IBM System x3530 M4 general-business rack servers offer the latest Intel Xeon E5-2400 series multicore processors and next-generation microarchitecture

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At a glance

The IBM® System x3530 M4 server delivers dual-socket performance in a 1U compact footprint. Featuring the latest Intel® Romley EN platform, the x3530 M4 is a flexible rack server positioned as a good investment value, while considering total cost of ownership and your IBM commitment. The x3530 M4 offers a wide range of configuration options.

Power, scalability, manageability, and serviceability for dynamic web-serving and business applications deliverable on demand:

- Ultrathin, high-availability, rack-optimized, 1U platform.
- Powerful Intel Xeon™ E5-2400 Series multicore processor with new microarchitecture design featuring Quick Path Interconnect (QPI) technology with Intel Extended Memory 64 Technology (EM64T).
- Support for both UDIMM and RDIMM; up to 32 GB of high-speed DDR3 SDRAM Registered DIMM memory in twelve DIMM slots that support up to 384 GB.
- Support for simple-swap SATA or simple-swap or hot-swap SAS/SATA 3.5-inch HDDs (up to four drives) or 2.5-inch simple-swap or hot-swap SAS/SATA HDDs (up to eight drives).
- Two PCI-Express x8 high-performance Gen 2 slots, and one x4 slot dedicated for Internal hardware RAID.
- Fixed 460-watt, redundant 460-watt or 675-watt high-efficiency power supplies.
- Integrated dual Gigabit Ethernet standard for network communication with easy upgrade to additional two ports on board NIC by FoD.
- Support for embedded hypervisor port activated with optional USB key.
- Built-in Integrated Management Module II (IMM2) with optional upgrade to remote presence though FoD, which supports a consistent management view across your portfolio and offers server monitoring, alerting, and remote control to decrease the time spent and lower the cost supporting your system.
- One 16550A-compatible serial port (rear), seven USB ports (two front, four rear, and one internal), one video port, and one front VGA port (model dependant).
Overview

IBM System x3530 M4 server delivers dual-socket performance in a 1U compact footprint. Featuring the latest Intel Romley EN platform, the x3530 M4 is a flexible rack server positioned as a good investment value, while considering total cost of ownership and your IBM commitment.

The x3530 M4 offers a wide range of configuration options. All of the power supply options meet 80-PLUS certifications to enable greater energy savings while providing redundancy and flexibility to meet your business needs. The x3530 M4 also offers choices of different computing power, 2.5-inch and 3.5-inch hard disk drive (HDD) capability. It also provides smart option upgrades with innovative Feature on Demand (FoD) technology, allowing competitive features with cost advantages. The FoD mechanism offers a simpler design than traditional hardware upgrade path, saving leadtime for feature upgrades when business grows. This high-density, cost-competitive machine is designed to meet all of your general-business needs today, and grow to meet increasing requirements in the future.

Optimized for energy efficiency and performance

An innovative, energy-smart design with powerful high-performance processors, a large capacity of high-performing DDR3 memory, and a balanced feature set make this server ideal for many general business applications:

- Latest Xeon E5-2400 series processors with a powerful multicore design to satisfy various client needs.
- Power supply options that allow choices between fixed or redundant supplies as well as capacities. designed to meet 80-PLUS certifications for greater energy efficiency and savings.
- Redundant cooling fans, low-voltage memory, and energy-smart design to enable lower power and help lower operational costs.
- Highly functional chipset optimized for better application computing supporting general-business workloads.
- Twelve DIMM slots that enable deployment of up to 384 GB of DDR3 SDRAM Registered DIMM memory, with up to 32 GB of memory standard.
- Standard simple-swap SATA or hot-swap SAS/SATA 3.5-inch HDDs (up to four drives) or 2.5-inch hot swap SAS/SATA HDDs (up to eight drives).
- Integrated dual Gigabit Ethernet standard for network communication with easy upgrade to additional two ports on-board NIC by Feature on Demand (FoD).
- Support for embedded hypervisor port activated with optional USB key.
- Two PCI-Express x8 high-performance Gen 3 slots, and one x4 slot dedicated for Internal HW RAID.
- Built-in Integrated Management Module II (IMM2) with optional upgrade to remote presence through FoD, which supports a consistent management view across your portfolio and offers server monitoring, alerting, and remote control to decrease the time spent and lower the cost of supporting your system.
- Integrated IBM System x® ToolsCenter and ServerGuide to help you easily install and maintain the server.

Manage with efficiency

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

- Newly designed light path front panel helps identify system failures without opening the chassis or interrupting system operation. An optional upgrade to Advanced Lightpath Kit provides richer system serviceability.
- IBM Systems Director Active Energy Manager™ (AEM) for advanced power management, including near-real-time monitoring, trending, and reporting of power consumption.
- Configurable Unified Extensible Firmware Interface (UEFI) setup.
• IMM2 systems management processor on planar that provides better security and system management; optional upgrade to remote presence by FoD key.
• Monitoring and control of operating status and key server components.
• Intelligent Platform Management Interface (IPMI) 2.0-compliant full IMM2 for enterprise-class systems management to monitor, maintain, and maximize server availability, including optional upgrade for full remote systems management.
• Predictive Failure Analysis (PFA) on selected components that helps warn of problems before they occur.
• Fast and easy servicing through innovative light path diagnostics and improved onboard diagnostics.

**Ultimate fault tolerant protection**

• Redundant fans with calibrated vectored cooling (to keep components cool), and simplified fan replacement.
• Selection between cost-optimized fixed power supplies and redundant power supplies. Hot-swap, redundant power supplies are designed to help reduce downtime.
• High-performance hot-swap SAS and SATA HDDs.
• Hot-swap SATA/SAS models support hardware RAID-0, RAID-1, and RAID-10 (model dependant) or RAID-0, RAID-1, RAID-10, RAID-5, and RAID-50 with different option of cache or flash. All models are able to upgrade to advanced hardware RAID options (optional RAID-0, RAID-1, RAID-10, RAID-5, RAID-50, RAID-6, and RAID-60 with SED and optional cache and flash).
• IBM Director and web support.
• Three-year, customer replaceable unit (CRU) and on-site labor\(^1\), limited warranty\(^2\); optional warranty service upgrades available.

\(^1\) You may be asked certain diagnostic questions before a technician is sent.

\(^2\) For information on IBM Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request.

**Key prerequisites**

• Monitor
• USB keyboard
• USB mouse

**Note:** PS/2 style keyboard and mouse are not supported.

**Planned availability date**

December 14, 2012

**Description**

**System x3530 M4-related options**

System x3530 M4 servers feature an Intel Xeon multicore processor that supports internal processing speeds of up to 2.80 GHz, and processing operations to memory up to 1600 MHz. They contain integrated, full-speed L3 cache.

**High-performance server subsystems**

These servers are high-throughput, network servers with excellent scalability when you add memory and a second processor.

Two Intel Xeon connectors are standard on the system board to support installation of a second processor. High-speed DDR3 SDRAM Registered DIMM memory is
optimized for 1066 MHz, 1333 MHz, or 1600 MHz processor-to-memory subsystem performance.

Additional features

- Powerful Intel multicore processor support
- System board containing 12 DIMM connectors, supporting 4 GB UDIMM or 4 GB, 8 GB, or 16 GB DDR3 SDRAM Registered DIMM or 32 GB DDR3 LRDIMM memory, with:
  - Support for up to 384 GB of system memory
  - Support for two DIMMs Per Channel (2DPC) at 1600 MHz for Intel Xeon processors
- SAS/SATA controller
- Internal hardware RAID card support for high-speed dual differential pairs to communicate with hot-swap SAS/SATA HDDs
- Intel Ethernet Controller I350 Dual 1 Gb on board plus Intel I-350 Embedded Dual Port 1 GbE Activation for IBM System x (FoD) speeding network communications to LAN clients

The System x3530 M4 subsystems are tuned to provide solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features combined with multicore capability make this server an excellent choice for:

- Database
- Linux™ clusters
- File and print
- Virtualization
- Online gaming
- Video and photo sharing
- Web searching
- Blogging and messaging
- Video recording
- Mail server (Notes® and Exchange)

High-availability and serviceability features

The System x3530 M4 server subsystem delivers excellent reliability and serviceability features:

- Four 3.5-inch simple-swap SATA or simple-swap or hot-swap SAS/SATA or eight 2.5-inch SFF simple-swap or hot-swap SAS/SATA HDDs bays
- Redundant simple-swap cooling fans
- Fixed power supplies or optional hot-swap, redundant power supplies
- 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 to improve data integrity and help reduce downtime
- PFA on memory and HDD options to help alert the system administrator of an imminent component failure
- Intel I350 Gigabit Ethernet controllers that support:
  - Failover
  - PXE 2.0 Boot Agent
  - IPMI 2.0
  - Wake on LAN
- Worldwide, voltage-sensing 460-watt or 675-watt high-efficiency power supplies
- Up to six sets of counter-rotating fans that provide excellent cooling for added reliability:
- Each power supply comes with its own internal cooling fan
- Redundant fans cool processor, memory, and HDD bays
- Fan speed controls are incorporated to reduce noise, while reducing system temperatures
- Integrated systems management processor for diagnostic, reset, POST, and auto recovery functions; monitoring temperature, voltage, and fan speed; alerts generated when thresholds are exceeded (refer to the Limitations section for restrictions)
- Information LED panel giving visual indications of system well-being
- Light path diagnostics and onboard diagnostics providing an error log that can help find a failing component, helping reduce downtime and service costs
- Easy access to system board, adapter cards, processor, and memory
- CPU failure recovery in dual-socket configurations:
  - Forces failed processor offline
  - Reboots server automatically
  - Generates alerts
  - Continues operations with the working processor

**Expandability and growth**
The System x3530 M4 server contains high levels of function and storage capacity for a 1U, 17.6-inch rack-drawer package. It supports customer installation of adapters, processors, memory, and HDD options. Functions such as SVGA video, SATA, and Gigabit Ethernet controller are integrated on the system board. An internal hardware RAID card is needed for system hot-swap SATA/SAS HDD drives. Features include:

- Rack-optimized design for 17.6-inch-wide, industry-standard rack cabinets (supported in the NetBAY42 and NetBAY25)
- Twelve DIMM sockets capable of support for up to 384 GB of system memory
- Four 3.5-inch simple-swap, simple-swap or hot-swap SATA or eight 2.5-inch SFF, simple-swap or hot-swap SAS/SATA HDD bays

**Systems Management Module II (IMM2)**
The System x3530 M4 includes an IMM2 that provides industry-standard Intelligent Platform Management Interface (IPMI) 2.0-compliant systems management. The IMM2 comes standard, and shares one of the two onboard Ethernet ports for access. The IMM2 can be accessed by software that is compatible with IPMI 2.0 (for example, xCAT). The client is able to make a choice between a dedicated or shared system management port by firmware modification.

Features and benefits:

- Monitoring:
  - System voltages
  - Battery voltage
  - System temperatures
- Fan speed control
- Fan tachometer monitor
- Good power signal monitor
- System ID and planar version detection
- System power and reset control
- NMI detection (system interrupts)
- SMI detection and generation (system interrupts)
- Serial port text console redirection
- System LED monitor (power, HDD, activity, alerts, and heartbeat)
• Identify LED control
• An embedded web server that enables remote control from any standard web browser; no additional software is required on the remote administrator’s workstation
• The ability for administrators to use the command-line interface (CLI) from a Telnet session to perform some of the functions that can be performed from the web server
• Secure Sockets Layer (SSL) and Lightweight Directory Access Protocol (LDAP)
• Built-in LAN and serial connectivity that supports virtually any network infrastructure
• Multiple alerting functions that warn systems administrators of potential problems through email, IPMI PETs, and SNMP

In addition, you can purchase an optional FoD Key to enable the remote presence and blue-screen capture features. This key enables easy console redirection with text and graphics, keyboard, and mouse support (operating system must support USB) over the system management LAN connections.

With video compression now built into the adapter hardware, the adapter allows the greater screen sizes and refresh rates that are available in the marketplace. This feature helps enable the user to display server activities from power-on to full operation remotely with remote user interaction at virtually any time.

**IBM Director**

The System x3530 M4 server also features 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 to access and manage physically dispersed IT assets more efficiently over the Internet. It can help reduce costs through potentially:

• Reducing downtime
• Increasing productivity of IT personnel and users
• Reducing 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.

IBM Director includes a portfolio of integrated server tools that work with the systems management monitoring functions. Typical functions and monitoring capabilities can include:

• PFA-enabled critical hardware components
• Temperature
• Voltage
• Fan speed
• Light path diagnostics

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 bootup 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:
  - Memory
  - HDDs

- Define automated actions, such as:
  - Send email or page to an administrator
  - Run a command or program
  - Deliver 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 integrates into leading workgroup and enterprise systems management environments through the use of upward integration modules (available from IBM and third parties). Advanced management capabilities built into System x 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 x3530 M4 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 over the long haul. 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 Predictive Failure Analysis (PFA).
- The ServerProven® program lets you confidently configure your server with various devices and operating systems. This program provides compatibility information from actual testing of the System x3530 M4 server with various adapters and devices.
- The web-based ServerGuide 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.

**Note:** IBM makes no warranties, expressed or implied, regarding non-IBM products and services that are ServerProven, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.
**Emulex VFA III FCoE/iSCSI License for IBM System x (FOD)**

The Emulex VFA III FCoE/iSCSI license for IBM System x (part number 95Y3760) is an enhancement to the existing Virtual Fabric Adapter III portfolio. This will allow IBM clients to simplify their I/O infrastructure while also reducing overall hardware acquisition costs. Existing Virtual Fabric Adapter III clients can now deploy FCoE / iSCSI using the new software license key.

**Overview**

The Emulex VFA III FCoE/iSCSI license for IBM System x offers:

- Flexible deployment of FCoE / iSCSI and Ethernet using a software key and only our existing Emulex 10 GbE Virtual Fabric Adapter III for IBM System x (95Y3762) and Emulex 10 GbE Integrated Virtual Fabric Adapter III for IBM System x (95Y3768)
- The ability to run multiple protocols (Ethernet, FCoE) on the same Emulex 10 GbE Virtual Fabric Adapter III for IBM System x (95Y3762) and Emulex 10 GbE Integrated Virtual Fabric Adapter III for IBM System x (95Y3768)

**Features and benefits**

Emulex VFA III FCoE/iSCSI license for IBM System x enables convergence of FCoE protocol with standard Ethernet traffic. By using the Virtual Fabric aspects, the 10 Gigabit interface can be partitioned into four logical NIC interfaces running Ethernet traffic, or the port can be assigned to transmit FCoE or iSCSI. This consolidates the traffic of three types of protocols onto a single adapter.

**Fast and scalable**

- True line-rate 10 Gb performance.
- FCoE / iSCSI bandwidth provisioning from 100 Mbs to 10 Gbs enabling faster virtual machine (VM) booting and faster backup in case of disaster recovery.
- Clients can upgrade to FCoE / iSCSI without losing their existing investment in switches and adapters.

**Flexible**

- Each port operates anywhere between 100 Mb and 10 Gb and can run as Ethernet NIC, iSCSI, or FCoE.
- The adapter offers an easy transition from 1 Gb to 10 GbE and to FCoE or iSCSI.

**Reliable**

- Intelligent Failure Monitoring enables automatic failover between physical or virtual ports in an event of uplink port failure.
- Recovery from failures is easy even when operating with virtual ports.
- Uses proven Emulex LightPulse Fibre Channel drivers for FCoE support

**Key prerequisites**

- Emulex 10 GbE Virtual Fabric Adapter III for IBM System x (95Y3762)
- Emulex 10 GbE Integrated Virtual Fabric Adapter III for IBM System x (95Y3768)

Refer to the IBM ServerProven plan at


IBM System x provides end-to-end testing for selected iSCSI and FCoE configurations. Refer to

http://www-03.ibm.com/systems/support/storage/ssic/interoperability.wss
Intel Ethernet Controller I350 Dual 1 Gb on board plus Intel I-350 Embedded Dual Port GbE Activation for IBM System x (FoD)

Overview
This IBM Server ships with four physical ports of 10/100/1000 based on Intel's I-350 Ethernet Controller. Two ports are active in the standard configuration, and the other two are dormant. Clients may purchase a license that will activate the dormant two ports by purchasing Intel I-350 Embedded Dual Port GbE Activation for IBM System x (FoD).

This provides the client with a total of four ports of 10/100/1000 Ethernet without using any PCIe slots.

Features at a glance:

- GigE Pay as you grow with IBM Feature on Demand. This nondisruptive enablement process is perfect for clients who require a low-cost 2-port GigE network solution that is included in the standard configuration. Those clients, who desire the flexibility of adding additional ports, while not having to open the server and insert new adapters, will enjoy the convenience and practicality of this IBM solution. IBM's FoD will activate the two dormant ports on the server, bringing the total number of ports up to four while not using any PCIe slots.

- Energy Efficient Ethernet (EEE). The I350 supports the IEEE802.3az EEE standard so that during periods of low network activity, EEE reduces the power consumption of an Ethernet connection by negotiating with the switch port to transition to a low power idle (LPI) state. This reduces power to approximately 50% of its normal operating power, saving power on both the network and the switch ports. When increased traffic is detected, the controller and the switch quickly come back to full power to handle the increased traffic. EEE is supported for both 1000BASE-T and 100BASE-TX.

- DMA Coalescing (DMAC). Typically, when a packet arrives, DMA calls are made to transfer the packet within the server. These calls "wake up" the processor, memory, and other system components from a lower power state in order to perform the tasks required to handle the incoming packet.

- LAN Acceleration. TCP stateless offloads including TCP/IP checksum, TCP segmentation, Receive Side Coalescing (RSC), and Receive Side Scaling (RSS). iSCSI accelerations benefit from CRC offloads as well as integrated host-based initiators running on the host processor. I/O Virtualization technologies such as VMDq (used in VMware NetQueue and Microsoft VMQ) provide increased throughput and reduced CPU usage by offloading the network processing in the hypervisors. Flexible I/O Virtualization.

- The Intel I350 includes Virtualization Technology for connectivity (VT-c) to deliver I/O virtualization and QoS features designed directly into the silicon. Using VT-c, network connectivity models used by servers today evolve to more efficient models by providing port partitioning, multiple Rx/Tx queues, and on-controller QoS functionality for both virtual and nonvirtual servers.

- VMDq. VMDq works in conjunction with VMware NetQueue or Microsoft Virtual Machine Queues (VMQ), in their respective hypervisors, to use the on-controller sorting and queuing functionality for traffic steering and Rx/Tx round-robin scheduling for balanced bandwidth allocation across multiple transmit and receive queues. These technologies enable the hypervisor to represent a network port as multiple ports that are as signed to the VMs to improve overall performance of I/O operations.

Key product specifications
Intel I-350 Embedded Dual Port GbE Activation for IBM System x (FoD)

Key Ethernet features:

- IEEE 802.3 auto-negotiation
- 1 Gbps Ethernet IEEE 802.3, 802.3u, 802.3ab PHY specifications compliant IEEE 802.3x and 802.3z compliant flow control support with software-controllable Rx thresholds and Tx pause frames
- IEEE 1588 protocol and 802.1AS implementation
- Automatic crossover detection function (MDI/MDI-X)
- IEEE802.3az - Energy Efficient Ethernet (EEE)
- Full wake up support: Advanced Power Management (APM) Support formerly Wake on LAN Advanced Configuration and Power Interface (ACPI) specification v2.0c Magic Packet wake-up enable with unique MAC address
- MAC and VLAN anti-spoofing
- Storm control
- Per-pool statistics, offloads, and jumbo support
- IEEE 802.1q Virtual Local Area Network (VLAN) support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags
- IEEE 802.1q advanced packet filtering
- Mirroring rules

I/O Virtualization features:

- Eight transmit (Tx) and receive (Rx) queue pairs per port
- Flexible Port Partitioning with 32 Virtual Functions on Quad-port or 16 Virtual Functions on Dual-port
- Support for PCI-SIG SR-IOV specification
- Rx/Tx Round-Robin Scheduling
- Traffic isolation and traffic steering
- VM to VM packet forwarding (packet loopback)
- Malicious driver detection
- Independent Function Level Reset (FLR) for physical and virtual functions
- Support for simple VEPA
- VF promiscuous modes

Stateless offloads and performance features:

- TCP/UDP, IPv4 checksum offloads (Rx/ Tx/Large-send); Extended Tx descriptors
- IPv6 support for IP/TCP and IP/UDP receive checksum offload
- Tx TCP segmentation offload (IPv4, IPv6)
- Transmit Segmentation Offloading (TSO)
- Interrupt throttling control
- Legacy and Message Signal Interrupt (MSI)
- Message Signal Interrupt Extension (MSI-X)
- Receive Side Scaling (RSS) for WindowsScalable I/O for Linux environments (IPv4, IPv6, TCP/UDP)
- Support for packets up to 9.5 KB (jumbo frames)

**Standard System x3530 M4 configurations**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Processor</th>
<th>Memory</th>
<th>GTS</th>
<th>Interface</th>
<th>HDD</th>
<th>Other</th>
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<tr>
<td>7160F2x</td>
<td>2.4 GHz</td>
<td>4 GB</td>
<td>7.2</td>
<td>S/S SATA/SATA</td>
<td>2.5-in</td>
<td>Open Bay</td>
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**Note:** The model "x" designation is geography-dependent and is spelled out explicitly in the Product number section.
Product positioning

System x3530 M4 is a 1U, dual-socket rack server for single or multiple general business application hosting built on innovative IBM X-Architecture® leveraging Intel QPI technology. Featuring power-optimized, high-performance Intel Xeon multicore processors, and an energy-efficient design with balanced functionality, the System x3530 M4 can help reduce cost, improve service, and allow you to manage risk easily and simply.

The System x3530 M4 is suitable for midmarket and SMB rack clients looking to optimize their IT budgets, and is designed for single or multiple general business application hosting and virtualized, nonblade environments.

Optimized for speed

The new System x3530 M4 server models offer new levels of fast Intel Xeon multicore processors with up to 8.0 GT/s QPI speed and lower power for datacenter environments and collaboration applications. This server is uniquely optimized for better application computing with a highly functional chipset and twelve DIMM slots for a maximum of 384 GB of DDR3 SDRAM.

Intel Turbo Boost Technology is one of the many exciting new features that Intel has built into the latest-generation Intel microarchitecture. It automatically allows processor cores to run faster than the base operating frequency if they are operating below power, current, and temperature specification limits.

Innovation comes standard

- Boost application efficiency with snoop filters that free up cache and improve processor performance.
- A basic light path improves in-rack manageability and allows easy problem identification.

Ultimate fault tolerant protection

- Memory mirroring/sparing/independent feature enables you to increase memory reliability.
- Simple-swap or hot-swap SATA/SAS models support hardware RAID-0, RAID-1, RAID-5, and RAID-10 (model dependant).

Target applications

- Database
- Email collaboration
- Online gaming
- Video and photo sharing
- Web searching
- Blogging and messaging
- Video recording
- Mail server (Notes and Exchange)
- File and print
- Virtualization
- Linux clustering
- Scientific and technical computing
Product number

Note: EMEA are GAV models

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<th>Description</th>
<th>MT</th>
<th>Mod</th>
<th>Part Number</th>
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Starting Point models

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<td>System x 3530 M4 Starting Point</td>
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Options

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<th>Part number</th>
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<tr>
<td>00W2146</td>
<td>Rail Kit for x3630 M4 and x3530 M4</td>
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<tr>
<td>00W2186</td>
<td>IBM 64GB SATA 3.5&quot; MLC HS Enterprise Value SSD</td>
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<tr>
<td>00W2191</td>
<td>IBM 128GB SATA 3.5&quot; MLC HS Enterprise Value SSD</td>
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<td>IBM 256GB SATA 3.5&quot; MLC HS Enterprise Value SSD</td>
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<td>IBM 512GB SATA 3.5&quot; MLC HS Enterprise Value SSD</td>
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<td>00J6451</td>
<td>675W -48V Redundant DC PSU</td>
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Pseudo part numbers

Note: The following pseudo part numbers cannot be ordered as stand-alone parts and can only be ordered by configurator.

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<thead>
<tr>
<th>Pseudo part number</th>
<th>Description</th>
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<td>00W2141</td>
<td>x3530 M4 Label GBM</td>
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<td>00W2415</td>
<td>IBM System x 2.5&quot; Simple Swap Disk Filler</td>
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<td>94Y6485</td>
<td>x3530 M4 front VGA Cable for 2.5&quot; HDD configuration</td>
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<tr>
<td>00W2145</td>
<td>x3530 M4 2.5&quot; Simple Swap Bracket ASM Kit</td>
</tr>
</tbody>
</table>

Publications

The following items are shipped with the System x3530 M4 server.

- System x3530 M4 Installation and User's 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 System x3530 M4 server. This publication in English and translation versions can be found in Documentation CD.

Note: 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 x3530 M4 Installation and User's Guide, in US English versions, is available from The IBM Publications Center

http://www.ibm.com/shop/publications/order
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. Payment options for orders are via credit card (in the US) or customer number for 20 countries. A large number of publications are available online in various file formats, and they can all be downloaded by all countries, free of charge.

**Services**

**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.

**Technical information**

**Specified operating environment**

**Physical specifications**

**Note:** The model "x" designation is geography-dependent and is spelled out explicitly in the Product number section.

- 7160F2x
- Processor: Xeon E5-2440 6C (95w)
- Internal speed: 2.4 GHz
- External speed: 7.2 GTS
- Number standard: 1
- Maximum: 2
- L3 cache (full-speed): 15 MB
- Memory: 4 GB ECC 1333 MHz RDIMM
- RDIMMs: 1 x 4 GB (2Gb,1Rx4,1.35V)
- DIMM sockets: 12
- Capacity: 384 GB
- Video: SVGA
- Memory: 16 MB
- HDD controller: SATA
- Channels: 8
- Connector internal: 2
- HDD: 1
- Total bays: 8
- 5.25 slim: 0
3.5-in tape 0  
Simple-swap (3.5-in) 0  
Simple-swap (2.5-in) 8  
Hot-swap (3.5-in) 0  
Hot-swap (2.5-in) 0  
Internal capacity 12 TB  
Bays available 8  
5.25 slim 0  
3.5-in tape 0  
Simple-swap (3.5-in) 0  
Simple-swap (2.5-in) 8  
Hot-swap (3.5-in) 0  
Hot-swap (2.5-in) 0  
Total PCI slots 3  
PCI_E (x8) 2  
PCI_E (x16) 0  
PCI_E (x4) 1  
System management Standard  
Ethernet controller Dual 1 Gb  
Additional NIC (FoD) 2  
Optical drive (SATA) None  
Power supply 460 W  
Number standard 1  
Maximum 2  
Hot-swap YES  
Redundant power YES  
Auto restart YES  

3 Maximum of 384 GB by using twelve 32 GB optional DIMMs.  
4 The standard system can hold four 3.5-inch SS/HS SATA HDDs or eight 2.5-inch SS/HS SAS/SATA HDDs. Maximum capacities are based on installation of four 3.5-inch 3 TB SS/HS SAS/SATA HDDs or eight 1 TB 2.5-inch SAS/SATA HDDs.  
5 Two PCIe x8 is the standard feature for PCI slot 1 or may be replaced with the PCI Riser Card x16 (via CTO).  

Note: For the latest information on supported options, refer to the Sales Manual or visit  

Multi-Burner Plus Drive  
- Specifications:  
  - DVD-ROM (3.3x-8x CAV, 4.7 GB DVD-ROM read): 4.58 - 11.08 Mbps  
  - DVD-ROM (3.3x-8x CAV, 8.5 GB Dual-layer read): 4.58 - 11.08 Mbps  
  - DVD-R/+R (3.3x-8x CAV, 4.7 GB DVD-R/+R read): 4.58 - 11.08 Mbps  
  - DVD-R/+R (3.3x-8x CAV, 8.5 GB DVD-R/+R read): 4.58 - 11.08 Mbps  
  - DVD-RW/+RW (3.3x-8x CAV, 4.7 GB DVD-RW/+RW read): 4.58 - 11.08 Mbps  
  - DVD-RAM (2x-5x PCAV, 4.7 GB DVD-RAM read): 2.77 - 6.925 Mbps  
  - CD-R/RW/ROM (8-24x CAV, read): 1.2 - 3.6 Mbps  
  - DVD-R/+R (3.3x-8x CAV, 4.7 GB DVD-R/+R write): 4.58 - 11.08 Mbps  
  - DVD-R/+R (3.3x-8x CLV, 8.5 GB DVD-R/+R Dual-layer write): 4.58 - 11.08 Mbps  
  - DVD-RW (2x-6x CLV, 4.7 GB DVD-RW write): 2.77 - 8.31 Mbps  
  - DVD-RW (2x - 8x ZCLV, 4.7 GB DVD-RW write): 2.77 - 11.08 Mbps  
  - DVD-RAM (2x-5x PCAV, 4.7 GB DVD-RAM write): 2.77 - 6.925 Mbps  
  - CD-RW (8-24x ZCLV, write): 1.2 - 3.6 Mbps  
- Max burst data transfer rate: Ultra DMA Mode 4: 66.6 Mbps  
- Average access times:  
  - DVD-ROM including latency and error correction: 145 ms  
  - DVD-RAM including latency and error correction: 175 ms
- CD-ROM including latency and error correction: 125 ms

**Video subsystem**
- SVGA compatible video controller (Matrox G200eR2).
- Integrated on Integrated Management Module II (IMM2).
- Integrated on planar and connected to the PCI bus.
- DDR3 528 MHz or 504 MHz SDRAM video memory controller.
- Video memory is not expandable.
- One DVI (Digital Video Interface) is not used.
- Avocent Digital Video Compression (with IBM Integrated Management Module Advanced Upgrade option).

**Supported video modes**

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
<th>Refresh</th>
<th>Bpp</th>
</tr>
</thead>
<tbody>
<tr>
<td>640</td>
<td>400</td>
<td>60, 72, 75, 85</td>
<td>8, 16, 24</td>
</tr>
<tr>
<td>800</td>
<td>600</td>
<td>60, 72, 75, 85</td>
<td>8, 16, 24</td>
</tr>
<tr>
<td>1024</td>
<td>768</td>
<td>60, 70, 75, 85</td>
<td>8, 16, 24</td>
</tr>
<tr>
<td>1280</td>
<td>1024</td>
<td>60, 75</td>
<td>8, 16, 24</td>
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<tr>
<td>1440</td>
<td>900</td>
<td>60</td>
<td>8, 16, 24</td>
</tr>
<tr>
<td>1600</td>
<td>1200</td>
<td>60, 75</td>
<td>8, 16, 24</td>
</tr>
<tr>
<td>1680</td>
<td>1050</td>
<td>60</td>
<td>8, 16, 24</td>
</tr>
</tbody>
</table>

The maximum resolution of the video controller is 1600 x 1200\(^\text{6}\) at 75 Hz.

\(^{6}\) The maximum screen resolution is not supported for all Bits per Pixel (color depth) and refresh rates. The maximum Bits per Pixel (color depth) is not supported for all resolutions and refresh rates.

**Dimensions**
- 1U Rack Drawer:
  - Width: 447 mm (17.6 in)
  - Depth: 673 mm (26.5 in)
  - Height: 43 mm (1.69 in)
- Rack:
  - Weight: (minimum configuration) 10.4 kg (22.9 lb)
  - Weight: (maximum configuration) 15.6 kg (34.3 lb)

**Electrical**
Models with 460 W fixed power supplies:
- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 6.0 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.0 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.13 kVA
  - Maximum configuration: 0.57 kVA

Models with 460 W Redundant power supplies:
- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 5.6 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 2.8 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.12 kVA
  - Maximum configuration: 0.53 kVA
Models with 675 W Redundant power supplies:

- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; 7.8 A
- 200 to 240 (nominal) V ac; 50 Hz or 60 Hz; 3.8 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.14 kVA
  - Maximum configuration: 0.77 kVA

Models with DC 675 W Redundant power supplies:

- -40 to -75 (nominal) V dc; 18.34 A
- Input kilovolt-amperes (kVA) (approximately):
  - Minimum configuration: 0.14 kVA
  - Maximum configuration: 0.77 kVA

Btu output:

- Minimum configuration: 406.03 Btu/hr (AC 119 watts)
- Maximum configuration: 2627.35 Btu/hr (AC 770 watts)
- Noise level (horizontal position): 6.5 bels (operating)
- Noise level (horizontal position): 6.3 bels (idle)

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

System x3530 M4 is intended for use as rack-drawer servers and are tested and designed to operate in a horizontal position.

- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)

**Operating environment**

Air temperature:

- Server on: 5°C to 40°C (41°F to 104°F); altitude: 0 to 915 m (3,000 ft)
- Server on: 5°C to 32°C (41°F to 89.6°F); altitude: 915 m (3,000 ft) to 2,134 m (7,000 ft)
- Server on: 5°C to 28°C (41°F to 82.4°F); altitude: 2,134 m (7,000 ft) to 3,050 m (10,000 ft)
- Server off: 5°C to 45°C (41.0°F to 113°F)
- Shipping: -40°C to 60°C (-40°F to 140°F)

Humidity:

- Server on: 8% to 85%, Max. Dew Point 24°C, Max. rate of change 5°C/hr
- Server off: 8% to 80%, Max. Dew Point 27°C
- Shipping: 5% to 100%

Design to ASHRAE Class A3, ambient of 35°C to 40°C, with relaxed support:
• Support cloud like workload with no performance degradation acceptable (Turbo-Off)
• Under no circumstance, can any combination of worst case workload and configuration result in system shutdown or design exposure at 40°C

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

- USB keyboard
- USB 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:

- USB keyboard
- USB mouse
- HDD
- Display

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

**Software requirements**
The following software products have been tested by IBM and software publishers in the latest available versions, and where appropriate, are, or will soon be, certified by the publisher to be compatible with the System x3530 M4.

**Operating systems**

- Linux
  - Red Hat Enterprise Linux 6.3 - 32 bit
  - Red Hat Enterprise Linux 6.3 - 64 bit (including KVM)
  - Red Hat Enterprise Linux 5.8 Server x64 Edition
  - Red Hat Enterprise Linux 5.8 Server with Xen x64 Edition
  - Red Hat Enterprise Linux 5.8 Server x86 Edition
  - SUSE Linux Enterprise Server 10 SP4 for AMD64/EM64T
  - SUSE Linux Enterprise Server 10 SP4 for x86
  - SUSE Linux Enterprise Server 11 SP2 for x86
  - SUSE Linux Enterprise Server 11 SP2 for AMD64/EM64T
  - SUSE Linux Enterprise Server 11 SP2 with Xen for AMD64/EM64T
- VMware
  - VMware ESX 4.1 u3
  - VMware ESXi 4.1 u3
  - VMware ESXi 5.0 u1
  - VMware ESXi 5.1
- Microsoft
  - Windows™ 2012
Note: For information on additional support, certification, version information, or network operating systems, visit

http://www-03.ibm.com/servers/eserver/serverproven/compat/us/

Compatibility

The System x3530 M4 server contains licensed system programs that include set configuration, set features, and test programs. System UEFI is loaded from a flash EEPROM into system memory. This BIOS provides instructions and interfaces designed to support the standard features of the System x3530 M4 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

http://www-03.ibm.com/servers/eserver/serverproven/compat/us/

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

- Solid-state memory cells have an intrinsic, finite number of write cycles that each cell can incur. As a result each solid-state device has a maximum amount of write cycles to which it can be subjected, documented as Total Bytes Written (TBW). IBM is not responsible for replacement of hardware that has reached the maximum guaranteed number of write cycles. This limit may be revealed as the device failing to communicate to system-generated commands or becoming incapable of being written to.

- The System x3530 M4 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 altering the BIOS. The default configuration 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.

- System x3530 M4 servers can address a maximum of 384 GB of system memory. All supported system memory is addressable through direct memory access. The System x3530 M4 server supports 4 GB UDIMM and 2 GB, 4 GB, 8 GB, and 16 GB DDR3 SDRAM Registered DIMM and 32 GB DDR3 LRDIMM memory. All supported DIMMs can coexist in the same system. Refer to the Planning information section for supported memory options.

- The IBM x3530 M4 contains built-in Software RAID, ServeRAID C105. It supports SATA drives and either a RAID 0 or RAID 1 array must be created. VMware does not support ServerRAID C105 and there is no native driver support for Linux distributions. The ServeRAID H1110 Controller for IBM System X, Option Part Number 81Y4492, is a cost-optimized hardware RAID upgrade which supports SAS or SATA drives and is supported natively by all operating systems supported on x3530 M4.

- To ensure proper air flow for cooling, the System x3530 M4 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 upgrades must be of the same QPI link speed, Integrated Memory Controller frequency, core frequency, power segment, internal cache size and type. Mixing processors of different stepping levels but same model (as per CPUID instruction) is supported. Mixing microprocessors of different QPI, core speed, cache size, core quantity and power segment is not supported.
Refer to the Software requirements section for operating system limitations.

Planning information

Customer responsibilities

System x3530 M4 and related options

The System x3530 M4 server and related options are designated as customer setup. Customer setup instructions are shipped with system and options.

Configuration information

Rack installations

System x3530 M4 1U rack-drawer models are designed to be installed in a 17.6-inch rack cabinet designed for 673 mm (26.5 in) deep devices, such as the NetBAY42U ER and NetBAY42U SR. Installation into some of the older Netfinity® racks (9306900, 9306910, 9306200) will require a rack extension kit for proper cable bend radius and cooling.

If a System x3530 M4 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 635 - 788 mm (25 - 31 in)
- The thickness of the mounting flanges must be 1.9 - 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 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, power distribution units, 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 x3530 M4 server is an Intel Xeon processor system that supports internal processing speeds of up to 2.40 GHz and processing operations to memory up to 1600 MHz. It contains an integrated, shared among cores L3 cache. This dual-socket system supports a second processor with the same QPI link speed, Integrated Memory Controller frequency, core frequency, power segment, internal cache size and type of processor as the first.
Power considerations

The System x3530 M4 server includes 460-watt or 675-watt high efficiency power supplies. This power supply is capable of providing sufficient power to run the server fully configured with supported devices.

Supported power options

The following power options are supported:

- 675 W high efficiency redundant power supply
- 460 W high efficiency redundant power supply

Cable orders

The dual 10/100/1000 Mbps, full-duplex, Ethernet PCI-E controllers, standard with the System x3530 M4 server, are connected directly to independent RJ-45 connectors. The RJ-45 connectors provide a 10/100/1000 Base-T interface (either at 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 a UTP cable with RJ-45 connectors at both ends. For 100 Mbps, or higher, Category 5e, 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 x3530 M4 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

One box

- System unit carton: System unit
- Country kit
  - System x3530 M4 Documentation CD
  - Rack Installation Guide

The System x3530 M4 server is shipped in a single package. The country kit is contained inside the system unit carton.

Processor upgrade options

- Intel Xeon processor
- Safety instructions and 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.

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.

Global Technology Services

Contact your IBM representative for the list of selected services available in your country, either as standard or customized offerings, for the efficient installation, implementation, and/or integration of this product.

Terms and conditions

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

Warranty period

- System - Three years
- Optional features - One year

**Note:** For configurations that support the RAID Battery, the RAID battery will be warranted for 1 year effective on its "Date of Installation". All other product warranty terms for the machine remain unchanged.

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature which replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature is the same as the machine it is installed.

The following have been designated as consumables, supply items, or structural parts and therefore not covered by this warranty:

- Tape filler
- EMC blank filler
- EIA sET kit
- Safety cover
- Airflow baffle
- Gen-III slide kit
- Gen-III 1U CMA kit
- DVD blank filler
- Blank fan filler
- MISC part kit
- Battery holder
- PSU filler
- CMA assembly Kit
- CMA, 2U/4U kit
- Remote battery tray
- Gen-III 2U CMA kit
- Slide kit
- Hard drive cage

**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 website. Certain machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines On-site Service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. 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 normal IBM 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 (mandatory) or a Tier 2 (optional) CRU. Installation of Tier 1 CRUs, as specified in this announcement, 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 designated for your machine.

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 parts or features have been designated as Tier 2 CRUs:

- System Planar Board
- Processors (CPUs)/Heatsink

Other parts, including the following been designated as Tier 1 CRUs:

- CMOS batteries
- Hard disk drives
- System fan
- Power supply
- Memory DIMM
- Optical drive
- PCI adapter
- Power cord
- Service label
- System label
- Hyper visor USB key
• PCI riser
• RAID card without Battery
• Tape drive
• Ethernet daughter card
• Backplanes/backplate

**On-site Service**
At the discretion of IBM, you will receive CRU service or IBM or your reseller will repair the failing machine at your location and verify its operation. If required, On-site Repair can be provided for Tier 2 CRU parts. On-site Repair is provided, nine hours per day, Monday through Friday excluding holidays, NBD response. 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.

**International Warranty Service (IWS)**
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 the machine was purchased.

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


For more information on IWS, refer to Services Announcement ZS01-0168, 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.

**IBM hourly service rate classification**
Two

**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.
**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 website

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.

**Prices**

For all local charges, contact your IBM representative.

**ServicePac Service Upgrades**

The announced hardware products may also be eligible for ServicePac® warranty upgrades. ServicePac provides a higher level of service to enhance the base IBM Machine Warranty and a selection of software support services.

ServicePac can be purchased from your IBM Business Partner and are specific to the machines/products listed.

The upgrade level of service is dependant on country.

For a full list of ServicePac offerings and prices, refer to the IBM ServicePac Product Selector Tool. Visit


**Announcement countries for ServicePac**

Announcement is restricted to the following countries:

- Algeria
- Angola
- Austria
- Bahrain
- Belgium
- Botswana
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Egypt
• Estonia
• Finland
• France (Except overseas territories)
• Germany
• Greece
• Hungary
• Ireland
• Israel
• Italy
• Jordan
• Kazakhstan
• Kenya
• Kuwait
• Latvia
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• Luxembourg
• Mauritius
• Morocco
• Mozambique
• Netherlands
• Nigeria
• Norway
• Oman
• Pakistan
• Poland
• Portugal
• Qatar
• Romania
• Russia
• Saudi Arabia
• Serbia
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• Slovenia
• South Africa
• Spain
• Sweden
• Switzerland
• Tanzania
• Tunisia
• Turkey
• UK (Mainland only)
• Ukraine
• United Arab Emirates

Order and registration via Finland.
**Maintenance**

The products in this document are also covered by Maintenance Agreements and ServiceSuite® contracts.

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