

IBM System x3650 M4 HD

IBM Redbooks Product Guide

The IBM® System x3650 M4 HD is a 2-socket 2U rack-optimized server. It supports up to 32 internal drives and features an innovative design that delivers an optimal balance of performance, uptime, and dense storage. It offers excellent reliability, availability, and serviceability (RAS) for an improved business environment. The IBM System x3650 M4 HD is designed for easy deployment, integration, service, and management.

Suggested use: Big data applications, cloud-computing deployments, data management, and business-critical workloads

The following figure shows the IBM System x3650 M4 HD configured with 24 hot-swap 2.5-inch drive bays.



Figure 1. The IBM System x3650 M4 HD

Did you know?

The x3650 M4 HD offers a flexible design that supports up to 26 2.5-inch drives (24 in the front, two accessible from the rear), or 16 2.5-inch drives and 16 1.8-inch solid-state drive bays. Combined with Intel E5-2600 v2 processors, up to 768 GB of memory, 12 Gbps SAS controllers, and up to 6 PCIe 3.0 slots, you have a system that can handle big data applications. Comprehensive systems management tools with the next-generation Integrated Management Module II (IMM2) make the server easy to deploy, integrate, service, and manage.

Key features

The x3650 M4 HD is an outstanding 2U two-socket business-critical server, offering improved performance and pay-as-you grow flexibility along with new features that improve server management capability. This powerful system is designed for your most important business applications and cloud deployments.

Combining balanced performance and flexibility, the x3650 M4 HD is a great choice for small and medium businesses up to the large enterprise. It can provide outstanding uptime to keep business-critical applications and cloud deployments running safely. Ease of use and comprehensive systems management tools make it easy to deploy. Outstanding RAS and high-efficiency design improve your business environment and help save operational costs.

Scalability and performance

The x3650 M4 HD offers numerous features to boost performance, improve scalability, and reduce costs:

- Featuring the Intel Xeon processor E5-2600 v2 product family, which improves productivity by offering superior system performance with up to 12 core per processors, core speeds up to 3.5 GHz, L3 cache up to 30 MB, and QPI interconnect links of up to 8 GTps.
- Two processors, up to 24 cores, and 48 threads maximize the concurrent execution of multi-threaded applications.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows CPU cores to run at maximum speeds during peak workloads by temporarily going beyond processor thermal design power (TDP).
- Intel Hyper-Threading Technology boosts performance for multi-threaded applications by enabling simultaneous multi-threading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Intel Advanced Vector Extensions (AVX) improve floating-point performance for compute-intensive technical and scientific applications.
- Supports up to 24 Load Reduced DIMMs (LRDIMMs) of 1866 MHz DDR3 ECC memory, which provide speed, high availability, and a memory capacity of up to 768 GB (running at 1066 MHz).
- The use of solid-state drives (SSDs) instead of, or along with, traditional hard disk drives (HDDs) can 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 26x 2.5-inch bays or a combination of up to 16x 2.5-inch bays and 16x 1.8-inch SSD bays provide a flexible and scalable platform to meet your increasing demands.
- The server has four integrated Gigabit Ethernet ports and two optional 10 Gb Ethernet (or InfiniBand) ports with mezzanine cards that do not use PICE slots.
- The server offers PCI Express 3.0 I/O expansion capabilities that improve the theoretical maximum bandwidth by 60% (8 GTps per link) compared to the previous generation of PCI Express 2.0.
- With Intel Integrated I/O Technology, the PCI Express 3.0 controller is integrated into the Intel Xeon processor E5 family. This integration helps to reduce I/O latency dramatically and increase overall system performance.
- Support for up to two NVIDIA Quadro graphics processing units (GPUs) to maximize computing power.

Availability and serviceability

The x3650 M4 HD provides many features to simplify serviceability and increase system uptime:

- The server offers memory mirroring and memory rank sparing for redundancy in the event of a non-correctable memory failure.
- Tool-less cover removal provides easy access to upgrades and serviceable parts, such as CPU, memory, and adapters.
- The server offers hot-swap drives, supporting RAID redundancy for data protection and greater system uptime.
- The server has up to two redundant hot-swap power supplies and four hot-swap dual-motor redundant fans (two fan zones with an N+1 fan design) to provide availability for business-critical applications.
- A 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.
- SSDs offer better reliability than traditional HDDs for greater uptime.
- The built-in Integrated Management Module Version II (IMM2) continuously monitors system parameters, triggers alerts, and performs recovery 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 onsite 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 x3650 M4 HD:

- Local console ports are standard at the rear of the server. Front video and USB ports are available through an optional console breakout cable.
- The server includes an Integrated Management Module II (IMM2) to monitor server availability and perform remote management.
- An 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.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- IBM Systems Director is included for proactive systems management. It offers comprehensive systems management tools that help increase uptime, reduce costs, and improve productivity through advanced server management capabilities.
- Intel Execute Disable Bit functionality can prevent certain classes of malicious buffer overflow attacks when combined with a supported operating system.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.

Energy efficiency

The x3650 M4 HD offers the following energy-efficiency features to save energy, reduce operational costs, increase energy availability, and contribute to a green environment:

- Energy-efficient system board components help lower operational costs.
- There are highly efficient 550 W, 750 W, and 900 W AC power supplies with 80 PLUS Platinum certification. A 750W DC power option is available.
- The Intel Xeon processor E5-2600 v2 product family offers better performance over the previous generation while fitting into the same thermal design power (TDP) limits.
- Intel Intelligent Power Capability powers individual processor elements on and off as needed to reduce power draw.
- 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.
- SSDs use as much as 80% less power than traditional 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which are a part of IBM Calibrated Vectors 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 and connectors

The following figure shows the front of the server.

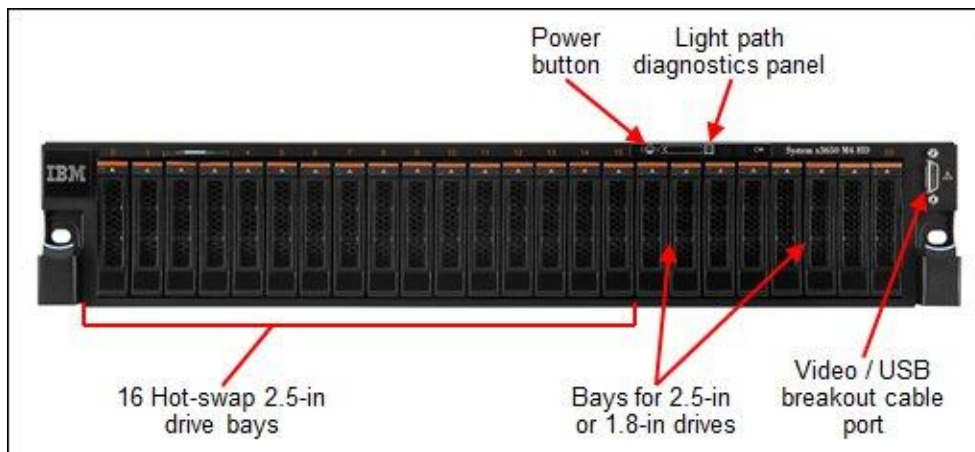


Figure 2. Front view of the IBM System x3650 M4 HD

The following figure shows the rear of the server.

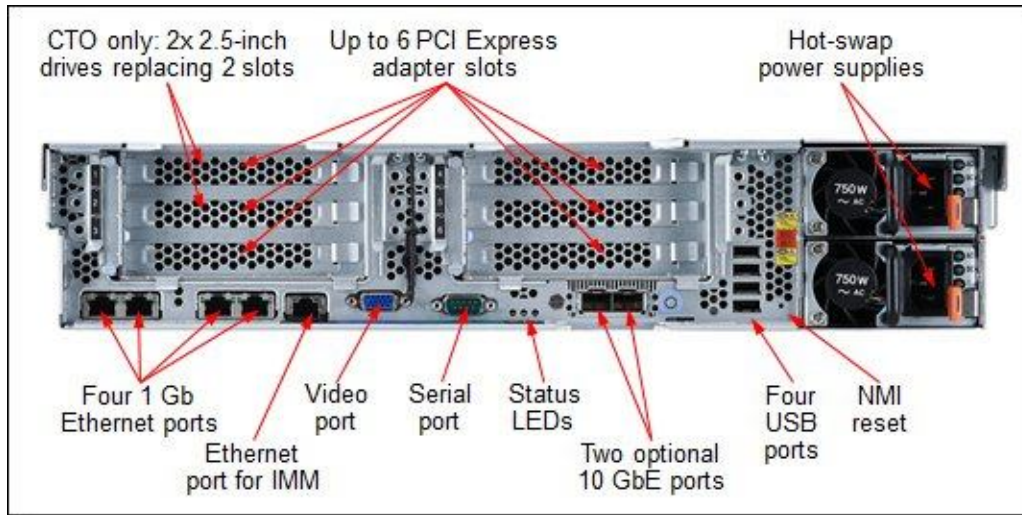


Figure 3. Rear view of the IBM System x3650 M4 HD

The following figure shows the locations of key components inside the server.

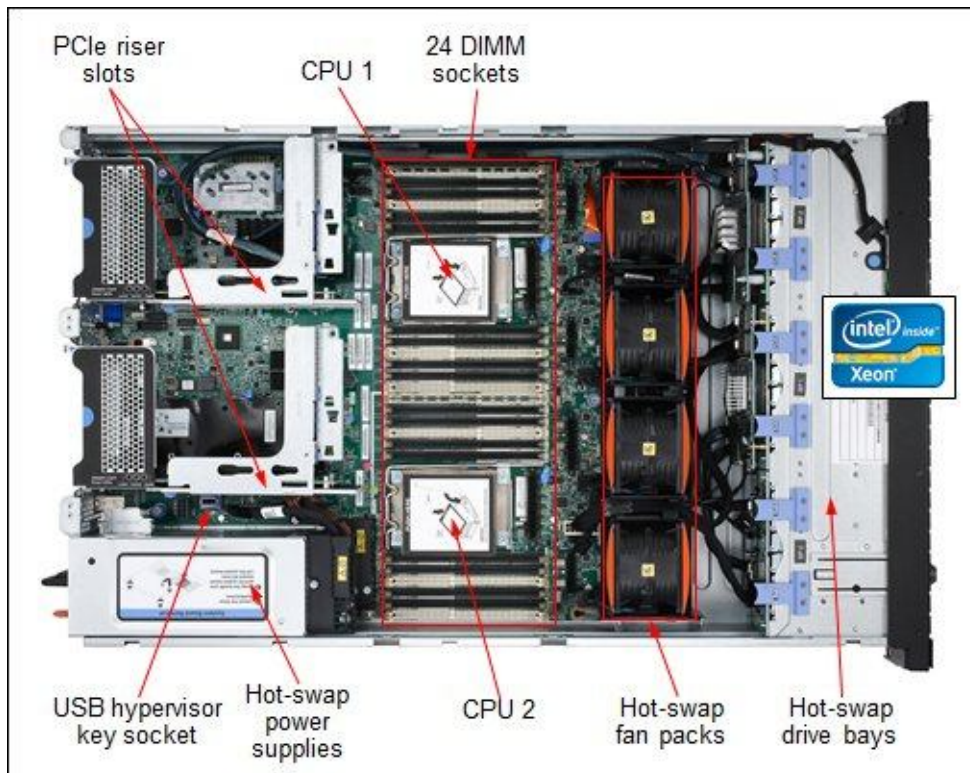


Figure 4. Inside view of the IBM System x3650 M4 HD

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications (part 1)

Components	Specification
Form factor	2U rack.
Processor	Up to two Intel Xeon processor E5-2600 v2 product family CPUs. Two QPI links up to 8.0 GTps each. Up to 1866 MHz memory speed. Twelve cores up to 2.7 GHz and 30 MB L3 cache Ten cores up to 3.0 GHz and 25 MB L3 cache Eight cores up to 3.3 GHz and 25 MB L3 cache Six cores up to 3.5 GHz and 25 MB L3 cache Four cores up to 3.5 GHz and 15 MB L3 cache
Chipset	Intel C602J.
Memory	Up to 24 DIMM sockets (12 DIMMs per processor). RDIMMs, UDIMMs, and LRDIMMs (Load Reduced DIMMs) are supported, but memory types cannot be intermixed. Memory speed up to 1866 MHz.
Memory maximums	With RDIMMs: Up to 384 GB with 24x 16 GB RDIMMs and two processors. With UDIMMs: Up to 128 GB with 16x 8 GB UDIMMs and two processors. With LRDIMMs: Up to 768 GB with 24x 32 GB LRDIMMs and two processors.
Memory protection	ECC, Chipkill, memory mirroring, and memory rank sparing.
Disk drive bays	Up to 26x 2.5-inch hot-swap bays supporting HDDs or SSDs (24 bays front accessible and 2 bays rear accessible); or 16x 2.5-inch HDDs/SSDs (front) plus 16x 1.8-inch SSDs (front accessible).
Maximum internal storage	Up to 26 TB with 26x 1 TB NL SAS HDDs. Up to 16 TB HDD storage with 16x 1 TB NL SAS HDDs + 8 TB SSD storage with 16x 512 GB SSDs (24 TB total). An intermix of SAS/SATA is supported.
RAID support	RAID 0, 1, and 10 with integrated ServeRAID M5210e. Optional upgrades to RAID 5 and 50 are available with zero-cache, 1 GB cache without battery, or 1 GB, 2 GB, or 4 GB flash-backed cache. Optional upgrade to RAID 6 or 60.
Optical drive bays	None.
Tape drive bays	None.
Network interfaces	Four integrated Gigabit Ethernet 1000BASE-T ports (RJ-45): Two embedded 10 Gb Ethernet ports (10GBASE-T RJ-45 or 10GBASE-SR SFP+ based) on an optional 10 Gb Ethernet mezzanine card (does not use a PCIe slot).
PCI Expansion slots	Up to six slots depending on the riser cards that are installed. The slots are as follows: <ul style="list-style-type: none"> Slot 1: PCIe 3.0 x8; full-height, full-length Slot 2: PCIe 3.0 x8; full-height, half-length Slot 3: PCIe 3.0 x8; full-height, half-length Slot 4: Optional, requires second processor and second riser card Slot 5: Optional, requires second processor and second riser card Slot 6: Optional, requires second processor and second riser card Optional riser cards available through CTO with PCIe x8 or PCIe x16 or PCI-X slots. Slots 1 and 2 can be replaced with two 2.5-inch hot-swap drive bays through CTO.

Table 1. Standard specifications (part 2)

Components	Specification
Ports	Front: A breakout cable port offers two USB 2.0 ports and one DB-15 video. Four USB 2.0, one DB-15 video, one DB-9 serial, one RJ-45 systems management, four RJ-45 GbE network ports, two optional RJ-45 or SFP+ 10 GbE network ports on rear. One internal USB port for embedded hypervisor.
Cooling	IBM Calibrated Vectored Cooling with up to four redundant hot swap fans (all standard; two fan zones with N+1 fan design; each fan has two motors).
Power supply	Up to two redundant hot-swap 550 W AC, 750 W AC, or 900 W AC power supplies (all 80 PLUS Platinum certification), or -48V 750 W DC power supply options.
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Hot-swap parts	Hard disk drives, power supplies, and fans.
Systems management	UEFI, IBM Integrated Management Module II (IMM2), Predictive Failure Analysis, Light Path Diagnostics, Automatic Server Restart, IBM Systems Director and Active Energy Manager, and IBM ServerGuide. Optional IMM Advanced Upgrade software feature for remote presence.
Security features	Power-on password, administrator's password, and Trusted Platform Module (TPM).
Operating systems supported	Microsoft Windows Server 2012, 2008 R2 and 2008, Red Hat Enterprise Linux 6, SUSE Linux Enterprise Server 11, and VMware vSphere 5.1
Limited warranty	Three-year customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through IBM ServicePac® offerings: Four-hour or two-hour response time, eight-hour fix time, one-year or two-year warranty extension, remote technical support for IBM hardware and some IBM and third-party applications.
Dimensions	Height: 86 mm (3.4 in.), width: 445 mm (17.5 in.), depth: 746 mm (29.4 in.)
Weight	Minimum configuration: 25 kg (55 lb), maximum: 30 kg (65 lb)

The x3650 M4 HD servers are shipped with the following items:

- Statement of Limited Warranty
- Important Notices
- Rack Installation Instructions
- Documentation CD that contains the *Installation and Service Guide*
- IBM System x® Gen-III Slides Kit
- IBM System x Gen-III Cable Management Arm (CMA)
- 2.8 m (9.18 in.) C13-C14 power cord (one for models with one power supply, and two for models with two power supplies)

Standard models

The following table lists the standard models.

Table 2. Standard models

Model	Intel Xeon processors† (two maximum)	Memory	RAID	Disk bays	Disks	Slots* S/A/M	GbE	Power supply
5460-B3x	1x E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	1x 8 GB (1333MHz)‡	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-C3x	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8 GB 1600 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-D3x	1x E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	1x 8 GB 1600 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-F3x	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8 GB 1600 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-G3x	1x E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	1x 8 GB 1866 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-H3x	1x E5-2660 v2 10C 2.2GHz 25MB 1866MHz 95W	1x 8 GB 1866 MHz	M5210-e + H1110	16+2x 2.5"	Open	1 / 0 / 4	4	1x 750W
5460-J3x	1x E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	1x 16 GB 1866 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-L3x	1x E5-2680 v2 10C 2.8GHz 25MB 1866MHz 115W	1x 16 GB 1866 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
5460-M3x	1x E5-2690 v2 10C 3.0GHz 25MB 1866MHz 130W	1x 16 GB 1866 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 900W
5460-83x	1x E5-2697 v2 12C 2.7GHz 30MB 1866MHz 130W	1x 16 GB 1866 MHz	M5210-e	16x 2.5"	Open	3 / 3 / 6	4	1x 900W

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, and power consumption.

* The PCIe slot counts are: Slots standard / slots available / slots maximum.

‡ Model B3x includes a 1600 MHz DIMM standard, however, it operates at 1333 MHz to match the installed processor.

For more information about the standard features of the server, see the "Standard specifications" section.

Express models

The following table lists the express models.

Table 3. Express models

Model	Intel Xeon processors† (two maximum)	Memory	RAID controller	Disk bays	Disks	Slots* S/A/ M	GbE	Power
North America (NA)								
5460-EAU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8 GB 1600 MHz	M5210-e	16x 2.5"	4x 1TB NL SAS	3 / 3 / 6	4	1x 750W
Latin America (LA)								
5460-EAU	1x E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	1x 8 GB 1600 MHz	M5210-e	16x 2.5"	4x 1TB NL SAS	3 / 3 / 6	4	1x 750W
Europe Integrated Operating Team (IOT)								
5460-E1G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8 GB 1600 MHz	M5210-e + 1GB Flash/R5	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
Central and Eastern Europe (CEE) and Middle East and Africa (MEA)								
5460-E1G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8 GB 1600 MHz	M5210-e + 1GB Flash/R5	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
Russia/Commonwealth of Independent States (CIS)								
5460-E1G	1x E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	1x 8 GB 1600 MHz	M5210-e + 1GB Flash/R5	16x 2.5"	Open	3 / 3 / 6	4	1x 750W
Japan								
5460-PAA	1x E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	1x 8 GB (1333 MHz)‡	M5210-e + 1GB Flash/R5	16x 2.5"	Open	3 / 3 / 6	4	1x 750W

† Processor detail: Processor quantity and model, cores, core speed, L3 cache, memory speed, power consumption.

* The PCIe slot counts are: Slots standard / slots available / slots maximum.

‡ Model PAA includes a 1600 MHz DIMM standard, however, it operates at 1333 MHz to match the installed processor.

Processor options

The x3650 M4 HD supports the processor options that are listed in the following table. The server supports up to two processors. This table shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor, this processor is available only through CTO.

Table 4. Processor options

Part number	Feature codes*	Description	Models where used
46W4210	A3PT / A3RJ	Intel Xeon E5-2603 v2 4C 1.8GHz 10MB 1333MHz 80W	-
46W4211	A3PU / A3RK	Intel Xeon E5-2609 v2 4C 2.5GHz 10MB 1333MHz 80W	B3x
46W4213	A3PW / A3RM	Intel Xeon E5-2620 v2 6C 2.1GHz 15MB 1600MHz 80W	C3x, E1x
00Y8430	A4EU / A4EW	Intel Xeon E5-2628L v2 8C 1.9GHz 20MB 1600MHz 70W	-
46W4214	A3PX / A3RN	Intel Xeon E5-2630 v2 6C 2.6GHz 15MB 1600MHz 80W	D3x
46W4226	A3S2 / A3S0	Intel Xeon E5-2630L v2 6C 2.4GHz 15MB 1600MHz 60W	-
46W4212	A3PV / A3RL	Intel Xeon E5-2637 v2 4C 3.5GHz 15MB 1866MHz 130W	-
46W4217	A3Q0 / A3RR	Intel Xeon E5-2640 v2 8C 2.0GHz 20MB 1600MHz 95W	EAx, F3x
46W4221	A3Q4 / A3RV	Intel Xeon E5-2643 v2 6C 3.5GHz 25MB 1866MHz 130W	-
00Y8431	A4EV / A4EX	Intel Xeon E5-2648L v2 10C 1.9GHz 25MB 1866MHz 70W	-
46W4215	A3PY / A3RP	Intel Xeon E5-2650 v2 8C 2.6GHz 20MB 1866MHz 95W	G3x
46W4225	A3Q8 / A3RZ	Intel Xeon E5-2650L v2 10C 1.7GHz 25MB 1600MHz 70W	-
46W4216	A3PZ / A3RQ	Intel Xeon E5-2660 v2 10C 2.2GHz 25MB 1866MHz 95W	H3x
46W4222	A3Q5 / A3RW	Intel Xeon E5-2667 v2 8C 3.3GHz 25MB 1866MHz 130W	-
46W4219	A3Q2 / A3RT	Intel Xeon E5-2670 v2 10C 2.5GHz 25MB 1866MHz 115W	J3x
46W4220	A3Q3 / A3RU	Intel Xeon E5-2680 v2 10C 2.8GHz 25MB 1866MHz 115W	L3x
46W4297	A3Q9 / A3S1	Intel Xeon E5-2690 v2 10C 3.0GHz 25MB 1866MHz 130W	M3x
46W4223	A3Q6 / A3RX	Intel Xeon E5-2695 v2 12C 2.4GHz 30MB 1866MHz 115W	-
46W4224	A3Q7 / A3RY	Intel Xeon E5-2697 v2 12C 2.7GHz 30MB 1866MHz 130W	83x

* The first feature code is for the first processor; the second feature code is for the second processor.

Memory options

IBM DDR3 memory is compatibility tested and tuned for optimal IBM 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 x3650 M4 HD supports DDR3 memory. The server supports up to 12 DIMMs when one processor is installed and up to 24 DIMMs when two processors are installed. Each processor has four memory channels, and there are three DIMMs per channel.

The following rules apply when selecting the memory configuration:

- The server supports UDIMMs, RDIMMs, and LRDIMMs.
- Mixing different types of memory (UDIMMs, RDIMMs, and LRDIMMs) is not supported.
- Mixing 1.5 V and 1.35 V DIMMs is supported; in such a case, all DIMMs operate at 1.5 V.
- The maximum number of ranks per one channel is eight (except for Load Reduced DIMMs, where more than eight ranks are supported, because one quad-rank LRDIMM provides the same electrical load on a memory bus as a single-rank RDIMM).
- The maximum quantity of DIMMs that can be installed in the server depends on the number of CPUs, DIMM type, rank, and operating voltage, as shown in the "Max. qty supported" row in Table 5.
- All DIMMs in the server operate at the same rank speed, which is determined as the lowest value of the following items:
 - Memory speed that is supported by the specific CPU.
 - Lowest of maximum operating speeds for selected memory configuration that depends on rated speed, operating voltage, and quantity of DIMMs per channel, as shown under the "Maximum operating speed" section in Table 5.

The following table (Parts 1 and 2) shows the characteristics of the supported DIMMs. Tables cells that are highlighted with a gray background indicate when the combination of DIMM voltage and the number of DIMMs per channel still allows the DIMMs to operate at a rated speed.

Table 5. Maximum memory speeds (Part 1: RDIMMs)

DIMM specification	RDIMM					
	Single rank			Dual rank		
Rank						
Part numbers	00D5024 (4 GB) 00D5036 (8 GB)		00D5020 (4 GB) 00D5032 (8 GB)	00D5044 (8 GB) 46W0672 (16 GB)		00D5028 (4 GB) 00D5040 (8 GB) 00D5048 (16 GB)
Rated speed	1600 MHz		1866 MHz	1600 MHz		1866 MHz
Rated voltage	1.35 V		1.5 V	1.35 V		1.5 V
Operating voltage	1.35 V	1.5 V	1.5 V	1.35 V	1.5 V	1.5 V
Max qty supported*	24	24	24	24	24	24
Max DIMM capacity	8 GB	8 GB	8 GB	16 GB	16 GB	16 GB
Max memory capacity	192 GB	192 GB	192 GB	384 GB	384 GB	384 GB
Max. memory at rated speed	None	128 GB	64 GB	None	256 GB	128 GB
Maximum operating speed						
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz	1333 MHz	1600 MHz	1866 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1600 MHz	1333 MHz	1600 MHz	1600 MHz
3 DIMMs per channel	800 MHz	1066 MHz	1066 MHz	800 MHz	1066 MHz	1066 MHz

* The maximum quantity that is supported is shown for two processors installed.

Table 5. Maximum memory speeds (Part 2: UDIMMs and LRDIMMs)

DIMM specification	UDIMM		LRDIMM
Rank	Dual rank		Quad rank
Part number	00D5016 (8 GB)		46W0761 (32 GB)
Rated speed	1600 MHz		1866 MHz
Rated voltage	1.35 V		1.5 V
Operating voltage	1.35 V	1.5 V	1.5 B
Max. qty supported*	16	16	24
Max. DIMM capacity	8 GB	8 GB	32 GB
Max. memory capacity	128 GB	128 GB	768 GB
Max. memory at rated speed	None	128 GB	256 GB
Maximum operating speed			
1 DIMM per channel	1333 MHz	1600 MHz	1866 MHz
2 DIMMs per channel	1333 MHz	1600 MHz	1600 MHz
3 DIMMs per channel	No support	No support	1066 MHz

* The maximum quantity that is supported is shown for two processors installed.

The following memory protection technologies are supported:

- ECC
- Chipkill (for x4-based memory DIMMs)
- Memory mirroring
- Memory rank sparing

If memory mirroring is used, DIMMs must be installed in pairs (minimum of one pair per each CPU), and both DIMMs in a pair must be identical in type and size.

If memory rank sparing is used, then a minimum of one quad-rank DIMM or two single-rank or dual-rank DIMMs must be installed per populated channel (the DIMMs do not need being identical). In rank sparing mode, one rank of a DIMM in each populated channel is reserved as spare memory. The size of a rank varies depending on the DIMMs that are installed.

The following table lists the memory options that are available for x3650 M4 HD server.

Table 6. Memory options

Part number	Feature codes	Description	Maximum supported	Standard models where used
UDIMMs				
00D5016	A3QC	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP UDIMM	16 (8 per CPU)	-
RDIMMs - 1866 MHz				
00D5020	A3QD	4GB (1x4GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
00D5028	A3QF	4GB (1x4GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
00D5032	A3QG	8GB (1x8GB, 1Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	G3x, H3x
00D5040	A3QJ	8GB (1x8GB, 2Rx8, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	83x, J3x, L3x, M3x
00D5048	A3QL	16GB (1x16GB, 2Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP RDIMM	24 (12 per CPU)	-
RDIMMs - 1600 MHz				
00D5024	A3QE	4GB (1x4GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
00D5036	A3QH	8GB (1x8GB, 1Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	B3x, C3x, D3x, E1x, EAx, F3x
00D5044	A3QK	8GB (1x8GB, 2Rx8, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
46W0672	A3QM	16GB (1x16GB, 2Rx4, 1.35V) PC3L-12800 CL11 ECC DDR3 1600MHz LP RDIMM	24 (12 per CPU)	-
LRDIMMs				
46W0761	A47K	32GB (1x32GB, 4Rx4, 1.5V) PC3-14900 CL13 ECC DDR3 1866MHz LP LRDIMM	24 (12 per CPU)	-

Internal storage

IBM System x3650 M4 HD server supports 1.8-inch and 2.5-inch drives. The server supports the following drive configurations:

- 16x 2.5-inch hot-swap drive bays (front of server)
- 16x 2.5-inch hot-swap drive bays (front) + 2x 2.5-inch hot-swap drive bays (rear)
- 24x 2.5-inch hot-swap drive bays (front)
- 24x 2.5-inch hot-swap drive bays (front) + 2x 2.5-inch hot-swap drive bays (rear)
- 16x 2.5-inch hot-swap drive bays (front) + 16x 1.8-inch hot-swap drive bays (front)

Note: The combination of 16x 2.5-inch hot-swap drive bays (front) + 16x 1.8-inch hot-swap drive bays (front) + 2x 2.5-inch hot-swap drive bays (rear) is not supported.

The following figure shows these drive bay configurations.

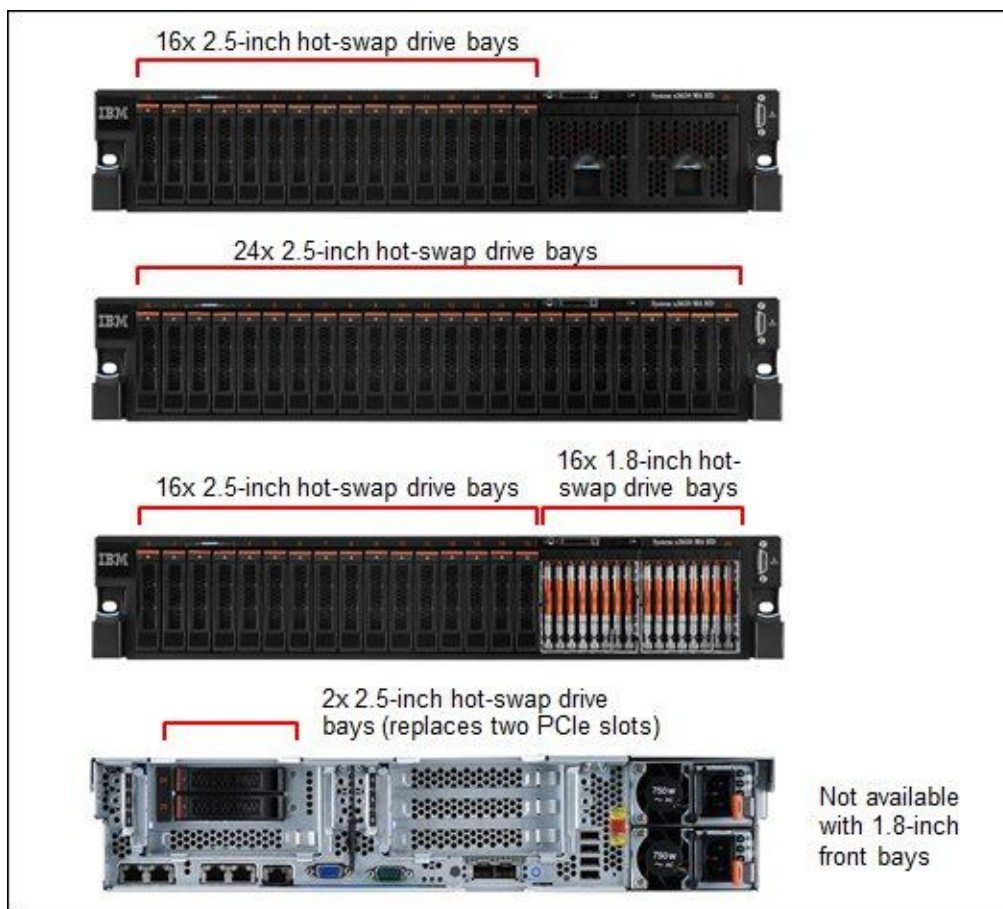


Figure 5. Internal drive configurations

Backplanes and enablement kits

All standard models ship with 16x 2.5-inch hot-swap drive bays (feature code A3NR). Model H3x also ships with 2x 2.5-inch bays in the rear of the server (feature code A3NQ).

Backplane and enablement kits are listed in the following table. All backplanes operate at 6 Gbps SAS.

Table 7. Backplane kits

Part number	Feature codes	Description	Maximum supported	Models where used
None	A3NR	IBM System x3650 M4 HD 16 Base Kit	1	All models
46W4204	A4M4	x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit with Expander	1 (mutually exclusive)	-
46W4206	A4M6	x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit		-
00Y7658	A4M7	x3650 M4 HD 3 x 8 2.5" HS HDD Assembly Kit		-
46W4205	A4M5	x3650 M4 HD Plus 16 x 1.8" SSD Assembly Kit		-
None	A3NQ	x3650 M4 HD Rear 2 HDD Kit*	1*	-

* Model H3x or CTO only. A3NQ can be combined with A3NR, A4M4, A4M6, and A4M7 (but not A4M5).

The following table shows the internal storage expansion options that are available for the x3650 M4 HD server.

Table 8. Internal storage expansion options (Part 1)

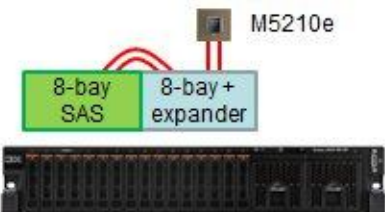
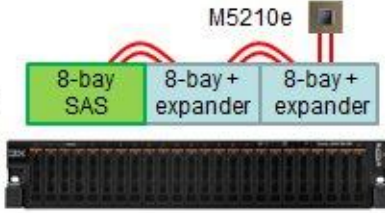
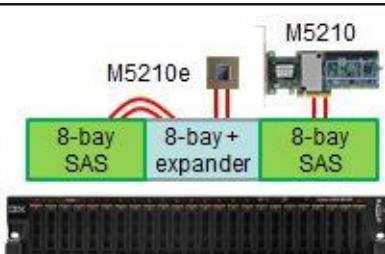
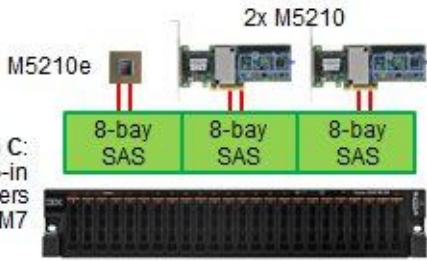
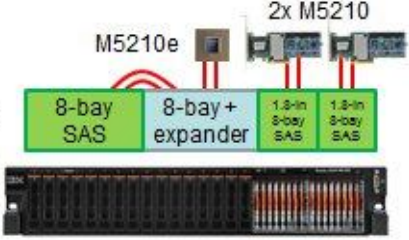
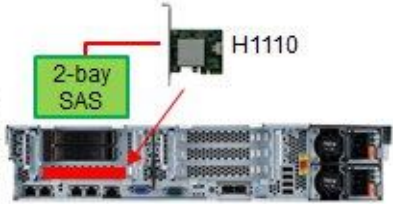
Configuration	Name and description
<p>Base: 16x 2.5-in 1 controller Feature A3NR</p> 	<p>Base offering, feature A3NR</p> <ul style="list-style-type: none"> • 16x 2.5-inch hot-swap drive bays (front). • One 8-bay backplane + one 8-bay backplane with SAS expander. • The SAS expander is mounted on the backplane and does not use a PCIe slot. • All 16 drives are driven by an onboard M5210e controller.
<p>CTO option A: 24x 2.5-in 1 controller Feature A4M4</p> 	<p>CTO Option A, feature A4M4 x3650 M4 HD Plus 8x 2.5" HS HDD Assembly Kit with Expander</p> <ul style="list-style-type: none"> • One 8-bay backplane + two 8-bay backplanes with SAS expanders • The SAS expanders are mounted on backplanes and do not use a PCIe slot. • All 24 drives are driven by two ports of an onboard M5210e controller.
<p>CTO option B: 24x 2.5-in 2 controllers Feature A4M6</p> 	<p>CTO Option B, feature A4M6 x3650 M4 HD Plus 8 2.5" HS HDD Assembly Option Kit</p> <ul style="list-style-type: none"> • One 8-bay backplane + two 8-bay backplanes with SAS expanders. • Two backplanes connect to M5210e. • One backplane connects to an M5210 or N2215 adapter. • Adapters are not part of feature A4M6.

Table 8. Internal storage expansion options (Part 2)

Configuration	Name and description
<p data-bbox="237 407 386 506">CTO option C: 24x 2.5-in 3 controllers Feature A4M7</p> 	<p data-bbox="862 275 1393 331">CTO Option C, feature A4M7 x3650 M4 HD 3 x 8 2.5" HS HDD Assembly Kit</p> <ul data-bbox="883 331 1349 527" style="list-style-type: none"> • Maximizes the performance of the RAID subsystem. • Three 8-bay backplanes. • One backplane connects to M5210e. • One backplane connects to an M5210 or N2215 adapter. • Adapters are not part of feature A4M7.
<p data-bbox="237 663 386 785">CTO option D: 16x 2.5-in + 16x 1.8-in 3 controllers Feature A4M5</p> 	<p data-bbox="862 562 1398 619">CTO Option D, feature A4M5 x3650 M4 HD Plus 16 x 1.8" SSD Assembly Kit</p> <ul data-bbox="883 619 1398 785" style="list-style-type: none"> • Best use case for storage tiering. • Two 8-bay 2.5-inch backplanes with M5210e. • Two 8-bay 1.8-inch backplanes. • Each 1.8-in backplane connects to an M5210 or N2215 adapter. • Adapters are not part of feature A4M5.
<p data-bbox="201 919 386 1018">CTO Rear option: 2x 2.5-in 1 controller Feature A3NQ</p> 	<p data-bbox="862 835 1370 863">x3650 M4 HD Rear 2 HDD Kit, feature A3NQ</p> <ul data-bbox="883 863 1422 1052" style="list-style-type: none"> • Add-on for Option A, B or C; not supported by D. • Two drives are installed in place of PCIe slots 1 and 2. • ServeRAID H1110 is installed in slot 3. • CTO only. • The adapter is separate from feature A3NQ.

The following figure shows the inside of the server with the x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit with Expander installed (option 46W4204 or feature code A4M4). You can see the three backplanes, two of which have SAS expanders.



Figure 6. x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit with Expander installed in the server

Controllers for internal storage

The following table lists the RAID controllers, SAS HBAs, and additional options that are used for the internal disk storage of an x3650 M4 HD server.

Table 9. RAID controllers and SAS HBAs for internal storage

Part number	Feature code	Description	Maximum supported	Standard models where used
Integrated	None	ServeRAID M5210e SAS/SATA Controller	1	All models
46C9110	A3YZ	ServeRAID M5210 SAS/SATA Controller	2	-
81Y4492	A1XL	ServeRAID H1110 SAS/SATA Controller	1	H3x
47C8675	A3YY	N2215 SAS/SATA HBA for IBM System x	2	-
Hardware upgrades for the M5210 and M5210e				
47C8656	A3Z0	ServeRAID M5200 Series 1GB Cache/RAID 5 Upgrade	1	-
47C8660	A3Z1	ServeRAID M5200 Series 1GB Flash/RAID 5 Upgrade	1	-
47C8664	A3Z2	ServeRAID M5200 Series 2GB Flash/RAID 5 Upgrade	1	-
47C8668	A3Z3	ServeRAID M5200 Series 4GB Flash/RAID 5 Upgrade	1	-
Feature on Demand upgrades for the M5210 and M5210e				
47C8706	A3Z5	ServeRAID M5200 Series RAID 6 Upgrade-FoD	1†	-
47C8708	A3Z6	ServeRAID M5200 Series Zero Cache/RAID 5 Upgrade-FoD	1	-
47C8710	A3Z7	ServeRAID M5200 Series Performance Accelerator-FoD	1	-
47C8712	A3Z8	ServeRAID M5200 Series SSD Caching Enabler-FoD	1	-

† The ServeRAID M5200 Series RAID 6 Upgrade (47C8706) requires one of the RAID 5 upgrades with cache (47C8656, 47C8660, 47C8664).

The integrated ServeRAID M5210e 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 M5200 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports 1 GB cache (no battery backup) or 1 GB, 2 GB, or 4 GB flash-backed cache
- Supports performance upgrades through IBM Features on Demand
- 12 Gbps throughput per port
- PCIe x8 Gen 3 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller

The ServeRAID M5210 SAS/SATA Controller has the following specifications:

- Eight internal 12 Gbps SAS/SATA ports
- Two x4 mini-SAS HD internal connectors (SFF8643)
- Supports connections to SAS/SATA drives and SAS Expanders
- Supports RAID levels 0, 1, and 10
- Supports RAID levels 5 and 50 with optional M5200 Series RAID 5 upgrades
- Supports RAID 6 and 60 with the optional M5200 Series RAID 6 Upgrade
- Supports 1 GB cache (no battery backup) or 1 GB, 2 GB, or 4 GB flash-backed cache
- Supports performance upgrades through IBM Features on Demand
- 12 Gbps throughput per port
- PCIe 3.0 x8 host interface
- Based on the LSI SAS3108 12 Gbps ROC controller
- IBM PowerPC® 476 1.2GHz dual core processor

The ServeRAID H1110 adapter has the following specifications:

- Four internal 6 Gbps SAS/SATA ports
- One x4 mini-SAS internal connector (SFF8087)
- 6 Gbps throughput per port
- Based on the LSI SAS2004 6 Gbps RAID on Chip (ROC) controller
- PCIe 2.0 x4 host interface
- Supports RAID 0, 1, 1E, and 10
- Connects to up to four SAS or SATA drives (SAS expanders are not supported.)

The N2215 SAS/SATA host bus adapter has the following specifications:

- Two internal mini-SAS HD x4 connectors (SFF8643)
- MD2 small form factor
- PCI Express x8 3.0 host interface
- SAS Controller: LSI SAS3008
- 12 Gbps per port data transfer rate
- No RAID support, no cache
- UEFI support

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 drive options

The following table lists hard disk drive options for the internal disk storage of the x3650 M4 HD server.

Table 10. Disk drive options for internal disk storage (Part 1)

Part number	Feature code	Description	Maximum supported
2.5" NL SAS Hot-Swap HDDs			
81Y9690	A1P3	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	26
90Y8953	A2XE	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	26
2.5" 15K SAS Hot-Swap HDDs			
81Y9670	A283	IBM 300GB 15K 6Gbps SAS 2.5" G2HS HDD	26
90Y8926	A2XB	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	26
2.5" 10K SAS Hot-Swap HDDs			
81Y9650	A282	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	26
90Y8872	A2XD	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	26
90Y8877	A2XC	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	26
2.5" 10K SAS Hot-Swap self-encrypting drives (SEDs)			
81Y9662	A3EG	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	26
2.5" solid-state drives (SSDs) - hot-swap - Enterprise			
49Y6139	A3F0	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	26
49Y6134	A3EY	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	26
49Y6129	A3EW	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	26
43W7718	A2FN	IBM 200GB SATA 2.5" MLC HS SSD	26
00W1125	A3HR	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	26
2.5" solid-state drives (SSDs) - hot-swap - Enterprise Value			
49Y5844	A3AU	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	26
49Y5839	A3AS	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	26
90Y8643	A2U3	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	26
90Y8648	A2U4	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	26

Table 10. Disk drive options for internal disk storage (Part 2)

Part number	Feature code	Description	Maximum supported
1.8" solid-state drives (SSDs) - Enterprise			
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
1.8" solid-state drives (SSDs) - Enterprise Value			
49Y5993	A3AR	IBM 512GB SATA 1.8" MLC Enterprise Value SSD	16
00W1227	A3TH	IBM 256GB SATA 1.8" MLC Enterprise Value SSD	16
00W1222	A3TG	IBM 128GB SATA 1.8" MLC Enterprise Value SSD	16
49Y5834	A3AQ	IBM 64GB SATA 1.8" MLC Enterprise Value SSD	16

Internal backup units

The server does not support an internal tape drive.

Optical drives

The server does not support an internal optical drive.

I/O expansion options

The server supports up to six PCIe slots with different riser cards that are installed into two riser sockets on the system board (one riser socket supports the installation of one riser card). Riser 1 supplies slots 1, 2, and 3. Riser 2 supplies slots 4, 5, and 6. Standard models have Riser card 1 installed with three PCIe 3.0 x8 slots. To enable slots 4 - 6, install a second processor and a second riser card.

These options are available through CTO only. Slots 1 and 2 can be replaced with a two-bay 2.5-inch hot-swap drive kit, feature A3NQ. The kit includes a 1-card riser for a RAID card that is installed in slot 3.a

The following table lists the PCI riser card options that are available.

Table 11. PCI riser card options

Part number	Feature code*	Description	Maximum supported	Models where used
None*	A47M	x3650 M4 HD PCIe Riser Card 1 (1 x16 FH/FL + 1 x8 FH/HL Slots)	1	-
00Y7757	A47Z	x3650 M4 HD PCIe Riser Card 2 (1 x16 FH/FL + 1 x8 FH/HL Slots)	1†	-
None*	A47Y	x3650 M4 HD PCIX Riser Card 1 (1 x16 FH/HL PCIe + 2 PCI-X FH/FL)	1	-
00Y7758	A480	x3650 M4 HD PCIX Riser Card 2 (1 x16 FH/HL PCIe + 2 PCI-X FH/FL)	1†	-
None*	A47N	x3650 M4 HD PCIe Riser Card 1 (1 x8 FH/FL + 2 x8 FH/HL Slots)	1	All other models
00Y7759	A481	x3650 M4 HD PCIe Riser Card 2 (1 x8 FH/FL + 2 x8 FH/HL Slots)	1†	-
None*	A47P	x3650 M4 HD PCIe Riser Card 1 (1 x16 for GPU + 1 x8 FH/HL Slots)	1	-
00Y7760	A47Q	x3650 M4 HD PCIe Riser Card 2 (1 x16 for GPU + 1 x8 FH/HL Slots)	1†	-
None	A3NQ	x3650 M4 HD Rear 2 HDD Kit -- includes riser for RAID card in slot 3	1	H3x

* CTO only.

† The use of Riser card slot 2 requires a second processor to be installed.

The locations of the PCIe slots are shown in the following figure.



Figure 7. Slot dimensions

The specific slots that are available depend on the riser cards that are installed in Riser socket 1 and Riser socket 2, as shown in the following table. Standard models except for model H3x have 00Y7759 installed in Riser socket 1.

Tip: All slots support full-height adapters. Slots 1, 4, and 5 support full-length adapters, and slots 2, 3, and 6 (when present) support half-length adapters.

Table 12. PCIe slot descriptions (FH=full height, FL=full length, HL=half length, DW=double width)

Slot number	PCIe 3 x8 riser 00Y7759 (standard)	PCIe x16 riser 00Y7757	PCI-X riser 00Y7758	GPU riser 00Y7760
Riser socket 1 (CPU 1)	1: PCIe 3.0 x8; FH, FL	1: PCIe 3.0 x16 FH, FL	1: PCI-X 64b/133 FH, FL	1: No slot present
	2: PCIe 3.0 x8; FH, HL	2: PCIe 3.0 x8 FH, HL	2: PCI-X 64b/133 FH, HL	2: PCIe 3.0 x16 FH, FL, DW
	3: PCIe 3.0 x8; FH, HL	3: No slot present	3: PCIe 3.0 x16 FH, HL	3: PCIe 3.0 x8 FH, HL
Riser socket 2 (CPU 2 required)	4: PCIe 3.0 x8 FH, FL	4: PCIe 3.0 x16 FH, FL	4: PCI-X 64b/133 FH, FL	4: No slot present
	5: PCIe 3.0 x8 FH, FL	5: PCIe 3.0 x8 FH, FL	5: PCI-X 64b/133 FH, FL	5: PCIe 3.0 x16 FH, FL, DW
	6: PCIe 3.0 x8 FH, HL	6: No slot present	6: PCIe 3.0 x16 FH, HL	6: PCIe 3.0 x8 FH, HL

Note: Slots 4, 5, and 6 require a second processor to be installed.

Network adapters

x3650 M4 HD supports four integrated Gigabit Ethernet ports. Optionally, two 10 Gb Ethernet ports or InfiniBand can be added by installing one of the available dual-port mezzanine cards that are listed in the following table. These cards use a dedicated connector on the system board and do not use a PCI expansion slot.

Integrated NICs have the following features:

- Intel I350AM4 chip
- Four GbE ports
- TCP Offload Engine (TOE) support
- Wake on LAN support
- 802.1Q VLAN tagging support
- NIC Teaming (load balancing and failover)

The following table lists additional supported network adapters.

Table 13. Network adapters

Part number	Feature code	Description	Maximum supported#
Mezzanine Card - does not use a PCI expansion slot			
49Y7980	A3JS	Intel X520 Dual Port 10GbE SFP+ Embedded Adapter	1
49Y7990	A3JT	Intel X540 Dual Port 10GBase-T Embedded Adapter	1
00D4143	A36R	IBM Dual Port FDR Embedded Adapter	1
90Y6338	A24F	Mellanox ConnectX-3 Dual Port QDR/FDR10 Mezz Card	1
90Y6454	A22H	QLogic Dual Port 10GbE SFP+ Embedded VFA	1
40 Gb Ethernet			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	6
10 Gb Ethernet			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter	6
42C1820	1637	Brocade 10Gb CNA for IBM System x	6
95Y3762	A2U1	Emulex Dual Port 10GbE SFP+ VFA III for IBM System x	6
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for IBM System x	6
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for IBM System x	6
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x	6
00D9690	A3PM	Mellanox ConnectX-3 10 GbE Adapter for IBM System x	6
42C1800	5751	QLogic 10Gb CNA for IBM System x	6
90Y4600	A3MR	QLogic 8200 Dual Port 10GbE SFP+ VFA for IBM System x	6
Gigabit Ethernet			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for IBM System x	6
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for IBM System x	6
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for IBM System x	6
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for IBM System x	6
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter	6
None*	1485	NetXtreme II 1000 Express G Ethernet Adapter- PCIe	6
49Y4220	5766	NetXtreme II 1000 Express Quad Port Ethernet Adapter	6
42C1750	2975	PRO/1000 PF Server Adapter	6
InfiniBand			
95Y3750	A2MY	Mellanox ConnectX-2 Dual-port QSFP QDR IB Adapter	6
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for IBM System x	6

* CTO only.

Maximum quantity is achieved with two processors installed. With one processor, the maximum quantity is half of the listed value (this does not apply to mezzanine cards).

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

Storage host bus adapters

The following table lists the storage HBAs that are supported by the x3650 M4 HD server. The maximum quantity that is listed is for configurations with two processors installed. If one processor is installed, the maximum quantity that is supported is half of the listed value.

Table 14. Storage adapters

Part number	Feature code	Description	Maximum supported
Fibre Channel - 16 Gb			
81Y1668	A2XU	Brocade 16Gb FC Single-port HBA for IBM System x	6
81Y1675	A2XV	Brocade 16Gb FC Dual-port HBA for IBM System x	6
81Y1655	A2W5	Emulex 16Gb FC Single-port HBA for IBM System x	6
81Y1662	A2W6	Emulex 16Gb FC Dual-port HBA for IBM System x	6
00Y3337	A3KW	QLogic 16Gb FC Single-port HBA for IBM System x	6
00Y3341	A3KX	QLogic 16Gb FC Dual-port HBA for IBM System x	6
Fibre Channel - 8 Gb			
46M6049	3589	Brocade 8 Gb FC Single-port HBA for IBM System x	6
46M6050	3591	Brocade 8 Gb FC Dual-port HBA for IBM System x	6
42D0485	3580	Emulex 8 Gb FC Single-port HBA for IBM System x	6
42D0494	3581	Emulex 8 Gb FC Dual-port HBA for IBM System x	6
42D0501	3578	QLogic 8 Gb FC Single-port HBA for IBM System x	6
42D0510	3579	QLogic 8 Gb FC Dual-port HBA for IBM System x	6

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 that are listed in the following table.

Table 15. SSD adapters

Part number	Feature code	Description	Maximum supported
90Y4377	A3DY	IBM 1.2TB High IOPS MLC Mono Adapter	6
90Y4397	A3DZ	IBM 2.4TB High IOPS MLC Duo Adapter	6
90Y4361	A3MZ	IBM 300GB High IOPS MLC Modular Adapter	6
90Y4373	A3N2	IBM 300GB High IOPS SLC Modular Adapter	6
46C9078	A3J3	IBM 365GB High IOPS MLC Mono Adapter	6
90Y4365	A3N0	IBM 600GB High IOPS MLC Modular Adapter	2
46C9081	A3J4	IBM 785GB High IOPS MLC Mono Adapter	6
90Y4369	A3N1	IBM 800GB High IOPS MLC Modular Adapter	2

For details about these adapters, see the IBM Redbooks Product Guides in the Internal Storage category: <http://www.redbooks.ibm.com/portals/systemx?Open&page=pg&cat=internalstorage>

GPU adapters

The server supports graphics processing units (GPUs).

The following table lists the supported GPUs. Certain riser cards are needed as listed in the table. The server supports up to two NVIDIA adapters, one in each riser card. The use of the second GPU requires that the second processor be installed. GPUs are available through CTO only. Additional cables and other components are included by the configurator.

Table 16. GPU adapters

Part number	Feature code	Description	Riser used	Maximum supported
None*	A3WJ	NVIDIA Quadro K2000	GPU riser, 00Y7760	2
None*	A3WH	NVIDIA Quadro K600	PCIe x16 riser, 00Y7757	2

* CTO only.

Power supplies

The server supports up to two redundant power supplies. Standard models come with one or two power supplies (model dependent). The following table lists the power supplies.

Table 17. Power supplies

Part number	Feature code	Description	Maximum supported	Standard models where used
94Y6667	A2EB	IBM System x 900W High Efficiency Platinum AC Power Supply	2	M3x, 83x
94Y6669	A1H5	IBM System x 750W High Efficiency Platinum AC Power Supply	2	All other models
94Y6668	A1H6	IBM System x 550W High Efficiency Platinum AC Power Supply	2	
94Y7631	A39N	IBM System x 750W High Efficiency -48 V DC Power Supply	2	-

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

All IBM CFF power supplies are compliant with and exceed 80 Plus Platinum standard, as shown in the following table. Maximum power efficiency is achieved at 50% load.

Table 18. Power supply efficiencies

Power supply unit	20% load	50% load	100% load
80 PLUS Platinum standard			
	90.00%	94.00%	91.00%
IBM Power supplies			
IBM System x 900W High Efficiency Platinum AC Power Supply	90.45%	94.02%	91.89%
IBM System x 750W High Efficiency Platinum AC Power Supply	92.32%	94.31%	93.14%
IBM System x 550W High Efficiency Platinum AC Power Supply	92.94%	94.21%	92.74%

For power supply selection, use the following rule-of-thumb:

Select 550W power supplies if all of the following items are true:

- 8 or fewer DIMMs (no LRDIMMs)
- 16 or fewer HDDs
- One CPU 115W or lower
- 1 or 2 PCIe adapters
- No High IOPS adapters
- No GPUs

Select 750 W power supplies if all of the following items are true:

- 16 or fewer DIMMs (no LRDIMMs)
- 24 or fewer drives
- Two CPUs 115 W or lower
- No High IOPS adapters
- No GPUs

Select 900 W power supplies if all of the following items are true:

- More than 16 DIMMs
- 26 or 32 drives
- CPUs above 115 W
- High IOPS adapters
- GPU adapters

For accurate power supply selection, use the IBM Power Configurator:

<http://ibm.com/systems/bladecenter/resources/powerconfig.html>

Integrated virtualization

The server supports VMware ESXi that is 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	Standard models where used
41Y8298	A2G0	IBM Blank USB Memory Key for VMware ESXi Downloads	1	None
41Y8300	A2VC	IBM USB Memory Key for VMware vSphere 5.0	1	None
41Y8307	A383	IBM USB Memory Key for VMware ESXi 5.0 Update 1	1	None

Local server management

The x3650 M4 HD offers local console access USB ports and a video port on the rear of the server, as shown in Figure 3. Console access from the front of the server is available through an optional console breakout cable that is connected to a port on the front of the server as shown in the following figure.



Figure 8. Optional console breakout cable

The console breakout cable can be ordered by using the information in the following table.

Table 20. Console breakout cable

Part number	Feature code	Description	Maximum supported	Standard models where used
00Y8325	A47X	IBM x3650 M4 HD Video and USB Breakout Cable	1	None

To aid with problem determination, the server includes basic light path diagnostics, which are a set of LEDs on the front of the server and inside the server that show you which component is failing. The LEDs are shown in the following figure.

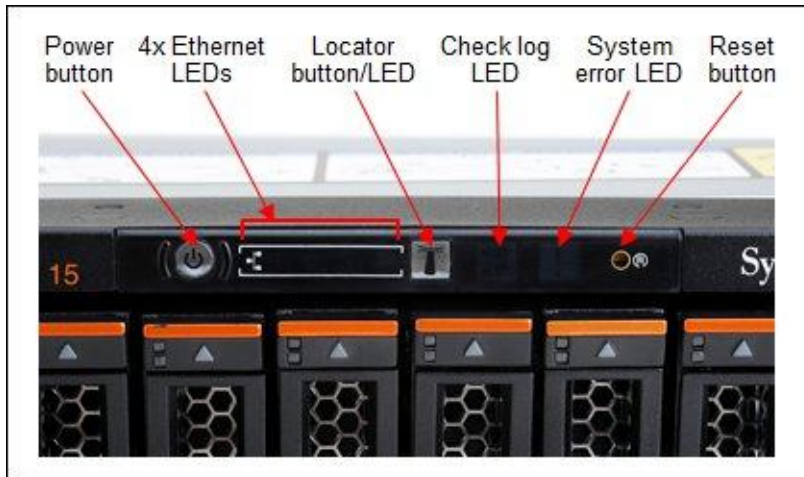


Figure 9. Power button and system LEDs

When an error occurs, the system error LED lights up. You can review the logs through the web interface of the IMMv2 (see the "Remote management" section).

Remote management

The server contains IBM Integrated Management Module II (IMM2), 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 IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. Optionally, the IMM2 also provides a virtual presence capability for remote server management capabilities.

The x3650 M4 HD offers a dedicated Ethernet port at the rear of the server for remote access to the IMM2. Alternatively, one of the four Ethernet ports that are accessible by the operating system can be shared with IMM2 access. This feature is enabled through the system setup in UEFI.

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 optional IBM Integrated Management Module Advanced Upgrade is required to enable the remote presence and blue-screen capture features. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel colors, 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

The blue-screen capture feature captures the video display contents before the IMM restarts the server when the IMM detects an operating system hang condition. A system administrator can use the blue-screen capture to assist in determining the cause of the hang condition. The following table lists the remote management option ordering information.

Table 21. Remote management option

Part number	Feature code	Description	Maximum supported	Models where used
90Y3901	A1ML	IBM Integrated Management Module Advanced Upgrade	1	None

Supported operating systems

The server supports the following operating systems:

- Microsoft Windows Server 2008 R2, SP1
- Microsoft Windows Server 2008, Datacenter x86 Edition, SP2
- Microsoft Windows Server 2008, Datacenter x64 Edition, SP2
- Microsoft Windows Server 2008, Enterprise x86 Edition, SP2
- Microsoft Windows Server 2008, Enterprise x64 Edition, SP2
- Microsoft Windows Server 2008, Standard x86 Edition, SP2
- Microsoft Windows Server 2008, Standard x64 Edition, SP2
- Microsoft Windows Server 2008, Web x86 Edition, SP2
- Microsoft Windows Server 2008, Web x64 Edition, SP2
- Microsoft Windows Server 2012
- SUSE Linux Enterprise Server 11 for x86, SP2
- SUSE Linux Enterprise Server 11 for AMD64/EM64T, SP2
- SUSE Linux Enterprise Server 11 with Xen for AMD64/EM64T, SP2
- Red Hat Enterprise Linux 6 Server Edition, U3
- Red Hat Enterprise Linux 6 Server x64 Edition, U3
- VMware vSphere 5.1 (ESXi)

For more information about the specific versions and service levels that are supported and any other prerequisites, see the IBM ServerProven® website:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml>

Physical and electrical specifications

Dimensions and weight:

- Height: 86.5 mm (3.4 in.)
- Width: 445 mm (17.5 in.)
- Depth: 746 mm (29.4 in.)
- Weight:
 - Minimum configuration: 25 kg (55 lb)
 - Maximum configuration: 30 kg (65 lb)

Supported environment:

The IBM System x3650 M4 HD complies with ASHRAE class A3 specifications.

- Power on:
 - Temperature: 5 °C to 40 °C (41 °F to 104 °F) up to 950 m (3,117 ft)
 - Above 950 m, de-rated maximum air temperature 1 °C / 175 m
 - Humidity, non-condensing: -12 °C dew point (10.4 °F) and 8% - 85% relative humidity
 - Maximum dew point: 24 °C (75 °F)
 - Maximum altitude: 3050 m (10,000 ft) and 5 °C to 28 °C (41 °F to 82 °F)
 - Maximum rate of temperature change: 20 °C/hr (68 °F/hr) for HDDs
- Power off:
 - Temperature: 5 °C to 45 °C (41 °F to 113 °F)
 - Relative humidity: 8% - 85%
 - Maximum dew point: 27 °C (80.6 °F)
- Storage (non-operating):
 - Temperature: 1 °C to 60 °C (33.8 °F to 140 °F)
 - Altitude: 3050 m (10,000 ft)
 - Relative humidity: 5% - 80%
 - Maximum dew point: 29 °C (84.2 °F)
- Shipment (non-operating):
 - Temperature: -40 °C to 60 °C (-40 °F to 140 °F)
 - Altitude: 10,700 m (35,105 ft)
 - Relative humidity: 5% - 100%
 - Maximum dew point: 29 °C (84.2 °F)
- Electrical:
 - Models with 900 W power supplies:
 - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 10 A
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 5 A
 - Input kilovolt-amperes (kVA) (approximately):
 - Minimum configuration: 0.15 kVA
 - Maximum configuration: 1.2 kVA
 - Models with 750 W AC power supplies:
 - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 8.9 A
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 4.5 A
 - Input kilovolt-amperes (kVA) (approximately):
 - Minimum configuration: 0.15 kVA
 - Maximum configuration: 0.99 kVA

- Models with 550 W power supplies:
 - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 6.5 A
 - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 3.3 A
 - Input kilovolt-amperes (kVA) (approximately):
 - Minimum configuration: 0.16 kVA
 - Maximum configuration: 0.73 kVA
- BTU output:
 - Minimum configuration: 525 Btu/hr (154 watts)
 - Maximum configuration: 4053 Btu/hr (1188 watts)
- Noise level:
 - 6.6 bels (operating)
 - 6.4 bels (idle)

Warranty options

The IBM System x3650 M4 HD has a three-year onsite warranty with 9x5/next business day terms. IBM offers the warranty service upgrades through IBM ServicePac offerings. 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 ServicePac offerings might be available in a particular country. For more information about the IBM ServicePac offerings that are available in your country, visit the IBM ServicePac Product Selector:

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

The following table explains warranty service definitions in more detail.

Table 22. Warranty service definitions

Term	Description
IBM onsite repair (IOR)	A service technician comes 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. - 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. - 5:00 p.m. in the customer's local time zone, Monday through Friday, excluding IBM holidays.

In general, the types of IBM ServicePac offerings are as follows:

- 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 3 years with 24x7 coverage (severity 1) or 9x5/next business day for all severities
 - Installation and start-up support for System x servers
 - Remote technical support for System x servers
 - Software support - Support Line:
 - Microsoft or Linux software
 - VMware
 - IBM Director

Regulatory compliance

The server conforms to the following standards:

- FCC - Verified to comply with Part 15 of the FCC Rules, Class A
- Canada ICES-003, issue 5, Class A
- UL/IEC 60950-1
- CSA C22.2 No. 60950-1
- NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22, Class A; AS/NZS 60950.1
- IEC 60950-1(CB Certificate and CB Test Report)
- China CCC GB4943.1, GB9254 Class A, and GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN22, Class A; KN24
- Russia/GOST ME01, IEC-60950-1, GOST R 51318.22, GOST R 51318.24, GOST R 51317.3.2, and GOST R 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3)
- CISPR 22, Class A
- TUV-GS (EN60950-1 /IEC60950-1, EK1-ITB2000)

External disk storage systems

The following table lists the external storage systems that are supported by x3650 M4 HD and can be ordered through the System x sales channel. The server might support other IBM disk systems that are not listed in this table. For more information, see IBM System Storage® Interoperability Center.

Table 23. 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 that are listed in the following table.

Table 24. 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 Line Cord)
8767HNX	Half High Tape Drive Enclosure (with NEMA 5-15P Line Cord)
Tape enclosure adapters (with cables)	
44E8869	USB Enclosure Adapter Kit
40K2599	SAS Enclosure Adapter Kit
Internal backup drives that are supported by external tape enclosures	
46C5364	IBM RDX Removable Hard Disk Storage System - Internal USB 160 GB Bundle
46C5387	IBM RDX Removable Hard Disk Storage System - Internal USB 320 GB Bundle
46C5388	IBM RDX Removable Hard Disk Storage System - Internal USB 500 GB Bundle
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 24. External backup options (Part 2)

Part number	Description
External backup units*	
362516X	IBM RDX Removable Hard Disk Storage System - External USB 160 GB Bundle
362532X	IBM RDX Removable Hard Disk Storage System - External USB 320 GB Bundle
362550X	IBM RDX Removable Hard Disk Storage System - External USB 500 GB Bundle
3628L3X	IBM Half High LTO Gen 3 External SAS Tape Drive (with US power cord)
3628L4X	IBM Half High LTO Gen 4 External SAS Tape Drive (with US power cord)
3628L5X	IBM Half High LTO Gen 5 External SAS Tape Drive (with US power cord)
3628N3X	IBM Half High LTO Gen 3 External SAS Tape Drive (without power cord)
3628N4X	IBM Half High LTO Gen 4 External SAS Tape Drive (without power cord)
3628N5X	IBM Half High LTO Gen 5 External SAS Tape Drive (without power 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 that are listed can be ordered through the System x sales channel. The server might support other IBM tape drives that are not listed in this table. For more information, see the IBM System Storage Interoperability Center.

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

For the latest information about the specific versions and service levels that are supported and any other prerequisites, see the IBM ServerProven website:

<http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml>

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 that are listed in the following table.

Table 25. 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 that are listed in the following table.

Table 26. Uninterruptible power supply units

Part number	Description
Rack-mounted UPS	
21304RX	IBM UPS 10000XHV
53951AX	IBM 1500VA LCD 2U Rack UPS (100V/120V)
53951KX	IBM 1500VA LCD 2U Rack UPS (230V)
53952AX	IBM 2200VA LCD 2U Rack UPS (100V/120V)
53952KX	IBM 2200VA LCD 2U Rack UPS (230V)
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 (200V/208V/230V)

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 server supports attachments to the power distribution units (PDUs) that are listed in the following table.

Table 27. 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
46M4167	IBM 1U 9 C19/3 C13 Switched and Monitored 30A 3 Phase PDU
46M4116	IBM 0U 24 C13 Switched and Monitored 30A PDU
46M4119	IBM 0U 24 C13 Switched and Monitored 32A PDU
46M4134	IBM 0U 12 C19/12 C13 Switched and Monitored 50A 3 Phase PDU
46M4137	IBM 0U 12 C19/12 C13 Switched and Monitored 32A 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 power cord
39Y8923	DPI 60A Three Phase C19 Enterprise PDU with IEC309 3P+G (208 V) fixed power cord
39Y8941	DPI Single Phase C13 Enterprise PDU without power cord
39Y8948	DPI Single Phase C19 Enterprise PDU without power cord
Front-end PDUs	
39Y8934	DPI 32 amp/250 V Front-end PDU with IEC 309 2P+Gnd connector
39Y8935	DPI 63 amp/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

Table 27. Power distribution units (part 2)

Part number	Description
Universal PDUs	
39Y8951	DPI Universal Rack PDU with US LV and HV power 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
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 that are listed in the following table.

Table 28. Rack cabinets

Part number	Description
201886X	IBM 11U Office Enablement Kit
93072PX	IBM 25U Static S2 Standard Rack
93072RX	IBM 25U Standard Rack
93074RX	IBM 42U Standard Rack
93074XX	IBM 42U Standard Rack Extension
93084EX	IBM 42U Enterprise Expansion Rack
93084PX	IBM 42U Enterprise 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
99564RX	IBM S2 42U Dynamic Standard Rack
99564XX	IBM S2 42U Dynamic Standard Expansion Rack

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 that are listed in the following table.

Table 29. Rack options

Part number	Feature code	Description
Monitor kits and keyboard trays		
17238BX	1723HC1 fc A3EK	IBM 1U 18.5" Standard Console
17238EX	1723HC1 fc A3EL	IBM 1U 18.5" Enhanced Media Console
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>

IBM Global Financing

IBM Global Financing can help you obtain the IT solution that you need while preserving funding for other strategic investments and optimizing cash flow. Our Fair Market Value (FMV) lease helps ensure that you have the latest IBM technology and with our mid-lease upgrade capability, you can increase the capacity of the system with little to no change in monthly payments. At the end of the lease, take advantage of our flexible end-of-lease options to fit your changing business needs. IBM Global Financing has the breadth and depth of offerings, longevity, proven success, and global reach to help you develop a robust financing and asset management strategy that provides you the opportunity to leverage new technologies and turn your ambitious vision into a tangible solution.

Here are some other reasons why working with us makes solid financial sense:

- Expand your purchasing power: Affordable monthly payments allow you to change the technology acquisition discussion from “what can I afford right now” to “what solution is really right for my business.” IBM Global Financing allows you to expand your purchase power to get you the right solution.
- Accelerate your project’s cash flow break-even point: Acquire your IBM technology today and begin to realize its benefits now. An FMV lease can help you get the solution that you need now, with low monthly payments that better align upfront costs with the anticipated return on investment from the technology.
- Easy to acquire with affordable rates: We offer one-stop shopping for a total IT solution, so you can acquire IBM hardware, software, services, and the financing you need from one IT provider.

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