IBM System x3650 M2 server models feature IntelXeon 5500 Series processors with a new microarchitecture design featuring Quick Path Interconnect (QPI) technology

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At a glance

Power, scalability, control, and serviceability for dynamic Web-serving and On Demand Business applications:

- Ultra-thin, high-availability, rack-optimized, 2U platform

- Powerful IntelXeon 5500 series quad-core processors with a new microarchitecture design featuring Quick Path Interconnect (QPI) technology

- 2, 4, or 8 GB[1] of high-speed DDR-3 SDRAM Registered DIMM memory; sixteen DIMM slots that support up to 128 GB maximum memory with 8 GB optional DIMMs

- Support for up to twelve 2.5-inch hot-swap SAS or hot-swap SATA HDDs or SSDs

- Four PCI-Express x8 Gen 2 slots:

  – 2 x8 - full length, full height

  – 1 x8 - half length, full height

  – 1 x8 - Low Profile

  Slots 1 and 2 are convertible either to 2 PCI-X or 1 x16 PCI-E depending on optional riser. Slots 3 and 4 are convertible to 2 x16 via optional risers.

- 675-watt, auto-ranging power supply

- Integrated systems management processor

- Integrated dual Gigabit Ethernet ports (standard) for high I/O capacity, plus two additional GbE ports (option) with failover capability

- One serial port (16550A-compatible), four USB ports (front and rear), and two video ports (front and rear)

Overview

New models of the System x3650 M2 feature Intel® quad-core processors.

This 2U-high, rack-optimized server features superior power, optimized performance, and leadership virtualization and systems management for business-critical workloads built on IBMX-Architecture.

Optimized for energy efficiency and performance

Apply a new, innovative energy-smart design with powerful high-performance processors, a large capacity of high-performing DDR3 memory, and a no-compromise feature set ideal for most general business applications:

- Powerful processors:
  - Quad-Core IntelXeon Processor E5504
  - Quad-Core IntelXeon Processor E5506
  - Quad-Core IntelXeon Processor E5520
  - Quad-Core IntelXeon Processor L5520
  - Quad-Core IntelXeon Processor L5530 (CTO only)
  - Quad-Core IntelXeon Processor E5530
  - Quad-Core IntelXeon Processor E5540
  - Quad-Core IntelXeon Processor X5550
  - Quad-Core IntelXeon Processor X5560
  - Quad-Core IntelXeon Processor X5570
- New energy-efficient design incorporating low 675W and very efficient power supplies, six cooling fans (three banks of counter-rotating dual fans), altimeter (barometric pressure sensor), and energy-efficient planar components to lower operational costs
- Highly functional chipset optimized for better application computing for general business workloads
- Sixteen DIMM slots that enable you to deploy up to 128 GB of DDR3 SDRAM Registered DIMM memory, with 2, 4 GB memory standard (model dependent) - 8 GB DIMM optional
- Standard SAS/SATA HDDs or SSDs with RAID support on hot-swap models
- Support for up to 12 hot-swap SAS/SATA HDDs or SSDs
- Integrated Dual Gigabit Ethernet ports (standard) for high I/O capacity, and two additional GbE ports (option) with failover capability
- Support for Embedded VMware ESXi 3.5 hypervisor (connector on an internal SAS riser card activated with optional 2 GB USB key) for leadership virtualization
- Four PCI-Express x8 high-performance Gen 2 I/O slots that help provide greater network performance with long-term investment protection (4 PCIe x8 convertible to 2 x16 PCI-e or 4 PCI-X 64 bit slots)

Manage with efficiency

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

- IBM Systems Director Active Energy Manager™ for advanced datacenter power notification and management to help achieve lower heat output and reduced cooling needs
- Snoop filters to boost processor performance
- Integrated SAS controller supporting up to twelve 2.5-inch hot-swap HDD bays (4 or 8 bays standard, 4-bay kits optional) with four RAID alternatives, helping to safe-guard your data at no additional cost

- Memory mirroring, configurable using UEFI (Unified Extensible Firmware Interface) setup
- Integrated Management Module (IMM) systems management processor
- Monitoring and control of operating status and key server components
- Predictive Failure Analysis® (PFA) on selected components that warns of problems before they occur
- Fast and easy servicing through innovative light path diagnostics, improved onboard diagnostics, and LED diagnostic panel
- Optional IBM® Virtual Media Key to enable remote presence and blue-screen capture features

Ultimate fault tolerant protection

- Hot-swap, redundant fans with calibrated vectored cooling, to keep components cool, and simplified fan replacement
- Optional hot-swap, redundant power supplies to help reduce downtime
- IBM Director and Web support
- Three-year, Customer Replaceable Unit (CRU) and on-site labor[2], limited warranty[3]; optional warranty service upgrades available

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

[2] You may be asked certain diagnostic questions before a technician is sent.

[3] For information on IBM's Statement of Limited Warranty, contact your IBM representative or reseller. Copies are available upon request.

Key prerequisites

Monitor, USB keyboard, and USB mouse

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

Planned availability date

October 9, 2009

Description

System x3650 M2 server

The System x3650 M2 server features IntelXeon quad-core processors that support internal processing speeds of up to 2.93 GHz, and processing operations to memory and the PCI bus at 133 MHz. They contain integrated, full-speed 4 or 8 MB ECC L2 cache.

High-performance server subsystems

The System x3650 M2 server expands the new server line by adding a higher level of processor power. This high-throughput, four-way multicore network server offers excellent performance and scalability when you add memory and a second processor. It incorporates powerful Xeon® processors with up to 8 MB L2 cache. The advanced transfer L2 cache is integrated onto the processor and runs at the same clock speed. The advanced transfer cache is a result of a "backside bus" 256 bits wide. It features a quad-wide cache line that can transfer four 64-bit cache line

segments at one time to deliver full-speed capability. The cache is eight-way set associative.

Two IntelXeon processor connectors are standard on the system board to support installation of a second processor. High-speed PC3 DDR3 Advanced Memory Feature DIMMs run at 667 MHz DRAM clock speed and offer maximum 10667 MB/s bandwidth, processor-to-memory subsystem performance. The x3650 M2 server uses the Intel 5500 chipset with Chipkill^{TM} technology to maximize throughput from processors, to memory, to the 32-bit and 64-bit PCI buses.

Standard System x3650 M2 configurations

Note: The model "G" designation is geography or country dependent.

```
                                    HDD
      Model    Processor Memory GT/s interface  HDD     Other

      7947-24G  2.00 GHz   4 GB  4.80  SAS/SATA  2.5-in  Open bay
                L2 Cache: 4 MB                           hot-swap
                                                         1 x 675W
      7947-34G  2.13 GHz   4 GB  4.80  SAS/SATA* 2.5-in  Open bay
                L2 Cache: 4 MB                           hot-swap
                                                         1 x 675W
      7947-44G  2.26 GHz   4 GB  5.86  SAS/SATA  2.5-in  Open bay
                L2 Cache: 8 MB                           hot-swap
                                                         1 x 675W
      7947-4LG  2.26 GHz   4 GB  5.86  SAS/SATA  2.5-in  Open bay
                L2 Cache: 8 MB                           hot-swap
                                                         1 x 675W
      7947-56G  2.40 GHz   4 GB  5.86  SAS/SATA  2.5-in  Open bay
                L2 Cache: 8 MB                           hot-swap
                                                         1 x 675W
      7947-66G  2.53 GHz   8 GB  5.86  SAS/SATA  2.5-in  Open bay
                L2 Cache: 8 MB         M5014             hot-swap
                                                         1 x 675W
      7947-76G  2x2.66 GHz 16 GB 6.40  SAS/SATA* 2.5-in  Open bay
                L2 Cache: 8 MB         M5015             hot-swap
                                                         2 x 675W
      7947-86G  2x2.80 GHz 16 GB 6.40  SAS/SATA* 2.5-in  Open bay
                L2 Cache: 8 MB         M5015             hot-swap
                                                         2 x 675W
      7947-96G  2x2.93 GHz 16 GB 6.40  SAS/SATA* 2.5-in  Open bay
                L2 Cache: 8 MB         M5015             hot-swap
                                                         2 x 675W
```

* = Multiburner Optical Drive

Additional features

- Eight-core processing achieved with a second processor of equal speed and processor type
- System board containing 16 DIMM connectors supporting 1 GB, 2 GB, 4 GB, and 8 GB DDR3 PC3-10600 SDRAM ECC DIMMs with:
  - DDR3 memory for improved performance
  - Up to 128 GB of system memory using 8 GB optional DIMMs
- High-speed, wide-bandwidth PCI-Express or PCI/PCI-X bus slots
- On standard models, either four or eight 2.5-inch bays to support optional SAS HDDs and one bay to support optical drive (optical standard in some models)
- Dual Broadcom 5709 chip that supports dual Gigabit (10/100/1000) Ethernet ports, which speed network communications to LAN clients

The System x3650 M2 server offers solid system throughput from processor, to memory, to bus, to disk-intensive I/O. These features, combined with multicore capability, make the x3650 M2 server an excellent choice for a stand-alone or clustered general-business application, file, and print server.

High-availability and serviceability features

The System x3650 M2 server subsystem delivers excellent reliability and serviceability features:

- Support for light path diagnostics with viewable drop-down panel, Wake on LAN®, and PXE
- Up to six hot-swap fans (three pairs)
- Up to twelve 2.5-inch HS HDDs with optional upgrade kit
- ServeRAID™ M5014 and M5015 SATA/SAS controller standard on select models and optional on others that supports 0, 1, 10, 5, and 50 RAID levels
- Chipkill memory that basically distributes information covered by error correction coding across separate memory chips; if any of the chips fail, the data can in many cases still be reconstructed from the remaining chips and the system can continue running
- ECC L2 cache processors to help improve data integrity and help reduce downtime
- Predictive Failure Analysis (PFA) on processors, HDD options, memory, voltage regulator modules (VRMs), power supply, and fans (when Remote Supervisor Adapter is installed), to help alert the system administrator of imminent component failure
- Worldwide voltage-sensing, 675-watt, hot-plug power supply featuring auto restart
- Optional 675-watt, hot-swap power supply upgrade for high-availability requirements
- Optional Virtual Media Key to enable the remote presence and blue-screen capture features
- Integrated Management Module systems management processor that supports:
  - Automatic server restart (ASR)
  - Fan monitoring and control
  - Power supply monitoring
  - Temperature monitoring
  - Voltage monitoring
  - Power on/off, reset sequencing
  - LED controls (onboard diagnostics support with light path LED)
  - Remote power control
  - Local firmware update
  - Error logging
- Information LED panel for visual indications of system well-being
- Onboard diagnostics with an LED map to locate a failing component, helping reduce downtime and service costs
- Support for virtual floppy (with optional Virtual Media Key), which enables a user to easily direct a remote host to boot, and use standard instructions stored anywhere on the network
- Easily accessible system board, adapter cards, processor, and memory
- CPU failure recovery in configurations, which:
  - Forces the failed processor offline
  - Reboots the server automatically
  - Generates alerts
  - Continues operations with the working processor

Expandability and growth

The System x3650 M2 server packs a lot of function and storage capacity into a 2U 19-inch rack-drawer package, yet it is amazingly easy to upgrade and service. Functions such as SVGA video, SAS, and full-duplex 10/100/1000 Mbps Ethernet are integrated on the system board. Features include:

- Rack-drawer models designed for 19-inch-wide by 28-inch-deep industry-standard rack enclosures, such as the NetBAY42 SR
- Four PCI/PCI-Express adapter card slots available (2 x PCI-Express slots may be replaced by a riser card option to get two PCI-X slots)
- System board optional upgrades (PCI slot not required)
  - IBM Virtual Media Key
- Support for up to 6000 GB of internal data storage, using twelve 500 GB SAS/SATA HDDs

Systems management

Integrated Management Module (IMM)

The System x3650 M2 includes an integrated Management Module that provides industry-standard Intelligent Platform Management Interface (IPMI) 2.0-compliant systems management. The IMM comes standard, and shares one of the two onboard Ethernet ports for access. The IMM can be accessed via software that is compatible with IPMI 2.0 (xCAT, for example). The IMM is implemented using industry-leading OSA firmware and applications in conjunction with the Integrated Management Module.

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 control (power, HDD, activity, alerts, and heartbeat)
- An embedded Web server that gives you remote control from any standard Web browser. No additional software is required on the remote administrator's workstation.
- For users who are accustomed to a command-line interface (CLI), the ability of the administrator to use the CLI from a Telnet session to perform some of the functions that can be performed from the Web server.
- Secure Socket Layer (SSL) and Lightweight Directory Access Protocol (LDAP).
- Built-in LAN and serial connectivity that supports virtually any network infrastructure.
- Multiple alerting functions to warn systems administrators of potential problems through e-mail, IPMI PETs, and SNMP.

With video compression now built into the adapter hardware, the adapter allows the greater screen sizes and refresh rates that are becoming common 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 Virtual Media Key

The optional Virtual Media Key delivers advanced control and monitoring features to manage your IBM System x3650 M2 server at virtually any time, from virtually any place. The key can be added to the server through a connector on the planar.

This key enables easy console redirection with text and graphics, and keyboard and mouse (operating system must support USB) support over the system management LAN connections.

With video compression now built into the adapter hardware, it is designed to allow the greater screen sizes and refresh rates that are becoming standard in the marketplace. This feature allows 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 x3650 M2 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:

- 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.

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:
  - Processors
  - Memory
  - HDDs
  - Voltage regulator modules (VRM)
  - Power supplies
  - Fans
- Define automated actions, such as:

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- – Send e-mail or page to an administrator
  - – Execute a command or program
  - – Pop up an error message to the IBM Director console
- Flash UEFI
- 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 via upward integration modules (available from IBM and third parties). Advanced management capabilities built into System x® servers are available through:

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

ServeRAID M5014 and M5015 SAS/SATA Controllers (46M0916 and 46M0829)

- RAID levels 0, 1, 5, 10, and 50
- M5015 cache memory: 800MHz DDRII SDRAM Memory (512 MB)
- M5014 cache memory: 800MHz DDRII SDRAM Memory (256 MB)
- Online Capacity Expansion (OCE)
- Online RAID Level Migration (RLM)
- Auto-resume after loss of system power during array rebuild or reconstruction (RLM)
- Single controller multipathing (failover)
- Load balancing
- Configurable stripe size up to 1 MB
- Fast initialization for quick array setup
- Check consistency for background data integrity
- Patrol read for media scanning and repairing
- 64 logical drive support
- Up to 64TB LUN support
- DDF-compliant Configuration on Disk (COD)
- S.M.A.R.T support
- Global and dedicated hot spare with revertible hot spare support
- Automatic rebuild
- Enclosure affinity
- Emergency SATA hot spare for SAS arrays
- Enclosure management
- SES (inband)
- SGPIO (sideband)

IBM Active Energy Manager

IBM Active Energy Manager offers direct monitoring of power consumption and thermal load of your server through IBM Director. You can monitor power consumption to track utilization of energy resources. IBM Active Energy Manager is a leading solution on the market providing users with the combination of intelligence and features needed to effectively monitor power consumption in the datacenter. Active Energy Manager, an extension to IBM Director systems management software, allows clients to "meter" actual power usage and trend data for any single physical system or group of systems. Developed by IBM Research, Active Energy Manager utilizes IBM-developed monitoring circuitry to help identify how much actual power is being used and the temperature of the system. The software is available across IBM's new System x servers, as well as its BladeCenter® line of systems. With Active Energy Manager, the user is able to understand the actual power draw.

With the addition of the optional IBM Virtual Media Key, the IT administrator achieves comprehensive, virtual on-site control of System x servers through the ability to remotely:

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

Advanced Configuration and Power Interface (ACPI)

ACPI is an open industry specification that defines a flexible and extensible hardware interface for the system board. Software designers use this specification to integrate power management features throughout a computer system, including hardware, the operating system, and application software. This integration enables

MicrosoftWindows to determine which applications are active, and handle all of the power management resources for computer subsystems and peripherals.

World-class support tools and programs

The System x3650 M2 server tools and programs can 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.

- Three-year, Customer Replaceable Unit (CRU) and On-site Service, limited warranty; optional warranty service upgrades available.
- The ServerProven® program lets you confidently configure your server with various devices and operating systems. This Web-based program provides compatibility information from actual testing of the System x3650 server with various adapters and devices.
- Electronic support on the Web offers additional support in an easy-to-use format.

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

Accessibility by people with disabilities

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

   http://www.ibm.com/able/product_accessibility/index.html

Product positioning

The System x3650 M2 servers are a part of the System x rack-optimized server line. These two-socket servers deliver IntelXeon quad-core power and excellent server function in an ultra-thin, rack-optimized, 2U footprint.

Optimized for speed

The System x3650 M2 server offers new levels of fast IntelXeon dual- and quad-core processors with up to 6.4 GT/s and lower power for datacenter environments and collaboration applications. This server is uniquely optimized for better application computing with a highly functional chipset and sixteen DIMM slots for a maximum of 128 GB of fully buffered DDR-3 SDRAM Registered DIMM memory.

Innovation comes standard

- Boost application efficiency with snoop filters that free up cache and improve processor performance.
- Supercharged TOE optimizes system performance by offloading protocol processing.
- A drop-down light path diagnostics panel improves in-rack manageability and allows easy problem identification.

Ultimate fault-tolerant protection

- A memory mirroring feature enables you to increase memory reliability.
- A SAS controller with RAID-0, -1, and -1E on hot-swap SAS models helps safeguard your data at no additional cost.

Target applications

- Database
- E-mail collaboration
- File/print
- Virtualization

- Linux® clustering
- Scientific and technical computing

These powerful servers also meet traditional enterprise network server requirements, but with an added benefit of requiring less space.

Product number

Note: EMEA are GAV models.

```
                                            Part
Description                      MT   Mod    number

IBM System x3650 M2             7947  24G    794724G
                               7947  34G    794734G
                               7947  44G    794744G
                               7947  4LG    79474LG
                               7947  56G    794756G
                               7947  66G    794766G
                               7947  76G    794776G
                               7947  86G    794786G
                               7947  96G    794796G
```

The following are new unique option part numbers for System x3650 M2 server.

```
                                            Part
Description                                 number

Intel Xeon L5530 4C 2.4GHz, 8Mb Cache, 1066MHz    59Y3124
Hot-swap SAS SATA 4 Pack HDD Enablement Option    59Y3056


The following are Pseudo options.

  IntelXeon Processor L5530 4C              59Y3202
    (2.40GHz 8MB L3 Cache 1066MHz 60w)
    (2.40GHz 8MB Cache 1066MHz 60w)
  TEK with Packaging                        59Y3205
  TEK No Packaging                          59Y3206
  IBM 4/8/12 HDD Enablement Kit             59Y3207
  NVIDIA Quadro  FX 580                     49Y6803
```

Publications

The following publications and CD-ROMs are shipped with the x3650 M2 server:

- The x3650 M2 Installation Guide contains an introduction to the computer, installation and setup, installing options, reference information, and problem determination. The installation guide has easy-to-use text and pictorials to enable you to quickly set up the System x3650 M2 server servers.
- IBM Director systems management software is included.

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

The *System x3650 M2 server Installation Guide* and *Problem Determination and Service Guide,* in U.S. English versions, are available from

http://www-304.ibm.com/jct01004c/systems/support/

Select "Product Support," "System x," then "Product family," and then click "Publications lookup."

The IBM Publications Center Portal

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, 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.

Displayable softcopy publications

The product books are offered in displayable softcopy form. All books are included. The displayable manuals are part of the basic machine-readable material. The files are shipped on DVD-ROM. Terms and conditions for use of the machine-readable files are shipped with the files.

Source file publications

The product books are offered in source file form.

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

http://www.ibm.com/services/learning/index.html

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

Technical information

Specified operating environment

Physical specifications

```
System x3650 M2:

                        7947-24G              7947-34G


Processor               Xeon 4C E5504 (80w)   Xeon 4C E5506 (80w)
  Internal speed        2.00 GHz              2.13 GHz
  External speed        4.8 GTS               4.8 GTS
  Number standard       1                     1
  Maximum               2                     2
L2 cache (full-speed)   4 MB                  4 MB
Memory                  4 GB ECC              4 GB ECC
  RDIMMs                2 x 2 GB              2 x 2 GB
  DIMM sockets          16                    16
```

	7947-44G	7947-4LG
Capacity (4)	128 GB	128 GB
Video	SVGA	SVGA
SATA controller	SATA	SATA
Channels	4	4
Connector internal	4	4
HDD (5)		
Total bays	9 (standard)	9 (standard)
5.25 slim	1	1
3.5-in tape	0	0
Hot-swap (3.5-in)	0	0
Hot-swap (2.5-in)	4 standard	4 standard
Internal capacity	6 TB with upgrade kits	6 TB with upgrade kits
Bays available	9	8
5.25 slim	1	0
3.5-in tape	0	0
Hot-swap (3.5-in)	0	0
Hot-swap (2.5-in)	8	8
Total PCI slots	4	4
PCI_E (x8)	4	4
System management	Standard	Standard
Ethernet controller	Two 1Gb	Two 1Gb
Optical drive (SATA)	Optional	Multiburner
Power supply	675 W	675 W
Number standard	1	1
Maximum	2	2
Hot-swap	Yes	Yes
Redundant power	Optional	Optional
Auto restart	Yes	Yes

	7947-56G	7947-66G
Processor	Xeon 4C E5520 (80w)	Xeon 4C L5520 (60w)
Internal speed	2.26 GHz	2.26 GHz
External speed	5.86 GTS	5.86 GTS
Number standard	1	1
Maximum	2	2
L2 cache (full-speed)	8 MB	8 MB
Memory	4 GB ECC	4 GB ECC
RDIMMs	2 x 2 GB	2 x 2 GB
DIMM sockets	16	16
Capacity (4)	128 GB	128 GB
Video	SVGA	SVGA
SATA controller	SATA	SATA
Channels	4	4
Connector internal	4	4
HDD (5)		
Total bays	9 (standard)	9 (standard)
5.25 slim	1	1
3.5-in tape	0	0
Hot-swap (3.5-in)	0	0
Hot-swap (2.5-in)	8 standard	8 standard
Internal capacity	6 TB (with upgrade kit)	6 TB (with upgrade kit)
Bays available	9	9
5.25 slim	1	1
3.5-in tape	0	0
Hot-swap (3.5-in)	0	0
Hot-swap (2.5-in)	8	8
Total PCI slots	4	4
PCI_E (x8)	4	4
System management	Standard	Standard
Ethernet controller	Two 1Gb	Two 1Gb
Optical drive (SATA)	Optional	Optional
Power supply	675 W	675 W
Number standard	1	1
Maximum	2	2
Hot-swap	Yes	Yes
Redundant power	Optional	Optional
Auto restart	Yes	Yes

	7947-56G	7947-66G
Processor	Xeon 4C E5530 (80w)	Xeon 4C E5540 (80w)

```
    Internal speed       2.40 GHz              2.53 GHz
    External speed       5.86 GTS              5.86 GTS
    Number standard      1                     1
    Maximum              2                     2
L2 cache (full-speed)    8 MB                  8 MB
Memory                   4 GB ECC              8 GB ECC
    RDIMMs               2 x 2 GB              2 x 4 GB
    DIMM sockets         16                    16
    Capacity (4)         128 GB                128 GB
Video                    SVGA                  SVGA
SATA controller          SATA                  SATA
    Channels             4                     4
    Connector internal   4                     4
HDD (5)
Total bays               9 (standard)          9 (standard)
    5.25 slim            1                     1
    3.5-in tape          0                     0
    Hot-swap (3.5-in)    0                     0
    Hot-swap (2.5-in)    8 standard            8 standard
    Internal capacity    6 TB (with upgrade kit) 6 TB (with upgrade kit)
Bays available           9                     9
    5.25 slim            1                     1
    3.5-in tape          0                     0
    Hot-swap (3.5-in)    0                     0
    Hot-swap (2.5-in)    8                     8
Total PCI slots          4                     4
    PCI_E (x8)           4                     4
System management        Standard              Standard
Ethernet controller      Two 1Gb               Two 1Gb
Optical drive (SATA)     Optional              Optional
Power supply             675 W                 675 W
    Number standard      1                     1
    Maximum              2                     2
    Hot-swap             Yes                   Yes
    Redundant power      Optional              Optional
    Auto restart         Yes                   Yes


                         7947-76G              7947-86G


Processor                Xeon 4C X5550 (95w)   Xeon 4C X5560 (95w)
    Internal speed       2.66 GHz              2.80 GHz
    External speed       6.4 GTS               6.4 GTS
    Number standard      2                     2
    Maximum              2                     2
L2 cache (full-speed)    8 MB                  8 MB
Memory                   16 GB ECC             16 GB ECC
    RDIMMs               4 x 4 GB              4 x 4 GB
    DIMM sockets         16                    16
    Capacity (4)         128 GB                128 GB
Video                    SVGA                  SVGA
SATA controller          SATA                  SATA
    Channels             4                     4
    Connector internal   4                     4
HDD (5)
Total bays               9 (standard)          9 (standard)
    5.25 slim            1                     1
    3.5-in tape          0                     0
    Hot-swap (3.5-in)    0                     0
    Hot-swap (2.5-in)    8 standard            8 standard
    Internal capacity    6 TB (with upgrade kit) 6 TB (with upgrade kit)
Bays available           8                     8
    5.25 slim            0                     0
    3.5-in tape          0                     0
    Hot-swap (3.5-in)    0                     0
    Hot-swap (2.5-in)    8                     8
Total PCI slots          4                     4
    PCI_E (x8)           4                     4
System management        Standard              Standard
Ethernet controller      Two 1Gb               Two 1Gb
Optical drive (SATA)     Multiburner           Mutiburner
Power supply             675 W                 675 W
    Number standard      2                     2
    Maximum              2                     2
```

```
Hot-swap              Yes                    Yes
Redundant power       Yes                    Yes
Auto restart          Yes                    Yes


                      7947-96G


Processor             Xeon 4C X5570 (95w)
  Internal speed      2.93 GHz
  External speed      6.4 GTS
  Number standard     2
  Maximum             2
L2 cache (full-speed) 8 MB
Memory                16 GB ECC
  RDIMMs              4 x 4 GB
  DIMM sockets        16
  Capacity (4)        128 GB
Video                 SVGA
SATA controller       SATA
  Channels            4
  Connector internal  4
HDD (5)
Total bays            9 (standard)
  5.25 slim           1
  3.5-in tape         0
  Hot-swap (3.5-in)   0
  Hot-swap (2.5-in)   8 standard
  Internal capacity   6 TB (with upgrade kit)
Bays available        8
  5.25 slim           0
  3.5-in tape         0
  Hot-swap (3.5-in)   0
  Hot-swap (2.5-in)   8
Total PCI slots       4
  PCI_E (x8)          4
System management     Standard
Ethernet controller   Two 1Gb
Optical drive (SATA)  Multiburner
Power supply          675 W
  Number standard     2
  Maximum             2
  Hot-swap            Yes
  Redundant power     Optional
  Auto restart        Yes
```

[4] Maximum of 128 GB by using 16 x 8 GB optional DIMMs.

[5] The standard system can hold four or eight 2.5-inch HS HDDs. Max capacities are based on installation of twelve 500 GB slim-high, SAS/SATA HDDs with one or two optional 4-Bay HDD expansion options. **Note:** For the latest information on supported HDD options, refer to the *Sales Manual* or visit

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

Multi-Burner Plus Drive

- Specifications

  – DVD-ROM (6.6x-16x CAV, 4.7 GB DVD-ROM read): 9.17 to 22.16 MB/s

  – DVD-ROM (5.0x-126x CAV, 8.5 GB Dual-layer read): 6.8 to 16.62 MB/s

  – DVD-R/+R (3.3x-8X CAV, 4.7 GB DVD-R/+R read): 5.73 to 13.85 MB/s

  – DVD-R/+R (3.3x-8X CAV, 8.5 GB DVD-R/+R read): 4.58 to 11.08 MB/s

  – DVD-RW/+RW (3.3x-8X CAV, 4.7 GB DVD-RW/+RW read): 4.58 to 11.08 MB/s

  – DVD-RAM (6x-12x PCAV, 4.7 GB DVD_RAM read): 8.31 to 16.62 MB/s

  – CD-R/RW/ROM (17-40x CAV, read): 2.6 to 6.0 MB/s

  – DVD-R+R (1x -16X PCAV, 4.7 GB DVD-R/+R write): 9.9 to 22.16 MB/s

  – DVD-R/+R (2x-8X CLV, 8.5 GB DVD-R/+R Dual-layer write): 5.54 MB/s

  – DVD-RW (2x-6X CLV, 4.7 GB DVD-RW write): 8.31 MB/s

- DVD+RW (3.3x - 8X ZCLV, 4.7 GB DVD+RW write): 4.57 to 11.08 MB/s
- DVD-RAM (6x-16x PCAV, 4.7 GB DVD-RAM write): 8.31 to 16.62 MB/s
- CD-RW (8-32x ZCLV, write): 4.8 MB/s
- Max burst data transfer rate: Ultra DMA Mode 4: 66.6 MB/s
- Average access times:
  - DVD-ROM including latency and error correction: 145ms
  - DVD-RAM including latency and error correction: 175ms
  - CD-ROM including latency and error correction: 125ms

Note: Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Video subsystem

- SVGA compatible video controller (Matrox G200).
- Integrated on Integrated Management Module (IMM).
- Integrated on planar and connected to the PCI bus.
- DDR2-250 MHz SDRAM video memory controller.
- Video memory is not expandable.
- One DVI (Digital Video Interface) is not used.
- Avocent Digital Video Compression (with Virtual Media Key option).

```
Supported video mode capabilities for the SVGA PCI controller with a
200 MHz memory clock:

  MicrosoftWindows 2000 or Windows® 2003 (32- and 64-bit) and
  Linux (all distributions)


                            Refresh
  Resolution        Colors  rate (Hz)

  640 x 480 x 8      256    60, 72, 75, 85, 90, 100, 120, 160, 200
  640 x 480 x 16     64K    60, 72, 75, 85, 90, 100, 120, 160, 200
  640 x 480 x 32     16M    60, 72, 75, 85, 90, 100, 120, 160, 200
  800 x 600 x 8      256    60, 70, 72, 75, 85, 90, 100, 120, 160, 200
  800 x 600 x 16     64K    60, 70, 72, 75, 85, 90, 100, 120, 160, 200
  800 x 600 x 32     16M    60, 70, 72, 75, 85, 90, 100, 120, 160
  1024 x 768 x 8     256    60, 70, 72, 75, 85, 90, 100, 120, 140, 150,
                            160, 200
  1024 x 768 x 16    64K    60, 70, 72, 75, 85, 90, 100, 120, 140, 150,
                            160, 200
  1024 x 768 x 32    16M    60, 70, 72, 75, 85, 90, 100
  1280 x 1024 x 8    256    60, 72, 75
  1280 x 1024 x 16   64K    60, 72, 75
  1280 x 1024 x 32   16M    60, 72, 75

Note: Some modes are not supported by all monitors.
```

Dimensions

```
2U Rack Drawer:
   Width:  443.6 mm (17.5 in)
   Depth:  698.0 mm (27.5 in)
   Height:  85.4 mm (3.36 in)

Rack:
   Weight (minimum configuration):  21.1 kg (46.5 lb)
   Weight (maximum configuration):  29.6 kg (65 lb)
```

Electrical

- 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: 0.12 kVA
  - Maximum configuration: 0.78 kVA
- Btu output:
  - Minimum configuration: 307 Btu/hr (90 watts)
  - Maximum configuration: 2262 Btu/hr (780 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 x3650 M2 servers are 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 51318.22-99, GOST R 51318.24-99, GOST R 51317.3.2-2006, GOST R 51317.3.3-99
- 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: 10 C to 35 C (50.0 F to 95.0 F); altitude: 0 to 914.4 m (3000 ft). Decrease system temperature by 0.75 C for every 1000-foot increase in altitude.
- Server off: 10 C to 43 C (50.0 F to 109.4 F); maximum altitude: 2133 m (7000 ft).
- Shipment: -40 C to +60 C (-40 F to 140 F); maximum altitude: 2133 m (7000 ft).

Humidity:

- Server on/off: 8% to 80%
- Shipment: 5% to 100%

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 switch.

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 x3650 M2.

Operating systems

- Microsoft
  - MicrosoftWindows Server 2008, Standard x86 Edition
  - MicrosoftWindows Server 2008, Standard x64 Edition
  - MicrosoftWindows Server 2008, Web x86 Edition
  - MicrosoftWindows Server 2008, Web x64 Edition
  - Windows Essential Business Server 2008 Premium Edition
  - Windows Small Business Server 2008 Premium Edition
  - Windows Small Business Server 2008 Standard Edition
- Linux
  - SUSE LINUX Enterprise Server 10 for x86
  - SUSE LINUX Enterprise Server 10 for AMD64/EM64T
  - SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
  - Red Hat Enterprise Linux 5 Server Edition

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

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

IBM makes no representation or warranty regarding third-party products, including those designated as ServerProven.

Compatibility

The System x3650 M2 server systems contain licensed system programs that include set configuration, set features, and test programs. System UEFI is loaded from a "flash" EEPROM into system memory. This UEFI provides instructions and interfaces designed to support the standard features of the x3650 M2 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 or IBM Business Partner, or refer to the *IBM Sales Manual* for information on the compatibility of hardware and software for System servers. The *Sales Manual* is updated periodically as new features and options are announced that support these servers.

Limitations

- The System x3650 M2 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 UEFI configuration. 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 x3650 M2 servers can address a maximum of 128 GB of system memory. All supported system memory is addressable through direct memory access. The System x3650 M2 server supports 1 GB, 2 GB, 4 GB, and optional 8 GB DDR-3 SDRAM Registered DIMMs. All supported DIMMs can coexist in the same system. Refer to the Planning information section for supported memory options.
- The batteries used in the ServeRAID M5014 and M50515 SAS/SATA PCIe Controllers are consumables, therefore, not covered under this warranty.
- To ensure proper air flow for cooling, the System x3650 M2 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 type and clock speed. Mixing microprocessors of different speeds or cache size is not supported.

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

Planning information

Customer responsibilities

The System x3650 M2 server is designated as customer setup. Customer setup instructions are shipped with each system.

Configuration information

Integrated RAID-1 configuration

There are two manufacturing instructions (MI) available to allow the user to set up a RAID-1 configuration.

The two instructions are:

- Integrated Mirroring - Two HDDs required via Instruction 01R1356
- Integrated Mirroring with HotSpare - Three HDDs required via Instruction 01R1357

Cabling - Standard non-RAID configurations

The System x3650 M2 server hot-swap model contains two DASD backplanes supporting up to eight hot-swap, SAS-compliant drive bays. Two backplanes are connected to a SAS RAID controller through two cables.

Cabling - Simple-swap NON-RAID configuration contains cables supporting up to four simple-swap non-RAID SATA drives. It does not contains any backplane.

Rack installations

System x3650 M2 server 2U rack-drawer models are designed to be installed in a 19-inch rack cabinet designed for 28-inch deep devices, such as the NetBAY42U ER and NetBAY42U SR. Installation into some of the older Netfinity® racks (9306900, 9306910, 9306200) requires a rack extension kit.

If a System x3650 M2 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 698.5 mm and 762 mm (27.5 in and 30 in).
- The thickness of the mounting flanges must be between 1.9 mm and 3.3 mm.
- The mounting flanges must have either 7.1-mm (.28-in) diameter holes or 9.6-mm (.38-in) square holes on the standard EIA hole spacing.

- The rack must have a minimum depth of 70 mm (2.76 in) between the front mounting flange and inside of the front door for appropriate cooling.
- The rack must have a minimum depth of 157 mm (6.2 in) between the rear mounting flange and inside of the rear door to install the server and make space for cable management.
- 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, and PDUs.
- The rack must provide proper stabilization so that the rack does not become unstable when servers are pulled out for service.

Processor upgrade options

- Quad-Core IntelXeon Processor E5504 2.00GHz/4MB DDR3 800MHz/4.8GT/S 80W No Turbo - 46M1078
- Quad-Core IntelXeon Processor E5506 2.13GHz/4MB DDR3 800MHz/4.8GT/S 80W No Turbo - 46M1079
- Quad-Core IntelXeon Processor L5520 2.26GHz/8MB DDR3 1066MHz/5.8GT/S 80W No Turbo - 46M1080
- Quad-Core IntelXeon Processor E5520 2.26GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1081
- Quad-Core IntelXeon Processor E5530 2.40GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1083
- Quad-Core IntelXeon Processor E5540 2.53GHz/8MB DDR3 1066MHz/5.8GT/S 80W Turbo - 46M1084
- Quad-Core IntelXeon Processor X5550 2.66GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1085
- Quad-Core IntelXeon Processor X5560 2.80GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1086
- Quad-Core IntelXeon Processor X5570 2.93GHz/8MB DDR3 1333MHz/6.4GT/S 95W Turbo - 46M1087

Supported memory options

The following memory options are supported:

- 44T1480 - 1GB (1x1GB) Single Rank
- 44T1481 - 2GB (1x2GB) Dual Rank
- 44T1482 - 2GB (1x2GB) Single Rank
- 44T1483 - 4GB (1x4GB) Dual Rank
- 44C7449 - 8GB (1x8GB) Dual Rank

Power considerations

The System x3650 M2 server includes a standard 675-watt hot-swap power supply. This power supply supplies sufficient power to run the server. A System x3650 M2 675-watt hot-swap power supply upgrade is optionally available to support redundancy.

Cable orders

Two 10/100/1000 Mbps, full-duplex Ethernet PCI controllers, standard with the System x3650 M2 server, are connected directly to an independent RJ-45 connector. The RJ-45 connector provides a 10BASE-T, 100BASE-TX, and 1000BASE-TX interface for connecting twisted-pair cable to the Ethernet network. Cabling is not included

with the server. To connect the Ethernet controller to a repeater or switch, use an unshielded twisted pair (UTP) cable with RJ-45 connectors at both ends. For 100/1000 Mbps operation, Category 5 cabling must be used. For 10 Mbps operation, Category 3, or better, cabling must be used.

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

Installability

The System x3650 M2 server requires about 20 minutes for installation. Installation includes unpacking, setting up, and powering on the system. Additional time is required to install an operating system, additional adapters, or features.

Packaging

```
Product                Package description              Boxes

System x3650 M2        System unit carton                 1

                          Contents:

                        System unit
                        Rack kit

System x3650 M2        System unit carton                 1

                          Contents:

        Flyer - Important Notices
        Rack Installation Instructions
        CD - Documentation V1.0 (Installation and User Guides)
        CD - Director V6.1
        IBM Director
        CD - Ethernet VT
```

The System x3650 M2 server system is shipped as a single package. Other items are in zipped bags or boxes.

Security, auditability, and control

Security and auditability features include:

- Power-on and privileged access password functions control access to the data and server setup program on the server.
- 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.
- Selectable boot sequence can be used to prevent unauthorized installation of software or removal of data from the diskette drive.

The servers are intended to be installed in a rack and secured in a rack. It is a customer's responsibility to ensure that the server is 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.

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBMElectronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

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

Terms and conditions

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

Warranty period

- System Unit - Three years
- Optional features - 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 have been designated as consumables or supply items and are, therefore, not covered by this warranty:

- System batteries
- RAID batteries

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. 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 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 (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 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 parts have been designated as Tier 1 CRUs:

- Air baffles
- Blank filler
- Cable-management arm
- Hard disk drives
- Hot-swap fan
- Hot-swap AC power supply
- Lift handle kit
- Memory DIMM
- Memory expansion card
- Optical drive
- PCI adapter
- PCI divider
- Power cord
- Service label
- System label
- Top cover
- Fan Bracket
- Hypervisor™ USB Key
- PCI Riser

IBM is a registered trademark of International Business Machines Corporation

- RAID Card without Battery
- Tape Drive
- Virtual Media Key
- Ethernet Daughter Card

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.

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 the machine was purchased.

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

   http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/warrantyform?brandind=5000008

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 IBMSystem x technical support Web
site

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.

Pricing

For all local charges, contact your IBM representative.

ServicePac® service upgrades

The announced products are also eligible for ServicePac warranty upgrades.
ServicePacs provide a higher level of service than that provided under the base IBM
Machine Warranty.

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

```
        ServicePac                              Ordering
        offering               PC no            part number

3yr On-site Repair          PC1074  e-ServicePac    65Y5220(2)
9hr x 5 days 4hr Resp Target

3yr On-site Repair          PC1075  e-ServicePac    65Y5221(2)
24hr x 7 days 4hr Resp Target

3yr On-site Repair          PC506   e-ServicePac    41W9360(4)
24hr x 7 days 6hr Committed
Service

3yr On-site Repair          PC1088  e-ServicePac    65Y5212
24hr x 7 days 6hr Committed                         (UK Only)
Service

3yr On-site Repair          PC1097  e-ServicePac    68Y5030
24hr x 7 days 6hr Committed                         (Italy Only)
Service

3yr On-site Repair          PC1121  e-ServicePac    68Y5151
24hr x 7 days 6hr Committed                         (France Only)
Service

3yr On-site Repair          PC529   e-ServicePac    41W9680 (5)
24hr x 7 days 8hr Committed
Service

3yr On-site Repair          PC926   e-ServicePac    40Y5878 (6)
24hr x 7 days 24hr Committed
Service

3yr On-site Repair          PC517   e-ServicePac    41W9371 (7)
24hr x 7 days 24hr Committed
Service

4yr On-site Repair          PC1076  e-ServicePac    65Y5222(2)
9hr x 5 days 4hr Resp Target

4yr On-site Repair          PC1077  e-ServicePac    65Y5223(2)
```

```
    24hr x 7 days 4hr Resp Target


    5yr On-site Repair           PC1078  e-ServicePac     65Y5224(2)
    9hr x 5 days 4hr Resp Target


    5yr On-site Repair           PC1079  e-ServicePac     65Y5225(2)
    24hr x 7 days 4hr Resp Target


    3yr On-site Repair           PC1024  e-ServicePac     65Y0091
                                                          (Russia Only

    9hr x 5 days NBD Comm Parts


    Announcement countries for ServicePacs


    Announcement is restricted to the following countries:

     e-ServicePac

     Austria Belgium Bulgaria Croatia Czech Rep
     Denmark Egypt Finland France (1) Germany Greece

     Hungary Ireland Israel  Italy  Luxembourg
     Netherlands Norway  Pakistan Poland  Portugal Romania

     Russia (2) S. Africa Serbia Slovakia Slovenia Spain

     Sweden  Switzerland Turkey  UK (3) Ukraine


     (1) Except overseas Territories
     (2) Except Russia
     (3) UK mainland Only
     (4) Austria, Germany, Turkey and South Africa only
     (5) Czech Republic, Hungary, Poland, Russia, Solovakia, Slovenia,
         Switzerland, Romania, Croatia and Serbia Only
     (6) Austria, Germany, Switzerland and South Africa Only
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