisfies or partially satisfies requirements from one or more of the worldwide user group communities. Groups include COMMON, COMMON Europe, Guide Share Europe (GSE), InterAction (Australia/New Zealand), Japan Guide Share (JGS), and SHARE Inc.

Planning information

Customer responsibilities

System x3655 and related options

The System x3655 server and related options are designated as customer setup. Customer setup instructions are shipped with system and options.

Configuration information

Bay configuration

The System x3655 server has two configurations, 2.5-inch SAS and 3.5-inch SAS/SATA. The configuration that supports 2.5-inch SAS HDDs has 10 bays. The bay on the left contains the DVD-CDRW drive. Two bays near the center support tape drive and eight 2.5-inch HDD bays located in the center and right side support various hot-swap HDD installations. The configuration which supports 3.5-inch SAS/SATA HDDs has seven bays. The bay on the left contains the DVD-CDRW drive. Six 3.5-inch HDD bays located in the center and right side support various HDD installations.

The 24x-10x DVD-CDRW is cabled directly to the IDE port.

Cabling - standard non-RAID configurations

System x3655 2.5-inch SAS models contain a DASD backplane supporting eight hot-swap, SAS drive bays. System x3655 3.5-inch SAS/SATA models contain DASD backplane supporting six SAS/SATA drive bays. The backplane is connected to the internal connector of the integrated SAS controller through a 16-bit low-voltage differential SCSI cable.

Additional cabling alternatives

In configurations where an external SCSI device attachment is required, a supported SCSI adapter or ServeRAID™ controller must be installed.

Rack installations
System x3655 server 2U rack-drawer models are designed for installation in a 19-inch rack cabinet made for 28-inch deep devices, such as the NetBAY42U ER and NetBAY42U SR. Installation into some of the older Netfinity® racks (9306900, 9306910, and 9306200) requires a rack extension kit for proper cable bend radius and cooling.

If an System x3655 server is mounted in a non-IBM rack, the rack must satisfy the following specifications:

- The rack must meet EIA- 310-D standards for mounting flanges and hole locations.
- The front to rear distance of the mounting flanges must be between 457.2 and 762 mm (24 and 30 in).
- The thickness of the mounting flanges must be between 1.9 and 3.3 mm (0.08 and 0.13 in).
- The mounting flanges must have either 7.1-mm (0.28-in) diameter holes or 9.6-mm (0.38-in) square holes on the standard EIA hole spacing.
- The rack must have a minimum depth of 50 mm (1.97 in) between the front mounting flange and inside of the front door for appropriate cooling.
- The rack must have a minimum depth of 166 mm (6.53 in) between the rear mounting flange and inside of the rear door to install the server and provide cable management space.
- The minimum side-to-side clearance in the rack between the front and rear mounting flanges must be of 467 mm (18.2 in) to accommodate the width of the server and the slide mounting brackets.
- The minimum side-to-side clearance in the rack between each door and the mounting flanges must be 484 mm (19.1 in) to accommodate the slide mounting brackets.
- The rack must include perforated front and rear doors and must not prevent the flow of cool air into or out of the rack.
- The weight-handling capacity of the rack must be able to support the maximum rack configuration, including all servers, external cables, PDUs, and so on.
- The rack must provide proper stabilization so that the rack does not become unstable when servers are pulled out for service.

**Processor options**

The System x3655 server is an AMD Opteron processor system that supports internal processing speeds of up to 2.1 GHz and processing operations to memory and the PCI bus at up to 2.1 GHz. It contains an integrated, full-speed 1 MB ECC L2 cache. This system supports SMP applications through installation in the second processor slot of System x3655 models with like processors.

**Supported processor options**

The following processor options are supported:

- System x3655 Opteron processor Model 2344 HE QC (46M2282)
- System x3655 Opteron processor Model 2352 QC 75W (44R5930)

**Supported memory options**

The following memory options are supported:

- 1 GB (2x512MB Kit) DDR2 667 MHz ECC SDRAM RDIMM (41Y2759)
- 2 GB (2x1GB Kit) DDR2 667 MHz ECC SDRAM RDIMM (41Y2762)
- 4 GB (2x2GB Kit) DDR2 667 MHz ECC SDRAM RDIMM (41Y2765)

**Power considerations**

The System x3655 server includes a standard 835-watt power supply. This power supply is capable of providing sufficient power to run the server fully configured with supported devices.

**Cable orders**
The dual 10/100/1000 Mbps, full duplex, Ethernet PCI controllers, standard with the System x3655, are connected directly to independent RJ-45 connectors. The RJ-45 connectors provide a 10/100/1000 Base-T interface (at either half- or full-duplex) 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 an unshielded twisted pair (UTP) cable with RJ-45 connectors at both ends. For 100 Mbps or higher 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 System x3655 server requires about 30 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**

- System Unit
- Country Kit carton
  - Power cord
  - System x3655 Installation Guide
  - Rack Installation Guide
  - CD-ROM packages

16 Documentation, IBM Director, Broadcom, ServerGuide, ServeRAID, and diagnostics

**Note:** The System x3655 server is shipped in a single package. The Country Kit carton is contained inside the top portion of the System Unit carton.

**Processor upgrade options**

- AMD Opteron processor, System x3655 Opteron processor Model 2344 HE QC, System x3655 Opteron processor Model 2352 QC 75W
- Safety instructions/warranty

**Supplies**

For information about Priority Fulfillment Services distribution channels, call 1-888-IBM Media in the U.S. and Canada or visit

http://www.ibm.com/storage/media

**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.

These servers are intended to be installed and secured in a rack. It is a customer’s responsibility to ensure that the server and rack installation are secure to prevent sensitive data from being removed.
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**

**IBM Global Financing**

Yes

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

In the United States, call 800-IBM-SERV (426-7378), or write to:

Warranty Information  
P.O. Box 12195  
Research Triangle Park, NC 27709  
Attn: Dept JDJA/B203

**Warranty Period:**

- Systems - Three years
- Options - One year

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

The following has been designated as consumables or supply items; therefore, not covered by this warranty:

- Battery

**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.

The type of service is Customer Replaceable Unit (for example, keyboard, mouse, speaker, memory, or hard disk drive) Service and On-site Service.

**Customer Replaceable Unit (CRU) Service**

IBM provides a replacement CRU 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. A CRU is designated as being either a Tier 1 or a Tier 2 CRU. Installation of a Tier 1 CRU 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 below, On-site Service.

Based upon availability, a CRU 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 15 days of your receipt of the replacement.

The following have been designated as a Tier 1 CRU:
• Blank filler
• Cable-management arm
• Hard disk drive
• Hot-swap fan
• Hot-swap power supply
• Lift handle kit
• Memory DIMM
• Memory expansion card
• Optical drive
• PCI adapter
• PCI divider
• Power cord
• Service label
• Service processor
• System label
• Top cover
• Voltage regulator module

On-site Service

This provides On-site Repair, 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM or your reseller 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-country service delivery is used.

Call IBM at 1-800-IBM-SERV (426-7378) to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

Calls must be received by 5:00 p.m. local time in order to qualify for NBD service.

International Warranty Service

International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country and the warranty period observed will be that of the country in which machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit:

http://www.ibm.com/support

For more information on IWS, refer to Services Announcement 601-034, dated September 25, 2001.

Licensing
Programs included with this product are licensed under the terms and conditions of the License Agreements that are shipped with the system.

**Maintenance services**

*ServicePac, ServiceSuite, ServiceElect, and ServiceElite*

ServicePac®, ServiceSuite™, ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

**Warranty service upgrade**

During the warranty period, a warranty service upgrade provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

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.

CRUs will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the On-site Service levels specified below.

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.

See the Pricing section for specific offerings.

**Maintenance service**

If required, IBM provides repair or exchange service depending on the type of maintenance 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.

**CRU Service**

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), IBM will ship the CRU 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.

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 15 days of your receipt of the replacement.

**On-site Service**

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.

See the Pricing section for specific offerings.

**Maintenance service (ICA)**
Maintenance services are available for ICA legacy contracts.

**Alternative service (warranty service upgrades)**

During the warranty period, a warranty service upgrade provides an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of On-site Service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

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.

A CRU will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified below, On-site Service.

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.

See the Pricing section for specific offerings.

**Maintenance service**

If required, IBM provides repair or exchange service depending on the type of maintenance 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.

**CRU Service**

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), IBM will ship the CRU 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.

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 15 days of your receipt of the replacement.

**On-site Service**

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.

See the Prices section for specific offerings.

**Non-IBM parts support**

**Warranty service**

IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.
**Warranty service upgrades and maintenance services**

Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, or memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

**IBM hourly service rate classification**

One

**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

**Licensed machine code**

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting


IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support Web site

http://www-304.ibm.com/systems/support/

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

**Educational allowance**

None

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**Pricing**
Product charges

For current prices, contact IBM at 888-Shop-IBM (746-7426) or visit http://www-03.ibm.com/systems/x/

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine type</th>
<th>Model</th>
<th>Feature number</th>
<th>Part number</th>
<th>Monthly rental charge</th>
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</thead>
<tbody>
<tr>
<td>System x</td>
<td>3655</td>
<td>22U</td>
<td></td>
<td>794322U</td>
<td>N/A</td>
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<td><strong>ExpressSeller</strong></td>
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<tr>
<td>System x</td>
<td>3655</td>
<td>E1U</td>
<td></td>
<td>7943E1U</td>
<td>N/A</td>
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<tr>
<td></td>
<td></td>
<td>E2U</td>
<td></td>
<td>7943E2U</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Field Plant install install MES Cables only only removal required**

N  N  Yes  Yes

If field installed on a purchased machine, parts removed or replaced become the property of IBM and must be returned.

The following are newly announced features on the specified models of the IBM System x 7943 machine type:

<table>
<thead>
<tr>
<th>Description</th>
<th>Model</th>
<th>Feature Both numbers support</th>
</tr>
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<tbody>
<tr>
<td>IBM System x3655</td>
<td></td>
<td>AC1</td>
</tr>
<tr>
<td>IBM System x3655</td>
<td></td>
<td>MC1</td>
</tr>
<tr>
<td>Quad Core AMD Opteron Processor Model 2344 HE (1.7GHz, 55W ACP)</td>
<td>AC1</td>
<td>6975  Initial</td>
</tr>
<tr>
<td>Addl Quad Core AMD Opteron Processor Model 2344 HE (1.7GHz, 55W ACP)</td>
<td>AC1</td>
<td>4434  Initial</td>
</tr>
<tr>
<td>2.0GB DDR2 667 MHZ DIMM memory</td>
<td>AC1</td>
<td>3977  Initial</td>
</tr>
<tr>
<td>4.0GB DDR2 667 MHZ DIMM memory</td>
<td>AC1</td>
<td>3978  Initial</td>
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</table>

The following are newly announced features on the specified models of the IBM System x 7940 machine type:

<table>
<thead>
<tr>
<th>Description</th>
<th>MT  Model</th>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>Machine Type: 7940  Models: AC1, MC1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0GB DDR2 667 MHZ DIMM memory</td>
<td>7940</td>
<td>AC1  3977</td>
</tr>
<tr>
<td>4.0GB DDR2 667 MHZ DIMM memory</td>
<td>7940</td>
<td>AC1  3978</td>
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</table>

The Single Entity Offerings (SEO)

<table>
<thead>
<tr>
<th>Description</th>
<th>SEO number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System x3655 - 1.7 GHZ AMD Opteron 2344 Processor, 2x 1 GB, DVD-CDRW, SAS 2.5-inch</td>
<td>794322U</td>
</tr>
<tr>
<td>System x3655 - 1.7 GHZ AMD Opteron 2344 Processor,</td>
<td>7943E1U</td>
</tr>
</tbody>
</table>
4 x 1 GB, DVD-CDRW, SAS/SATA 3.5-inch

System x3655 - 2.1 GHz AMD Opteron 2352 Processor, 7943E2U
4 x 1 GB, DVD-CDRW, SAS 2.5-inch

Option SEO

<table>
<thead>
<tr>
<th>Description</th>
<th>SEO number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quad Core AMD Opteron Processor Model 2344 HE</td>
<td>46M2282</td>
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<tr>
<td>(1.7 GHz/2MBx2 55W ACP)</td>
<td></td>
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</table>

**ServicePac for Warranty and Maintenance**

<table>
<thead>
<tr>
<th>Machine type</th>
<th>Model</th>
<th>Description</th>
<th>ServicePac MTM</th>
<th>ServicePac SEO</th>
</tr>
</thead>
<tbody>
<tr>
<td>7943 All</td>
<td>3 YR IOR 9 x 5 x 4 Hour</td>
<td>6756674</td>
<td>51J9121</td>
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</tr>
<tr>
<td>7943 All</td>
<td>3 YR IOR 24 x 7 x 4 Hour</td>
<td>6756675</td>
<td>51J9122</td>
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<tr>
<td>7943 All</td>
<td>3 YR IOR 24 x 7 x 2 Hour</td>
<td>6756676</td>
<td>51J9123</td>
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<tr>
<td>7943 All</td>
<td>4 YR IOR 9 x 5 NBD</td>
<td>6756677</td>
<td>51J9124</td>
<td></td>
</tr>
<tr>
<td>7943 All</td>
<td>4 YR IOR 9 x 5 x 4 Hour</td>
<td>6756678</td>
<td>51J9125</td>
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<tr>
<td>7943 All</td>
<td>4 YR IOR 24 x 7 x 4 Hour</td>
<td>6756679</td>
<td>51J9126</td>
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<tr>
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<td>4 YR IOR 24 x 7 x 2 Hour</td>
<td>675667A</td>
<td>51J9127</td>
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<tr>
<td>7943 All</td>
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<td>675667B</td>
<td>51J9128</td>
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<td>7943 All</td>
<td>5 YR IOR 9 x 5 x 4 Hour</td>
<td>675667C</td>
<td>51J9129</td>
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<tr>
<td>7943 All</td>
<td>5 YR IOR 24 x 7 x 4 Hour</td>
<td>675667D</td>
<td>51J9130</td>
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<tr>
<td>7943 All</td>
<td>5 YR IOR 24 x 7 x 2 Hour</td>
<td>675667F</td>
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Maintenance Only

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<tr>
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<th>ServicePac SEO</th>
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</thead>
<tbody>
<tr>
<td>7943 All</td>
<td>1 YR IOR 9 x 5 NBD</td>
<td>6756DDF</td>
<td>51J9132</td>
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</tr>
<tr>
<td>7943 All</td>
<td>1 YR IOR 9 x 5 x 4 Hour (MA)</td>
<td>6756DDG</td>
<td>51J9133</td>
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</tr>
<tr>
<td>7943 All</td>
<td>1 YR IOR 24 x 7 x 4 Hour (MA)</td>
<td>6756DDH</td>
<td>51J9134</td>
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<tr>
<td>7943 All</td>
<td>1 YR IOR 24 x 7 x 2 Hour (MA)</td>
<td>6756DDJ</td>
<td>51J9135</td>
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</tr>
<tr>
<td>7943 All</td>
<td>2 YR IOR 9 x 5 NBD</td>
<td>6756DDK</td>
<td>51J9136</td>
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<tr>
<td>7943 All</td>
<td>2 YR IOR 9 x 5 x 4 Hour (MA)</td>
<td>6756DDM</td>
<td>51J9137</td>
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<td>2 YR IOR 24 x 7 x 4 Hour (MA)</td>
<td>6756DDN</td>
<td>51J9138</td>
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</tr>
<tr>
<td>7943 All</td>
<td>2 YR IOR 24 x 7 x 2 Hour (MA)</td>
<td>6756DDP</td>
<td>51J9139</td>
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</tr>
</tbody>
</table>

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