IBM System x3850 X5

IBM Redbooks Product Guide

The x3850 X5 server is the fifth generation of the Enterprise X-Architecture, delivering innovation with enhanced reliability and availability features to enable optimal performance for databases, enterprise applications, and virtualized environments. Environments that run around the clock to supply information world-wide require dependable servers with features that can tolerate a component failure without total shutdown.

The x3850 X5 server packs numerous fault-tolerant and high-availability features into a high-density, rack-optimized package that helps to significantly reduce the space needed to support massive network computing operations. A single x3850 X5 supports up to four of the new Intel Xeon E7 high-performance 10-core processors and up to 3 TB of memory. Two x3850 X5 servers can be connected together to form a single-system image with up to eight processors and up to 6 TB of RAM. This processing capacity is ideal for large-scale database or virtualization requirements. Figure 1 shows the IBM® System x3850 X5.

Figure 1. The IBM System x3850 X5

Did you know

The x3850 X5 is an ideal server for enterprise database and virtualization workloads. The x3850 X5 currently holds the #1 scores in five industry-standard benchmarks. This includes a four-socket TPC-C (database benchmark) result of over 2.3 million transactions per minute (27% better than the closest HP result) and world record TPC-H (business intelligence) price performance result.

Key features

The x3850 X5 is a mission-critical 4U four-socket server, capable of expanding to up to 8 processor sockets and 6 TB of memory in 10U of rack space. It offering outstanding performance, and superior reliability and fault-tolerant memory characteristics.

IBM® has been designing and implementing servers under the X-Architecture® name since 2001. IBM eX5 technology represents the fifth generation of enterprise servers based on the same design principle IBM began with in 1997: to offer systems that are expandable, offer “big iron” reliability, availability, and serviceability (RAS) features, with extremely competitive price/performance on an Intel Xeon processor-based system.

Scalability and performance

The x3850 X5 offers numerous features to boost performance, improve scalability, and reduce costs:

- The x3850 X5 supports up to four high-performance Intel Xeon E7 family allowing you to upgrade as business needs require.
- Scalable to eight processors by connecting two x3850 X5 servers together to form a single system image.
- Each x3850 X5 scalable to 2 TB of memory internally or 3 TB of memory with the addition of the MAX5 V2 memory expansion unit. With two x3850 X5 servers each with MAX5 units, the total available system memory is up to 6 TB.
- Supports the Intel Xeon E7-2800, E7-4800 and E7-8800 families of high performance processors, up to 10 cores each, offering superior system performance
- Intel Turbo Boost Technology dynamically turns off unused processor cores and increases the clock speed of the cores in use, by up to three model frequencies. For example, with 7-10 cores active, a 2.4 GHz E7-2870 10-core processor can run the cores at up to 2.53 GHz. With 5-6 cores active, it can run those cores at 2.67 GHz; with only 1-4 cores active, it can run those cores at 2.8 GHz
- Each processor includes two integrated memory controllers, to reduce memory bottlenecks and improve performance. Memory access is at up to 1066 MHz frequency, depending on the processor model and memory used.
- The MAX5 V2 adds an additional four memory controllers for a total of eight memory controllers to maximize memory parallelism and performance.
- In processors implementing Hyper-Threading technology, each core has two threads capable of running an independent process. Thus, an 8-core processor can run 16 threads concurrently.
- Intel’s Virtualization Technology (VT) integrates hardware-level virtualization hooks that allow operating system vendors to better utilize the hardware for virtualization workloads.
- Intel QuickPath Interconnect (QPI) technology for processor-to-processor connectivity and Intel Scalable Memory Interconnect (SMI) processor-to-memory connectivity:
  - Intel QPI link topology at up to 6.4 Gbps with four QPI links per CPU
  - Intel SMI link topology at up to 6.4 Gbps with four SMI links per CPU
- Up to 64 DIMM sockets in the server (eight per memory card), plus an additional 32 DIMMs with an optional 1U MAX5 V2 memory expansion unit, for a total of 96 DIMM sockets. With two x3850 X5 servers each with MAX5 units, the total number of DIMM sockets is 192.
- The use of solid-state drives (SSDs) instead of, or along with, traditional spinning drives (HDDs) can significantly improve I/O performance. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- Up to 24 1.8-inch SSD bays, or up to 16 2.5-inch bays together with the option of an optical drive, provide a flexible and scalable all-in-one platform to meet your increasing demands.

- Seven PCIe 2.0 slots for maximum I/O expandability

Availability and serviceability

The x3850 X5 provides many features to simplify serviceability and increase system uptime:

- Support for machine check architecture (MCA) recovery, a feature of the Intel Xeon processor E7 family, which enables the handling of system errors that otherwise require the operating system to be halted. SAP HANA is one of the first application which leverages the MCA recovery to handle system errors in order to prevent the application from being terminated in case of a system error.
- Extensive memory protection with IBM Chipkill, and, with DIMMs containing x4 DRAM modules, Redundant Bit Steering (RBS) (also known as Double Device Data Correction or DDDC) is also supported . The combination of IBM Chipkill and RBS provides very robust memory protection that sustains to two sequential memory DRAM chip failures without affecting overall system performance.
- Redundant CPU-to-I/O hub interconnect links provide ability to self-recover from CPU failure. If primary CPU fails then eX5 systems can use the second CPU to boot the OS as they still have access to the integrated I/O devices because of redundant links between CPUs and I/O hubs.
- Single image 8-way systems consisting of two interconnected 4-way nodes provide self-healing capabilities in case of single node failure. Two independent nodes form a resilient 8-way configuration. In case of single node failure the system can be restarted in degraded mode thus eliminating unexpected downtime that requires service specialist to recover.
- Memory mirroring and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- Hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- Two 1975 W hot-swap power supplies and five fans (three hot-swap, two integrated into the power supplies).
- The power source independent light path diagnostics panel and individual light path LEDs quickly lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Predictive Failure Analysis (PFA) detects when system components (processors, VRMs, memory, HDDs, fans, and power supplies) operate outside of standard thresholds and generates proactive alerts in advance of a possible failure, therefore increasing uptime.
- Solid-state drives (SSDs) offer significantly better reliability than traditional mechanical HDDs for greater uptime.
- Built-in Integrated Management Module (IMM) continuously monitors system parameters, triggers alerts, and performs recovering actions in case of failures to minimize downtime.
- Built-in diagnostics, using Dynamic Systems Analysis (DSA) Preboot, speed up troubleshooting tasks to reduce service time.
- Three-year customer-replaceable unit and on-site limited warranty, 9x5 next business day. Optional service upgrades are available.

Manageability and security

Powerful systems management features simplify local and remote management of the x3850 X5:

- The server includes an Integrated Management Module (IMM) to monitor server availability and perform remote management.
- Integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup, configuration, and updates, and simplifies error handling.
- Integrated Trusted Platform Module (TPM) 1.2 support enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- IBM Systems Director is included for proactive systems management. It offers comprehensive systems management tools that help to increase uptime, reduce costs, and improve productivity through advanced server management capabilities.

Energy efficiency

The x3850 X5 offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to the green environment:

- Energy-efficient planar components help lower operational costs.
- Support for one or two or four highly efficient 675 W ac power supplies allows for efficient use and scalability to meet the power requirements of the installed components.
- Intel Xeon processor E5-2600 product family offers significantly better performance over the previous generation while fitting into the same thermal design power (TDP) limits.
- Low-voltage Intel Xeon processors draw less energy to satisfy the demands of power and thermally constrained data centers and telecommunication environments.
- Low-voltage 1.35 V DDR3 memory RDIMMs consume 15% less energy compared to 1.5 V DDR3 RDIMMs.
- Solid state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which is a part of IBM Calibrated Vectored Cooling™ technology. Hexagonal holes can be grouped more densely than round holes, providing more efficient airflow through the system.
- IBM Systems Director Active Energy Manager™ provides advanced data center power notification and management to help achieve lower heat output and reduced cooling needs.

Locations of key components

Figure 2 shows the front of the server with the front bezel removed.

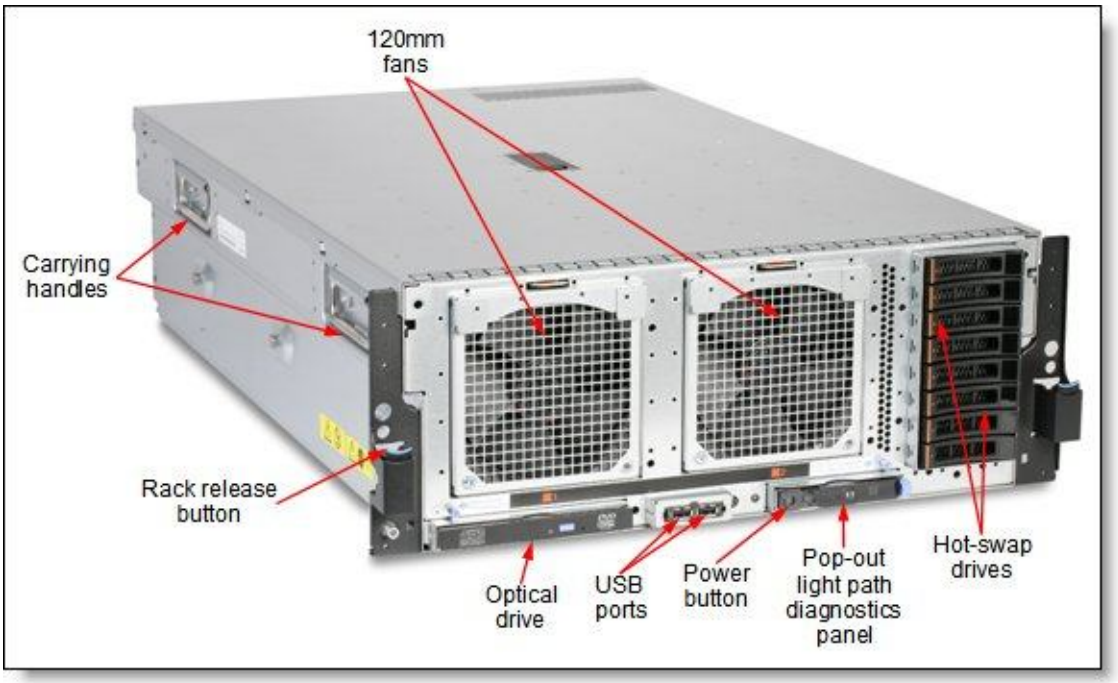

Figure 2. Front view of the IBM System x3850 X5

Figure 3 shows the rear of the server.

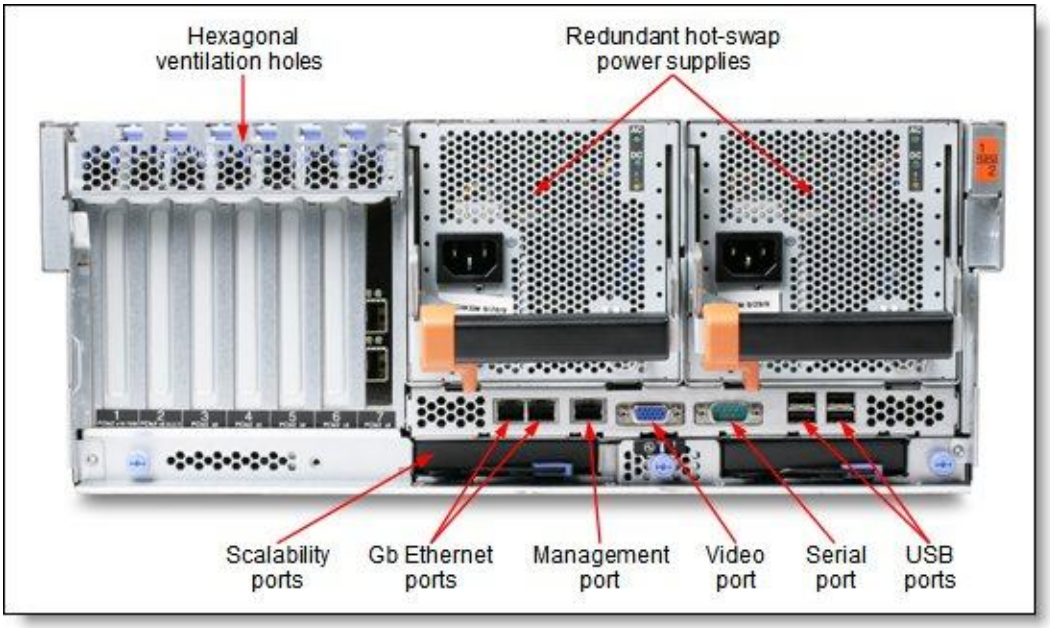

Figure 3. Rear view of the IBM System x3850 X5

Figure 4 shows the locations of key components inside the server.

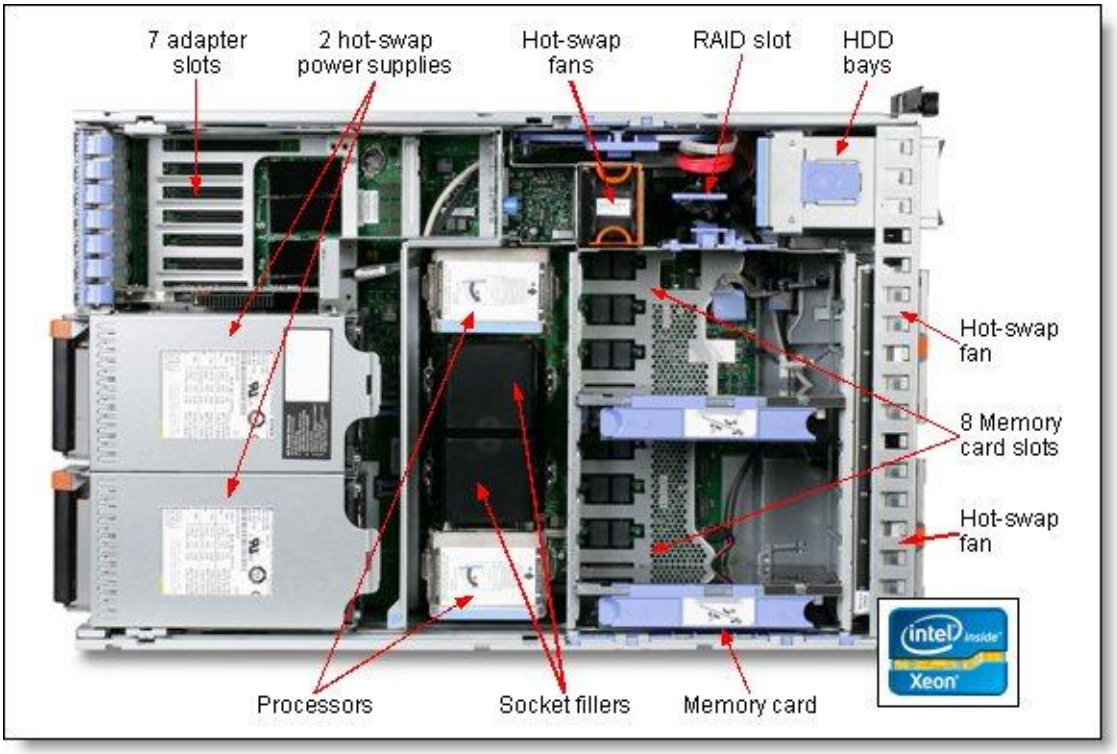

Figure 4. Inside view of the IBM System x3850 X5

The x3850 X5 supports the addition of the MAX5 memory expansion unit. This 1U device is cabled directly to the server and provides an additional 512 GB of memory capacity for applications that can benefit from the extra RAM. Figure 5 shows the MAX5 optional memory expansion unit.

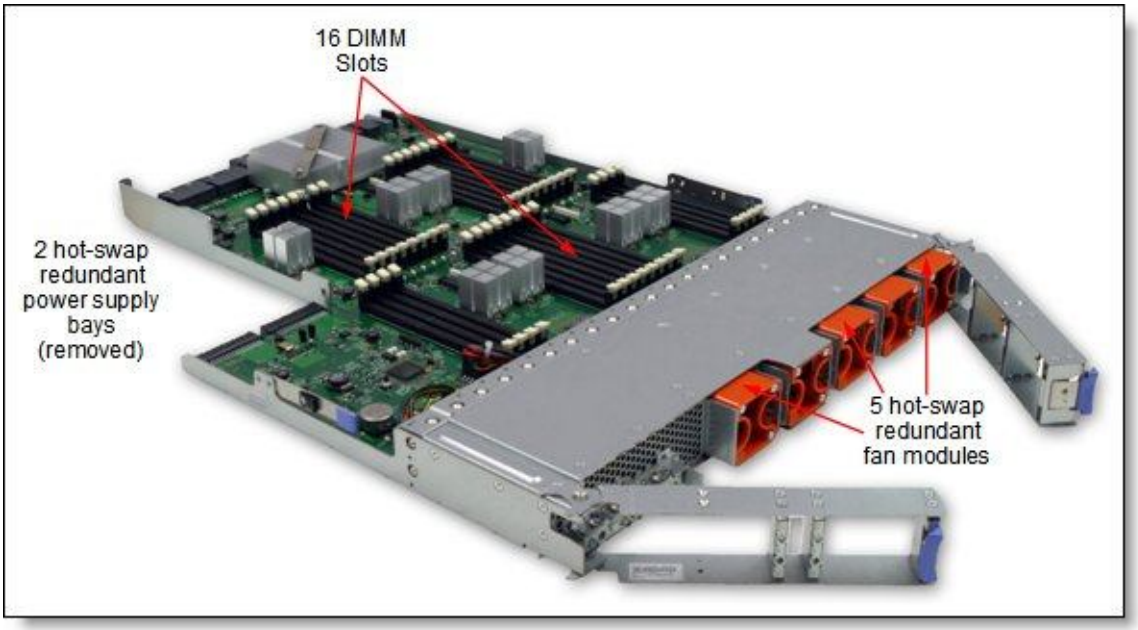

Figure 5. Inside view of the MAX5 optional memory expansion unit for the IBM System x3850 X5

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (Part 1)

Components	Specification
Form factor/height	Rack/4U per chassis; MAX5 adds 1U.
Scalability	Machine type 7143 can scale as follows: ● One server (4U rack-mounted complex) ● One server with MAX5 memory expansion unit (5U rack-mounted complex) ● Two servers with two MAX5 memory expansion units (10U rack-mounted complex)
Processor type	Machine type 7143: Intel Xeon E7-8800 and E7-4800 families, up to 10 cores.
Number of processors	Most models: 2 standard (some 4 standard); 4 maximum.
Cache (max)	Up to 30 MB L3 cache
Memory DIMM sockets	Up to eight memory cards, each with eight DIMM sockets (64 DIMM sockets total). MAX5 adds 32 DIMM sockets.
Memory maximums	2.0 TB using 32 GB DIMMs. Up to 3.0 TB with the addition of MAX5. With two x3850 X5 servers and two MAX5 units, total capacity up to 6.0 TB
Expansion slots	Eight slots total: ● Seven PCIe 2.0 slots (one used by 10 Gb Ethernet card, if included). ● One PCIe 2.0 slot for supported RAID card.
Disk bays	Eight 2.5" hot-swap SAS or sixteen 1.8" solid-state drives (SSD).
Maximum internal storage	Using NL SAS HDDs: 8 TB per chassis with eight 1 TB drives Using eXFlash solid-state drives: 8 TB per chassis with 16x 512 GB SSDs
Network interface	Two 1 Gb Ethernet ports. Broadcom 5709C controller. Emulex 10Gb Virtual Fabric Adapter standard on most models with two 10 Gb Ethernet ports
Power supply (std/max)	Up to two hot-swap redundant 1975 W power supplies
Hot-swap components	Power supplies, fans, hard disk drives, and solid-state-drives.
RAID support	7143: Integrated RAID-0, RAID-1 with ServeRAID M1015 in dedicated PCIe slot Optional RAID-5, 6, 10, 50, 60
External ports	Rear: Four scalability ports , one Ethernet for systems management, one serial port, four USB 2.0, one VGA, two Gb Ethernet Front: Two USB 2.0 Internal: One USB 2.0 port for Embedded Hypervisor
Systems management	Alert on LAN 2, Automatic Server Restart, IBM Systems Director, IBM ServerGuide, Integrated Management Module (IMM), light path diagnostics (independently powered), Predictive Failure Analysis on hard disk drives, processors, VRMs, fans and memory, Wake on LAN, Dynamic System Analysis, QPI Faildown.
Operating systems supported	Microsoft® Windows Server® 2008 (Standard, Enterprise and Data Center Editions 64-bit), 64-bit Red Hat Enterprise Linux®, 64-bit SUSE Enterprise Linux, (Server and Advanced Server), VMware vSphere Hypervisor

Table 1. Standard specifications (Part 2)

Components	Specification
Limited warranty	Three-year customer-replaceable unit and onsite limited warranty.
Dimensions	Width: 440 mm (17.3 inches), depth: 712 mm (28.0 inches), height: 173 mm (6.8 inches) or 4 rack units (4U)
Weight	Minimum configuration: 35.4 kg (78 lb), maximum configuration: 49.9 kg (110 lb)

The x3850 X5 servers are shipped with the following items:

- Rack rails and hardware
- Cable management hardware
- Country kit carton
- Two 2.8 m 220 V intra-rack cables
- On/off switch cover
- Documentation CD

Standard models

The following table lists the standard models.

Table 2. Standard models - Machine type 7143 (Intel Xeon E7-4800 and E7-8800 series processors)

Model 7143-	Intel Xeon CPUs (4 max) (quantity, model, core speed, cores, L3 cache, memory speed)	Scale without MAX5‡	Scale with MAX5‡	MAX5	Memory (cards)*	RAID	Bays (std/max) (No disks)	10G Std	Std PS
B1x	2x E7-4807 6C 1.86GHz 18MB 800	No	Yes	Opt	2x4GB (1)	Opt	0 / 8 (2.5")	Opt	1
B2x	2x E7-4820 8C 2.00GHz 18MB 978	No	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
B3x	2x E7-4830 8C 2.13GHz 24MB 1066	No	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
B5x	2x E7-4850 10C 2.00GHz 24MB 1066	No	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
B6x	2x E7-4860 10C 2.26GHz 24MB 1066	No	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
B7x	2x E7-4870 10C 2.40GHz 30MB 1066	No	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
C1x	2x E7-8850 10C 2.00GHz 24MB 1066	Yes	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
C2x	2x E7-8860 10C 2.26GHz 24MB 1066	Yes	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2
C3x	2x E7-8870 10C 2.40GHz 30MB 1066	Yes	Yes	Opt	4x4GB (2)	M1015	4 / 8 (2.5")	Std	2

‡ Columns indicate whether the server can scale to two nodes without a MAX5 attached and with a MAX5 attached.
* The number in brackets is the number of memory cards standard in each model. Up to eight cards are supported. Each holds up to eight DIMMs for a total of 64 DIMMs. The MAX5 adds 32 DIMM sockets for a total of 96 DIMMs.

Workload-optimized models

The following table lists the announced workload-optimized models. These are all named IBM System x3950 X5 to distinguish them from base x3850 X5 models, even though the base hardware is the same. These are systems that are specially configured to meet the requirements of a particular software stack.

Table 3. Workload-optimized models - Machine type 7143 (Intel Xeon E7-4800 and E7-8800 series processors)

Model	Intel Xeon CPUs (4 max)**	MAX5	Memory (cards)*	Standard RAID	Disk bays (std/max)	Disks	Network†	DVD	PS
Database workload-optimized models									
7143-D3x	4x E7-4860 10C 2.26GHz 24MB	Opt	32x4GB (8 cards)	2x 6 Gb SSD HBA	16 / 16 (1.8" SSD)	16x 200GB	2x 1Gb + 2x 10Gb	Opt	2
7143-D4x	4x E7-4860 10C 2.26GHz 24MB	Opt	32x4GB (8 cards)	4x M5015 + perf keys	16 / 16 (1.8" SSD)	16x 200GB	2x 1Gb + 2x 10Gb	Opt	2
SAP HANA workload-optimized models									
7143-HAx	2x E7-8870 10C 2.40GHz 30MB	NS§	16x16GB (4 cards)	1x M5015 + battery	8 / 8 (2.5" HDD)	8x 900GB SAS 1x 1.2TB PCIe	6x 1Gb + 4x 10Gb	Multi	2
7143-HBx	4x E7-8870 10C 2.40GHz 30MB	NS§	32x16GB (8 cards)	1x M5015 + battery	8 / 8 (2.5" HDD)	8x 900GB SAS 1x 1.2TB PCIe	6x 1Gb + 4x 10Gb	Multi	2
7143-HCx‡	4x E7-8870 10C 2.40GHz 30MB	NS§	32x16GB (8 cards)	1x M5015 + battery	8 / 8 (2.5" HDD)	8x 900GB SAS 1x 1.2TB PCIe	6x 1Gb + 4x 10Gb	Opt	2
7143-HDx	4x E7-8870 10C 2.40GHz 30MB	NS§	32x32GB (8 cards)	1x M5015 + battery	8 / 8 (2.5" HDD)	8x 900GB SAS 1x 1.2TB PCIe	6x 1Gb + 4x 10Gb	Multi	2
7143-HEx‡	4x E7-8870 10C 2.40GHz 30MB	NS§	32x32GB (8 cards)	1x M5015 + battery	8 / 8 (2.5" HDD)	8x 900GB SAS 1x 1.2TB PCIe	6x 1Gb + 4x 10Gb	Opt	2
Virtualization workload-optimized models									
7143-F1x (ESX)	4x E7-4860 10C 2.26GHz 24MB	Std (V2)	96x4GB (8 cards)	1x M1015	4 / 8 (2.5" HDD)	Open	2x 1Gb + 2x 10Gb	Opt	2
7143-F2x (RH)	4x E7-4860 10C 2.26GHz 24MB	Std (V2)	96x4GB (8 cards)	1x M1015	4 / 8 (2.5" HDD)	Open	2x 1Gb + 2x 10Gb	Opt	2
7143-B9x (ESX)	4x E7-4807 6C 1.86GHz 18MB	Std (V2)	96x4GB (8 cards)	1x M1015	4 / 8 (2.5" HDD)	Open	2x 1Gb + 2x 10Gb	Opt	2

** Processor detail: Quantity, model, cores, core speed, memory speed, L3 cache.
* The number in brackets is the number of memory cards standard in each model. Up to eight cards are supported. Each holds up to eight DIMMs for a total of 64 DIMMs. The MAX5 adds 32 DIMM sockets for a total of 96 DIMMs.
† The H models include one Emulex 10GbE Integrated Virtual Fabric Adapter (with two IBM 10GbE SW SFP+ Transceivers), one Emulex 10GbE Virtual Fabric Adapter II (with two IBM 10GbE SW SFP+ Transceivers), and one Intel Ethernet Quad Port Server Adapter I340-T4 for a total of four 10Gb ports and six 1Gb ports. All F models include one Emulex 10GbE Integrated Virtual Fabric Adapter. D3x and D4x models include one Emulex 10GbE Integrated Virtual Fabric Adapter II.
‡ Models HCx and HEx include the QPI Scalability Kit (four cables), part number 46M0072. Use model HBx plus HCx or HDx plus HEx to form a 2-node scaled complex.
§ NS=Not supported. MAX5 is not currently certified for use with SAP HANA and is therefore not supported

About these models:

- Models 7143-D3x, D4x: These models are designed for database applications and use solid state drives for the best I/O performance.

  Backplane connections for sixteen 1.8-inch solid state drives (SSD) are standard, as are sixteen 200 GB high-performance solid-state drives. Model D3x includes two SSD host bus adapters. Model D4x includes four ServeRAID M5015 RAID controllers with four ServeRAID M5000 Series Performance Accelerator Keys.

- Models 7143-HAx, HBx, HCx: These models are optimized to run the SAP High-Performance Analytic Appliance (HANA) solution.

  The x3950 X5 Workload Optimized Solution for SAP HANA is an integrated, ready-to-run, hardware-software offering, featuring the new SAP HANA software. Models HDx and HEx are specifically designed for SAP Business Suite, powered by SAP HANA (OLTP) workloads.

  Models HAx, HBx, HDx include a preload comprising SLES for SAP, IBM GPFS, and the SAP HANA software stack.

  HCx, HEx are add-on models designed to be connected to model HBx or HDx system respectively to form an eight-processor system. HCx and HEx include the four QPI cables necessary to join two systems together to form a two-node complex. HCx and HEx also include the additional GPFS software and SLES licenses to cover the extra four sockets, but do not include any preload because the are designed as an add-on to the HBx and HDx offerings respectively.

  All H models include either 256 GB, 512 GB or 1024 GB of RAM, SAS disk drives, and a high IOPS solid-state storage PCIe adapter.

- Model 7143-F1x, B9x: These models are designed for virtualization applications and include VMware ESXi 4.1 Update 1 on an integrated bootable USB memory key. The model comes standard with the MAX5 memory expansion unit and 384 GB of memory implemented using 4GB memory DIMMs (256 GB in the server and 128 GB in the MAX5).

  F1x is available world-wide and includes a MAX5 V2, 88Y6529. Model B9x is for China only and includes a MAX5 V2, 88Y6529.

- Model 7143-F2x: This model is designed for Open Virtualization and includes Red Hat Enterprise Linux with the Red Hat Enterprise Virtualization Hypervisor (Kernel-Based Virtual Machine, KVM). The software is not preloaded. The model comes standard with the MAX5 memory expansion unit and 384 GB of memory implemented using cost-effective 4GB memory DIMMs (256 GB in the server and 128 GB in the MAX5).

Refer to the Standard Specifications section for information about standard features of the server.

QPI wrap card

In the x3850 X5, QPI links are used for interprocessor communication both in a single-node system and in a two-node system. They are also used to connect the system to a MAX5 memory expansion unit. In a single-node x3850 X5, the QPI links connect in a full mesh between all CPUs. To complete this mesh, the QPI wrap card is used. QPI wrap cards are installed in sockets where the scalability cables are installed.

The QPI wrap cards are only for single-node configurations with three or four processors installed and only when a MAX5 unit is not installed. Two QPI wrap cards are needed.

Table 4. QPI wrap card

Part number	Feature code	Description	Maximum supported
49Y4379	5104	IBM x3850 X5 and x3950 X5 QPI wrap card kit (quantity 2)	1 pair

QPI wrap cards are not necessary for any of the following configurations:

- Single-node configurations with two processors
- Any configurations with MAX5 memory expansion units
- Two-node configurations

MAX5

The IBM MAX5 memory expansion unit is a 1U device and has 32 DDR3 DIMM sockets, two 675-watt power supplies, and five 40 mm hot-swap speed-controlled fans. It provides added memory and multinode scaling support for the x3850 X5 server. Some models include the MAX5 standard, as listed in the Standard Models and Workload-optimized models sections. The MAX5 options are listed in the following table.

There are two MAX5 options available.

- IBM MAX5 for System x®, part number 59Y6265 (also known as MAX5 V1)
- IBM MAX5 V2 for System x, part number 88Y6529

Both x3850 X5 machine types (7143 and 7145) support both MAX5 options, provided the firmware is at least UEFI level G0E171T/A. When used with the x3850 X5 machine type 7143 (Intel Xeon E7-4800 and E7-8800 series processors), MAX5 V2 supports low-voltage (operating at 1.35V DIMMs).

Note that some models and some processors do not support the MAX5. See the model table and the processor options table for details. The MAX5 V1 includes one power supply. The second power supply is optional (part 60Y0332) and provides redundancy. The MAX5 V2 includes two power supplies; no additional power supplies are needed or available.

Table 5. MAX5

Part number	Feature code	Description	Maximum supported
59Y6265	4199	IBM MAX5 for System x	1
88Y6529	A19H	IBM MAX5 V2 for System x	1
60Y0332	4782	IBM High Efficiency 675W Power Supply (MAX5 V1 only, 59Y6265)	1
59Y6267	4192	IBM MAX5 to x3850 X5 Cable Kit (quantity of four cables) (Used to connect one server to one MAX5)	1

Two-node and MAX5 scaling

The x3850 X5 supports the following scalable configurations:

- A single x3850 X5 server with four processor sockets. This configuration is sometimes referred to as a single-node server.
- A single x3850 X5 server with a single MAX5 memory expansion unit attached. This configuration is sometimes referred to as a memory-expanded server.
- Two x3850 X5 servers connected together to form a single-image eight-socket server. This configuration is sometimes referred to as a two-node server.
- Two x3850 X5 servers connected together to form a single-image eight-socket server with two MAX5 memory expansion units attached. This configuration is sometimes referred to as a two-node memory-expanded server. Only machine type 7143 supports this configuration.

The following table lists the cable options needed when scaling. Note that not all processors and models support all of these configurations - see the Processor options section below for details.

Table 6. Cables for two-node and MAX5 scaling

Part number	Feature code	Description	Maximum supported
59Y6267	4192	IBM MAX5 to x3850 X5 Cable Kit (quantity of four cables) Used to connect one server to one MAX5	1
46M0072	5103	IBM x3850 X5 and x3950 X5 QPI Scalability Kit (Quantity 4 cables) Used to connect two servers together without MAX5 units	1
59Y6271	4198	IBM eX5 MAX5 2-Node EXA Scalability Kit (for machine type 7143 only) Used to connect two servers together when MAX5 units are also used	1

Processor options

The x3850 X5 supports the processor options listed in the following table. The server supports up to four processors. The E7-8000 processors support native QPI scaling to two nodes without the need for a MAX5 memory expansion unit. All Intel Xeon E7 processors support two-node scaling with MAX5. Two-node scaling with MAX5 is supported with IBM MAX5 V2 for System x (88Y6529) or IBM MAX5 for System x (59Y6265).

Table 7. Processor options - Machine type 7143 (Intel Xeon E7-4800 and E7-8800 series processors)

Part number	Intel Xeon processor description	Can scale to two nodes without MAX5	Can scale to two nodes with MAX5*	Models where used
69Y1889	E7-4807 6C 1.86GHz 18MB 800MHz 95W	No	Yes	7143-B1x
69Y1890	E7-4820 8C 2.00GHz 18MB 978MHz 105W	No	Yes	7143-B2x
69Y1891	E7-4830 8C 2.13GHz 24MB 1066MHz 105W	No	Yes	7143-B3x
88Y5358	E7-4850 10C 2.00GHz 24MB 1066MHz 130W	No	Yes	7143-B5x, D1x
69Y1892	E7-4860 10C 2.26GHz 24MB 1066MHz 130W	No	Yes	7143-B6x, D2x
69Y1893	E7-4870 10C 2.40GHz 30MB 1066MHz 130W	No	Yes	7143-B7x
69Y1896	E7-8830 8C 2.13GHz 24MB 1066MHz 105W	Yes	Yes	-
69Y1894	E7-8837 8C 2.67GHz 24MB 1066MHz 130W	Yes	Yes	-
88Y5357	E7-8850 10C 2.00GHz 24MB 1066MHz 130W	Yes	Yes	7143-C1x
69Y1898	E7-8860 10C 2.26GHz 24MB 1066MHz 130W	Yes	Yes	7143-C2x
69Y1897	E7-8867L 10C 2.13GHz 30MB 1066MHz 105W	Yes	Yes	-
69Y1899	E7-8870 10C 2.40GHz 30MB 1066MHz 130W	Yes	Yes	All Hxx models

* Supports IBM MAX5 V2 for System x (88Y6529) or IBM MAX5 for System x (59Y6265).

Memory options

IBM DDR3 memory is compatibility tested and tuned for optimal System x performance and throughput. IBM memory specifications are integrated into the light path diagnostics for immediate system performance feedback and optimum system uptime. From a service and support standpoint, IBM memory automatically assumes the IBM system warranty, and IBM provides service and support worldwide.

The IBM System x3850 X5 supports DDR3 memory. Memory is installed in memory cards. The server supports eight memory cards, and each card holds eight DIMMs. Two memory cards are connected to each processor. As a result, all eight memory cards are usable only when all four processors are installed. Adding a MAX5 memory expansion unit to the server offers an additional 32 DIMM slots for a total of 96 DIMM slots per node.

The following table lists the memory options that are supported in the server and MAX5 (either MAX5 V2 or MAX5).

Notes:

- In the MAX5 memory expansion unit, do not mix DIMMs with x4 technology (DIMMs with DRAMs that are organized with 4 data lanes, as indicated by "x4" in the description) with DIMMs with x8 technology (DIMMs with DRAMs that are organized with 8 data lanes).
- In the server, you can mix DIMMs with x4 and x8 technology.

Table 8. Memory options - x3850 X5 machine type 7143 (Intel Xeon E7 series processors)

Part number	x3850 X5 feature code	Description	Where used
69Y1888	A14D	IBM x3850 X5 and x3950 X5 Memory Expansion Card (7143 only)	All 7143 models
44T1592	1712	2GB (1x2GB, 1Rx8, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz	-
49Y1407	8942	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz	-
44T1599	1713	4GB (1x4GB, Dual Rankx8) PC3-10600 CL9 ECC DDR3 1333MHz	All other models
49Y1399	A14E	8GB (1x8GB, 4Rx8, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz	-
46C7482	1706	8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz	-
49Y1400	8939	16GB (1x16GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz	All Hxx models
46C7483	1707	16GB (1x16GB, 4Rx4, 1.5V) PC3-8500 CL7 ECC DDR3 1066MHz	-
49Y1563	A1QT	16 GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333 MHz LP RDIMM	-
90Y3101	A1CP	32GB (1x32GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz	-

Table 9. Memory options - MAX5 V2, 88Y6529

Part number	MAX5 V2 feature code	Description
44T1592	2429	2GB MAX5 1x2GB 1Rx8 1.5V PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM
49Y1407	A1MH	4GB MAX5 (1x4GB, 2Gb, 2Rx8, 1.35V) PC3L-10600R-999 LP ECC RDIMM
44T1599	2431	4GB MAX5 1x4GB DualRankx8 PC310600 CL9 ECC DDR3 1333MHz LP RDIMM
46C7482	2432	8GB MAX5 1x8GB QuadRankx8 PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM
49Y1399	A1N7	8GB MAX5 1x8GB, 4Rx8, 1.35V PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM
46C7483	2433	16GB MAX5 1x16G QuadRankx4 PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM
None	A3E1	16GB MAX5 1x16GB 2Rx4 1.35V PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM
49Y1400	A1N8	16GB MAX5 1x16GB 4Rx4 1.35V PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM
90Y3101	A1R2	32GB MAX5 (4GB, 4Rx4, 1.35V) PC3L-8500 DDR3-1066MHz LP RDIMM

Table 10. Memory options - MAX5, 59Y6265

Part number	MAX5 feature code	Description
44T1592	2429	2GB MAX5 1x2GB 1Rx8 1.5V PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM
44T1599	2431	4GB MAX5 1x4GB DualRankx8 PC310600 CL9 ECC DDR3 1333MHz LP RDIMM
46C7482	2432	8GB MAX5 1x8GB QuadRankx8 PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM
46C7483	2433	16GB MAX5 1x16G QuadRankx4 PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM

The following memory protection technologies are supported:

- ECC
- ChipKill
- Memory Mirroring
- Memory Sparing
- Redundant Bit Steering (MAX5, or servers with E7 processors only, x4 DIMMs only)

Internal storage

The server supports either up to eight 2.5" drives or up to 16 1.8" drives internally. The number of drives that can be inserted depends on the backplanes that are installed. Backplane options are listed in the following table. The backplanes that are standard in each model are listed in Table 2.

Table 11. Drive backplane options

Part number	Feature code	Name	Maximum supported
59Y6213	4191	IBM eXFlash 8x 1.8-inch HS SAS SSD Backplane Supports eight 1.8" drives (includes two SAS cables)	2
59Y6135	3873	IBM 2.5" Hot Swap SAS Hard Disk Drive Backplane Supports four 2.5-inch drives (includes one SAS cable)	2

Internal drive options

The following table lists the hard drive options available for internal storage.

Table 12. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description	Maximum supported
2.5-inch 15K SAS hot-swap HDDs			
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	8
42D0677	5536	IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	8
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	8
2.5-inch 15K SAS hot-swap SEDs			
44W2294	5412	IBM 146GB 15K 6Gbps SAS 2.5" SFF Slim-HS SED	8
90Y8944	A2ZK	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	8
2.5-inch 10K SAS hot-swap HDDs			
00AD075	A48S	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	8
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	8
49Y2003	5433	IBM 600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	8
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	8
42D0637	5599	IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	8
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	8

Table 12. Disk drive options for internal disk storage (Part 2)

Part number	Feature code	Description	Maximum supported
2.5-inch 10K SAS hot-swap SEDs			
00AD085	A48T	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS SED	8
81Y9662	A3EG	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	8
90Y8908	A3EF	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	8
44W2264	5413	IBM 300GB 10K 6Gbps SAS 2.5" SFF Slim-HS SED	8
90Y8913	A2XF	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	8
1.8-inch solid state drives (SSDs) - Enterprise			
41Y8371	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	16
41Y8366	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	16
49Y6124	A3AP	IBM 400GB SATA 1.8" MLC Enterprise SSD	16
49Y6119	A3AN	IBM 200GB SATA 1.8" MLC Enterprise SSD	16
00W1120	A3HQ	IBM 100GB SATA 1.8" MLC Enterprise SSD	16
43W7746	5420	IBM 200GB SATA 1.8" MLC SSD	16
43W7726	5428	IBM 50GB SATA 1.8" MLC SSD	16
1.8-inch solid state drives (SSDs) - Enterprise Value			
00AJ040	A4KV	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	16
00AJ045	A4KW	S3500 240GB SATA 1.8" MLC Enterprise Value SSD	16
00AJ050	A4KX	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	16
49Y5993	A3AR	IBM 512GB SATA 1.8" MLC Enterprise Value SSD	16
00W1227	A3TH	IBM 256GB SATA 1.8" MLC Enterprise Value SSD	16
49Y5834	A3AQ	IBM 64GB SATA 1.8" MLC Enterprise Value SSD	16
00W1222	A3TG	IBM 128GB SATA 1.8" MLC Enterprise Value SSD	16
2.5-inch solid state drives (SSDs) - Enterprise			
41Y8341	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	8
41Y8336	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	8
41Y8331	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	8
43W7718	A2FN	IBM 200GB SATA 2.5" MLC HS SSD	8
49Y6139	A3F0	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	8
49Y6134	A3EY	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	8
49Y6129	A3EW	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	8
00W1125	A3HR	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	8

Table 12. Disk drive options for internal disk storage (Part 3)

Part number	Feature code	Description	Maximum supported
2.5-inch solid state drives (SSDs) - Enterprise Value			
00AJ000	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	8
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	8
00AJ010	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	8
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	8
49Y5844	A3AU	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	8
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	8
90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	8
49Y5839	A3AS	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	8
2.5-inch SAS-SSD hybrid drives			
00AD102	A4G7	IBM 600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	8
2.5-inch NL SAS hot-swap HDDs			
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	8
42D0707	5409	IBM 500GB 7200 6Gbps NL SAS 2.5" SFF Slim-HS HDD	8
81Y9726	A1NZ	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	8
2.5-inch NL SATA hot-swap HDDs			
81Y9730	A1AV	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8
42D0752	5407	IBM 500GB 7200 NL SATA 2.5" SFF Slim-HS HDD	8
81Y9722	A1NX	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	8

Controllers for internal storage

The following table lists the RAID controllers, SAS HBAs and additional options used for internal disk storage of x3850 X5 server.

Table 13. RAID controllers and SAS HBAs for internal storage

Part number	Feature code	Description	Maximum supported
90Y4304	A2NF	ServeRAID M5016 SAS/SATA Controller for System x	2
46M0916	3877	ServeRAID M5014 SAS/SATA Controller	4
46M0829	0093	ServeRAID M5015 SAS/SATA Controller	4
46M0831	0095	ServeRAID M1015 SAS/SATA Controller	1
46M0832	9749	ServeRAID M1000 Series Advance Feature Key	1
46M0969	3889	ServeRAID B5015 SSD Controller	4
81Y4426	A10C	ServeRAID M5000 Series Performance Accelerator Key†	4
46M0930	5106	ServeRAID M5000 Series Advance Feature Key†	4
46M0917	5744	ServeRAID M5000 Series Battery Assembly	4
88Y5874	A39Q	ServeRAID M5016 Battery Tray	1
46M0912	3876	IBM 6Gb Performance Optimized HBA	4
46C8988	A3MW	N2115 SAS/SATA HBA for IBM System x	4

† Only one key is supported in each controller, either the Advance Feature Key or the Performance Accelerator Key.

The ServeRAID M1015 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional ServeRAID M1000 Series Advanced Feature Key
- 6 Gbps throughput per port
- Based on the LSI SAS2008 6 Gbps RAID on Chip (ROC) controller
- PCI Express 2.0 x8 host interface
- Configurable stripe size up to 64 KB

The ServeRAID M5014 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 256 MB of onboard cache
- Optional Intelligent Li-Ion-based battery backup unit with the ServeRAID M5000 Series Battery Kit

The ServeRAID M5015 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 512 MB of onboard cache
- Standard Intelligent Li-Ion-based battery backup unit with up to 48 hours of data retention

The ServeRAID M5016 adapter card has the following specifications:

- Two Mini-SAS internal connectors (SFF-8087)
- 6 Gbps throughput per port
- 800 MHz dual-core PowerPC® processor with LSI SAS2208 6 Gbps RAID on Chip (ROC) controller
- PCI Express x8 Gen 2 host interface
- 1 GB of onboard data cache (DDR3 running at 1333 MHz)
- CacheVault flash power module to protect data in cache in case of critical power or server failure
- Supports RAID levels 0, 1, 5, 6, 10, 50, and 60
- Supports up to 64 logical volumes
- Supports LUN sizes up to 64 TB
- Configurable stripe size up to 1 MB

The ServeRAID M5016 Battery Tray, 90Y4304, is used to house the M5016 power module remotely from the controller. The tray replaces the existing tray supplied with the server and supports up to two power modules. Only one ServeRAID M5016 Battery Tray can be installed in the x3850 X5.

The ServeRAID B5015 SSD Controller has the following specifications:

- Two Mini-SAS internal connectors
- Supports RAID levels 1 and 5
- 6 Gbps throughput per SAS port
- PCI Express 2.0 x8 host interface
- Based on PMC-Sierra PM8013 maxSAS 6 Gb/s SAS RoC controller
- Performance optimized for SSDs
- Stripe size of up to 1 MB

For more information, see the list of IBM Redbooks Product Guides in the RAID adapters category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=raid

Internal tape drives

The server does not support an internal tape drive option.

Optical drives

The server supports the optical drive options listed in the following table.

Table 14. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0901	4161	IBM UltraSlim Enhanced SATA DVD-ROM	1	-
46M0902	4163	UltraSlim Enhanced SATA Multi-Burner	1	7143-HAx, HBx

IBM UltraSlim Enhanced SATA DVD-ROM (part number 46M0901) supports the following media and speeds for reading:

- CD-ROM 24X
- CD-DA (DAE) 20X
- CD-R 24X
- CD-RW 24X
- DVD-ROM (single layer) 8X
- DVD-ROM (dual layer) 8X
- DVD-R (4.7 GB) 6X
- DVD-R DL 4X
- DVD+R 6X
- DVD+R DL 4X
- DVD-RW (4.7 GB) 4X
- DVD+RW 4X
- DVD-RAM (4.7/9.4 GB) 4X

IBM UltraSlim Enhanced SATA Multi-Burner (part number 46M0902) supports the same media and speeds for reading as DVD-ROM (46M0901). In addition, this drive supports the following media and speeds for writing:

- CD-R 24X
- CD-RW 4X
- High Speed CD-RW 10X
- Ultra Speed CD-RW 16X
- Ultra Speed Plus CD-RW 16X
- DVD-R 8X
- DVD-R DL 6X
- DVD+R 8X
- DVD+R DL 6X
- DVD-RW 6X
- DVD+RW 8X
- DVD-RAM 5X

I/O expansion options

The server offers the following PCI Express 2.0 slots. None are hot-swap.

- Slot 1: PCI Express 2.0 x16, full length, full height
- Slot 2: PCI Express 2.0 x4 (x8 mechanical), full length, full height
- Slot 3: PCI Express 2.0 x8, full length, full height
- Slot 4: PCI Express 2.0 x8, full length, full height
- Slot 5: PCI Express 2.0 x8, half length, full height
- Slot 6: PCI Express 2.0 x8, half length, full height
- Slot 7: PCI Express 2.0 x8, half length, full height (used by the Emulex 10Gb Ethernet Adapter)

The server has an additional PCI Express slot dedicated to the BR10i RAID controller if installed.

Note: The use of slots 1 - 4 requires that a second processor be installed.

Network adapters

x3850 X5 offers two integrated Gigabit Ethernet ports, based on the Broadcom BCM5709C controller.

Most models also have an Emulex 10GbE Integrated Virtual Fabric Adapter II for IBM System x (feature A148) installed as standard in slot 7. See Table 2 for specifics. This adapter is functionally identical to the Emulex 10Gb Virtual Fabric Adapter II for IBM System x, 49Y7950. The difference is that the integrated adapter has a longer edge connector, meaning that the card can only be installed in this server.

For technical details about this card, see the IBM Redbooks® Product Guide Emulex 10GbE Virtual Fabric Adapter II and III family for IBM System x, TIPS0844, available at http://www.redbooks.ibm.com/abstracts/tips0844.html.

The following table lists additional supported network adapters.

Table 15. Network adapters

Part number	Feature code	Description	Maximum supported
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	7
10 Gb Ethernet			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for IBM System x	7
42C1820	1637	Brocade 10Gb CNA for IBM System x	7
None*	A148	Emulex 10GbE Integrated Virtual Fabric Adapter II for IBM System x	1
49Y7950	A18Z	Emulex 10GbE Virtual Fabric Adapter II for IBM System x	7
95Y3751	A348	Emulex Dual Port VFAII Adapter & FCoE/iSCSI License for IBM System x	7
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	7
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	7
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x	7
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x	7
42C1800	5751	QLogic 10Gb CNA for IBM System x	7
47C9952	A47H	Solarflare SFN5162F MR Dual Port 10GbE SFP+ Adapter for IBM System x	4
47C9960	A47J	Solarflare SFN6122F LL Dual Port 10GbE SFP+ Adapter for IBM System x	4
1 Gb Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	7
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	7
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	7
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	7
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter	7
42C1750	2975	PRO/1000 PF Server Adapter	7
InfiniBand			
95Y3750	A2MY	Mellanox ConnectX-2 Dual-port QSFP QDR IB Adapter for IBM System x	1
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	7

* The Emulex 10GbE Integrated Virtual Fabric Adapter II for IBM System x is either included in standard models or available via CTO only

For more information, see the list of IBM Redbooks Product Guides in the Ethernet and IB adapters category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=networkadapters

Storage host bus adapters

The following table lists storage HBAs supported by the x3850 X5 server.

Table 16. Storage adapters

Part number	Feature code	Description	Maximum supported
16 Gb Fibre Channel			
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	7
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	7
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	7
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	7
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	7
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	7
8 Gb Fibre Channel			
46M6050	3591	Brocade 8Gb FC Dual-port HBA for IBM System x	7
46M6049	3589	Brocade 8Gb FC Single-port HBA for IBM System x	7
42D0494	3581	Emulex 8Gb FC Dual-port HBA for IBM System x	7
42D0485	3580	Emulex 8Gb FC Single-port HBA for IBM System x	7
42D0510	3579	QLogic 8Gb FC Dual-port HBA for IBM System x	7
42D0501	3578	QLogic 8Gb FC Single-port HBA for IBM System x	7
4 Gb Fibre Channel			
59Y1993	3886	Brocade 4Gb FC Dual-port HBA for IBM System x	7
59Y1987	3885	Brocade 4Gb FC Single-port HBA for IBM System x	7
42C2071	1699	Emulex 4Gb FC Dual-Port PCI-E HBA for IBM System x	7
42C2069	1698	Emulex 4Gb FC Single-Port PCI-E HBA for IBM System x	7
39R6527	3568	QLogic 4Gb FC Dual-Port PCIe HBA for System x	7
39R6525	3567	QLogic 4Gb FC Single-Port PCIe HBA for System x	7
SAS			
46M0907	5982	IBM 6Gb SAS HBA	7
46C9010	A3MV	N2125 SAS/SATA HBA for IBM System x	7

For more information, see the list of IBM Redbooks Product Guides in the Host bus adapters category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=hba

PCIe SSD adapters

The server supports the High IOPS SSD adapters listed in the following table.

Table 17. SSD adapters

Part number	Feature code	Description	Maximum supported
46M0877	0096	IBM 160GB High IOPS SS Class SSD PCIe Adapter	
46M0878	0097	IBM 320GB High IOPS SD Class SSD PCIe Adapter	
46M0898	1649	IBM 320GB High IOPS MS Class SSD PCIe Adapter	
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	
90Y4397	A3DZ	IBM 2.4TB High IOPS MLC Duo Adapter	
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	
81Y4535	A1NE	320GB High IOPS SLC Adapter For IBM System x	
81Y4539	A1ND	640GB High IOPS SLC Duo Adapter For IBM System x	
90Y4361*	A3MZ	IBM 300GB High IOPS MLC Modular Adapter	
90Y4365*	A3N0	IBM 600GB High IOPS MLC Modular Adapter	
90Y4369*	A3N1	IBM 800GB High IOPS MLC Modular Adapter	
90Y4373*	A3N2	IBM 300GB High IOPS SLC Modular Adapter	

* These modular adapters are not available via CTO or Special build. The adapter cannot be shipped installed and instead must be shipped in its option box and configured at the final installation location. For more information, see https://ibm.com/support/entry/myportal/docdisplay?lndocid=SERV-IOMA

For more information, see the list of IBM Redbooks Product Guides in the Internal Storage category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=internalstorage

Power supplies

The server supports up to two redundant hot-swap power supplies, providing N+N redundancy. Most standard models come with two power supplies (Table 2).

The MAX5 power subsystem consists of two hot-pluggable 675 W power supplies, designed for N+N (fully redundant) hot-swap operation. The MAX5 V1 has one power supply standard and a second optional power supply for redundancy. See the MAX5 section for details. The MAX5 V2 has two power supplies installed. No further power supplies are needed or available.

Table 18. Power supplies

Part number	Feature code	Description	Maximum supported
59Y6139	2111	IBM 1975 W Power Supply (x3850 X5)	2 (1 or 2 standard)
60Y0332	4782	IBM High Efficiency 675W Power Supply For second power supply for MAX5 V1	1 (MAX5 V1 only)

An AC power supply ships standard with one 2.8 m C13 - C14 power cord.

Integrated virtualization

The server supports VMware ESXi installed on a USB memory key. The key is installed in a USB socket inside the server. The following table lists the virtualization options.

Table 19. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1
41Y8296	A1NP	IBM USB Memory Key for VMware ESXi 4.1 Update 1	1
41Y8300	A2VC	IBM USB Memory Key for VMWare ESXi 5.0	1
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update1	1
41Y8311	A2R3	IBM USB Memory Key for VMWare ESXi 5.1	1

Remote management

The server contains IBM Integrated Management Module (IMM), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. The IMM also provides a virtual presence capability for remote server management capabilities.

The IMM provides remote server management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The server also supports virtual media and remote control features, which provide the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the IMM memory and mapping it to the server as a virtual drive
- Capture blue-screen errors

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2008 HPC Edition
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2012
- Microsoft Windows Small Business Server 2008 Premium Edition
- Microsoft Windows Small Business Server 2008 Standard Edition
- Red Hat Enterprise Linux 5 Server with Xen x64 Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- Solaris 10 Operating System
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 10 with Xen for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 with Xen for AMD64/EM64T
- VMware ESX 4.1
- VMware ESXi 4.1
- VMware vSphere 5.0 (ESXi)
- VMware vSphere 5.1 (ESXi)

See the IBM ServerProven® website for the latest information about the specific versions and service levels supported and any other prerequisites:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

Physical and electrical specifications

Dimensions:

- Width: 440 mm (17.3 inches)
- Depth: 712 mm (28.0 inches)
- Height: 173 mm (6.8 inches) or 4 rack units (4U)

Weight:

- Minimum configuration: 35.4 kg (78 lb)
- Maximum configuration: 49.9 kg (110 lb)

Electrical:

- 100 to 127 (nominal) V ac; 50 or 60 Hz; System 20A (10A/PS)
- 200 to 208 (nominal) V ac; 50 or 60 Hz; System 10A
- 200 to 240 (nominal) V ac; 50 or 60 Hz; System 9A
  - Minimum configuration: 0.20 kVA (one power supply)
  - Minimum configuration: 0.26 kVA (two power supplies)
  - Typical configuration: 1.12 kVA (two power supplies)
  - Maximum configuration: 2.16 kVA (two power supplies)

Btu output:

- Ship configuration (one power supply): 648 Btu/hr (190 watts)
- Ship configuration (two power supplies): 802 Btu/hr (235 watts)
- Typical configuration: 3,753 Btu/hr (1100 watts)
- Full configuration: 7,336 Btu/hr (2150 watts)

Noise level: 6.3 bels

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

Warranty options

The IBM System x3850 X5 has a 3-year onsite warranty with 9x5/next-business-day terms. IBM offers the warranty service upgrades through IBM ServicePacs®, discussed in this section. The IBM ServicePac is a series of prepackaged warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

IBM ServicePac offerings are country-specific. That is, each country might have its own service types, service levels, response times, and terms and conditions. Not all covered types of ServicePacs might be available in a particular country. For more information about IBM ServicePac offerings available in your country, see the IBM ServicePac Product Selector at:

https://www-304.ibm.com/sales/gss/download/spst/servicepac

The following table explains warranty service definitions in more detail.

Table 20. Warranty service definitions

Term	Description
IBM onsite repair (IOR)	A service technician will come to the server's location for equipment repair.
24x7x2 hour	A service technician is scheduled to arrive at your customer's location within two hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
24x7x4 hour	A service technician is scheduled to arrive at your customer's location within four hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.
9x5x4 hour	A service technician is scheduled to arrive at your customer's location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m. it is determined that onsite service is required, the customer can expect the service technician to arrive the morning of the following business day. For noncritical service requests, a service technician will arrive by the end of the following business day.
9x5 next business day	A service technician is scheduled to arrive at your customer's location on the business day after we receive your call, following remote problem determination. We provide service from 8:00 a.m. to 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the types of IBM ServicePacs are:

- Warranty and maintenance service upgrades
  - One, 2, 3, 4, or 5 years of 9x5 or 24x7 service coverage
  - Onsite repair from next business day to 4 or 2 hours
  - One or two years of warranty extension
- Remote technical support services
  - One or three years with 24x7 coverage (severity 1) or 9x5/next business day for all severities
  - Installation and startup support for System x servers
  - Remote technical support for System x servers
  - Software support - Support Line
    - Microsoft or Linux software
    - VMware
    - IBM Systems Director

Regulatory compliance

The server conforms to the following international standards:

- Multiprocessor Specification (MPS) 1.4
- Hardware-enabled to meet ISO 9241, Part 3
- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 4, Class A
- IEC/UL 60950-1, 2nd Edition
- CAN/CSA - C22.2 No. 60950-1-07 2nd Edition
- NOM-019 (This server is certified by the respective UL and NOM agencies.)

External disk storage expansion

The following table lists the external SAS disk storage expansion enclosures that are available.

Table 21. External SAS storage expansion enclosures

Part number	Description	Maximum quantity supported per one M5025
172701X	IBM System Storage® EXP3000	18 (9 per port)
174712X	IBM System Storage EXP2512 Express	18 (9 per port)
174724X	IBM System Storage EXP2524 Express	9 (9 per port)

The hard disk drives listed in the following are supported with external expansion enclosures.

Table 22. Hard drive options for external expansion enclosures

Part number	Description	Maximum quantity supported per one enclosure
EXP3000 Hot-Swap SATA 3.5" Hard Drives		
43W7630	1000 GB Dual Port Hot Swap SATA	12
49Y1940	IBM 2 TB 7200 Dual Port SATA 3.5" HS HDD	12
EXP3000 Hot-Swap SAS 3.5" Hard Drives		
44W2234	IBM 300 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
44W2239	IBM 450 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
44W2244	IBM 600 GB 15K 6 Gbps SAS 3.5" Hot-Swap HDD	12
EXP2512 Hot-Swap SAS 3.5" Hard Drives		
49Y1899	300 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1900	450 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1901	600 GB 15K 6 Gb SAS 3.5" HDD	12
49Y1903	1 TB 7,200 RPM 6 Gb SAS NL 3.5" HDD	12
49Y1902	2 TB 7,200 RPM 6 Gb SAS NL 3.5" HDD	12
EXP2524 Hot-Swap SAS 2.5" Hard Drives		
49Y1896	146 GB 15K 6 Gb SAS 2.5” HDD	24
49Y1895	300 GB 10K 6 Gb SAS 2.5” HDD	24
81Y9596	600 GB 10K 6 Gb SAS 2.5” HDD	24
49Y1898	500 GB 7,200 RPM 6 Gb SAS NL 2.5” HDD	24

The RAID controllers listed in the following table are supported with external expansion enclosures.

Table 23. RAID controllers for external storage expansion enclosures

Part number	Feature code	Description	Maximum supported
46M0830	0094	ServeRAID M5025 SAS/SATA Controller	2
46M0930	5106	ServeRAID M5000 Series Advance Feature Key†	1 per one M5025
81Y4426	A10C	ServeRAID M5000 Series Performance Accelerator Key†	1 per one M5025

† Only one key is supported in each controller, either the Advance Feature Key or the Performance Accelerator Key.

The ServeRAID M5025 SAS/SATA Controller has the following specifications:

- Two Mini-SAS external connectors
- Supports RAID levels 0, 1, 5, 10, and 50
- Supports RAID 6 and 60 with the optional M5000 Advanced Feature Key
- Performance optimization for SSD drives with optional M5000 Series Performance Accelerator Key
- 6 Gbps throughput per port
- PCI Express 2.0 x8 host interface
- Based on the LSI SAS2108 6 Gbps ROC controller
- 512 MB of onboard cache
- Intelligent Li-Ion-based battery backup unit with up to 48 hours of data retention
- Supports connectivity to the EXP3000, EXP2512, and EXP2524 storage expansion enclosures

For more information, see the *ServeRAID M5025 SAS/SATA Controller for IBM System x* at-a-glance guide, TIPS0739, at: http://www.redbooks.ibm.com/abstracts/tips0739.html?Open

The external SAS cables listed in the following table are supported with external expansion enclosures and M5025 RAID controllers.

Table 24. External SAS cables for external storage expansion enclosures

Part number	Description	Maximum quantity supported per enclosure*
39R6531	IBM 3 m SAS Cable	1
39R6529	IBM 1 m SAS Cable	1

* Note: The EXP3000 and EXP2500 series can be chained with each other. In such a case, one cable is used to connect first EXP25xx or EXP3000 to the RAID controller, and every consecutive EXP unit is connected to the previous one by one cable.

External disk storage systems

The following table lists the external storage systems that are supported by x3550 M4 and can be ordered through System x sales channel. The server may support other IBM disk systems that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information, http://www.ibm.com/systems/support/storage/ssic

Table 25. External disk storage systems

Part number	Description
1746A2D	IBM System Storage DS3512 Express Dual Controller Storage System
1746A2S	IBM System Storage DS3512 Express Single Controller Storage System
1746A4D	IBM System Storage DS3524 Express Dual Controller Storage System
1746A4S	IBM System Storage DS3524 Express Single Controller Storage System
181494H	IBM System Storage DS3950 Model 94
181498H	IBM System Storage DS3950 Model 98
181492H	IBM System Storage EXP395 Expansion Unit
1746A2E	IBM System Storage EXP3512 Express Storage™ Expansion Unit
1746A4E	IBM System Storage EXP3524 Express Storage Expansion Unit

For more information, see the list of IBM Redbooks Product Guides in the System Storage category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=externalstorage

External backup units

The server supports the external backup attachment options listed in the following table.

Table 26. External backup options (Part 1)

Part number	Description
External tape expansion enclosures for internal tape drives	
87651UX	1U Tape Drive Enclosure
8767HHX	Half High Tape Drive Enclosure
87651NX	1U Tape Drive Enclosure (with Nema 5-15P LineCord)
8767HNX	Half High Tape Drive Enclosure (with Nema 5-15P LineCord)
Tape enclosure adapters (with cables)	
44E8869	USB Enclosure Adapter Kit
40K2599	SAS Enclosure Adapter Kit
Internal backup drives supported by external tape enclosures	
46C5399	IBM DDS Generation 5 USB Tape Drive
39M5636	IBM DDS Generation 6 USB Tape Drive
43W8478	IBM Half High LTO Gen 3 SAS Tape Drive
44E8895	IBM Half High LTO Gen 4 SAS Tape Drive
49Y9898	IBM Half High LTO Gen 5 Internal SAS Tape Drive
00D8924	IBM Half High LTO Ultrium Gen 6 Internal SAS Tape Drive

Table 26. External tape options (Part 2)

Part number	Description
External backup units*	
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US line cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US line cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US line cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without line cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without line cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without line cord)
3580S3V	System Storage TS2230 Tape Drive Express Model H3V
3580S4V	System Storage TS2240 Tape Drive Express Model H4V
3580S5E	System Storage TS2250 Tape Drive Express Model H5S
3580S5X	System Storage TS2350 Tape Drive Express Model S53
3572S4R	TS2900 Tape Library with LTO4 HH SAS drive & rack mount kit
3572S5R	TS2900 Tape Library with LTO5 HH SAS drive & rack mount kit
35732UL	TS3100 Tape Library Model L2U Driveless
35734UL	TS3200 Tape Library Model L4U Driveless
46X2682†	LTO Ultrium 5 Fibre Channel Drive
46X2683†	LTO Ultrium 5 SAS Drive Sled
46X2684†	LTO Ultrium 5 Half High Fibre Drive Sled
46X2685†	LTO Ultrium 5 Half High SAS Drive Sled
46X6912†	LTO Ultrium 4 Half High Fibre Channel Drive Sled
46X7117†	LTO Ultrium 4 Half High SAS DriveV2 Sled
46X7122†	LTO Ultrium 3 Half High SAS DriveV2 Sled

* Note: The external tape drives listed can be ordered through System x sales channel. Server may support other IBM tape drives that are not listed in this table. Refer to IBM System Storage Interoperability Center for further information.

† Note: These part numbers are the tape drives options for 35732UL and 35734UL.

For more information, see the list of IBM Redbooks Product Guides in the Backup units category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tape

Top-of-rack Ethernet switches

The server supports the top-of-rack Ethernet switches from IBM System Networking listed in the following table.

Table 27. IBM System Networking - Top-of-rack switches

Part number	Description
IBM System Networking - 1 Gb top-of-rack switches	
0446013	IBM System Networking RackSwitch G8000R
7309CFC	IBM System Networking RackSwitch G8000F
7309CD8	IBM System Networking RackSwitch G8000DC
7309G52	IBM System Networking RackSwitch G8052R
730952F	IBM System Networking RackSwitch G8052F
427348E	IBM Ethernet Switch J48E
6630010	Juniper Networks EX2200 24 Port
6630011	Juniper Networks EX2200 24 Port with PoE
6630012	Juniper Networks EX2200 48 Port
6630013	Juniper Networks EX2200 48 Port with PoE
IBM System Networking - 10 Gb top-of-rack switches	
7309DRX	IBM System Networking RackSwitch G8264CS (Rear to Front)
7309DFX	IBM System Networking RackSwitch G8264CS (Front to Rear)
7309BD5	IBM System Networking RackSwitch G8124DC
7309BR6	IBM System Networking RackSwitch G8124ER
7309BF7	IBM System Networking RackSwitch G8124EF
7309G64	IBM System Networking RackSwitch G8264R
730964F	IBM System Networking RackSwitch G8264F
7309CR9	IBM System Networking RackSwitch G8264TR
7309CF9	IBM System Networking RackSwitch G8264TF
0719410	Juniper Networks EX4500 - Front to Back Airflow
0719420	Juniper Networks EX4500 - Back to Front Airflow
IBM System Networking - 40 Gb top-of-rack switches	
8036ARX	IBM System Networking RackSwitch G8316R
8036AFX	IBM System Networking RackSwitch G8316F

For more information, see the list of IBM Redbooks Product Guides in the Top-of-rack switches category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=tor

Uninterruptible power supply units

The server supports attachments to the uninterruptible power supply (UPS) units listed in Table 24.

Table 28. Uninterruptible power supply units

Part number	Description
21304RX	IBM UPS 10000XHV
53953AX	IBM 3000VA LCD 3U Rack UPS (100 V/120 V)
53953JX	IBM 3000VA LCD 3U Rack UPS (200 V/208 V)
53956AX	IBM 6000VA LCD 4U Rack UPS (200 V/208 V)
53956KX	IBM 6000VA LCD 4U Rack UPS (230 V)
53959KX	IBM 11000VA LCD 5U Rack UPS (200 V/208 V/230 V)

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Power distribution units

The following table lists the server supports attachments to the power distribution units (PDUs).

Table 29. Power distribution units (part 1)

Part number	Description
Switched and monitored PDUs	
46M4002	IBM 1U 9 C19/3 C13 Active Energy Manager DPI® PDU
46M4003	IBM 1U 9 C19/3 C13 Active Energy Manager 60A 3-Phase PDU
46M4004	IBM 1U 12 C13 Active Energy Manager DPI PDU
46M4005	IBM 1U 12 C13 Active Energy Manager 60A 3-Phase PDU
Enterprise PDUs	
71762MX	IBM Ultra Density Enterprise PDU C19 PDU+ (WW)
71762NX	IBM Ultra Density Enterprise PDU C19 PDU (WW)
71763MU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU+ (NA)
71763NU	IBM Ultra Density Enterprise PDU C19 3 Phase 60A PDU (NA)
39M2816	IBM DPI C13 Enterprise PDU without linecord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed line cord
39Y8941	DPI Single Phase C13 Enterprise PDU without line cord
39Y8948	DPI Single Phase C19 Enterprise PDU without line cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8938	30 amp/125 V Front-end PDU with NEMA L5-30P connector
39Y8939	30 amp/250 V Front-end PDU with NEMA L6-30P connector
39Y8940	60 amp/250 V Front-end PDU with IEC 309 60A 2P+N+Gnd connector
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV line cords
39Y8952	DPI Universal Rack PDU with CEE7-VII Europe LC
39Y8953	DPI Universal Rack PDU with Denmark LC
39Y8954	DPI Universal Rack PDU with Israel LC
39Y8955	DPI Universal Rack PDU with Italy LC
39Y8956	DPI Universal Rack PDU with South Africa LC
39Y8957	DPI Universal Rack PDU with UK LC

Table 29. Power distribution units (part 2)

Part number	Description
39Y8958	DPI Universal Rack PDU with AS/NZ LC
39Y8959	DPI Universal Rack PDU with China LC
39Y8962	DPI Universal Rack PDU (Argentina)
39Y8960	DPI Universal Rack PDU (Brazil)
39Y8961	DPI Universal Rack PDU (India)
0U Basic PDUs	
46M4122	IBM 0U 24 C13 16A 3-Phase PDU
46M4125	IBM 0U 24 C13 30A 3-Phase PDU
46M4128	IBM 0U 24 C13 30A PDU
46M4131	IBM 0U 24 C13 32A PDU
46M4140	IBM 0U 12 C19/12 C13 60A 3-Phase PDU
46M4143	IBM 0U 12 C19/12 C13 32A 3-Phase PDU

For more information, see the list of IBM Redbooks Product Guides in the Power infrastructure category: http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=power

Rack cabinets

The server supports the rack cabinets listed in the following table.

Table 30. Rack cabinets

Part number	Description
93072PX	IBM 25U Static S2 Standard Rack
93604EX	IBM 42U 1200 mm Deep Dynamic Expansion Rack
93604PX	IBM 42U 1200 mm Deep Dynamic Rack
93614EX	IBM 42U 1200 mm Deep Static Expansion Rack
93614PX	IBM 42U 1200 mm Deep Static Rack
93624EX	IBM 47U 1200 mm Deep Static Expansion Rack
93624PX	IBM 47U 1200 mm Deep Static Rack
93072RX	IBM 25U S2 standard Rack
14102RX	IBM 25U standard Rack
93074RX	NetBAY S2 42U Standard Rack Cabinet
93074XX	IBM 42U S2 expansion Rack
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise Rack
14104RX	IBM 42U S2 standard Rack
99564RX	IBM S2 42U Dynamic Standard Rack Cabinet
99564XX	IBM S2 42U Dynamic Expansion Rack Cabinet

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

Rack options

The server supports the rack console switches and monitor kits listed in the following table.

Table 31. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
172317X	1723HC1 fc 0051	1U 17in Flat Panel Console Kit
172319X	1723HC1 fc 0052	1U 19in Flat Panel Console Kit
Console switches		
1754D2X	1754HC2 fc 6695	IBM Global 4x2x32 Console Manager (GCM32)
1754D1X	1754HC1 fc 6694	IBM Global 2x2x16 Console Manager (GCM16)
1754A2X	1754HC4 fc 0726	IBM Local 2x16 Console Manager (LCM16)
1754A1X	1754HC3 fc 0725	IBM Local 1x8 Console Manager (LCM8)
Console cables		
43V6147	3757	IBM Single Cable USB Conversion Option (UCO)
39M2895	3756	IBM USB Conversion Option (4 Pack UCO)
39M2897	3754	IBM Long KVM Conversion Option (4 Pack Long KCO)
46M5383	5341	IBM Virtual Media Conversion Option Gen2 (VCO2)
46M5382	5340	IBM Serial Conversion Option (SCO)

For more information, see the list of IBM Redbooks Product Guides in the Rack cabinets and options category:
http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=rack

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Related publications and links

For more information see the following resources:

- IBM System x3850 X5 product page
  http://www.ibm.com/systems/x/hardware/enterprise/x3850x5/
- *IBM System x 3850 X5 Installation and User's Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5085479
- *IBM System x 3850 X5 Problem Determination and Service Guide*
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5084848
- ServerProven hardware compatibility page for the x3850 X5
  http://ibm.com/systems/info/x86servers/serverproven/compat/us/xseries/7145.html
- At-a-glance guides for IBM System x servers and options
  http://www.redbooks.ibm.com/portals/systemx?Open&page=pgbycat
- *Configuration and Option Guide*
  http://www.ibm.com/systems/xbc/cog/
- xRef - IBM System x Reference Sheets
  http://www.redbooks.ibm.com/xref
- IBM System x Support Portal
  http://ibm.com/support/entry/portal/
  http://ibm.com/support/entry/portal/Downloads/Hardware/Systems/System_x/System_x3850_X5

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