

## System x3690 X5

### Product Guide (withdrawn product)

System x3690 X5 is a powerful two-socket 2U rack-mount server using the latest Intel Xeon processors. The x3690 X5 servers can be combined with the MAX5 memory expansion unit for up to 2 TB of memory. Add to that the 16 2.5-inch disk drive bays and you have a high performance workhorse in a rack-dense package. The x3690 X5 server belongs to the family of a new generation of Enterprise X-Architecture® servers. The server delivers innovation with enhanced reliability and availability features to enable optimal performance for databases, enterprise applications, and virtualized environments.

The System x3690 X5 is shown in Figure 1.



Figure 1. The System x3690 X5

### Did you know?

The x3690 X5 offers a two step approach to expanding the system with memory. You can first start with 16 DIMMs installed just on the system board, then as needs require, install the memory mezzanine and an additional 16 DIMMs. The for applications that can use the most amount of RAM, use the 1U MAX5 memory expansion unit which adds an additional 32 DIMM sockets. The MAX5 scalability and memory expansion feature is a unique Lenovo enhancement, not offered by other x86 server architectures. The total number of DIMM sockets available to the system is then 64 DIMMs -- in only 3U of rack space -- and with 32 GB DIMMs, that is 2 TB of RAM.

The x3690 X5 servers also contain up to 16 HDD bays that support 2.5-inch hot-swap internal SAS/SATA drives totaling up to 8TB, or up to 24 solid-state drive bays, supporting 1.8-inch hot-swap SSDs, using up to three eXFlash storage options. *Each* individual SSD is capable of sustaining approximately 4,300 IOPS, which is more than 10X what an enterprise 15,000 RPM 2.5-inch 146.8GB SAS HDD can achieve (420 IOPS).

## Key features

The x3690 X5 is an outstanding 2U two-socket mission-critical server, offering outstanding performance, superior reliability, and fault-tolerant memory characteristics.

Lenovo has been designing and implementing servers under the X-Architecture® name since 2001. eX5 technology represents the fifth generation of enterprise servers based on the same design principle Lenovo 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 x3690 X5 offers numerous features to boost performance, improve scalability, and reduce costs:

- The x3690 X5 supports up to two high-performance Intel Xeon E7 family allowing you to upgrade as business needs require.
- 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 32 dual inline memory modules (DIMMs) in the base system (16 on the system planar and 16 on an optional memory mezzanine inside the server), plus an additional 32 DIMMs with an optional 1U MAX5 V2 memory expansion unit, for a total of 64 DIMM sockets.
- Support for 32 GB DIMMs for a maximum of 2 TB per x3690 X5 with MAX5 V2
- 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.

## Availability and serviceability

The x3690 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 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 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 x5 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.
- 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.
- Four redundant hot-swap power supplies and five redundant hot-swap fans to provide availability for business-critical applications.
- 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 Version II (IMM2) 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 x3690 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 x3690 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, 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 E7-2800/4800/880 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 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

Figure 2 shows the front of the server.

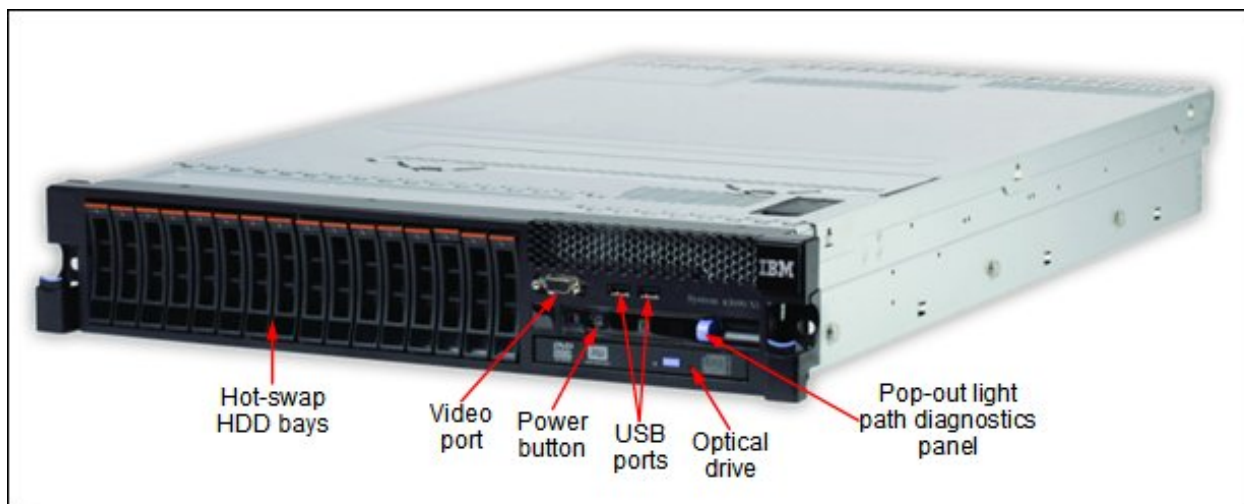


Figure 2. Front view of the System x3690 X5

Figure 3 shows the rear of the server.

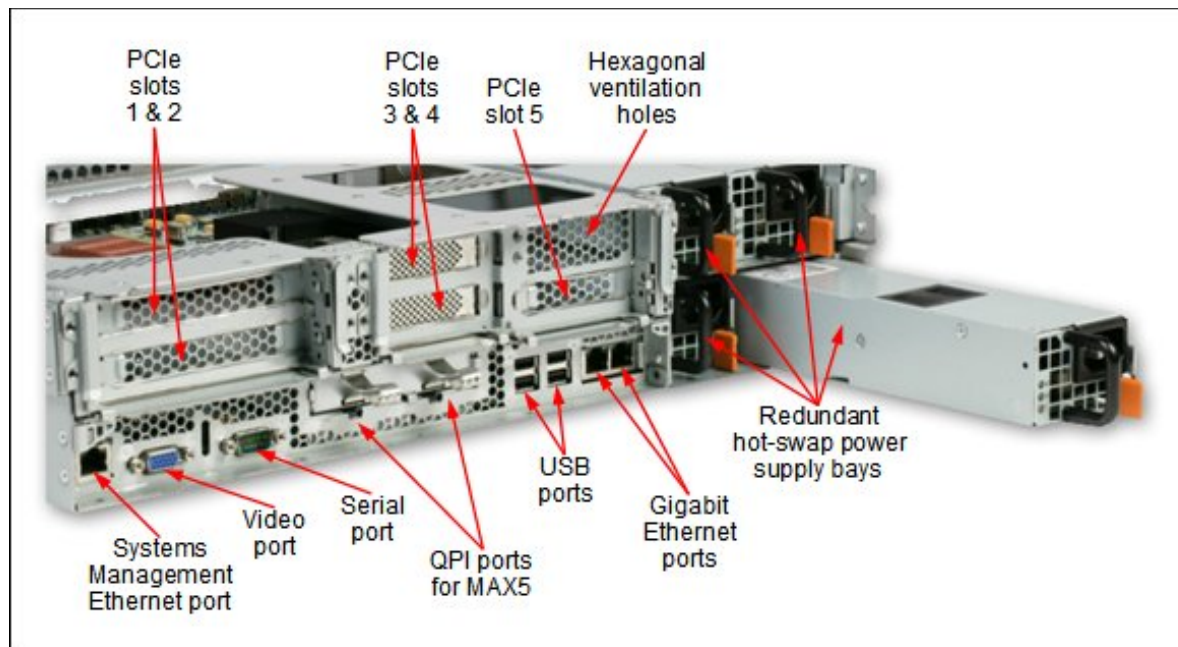


Figure 3. Rear view of the System x3690 X5

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

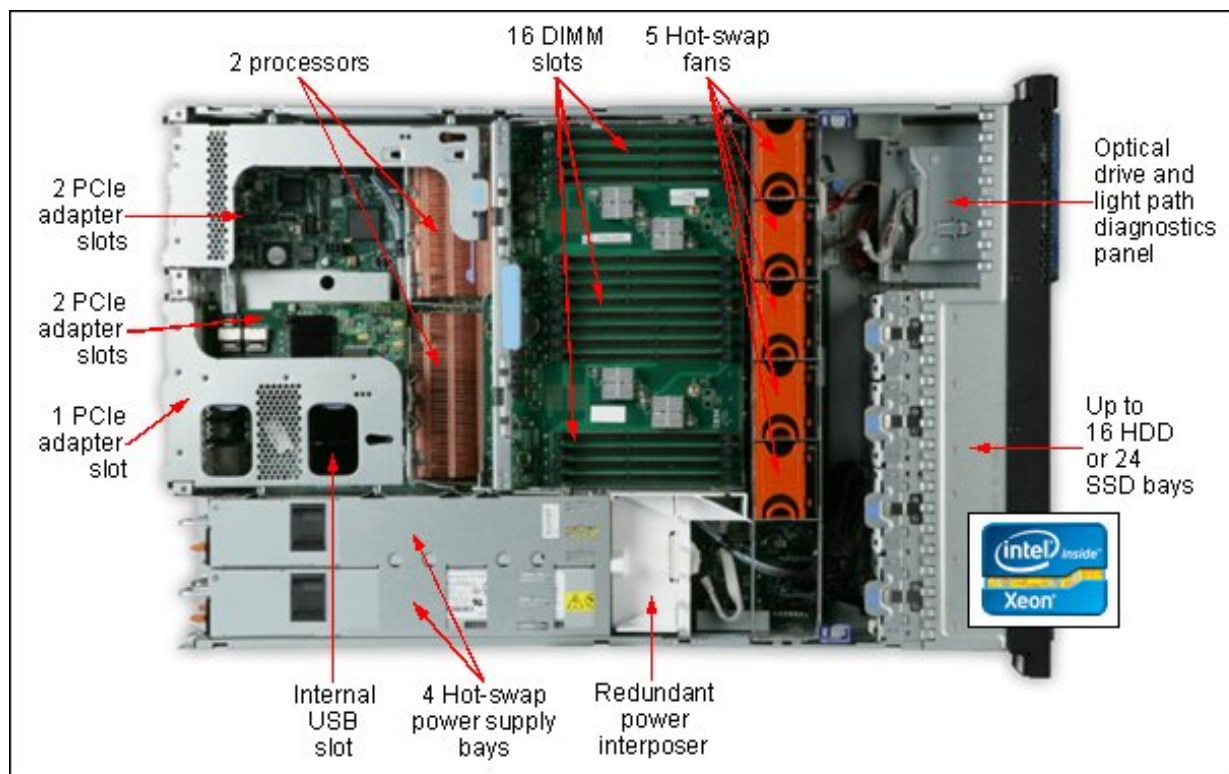


Figure 4. Inside view of the System x3690 X5

Figure 5 shows the MAX5 optional memory expansion unit.

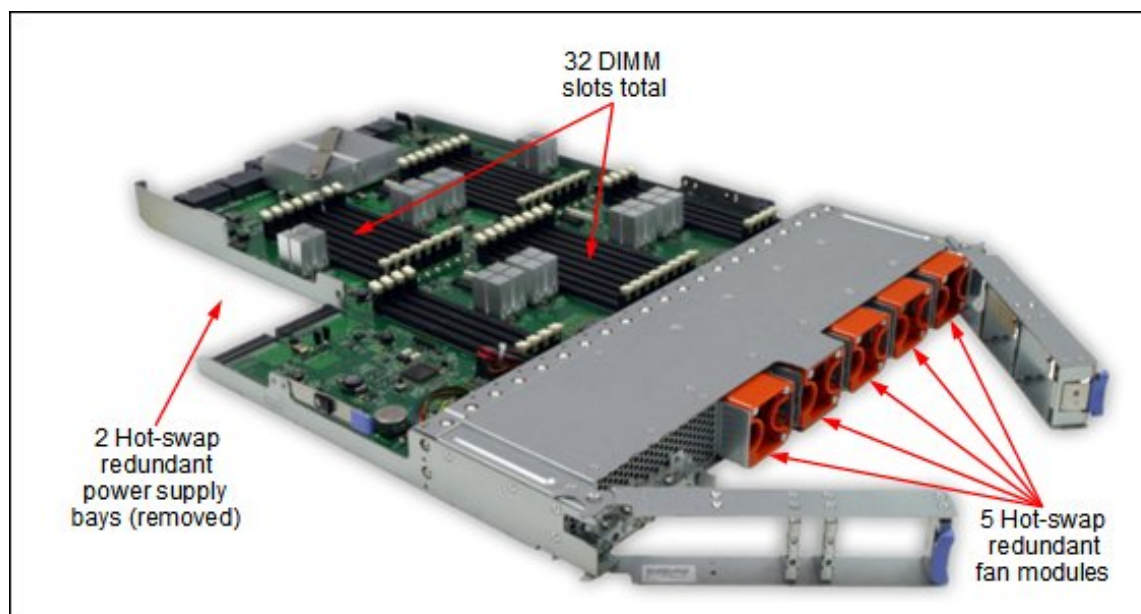


Figure 5. Inside view of the MAX5 optional memory expansion unit for the System x3690 X5

## Standard specifications

Table 1 lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Form factor/height	Rack/2U per chassis; MAX5 adds 1U
Processor (max)	Machine type 7147: Intel Xeon E7-2800, E7-4800 and E7-8800 families, up to 10 cores
Number of processors	1 or 2 standard (model dependent), 2 maximum
Cache (max)	Up to 30 MB
Memory DIMM sockets	Up to 64 DIMM sockets: <ul style="list-style-type: none"> <li>• 16 on the system planar</li> <li>• 32 total with optional memory mezzanine</li> <li>• 64 total with optional MAX5 and memory mezzanine</li> </ul>
Memory maximums	Up to 2 TB of RAM using all 32 GB DIMMs: <ul style="list-style-type: none"> <li>• 512 GB without the memory mezzanine</li> <li>• 1 TB total with the memory mezzanine populated</li> <li>• 2 TB total with the memory mezzanine and MAX5 populated</li> </ul>
Expansion slots	Up to 5 PCIe 2.0 slots depending on the riser cards used
Disk bays	Up to 16x 2.5-inch SAS hot-swap bays; or Up to 24x 1.8-inch SSD hot-swap bays
Optical drive	Optional

Components	Specification
Maximum internal storage	25.6 TB per chassis (using 1.6 TB 2.5-inch SAS solid-state drives)
Network interface	2x 1 Gb Ethernet ports, based on the Broadcom BCM5709C controller. 2x 10 Gb Ethernet ports (standard on some models, optional on the others) 1x Intel Ethernet Quad Port Server Adapter I340-T4 (standard on some workload-optimized models)
Power supply (std/max)	1 / 4 - 675 W 220 V
Hot-swap components	Power supplies, fans, hard disk drives
RAID support	Most models: ServeRAID M1015 controller standard supporting RAID 0, 1, 10, 5, and 50.
Systems management	Alert on LAN 2, automatic server restart, IBM Systems Director, ServerGuide, IMM, light path diagnostics (independently powered), predictive failure analysis on hard disk drives, processors, VRMs, fans and memory, Wake on LAN, dynamic system analysis
Operating systems supported	Microsoft® Windows® Server 2008 (Standard, Enterprise and Datacenter editions 64-bit), 64-bit Red Hat Enterprise Linux® and SUSE Enterprise Linux, (Server and Advanced Server), VMware vSphere
Limited warranty	3-year customer replaceable unit and on-site limited warranty
Dimensions	Height: 86 mm (3.5 inches, 2U), depth: 698 mm (27.4 inches), width: 429 mm (16.8 inches)
Weight	31.3 kg (69 lb) when fully configured

The x3690 X5 servers are shipped with the following items:

- Rack rails and hardware
- Cable management hardware
- Country kit carton
- Two 2.8m 220 V intra-rack cables
- On/off switch cover
- Documentation CD
- IBM Systems Director 6.2 DVD



## Standard models

Table 2 lists the standard models.

Table 2. Standard models - Machine type 7147 (Intel Xeon E7-2800 and E7-8800 series processors)

Model	Intel Xeon (2 maximum)	MAX5	Memory	Memory mezz.	RAID	Disk bays*	Disks	Network	DVD	675W Power*
7147-A1x	1x E7-2803 6C 1.73GHz 18MB 800MHz 105w	No support	2x 4GB	Optional	Optional	Open	Open	2x 1Gb	Open	1 / 4
7147-A2x	1x E7-2820 8C 2.00GHz 18MB 978MHz 105w	No support	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4
7147-A3x	1x E7-2830 8C 2.13GHz 24MB 1066MHz 105w	Optional	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4
7147-A5x	1x E7-2850 10C 2.00GHz 24MB 1066MHz 130w	Optional	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4
7147-A6x	1x E7-2860 10C 2.26GHz 24MB 1066MHz 130w	Optional	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4
7147-A7x	1x E7-2870 10C 2.40GHz 30MB 1066MHz 130w	Optional	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4
7147-C1x	1x E7-8837 8C 2.67GHz 24MB 1066MHz 130W	Optional	2x 4GB	Optional	M1015	4x 2.5" / 16	Open	2x 1Gb	Open	2 / 4

\* Standard / Maximum

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

## Workload-optimized models

Table 3 lists the announced workload-optimized models. These are systems that are specially configured to meet the requirements of a particular software stack.

Table 3. Workload optimized models - Machine type 7147 (Intel Xeon E7-2800 series processors)

Model 7147-	Processor** (2 max)	MAX5	RAM	Mem mez.	RAID	Disk bays	Disks	Network†	PS
<b>Database workload-optimized models</b>									
D1x	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Opt	16x 4 GB	Opt	4x B5015	16x1.8" / 24	16x 200GB SSD	2x 1Gb+ 2x 10Gb	4 / 4
D2x	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Opt	16x 4 GB	Opt	2x 6Gb SSD HBA	16x1.8" / 24	16x 200GB SSD	2x 1Gb+ 2x 10Gb	4 / 4
D3x	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Opt	16x 4 GB	Opt	2x M5015 (+Perf keys)	16x1.8" / 24	16x 200GB SSD	2x 1Gb+ 2x 10Gb	4 / 4
D4x	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Opt	16x 4 GB	Opt	2x 6Gb SSD HBA	16x1.8" / 24	16x 200GB SSD	2x 1Gb+ 2x 10Gb	4 / 4
<b>SAP HANA workload-optimized models</b>									
HAX	2x Xeon E7-2870 10C 2.40GHz 30MB 1066	NS‡	8x 16 GB	Std	2x M5015 (+Perf keys)	16x1.8"/24	10x 200GB SSD DVD Multiburner	6x 1Gb 4x 10Gb	4 / 4
HBx	2x Xeon E7-2870 10C 2.40GHz 30MB 1066	NS‡	16x 16 GB	Std	2x M5015 (+Perf keys)	16x1.8"/24	10x 200GB SSD DVD Multiburner	6x 1Gb 4x 10Gb	4 / 4
<b>Virtualization workload-optimized models</b>									
F1x (ESX)	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Std	64x 4GB	Std	1x M1015	4x 2.5" / 16	None	2x 1Gb + 2x 10Gb	4 / 4
F2x (RH)	2x Xeon E7-2860 10C 2.26GHz 24MB 1066	Std	64x 4GB	Std	1x M1015	4x 2.5" / 16	None	2x 1Gb + 2x 10Gb	4 / 4



\*\* Processor detail: model, core speed, cores, L3 cache, memory speed

† The HAx and HBx models include two Emulex 10GbE Integrated Virtual Fabric Adapter II (each with two IBM 10GbE SW SFP+ Transceivers) and one Intel Ethernet Quad Port Server Adapter I340-T4. The D1x, D2x, F1x, and F2x models include one Emulex 10GbE Integrated Virtual Fabric Adapter (no transceivers included). The D3x and D4x models include one Emulex 10GbE Integrated Virtual Fabric Adapter II (no transceivers included)

‡ NS = Not supported. MAX5 is not currently certified for use with SAP HANA and is therefore not supported.

About these models:

- **Models 7147-D1x, D2x, D3x, D4x:** These models are designed for database applications and uses solid state drives for the best I/O performance.  
Backplane connections for 16 1.8-inch solid state drives (SSD) are standard as are 16 200GB high-performance solid-state drives. Model D1x includes four SSD-optimized ServeRAID B5015 RAID controllers, models D2x and D4x includes two SSD host bus adapters, and model D3x includes two ServeRAID M5015 RAID controllers each with the ServeRAID M5000 Series Performance Accelerator Key.
- **Models 7147-HAx, HBx:** These models are optimized to run the SAP High-Performance Analytic Appliance (HANA) solution.  
HANA is an integrated, ready-to-run, hardware-software offering, featuring the new SAP In-Memory Computing Engine. These models include a preload comprised of SLES for SAP, IBM GPFS™, and the SAP HANA software stack. They include two processors, 128 or 256 GB of memory and choice of either all eXFlash solid state drives or a combination of solid state and spinning disk. They are designed for use in small to mid-sized SAP HANA configurations. Note: MAX5 is not currently certified for use with SAP HANA and is therefore not supported. H models also include a SATA Multiburner optical drive.
- **Model 7147-F1x:** This model is 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 256 GB of memory implemented using cost-effective 4GB memory DIMMs (128 GB in the server and in the MAX5).
- **Model 7147-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 256 GB of memory implemented using cost-effective 4GB memory DIMMs (128 GB in the server and 128 GB in the MAX5).

## Processor options

The server supports the processor options listed in the following table. The server supports one or two processors. Some processors do not support the attachment of the MAX5 memory expansion unit - these are noted in the table. The table also shows which server models have each processor standard. If there is no corresponding *where-used* model for a particular processor, then this processor is only available through configure-to-order (CTO).

Table 4. Processor options - Machine type 7147 (Intel Xeon E7-2800 and E7-8800 series processors)

Part number	Intel Xeon processor description	MAX5 supported	Models where used
88Y5654	Xeon E7-8867L 10C 2.13GHz 30MB 1066MHz 105w	Yes	-
88Y5657	Xeon E7-8837 8C 2.67GHz 24MB 1066MHz 130W	Yes	7147-C1x
88Y5662	Xeon E7-4807 6C 1.86GHz 18MB 800MHz 95w	Yes	-
88Y5663	Xeon E7-2870 10C 2.40GHz 30MB 1066MHz 130w	Yes	7147-A7x, HAx, HBx
88Y5664	Xeon E7-2860 10C 2.26GHz 24MB 1066MHz 130w	Yes	7147-A6x, Add Dxx models, F1x, F2x
88Y5720	Xeon E7-2850 10C 2.00GHz 24MB 1066MHz 130w	Yes	7147-A5x
88Y5665	Xeon E7-2830 8C 2.13GHz 24MB 1066MHz 105w	Yes	7147-A3x
88Y5666	Xeon E7-2820 8C 2.00GHz 18MB 978MHz 105w	No	7147-A2x
88Y5667	Xeon E7-2803 6C 1.73GHz 18MB 800MHz 105w	No	7147-A1x

## MAX5 memory expansion unit

The MAX5 memory expansion unit is a 1U unit that has 32 DDR3 DIMM sockets, two 675-watt power supplies, and five 40-mm hot-swap speed-controlled fans. It provides added memory for the x3690 X5 server. Some models include the MAX5 standard as listed in the model table above. The MAX5 options are listed in Table 5.

There are two MAX5 options available as listed in the table:

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

MAX5 V2 is the second generation unit and features newer versions of the Intel scalable memory buffers, which enable support for both 1.35V DIMMs and 32 GB DIMMs.

Note that some models and some processors do not support the MAX5 (either generation). 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	MAX5 for System x (also known as MAX5 V1)	1
88Y6529	A19H	MAX5 V2 for System x	1
60Y0332	4782	High Efficiency 675W Power Supply (for MAX5 V1 only, part 59Y6265)	1 (MAX5 V1 only)
59Y6269	7481	MAX5 to x3690 X5 Cable Kit	1

## Memory options

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

The System x3690 X5 supports DDR3 memory. Memory is installed in DIMM sockets either on the system planar (16 sockets) in an optional memory mezzanine tray (16 sockets). The DIMMs on the system planar are directly connected to the first processor, and the DIMMs on the mezzanine are directly connected to the second processor. If you install the mezzanine then you must install the second processor. However the reverse is different: you do not have to install the mezzanine if you have two processors installed (although for performance reasons the mezzanine is recommended).

The following table lists memory options available for x3690 X5 server and for the MAX5 memory expansion unit.

Table 6. Memory options - Machine type 7147 (Intel Xeon E7-2800 and E7-8800 series processors)

Part number	Feature code**	Description	Supported in MAX5 V2	Maximum supported	Models where used
81Y8926	A15H	x3690 X5 16-DIMM Internal Memory Expansion	No	1	All Fxx and Hxx models
44T1592	1712 / 2429	2GB (1x2GB, 1Rx8, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Yes	32	-
44T1481*	3964*	2GB (1x2GB) Dual Rank PC3-10600 CL9 ECC DDR3-1333 LP RDIMM	No	32	-
49Y1433	8934	2GB (1x2GB, 2Rx8, 1.5V) PC3-10600 CL9 ECC DDR3 1333MHz LP RDIMM	No	32	-
49Y1407	8942 / A1MH	4GB (1x4GB, 2Rx8, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Yes	32	All models except Hxx
44T1599	1713 / 2431	4GB (1x4GB, Dual Rankx8) PC3-10600 CL9 ECC DDR3-1333MHz LP RDIMM	Yes	32	F1x (MAX5)
46C7448	1701	4GB (1x4GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3-1066MHz LP RDIMM	No	32	-
49Y1399	A14E / A1N7	8GB (1x8GB, 4Rx8, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Yes	32	-
46C7482	1706 / 2432	8GB (1x8GB, Quad Rankx8) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Yes	32	-
49Y1400	8939 / A1N8	16GB (1x16GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Yes	32	All Hxx models
46C7483	1707 / 2433	16GB (1x16GB, Quad Rankx4) PC3-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Yes	32	-
49Y1563	A1QT / A3E1	16GB (1x16GB, 2Rx4, 1.35V) PC3L-10600 CL9 ECC DDR3 1333MHz LP RDIMM	Yes	32	-
90Y3101	A1CP / A1R2	32GB (1x32GB, 4Rx4, 1.35V) PC3L-8500 CL7 ECC DDR3 1066MHz LP RDIMM	Yes	32	-

\* Withdrawn from marketing

\*\* When two feature codes are listed, the first is the feature code when the DIMM is used in the server, and the second is the feature code when the DIMM is used in the MAX5 V2.

The MAX5 V2 supports a subset of the memory DIMMs listed as shown in the table. The 16 GB and 32 GB x4 memory options that are supported in the MAX5 as listed in the above table are only supported when it is the only type of memory used in the MAX5. No other memory options can be used in the MAX5 if one of the 16 GB or 32 GB DIMMs options are used in the MAX5. These x4 DIMM also supports redundant bit steering (RBS) when used in the MAX5 or when used in x3690 X5 servers with E7 processors (machine type 7147).

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

System x3690 X5 server supports internally up to 16 2.5-inch SAS or SATA drives, or up to 24 1.8-inch solid state drives (SSDs). 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. Only certain combinations of backplanes are supported; see the *Installation and User's Guide* for information.

Table 7. Drive backplane options

Part number	Feature code	Name	Maximum supported
60Y0339	9287	4x 2.5" HS SAS HDD Backplane Supports up to eight 2.5-inch SAS or SATA hot-swap drives.	4*
60Y0381	1790	8x 2.5" HS SAS HDD Backplane Supports up to eight 2.5-inch SAS or SATA hot-swap drives.	2
60Y0360	9281	eXFlash 8x 1.8" HS SAS SSD Backplane Supports up to eight 1.8-inch hot-swap SSDs.	3

\* Only two 4x 2.5" are supported when building an initial configuration using one of the configurators, however the server does support four 4x 2.5" backplanes if installed after an initial configuration.

## Internal drive options

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

Table 8. Disk drive options for internal disk storage

Part number	Feature code	Description	Maximum supported
1.8-inch solid state drives (SSDs) - Enterprise			
49Y6124	A3AP	400GB SATA 1.8" MLC Enterprise SSD	24
49Y6119	A3AN	200GB SATA 1.8" MLC Enterprise SSD	24
00W1120	A3HQ	100GB SATA 1.8" MLC Enterprise SSD	24
43W7746	5420	200GB SATA 1.8" MLC SSD	24
43W7726	5428	50GB SATA 1.8" MLC SSD	24
41Y8371	A4FT	S3700 400GB SATA 1.8" MLC Enterprise SSD	24
41Y8366	A4FS	S3700 200GB SATA 1.8" MLC Enterprise SSD	24

Part number	Feature code	Description	Maximum supported
1.8-inch solid state drives (SSDs) - Enterprise Value			
00AJ040	A4KV	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	24
00AJ045	A4KW	S3500 240GB SATA 1.8" MLC Enterprise Value SSD	24
00AJ050	A4KX	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	24
00W1222	A3TG	128GB SATA 1.8" MLC Enterprise Value SSD	24
00W1227	A3TH	256GB SATA 1.8" MLC Enterprise Value SSD	24
49Y5834	A3AQ	64GB SATA 1.8" MLC Enterprise Value SSD	24
49Y5993	A3AR	512GB SATA 1.8" MLC Enterprise Value SSD	24
2.5-inch solid state drives (SSDs) - Enterprise			
41Y8341	A4FQ	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8336	A4FN	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	16
41Y8331	A4FL	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	16
49Y6195	A4GH	1.6TB SAS 2.5" MLC HS Enterprise SSD	16
49Y6139	A3F0	800GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6134	A3EY	400GB SAS 2.5" MLC HS Enterprise SSD	16
49Y6129	A3EW	200GB SAS 2.5" MLC HS Enterprise SSD	16
00W1125	A3HR	100GB SATA 2.5" MLC HS Enterprise SSD	16
43W7718	A2FN	200GB SATA 2.5" MLC HS SSD	16
2.5-inch solid state drives (SSDs) - Enterprise Value			
00AJ000	A4KM	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ005	A4KN	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ010	A4KP	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	16
00AJ015	A4KQ	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5839	A3AS	64GB SATA 2.5" MLC HS Enterprise Value SSD	16
49Y5844	A3AU	512GB SATA 2.5" MLC HS Enterprise Value SSD	16
90Y8643	A2U3	256GB SATA 2.5" MLC HS Enterprise Value SSD	16
90Y8648	A2U4	128GB SATA 2.5" MLC HS Enterprise Value SSD	16
2.5-inch 15K SAS hot-swap HDDs			
00AJ300	A4VB	600GB 15K 6Gbps SAS 2.5" G2HS HDD	16
81Y9670	A283	300GB 15K 6Gbps SAS 2.5" SFF HS HDD	16
90Y8926	A2XB	146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	16
42D0677	5536	146GB 15K 6Gbps SAS 2.5" SFF Slim-HS HDD	16
2.5-inch 15K SAS hot-swap SEDs			
90Y8944	A2ZK	146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	16
44W2294	5412	146GB 15K 6Gbps SAS 2.5" SFF Slim-HS SED	16
81Y9662	A3EG	900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
2.5-inch 10K SAS hot-swap HDDs			
90Y8877	A2XC	300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
42D0637	5599	300GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	16
90Y8872	A2XD	600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	16
49Y2003	5433	600GB 10K 6Gbps SAS 2.5" SFF Slim-HS HDD	16

Part number	Feature code	Description	Maximum supported
81Y9650	A282	900GB 10K 6Gbps SAS 2.5" SFF HS HDD	16
00AD075	A48S	1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	16
2.5-inch 10K SAS hot-swap SEDs			
00AD085	A48T	1.2TB 10K 6Gbps SAS 2.5" G2HS SED	16
90Y8908	A3EF	600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
90Y8913	A2XF	300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	16
44W2264	5413	300GB 10K 6Gbps SAS 2.5" SFF Slim-HS SED	16
2.5-inch SAS-SSD hybrid drives			
00AD102	A4G7	600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	16
2.5-inch NL SAS hot-swap HDDs			
81Y9690	A1P3	1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	16
90Y8953	A2XE	500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	16
42D0707	5409	500GB 7200 6Gbps NL SAS 2.5" SFF Slim-HS HDD	16
2.5-inch NL SATA hot-swap HDDs			
81Y9730	A1AV	1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9722	A1NX	250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
81Y9726	A1NZ	500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	16
2.5-inch SATA hot-swap HDDs			
None*	5414	500GB 7200 SATA 2.5" SFF Slim-HS HDD	1

\* Available via special bid or configure-to-order (CTO) only

## Controllers for internal storage

The following table lists the RAID controllers, SAS HBAs and other options used for internal disk storage of x3690 X5 server.

Table 9. RAID controllers for internal storage

Part number	Feature code	Description	Maximum supported
60Y0309	4164	x3690 X5 RAID Expansion Adapter	1
46M0831	0095	ServeRAID M1015 SAS/SATA Controller	2
46M0916	3877	ServeRAID M5014 SAS/SATA Controller	4
46M0829	0093	ServeRAID M5015 SAS/SATA Controller	4
90Y4304	A2NF	ServeRAID M5016 SAS/SATA Controller	4
88Y5874	A39R	ServeRAID M5016 battery tray	2 (1 per pair of M5016)
46M0969	3889	ServeRAID B5015 SSD Controller	4
46M0930	5106	ServeRAID M5000 Series Advance Feature Key†	1 per one M5015 or M5014
81Y4426	A10C	ServeRAID M5000 Series Performance Accelerator Key†	1 per one M5015 or M5014
46M0912	3876	6Gb Performance Optimized HBA	3

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

The x3690 X5 RAID Expansion Adapter (also known as the ServeRAID Expansion Adapter or 4x4 Drive Backplane ServeRAID Expansion adapter) is a SAS expander that allows you to create RAID arrays of up to 16 drives and across up to four backplanes. You can use only the 2.5-inch hot-swap drive backplanes with this adapter. You can use the Expansion Adapter only with the following RAID controllers:

- ServeRAID M1015 SAS/SATA adapter
- ServeRAID M5014 SAS/SATA adapter
- ServeRAID M5015 SAS/SATA adapter
- ServeRAID M5016 SAS/SATA adapter

The Expansion Adapter must be installed in PCI Slot 1 and the ServeRAID adapter must be installed in PCI Slot 3.

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 SAS/SATA Controller has the following specifications:

- Two Mini-SAS internal connectors (SFF-8087)



- Eight internal 6 Gbps SAS/SATA ports
- 6 Gbps throughput per port
- 800 MHz dual-core PowerPC® processor
- Based on the 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 technology to protect data in cache in case of critical power or server failure
- Supports RAID levels 0, 1, 5, 6, 10, 50, and 60
- Connects to up to 128 SAS or SATA drives
- Intermix of SAS and SATA drives are supported, but the mixing of SAS and SATA drives in the same RAID array is not supported
- Supports up to 64 logical volumes
- Supports LUN sizes up to 64 TB
- Configurable stripe size up to 1 MB

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 Lenovo Press Product Guides in the RAID adapters category:  
<https://lenovopress.com/servers/options/raid>

## Internal backup drives

The server does not support an internal backup option.

## Optical drives

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

Table 10. Optical drives

Part number	Feature code	Description	Maximum supported	Standard models where used
46M0902	4163	UltraSlim Enhanced SATA Multi-Burner	1	All Hxx models

UltraSlim Enhanced SATA Multi-Burner (part number 46M0902) 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

UltraSlim Enhanced SATA Multi-Burner (part number 46M0902) 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 up to five PCI Express 2.0 slots through two riser slots. The slots available depend on the riser cards used. None of the slots are hot-swap. All slots are available regardless of whether one or two processors are installed.

Riser slot 1 can accept one of the riser cards listed in the following table, however, all standard models have the 2x8 riser card installed. This card provides the following PCIe 2.0 slots:

- Slot 1, PCIe 2.0 x8 full height, half length slot
- Slot 2, PCIe 2.0 x8 full height, half length slot

For CTO customers, the 2x8 riser can be replaced by another riser with one PCIe 2.0 x16 slot, either a full-length slot or a 3/4-length slot, as listed in the following table. Additional power for the adapter is available from an on-board power connector if needed. Note that you cannot install the full-length riser (60Y0337) if the memory mezzanine is installed.

Table 11. Riser cards for riser slot 1

Part number	Feature code	Description	Standard models where used
60Y0329	9285	System x3690 X5 PCI-Express (2x8) Riser Card (standard in all models)	All models
60Y0331	9282	System x3690 X5 PCI-Express (1x16) Riser Card-3/4 length	-
60Y0337	9283	System x3690 X5 PCI-Express (1x16) Riser Card- full length*	-

\* The 1x16 full-length riser cannot be used if the memory mezzanine is installed in the server.

Riser slot 2 has the 3x8 riser card installed in all standard models, except for model 7148-ARx. For model ARx, it can be ordered using 60Y0366. See the following table. This riser card has the following three slots:

- Slot 3, PCIe 2.0 x8 low profile adapter.
- Slot 4, PCIe 2.0 x4 low profile adapter (x8 mechanical).
- Slot 5, PCIe 2.0 x8 low profile adapter. The Emulex 10Gb Ethernet adapter is installed in this slot if the adapter is part of the server configuration.

The 3x8 riser card also contains two USB ports, one of which supports the use of an embedded hypervisor key with VMware ESXi installed on it. The other USB port is not used.

Table 12. Riser cards for riser slot 2

Part number	Feature code	Description	Standard models where used
60Y0366	9280	System x3690 X5 PCI-Express (3x8) Riser Card*	All models except ARx

\* Some ordering systems refer to this option as the PCIe x4 and x8 Adapter with 2 USB Ports

**Note:** Full-length adapters cannot be installed in any slots if the memory mezzanine is also installed. Instead, adapters up to 3/4 length are supported.

## Network adapters

The x3690 X5 offers two integrated Gigabit Ethernet ports, based on the Broadcom BCM5709C controller. The following table lists additional supported network adapters.

Table 13. Network adapters

Part number	Feature code	Description	Maximum supported
<b>40 Gb Ethernet</b>			
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for System x	4
<b>10 Gb Ethernet</b>			
49Y7910	A18Y	Broadcom NetXtreme II Dual Port 10GBaseT Adapter for System x	4
42C1820	1637	Brocade 10Gb CNA for System x	4
None	A148	Emulex 10GbE Integrated Virtual Fabric Adapter II for System x	1
49Y7950	A18Z	Emulex 10GbE Virtual Fabric Adapter II for System x	3*
49Y4274	5715	Emulex VFA II FCoE/iSCSI License for System x (Features on Demand upgrade for 49Y7950)	3*
95Y3751	A348	Emulex Dual Port VFAll Adapter & FCoE/iSCSI License for System x	3*
49Y7960	A2EC	Intel X520 Dual Port 10GbE SFP+ Adapter for System x	3
49Y7970	A2ED	Intel X540-T2 Dual Port 10GBaseT Adapter for System x	3
81Y9990	A1M4	Mellanox ConnectX-2 Dual Port 10GbE Adapter for System x	4
00D9690	A3PM	Mellanox ConnectX-3 10GbE Adapter for System x	4
42C1800	5751	QLogic 10Gb CNA for System x	4
47C9952	A47H	Solarflare SFN5162F MR Dual Port 10GbE SFP+ Adapter for System x	4
47C9960	A47J	Solarflare SFN6122F LL Dual Port 10GbE SFP+ Adapter for System x	4
<b>1 Gb Ethernet</b>			
90Y9370	A2V4	Broadcom NetXtreme I Dual Port GbE Adapter for System x	4
90Y9352	A2V3	Broadcom NetXtreme I Quad Port GbE Adapter for System x	4
49Y4230	5767	Intel Ethernet Dual Port Server Adapter I340-T2 for System x	4
49Y4240	5768	Intel Ethernet Quad Port Server Adapter I340-T4 for System x	4
42C1780	2995	NetXtreme II 1000 Express Dual Port Ethernet Adapter	4
None	1485	NetXtreme II 1000 Express G Ethernet Adapter- PCIe	4
49Y4220	5766	NetXtreme II 1000 Express Quad Port Ethernet Adapter	4
42C1750	2975	PRO/1000 PF Server Adapter	3
<b>InfiniBand</b>			
95Y3750	A2MY	Mellanox ConnectX-2 Dual-port QSFP QDR IB Adapter for System x	1
00D9550	A3PN	Mellanox ConnectX-3 FDR VPI IB/E Adapter for System x	4

\* Maximum of 3 if Emulex 10GbE Integrated Virtual Fabric Adapter II for System x (FC A148) is not installed, otherwise maximum of 2

For more information, see the list of Lenovo Press Product Guides in the Networking adapters category:  
<https://lenovopress.com/servers/options/ethernet>

## Storage host bus adapters

The following table lists storage HBAs supported by x3690 X5 server.

Table 14. Storage adapters

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

For more information, see the list of Lenovo Press Product Guides in the Host bus adapters category:  
<https://lenovopress.com/servers/options/hba>

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

Table 15. RAID controllers for external storage expansion enclosures

Part number	Feature code	Description	Maximum quantity supported
46M0830	0094	ServeRAID M5025 SAS/SATA Controller	4
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

## PCIe SSD adapters

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

Table 16. High IOPS SSD adapters

Part number	Feature code	Description	Maximum supported
46C9078	A3J3	365GB High IOPS MLC Mono Adapter	4
46C9081	A3J4	785GB High IOPS MLC Mono Adapter	4
46M0877	0096	160GB High IOPS SS Class SSD PCIe Adapter	4
46M0878	0097	320GB High IOPS SD Class SSD PCIe Adapter	2
46M0898	1649	320GB High IOPS MS Class SSD PCIe Adapter	4
90Y4377	A3DY	1.2TB High IOPS MLC Mono Adapter	4
90Y4397	A3DZ	2.4TB High IOPS MLC Duo Adapter	2
90Y4361	A3MZ*	300GB High IOPS MLC Modular Adapter	3
90Y4365	A3N0*	600GB High IOPS MLC Modular Adapter	3
90Y4369	A3N1*	800GB High IOPS MLC Modular Adapter	3
90Y4373	A3N2*	300GB High IOPS SLC Modular Adapter	3

\* MLC Modular Adapters 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?Indocid=SERV-IOMA>

For more information, see the list of Lenovo Press Product Guides in the PCIe SSD Adapters category: <https://lenovopress.com/servers/options/ssdadapter>

## Power supplies

The x3690 X5 power subsystem consists of up to four hot-pluggable 675W auto-sensing power supplies. The modules are independently powered by AC line cords. Most standard models have one or two power supplies as standard; workload-optimized models have all four standard. An AC power supply ships standard with one 2.8 m C13 - C14 power cord.

One power supply is sufficient when the total power budget is less than 675W. Use the System x and BladeCenter® Power Configurator to determine the power requirements of your configuration. The Power Configurator is available at:

<https://support.lenovo.com/us/en/documents/lnvo-pwrconf>

For power budgets under 675W, installing a second power supply provides redundancy. To install a second power supply, use the High Efficiency 675W Power Supply, part number 60Y0332. Installing four power supplies ensures redundancy even with a fully loaded server. To install the third and fourth power supplies, use the 675W Redundant Power Supply Kit, part number 60Y0327. The power subsystem is designed for N+N operation and hot-swap exchange. Having four power supplies installed allows for N+N redundancy, where N=2 (that is, a total of four power supplies where two are redundant backups for the other two). The following table lists the part numbers.

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 17. Power supplies

Part number	Feature code	Description	Maximum supported
60Y0332	4782	High Efficiency 675W Power Supply Use for x3690 X5 power supply 2 and MAX5 V1	1 (x3690 X5) 1 (MAX5 V1)
60Y0327	9279	675W Redundant Power Supply Kit Use for power supplies 3 and 4.	1

## Integrated virtualization

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

**Note:** The System x3690 X5 PCI-Express (3x8) Riser Card, part number 60Y0366, is required.

Table 18. Virtualization options

Part number	Feature code	Description	Maximum supported
41Y8298	A2G0	Blank USB Memory Key for VMware ESXi Downloads	1
41Y8296	A1NP	USB Memory Key for VMware ESXi 4.1 Update 1	1
41Y8300	A2VC	USB Memory Key for VMware ESXi 5.0	1
41Y8307	A383	USB Memory Key for VMware ESXi 5.0 Update1	1
41Y8311	A2R3	USB Memory Key for VMware ESXi 5.1	1
41Y8382	A4WZ	USB Memory Key for VMware ESXi 5.1 Update 1	1
41Y8385	A584	USB Memory Key for VMware ESXi 5.5	1



## Remote management

The server contains 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 Matrox G200eR2, 16 MB DDR2 SDRAM memory. Maximum graphic resolution is 1600x1200 at 75 Hz with 16 M colors.
- 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 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
- 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
- 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
- VMware vSphere 5.1

See the Lenovo Operating System Interoperability Guide for the latest information about the specific versions and service levels supported and any other prerequisites:

<http://lenovopress.com/osig>

## Physical and electrical specifications

### Dimensions:

- Height: 86 mm (3.5 inches, 2U)
- Depth: 698 mm (27.4 inches)
- Width: 429 mm (16.8 inches)

Maximum weight: 31.3 kg (69 lb) when fully configured

### Electrical:

- 100 to 127 (nominal) V ac; 50 Hz or 60 Hz; System 20A (10A/PS)
- 200 to 208 (nominal) V ac; 50 Hz or 60 Hz; System 10A
- 200 to 240 (nominal) V ac; 50 Hz 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 (1 power supply): 648 BTU/hr (190 watts)
- Ship configuration (2 power supplies): 802 BTU/hr (235 watts)
- Typical configuration: 3,753 BTU/hr (1100 watts)
- Full configuration (chassis/MAX5): 5115 BTU/hr (1498 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 are made in accordance with ISO 7779 and reported in conformance with ISO 9296.

## Warranty options

The system has a three-year warranty with 24x7 standard call center support and 9x5 Next Business Day onsite coverage. Also available are Lenovo Services 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.

Lenovo warranty service upgrade offerings are region-specific. Not all warranty service upgrades are available in every region. For more information about Lenovo warranty service upgrade offerings that are available in your region, go to the Data Center Advisor and Configurator website <http://dcsc.lenovo.com>, then do the following:

1. In the Customize a Model box in the middle of the page, select the **Services** option in the Customization Option dropdown menu
2. Enter in the machine type & model of the system
3. From the search results, you can click either **Deployment Services** or **Support Services** to view the offerings

The following table explains warranty service definitions in more detail.

Table 19. Warranty service definitions

Term	Description
On-site service	A service technician will arrive at the client's location for equipment service.
24x7x2 hour	A service technician is scheduled to arrive at the client's location within two hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
24x7x4 hour	A service technician is scheduled to arrive at the client's location within four hours after remote problem determination is completed. Lenovo provides service around the clock, every day, including Lenovo holidays.
9x5x4 hour	A service technician is scheduled to arrive at the client's location within four business hours after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday-Friday, excluding Lenovo holidays. For example, if a customer reports an incident at 3:00 pm on Friday, the technician will arrive by 10:00 am the following Monday.
9x5 next business day	A service technician is scheduled to arrive at the client's location on the business day after remote problem determination is completed. Lenovo provides service 8:00 am - 5:00 pm in the client's local time zone, Monday - Friday, excluding Lenovo holidays. Calls received after 4:00 pm local time require an extra business day for service dispatch. Next business day service is not guaranteed.
Committed Repair	Problems receive priority handling so that repairs are completed within the committed time of 6, 8, or 24 hours. Lenovo provides service 24 hours/day, every day, including Lenovo holidays.

The following Lenovo warranty service upgrades are available:

- Warranty and maintenance service upgrades:
  - Three, four, or five years of 9x5 or 24x7 service coverage
  - Onsite response from next business day to 2 or 4 hours
  - Committed repair service
  - Warranty extension of up to 5 years
  - Post warranty extensions
- Committed Repair Service  
 Committed Repair Services enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select countries.
  - Priority handling to meet defined time frames to restore the failing machine to good working condition
  - Committed repair service levels are measured within the following coverage hours:
    - 24x7x6: Service performed 24 hours per day, 7 days per week, within 6 hours
    - 24x7x8: Service performed 24 hours per day, 7 days per week, within 8 hours
    - 24x7x24: Service performed 24 hours per day, 7 days per week, within 24 hours
- Hard Disk Drive Retention  
 Lenovo's Hard Disk Drive Retention (HDDR) service is a multi-drive hard drive retention offering that ensures your data is always under your control, regardless of the number of hard drives that are installed in your Lenovo server. In the unlikely event of a hard drive failure, you retain possession of your hard drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The Hard Drive Retention service can be purchased in convenient bundles with our warranty upgrades and extensions.
- Microcode Support  
 Keeping microcode current helps prevent hardware failures and security exposure. There are two levels of service: analysis of the installed base and analysis and update where required. Offerings vary by region and can be bundled with other warranty upgrades and extensions.

- Remote Technical Support Services (RTS)  
RTS provides comprehensive technical call center support for covered servers, storage, operating systems, and applications. Providing a single source for support of hardware and software issues, RTS can reduce problem resolution time, decreasing the cost to address technical problems and increasing uptime. Offerings are available for Windows, Linux, IBM Systems Director, VMware, Microsoft business applications, and Lenovo System x storage devices, and IBM OEM storage devices.

## **Regulatory compliance**

The server conforms to the following international standards:

- 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
- Japan VCCI, Class A
- IEC-60950-1, 2nd edition (CB Certificate and CB Test Report)
- Australia and New Zealand C-Tick Mark CISPR 22, Class A
- Taiwan BSMI CNS13438, Class A and CNS14336
- China CCC (GB4943-2001), GB9254-2008 class A, GB17625.1-2003 (See note)
- Korea - MIC
- CE Mark (EN55022 Class A, EN60950, and EN55024)
- CISPR 22, Class A
- TUV-GS (EN60950-1:2001, 2nd edition)
- FCC - Verified to comply with Part 15 of the FCC Rules (Class A) prior to product delivery
- IEC-60950-1, 2nd edition (CB Certificate and CB Test Report)

## **Top-of-rack Ethernet switches**

The following table lists the Ethernet LAN switches that are offered by Lenovo.

Table 20. Ethernet LAN switches

Part number	Description
<b>1 Gb Ethernet Rack switches</b>	
7Y810011WW	Lenovo ThinkSystem NE0152T RackSwitch (Rear to Front)
7Z320011WW	Lenovo ThinkSystem NE0152TO RackSwitch (Rear to Front, ONIE)
7159BAX	Lenovo RackSwitch G7028 (Rear to Front)
7159CAX	Lenovo RackSwitch G7052 (Rear to Front)
7159G52	Lenovo RackSwitch G8052 (Rear to Front)
7165H1X	Juniper EX2300-C PoE Switch
7165H2X	Juniper EX2300-24p PoE Switch
<b>1 Gb Ethernet Campus switches</b>	
7Z340011WW	Lenovo CE0128TB Switch (3-Year Warranty)
7Z360011WW	Lenovo CE0128TB Switch (Limited Lifetime Warranty)
7Z340012WW	Lenovo CE0128PB Switch (3-Year Warranty)
7Z360012WW	Lenovo CE0128PB Switch (Limited Lifetime Warranty)
7Z350021WW	Lenovo CE0152TB Switch (3-Year Warranty)
7Z370021WW	Lenovo CE0152TB Switch (Limited Lifetime Warranty)
7Z350022WW	Lenovo CE0152PB Switch (3-Year Warranty)
7Z370022WW	Lenovo CE0152PB Switch (Limited Lifetime Warranty)
<b>10 Gb Ethernet switches</b>	
7159A1X	Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)
7159B1X	Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)
7Z330011WW	Lenovo ThinkSystem NE1064TO RackSwitch (Rear to Front, ONIE)
7159C1X	Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)
7159CRW	Lenovo RackSwitch G8272 (Rear to Front)
7159GR6	Lenovo RackSwitch G8296 (Rear to Front)
7159BR6	Lenovo RackSwitch G8124E (Rear to Front)
<b>25 Gb Ethernet switches</b>	
7159E1X	Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)
7Z210021WW	Lenovo ThinkSystem NE2572O RackSwitch (Rear to Front, ONIE)
7Z330021WW	Lenovo ThinkSystem NE2580O RackSwitch (Rear to Front, ONIE)
<b>100 Gb Ethernet switches</b>	
7159D1X	Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)
7Z210011WW	Lenovo ThinkSystem NE10032O RackSwitch (Rear to Front, ONIE)

For more information, see the list of Product Guides in the following switch categories:

- 1 Gb Ethernet switches: <http://lenovopress.com/networking/tor/1gb?rt=product-guide>
- 10 Gb Ethernet switches: <http://lenovopress.com/networking/tor/10gb?rt=product-guide>
- 25 Gb Ethernet switches: <http://lenovopress.com/networking/tor/25gb?rt=product-guide>
- 40 Gb Ethernet switches: <http://lenovopress.com/networking/tor/40gb?rt=product-guide>
- 100 Gb Ethernet switches: <https://lenovopress.com/networking/tor/100Gb?rt=product-guide>

## Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 21. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55943KT†	ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55943LT†	ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55946KT†	ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)
5594XKT†	ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)

† Only available in China and the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:

<https://lenovopress.com/servers/options/ups>

## Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 22. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
<b>0U Basic PDUs</b>															
00YJ776	ATZY	0U 36 C13/6 C19 24A 1 Phase PDU	N	Y	Y	N	N	N	N	N	N	Y	Y	Y	N
00YJ779	ATZX	0U 21 C13/12 C19 48A 3 Phase PDU	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
00YJ777	ATZZ	0U 36 C13/6 C19 32A 1 Phase PDU	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y
00YJ778	AU00	0U 21 C13/12 C19 32A 3 Phase PDU	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y
<b>0U Switched and Monitored PDUs</b>															
00YJ783	AU04	0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
00YJ781	AU03	0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU	N	N	Y	N	Y	N	Y	N	N	Y	Y	Y	N
00YJ782	AU02	0U 18 C13/6 C19 Switched and Monitored 32A 3 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
00YJ780	AU01	0U 20 C13/4 C19 Switched and Monitored 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
<b>1U Switched and Monitored PDUs</b>															
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77467	BLC4	1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU	N	N	N	N	N	N	N	N	N	Y	N	Y	N
4PU7A77469	BLC6	1U 12 C19/C13 switched and monitored 60A 3P Delta PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77468	BLC5	1U 12 C19/C13 switched and monitored 32A 3P WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
46M4002	5896	1U 9 C19/3 C13 Switched and Monitored DPI PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
46M4004	5894	1U 12 C13 Switched and Monitored DPI PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
46M4003	5897	1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
46M4005	5895	1U 12 C13 Switched and Monitored 60A 3 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)</b>															
71763NU	6051	Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH	N	N	Y	N	N	N	N	N	N	Y	Y	Y	N
71762NX	6091	Ultra Density Enterprise C19/C13 PDU Module	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U C13 Enterprise PDUs (12x IEC 320 C13 outlets)</b>															
39M2816	6030	DPI C13 Enterprise PDU Plus Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8941	6010	DPI C13 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U C19 Enterprise PDUs (6x IEC 320 C19 outlets)</b>															
39Y8948	6060	DPI C19 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8923	6061	DPI Three-phase 60A/208V C19 Enterprise PDU (US)	N	N	Y	N	N	N	Y	N	N	N	Y	Y	N
<b>1U Front-end PDUs (3x IEC 320 C19 outlets)</b>															
39Y8938	6002	DPI Single-phase 30A/120V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8939	6003	DPI Single-phase 30A/208V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8934	6005	DPI Single-phase 32A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y



Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
39Y8940	6004	DPI Single-phase 60A/208V Front-end PDU (US)	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
39Y8935	6006	DPI Single-phase 63A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>1U NEMA PDUs (6x NEMA 5-15R outlets)</b>															
39Y8905	5900	DPI 100-127V NEMA PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>Line cords for 1U PDUs that ship without a line cord</b>															
40K9611	6504	4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
40K9617	6505	4.3m, 32A/230V, Souriau UTG Female to AS/NZ 3112 (Aus/NZ) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9618	6506	4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

For more information, see the Lenovo Press documents in the PDU category:

<https://lenovopress.com/servers/options/pdu>

## Rack cabinets

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

Table 23. Rack cabinets

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

For more information, see the list of Lenovo Press Product Guides in the Rack cabinets and options category:

<https://lenovopress.com/servers/options/racks>

## Rack options

The x3690 X5 is a 2U-high device (1U is one rack unit and is 1.75 inches). The MAX5 memory expansion unit is an additional 1U high unit. Both are designed to be installed in standard 19-inch racks. Three slide kits are available for use with the x3690 X5, as listed in the following table. Cable management arms are optional but useful because they help prevent cables from becoming tangled and causing server downtime. Available cable management arms are also listed.

Table 24. Rail kit options and cable management arms

Part number	Feature code	Description	Use
Rail kits			
69Y2345	4786	System x3690 X5 Ball Bearing Slide Kit	Required if you plan to attach a MAX5 unit
None*	4178	Universal Slides Kit	Designed to fit telecommunications and short racks
None*	6457	Friction Slide	A low cost rail kit
Cable management arms			
69Y2346	6473	CMA for Ball Bearing and Universal Slides	Use with 69Y2345
69Y2344	6474	System x3690 X5 2U Cable Management Arm	Use with Universal Slides Kit
None*	6458	Friction CMA	Use with Friction Slide

\* Available via special bid or CTO only

## KVM console options

The following table lists the supported KVM consoles, keyboards, and KVM switches.

Table 25. Console keyboards

Part number	Description
Consoles	
17238BX	1U 18.5" Standard Console (without keyboard)
Console keyboards	
00MW310	Lenovo UltraNav Keyboard USB - US Eng
46W6713	Keyboard w/ Int. Pointing Device USB - Arabic 253 RoHS v2
46W6714	Keyboard w/ Int. Pointing Device USB - Belg/UK 120 RoHS v2
46W6715	Keyboard w/ Int. Pointing Device USB - Chinese/US 467 RoHS v2
46W6716	Keyboard w/ Int. Pointing Device USB - Czech 489 RoHS v2
46W6717	Keyboard w/ Int. Pointing Device USB - Danish 159 RoHS v2
46W6718	Keyboard w/ Int. Pointing Device USB - Dutch 143 RoHS v2
46W6719	Keyboard w/ Int. Pointing Device USB - French 189 RoHS v2
46W6720	Keyboard w/ Int. Pointing Device USB - Fr/Canada 445 RoHS v2
46W6721	Keyboard w/ Int. Pointing Device USB - German 129 RoHS v2
46W6722	Keyboard w/ Int. Pointing Device USB - Greek 219 RoHS v2
46W6723	Keyboard w/ Int. Pointing Device USB - Hebrew 212 RoHS v2
46W6724	Keyboard w/ Int. Pointing Device USB - Hungarian 208 RoHS v2

Part number	Description
46W6725	Keyboard w/ Int. Pointing Device USB - Italian 141 RoHS v2
46W6726	Keyboard w/ Int. Pointing Device USB - Japanese 194 RoHS v2
46W6727	Keyboard w/ Int. Pointing Device USB - Korean 413 RoHS v2
46W6728	Keyboard w/ Int. Pointing Device USB - LA Span 171 RoHS v2
46W6729	Keyboard w/ Int. Pointing Device USB - Norwegian 155 RoHS v2
46W6730	Keyboard w/ Int. Pointing Device USB - Polish 214 RoHS v2
46W6731	Keyboard w/ Int. Pointing Device USB - Portuguese 163 RoHS v2
46W6732	Keyboard w/ Int. Pointing Device USB - Russian 441 RoHS v2
46W6733	Keyboard w/ Int. Pointing Device USB - Slovak 245 RoHS v2
46W6734	Keyboard w/ Int. Pointing Device USB - Spanish 172 RoHS v2
46W6735	Keyboard w/ Int. Pointing Device USB - Swed/Finn 153 RoHS v2
46W6736	Keyboard w/ Int. Pointing Device USB - Swiss F/G 150 RoHS v2
46W6737	Keyboard w/ Int. Pointing Device USB - Thai 191 RoHS v2
46W6738	Keyboard w/ Int. Pointing Device USB - Turkish 179 RoHS v2
46W6739	Keyboard w/ Int. Pointing Device USB - UK Eng 166 RoHS v2
46W6740	Keyboard w/ Int. Pointing Device USB - US Euro 103P RoHS v2
46W6741	Keyboard w/ Int. Pointing Device USB - Slovenian 234 RoHS v2
Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Console switch cables	
43V6147	Single Cable USB Conversion Option (UCO)
39M2895	USB Conversion Option (4 Pack UCO)
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the KVM Switches and Consoles category:  
<http://lenovopress.com/servers/options/kvm>

## Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers, please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:

<https://www.lenovo.com/us/en/landingpage/lenovo-financial-services/>

## Related publications and links

For more information, see the following resources:

- System x3690 X5 Installation and User's Guide  
<http://ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5085206>
- System x3690 X5 Problem Determination and Service Guide  
<http://ibm.com/support/entry/portal/docdisplay?Indocid=MIGR-5085205>
- ServerProven hardware compatibility page for the x3690 X5  
[http://www.lenovo.com/us/en/serverproven/xseries\\_old/7147.shtml](http://www.lenovo.com/us/en/serverproven/xseries_old/7147.shtml)

## Related product families

Product families related to this document are the following:

- [4-Socket Rack Servers](#)
- [Mission Critical Servers](#)

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